

CHAPTER V. CAPITALIZATION.

Basis of statistics.—The statistics of capitalization of central electric light and power stations are confined to the par value of the authorized and outstanding preferred and common stock and bonds of commercial corporations, the par value of the bonds issued by municipalities to secure funds for the construction, purchase, or operation of the municipal stations, and the returns made on such capitalization in the form of dividends or interest. For 909 stations owned by individuals, private companies, or cooperative associations, which were not incorporated and had no stock, no statistics of capitalization could be reported. In addition, 21 companies which operated both electric light and power stations and electric railways reported their entire capitalization in connection with the inquiry on street railways; 9 stations, which are reported separately in the tables showing the number of companies, represent stations owned by corporations operating other stations which reported the capitalization of these 9 stations in the same or another state; while 7 companies did not report capitalization. In the cases of 254 municipal stations, bonds originally issued by the city to secure funds for their construction, purchase, or operation had been retired, and for this or other reasons no statistics of capitalization could be secured. Deducting these plants, there remain 2,516 commercial and 998 municipal stations for which statistics of capitalization are shown.

Increase since 1902.—A presentation of statistics as to the capital stock, funded debt, dividends, and interest on funded debt of all companies and municipal stations having outstanding investment securities is given for 1907 and 1902 in Table 57.

Although the number of municipal stations having outstanding bonds was relatively larger in 1907 than in 1902—constituting 28.4 per cent of the aggregate number of companies and municipal stations reporting capital stock or funded debt in 1907 compared with 24.3 per cent in 1902—the funded debt of the municipal stations constituted but 4 per cent of the total funded debt in 1907 as compared with 4.4 per cent in 1902. The aggregate amount of interest paid on funded debt was \$27,991,762 in 1907 and \$12,623,545 in 1902, the interest on the municipal bonds constituting 4.1 per cent of the former amount and 4 per cent of the latter amount. The funded debt of the municipal stations represented 1.9 per cent of the total capitalization outstanding in both 1907 and 1902.

TABLE 57.—*Capital stock, funded debt, dividends, and interest paid on funded debt of commercial companies, and funded debt and interest of municipal stations having bonds outstanding: 1907 and 1902.*

	1907	1902	Per cent of increase.
Number of commercial companies and municipal stations having outstanding capitalization.....	3,514	2,705	29.9
Commercial companies.....	12,516	2,049	22.8
Municipal stations reporting bonds outstanding.....	998	656	52.1
Total capitalization outstanding.....	\$1,367,338,836	\$639,125,363	113.9
Capital stock.....	741,317,497	372,951,952	98.8
Funded debt.....	626,021,339	266,173,411	135.2
Commercial companies:			
Total capitalization outstanding.....	1,341,995,182	627,515,875	113.9
Capital stock—			
Authorized, par value.....	900,092,160	435,178,372	106.8
Common.....	798,873,386	407,807,934	95.9
Preferred.....	101,218,774	27,370,438	269.8
Outstanding, par value.....	741,317,497	372,951,952	98.8
Common.....	666,003,772	349,080,281	90.8
Preferred.....	75,313,725	23,871,671	215.5
Dividends, amount.....	19,300,572	6,189,837	211.8
On common stock.....	16,883,812	5,660,341	203.6
On preferred stock.....	2,416,760	629,496	283.9
Funded debt—			
Authorized, amount.....	815,516,672	308,117,894	164.7
Outstanding, amount.....	600,677,685	254,563,923	136.0
Interest.....	26,842,330	12,118,740	121.5
Municipal stations:			
Funded debt—			
Authorized, amount.....	29,031,638	12,625,482	129.9
Outstanding, amount.....	25,343,654	11,609,488	118.3
Interest.....	1,149,432	504,805	127.7

¹ Exclusive of 37 companies (21 operating electric railways with capitalization included in report for street and electric railways; 9 duplications due to corporations reporting capitalization in one state and owning establishments in another state, which are reported separately in certain of the tables; and 7 not reporting capitalization for sundry reasons), but including 2 companies reporting bonds only, their capital stock not being separable from other interests.

Capitalization of commercial companies.—While the capitalization of the commercial companies shows a large increase from 1902 to 1907—the total outstanding capitalization increasing 113.9 per cent—this increase is in harmony with the growth in the production of electricity as indicated by the increase in kilowatt output for these stations, which was 141.1 per cent. Of the total outstanding capitalization of the commercial companies in 1907, 55.2 per cent represented capital stock compared with a corresponding percentage of 59.4 in 1902, and 44.8 per cent represented funded debt as compared with a corresponding percentage of 40.6 in 1902. That is, the proportion of the total capitalization represented by capital stock has been appreciably reduced, while that represented by funded debt has increased. This falling off in the relative importance of capital stock is confined to common stock, which formed 49.6 per cent of the total capitalization in 1907 compared with 55.6 per cent in 1902, while the proportion represented by preferred stock increased from 3.8 per cent of the total capitalization in 1902 to

5.6 per cent in 1907. The average outstanding capitalization per system increased in harmony with the general growth. For 1907 the average total capitalization per system was \$533,384 compared with \$306,255 in 1902, or a general average increase of 74.2 per cent. These averages represent an average amount of capital stock outstanding per system in 1907 of \$294,641 compared with \$182,017 in 1902, or an average increase of 61.9 per cent; and an average amount of funded debt in 1907 of \$238,743 compared with \$124,238 in 1902, or an average increase of 92.2 per cent.

The aggregate amount of funded debt shows an increase of 136 per cent compared with an increase of 98.8 per cent for capital stock. Though there was an increase of 215.5 per cent in the par value of preferred stock outstanding, the average increase for all stock is much smaller, owing to the lower rate of increase for common stock. The very satisfactory condition of the industry is evidenced by the increase in average dividend rates and the decrease in the average interest rate. The interest paid represents an average rate of 4.47 per cent on the total amount of outstanding funded debt in 1907 compared with an average rate of 4.76 per cent in 1902, and the dividends paid represent an average rate of 2.6 per cent in 1907 on the total amount of outstanding stock compared with an average rate of 1.66 per cent in 1902; while the total amount of dividends and interest paid in 1907 represents an average rate of 3.44 per cent on the total volume of outstanding securities, including both stocks and bonds, compared with an average rate of 2.92 per cent in 1902. The funded debt reported in 1907, however, includes \$9,270,800 upon which no interest was paid. Eliminating this debt the average rate of interest upon the funded debt of the commercial companies upon which interest was paid becomes 4.54 per cent, which is the same as the average rate of interest for the outstanding bonds of the municipal stations. The allied industries tend to confuse all the statistics for the central electric stations, but especially those relating to capitalization. They make it difficult to draw any conclusion for the industry as a whole in regard to the increase in capitalization as compared with the increase of equipment, expenses, and income. It is significant, however, that of the 2,049 commercial companies having outstanding capitalization in 1902, only 41 reported the payment of dividends on preferred stock and 561 the payment of dividends on common stock; while of the 2,516 companies having outstanding capitalization in 1907, there were 101 which paid dividends on preferred stock and 661 which paid dividends on common stock. The average rate of dividend on preferred stock for the companies which paid dividends on such stock in 1907 was 5.39 per cent and in 1902, 5.16 per cent. The average rate on common stock for companies which paid dividends on common stock in 1907 was 5.25 per cent and in 1902, 4.4 per cent.

In this connection a comparison of the average return on the capitalization of the central electric light and power stations with that for the other electrical industries which represent public utilities may be of interest. The following statement shows the average rate per cent which the interest paid on funded debt and dividends paid on capital stock represent on the total outstanding capitalization of the incorporated companies in the electric light and power, street and electric railway, and telegraph and telephone industries. It should be borne in mind, however, that these rates are computed on the total outstanding capitalization, including that upon which no dividends or interest were paid.

*Average rate of return on capitalization of incorporated companies:
1907 and 1902.*

INDUSTRY.	AVERAGE RATE, PER CENT.	
	1907	1902
Central electric light and power stations.....	3.44	2.92
Street and electric railways.....	3.34	3.32
Telegraph and telephone companies.....	4.46	5.23

The average rate of return on outstanding capitalization in 1902 was larger both for street and electric railways and for telegraph and telephone companies than for commercial companies operating central electric light and power stations, but in 1907 the latter class of companies reported a higher average rate than did the street and electric railways, though this rate was still exceeded by the average rate for the telegraph and telephone industries.

Capitalization of purely electric and composite companies.—The report for 1902 does not permit a comparative presentation to be made for the two censuses in respect to the capitalization of commercial companies classified according to the character of the business done, but in 1902, 1,302 of the 2,049 commercial companies having outstanding capitalization, or 63.5 per cent, were purely electric and 747, or 36.5 per cent, were composite. A further idea as to the probable distribution of the total capitalization between the two classes of companies in 1902 may be gained from the statistics in reference to interest, the interest payments of the purely electric companies amounting to \$8,767,252, or 72.3 per cent of the total interest paid on funded debt, while those of the composite companies amounted to \$3,351,488, or 27.7 per cent of the total interest on funded debt. From Table 58, which gives the distribution of capitalization between the purely electric and the composite companies in 1907, it will be seen that the capitalization of companies engaged exclusively in the generation and sale of electric current formed only 49.1 per cent of the total capitalization of all incorporated companies for which statistics were secured.

TABLE 58.—Purely electric and composite companies—Capital stock, funded debt, dividends, and interest: 1907.

	All companies.	Purely electric companies.	Composite companies.	PER CENT OF TOTAL.	
				Purely electric.	Composite.
Number of companies...	2,516	1,542	974	61.3	38.7
Total capitalization outstanding.....	\$1,341,995,182	\$659,206,602	\$682,788,580	49.1	50.9
Capital stock outstanding, par value.....	741,317,497	375,681,037	365,636,460	50.7	49.3
Common.....	666,003,772	348,191,966	317,811,806	52.3	47.7
Preferred.....	75,313,725	27,489,071	47,824,654	36.5	63.5
Dividends, amount.....	19,300,572	11,072,882	8,227,690	57.4	42.6
On common stock.....	16,883,812	10,312,935	6,570,877	61.1	38.9
On preferred stock.....	2,416,760	759,947	1,656,813	31.4	68.6
Funded debt outstanding, amount.....	600,677,685	283,525,565	317,152,120	47.2	52.8
Interest.....	26,842,330	12,290,086	14,546,244	45.8	54.2

The total capitalization is fairly well distributed between the two classes of companies, though the purely electric companies greatly outnumber the composite companies. It will be observed, however, that the composite companies reported nearly two-thirds of the preferred stock outstanding.

In Table 58 and all other tables containing statistics of capitalization the total capital stock and funded debt of each company are included, except where specially noted, but it is manifest that a considerable proportion of this capitalization is not properly chargeable to the central electric stations. All companies which reported the operation of an electric station in connection

with some other industry and which kept no distinctive capital account, furnished an estimate as to the proportion of the outstanding capitalization which was chargeable to the electric light and power department. These estimates ranged from 1 to 99 per cent, depending upon the relative importance of the electric portion of the business. By means of a computation based upon these estimates the sum of \$381,958,476 is obtained as the estimated par value of the capitalization represented by the electric portion of the business of the companies classified as composite. In addition, a small portion of the capitalization of the companies in the purely electric class, amounting to \$5,681,307, is, in like manner, chargeable to other than electric light and power interests, making the capitalization of this class of companies which is chargeable to electric stations \$653,525,295. By combining these two amounts, \$1,035,483,771 is obtained as the capitalization chargeable to the central electric light and power stations, instead of \$1,341,995,182, as shown in Table 58, the difference of \$306,511,411 being the estimated capitalization not chargeable to the electric stations, but representing industries carried on in connection with the electric light and power industry, such as gas and ice plants, waterworks, sawmills, steam heating, mines, quarries, etc. Table 59 shows for 1907 this distribution of capitalization and the dividends and interest chargeable, respectively, to the electric light and power industry and to the allied industries.

TABLE 59.—DISTRIBUTION OF CAPITALIZATION, DIVIDENDS, AND INTEREST BETWEEN THE ELECTRIC LIGHT AND POWER INDUSTRY AND ALLIED INDUSTRIES: 1907.

	Capitalization.	DIVIDENDS AND INTEREST.				PER CENT DISTRIBUTION.			
		Total.		Dividends.	Interest.	Capitalization.	Dividends and interest.		
		Amount.	Average rate, per cent.				Total.	Dividends.	Interest.
Total.....	\$1,341,995,182	\$46,142,902	3.44	\$19,300,572	\$26,842,330	100.0	100.0	100.0	100.0
Electric light and power industry.....	1,035,483,771	35,803,408	3.46	15,159,573	20,643,835	77.2	77.6	78.5	76.9
Purely electric companies.....	653,525,295	23,241,772	3.56	11,030,537	12,211,235	48.7	50.4	57.2	45.5
Composite companies, chargeable to electric light and power industry.....	381,958,476	12,561,636	3.29	4,129,036	8,432,600	28.5	27.2	21.4	31.4
Allied industries.....	306,511,411	10,339,494	3.37	4,140,999	6,198,495	22.8	22.4	21.5	23.1

¹ Includes \$5,681,307 reported for companies classified as purely electric, upon which dividends and interest amounting to \$127,196 were paid as follows: Dividends, \$42,345; interest, \$84,851.

Of the total capitalization, 77.2 per cent is chargeable to the electric light and power industry and 22.8 per cent to other interests. Although the returns on capitalization have been distributed for the reports on composite plants according to the estimated proportion of the outstanding capitalization chargeable to the electric light and power plant department, yet this is an assumption that may or may not be correct and undoubtedly will not hold good in many cases. In

some instances these allied industries may be conducted at a loss and the bond interest and dividends, if any, be paid from the profits of the electric plant; in others the electric plant may be operated at a loss and the interest and dividends be paid from the profits of the allied industries. The Census Bureau collected no statistics concerning profits on the year's business or the source of the money expended in the payment of interest or dividends.

Capitalization and cost of construction.—The capitalization reported does not include promissory notes and other temporary obligations, which in some instances amount to considerable sums. On the other hand, the stock and bonds were in some instances sold for less than the par value, and therefore the par value is correspondingly greater than the actual amount invested. There are also cases in which the market value of the stock is considerably in excess of the par value. In any event the capitalization as reported to the Census Bureau should not be accepted as representing the cash actually invested, as it by no means represents cost of physical equipment, etc., but includes earning capacity, good will, etc. In spite of this fact, however, the aggregate capitalization reported approximates very closely the amount reported as cost of plant. The 2,516 commercial companies reported \$1,027,182,892 as the cost of plant, which includes land, buildings, machinery, tools and implements, overhead and underground construction, lamps, motors, meters, transformers wired for use, and all supplies on hand. Although the total capitalization of these companies amounts to \$1,341,995,182, yet if the estimated amount chargeable to the allied interests, \$306,511,411, is deducted, the balance of \$1,035,483,771 chargeable to the electric light and power industry approximates very closely the amount reported as cost of plant, the difference being but eight-tenths of 1 per cent.

Many companies as they now exist are consolidations of other companies. In some instances a portion or all of the capitalization of the subsidiary companies has been retired, but frequently the entire capitalization of both the parent and subsidiary companies is included in the census reports. A portion of this capitalization is undoubtedly based on the earning capacity rather than on the actual value of the plant or the amount of cash invested. On the other hand, the application of earnings to new construction and betterments tends to lower the ratio of capitalization to cost of construction.

Analysis of dividends and interest.—The return on capital invested is, from a financial standpoint, the matter of chief interest in connection with capitalization and the most important statistics on this subject for 1907 are therefore assembled in Table 60.

Of the 2,516 incorporated companies having outstanding capitalization, 183, or 7.3 per cent, reported preferred stock, and 1,129, or 44.9 per cent, reported funded debt. In the aggregate, returns in the form of dividends or interest were made on a capitalization of \$957,741,023, or 71.4 per cent of the total amount outstanding, this comprising \$321,509,301 of common stock, or 48.3 per cent of the total common stock outstanding; \$44,824,837 of preferred stock, or 59.5 per cent of the total preferred stock outstanding; and \$591,406,885 of funded debt, this latter amount repre-

senting all of the funded debt, except \$9,270,800 upon which interest was not paid.

The very close correspondence between the average rates of dividends on dividend-paying common and preferred stocks is a noticeable feature. The average rate of dividends on the dividend-paying common stock was 5.25 per cent, and on the dividend-paying preferred stock 5.39 per cent. As already stated, the average rate of interest on funded debt on which interest was paid was 4.54 per cent.

TABLE 60.—*Analysis of dividends and interest: 1907.*

Number of companies	12,516
Common stock:	
Number of companies reporting	2,514
Number of companies declaring dividends	601
Amount outstanding, par value	\$666,003,772
Amount on which dividends were declared	\$321,509,301
Per cent dividend-paying stock forms of all common stock	48.3
Amount of dividends	\$16,883,812
Average rate of dividends on all common stock, per cent	5.24
Average rate of dividends on dividend-paying common stock, per cent	5.25
Preferred stock:	
Number of companies reporting	183
Number of companies declaring dividends	102
Amount outstanding, par value	\$75,313,725
Amount on which dividends were declared	\$44,824,837
Per cent dividend-paying stock forms of all preferred stock	59.5
Amount of dividends	\$2,416,760
Average rate of dividends on all preferred stock, per cent	3.21
Average rate of dividends on dividend-paying preferred stock, per cent	3.21
Funded debt:	
Number of companies reporting	1,129
Number of companies paying interest	1,078
Amount outstanding	\$600,677,685
Amount on which interest was paid	\$591,406,885
Amount of interest	\$26,842,330
Average rate of interest, per cent	4.54

¹ Including 2 companies reporting bonds only, their capital stock not being separable from other interests.

Table 61 shows the capitalization of the companies paying either dividends on stock or interest on funded debt and of those which made no return on capitalization.

TABLE 61.—*Capitalization—Amount, dividends, and interest for companies paying either dividends on stock or interest on funded debt, and amount for companies paying neither dividends nor interest: 1907.*

	COMPANIES REPORTING CAPITALIZATION.		
	Total.	Companies paying either dividends on stock or interest on funded debt.	Companies paying neither dividends on stock nor interest on funded debt.
Number of companies	12,516	1,496	1,020
Capitalization:			
Amount outstanding, par value	\$1,341,995,182	\$1,275,409,707	\$66,525,475
Amount of dividends and interest	\$46,142,902	\$46,142,902	.....
Average rate of dividends and interest, per cent	3.44	3.62	.....

¹ Exclusive of 37 companies (21 operating electric railways with capitalization included in report for street and electric railways; 9 duplications due to corporations reporting capitalization in one state and owning establishments in another state, which are reported separately in certain of the tables; and 7 not reporting capitalization for sundry reasons), but including 2 companies reporting bonds only, their capital stock not being separable from other interests.

The capitalization reported for the 1,496 companies paying either dividends on stock or interest on funded debt is the total capitalization of these companies, and it includes capitalization upon which no return was made. For example, some companies paid interest on

bonds, but did not pay dividends on either preferred or common stock, and other companies paid dividends on preferred stock, but not on their common stock. The total outstanding stock and bonds of both classes of companies is included in this table. In Tables 62 to 65, inclusive, the analysis is extended to the dividend-paying stocks, common and preferred, and to the funded debt.

It is to be noted that the amount of stocks or bonds reported as outstanding is the amount outstanding at the close of the year covered by the report, and includes in many cases stocks or bonds issued during the year, while on the other hand it does not include any bonds which may have been retired during the year and on which interest was paid. The average rate of return in the shape of dividends or interest has necessarily to be computed on the basis of the amount of stocks or bonds reported as outstanding and on a twelve-month basis; hence, to the extent that dividends or interest were paid on stock or bonds issued during the year and therefore not for a full year, and also to the extent that interest was paid on bonds retired during the year, the average rates per cent are affected, but this element of error is believed to be so small as not to affect the results appreciably.

The number of companies paying dividends on either or both classes of stock constituted 28.7 per cent of the total number, and the outstanding stock of these companies constituted 55.7 per cent of the total amount of stock outstanding. This of course includes the common stock of companies paying dividends on preferred stock only as well as the common stock upon which dividends were paid.

Comparing Table 60 with Table 62 it will be seen that there were 61 companies paying dividends on preferred stock but not on common stock, these companies

having \$46,755,484 of common stock outstanding. From Table 129, which gives a detailed summary by states, the average dividend rate for all common stock in the several states may be deduced. Of the states reported separately, Massachusetts has the highest average dividend rate on common stock, 8.23 per cent, followed by Rhode Island, with 5.41 per cent; Connecticut, with 4.9 per cent; and New Hampshire, with 4.81 per cent. In 1902, of the states reported separately, Massachusetts, Rhode Island, Connecticut, and West Virginia were the leading states in respect to the average rate of dividends on common stock, with 7.26, 5.6, 4.77, and 4.61 per cent, respectively. In 1907, 18 states showed an average dividend of less than 1 per cent on the total outstanding common stock, or no returns at all on this class of stock, as compared with 21 states in 1902.

TABLE 62.—Capital stock—Amount and dividends for companies paying dividends either on common or preferred stock, and amount for companies not paying dividends: 1907.

	COMPANIES REPORTING CAPITALIZATION.		
	Total.	Companies paying dividends on either common or preferred stock.	Companies paying dividends on neither common nor preferred stock.
Number of companies.....	2,514	722	1,792
Capital stock:			
Amount outstanding, par value...	\$741,317,497	\$413,089,622	\$328,227,875
Amount of dividends.....	\$19,300,572	\$19,300,572	.....
Average rate of dividends, per cent.	2.60	4.67	.....

A distribution or classification of the common stock of the companies paying dividends on common stock, according to rates of dividends, is of interest as showing the prevailing rate or rates. Such a classification is given in Table 63.

TABLE 63.—COMMON STOCK—AMOUNT AND DIVIDENDS FOR COMPANIES PAYING DIVIDENDS, GROUPED BY RATE OF DIVIDENDS, AND AMOUNT FOR COMPANIES NOT PAYING DIVIDENDS: 1907.

	Number of companies.	COMMON STOCK, PAR VALUE.						
		Authorized.		Outstanding.		Dividends.		
		Amount.	Per cent distribution.	Amount.	Per cent distribution.	Amount.	Per cent distribution.	Average rate, per cent.
Companies reporting common stock.....	2,514	\$798,873,386	100.0	\$666,003,772	100.0	\$16,883,812	100.0	2.54
Companies paying dividends on common stock.....	661	378,019,099	47.3	321,509,301	48.3	16,883,812	100.0	5.25
Rate of dividends:								
Less than 1 per cent.....	2	3,750,000	0.5	3,582,500	0.5	17,010	0.1	0.47
1 per cent but less than 2.....	16	14,235,000	1.8	14,101,400	2.1	171,290	1.0	1.21
2 per cent but less than 3.....	35	12,582,500	1.6	11,568,800	1.7	253,620	1.5	2.19
3 per cent but less than 4.....	48	38,372,000	4.8	24,816,630	3.7	731,059	4.3	2.95
4 per cent but less than 5.....	46	10,277,366	1.3	9,174,666	1.4	366,986	2.2	4.00
5 per cent but less than 6.....	98	96,341,950	12.1	75,694,700	11.4	2,846,735	16.9	3.76
6 per cent but less than 7.....	141	76,540,983	9.6	69,950,195	10.5	4,101,328	24.3	5.86
7 per cent but less than 8.....	26	60,942,300	7.6	55,310,185	8.3	2,853,152	16.9	5.16
8 per cent but less than 9.....	67	30,052,600	3.8	29,412,100	3.8	1,954,800	11.6	7.69
9 per cent but less than 10.....	7	1,060,000	0.1	1,026,575	0.2	62,415	0.5	9.00
10 per cent and over.....	175	33,864,400	4.2	30,871,550	4.6	3,495,417	20.7	11.32
Companies not paying dividends on common stock.....	1,853	420,854,287	52.7	344,494,471	51.7	.....	.....	.....

The companies paying dividends on common stock formed 26.3 per cent of the total number, and the out-

standing common stock of these companies formed 48.3 per cent of the total amount outstanding; that

is, nearly three-fourths of the companies paid no dividends at all upon their common stock, and no dividends were paid on more than one-half of the common stock outstanding.

The rate of dividends indicated for each group frequently is not paid on the entire amount of outstanding stock credited to the group. The stock reported as outstanding is the amount outstanding at the close of the year and includes any stock which may have been issued during the year, even near its close, and on which dividends were not paid, and also the total outstanding common stock of companies, although dividends were paid on a portion only of their common stock. The rates reported are such as were given in the schedules, except in a few cases where the amount of the dividend was reported and the rate omitted, in which case the rate was established in the office by its relation to the outstanding stock. It must be under-

stood, therefore, that the rate refers only to the amount of stock on which the dividends were declared, but the amount of this dividend stock was not reported. For these reasons, in several of the rate groups, the average rate computed from the amount of common stock outstanding and the amount paid in dividends on common stock falls short of the group rate.

A noticeable feature of this table is the relatively large number of companies paying dividends of 10 per cent or over, these companies constituting 26.5 per cent of the companies paying dividends on common stock. Next to this group the largest number of companies paying dividends on common stock is shown for the group with a rate of 6 per cent but less than 7, which also shows the largest amount disbursed as dividends on common stock of any group.

The preferred stock on which dividends were paid, distributed by rate groups, is shown in Table 64.

TABLE 64.—PREFERRED STOCK—AMOUNT AND DIVIDENDS FOR COMPANIES PAYING DIVIDENDS, GROUPED BY RATE OF DIVIDENDS, AND AMOUNT FOR COMPANIES NOT PAYING DIVIDENDS: 1907.

	Number of companies.	PREFERRED STOCK, PAR VALUE.						
		Authorized.		Outstanding.		Dividends.		
		Amount.	Per cent distribution.	Amount.	Per cent distribution.	Amount.	Per cent distribution.	Average rate, per cent.
Companies reporting preferred stock.....	183	\$101,218,774	100.0	\$75,313,725	100.0	\$2,416,760	100.0	3.21
Companies paying dividends on preferred stock.....	101	61,664,274	60.9	44,824,837	59.5	2,416,760	100.0	5.39
Rate of dividends:								
1 per cent but less than 2.....	1	200,000	0.2	110,833	0.1	1,663	0.1	1.50
2 per cent but less than 3.....	2	1,044,000	1.0	244,000	0.3	5,880	0.2	2.41
3 per cent but less than 4.....	6	368,900	0.4	368,900	0.5	11,067	0.5	3.00
4 per cent but less than 5.....	27	24,280,500	24.0	19,418,600	25.8	938,379	38.8	4.83
5 per cent but less than 6.....	50	34,474,674	34.1	23,432,304	31.1	1,369,845	56.7	5.85
6 per cent but less than 7.....	10	1,013,700	1.0	967,700	1.3	67,739	2.8	7.00
7 per cent but less than 8.....	5	282,500	0.3	282,500	0.4	22,187	0.9	7.85
8 per cent and over.....								
Companies not paying dividends on preferred stock.....	82	39,554,500	39.1	30,488,888	40.5			

The companies paying dividends on preferred stock formed 55.2 per cent of the total number having preferred stock, and the preferred stock of these companies constituted 59.5 per cent of the total amount of preferred stock outstanding. Of the companies paying dividends, those reporting a rate of 6 per cent but less than 7 are most numerous and reported the major portion of the dividends paid on preferred stock.

Table 65 shows the number of companies reporting funded debt at the census of 1907, the amount of debt, both authorized and outstanding, and the amount of interest paid. It also distinguishes between the companies that did and did not pay interest.

The amount shown as interest on funded debt is not the total interest chargeable for the year on the total outstanding debt. It is common practice to charge all or a part of the interest to the plant account while construction is going on, and hence in such cases the total amount of interest on funded debt does not appear in the income account from which the census figures of interest on funded debt are taken, but only that portion of it which is charged against income. There were other conditions also which operated in

certain cases to prevent the showing of interest on funded debt in the statistics, such as the use of bonds as collateral for floating debt and the waiver of the payment of interest by special agreement, not to mention the defaulting of interest. There were 51 companies with funded debt outstanding which for various reasons did not show any interest charge in the income account. The companies reporting funded debt formed 44.9 per cent of the total number, and interest was paid upon all but 1.5 per cent of the total amount outstanding.

TABLE 65.—Funded debt—Amount and interest for companies paying interest and amount for companies not paying interest: 1907.

	COMPANIES REPORTING FUNDED DEBT.		
	All companies.	Companies paying interest.	Companies not paying interest.
Number of companies.....	1,129	1,078	51
Funded debt:			
Amount authorized.....	\$815,516,672	\$788,113,672	\$27,403,000
Amount outstanding.....	\$600,677,685	\$591,406,885	\$9,270,800
Amount of interest.....	\$26,842,330	\$26,842,330	
Average rate of interest, per cent.....	4.47	4.54	

In Table 66 the companies having funded debt are classified according to the rate of interest on their bonds. In cases where companies had bond issues bearing different rates of interest, they are classified according to the average rate paid on the whole debt.

TABLE 66.—Companies reporting funded debt, grouped by rate of interest: 1907.

	COMPANIES REPORTING FUNDED DEBT.	
	Number.	Per cent distribution.
Companies reporting funded debt.....	1,129	100.0
Companies paying interest on funded debt.....	1,078	95.5
Rate of interest:		
Less than 4 per cent.....	11	1.0
4 per cent but less than 5.....	63	5.8
5 per cent but less than 6.....	638	59.2
6 per cent but less than 7.....	334	31.0
7 per cent but less than 8.....	23	2.1
8 per cent and over.....	9	0.8
Companies not paying interest on funded debt.....	51	4.5

panies organized since 1902 are comparatively small, and while some large companies have been organized to construct new plants, most of them have been formed by the reorganization and consolidation of companies that were in existence in 1902. These reorganizations are made for the avowed purpose of effecting economies that are not possible in the small companies. This being the case, it would be expected that the larger companies would secure greater profit on the year's business, which in turn would be reflected in a larger rate of dividends on the capital stock. While the census classification of companies according to size on the basis of dynamo capacity is not a perfect classification for the purpose indicated, it is of interest, and the statistics are presented in Table 67.

Of the total number of companies in 1907, 162, or 6.4 per cent, purchased current and hence form a class by themselves. The capitalization of these companies represented 5.5 per cent of the total capitalization, and averaged \$456,017 per company, compared with an average of \$538,709 per company for the 2,354 companies equipped with dynamos and generating current.

Capitalization statistics of companies, classified according to dynamo capacity.—A large majority of the com-

TABLE 67.—CAPITALIZATION STATISTICS OF COMMERCIAL COMPANIES, CLASSIFIED ACCORDING TO DYNAMO CAPACITY OF STATIONS: 1907.

DYNAMO CAPACITY OF STATIONS IN KILOWATTS.	CAPITALIZATION.				CAPITAL STOCK.			
	Number of companies reporting.	Amount.	Dividends and interest.		Number of companies reporting.	Amount.	Dividends.	
			Amount.	Average rate, per cent.			Amount.	Average rate, per cent.
Total.....	1,2516	\$1,341,995,182	\$46,142,902	3.44	2,514	\$741,317,497	\$19,300,572	2.60
Under 200.....	1,281	50,680,027	1,258,055	2.48	1,279	39,710,805	719,029	1.81
200 but under 500.....	534	64,807,465	1,509,489	2.33	534	42,440,338	506,033	1.19
500 but under 1,000.....	207	60,606,542	1,881,907	3.11	207	35,003,975	604,544	1.73
1,000 but under 2,000.....	150	129,337,257	3,866,422	2.99	150	73,524,091	1,447,998	1.84
2,000 but under 5,000.....	109	210,387,010	7,069,033	3.36	109	122,263,210	3,263,396	2.67
5,000 and over.....	73	752,302,191	27,818,119	3.70	73	384,844,788	11,658,581	3.03
Companies without generating equipment.....	162	73,874,690	2,739,877	3.71	162	38,530,290	1,100,091	2.86

DYNAMO CAPACITY OF STATIONS IN KILOWATTS.	CAPITAL STOCK—continued.								FUNDED DEBT.			
	Common.				Preferred.				Number of companies reporting.	Amount.	Interest.	
	Number of companies reporting.	Amount.	Dividends.		Number of companies reporting.	Amount.	Dividends.				Amount.	Average rate, per cent.
Total.....			2,514	\$666,003,772			\$16,883,812	2.54	183	\$75,313,725			$2,416,760	3.21	1,129	$600,677,685	$26,842,330	4.47
Under 200.....	1,279	38,757,905	694,358	1.79	43	952,900	25,571	2.68	374	10,969,222	538,126	4.01
200 but under 500.....	534	40,169,155	470,434	1.17	35	2,271,183	35,599	1.57	290	22,367,127	1,003,456	4.49
500 but under 1,000.....	207	32,571,675	538,129	1.65	25	2,432,300	66,415	2.73	148	25,602,567	1,277,363	4.99
1,000 but under 2,000.....	150	71,831,091	1,224,350	1.70	28	6,693,000	223,648	3.34	116	50,813,166	2,418,424	4.76
2,000 but under 5,000.....	109	112,158,110	3,037,456	2.71	21	10,105,100	225,940	2.24	86	38,123,800	3,806,637	4.32
5,000 and over.....	73	336,915,946	9,961,494	2.96	26	47,928,842	1,697,087	3.54	68	367,457,403	16,159,538	4.40
Companies without generating equipment.....	162	33,599,890	957,591	2.85	5	4,930,400	142,500	2.89	47	35,344,400	1,639,786	4.64

¹ Including 2 companies reporting bonds only, their capital stock not being separable from other interests.

The group of small companies, those operating stations with a dynamo capacity of less than 200 kilowatts, constituted 50.9 per cent of the total number, but their capitalization formed but 3.8 per cent of the total capitalization and averaged but \$39,563 per company. On the other hand, the companies operating stations with a capacity of 5,000 kilowatts or over constituted only 2.9 per cent of the total number, but represented 56.1 per cent of the total capitalization, with an average of \$10,305,509 per company. It should be remembered that the amounts of common stock, preferred stock, and funded debt shown for the several groups are the total amounts outstanding and include nondividend-paying stocks and noninterest-paying bonds as well as those upon which dividends or interest was paid. For this reason, the average rates per cent, as given, do not represent the average rates per cent for stocks upon which dividends were paid or for funded debt upon which interest was paid, but the average return in the form of dividends or interest on the total amounts of stock or funded debt outstanding, respectively. In most cases the average rate of return is better for companies operating stations with a high dynamo capacity than for those operating stations with a low capacity, though the rule does not hold in all cases.

Table 68 shows the per cent distribution of the number of companies reporting, capitalization, and dividends and interest for the several groups, and the average capitalization per company for each group.

TABLE 68.—Per cent distribution, by dynamo capacity, of number of companies, capitalization, and dividends and interest, and average capitalization per company: 1907.

KILOWATT CAPACITY OF DYNAMOS.	PER CENT DISTRIBUTION.			Average capitalization per company.
	All companies.	Capitalization.	Dividends and interest.	
Total.....	100.0	100.0	100.0	\$533,384
Under 200.....	50.9	3.8	2.7	39,563
200 but under 500.....	21.2	4.8	3.3	121,362
500 but under 1,000.....	8.2	4.5	4.1	292,785
1,000 but under 2,000.....	6.0	9.6	8.4	862,248
2,000 but under 5,000.....	4.3	15.7	15.3	1,930,156
5,000 and over.....	2.9	56.1	60.3	10,305,509
Companies without generating equipment.....	6.4	5.5	5.9	456,017

The analysis of the statistics might be carried to the point of ascertaining the earnings of the incorporated companies, classified according to dynamo capacity and the relation the earnings bear to the capitalization for the several groups. But any deductions in regard to earnings that might be drawn from these returns are apt to be misleading.¹ The amounts disbursed in the form of interest and dividends by the different groups of companies can be used, how-

¹ See p. 87, Ch. VII.

ever, in lieu of earnings, as a basis of comparison, and these disbursements for groups of companies will give results which will approximate comparisons of earnings. Hence the fact that the average rate per cent of dividends and interest combined, as well as the average rate per cent of dividends on common stock, as given in Table 67, shows a general tendency to increase with dynamo capacity, can be taken as an indication of the relative increase in the rate of earnings accompanying increase in capitalization. It will be noted also in this connection that the rate of interest on funded debt shows no such increase, but in fact is smaller for the highest group than for the lowest.

As a general rule, increase in capitalization is accompanied by an increase in the proportion of the capitalization represented by both preferred stock and funded debt, with a decrease in the proportion of the capitalization represented by common stock—that is, the larger the capitalization the larger the percentage thereof represented by preferred stock and by funded debt, and the smaller the percentage represented by common stock. Although the application of this rule to individual companies or to small groups of companies would show exceptions, yet it holds good when the companies are grouped on lines broad enough to eliminate minor variations, as shown by the following tabular statement:

Average capitalization per company and per cent distribution of capitalization for groups of companies, classified according to dynamo capacity: 1907.

	All companies.	COMPANIES WITH A DYNAMO CAPACITY OF—			
		Under 200 kilowatts.	200 but under 1,000 kilowatts.	1,000 but under 5,000 kilowatts.	5,000 kilowatts and over.
Average capitalization per company.....	\$538,709	\$39,563	\$169,250	\$1,311,677	\$10,305,509
Per cent distribution: Capitalization.....	100.0	100.0	100.0	100.0	100.0
Capital stock.....	55.4	78.4	61.8	59.1	51.2
Common stock.....	49.9	76.5	58.0	54.2	44.8
Preferred stock.....	5.5	1.9	3.8	4.9	6.4
Funded debt.....	44.6	21.6	38.2	40.9	48.8

The above statement is confined to the companies having generating equipment. It will be seen that the percentage which common stock forms of the total capitalization decreases uninterruptedly from 76.5 per cent for the lowest group, companies operating stations with a capacity of less than 200 kilowatts, to 44.8 per cent for the highest group, companies operating stations with a capacity of 5,000 kilowatts and over; while the percentage for preferred stock increases uninterruptedly from 1.9 per cent to 6.4 per cent for the successive groups, and the percentage for funded debt from 21.6 per cent to 48.8 per cent.

Municipal stations.—The increase in the number of municipal stations is naturally accompanied by an increase in the municipal bonds issued on account of these stations.

TABLE 69.—*Municipal stations—Funded debt and interest: 1907 and 1902.*

	1907	1902	Per cent of increase.
Number of stations.....	1,252	815	53.6
Reporting bonds outstanding.....	998	656	52.1
Reporting no bonds outstanding.....	254	159	59.7
Funded debt:			
Amount authorized.....	\$29,031,638	\$12,625,482	129.9
Amount outstanding.....	\$25,343,654	\$11,609,488	118.3
Amount of interest.....	\$1,149,432	\$504,805	127.7
Average rate of interest, per cent.....	4.54	4.35	.....

As a general rule, the rate of interest on the bonds of municipalities is lower than on those of private enterprises, and in 1902 the average rate on municipal bonds issued against light and power stations was 4.35 per cent, compared with a corresponding rate of 4.76 per cent for incorporated commercial companies. But the bond rate for commercial companies shows a lower average in 1907 than in 1902, while a slight increase is shown in the rate for municipal bonds, so that, as before noted, the average rate of interest on the net amount of funded debt of the commercial companies upon which interest was paid in 1907 was the same as that for municipal bonds, 4.54 per cent.

The municipal stations reporting bonds outstanding in 1907 represented 79.7 per cent of the total number compared with 80.5 per cent in 1902, and the outstanding bonds represented 87.3 per cent of the amount authorized in 1907 compared with 92 per cent in 1902. The average amount of bonded indebtedness per station has increased materially, being \$25,394 per station in 1907 compared with \$17,697 in 1902.

The bonded debt of the composite municipal stations formed 57.4 per cent of the total for municipal stations, and the average rate of interest was 4.8 per cent, compared with an average rate of 4.18 per cent for the purely electric municipal stations.

TABLE 70.—*Municipal stations—Funded debt and interest for purely electric and composite stations: 1907.*

	MUNICIPAL STATIONS.				
	Total number.	Purely electric.	Composite.	Per cent of total.	
				Purely electric.	Composite.
Number of stations....	1,252	521	731	41.6	58.4
Number reporting bonds outstanding....	998	410	588	41.1	58.9
Funded debt:					
Amount outstanding.....	\$25,343,654	\$10,799,693	\$14,543,961	42.6	57.4
Amount of interest.....	\$1,149,432	\$451,776	\$697,656	39.3	60.7
Average rate of interest, per cent....	4.54	4.18	4.80	.....	.....

In making the reports for municipal stations carrying on business of a composite character, an estimate was given of the proportionate part of the bonded investments chargeable to the electric light and power industry, as was done with respect to capital investments in the case of the commercial companies, and although these estimates are in most cases only approximations and do not represent book values, yet they afford a basis for arriving at a general estimate of the amount of municipal bonds and interest paid thereon represented by the electric light and power industry. Table 71 accordingly shows the estimated amount of bonds chargeable to the electric light and power industry and to the allied industries, respectively.

TABLE 71.—*Municipal stations—Distribution of funded debt and interest between the electric light and power industry and allied industries: 1907.*

	BONDS OUTSTANDING.		INTEREST.	
	Amount.	Per cent distribution.	Amount.	Average rate, per cent.
Total.....	\$25,343,654	100.0	\$1,149,432	4.54
Electric light and power industry....	20,479,798	80.8	911,190	4.45
Purely electric stations.....	10,697,093	42.2	446,883	4.18
Composite stations.....	9,782,705	38.6	464,307	4.75
Allied industries.....	4,863,856	19.2	238,242	4.90

¹Includes \$102,600 reported for companies classified as purely electric, upon which interest amounting to \$4,893 was paid.

CHAPTER VI.

COST OF CONSTRUCTION AND EQUIPMENT.

General discussion.—The schedule used in the census of 1902 called for a separate statement as to the cost of land; buildings; machinery, tools, and implements within stations; overhead electric-service construction; underground electric-service construction; lamps, motors, meters, and transformers, wired for use; supplies of every description on hand; and miscellaneous equipment. The object of these inquiries was to ascertain the total cost of the plant and equipment, as represented by the total amount expended for the original construction and for all subsequent extensions, additions, and repairs to the same. It was presumed that the electric companies kept an account of this kind, but a majority contended that it was impossible to report the cost in such detail, and many asserted that they had no data from which

even the total cost of the plant and equipment to date could be estimated with a fair degree of accuracy. Moreover, a considerable number of the electric stations have changed ownership during recent years, and the purchase price often has little relation to the actual cost of the plant, and in fact seldom, if ever, represents this cost. The transfer is frequently made through the exchange of stock or by some other arrangement, whereby it is impossible to ascertain the money equivalent. In view of these conditions, the attempt to ascertain the cost of construction in such detail was abandoned in 1907, but in an effort to preserve the comparative value of the statistics, the total cost of the plant and equipment to date and the cost of construction during the census year were requested.

TABLE 72.—COMMERCIAL AND MUNICIPAL CENTRAL ELECTRIC STATIONS—TOTAL COST OF PLANTS AND EQUIPMENT; AVERAGE COST PER KILOWATT CAPACITY OF DYNAMOS AND PER HORSEPOWER CAPACITY OF ENGINES AND WATER WHEELS; AND COST OF CONSTRUCTION DURING THE CENSUS YEAR: 1907 AND 1902.

	TOTAL.		COMMERCIAL.		MUNICIPAL.	
	1907	1902	1907	1902	1907	1902
Total cost of plants and equipment.....	\$1,096,913,622	\$504,740,352	\$1,054,034,175	\$482,719,879	\$42,879,447	\$22,020,473
Total kilowatt capacity of dynamos.....	2,709,225	1,212,235	2,500,209	1,098,855	209,016	113,380
Average cost per kilowatt capacity of dynamos.....	\$405	\$416	\$422	\$439	\$205	\$194
Total horsepower capacity of engines and water wheels.....	4,098,188	1,845,048	3,776,837	1,685,020	321,351	160,028
Average cost per horsepower capacity of engines and water wheels.....	\$268	\$274	\$279	\$286	\$133	\$138
Cost of construction during the census year.....	\$100,912,573	\$41,792,447	\$95,746,208	\$40,050,613	\$5,166,365	\$1,741,834

The total cost of all central stations up to the end of the census year 1907 as compared with that similarly reported for 1902 showed an increase of \$592,173,270, or 117.3 per cent. In the same period the total cost reported for the commercial stations, which in 1907 represented 96.1 per cent of the total cost of all stations, and in 1902, 95.6 per cent, increased 118.4 per cent. The corresponding increase for the municipal stations was 94.7 per cent. The average cost of plant and equipment reported for all stations in 1907 was \$232,693; for commercial stations, \$304,458; and for municipal stations, \$34,249. In 1902 the corresponding averages were \$139,431, \$172,093, and \$27,019, respectively.

Many and varying factors enter into the cost of plants and equipment. Sites and rights, which in one instance may cost but little, in another may be very expensive. The installation and equipment of a station designed and prepared to supply current to a large city or thickly settled community, is quite unlike

that of a station transmitting electricity considerable distances and selling in bulk to but few customers. These conflicting elements are encountered in any attempt to arrive at an average cost per station or per kilowatt capacity of dynamo. In endeavoring to arrive at an average cost per dynamo capacity there is always the uncertainty as to the extent of the installation of surplus dynamos, which frequently do not, in a true sense, represent the capacity of the plant, but merely a reserve to be brought into use in case of a breakdown, need for repairs, etc. The decrease in the average cost per horsepower in both commercial and municipal stations and in average cost per kilowatt capacity of dynamos for commercial stations, may be influenced by the fact that in anticipation of future demands upon them, plants have in recent years been constructed with a more general excess of both primary power and dynamo capacity.

In but 1 state, Utah, was the total cost of plants and equipment reported less in 1907 than in 1902, and

in this instance the decrease was due to the fact that one of the largest of the central stations in the state for which statistics were secured in 1902 has since that date been combined with an electric railway, so that in 1907 it was included with the latter branch of the industry.

There were 7 states each of which reported in 1907 a total cost of plants and equipment of more than \$40,000,000. These states, together with the amounts thus reported and the corresponding totals for 1902, are shown in Table 73.

TABLE 73.—Total cost of plants and equipment for states each of which in 1907 reported a total of more than \$40,000,000: 1907 and 1902.

STATE.	TOTAL COST OF PLANTS AND EQUIPMENT.	
	1907	1902
Total for United States.....	\$1,096,913,622	\$504,740,352
Total for 7 selected states.....	677,617,993	341,831,031
New York.....	252,731,789	112,998,778
California.....	111,780,551	36,547,474
Illinois.....	88,142,233	38,329,275
Pennsylvania.....	73,907,749	41,579,338
New Jersey.....	65,219,445	58,432,502
Massachusetts.....	43,279,226	29,562,267
Ohio.....	42,557,000	26,381,397

At both censuses the totals for these 7 states formed approximately the same proportion of the corresponding totals for the entire United States, somewhat less than two-thirds in 1907 and slightly more than two-thirds in 1902.

Some of the most notable increases in the state totals in the cost of construction are shown in Table 74.

TABLE 74.—Notable increases in the total cost of construction for 20 selected states in 1907 over the amount reported in 1902.

STATE.	TOTAL COST OF PLANTS AND EQUIPMENT.		Actual increase.	Per cent of increase.
	1907	1902		
Total for United States.....	\$1,096,913,622	\$504,740,352	\$592,173,270	117.3
Total for 20 selected states.....	853,914,225	358,809,493	495,104,732	138.0
Alabama.....	7,293,876	908,895	6,384,981	702.5
California.....	111,780,551	36,547,474	75,233,077	205.9
Colorado.....	23,126,179	8,665,826	14,460,353	166.9
Georgia.....	7,354,286	1,252,578	6,101,708	487.1
Illinois.....	88,142,233	38,329,275	49,812,958	130.0
Indiana.....	25,680,710	6,706,510	18,974,200	282.9
Maryland.....	21,274,959	7,157,986	14,116,973	197.2
Massachusetts.....	43,279,226	29,562,267	13,716,959	46.4
Michigan.....	37,001,060	11,559,169	25,441,891	220.1
Minnesota.....	24,138,081	9,236,505	14,901,576	161.3
Missouri.....	33,865,760	15,679,872	18,185,888	116.0
Montana.....	17,950,677	4,740,807	13,209,870	278.6
Nevada.....	4,299,631	301,785	3,997,846	1,324.7
New York.....	252,731,789	112,998,778	139,733,011	123.7
Ohio.....	42,557,000	26,381,397	16,175,603	61.3
Oklahoma.....	7,130,864	597,516	6,533,348	1,093.4
Pennsylvania.....	73,907,749	41,579,338	32,328,411	77.8
South Carolina.....	8,803,382	2,442,989	6,360,393	260.4
South Dakota.....	2,806,363	623,504	2,182,859	350.1
Washington.....	20,789,849	3,537,022	17,252,827	487.8

The total cost of construction for these 20 states formed more than three-fourths of the total for the

United States in 1907 and only a little less than three-fourths in 1902; the corresponding amount of increase for these states was nearly seven-eighths of the total increase for the country.

For reasons already stated, the cost of the plants as reported to the Census Bureau does not represent the actual cost of installing a central station nor indicate the actual relative costs of stations equipped with water power as compared with those equipped with steam power. The reported cost does, however, give an approximate idea of the cost of construction, and the classification of the total cost reported according to the primary power used in the stations gives additional indication of the relative importance of the different classes of power. This classification is made in Tables 75 and 76.

In comparing the statistics for the different kinds of primary power for 1902 with those for 1907, it should be remembered that stations which in 1902 were operated by either steam or water power might, because of the extension of the service, or for other reasons, find the original power inadequate and by the addition of power of another character, be thrown into a different group in 1907. The extent of these changes is, however, a matter of great uncertainty.

The stations using steam exclusively as primary power in 1907 reported 57.7 per cent of the total cost of plants and equipment for all central stations, and if to this is added the cost of the stations which are practically steam plants but have minor power of some other kind, the proportion reported by stations using steam would be 64.4 per cent. But even this large percentage does not fully represent the cost of the steam equipment, since there is also a large amount represented by the plants in the class using water and steam. The remainder, with the exception of about one-half of 1 per cent of the total cost contributed by the plants equipped with gas as the primary power, represents the cost of plants using water power, or without primary-power equipment. In 1907 the plants using water exclusively reported 11.6 per cent of the total cost, and those equipped with water with other minor power, 2.8 per cent. Thus 14.4 per cent of the total cost was represented by this kind of power, exclusive of the portion represented by stations in the group "water and steam."

In 1907 the North Central states had about three-sevenths of the total number of stations, but the cost of plants and equipment reported for that division was only a little more than one-fourth of the total for all central stations; the North Atlantic division, on the other hand, with about one-half as many stations, reported somewhat less than twice the amount for cost of plants and equipment. The Western division was third, with a little less than one-fifth of the total cost, while the South Atlantic and South Central divisions each reported about one-twentieth.

CENTRAL ELECTRIC LIGHT AND POWER STATIONS.

TABLE 75.—COMMERCIAL AND MUNICIPAL CENTRAL ELECTRIC STATIONS—TOTAL COST OF PLANTS AND EQUIPMENT, BY KIND OF PRIMARY POWER: 1907 AND 1902.

KIND OF POWER.	Cen- sus.	TOTAL.		COMMERCIAL.		MUNICIPAL.	
		Number of stations.	Cost of plants and equipment.	Number of stations.	Cost of plants and equipment.	Number of stations.	Cost of plants and equipment.
Total	1907 1902	4,714 3,620	\$1,090,913,622 504,740,352	3,462 2,805	\$1,054,034,175 482,719,879	1,252 815	\$42,879,447 22,020,473
Steam exclusively	1907 1902	3,262 2,747	633,050,959 325,912,662	2,199 2,008	598,742,435 306,232,439	1,063 739	34,308,524 19,680,223
Steam with other minor power	1907 1902	93 43	73,016,313 48,904,865	80 41	72,200,226 48,831,365	13 2	756,087 73,500
Water exclusively	1907 1902	474 315	127,722,346 38,387,077	413 281	124,318,422 37,319,076	61 34	3,408,924 1,068,001
Water with other minor power	1907 1902	61 20	30,900,788 14,879,731	59 19	30,836,527 14,854,719	2 1	64,261 25,012
Water and steam	1907 1902	360 275	176,837,370 65,670,174	337 266	174,697,251 65,179,991	23 9	2,140,119 490,183
Gas exclusively	1907 1902	180 51	4,634,303 2,600,377	137 38	4,040,379 2,499,534	43 13	593,924 100,843
Stations without primary-power equipment	1907 1902	284 169	50,751,543 8,385,466	237 152	49,138,935 7,802,755	47 17	1,612,608 582,711

TABLE 76.—COMMERCIAL AND MUNICIPAL CENTRAL ELECTRIC STATIONS—COST OF PLANTS AND EQUIPMENT, BY KIND OF PRIMARY POWER USED AND BY GEOGRAPHIC DIVISIONS: 1907 AND 1902.

DIVISION.	Cen- sus.	Num- ber of sta- tions.	Total.	Steam exclusively.	Steam with other minor power.	Water exclusively.	Water with other minor power.	Water and steam.	Gas exclusively.	Stations without primary- power equipment.
United States	1907 1902	4,714 3,620	\$1,090,913,622 504,740,352	\$633,050,959 325,912,662	\$73,016,313 48,904,865	\$127,722,346 38,387,077	\$30,900,788 14,879,731	\$176,837,370 65,670,174	\$4,634,303 2,600,377	\$50,751,543 8,385,466
North Atlantic	1907 1902	1,070 913	484,441,333 266,548,738	287,302,016 161,398,717	61,814,755 42,101,267	52,219,507 6,975,989	3,331,165 13,752,012	45,882,261 36,565,192	2,712,242 2,144,121	31,179,387 3,611,443
South Atlantic	1907 1902	390 251	58,513,594 19,462,480	40,779,550 16,406,853	370,000	7,472,369 2,041,027	4,787,410 597,972	4,464,121 207,100	69,578 51,800	570,566 157,728
North Central	1907 1902	2,095 1,706	290,238,111 127,495,351	211,879,432 109,632,429	9,657,530 1,275,982	17,606,655 3,744,421	9,670,351 108,077	31,790,294 11,786,737	1,237,379 324,667	8,396,420 623,038
South Central	1907 1902	679 404	59,366,131 22,328,727	53,047,895 21,885,209	837,028 15,190	325,905 234,551	.....	3,381,268 109,510	435,645 23,414	438,390 60,853
Western	1907 1902	480 346	204,354,453 68,905,056	39,142,016 16,589,454	337,000 5,512,426	50,097,910 25,391,092	13,111,862 421,670	91,319,426 17,001,635	179,469 56,375	10,166,780 3,932,404

The cost of plants having steam as the primary power developed most rapidly in the North Atlantic and North Central divisions and least rapidly in the Western division. Measured by the cost of construction, the North Atlantic, Western, and North Central divisions represented the highest development of water power, as did the North Atlantic of stations equipped with gas as the primary power.

The remarkable increase in the cost of plants and equipment reported for stations which are not equipped with primary power was altogether disproportionate to the increase in their number. The use of water power and the ability to deliver the electric energy at long distances from the generating plant, and at a low cost, have brought about a great change in

the installation of power machines and dynamos in central electric stations. New stations have been built without such equipment, sometimes not only purchasing the current but selling the same in bulk to other stations by means of long-transmission lines. Many stations originally equipped with generating apparatus have had such apparatus removed because it has been found to be more economical to purchase current than to generate it. The largest increases for stations not equipped with primary power were in the North Atlantic, North Central, and Western divisions.

In 1902 the cost of construction by character of ownership was not reported, hence comparative figures are not available. These figures, however, are shown for 1907 in Table 77.

TABLE 77.—Total cost of plants and equipment, by character of ownership: 1907.

CHARACTER OF OWNERSHIP.	Total cost of plants and equipment.	Per cent distribution.
Total.....	\$1,096,913,622	100.0
Individual.....	6,574,920	0.6
Firm.....	4,019,813	0.4
Incorporated company ¹	1,043,439,442	95.1
Municipal.....	42,879,447	3.9

¹ Includes 2 establishments classed under the head "All other forms of ownership," in order that the operations of individual establishments may not be disclosed.

This table shows the importance of corporate ownership and the comparative insignificance of all the other forms of ownership so far as they relate to the cost of electric stations. The total cost of construc-

tion for the municipal stations was slightly less than 4 per cent of the total, while that for individuals and firms combined was but 1 per cent.

During the census year 1907, \$100,912,573 was expended for new stations and for additions and extensions to those already in existence. This amount represented an increase of \$59,120,126, or 141.5 per cent, over the amount reported as similarly expended during 1902. For the commercial stations the increase amounted to \$55,695,595, or 139.1 per cent, and for the municipal stations to \$3,424,531, or 196.6 per cent. The total cost of new construction reported for 1907, classified by kind of primary power used in the respective stations, is shown by geographic divisions in Table 78.

TABLE 78.—COMMERCIAL AND MUNICIPAL CENTRAL ELECTRIC STATIONS—COST OF CONSTRUCTION DURING THE YEAR, BY KIND OF PRIMARY POWER USED AND BY GEOGRAPHIC DIVISIONS: 1907.

DIVISION.	Number of stations.	Total.	Steam exclusively.	Steam with other minor power.	Water exclusively.	Water with other minor power.	Water and steam.	Gas exclusively.	Stations without primary-power equipment.
United States.....	4,714	\$100,912,573	\$54,505,377	\$4,413,308	\$8,715,446	\$3,532,877	\$13,776,002	\$643,331	\$15,326,232
North Atlantic.....	1,070	41,989,031	20,462,608	3,613,408	1,872,932	122,145	4,060,573	233,018	11,624,347
South Atlantic.....	390	7,023,710	5,014,384	30,855	496,615	1,287,936	126,857	2,281	64,782
North Central.....	2,095	28,091,301	19,652,627	610,849	1,999,692	1,392,634	2,753,211	207,627	1,474,661
South Central.....	679	5,216,238	4,784,711	133,195	20,953	.....	108,725	145,961	22,692
Western.....	480	18,592,293	4,591,047	25,000	4,325,254	730,162	6,726,636	54,444	2,139,750

The cost of construction during the year was distributed among the several geographic divisions in much the same relative proportions as was the total cost of plants and equipment reported, and the same is true also of the expenditures reported during the year upon the stations in most of the different groups, by kind of power used. The Western division, however, for the stations using water exclusively shows a much larger proportion of the total cost of construction during the year for this kind of power than of the total cost of plants and equipment to date for the same kind of power, while the reverse is true for the stations of the Western division which use water as the primary power but have minor power of some other kind.

In 7 states and territories there was a decrease in the total cost of new construction during the census year in 1907 as compared with 1902, namely: Arizona, Iowa, Maine, Massachusetts, Nevada, New Hampshire, and Rhode Island. In each case the decline was due to decreased expenditures on the commercial plants.

In 2 other states—Arkansas and Florida—decreases in the cost of new construction for the commercial plants were more than offset by increases in the amounts expended by municipal stations, so that the totals for the two branches of the industry showed increases.

In 3 states—Delaware, Kentucky, and West Virginia—a decrease was reported for municipal plants, although in each instance the amount was small.

The statistics for some of the states in which the largest amounts were expended by commercial stations on new construction during 1907 are shown in Table 79.

The figures for commercial stations show that the greatest expenditure in new construction during 1907 for plants using steam power occurred in the state of New York, Illinois ranking second in this respect. The greatest amounts for new construction in connection with plants using water power exclusively and for those using both water and steam power were expended in California.

CENTRAL ELECTRIC LIGHT AND POWER STATIONS.

TABLE 79.—COMMERCIAL CENTRAL ELECTRIC STATIONS—COST OF CONSTRUCTION DURING THE YEAR FOR SELECTED STATES, BY GEOGRAPHIC DIVISIONS AND KIND OF PRIMARY POWER: 1907.

	Total.	Steam exclusively.	Steam with other minor power.	Water exclusively.	Water with other minor power.	Water and steam.	Gas exclusively.	Stations without primary power equipment.
Total for commercial stations.....	\$95,746,208	\$50,540,907	\$4,268,353	\$8,261,987	\$3,532,027	\$13,566,719	\$541,003	\$15,035,212
Total for selected states.....	75,892,395	39,637,792	3,761,152	5,801,188	1,657,524	11,043,859	315,223	13,675,657
North Atlantic division:								
Massachusetts.....	4,613,916	3,975,826	90,369	19,194	776	469,416	296	58,039
New Jersey.....	3,834,018	504,827	3,297,519	4,980	7,075	3,025	900	15,692
New York.....	23,403,555	9,688,551	17,595	1,353,133	24,132	1,119,484	26,873	11,173,787
Pennsylvania.....	6,686,401	5,110,074	13,190	164,141	349	1,053,874	120,024	219,749
South Atlantic division:								
Maryland.....	2,914,439	2,871,056	21,969	500	4,476	8,838	.....	7,000
North Central division:								
Illinois.....	7,900,051	7,578,177	46,510	1,514	180,245	40,026	4,400	49,179
Michigan.....	3,761,219	1,103,413	59,844	193,070	1,146,159	997,270	20,500	240,963
Minnesota.....	2,632,701	264,729	12,044	1,549,551	.....	785,583	7,414	13,380
Ohio.....	3,572,162	3,475,463	47,892	.....	1,200	17,717	28,911	979
South Central division:								
Texas.....	1,616,022	1,362,268	129,220	.....	.....	39,723	84,361	450
Western division:								
California.....	8,849,652	1,876,787	20,000	1,014,801	1,200	4,851,493	.....	185,371
Colorado.....	2,005,800	1,582,290	.....	339,790	26,996	26,121	20,744	9,859
Oregon.....	1,657,903	129,205	.....	116,951	.....	1,389,400	800	21,487
Washington.....	2,444,556	114,466	.....	143,563	204,916	241,889	.....	1,679,722

There were 96 stations reported as under construction during the year 1907, which were not in actual operation before the close of the year. These stations properly form a part of the new construction, but the statistics for them are shown separately from those for the plants that were in operation during a portion or all of the year. In presenting these statistics it should be understood that although an earnest effort was made to obtain accurate information, both through the special agents in the field and by correspondence, the canvass was not so careful and thorough for this class of stations as for those in operation; some may therefore have been overlooked.

TABLE 80.—Number of stations under construction, December 31, 1907, by character of ownership and by geographic divisions.

DIVISION.	Aggregate.	STATIONS WHICH REPORTED COST TO DATE.					STATIONS WHICH DID NOT REPORT COST TO DATE.		
		Total.	Individual.	Firm.	Incorporated company.	Municipal.	Total.	Incorporated company.	Municipal.
United States.....	96	86	11	7	54	14	10	9	1
North Atlantic.....	21	18	3	1	14	.....	3	3	.....
South Atlantic.....	19	17	.....	.....	10	7	2	1	1
North Central.....	24	23	4	4	10	5	1	1	.....
South Central.....	12	12	3	1	6	2	.....	.....	.....
Western.....	20	16	1	1	14	.....	4	4	.....

Of the 96 stations under construction, 86 reported the amount expended on them to December 31, 1907, and 10 claimed to be unable to answer the inquiry. The number of stations is divided among the several geographic divisions in a manner which clearly indicates that, although the expenditure for construction and the capitalization may vary largely in the geographic divisions, the construction of new stations, regardless of size, is confined to no special section, but is general throughout the country.

TABLE 81.—Cost of construction and equipment of stations under construction, December 31, 1907, and capitalization of the incorporated companies, by character of ownership and by geographic divisions.

DIVISION AND CHARACTER OF OWNERSHIP.	Number of stations.	Cost of construction and equipment to December 31, 1907. ¹	Authorized capitalization of the incorporated companies.
United States.....	96	\$28,413,013	\$155,615,400
Individual.....	11	70,750	.....
Firm.....	7	60,904	.....
Incorporated company.....	63	25,925,028	155,615,400
Municipal.....	15	3,256,341	.....
North Atlantic.....	21	1,788,223	7,570,000
Individual.....	3	26,050	.....
Firm.....	1	2,000	.....
Incorporated company.....	17	1,760,183	7,570,000
South Atlantic.....	19	7,758,175	29,775,000
Incorporated company.....	11	7,610,634	29,775,000
Municipal.....	8	147,541	.....
North Central.....	24	5,197,828	9,632,000
Individual.....	4	26,400	.....
Firm.....	4	16,904	.....
Incorporated company.....	11	2,087,724	9,632,000
Municipal.....	5	3,066,800	.....
South Central.....	12	245,535	880,400
Individual.....	3	12,500	.....
Firm.....	1	12,000	.....
Incorporated company.....	6	179,035	880,400
Municipal.....	2	42,000	.....
Western.....	20	13,423,252	107,778,000
Individual.....	1	5,800	.....
Firm.....	1	30,000	.....
Incorporated company.....	18	13,387,452	107,778,000

¹ Ten of the 96 stations failed to report the cost of construction.

Combining the cost of the stations that were under construction at the close of the year and the cost of the new equipment, extensions, etc., of operating stations gives a total of \$129,325,586 as the total cost of new work during 1907. Incorporated companies owned the majority of the new stations, and their authorized capitalization, which amounted to \$155,615,400, is presented merely as some indication of the magnitude

of the new enterprises that were in progress or projected but had not been completed by December 31, 1907.

TABLE 82.—Cost of construction and equipment of stations under construction, December 31, 1907, and capitalization of the incorporated companies, by kind of power used and by geographic divisions.

DIVISION AND KIND OF POWER.	Number of stations.	Cost of construction and equipment to December 31, 1907. ¹	Authorized capitalization of the incorporated companies.
United States	96	\$28,413,013	\$155,615,400
Water ²	44	27,500,716	153,654,000
Steam.....	39	790,172	1,636,000
Gas.....	10	46,204	75,400
No power equipment.....	3	75,921	250,000
North Atlantic	21	1,788,223	7,570,000
Water ²	13	1,583,830	6,779,000
Steam.....	4	135,922	541,000
Gas.....	2	5,800	25,000
No power equipment.....	2	62,671	225,000
South Atlantic.....	19	7,758,175	29,775,000
Water.....	9	7,572,134	29,730,000
Steam.....	10	186,041	45,000
North Central.....	24	5,197,828	9,632,000
Water.....	5	5,016,000	9,350,000
Steam.....	13	144,824	232,000
Gas.....	6	37,004	50,000
South Central.....	12	245,535	860,400
Water.....	1	15,000	125,000
Steam.....	9	227,135	735,000
Gas.....	2	3,400	400
Western.....	20	13,423,252	107,778,000
Water.....	16	13,313,752	107,670,000
Steam.....	3	96,250	83,000
No power equipment.....	1	13,250	25,000

¹Ten of the 96 stations failed to report the cost of construction.

²Includes 2 stations having steam power also.

The bulk of the expenditure for new construction was reported for stations to be operated by water power, 96.8 per cent of the total being for plants of

that character, and although classed as electric stations there is little doubt that many of them are being built primarily for the generation of electrical energy which, by means of transmission lines, will be delivered in bulk to other places from which it will be distributed for actual use. The percentages reported for the remaining stations by character of primary power were as follows: Steam, 2.8 per cent; gas, two-tenths of 1 per cent; and those not to be supplied with power equipment, three-tenths of 1 per cent.

Of the 63 incorporated companies, 9 did not report the cost of construction. The Western division reported 48.4 per cent of the total cost for water-power stations under construction. The South Atlantic division was second in the construction of water-power stations, with 27.5 per cent of the total cost of construction; the North Central, third, with 18.2 per cent; the North Atlantic, fourth, with 5.8 per cent; and the South Central last, with one-tenth of 1 per cent of the total cost of construction for stations which were to use water power.

The following statement shows the character of ownership of the stations under construction, by kind of power:

Stations under construction, December 31, 1907—Number of stations, by kind of power and by character of ownership.

CHARACTER OF OWNERSHIP.	Total.	Water. ¹	Steam.	Gas.	No power equipment.
Total	96	44	39	10	3
Individual.....	11	4	4	3	.....
Firm.....	7	2	3	2	.....
Corporation.....	63	37	18	5	3
Municipal.....	15	1	14	.....	.....

¹Includes 2 stations having steam power also.

CHAPTER VII.

INCOME AND EXPENSES.

Purpose of the statistics.—The object in view in securing these statistics concerning income and expenses was to show the magnitude of the industry and to bring out certain of its important features. No attempt was made to secure figures from which the profits or losses on the year's business might be determined, as it was well understood that conclusions on this point could not properly be drawn from information which failed to take into consideration bad debts, discounts, depreciation, and perhaps other important matters of a similar character. As has already been explained, a small part of the income as given in this report does not represent cash receipts or actual receipts of any character, since in the case of municipal plants the estimated value of the current furnished for the municipality was classed as income, and similar estimates were made by the commercial stations for the value of the current supplied as free service.

In 1902 there were 380 commercial stations which furnished some service or paid a cash compensation in the character of a tax to the municipalities in which they were located. The value of the free service was estimated at \$150,809 and the cash compensation was \$199,423, making a total of \$350,232. In 1907 the inquiry as to compensation for franchise was abandoned, and in its stead the estimated value of current furnished free was called for. For the year last

named, 727 commercial companies reported free service, the value of which was estimated at \$337,810. If to this amount is added the estimated value of the current furnished by the municipal stations for the use of the municipality, \$5,672,785, a total of \$6,010,595 was classed as income which does not represent actual receipts.

GENERAL STATISTICS OF INCOME.

Although most of the income, 96.6 per cent, was derived from the sale of current, a small proportion, 3.4 per cent, was obtained from the sale of supplies and fixtures and from sundry miscellaneous sources. So far as possible, the income from the sale of supplies and fixtures was omitted from the reports, and is included only when such sales were so involved with the general business of the station that they could not be satisfactorily segregated. The income from miscellaneous sources includes such items as income from steam heating, pumping, steam or water power, rentals of machines, etc., wiring of houses and work of a kindred character, interest on deposits, etc. The details pertaining to income will be taken up in the tables which follow.

The chief items of income for commercial and municipal stations are shown in Table 83.

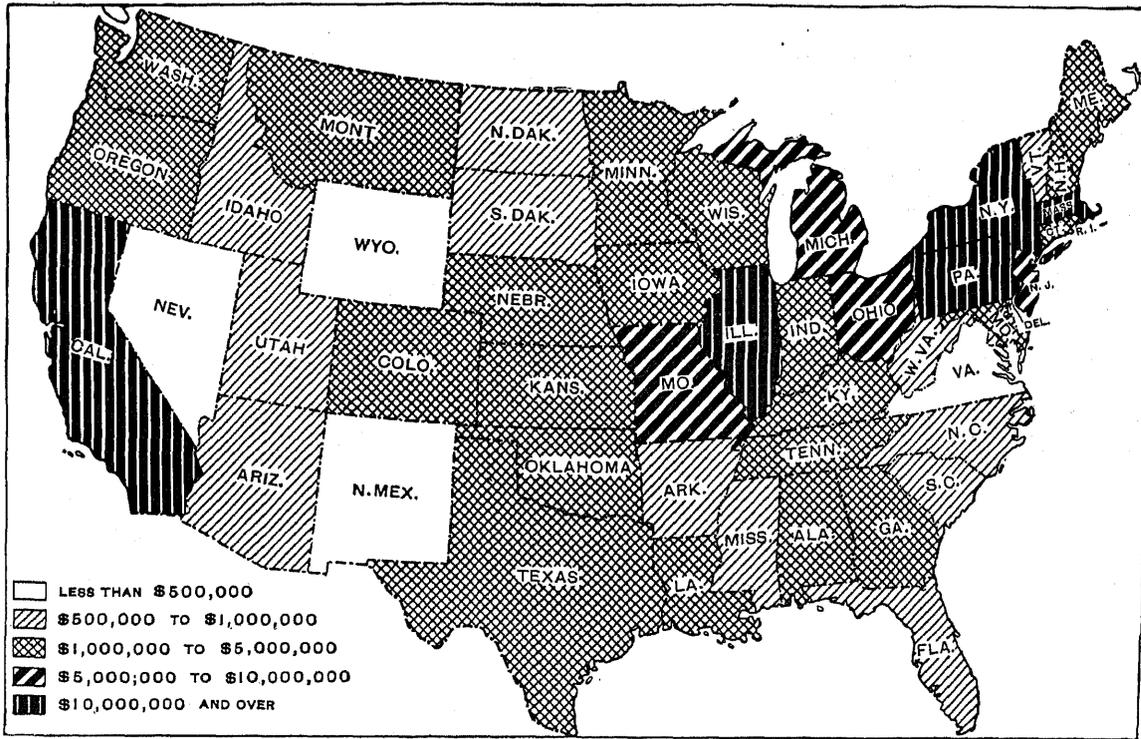
TABLE 83.—COMMERCIAL AND MUNICIPAL CENTRAL ELECTRIC STATIONS—GROSS INCOME: 1907 AND 1902.

	Census.	Total.	Commercial.	Municipal.	PER CENT OF TOTAL.		PER CENT OF INCREASE.		
					Commer- cial.	Municipal.	Total.	Commer- cial.	Municipal.
Number of stations.....	1907 1902	4,714 3,620	3,462 2,805	1,252 815	73.4 77.5	26.6 22.5	30.2	23.4	53.6
Gross income.....	1907 1902	\$175,642,338 85,700,605	\$161,630,339 78,735,500	\$14,011,999 6,965,105	92.0 91.9	8.0 8.1	105.0	105.3	101.2
Electric service.....	1907 1902	169,614,691 84,186,605	156,000,257 77,349,749	13,614,434 6,836,856	92.0 91.9	8.0 8.1	101.5	101.7	99.1
Lighting.....	1907 1902	125,755,114 70,138,147	112,714,851 63,389,284	13,040,263 6,748,863	89.6 90.4	10.4 9.6	79.3	77.8	93.2
Stationary motors.....	1907 1902	28,511,550 9,910,217	27,995,177 9,839,677	516,373 70,540	98.2 99.3	1.8 0.7	187.7	184.5	632.0
All other.....	1907 1902	15,345,027 4,138,241	15,290,229 4,120,788	57,798 17,453	99.6 99.6	0.4 0.4	270.9	271.1	231.2
All other sources.....	1907 1902	6,027,647 1,514,000	5,630,082 1,385,751	397,565 128,249	93.4 91.5	6.6 8.5	298.1	306.3	210.0

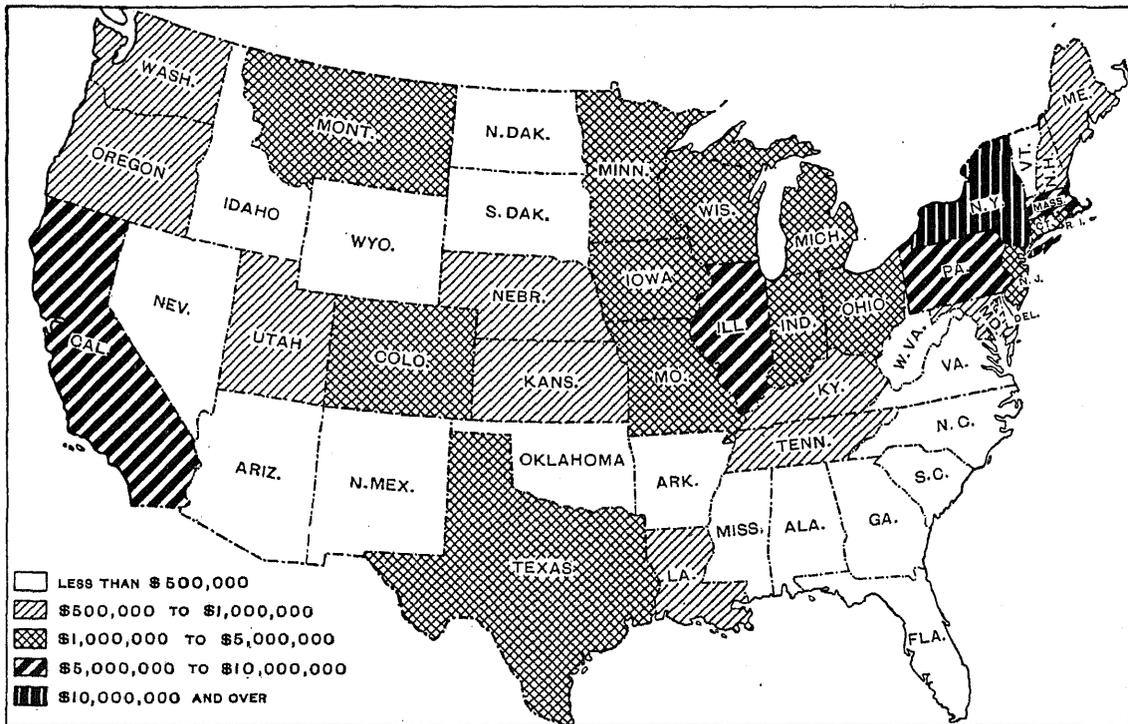
Of the different classes of income, that from lighting shows the largest actual amount, although measured by its percentage of increase it was the smallest. The earlier work of the central stations was chiefly in the

direction of lighting, which as a consequence was highly developed in 1902; while stationary-motor service and, to a still greater extent, the sale of current for miscellaneous purposes are of later development.

MAP 2.—CENTRAL ELECTRIC STATIONS—GROSS INCOME: 1907.



MAP 3.—CENTRAL ELECTRIC STATIONS—GROSS INCOME: 1902.



CENTRAL ELECTRIC LIGHT AND POWER STATIONS.

Although the municipal stations formed nearly 27 per cent of the total number of central stations, their proportion of the total income was only 8 per cent. The business of the municipal stations is practically confined to electric lighting. The income of these stations from stationary-motor service was less than 2 per cent of the total for that item for all stations, while the income from all other electric service, which embraces current sold to other electric companies and to railways, for charging automobiles, etc., was insignificant, forming less than one-half of 1 per cent of the total for this item.

The per cent distribution of the gross income for commercial and municipal stations is shown in Table 84.

It is apparent from the table that a considerable change has taken place in the relative importance of the various classes of income from electric service. The percentage that the income from lighting forms of the total income shows a decrease of 10.2, while the proportions for income from stationary-motor service and all other electric service, and from all other sources, increased considerably.

TABLE 84.—Commercial and municipal central electric stations—Per cent distribution of gross income: 1907 and 1902.

	TOTAL.		COMMERCIAL.		MUNICIPAL.	
	1907	1902	1907	1902	1907	1902
Gross income.....	100.0	100.0	100.0	100.0	100.0	100.0
Electric service.....	96.6	98.2	96.5	98.2	97.2	98.2
Lighting.....	71.6	81.8	69.7	80.5	93.1	96.9
Stationary motors.....	16.2	11.6	17.3	12.5	3.7	1.0
All other.....	8.7	4.8	9.5	5.2	0.4	0.3
All other sources.....	3.4	1.8	3.5	1.8	2.8	1.8

In some instances there is no real difference between the character of service performed by the purely electric stations, or those engaged only in the generation or sale of electricity, or both, and the composite stations, which embrace those also engaged in some other business; but in view of the fact that in many instances the electric branch of the industry for the latter class of stations was only incident to another pursuit, they have been given a separate presentation in various tables of this report. The income for the purely electric and the composite stations is shown in Table 85.

TABLE 85.—PURELY ELECTRIC AND COMPOSITE CENTRAL ELECTRIC STATIONS—GROSS INCOME: 1907 AND 1902

	Census.	Total.	Purely electric.	Composite.	PER CENT OF TOTAL.		PER CENT OF INCREASE.		
					Purely electric.	Composite.	Total.	Purely electric.	Composite.
Number of stations.....	1907 1902	4,714 3,620	2,048 2,139	2,066 1,481	56.2 59.1	43.8 40.9	30.2	23.8	39.5
Gross income.....	1907 1902	\$175,642,338 85,700,605	\$107,974,921 58,603,406	\$67,667,417 27,097,199	61.5 68.4	38.5 31.6	105.0	84.2	149.7
Electric service.....	1907 1902	169,614,691 84,186,005	104,629,574 57,470,597	64,985,117 26,716,008	61.7 68.3	38.3 31.7	101.5	82.1	143.2
Lighting.....	1907 1902	125,765,114 70,138,147	75,678,052 46,812,428	50,077,062 23,325,719	60.2 66.7	39.8 33.3	79.3	61.7	114.7
Stationary motors.....	1907 1902	28,511,550 9,910,217	18,213,001 7,100,519	10,298,549 2,809,698	63.9 71.6	36.1 28.8	187.7	156.5	266.5
All other.....	1907 1902	15,348,027 4,138,241	10,738,521 3,557,650	4,609,506 580,591	70.0 86.0	30.0 14.0	270.9	201.8	694.0
All other sources.....	1907 1902	6,027,647 1,514,000	3,345,347 1,132,809	2,682,300 381,191	55.5 74.8	44.5 25.2	298.1	195.3	603.7

That the character of the electric service of these two classes of stations taken as a whole is becoming more uniform is evidenced by the absence in 1907 of the wide divergence, so noticeable in 1902, in the proportions of the several items of income credited to each. Both in 1907 and in 1902 the composite stations showed their largest proportion of the income from electric service for lighting, and their smallest for all other electric service; but while the difference in the percentage of these two classes of income which was credited to composite stations was 19.3 in 1902, it was only 9.8 in 1907.

The actual increases for all classes of income from electric service and for the gross income were greater for the purely electric stations, while the composite stations showed a slightly larger actual gain in the income from "all other sources." The percentages of increase, however, are in every case greater for the composite stations, so that the proportions of the different classes of income shown for this class of stations were considerably greater in 1907 than in 1902.

The per cent distribution of the gross income for purely electric and composite stations is shown in Table 86.

TABLE 86.—Purely electric and composite central electric stations—
Per cent distribution of gross income: 1907 and 1902.

	TOTAL.		PURELY ELEC- TRIC.		COMPOSITE.	
	1907	1902	1907	1902	1907	1902
Gross income.....	100.0	100.0	100.0	100.0	100.0	100.0
Electric service.....	96.6	98.2	96.9	98.1	96.0	98.6
Lighting.....	71.6	81.8	70.1	79.9	74.0	86.1
Stationary motors.....	16.2	11.6	16.9	12.1	15.2	10.4
All other.....	8.7	4.8	9.9	6.1	6.8	2.1
All other sources.....	3.4	1.8	3.1	1.9	4.0	1.4

In 1907 the purely electric stations constituted a smaller proportion of the total number of establishments than in 1902, and also contributed a smaller percentage of the gross income. Table 86 shows that of the total income from electric service, the percentage of income from lighting for the purely electric stations was smaller in 1907 than in 1902, but slightly greater for the income from stationary-motor service, "All other electric service," and "All other sources." The gross income will be presented by dynamo capacity of the stations in several tables which follow.

TABLE 87.—COMMERCIAL AND MUNICIPAL CENTRAL ELECTRIC STATIONS—GROSS INCOME, BY DYNAMO CAPACITY OF STATIONS: 1907 AND 1902.

	Census.	Total.	Under 200 kilowatts.	200 but under 500 kilowatts.	500 but under 1,000 kilowatts.	1,000 but under 2,000 kilowatts.	2,000 but under 5,000 kilowatts. ¹	5,000 kilowatts and over.	Stations having no generating equipment.
Number of stations.....	1907 1902	4,714 3,620	3,038 2,587	821 586	269 172	169 98	116 67	74 32	227 78
Gross income.....	1907 1902	\$175,642,338 85,700,605	\$17,140,070 14,440,351	\$14,786,719 10,409,319	\$10,465,110 7,001,486	\$13,149,808 8,414,307	\$21,915,199 13,839,846	\$89,930,073 30,027,061	\$8,255,359 1,568,235
Electric service.....	1907 1902	169,614,691 84,186,605	16,344,745 14,090,189	13,954,088 10,122,092	10,075,476 6,896,143	12,617,855 8,175,941	21,277,402 13,635,206	87,277,832 29,756,206	8,067,293 1,510,828
Lighting.....	1907 1902	125,755,114 70,138,147	15,779,128 13,741,455	12,547,375 9,317,862	8,267,158 5,832,733	9,274,623 6,385,817	15,355,491 10,875,989	58,957,999 22,964,304	5,573,340 1,019,937
Stationary motors.....	1907 1902	28,511,550 9,910,217	386,329 228,578	1,094,952 598,897	1,240,926 682,445	2,190,200 1,263,138	4,353,295 2,034,955	17,621,388 4,824,518	1,624,460 277,686
All other.....	1907 1902	15,348,027 4,138,241	179,288 120,156	311,761 205,333	567,392 380,965	1,153,032 526,936	1,568,616 724,262	10,098,445 1,967,384	809,493 213,155
All other sources.....	1907 1902	6,027,647 1,514,000	795,325 350,162	832,631 287,227	389,634 105,343	531,953 238,366	637,797 204,640	2,652,241 270,855	188,066 57,407

¹ Includes 1 municipal station with a kilowatt capacity of 5,000 or over.

Of the six classes of stations grouped according to dynamo capacity, the largest income is shown for the class smallest in numbers, stations having a kilowatt capacity of 5,000 or over. In 1907 more than one-half of the total income was reported by this class, which naturally embraces the stations in the large cities. The next largest income is shown for the next lower group by kilowatt capacity and the next higher in number of stations; but the group ranking third in the amount of income reported is that which comprises the stations of smallest dynamo capacity, which, however, includes nearly two-thirds of the total number of stations. Almost 5 per cent of the total income was reported by stations not equipped with generating apparatus. The proportions of the total income from lighting reported for the different classes of stations vary but little from the corresponding proportions of total income, but in the case of income from stationary-motor service and all other electric service the proportions show decided variations. This results from the fact that the income from each of these two classes of service increases as the dynamo capacity of the stations grows larger. In 1907 the smallest stations, those with a dynamo capacity of less than 200

kilowatts, reported but 1.4 per cent of the total income for motor service, while the stations of largest dynamo capacity reported 61.8 per cent. In the case of income from all other electric service the corresponding proportions were 1.2 per cent and 69.7 per cent. From this it is clear that the business of the small stations is almost exclusively confined to lighting, while the larger stations are, to a considerable extent, engaged in performing other services.

There is a marked difference between the commercial and the municipal stations in respect to the proportions of income reported by large and small plants. While the commercial stations show their largest proportions for the two classes of highest individual capacity, the municipal stations show their largest proportions for the two of lowest individual capacity. The gross income for the class of smallest dynamo capacity for municipal stations represented more than one-third of the total, while that for the class of next higher dynamo capacity was nearly as much as the total for all the remaining classes. The two classes together reported 67.6 per cent of the total income and 92.6 per cent of the total number of stations.

CENTRAL ELECTRIC LIGHT AND POWER STATIONS.

TABLE 88.—COMMERCIAL CENTRAL ELECTRIC STATIONS—GROSS INCOME, BY DYNAMO CAPACITY OF STATIONS: 1907 AND 1902.

	Census.	Total.	Under 200 kilowatts.	200 but under 500 kilowatts.	500 but under 1,000 kilowatts.	1,000 but under 2,000 kilowatts.	2,000 but under 5,000 kilowatts.	5,000 kilowatts and over.	Stations having no generating equipment.
Number of stations.....	1907 1902	3,402 2,805	2,116 1,890	584 497	225 160	159 92	111 64	74 32	183 70
Gross income.....	1907 1902	\$161,630,339 78,735,500	\$11,725,245 10,582,929	\$10,727,632 8,980,913	\$8,903,772 6,688,819	\$12,077,872 7,922,180	\$20,568,767 13,107,024	\$89,930,073 30,027,001	\$7,666,978 1,426,574
Electric service.....	1907 1902	156,000,257 77,349,749	11,117,146 10,309,190	10,036,132 8,725,433	8,539,111 6,589,544	11,554,325 7,683,814	19,949,795 12,915,920	87,277,832 29,756,206	7,525,916 1,369,642
Lighting.....	1907 1902	112,714,851 63,380,284	10,621,562 9,992,266	8,837,815 7,952,853	6,845,383 5,533,734	8,328,039 5,905,006	14,070,217 10,156,839	58,957,999 22,964,304	5,053,836 884,282
Stationary motors.....	1907 1902	27,995,177 9,839,077	331,416 210,025	908,089 569,893	1,140,919 675,525	2,076,288 1,251,822	4,313,891 2,034,819	17,621,388 4,824,518	1,603,186 272,205
All other.....	1907 1902	15,290,229 4,120,788	164,168 105,999	290,228 202,717	552,809 380,285	1,149,998 526,986	1,565,687 724,262	10,698,445 1,967,384	868,894 213,155
All other sources.....	1907 1902	5,630,082 1,385,751	608,099 273,739	691,500 255,480	364,661 99,275	523,547 238,366	618,972 191,104	2,652,241 270,855	171,062 56,932

TABLE 89.—MUNICIPAL CENTRAL ELECTRIC STATIONS—GROSS INCOME, BY DYNAMO CAPACITY OF STATIONS: 1907 AND 1902.

	Census.	Total.	Under 200 kilowatts.	200 but under 500 kilowatts.	500 but under 1,000 kilowatts.	1,000 but under 2,000 kilowatts.	2,000 but under 5,000 kilowatts. ¹	Stations having no generating equipment.
Number of stations.....	1907 1902	1,252 815	922 697	237 89	44 12	10 6	5 3	34 8
Gross income.....	1907 1902	\$14,011,090 6,965,105	\$5,414,825 3,857,422	\$4,059,087 1,428,406	\$1,561,338 312,667	\$1,071,936 492,127	\$1,346,432 732,822	\$558,381 141,661
Electric service.....	1907 1902	13,614,434 6,836,856	5,227,569 3,780,999	3,917,956 1,396,659	1,536,365 300,599	1,063,530 492,127	1,327,607 719,286	541,877 141,186
Lighting.....	1907 1902	13,040,263 6,748,863	5,157,566 3,749,189	3,709,560 1,365,009	1,421,775 298,999	946,584 480,811	1,285,274 719,150	519,504 135,705
Stationary motors.....	1907 1902	516,373 70,540	54,913 17,653	186,863 29,034	100,007 6,920	113,912 11,316	39,404 136	21,274 5,481
All other.....	1907 1902	57,798 17,453	15,120 14,157	21,533 2,616	14,583 680	3,034	2,920	599
All other sources.....	1907 1902	397,565 128,249	187,226 76,423	141,131 31,747	24,973 6,068	8,406	18,825 13,536	17,004 475

¹ Includes 1 station having a capacity of more than 5,000 kilowatts.

By a reference to Tables 90 and 91 it will be seen that the proportions of the total income of the purely electric and the composite commercial stations reported for the different groups according to dynamo capacity are similar to those shown for the two classes combined. The same may be said of the proportions shown for the purely electric and the composite

municipal stations as compared with those shown for all municipal stations. It is noteworthy that in 1907 the stations of smallest dynamo capacity reported a smaller proportion of the total income both of the purely electric and of the composite municipal stations than in 1902.

TABLE 90.—PURELY ELECTRIC COMMERCIAL STATIONS—GROSS INCOME, BY DYNAMO CAPACITY OF STATIONS: 1907 AND 1902.

	Census.	Total.	Under 200 kilowatts.	200 but under 500 kilowatts.	500 but under 1,000 kilowatts.	1,000 but under 2,000 kilowatts.	2,000 but under 5,000 kilowatts.	5,000 kilowatts and over.	Stations having no generating equipment.
Number of stations.....	1907 1902	2,127 1,759	1,314 1,176	350 311	114 86	76 65	66 40	47 22	160 53
Gross income.....	1907 1902	\$101,222,267 54,455,737	\$7,506,219 6,095,183	\$5,994,937 5,315,200	\$3,874,663 3,239,659	\$5,221,022 5,525,615	\$12,820,831 10,003,345	\$59,664,130 22,625,474	\$6,140,465 1,051,261
Electric service.....	1907 1902	98,056,838 53,394,158	7,107,234 6,594,590	5,634,988 5,127,766	3,751,269 3,183,899	4,952,687 5,352,780	12,582,827 9,831,193	58,006,040 22,387,101	6,021,793 1,006,829
Lighting.....	1907 1902	69,383,375 42,804,000	6,777,126 6,354,594	5,009,071 4,665,079	2,973,428 2,575,351	3,281,487 4,036,559	8,630,737 7,611,473	38,845,455 10,996,183	3,866,071 564,761
Stationary motors.....	1907 1902	17,951,940 7,049,444	211,841 88,188	465,406 354,540	470,393 337,603	1,002,524 907,706	3,064,162 1,553,371	11,421,189 3,579,123	1,316,425 228,913
All other.....	1907 1902	10,721,523 3,540,714	118,267 61,808	180,511 108,147	307,448 270,945	668,676 408,515	887,928 666,349	7,739,396 1,811,795	839,297 213,155
All other sources.....	1907 1902	3,165,429 1,061,579	398,985 190,593	359,949 187,434	123,394 55,760	268,335 172,835	238,004 172,152	1,658,090 238,373	118,672 44,432

INCOME AND EXPENSES.

TABLE 91.—COMPOSITE COMMERCIAL STATIONS—GROSS INCOME, BY DYNAMO CAPACITY OF STATIONS: 1907 AND 1902.

	Census.	Total.	Under 200 kilowatts.	200 but under 500 kilowatts.	500 but under 1,000 kilowatts.	1,000 but under 2,000 kilowatts.	2,000 but under 5,000 kilowatts.	5,000 kilowatts and over.	Stations having no generating equipment.
Number of stations.....	1907 1902	1,335 1,046	802 714	234 186	111 74	83 27	45 18	27 10	33 17
Gross income.....	1907 1902	\$60,408,072 24,279,763	\$4,219,026 3,887,746	\$4,732,695 3,665,713	\$5,029,109 3,449,160	\$6,856,850 2,386,565	\$7,747,936 3,103,679	\$30,265,943 7,401,587	\$1,556,513 375,313
Electric service.....	1907 1902	57,943,419 23,955,591	4,009,912 3,804,600	4,401,144 3,597,667	4,787,842 3,405,645	6,601,638 2,331,034	7,366,968 3,084,727	29,271,792 7,369,105	1,504,123 362,813
Lighting.....	1907 1902	43,331,470 20,585,284	3,844,436 3,637,672	3,828,744 3,287,774	3,871,955 2,958,383	5,046,552 1,868,447	5,439,480 2,545,366	20,112,544 5,968,121	1,187,765 319,521
Stationary motors.....	1907 1902	10,043,237 2,790,233	119,575 122,737	442,683 215,323	670,526 337,922	1,073,764 344,116	1,249,729 481,448	6,200,199 1,245,395	286,761 43,292
All other.....	1907 1902	4,568,706 24,191	45,901 44,191	129,717 94,570	245,361 109,340	481,322 118,471	677,759 57,913	2,959,049 155,589	29,597
All other sources.....	1907 1902	2,464,653 324,172	209,114 83,146	331,551 68,046	241,267 43,515	255,212 65,531	380,908 18,952	994,151 32,482	52,390 12,500

TABLE 92.—PURELY ELECTRIC MUNICIPAL STATIONS—GROSS INCOME, BY DYNAMO CAPACITY OF STATIONS: 1907 AND 1902.

	Census.	Total.	Under 200 kilowatts.	200 but under 500 kilowatts.	500 but under 1,000 kilowatts.	1,000 but under 2,000 kilowatts.	2,000 but under 5,000 kilowatts. ¹	Stations having no generating equipment.
Number of stations.....	1907 1902	521 380	378 301	86 55	26 10	4 4	5 3	22 7
Gross income.....	1907 1902	\$6,752,654 4,147,669	\$2,007,991 1,672,765	\$1,589,617 921,067	\$1,021,748 257,190	\$336,881 423,964	\$1,346,432 732,822	\$449,985 139,861
Electric service.....	1907 1902	6,572,736 4,076,439	1,936,132 1,644,044	1,525,810 897,580	1,004,526 252,179	335,928 423,964	1,327,607 719,286	442,733 139,386
Lighting.....	1907 1902	6,294,677 4,008,428	1,917,550 1,622,891	1,432,399 869,765	925,765 244,579	304,592 418,138	1,285,274 719,150	429,097 133,905
Stationary motors.....	1907 1902	261,061 51,075	16,269 7,513	90,379 25,199	70,948 6,920	31,000 5,826	39,404 136	13,061 5,481
All other.....	1907 1902	16,998 16,936	2,313 13,040	3,032 2,616	7,813 680	336	2,929	575
All other sources.....	1907 1902	179,918 71,230	71,859 28,721	63,807 23,487	17,222 5,011	953	18,825 13,536	7,252 475

¹ Includes 1 station having a capacity of more than 5,000 kilowatts.

TABLE 93.—COMPOSITE MUNICIPAL STATIONS—GROSS INCOME, BY DYNAMO CAPACITY OF STATIONS: 1907 AND 1902.

	Census.	Total.	Under 200 kilowatts.	200 but under 500 kilowatts.	500 but under 1,000 kilowatts.	1,000 but under 2,000 kilowatts.	Stations having no generating equipment.
Number of stations.....	1907 1902	731 435	544 396	151 84	18 2	6 2	12 1
Gross income.....	1907 1902	\$7,259,345 2,817,436	\$3,406,834 2,184,657	\$2,469,470 507,339	\$539,500 55,477	\$735,055 68,163	\$108,396 1,800
Electric service.....	1907 1902	7,041,698 2,760,417	3,291,467 2,136,955	2,392,146 499,079	531,839 54,420	727,602 68,163	98,644 1,800
Lighting.....	1907 1902	6,745,586 2,740,435	3,240,016 2,126,298	2,277,161 495,244	496,010 54,420	641,992 62,673	90,407 1,800
Stationary motors.....	1907 1902	255,312 19,465	38,644 10,140	96,484 3,835	29,059	82,912 5,400	8,213
All other.....	1907 1902	40,800 517	12,807 517	18,501	6,770	2,698	24
All other sources.....	1907 1902	217,647 57,019	115,367 47,702	77,324 8,260	7,751 1,057	7,453	9,752

CENTRAL ELECTRIC LIGHT AND POWER STATIONS.

The extent to which the income is confined to a few states is illustrated by showing the detailed income for the 10 selected states in Table 94.

At each of the two censuses almost 70 per cent of the gross income for all central stations was reported by the 10 states for which figures are given in Table 94, the proportion in 1907 and in 1902 varying but three-tenths of 1 per cent. Notwithstanding the large increases in the income for each state, there were several which in 1907 showed considerably decreased proportions of the total income reported, as follows:

Pennsylvania, from 11.1 per cent to 9.1 per cent; Massachusetts, from 7.4 per cent to 6.1 per cent; Ohio, from 5.2 per cent to 4.4 per cent; and New Jersey, from 4 per cent to 3.4 per cent. The states which increased their proportions were New York, Illinois, California, Michigan, and Missouri. California and Illinois show the most pronounced growth in the gross income, although the total actual increase for the 2 states combined was only \$54,759 more than the increase for New York alone.

TABLE 94.—CENTRAL ELECTRIC STATIONS—GROSS INCOME FOR 10 SELECTED STATES: 1907 AND 1902.

STATE.	Census.	Number of stations.	Gross income.	Lighting.	Stationary-motor service.	All other electric service.	All other sources.
Total for United States.....	1907 1902	4,714 3,620	\$175,642,338 85,700,605	\$125,755,114 70,138,147	\$28,511,550 9,910,217	\$15,348,027 4,138,241	\$6,027,647 1,514,000
Total for 10 selected states.....	1907 1902	2,205 1,911	121,418,869 59,469,531	86,140,793 48,490,347	19,744,151 7,136,945	11,717,114 2,028,759	3,816,811 913,480
New York.....	1907 1902	314 256	34,859,170 16,854,839	24,296,438 12,920,807	5,688,401 2,396,046	4,082,544 1,425,386	791,787 112,600
Pennsylvania.....	1907 1902	327 279	16,015,392 9,486,867	12,081,602 8,321,766	2,101,320 640,948	1,217,878 348,702	614,592 176,451
Illinois.....	1907 1902	383 346	15,465,993 6,757,015	10,278,668 5,849,351	2,445,280 763,764	1,842,824 79,133	890,221 64,727
California.....	1907 1902	129 115	14,416,529 5,066,417	8,111,012 3,305,318	3,826,462 1,228,099	1,984,554 412,673	494,501 120,327
Massachusetts.....	1907 1902	120 114	10,749,240 6,340,944	8,543,327 5,263,113	1,519,708 744,879	539,463 236,890	146,742 96,062
Ohio.....	1907 1902	272 233	7,043,997 4,431,038	6,282,861 3,873,339	1,054,076 407,901	138,043 66,266	169,017 83,532
Michigan.....	1907 1902	234 201	6,072,010 2,613,812	3,848,797 2,285,995	873,081 173,881	1,028,560 56,924	321,563 97,012
New Jersey.....	1907 1902	64 64	5,952,378 3,421,304	5,123,926 2,799,961	682,028 258,055	104,791 298,583	41,633 64,705
Missouri.....	1907 1902	162 123	5,805,828 2,392,149	4,116,409 1,954,562	985,596 402,937	581,790 2,051	122,033 31,999
Indiana.....	1907 1902	200 180	4,438,332 2,105,146	3,457,753 1,916,135	568,199 120,435	196,658 1,551	215,722 67,025

The per cent distribution and per cent of increase of the gross income for the 10 selected states is shown in Table 95.

TABLE 95.—Central electric stations—Per cent distribution and per cent of increase for gross income in 10 selected states: 1907 and 1902.

STATE.	PER CENT DISTRIBUTION.		Per cent of increase.
	1907	1902	
Total for United States.....	100.0	100.0	104.9
Total for 10 selected states.....	69.1	69.4	104.2
New York.....	19.8	19.7	106.8
Pennsylvania.....	9.1	11.1	68.8
Illinois.....	8.8	7.9	128.9
California.....	8.2	5.9	184.6
Massachusetts.....	6.1	7.4	69.5
Ohio.....	4.4	5.2	72.5
Michigan.....	3.5	3.0	132.3
New Jersey.....	3.4	4.0	74.0
Missouri.....	3.3	2.8	142.7
Indiana.....	2.5	2.5	110.8

Other states not included in Table 94 which report large incomes for 1907 for central electric stations are, Texas, \$3,792,203; Minnesota, \$3,478,009; Washington, \$3,410,542; Colorado, \$3,410,240; Iowa, \$2,479,969; Connecticut, \$2,469,543; Montana, \$2,469,131; and Wisconsin, \$2,278,637. The income reported for the state of Washington is especially noteworthy, being an increase of \$2,626,891, or 335.2 per cent, over 1902. Washington is one of the states which relies largely upon water for primary power, and to the abundance of this economical force for the generation of electricity may be traced its relatively large use in that state.

The income of stations classified according to kind of primary power used and the percentages of increase are shown in Tables 96 and 97.

TABLE 96.—COMMERCIAL AND MUNICIPAL CENTRAL ELECTRIC STATIONS—GROSS INCOME, BY KIND OF PRIMARY POWER USED: 1907 AND 1902.

	Census.	Total.	Steam exclusively.	Steam with other minor power.	Water exclusively.	Water with other minor power.	Water and steam.	Gas exclusively.	Stations without primary-power equipment.
Number of stations.....	1907 1902	4,714 3,620	3,262 2,747	93 43	474 315	61 20	360 275	180 51	284 169
Gross income.....	1907 1902	\$175,642,338 85,700,605	\$119,029,194 64,730,894	\$7,967,002 3,357,962	\$11,098,303 4,156,505	\$3,104,158 1,059,866	\$22,700,921 9,052,574	\$1,010,150 775,137	\$10,732,610 2,567,867
Electric service.....	1907 1902	169,614,691 84,186,605	115,428,251 63,795,608	7,821,550 3,237,584	10,454,035 4,035,702	2,946,122 1,034,880	21,507,904 8,812,006	980,910 769,900	10,475,919 2,500,925
Lighting.....	1907 1902	125,755,114 70,138,147	92,462,389 55,439,357	6,582,067 2,755,445	3,621,562 2,165,746	1,702,752 121,058	13,152,818 7,004,961	884,204 706,036	7,349,322 1,945,544
Stationary motors.....	1907 1902	28,511,550 9,910,217	15,934,961 6,886,244	1,007,776 331,031	2,986,379 986,075	918,658 80,011	5,464,061 1,246,918	82,221 63,741	2,117,494 316,197
All other.....	1907 1902	15,348,027 4,138,241	7,030,901 1,470,007	231,707 151,108	3,846,094 883,881	324,712 833,811	2,891,025 660,127	14,485 123	1,009,103 239,184
All other sources.....	1907 1902	6,027,647 1,514,000	3,600,943 935,086	145,452 120,378	644,268 120,803	158,036 24,986	1,193,017 240,568	29,240 5,237	256,691 66,942

TABLE 97.—COMMERCIAL AND MUNICIPAL CENTRAL ELECTRIC STATIONS—PER CENT OF INCREASE OF GROSS INCOME, BY KIND OF PRIMARY POWER USED: 1907.

	Total.	Steam exclusively.	Steam with other minor power.	Water exclusively.	Water with other minor power.	Water and steam.	Gas exclusively.	Stations without primary-power equipment.
Number of stations.....	30.2	18.7	116.3	50.5	205.0	30.9	252.9	68.0
Gross income.....	105.9	83.9	137.3	167.0	192.9	150.8	30.3	318.0
Electric service.....	101.5	80.9	141.6	159.0	184.7	144.1	27.4	319.0
Lighting.....	79.3	66.8	138.9	67.2	1,306.6	87.8	25.2	277.8
Stationary motors.....	187.7	131.4	204.4	202.9	1,048.2	338.2	29.0	569.6
All other.....	270.9	378.3	53.3	335.1	¹ 61.1	416.1	11,676.4	321.9
All other sources.....	298.1	285.1	20.8	433.3	532.5	395.9	458.3	283.5

¹ Decrease.

In another chapter of this report reference is made to the fact that allowance must be made for changes from year to year in the equipment of existing stations in respect to the primary power employed, which would result in the transfer of stations from one class to another without materially adding to the total power equipment. The tables, therefore, should be accepted more as representing the conditions at the two censuses, and as showing the increase in the income reported for the stations using the different kinds of power, rather than as showing the actual growth in the use of any particular kind of primary power.

In 1907 the income for the steam plants, including the stations exclusively equipped with steam power and those which also had other minor power, constituted 72.3 per cent of the total. Even this large proportion does not fully indicate the relative importance of the income resulting from using steam as the primary power, since the stations which were about equally equipped with steam and with water power reported 12.9 per cent of the total gross income, some part of which should rightfully be classed as resulting

from the use of steam. If this amount was divided equally between water and steam, approximately 78.7 per cent of the gross income would be credited as income derived from the use of steam as the primary power, leaving but little more than one-fifth of the income to be divided among the three remaining classes, water-power stations, gas-power stations, and those stations having no primary power. Of these three classes, the stations using water exclusively, or water with other minor power, reported 8.1 per cent of the total income, and if to the income for these stations is added half of the amount reported for stations using both water and steam, the total income derived from the use of water power would represent approximately 14.6 per cent of the total gross income reported. The stations using gas reported but six-tenths of 1 per cent of the total gross income, and those purchasing their power, while showing large and most consistent percentages of increase in each of the several sources of income, reported but 6.1 per cent.

The proportion of income derived from each source is shown for the different classes of stations in Table 98.

CENTRAL ELECTRIC LIGHT AND POWER STATIONS.

TABLE 98.—COMMERCIAL AND MUNICIPAL CENTRAL ELECTRIC STATIONS—PER CENT DISTRIBUTION OF GROSS INCOME FOR EACH KIND OF POWER USED, BY SOURCE OF INCOME: 1907 AND 1902.

	Census.	Total.	Steam exclusively.	Steam with other minor power.	Water exclusively.	Water with other minor power.	Water and steam.	Gas exclusively.	Stations without primary-power equipment.
Gross income.....	1907 1902	100.0 100.0	100.0 100.0	100.0 100.0	100.0 100.0	100.0 100.0	100.0 100.0	100.0 100.0	100.0 100.0
Electric service.....	1907 1902	96.6 98.2	97.0 98.6	98.2 96.4	94.2 97.1	94.9 97.6	94.7 97.3	97.1 99.3	97.6 97.4
Lighting.....	1907 1902	71.6 81.8	77.7 85.6	82.6 82.1	32.6 52.1	54.9 11.4	57.9 77.4	87.5 91.1	68.5 75.8
Stationary motors.....	1907 1902	16.2 11.6	13.4 10.6	12.6 9.9	26.9 23.7	29.6 7.5	24.1 13.8	8.1 8.2	19.7 12.3
All other.....	1907 1902	8.7 4.8	5.9 2.3	2.9 4.5	34.7 21.3	10.5 78.7	12.7 6.2	1.4 (¹)	9.4 9.3
All other sources.....	1907 1902	3.4 1.8	3.0 1.4	1.8 3.6	5.8 2.9	5.1 2.4	5.3 2.7	2.9 0.7	2.4 2.6

¹ Less than one-tenth of 1 per cent.

A noteworthy feature of the central-station industry is the relatively small proportion of the total income of the stations using water power which is received from lighting. In 1907 the proportion obtained from this source was smallest (32.6 per cent) for the stations using water power exclusively. On the other hand, the stations using water power show exceptionally large proportions of their income as derived from motor service and from all other electric service. These results are in accordance with the well-known fact that many of the stations equipped with water power sell much of their current to other electric stations or to establishments which use it for motor service, etc. If the proportionate income from lighting reported for 1907 by the three classes using water power is considered separately in relation to the corresponding amounts for 1902, unaccountable differences are found; but when the three classes are considered together the discrepancies disappear. The differences referred to result, no doubt, from minor changes of equipment which transferred stations from

one class to another, but still kept them among those using water power.

The sale of current in bulk has grown to large proportions and constitutes a special branch of the electrical industry. Although a number of stations engaged in it were operated by steam as the primary power, most of the stations that make a specialty of this form of service are hydro-electric plants. In 1907 there were 92 stations, operated either exclusively or primarily by water power, the chief business of which was the sale of current in bulk, this current being transmitted to greater or less distances as necessity demanded. These 92 stations reported a total income of \$13,231,720, of which \$8,783,371, or 66.4 per cent, was from current sold in bulk; \$2,675,852, or 20.2 per cent, from lighting; \$1,221,408, or 9.2 per cent, from all other electric service; and \$551,089, or 4.2 per cent, from sources other than the sale of electricity.

Table 99 shows the income of stations with and those without meters on consumption circuits.

TABLE 99.—COMMERCIAL AND MUNICIPAL CENTRAL ELECTRIC STATIONS—GROSS INCOME FOR STATIONS WITH AND WITHOUT METERS ON CONSUMPTION CIRCUITS: 1907 AND 1902.

	Census.	TOTAL.			COMMERCIAL.			MUNICIPAL.		
		Total.	With meters.	Without meters.	Total.	With meters.	Without meters.	Total.	With meters.	Without meters.
Number of stations.....	1907 1902	4,714 3,620	4,085 2,719	629 901	3,462 2,805	3,019 2,147	443 658	1,252 815	1,066 572	186 243
Gross income.....	1907 1902	\$175,642,338 85,700,605	\$168,590,884 79,888,904	\$7,051,454 5,811,701	\$161,630,389 78,735,500	\$157,341,176 75,254,621	\$4,289,163 3,480,879	\$14,011,999 6,965,105	\$11,249,708 4,634,283	\$2,762,291 2,330,822
Electric service.....	1907 1902	169,614,691 84,186,605	162,702,690 78,463,821	6,912,001 5,722,784	156,000,287 77,349,749	151,818,384 73,944,448	4,181,873 3,405,301	13,614,434 6,830,856	10,884,306 4,519,373	2,730,128 2,317,483
Lighting.....	1907 1902	125,755,114 70,138,147	121,746,304 65,146,516	4,005,810 4,991,631	112,714,851 63,389,284	111,407,611 60,696,174	1,307,240 2,693,110	13,040,263 6,748,803	10,341,693 4,450,342	2,698,570 2,298,521
Stationary motors.....	1907 1902	28,511,550 9,910,217	27,896,922 9,606,409	614,628 303,808	27,995,177 9,839,677	27,409,632 9,545,887	585,545 293,790	516,373 70,540	487,290 60,522	29,083 10,018
All other.....	1907 1902	15,348,027 4,138,241	13,056,464 3,710,896	2,291,563 427,345	15,290,229 4,120,788	13,001,141 3,702,387	2,289,088 418,401	57,798 17,453	55,323 8,509	2,475 8,944
All other sources.....	1907 1902	6,027,647 1,514,000	5,888,194 1,425,083	139,453 88,917	5,630,082 1,385,751	5,522,792 1,310,173	107,290 75,578	397,565 128,249	365,402 114,910	32,163 13,339

The trend of the later methods of electric service is unquestionably in the direction of selling current by meter measurement. The change in this direction, which has been going on for some time, has been accelerated by advances made in the perfection of the meters. It is to the interest of the company furnishing the current to have these machines installed, not only as a matter of self-protection but because every step in the direction of reliability and accuracy is bound to win favor with the consumer.

It should be understood, in connection with Table 99, that although the figures for stations not equipped with meters are complete, as reported, this condition is not in the same degree conclusive for those classed as having meters. The latter class of stations embraces all which reported meters, and included many stations that were not fully equipped in this particular, but sold part of the current at contract or flat rates. The figures, however, demonstrate beyond question the fact that the stations without meters are decreasing in number, notwithstanding the increase in the total number of stations. In 1902, of the total number of stations, 24.9 per cent reported no meters as compared with only 13.3 per cent in 1907. The income for the stations without meters formed 6.8 per cent of the total in 1902 and but 4 per cent in 1907. There was little difference in the relative proportions of the commercial and the municipal stations which had installed meters, but a considerably larger percentage of the income of commercial stations is credited to those having meters than is the case with the municipal stations. The municipal stations have been somewhat slower in the adoption of meters, since many of them, by reason of the fact that the whole or the great bulk of the current produced is used directly by the municipality, do not feel the necessity for such equipment. In the case of the commercial stations the income for stations without meters formed 4.4 per cent of the total for such stations in 1902 and 2.7 per cent in 1907. The corresponding proportions for the municipal stations were 33.5 per cent and 19.7 per cent, respectively.

A comparison of the income of the commercial stations from the several classes of electric service in 1907 and in 1902 shows that the stations without meters reported a decreased proportion of the total in 1907 for all classes of income, except income from all other electric service, for which there was a decided gain. Of the total income from lighting, the proportion for commercial stations without meters decreased from 4.2 per cent to 1.2 per cent, while the percentage of the total income from stationary-motor service reported for this class of stations fell from 3 per cent to

2.1 per cent; in the case of income from all other electric service, however, the percentage increased from 10.2 per cent to 15 per cent. The increase in the income for this latter item is due to the fact that several companies with long-transmission lines, a business largely created since 1902, sold at wholesale large quantities of current at contract rates. In the case of the municipal stations, on the other hand, the part of the total income from all other electric service contributed by stations not equipped with meters shows a falling off from 51.2 per cent in 1902 to 4.3 per cent in 1907.

The income for commercial and for municipal lighting is shown in Table 100.

TABLE 100.—Commercial and municipal central electric stations—Gross income from commercial and public lighting: 1907 and 1902.

	STATIONS.		
	Total.	Commercial.	Municipal.
Lighting, 1907.....	\$125,755,114	\$112,714,851	\$13,040,263
Commercial.....	100,337,434	92,942,447	7,394,987
Public.....	25,417,680	19,772,404	5,645,276
Lighting, 1902.....	70,138,147	63,389,284	6,748,863
Commercial.....	50,368,173	47,259,711	3,108,462
Public.....	19,769,974	16,129,573	3,640,401
Per cent of increase:			
Total.....	79.3	77.8	93.2
Commercial.....	92.2	96.7	137.9
Public.....	28.6	16.4	55.1

By public lighting in this report is meant the lighting of streets, parks, public buildings, and all other public places for the illumination of which the municipality or other governmental division exercising municipal functions is responsible, irrespective of whether such service was rendered by commercial or municipal stations; while commercial lighting embraces all lighting which is furnished to individuals, firms, etc., by either the commercial or the municipal stations.

The income from commercial lighting formed 79.8 per cent of the total income for all kinds of lighting in 1907 and 71.8 per cent in 1902, while the corresponding proportions for public lighting were 20.2 per cent and 28.2 per cent, respectively. Thus the percentage for commercial lighting was larger by 8 per cent in 1907 than in 1902 and the percentage for public lighting correspondingly smaller. Both the actual and the percentage of increase were much greater for commercial than for public lighting. It is apparent from Table 100 that during the period between the two censuses commercial lighting made much more rapid progress than public lighting.

The extent to which the income from lighting is confined to a few states is shown in Table 101.

CENTRAL ELECTRIC LIGHT AND POWER STATIONS.

TABLE 101.—CENTRAL ELECTRIC STATIONS—GROSS INCOME FROM COMMERCIAL AND PUBLIC LIGHTING, FOR 15 SELECTED STATES: 1907 AND 1902.

	TOTAL.		COMMERCIAL LIGHTING.		PUBLIC LIGHTING.	
	1907	1902	1907	1902	1907	1902
Total for United States.....	\$125,755,114	\$70,138,147	\$100,337,434	\$50,368,173	\$25,417,680	\$19,769,974
Total for 15 selected states.....	98,183,606	55,045,472	78,494,819	39,173,239	19,688,787	15,872,233
New York.....	24,296,438	12,920,807	20,430,168	9,359,493	3,866,270	3,561,314
Pennsylvania.....	12,081,603	8,321,766	8,790,425	5,557,115	3,291,177	2,764,651
Illinois.....	10,278,668	5,849,351	8,078,661	4,094,781	2,200,007	1,754,570
Massachusetts.....	8,543,327	5,263,113	6,315,999	3,555,731	2,227,328	1,707,382
California.....	8,111,012	3,305,318	7,220,210	2,737,430	890,802	567,888
Ohio.....	6,282,861	3,873,339	4,577,668	2,480,638	1,705,193	1,392,701
New Jersey.....	5,123,926	2,799,961	3,700,863	1,696,783	1,423,063	1,103,178
Missouri.....	4,116,409	1,954,562	3,578,819	1,610,820	537,590	343,742
Michigan.....	3,848,797	2,285,995	2,958,391	1,631,983	890,406	654,012
Indiana.....	3,457,753	1,916,135	2,572,206	1,160,712	885,547	757,423
Texas.....	3,066,994	1,753,681	2,745,418	1,494,712	321,576	258,969
Minnesota.....	2,700,959	1,615,766	2,193,540	1,267,424	507,419	348,342
Colorado.....	2,181,310	1,209,760	1,921,459	984,325	259,851	225,435
Washington.....	2,078,156	586,274	1,838,208	502,148	239,948	84,126
Iowa.....	2,015,394	1,389,044	1,572,784	1,039,144	442,610	350,500

The bulk of the income from lighting, 78.1 per cent in 1907 and 78.5 per cent in 1902, was reported by the stations in the 15 states shown in the table. So large a part of the total income is reported by these states that no great difference between the rates of increase for the whole United States and for the 15 states together is to be expected. For the United States the increases were as follows: Total, 79.3 per cent; commercial lighting, 99.2 per cent; public lighting, 28.6 per cent. The corresponding increases for the 15 states were 78.4 per cent, 100.4 per cent, and 24 per cent.

In the report for 1902 a statement was prepared showing the total number of arc and of incandescent lamps, together with the separate income derived from each of the two classes of service, and the average income per lamp based upon these figures. The material for a corresponding statement for 1907 is wanting, on account of the fact that to a great extent the different stations have discontinued keeping accounts giving these data because of the general adoption of the meter system of selling electricity and the fact that it is no longer necessary for the company to know the number of lamps served. Not only is it often impossible to ascertain the separate income for arc and for incandescent lamps, but there is also no way of finding out the extent to which the electric current supplied from the same wire and measured by the same meters has been used for small fan motors and for other miscellaneous purposes. Furthermore, the number of lamps called for in 1907 was the number wired for service on the last day of the year covered by the report, and not, as in 1902, the number in service. In order that some idea may be had of the relative income per lamp at the two censuses, however, a number of reports in which complete answers appear to have been made were selected and tabulated, and the results, together with the figures as published in 1902 for all commercial central

stations in the United States, are presented in the following statement:

Commercial central electric stations—Average income from lamps as reported in 1902, and as obtained from 110 selected reports in 1907.

	COMMERCIAL STATIONS.	
	For 110 selected stations in 1907.	For all stations in 1902.
Arc lamps:		
Commercial lighting—		
Number of lamps.....	62,426	168,180
Income.....	\$2,496,837	\$8,220,154
Average income per lamp.....	\$40.00	\$48.88
Public lighting—		
Number of lamps.....	49,900	166,723
Income.....	\$3,471,622	\$13,871,646
Average income per lamp.....	\$69.57	\$83.20
Incandescent lamps:		
Commercial lighting—		
Number of lamps.....	8,841,206	16,243,853
Income.....	\$17,532,593	\$39,039,557
Average income per lamp.....	\$1.98	\$2.40
Public lighting—		
Number of lamps.....	112,062	372,740
Income.....	\$426,202	\$2,257,927
Average income per lamp.....	\$3.80	\$6.06

In selecting the 110 reports used as a basis for an average in 1907, ten reports were taken from each of the following states as fairly representative of the different sections of the United States: California, Illinois, Massachusetts, Missouri, New York, Ohio, Pennsylvania, Tennessee, Texas, Washington, and Wisconsin. Owing to the incomplete character of the data upon which the figures for 1907 are based, they should not be accepted as giving the exact price of lighting, but merely as showing that there is a general and unmistakable tendency toward a lower cost for electric lighting.

Stationary-motor service was second in importance as a source of income, and the states for which in 1907 an income of over \$500,000 was reported are shown in Table 102.

TABLE 102.—Commercial and municipal central electric stations—Gross income from stationary-motor service, for 14 selected states: 1907 and 1902.

	STATIONARY-MOTOR SERVICE.	
	1907	1902
Total for United States.....	\$28,511,550	\$9,910,217
Total for 14 selected states.....	22,728,096	7,771,683
New York.....	5,688,401	2,396,046
California.....	3,826,462	1,228,099
Illinois.....	2,445,280	763,764
Pennsylvania.....	2,101,320	640,948
Massachusetts.....	1,519,708	744,879
Ohio.....	1,054,076	407,901
Missouri.....	985,596	402,937
Montana.....	963,669	32,881
Colorado.....	951,836	343,559
Michigan.....	873,081	173,881
New Jersey.....	682,028	258,055
Indiana.....	568,199	120,435
Minnesota.....	536,622	191,432
Washington.....	531,818	66,866

Both for 1907 and 1902 the income from stationary-motor service for the 14 states shown in Table 102 was approximately four-fifths of the total for all states and territories, their proportion in 1907 being slightly greater than at the previous census. That New York, the leading state in population and in value of manufactures, with its great water power, should lead also in the income from stationary-motor service is not unexpected, but that California, which at the census of 1900 stood only twenty-first in population and twelfth in value of manufactures, should be easily second in income from this source is surprising, and shows that the use of electric current is more general in that state than elsewhere. It is worthy of mention that notwithstanding the large actual increase in the income from motor service for New York, that state's proportion of the total income for such service fell from 24.2 per cent in 1902 to 20 per cent in 1907; while that for California increased from 12.4 per cent to 13.4 per cent during the same time. The largest proportional increases in the income from motor service are those for Montana, which increased more than twenty-nine fold, and for Washington, which increased nearly eightfold.

Several states not mentioned in Table 102 show large increases in the income from motor service from 1902 to 1907. The figures for these states in the order of their importance are presented in the following tabular statement:

TABLE 103.—COMMERCIAL AND MUNICIPAL CENTRAL ELECTRIC STATIONS—GROSS INCOME FROM "ALL OTHER ELECTRIC SERVICE." 1907 AND 1902.

SOURCE OF INCOME.	TOTAL.			COMMERCIAL.			MUNICIPAL.		
	1907	1902	Per cent of increase.	1907	1902	Per cent of increase.	1907	1902	Per cent of increase
Total.....	\$15,348,027	\$4,138,241	270.9	\$15,290,229	\$4,120,788	271.1	\$57,798	\$17,455	231.2
Current sold to electric railways.....	7,841,497	2,304,515	240.3	7,829,275	2,301,343	240.2	12,222	3,172	285.3
Current sold to other electric companies.....	5,519,746	1,727,112	219.6	5,513,302	1,723,427	219.9	6,444	3,685	74.9
Miscellaneous electric service.....	1,986,784	106,614	1,783.5	1,947,652	96,018	1,928.4	39,132	10,596	269.3

	STATIONARY-MOTOR SERVICE.	
	1907	1902
South Carolina.....	\$432,384	\$169,353
Connecticut.....	407,577	155,732
Texas.....	376,897	203,859
Oregon.....	375,306	89,942
Maryland.....	349,059	91,437
Maine.....	284,627	92,032
Iowa.....	261,202	78,180
Wisconsin.....	253,087	75,992
Kansas.....	224,224	48,558
Kentucky.....	220,061	92,401

There appears to be no satisfactory way of ascertaining the average cost per kilowatt for motor service, since the conditions under which the income was obtained differed widely, not only as to the manner of charges, whether by meter, flat rate, or in bulk, but because of the variations in the length of service, and the certainty that the total kilowatts reported represent a large amount of idle or inactive dynamo capacity, while on the other hand many stations selling a large part of the electrical energy in bulk were unable to report the kilowatt capacity of the stationary motors used by the customers to whom the current was delivered. The capacity of the stationary motors both in 1907 and 1902 was reported in units of horsepower which, by being reduced to kilowatts, shows a total of 1,230,173 in 1907, and 326,752 in 1902. Using the figures as reported with their known failure to represent accurate totals, but assuming, for purposes of comparison, that the element of error was about equal at the two censuses, the average income per kilowatt capacity of stationary motors was less in 1907 than in 1902, the actual figures being \$23.18 per kilowatt and \$30.33 per kilowatt for the two censuses, respectively.

Next in order of importance to income from lighting and from stationary-motor service was the income from the sale of current to electric railways and to other electric companies. In Table 103 the income from all other electric service is classified into that from current sold to electric railways, that from current sold to other electric companies, and that from current sold for miscellaneous purposes, such as charging automobiles, operating fans, electric heating, cooking, welding, etc.

In 1907, of the total income from "All other electric service," 87.1 per cent was from current sold to electric-railway companies and to other electric companies as compared with 97.4 per cent in 1902. It appears, therefore, that notwithstanding the increase of 231.4 per cent in the total for such sales, the gain was proportionately less than that for the current sold for miscellaneous purposes. The income from this latter source increased from \$106,614 in 1902 to \$1,986,784 in 1907, or more than eighteenfold. More than two-thirds of this miscellaneous income was reported by stations in the state of New York, and most of it represented current sold for manufacturing purposes, much of which was sold to manufacturers using the electrolytic process. The continued cheapening of electric power and its growing popularity resulting from the

wide range of uses to which it may be put, the ease with which it is made available, its cleanliness and convenience, and the quickness with which it may be applied or discontinued, together with its constantly increasing uses, indicate that the next census will show a greatly increased use of electrical energy for miscellaneous purposes.

Both in 1907 and in 1902 the proportion of the earnings from "All other electric service" derived from current sold to electric railways exceeded that from current sold to other electric companies.

The income from current sold to electric railways and to other electric companies is shown in Table 104 for the 12 states, each of which reported an income of more than \$100,000 for the former character of service in 1907.

TABLE 104.—COMMERCIAL AND MUNICIPAL CENTRAL ELECTRIC STATIONS—GROSS INCOME FROM CURRENT SOLD TO ELECTRIC RAILWAYS AND TO OTHER ELECTRIC COMPANIES, FOR 12 SELECTED STATES: 1907 AND 1902.

	TOTAL.		INCOME FROM CURRENT SOLD TO ELECTRIC RAILWAYS.		INCOME FROM CURRENT SOLD TO OTHER ELECTRIC COMPANIES.	
	1907	1902	1907	1902	1907	1902
Total for United States.....	\$13,361,243	\$4,031,027	\$7,841,497	\$2,304,515	\$5,519,746	\$1,727,112
Total for 12 selected states.....	11,109,212	2,873,422	6,943,834	1,549,079	4,165,378	1,324,343
New York.....	2,748,057	1,350,819	1,168,700	389,829	1,579,357	960,990
California.....	1,946,894	430,602	1,396,735	183,986	550,159	246,616
Illinois.....	1,752,933	78,513	1,604,328	64,860	148,605	14,153
Pennsylvania.....	1,174,879	370,299	901,564	324,749	273,315	45,550
Michigan.....	958,753	63,661	277,115	55,830	681,638	7,831
Washington.....	607,980	99,600	143,183	86,588	464,797	13,012
Missouri.....	573,478	2,651	477,784	2,651	95,694	.....
Massachusetts.....	532,692	237,817	288,638	226,547	244,054	11,270
New Hampshire.....	290,971	75,684	217,361	71,586	73,610	4,098
Texas.....	187,276	106,043	187,276	91,220	.....	14,823
Oregon.....	179,518	51,000	107,072	51,000	12,446	.....
Indiana.....	155,781	733	114,078	733	41,703	.....

Of the total income for the two classes of service, 83.1 per cent in 1907 and 71.3 per cent in 1902 was contributed by the 12 states for which figures are shown in the table. In both years the income from current sold to electric railways exceeded that from current sold to other electric companies both for the United States and for the 12 states together. The 12 states increased their proportion of the total income from current sold to electric railways from 67.2 per cent in 1902 to 88.6 per cent in 1907; but the proportion of the total income from current sold to other electric companies reported by them declined from 76.7 per cent to 75.5 per cent. Several of the states—the most notable of which are Illinois, California, New York, Missouri, and Indiana—show remarkable gains in the income from current sold to electric railways, while Michigan and Washington show remarkable increases in the income from current sold to other electric companies.

Through the selection of states with reference to the income from the sale of current to electric railways, several were omitted which in 1907 reported an income

of more than \$100,000 from current sold to other electric companies, as follows: Georgia, \$204,654; Utah, \$203,587; Montana, \$188,529; Colorado, \$154,412; and Connecticut, \$122,973.

An analysis of the income from miscellaneous service is given in Table 105.

TABLE 105.—Commercial and municipal central electric stations—Income from electric service other than that for lighting, motor service, and current sold to railways and to other electric companies: 1907.

KIND OF SERVICE.	Total.	Commer- cial.	Municipal.
Total.....	\$1,986,784	\$1,947,652	\$39,132
Electric heating, cooking, welding, etc.....	271,591	265,241	6,350
Charging automobiles.....	154,747	153,459	1,288
Running fans.....	197,736	172,746	24,990
Heating irons.....	17,636	14,451	3,185
Furnishing current for moving-picture shows.....	2,195	1,529	666
Charging batteries, motor boats, etc.....	696	696	.....
Furnishing current for signs.....	10,121	10,121	.....
Not specified.....	231,858	230,010	1,848
Other miscellaneous ¹	1,100,204	1,099,399	805

¹A very small part of this amount was for current used to operate motors, but the income was mostly derived from current sold to electrolytic, electrochemical, or electrothermal plants for the production of aluminum, carborundum, carbide of calcium, caustic soda, etc.

The income from electric heating, cooking, welding, etc. and the income from charging automobiles were the only items in Table 105 which were specifically asked for in the schedule, and the remaining items represent a tabulation of amounts reported by companies which in answering the inquiry in reference to income from all other electric service specified the exact nature of the service. It is not believed that any of these items fully represents the actual earnings from the specific service. The introduction of the meter system of measuring the current used has, as before stated, tended to render it impracticable to distinguish between the use of current for lighting and for various other purposes in cases where the service is from the same wire and the total amount of electrical energy is recorded by the same meter.

EXPENSES.

The items of expense, the statistics for which are shown in the following tables, include salaries and wages of employees; supplies and materials used in connection with the operation of the plants; the cost

of such supplies and materials as were sold and the proceeds reported under income; the cost of fuel; the amount expended for the purchase of power; and other miscellaneous expenses, which include such items as taxes, ordinary repairs to buildings and machinery, rent of stations, line-wire supports, insurance, injuries and damages, advertising, legal expenses, interest, and in fact all other expenses not elsewhere reported. It does not, however, include interest on bonds, as did the report for 1902.

The items of expense for the commercial and municipal stations are shown in Table 106.

The proportions of the total expenses reported by the two classes of stations show but little variation at the two censuses. In 1907 the commercial stations reported 91.4 per cent of the total, a decrease of one-tenth of 1 per cent from the corresponding proportion for 1902, while the municipal stations reported 8.6 per cent of the total. The percentages of increase were greater for the latter class of stations, except for power purchased and for rent and other miscellaneous expenses.

TABLE 106.—COMMERCIAL AND MUNICIPAL CENTRAL ELECTRIC STATIONS—EXPENSES: 1907 AND 1902.

	Census.		Total.		PER CENT OF TOTAL.		PER CENT OF INCREASE.		
	1907	1902	Commercial.	Municipal.	Commercial.	Municipal.	Total.	Commercial.	Municipal.
Number of stations.....	1907	4,714	3,462	1,252	73.4	26.6	30.2	23.4	53.6
	1902	3,620	2,805	815	77.5	22.5			
Total expenses.....	1907	\$106,205,149	\$97,037,961	\$9,167,188	91.4	8.6	91.5	91.3	93.4
	1902	55,457,830	50,716,648	4,741,182	91.5	8.5			
Salaries and wages.....	1907	35,420,324	31,935,309	3,485,015	90.2	9.8	71.0	70.2	85.4
	1902	20,646,692	18,766,970	1,879,722	90.9	9.1			
Cost of supplies and materials.....	1907	14,326,351	12,969,731	1,356,620	90.5	9.5	56.6	56.3	59.1
	1902	9,149,664	8,296,763	852,901	90.7	9.3			
Cost of fuel.....	1907	23,057,745	19,824,962	3,232,783	86.0	14.0	98.2	94.6	123.6
	1902	11,635,509	10,189,685	1,445,824	87.6	12.4			
Power purchased.....	1907	7,074,472	6,696,188	378,284	94.7	5.3	232.0	233.6	206.1
	1902	2,130,759	2,007,193	123,566	94.2	5.8			
Miscellaneous expenses.....	1907	26,326,257	25,611,771	714,486	97.3	2.7	121.3	123.6	62.7
	1902	11,895,206	11,456,037	439,169	96.3	3.7			

The proportion that each item of expense bears to the total is shown in Table 107.

TABLE 107.—Commercial and municipal central electric stations—Per cent that each item of expense is of total: 1907 and 1902.

	TOTAL.		COMMERCIAL.		MUNICIPAL.	
	1907	1902	1907	1902	1907	1902
Total expenses.....	100.0	100.0	100.0	100.0	100.0	100.0
Salaries and wages.....	33.4	37.2	32.9	37.0	38.0	39.6
Cost of supplies and materials..	13.5	15.5	13.4	16.4	14.8	18.0
Cost of fuel.....	21.7	21.0	20.4	20.1	35.3	30.5
Power purchased.....	6.7	3.8	6.9	4.0	4.1	2.6
Miscellaneous expenses.....	24.8	21.4	26.4	22.6	7.8	9.3

Table 107 shows that salaries and wages formed the largest proportion of the total expenses, being upward of one-third of the total at both censuses. Miscella-

neous expenses, including rents, taxes, insurance, etc., was second in importance, forming nearly one-fourth of the total expenses in 1907 and more than one-fifth in 1902. The cost of fuel was of nearly equal importance with the last-mentioned item, and represented nearly the same proportion of the total at each of the two censuses. The cost of supplies and materials includes the amount expended during the year for such articles as meters, motors, transformers, lamps and fittings, poles or other supports, and wire and cable, etc., which were used in connection with the operation of the station or for ordinary repairs and replacements. It does not, however, include the cost of such of these articles as were used for new construction or for extension or additions to the plant or equipment. It also includes the cost of such of these articles as were sold, and the proceeds reported by the

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company as an income, rent of water privileges for water wheels or turbines, and freight on material which was not included in the cost. The cost of power purchased was the least important class of expense, representing only 6.7 per cent of the total in 1907, but

shows the largest proportionate increase of any of the items contained in the table.

The distribution of expenses between the purely electric and the composite stations is shown in Table 108.

TABLE 108.—PURELY ELECTRIC AND COMPOSITE CENTRAL ELECTRIC STATIONS—EXPENSES: 1907 AND 1902.

	Census.	Total.	Purely electric.	Composite.	PER CENT OF TOTAL.		PER CENT OF INCREASE.		
					Purely electric.	Com-posite.	Total.	Purely electric.	Com-posite.
Number of stations.....	1907 1902	4,714 3,620	2,648 2,139	2,066 1,481	56.2 59.1	43.8 40.9	30.2	23.8	39.5
Total expenses.....	1907 1902	\$106,205,149 55,457,830	\$63,490,175 37,272,578	\$42,714,974 18,185,252	59.8 67.2	40.2 32.8	91.5	70.3	134.9
Salaries and wages.....	1907 1902	35,420,324 20,646,692	20,914,204 13,891,420	14,506,120 6,755,266	59.0 67.3	41.0 32.7	71.6	50.6	114.7
Cost of supplies and materials.....	1907 1902	14,326,351 9,149,664	8,290,513 6,090,750	6,035,838 3,038,014	57.9 66.6	42.1 33.4	56.6	36.1	97.3
Cost of fuel.....	1907 1902	23,057,745 11,635,509	12,476,568 7,433,874	10,581,177 4,201,635	54.1 63.9	45.9 36.1	98.2	67.8	151.8
Power purchased.....	1907 1902	7,074,472 2,130,759	4,959,519 1,521,654	2,114,953 609,105	70.1 71.4	29.9 28.6	232.0	225.9	247.2
Miscellaneous expenses.....	1907 1902	26,326,257 11,895,206	16,849,371 8,334,874	9,476,886 3,560,332	64.0 70.1	36.0 29.9	121.3	102.1	166.2

All the items of expense showed larger percentages of increase for the composite stations than for the purely electric stations, a condition similar to that which was shown in Table 85 for income. The proportion that the composite stations form of the total number was greater in 1907 than in 1902, but the proportion of the total expenses that was reported by this class showed a still larger increase. It is noteworthy that the composite stations show their smallest proportion of the total of the various items for power purchased. This is natural, as many of them owe their existence to the fact that there is a surplus of primary power from some other industry which is harnessed to a dynamo for the generation of electrical energy. For each item of expense the proportion chargeable to the purely electric stations was less in 1907 than in 1902.

The proportion that each item of expense is of the total for the purely electric and the composite central electric stations is shown in Table 109.

TABLE 109.—Purely electric and composite central electric stations—Per cent that each item of expense is of total: 1907 and 1902.

	TOTAL.		PURELY ELECTRIC.		COMPOSITE.	
	1907	1902	1907	1902	1907	1902
Total expenses.....	100.0	100.0	100.0	100.0	100.0	100.0
Salaries and wages.....	33.4	37.2	32.9	37.3	34.0	37.1
Cost of supplies and materials..	13.5	16.5	13.1	16.3	14.1	16.8
Cost of fuel.....	21.7	21.0	19.7	19.9	24.8	23.1
Power purchased.....	6.7	3.8	7.8	4.1	5.0	3.3
Miscellaneous expenses.....	24.8	21.4	26.5	22.4	22.2	19.6

The proportion of the total expenses represented by salaries and wages, which formed about one-third of the total expenses for both the purely electric and the composite stations, and by the cost of supplies and

materials, which formed rather more than one-eighth for each class, shows a decrease in 1907 as compared with 1902. The proportionate cost of fuel remained nearly constant for both classes of stations. For each of the two classes of stations miscellaneous expenses formed a greater proportion of the total expenses in 1907 than in 1902, the gain being the larger for the purely electric stations, for which it formed more than one-fourth of the total expenses in 1907. This latter class of stations also reported much the greater increase in the proportion represented by the cost of power purchased, which nearly doubled between 1902 and 1907.

The expenses of stations, classified according to the kind of primary power used and the percentages of increase, are shown in Tables 110 and 111.

Although the expenses of the stations operated by steam power exclusively show an increase of 74.6 per cent, the percentage of the total expenses reported for this class of stations shows a decrease of 6.8 in 1907 as compared with 1902. Only one other class of stations, those using gas exclusively, showed a diminution in its percentage of the total expenses at the later census as compared with the earlier. Although the expenses for this latter class of stations show an increase of 61.7 per cent, this was the smallest increase shown for any of the seven classes for which figures are given in Table 110. Each of the remaining classes of stations increased its proportion of the total expenses in 1907, and the stations using water with other minor power and the stations not equipped with primary power more than doubled their proportions. Of the total increase in the cost of power purchased, 56.9 per cent was contributed by the stations without primary power, which reported 53.2 per cent of the total cost of power in 1907 as compared with 44.5 per cent in 1902.

TABLE 110.—COMMERCIAL AND MUNICIPAL CENTRAL ELECTRIC STATIONS—EXPENSES, BY KIND OF PRIMARY POWER USED: 1907 AND 1902.

	Census.	Total.	Steam exclusively.	Steam with other minor power.	Water exclusively.	Water with other minor power.	Water and steam.	Gas exclusively.	Stations without primary-power equipment.
Number of stations.....	1907 1902	4,714 3,620	3,262 2,747	93 43	474 315	61 20	360 275	180 51	284 169
Total expenses.....	1907 1902	\$106,205,149 55,457,830	\$74,178,650 42,492,368	\$5,147,919 2,228,828	\$4,972,066 2,448,675	\$1,536,930 342,327	\$12,234,923 5,675,249	\$710,849 439,650	\$7,423,812 1,830,733
Salaries and wages.....	1907 1902	35,420,324 20,646,092	24,120,179 15,462,511	1,807,087 798,666	2,173,107 1,193,781	622,989 196,698	4,630,594 2,399,751	298,858 166,379	1,787,510 428,906
Cost of supplies and materials.....	1907 1902	14,326,351 9,149,664	9,594,330 7,360,161	817,898 368,857	801,852 303,496	175,232 20,295	2,229,294 887,737	94,275 55,845	613,470 153,273
Cost of fuel.....	1907 1902	23,057,745 11,635,509	19,480,534 10,126,800	1,377,563 596,019	26,844 5,511	184,569 7,602	1,716,574 832,601	192,855 60,520	78,826 6,456
Power purchased.....	1907 1902	7,074,472 2,130,759	2,589,803 532,759	160,646 64,143	108,823 284,298	10,703 720	433,535 193,523	7,597 107,132	3,763,365 948,184
Miscellaneous expenses.....	1907 1902	26,326,257 11,895,206	18,393,804 9,010,137	984,725 401,143	1,861,440 661,589	543,437 117,012	3,224,926 1,361,637	117,284 49,774	1,200,641 293,914

TABLE 111.—COMMERCIAL AND MUNICIPAL CENTRAL ELECTRIC STATIONS—PER CENT INCREASE OF EXPENSES, BY KIND OF PRIMARY POWER USED: 1907.

	Total.	Steam exclusively.	Steam with other minor power.	Water exclusively.	Water with other minor power.	Water and steam.	Gas exclusively.	Stations without primary-power equipment.
Number of stations.....	30.2	18.7	116.3	50.5	205.0	30.9	252.9	68.0
Total expenses.....	91.5	74.6	131.0	103.1	349.0	115.6	61.7	305.5
Salaries and wages.....	71.6	56.0	126.3	82.0	216.7	93.0	79.6	312.0
Cost of supplies and materials.....	56.6	30.4	121.7	164.2	763.4	151.1	68.8	312.1
Cost of fuel.....	98.2	92.4	131.1	387.1	2,327.0	106.2	218.6	1,121.0
Power purchased.....	232.0	386.1	150.4	161.7	1,386.5	124.0	192.9	296.9
Miscellaneous expenses.....	121.3	104.1	145.5	181.4	364.4	136.8	135.6	308.5

¹ Decrease.

For the separate items of expense the percentages of gains or losses vary so surprisingly that they can only be accounted for by a transfer of stations from one group to another by reason of changes in or addition to their primary power. There is no doubt that many changes of this character have taken place since 1902, as a result of which stations reported in one class at that census are shown in another class in 1907; and the

totals, therefore, in Table 110, although showing existing conditions at each census, may not correctly portray the increase in the sense in which this term is generally applied.

The percentages which the several items of expense form of the total for each class of stations are shown in Table 112.

TABLE 112.—COMMERCIAL AND MUNICIPAL CENTRAL ELECTRIC STATIONS—PER CENT DISTRIBUTION OF TOTAL EXPENSES FOR EACH KIND OF POWER USED, BY ITEMS OF EXPENSE: 1907 AND 1902.

	Census.	Total.	Steam exclusively.	Steam with other minor power.	Water exclusively.	Water with other minor power.	Water and steam.	Gas exclusively.	Stations without primary-power equipment.
Total expenses.....	1907 1902	100.0 100.0	100.0 100.0	100.0 100.0	100.0 100.0	100.0 100.0	100.0 100.0	100.0 100.0	100.0 100.0
Salaries and wages.....	1907 1902	33.4 37.2	32.5 36.4	35.1 35.8	43.7 48.8	40.5 57.5	37.8 42.3	42.0 37.8	23.8 23.4
Cost of supplies and materials.....	1907 1902	13.5 16.5	12.9 17.3	15.9 16.5	16.1 12.4	11.4 5.9	18.2 15.6	13.3 12.7	8.3 8.4
Cost of fuel.....	1907 1902	21.7 21.0	26.3 23.8	26.8 26.7	0.5 0.2	12.0 2.2	14.0 14.7	27.1 13.8	1.1 0.4
Power purchased.....	1907 1902	6.7 3.8	3.5 1.3	3.1 2.9	2.2 11.6	0.7 0.2	3.5 3.4	1.1 24.4	50.7 51.8
Miscellaneous expenses.....	1907 1902	24.8 21.4	24.8 21.2	19.1 18.0	37.4 27.0	35.4 34.2	26.4 24.0	16.5 11.3	16.2 16.1

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Salaries and wages forms the largest item of expense for each class of stations equipped with primary power. That the stations having steam as the exclusive primary power showed the smallest proportionate expense for salaries and wages, is due in a measure to the fact that the cost of fuel forms a large item of expense for these stations, in addition to which this class includes a large proportion of the municipal stations for which the expense for salaries and wages is small. The percentage represented by cost of supplies and materials is reasonably uniform for the classes having primary power. Naturally, the stations having steam power show the largest proportionate cost of fuel. That the stations using water power exclusively and those classed as without primary power report fuel, may be explained by the fact that a number of stations which had been operated by steam in the early part of the year had removed their steam equipment and were operated by water power or wholly discontinued the use of primary power at the close of the year, the date for which the stations are classified as to kind of power and in other respects. The per cent distribution of expenses for the stations without primary power is scarcely comparable with those for the other classes of stations. About half the cost of operation of these stations lay in power purchased.

Salaries and wages.—The employees whose remuneration figures in the expense tables of this report include all those engaged in operating the plant and keeping the equipment in proper condition. The number and the salaries and wages of employees engaged exclusively upon new work or additions and extensions

are not included, since this expense is reported as part of the cost of construction during the year. If, however, any of the regular employees of the station who are ordinarily engaged in the operation of the plant were engaged a part of the time on new construction or additions, the amount paid such employees was included under "Salaries and wages." If rent, board, or other allowance was furnished as part compensation it was included in the total for salaries and wages. In the case of composite stations it frequently happens that such employees as general managers, clerks, engineers, and firemen work indiscriminately for the electric station and for the gas works or waterworks, etc., and in these instances an estimate was made of the proportion of salaries and wages chargeable to the electric service. No attempt has been made in this report to show the average wages of employees. One of the reasons for this is that a number of stations were in operation only a part of the year; and since these stations would show the full normal number of employees but wages for only that part of the year for which they were employed, the average wage as determined by dividing the total wages paid during the year by the average number of employees would produce results considerably less than the facts would warrant. The figures given for the average number of wage-earners represented approximately the number necessary to conduct the plant under normal conditions, or the average calculated from the weekly pay rolls of the company.

Detailed statistics of salaries and wages are presented in Table 113.

TABLE 113.—COMMERCIAL AND MUNICIPAL CENTRAL ELECTRIC STATIONS—EMPLOYEES, SALARIES, AND WAGES: 1907 AND 1902.

	TOTAL.		COMMERCIAL.		MUNICIPAL.		PER CENT OF INCREASE.			PER CENT OF TOTAL.				
	1907	1902	1907	1902	1907	1902	Total	Com- mercial.	Municipal.	Commercial.		Municipal.		
										1907	1902	1907	1902	
Total:														
Number.....	47,632	30,326	42,066	26,909	5,566	3,417	57.1	56.3	62.9	88.3	88.7	11.7	11.3	
Salaries and wages.....	\$35,420,324	\$20,646,692	\$31,935,309	\$18,766,970	\$3,485,015	\$1,879,722	71.6	70.2	85.4	90.2	90.9	9.8	9.1	
Salaries employees:														
General officers of corporations—														
Number.....	1,761	1,416	1,761	1,416			24.4	24.4		100.0	100.0			
Salaries.....	\$2,202,028	\$1,465,471	\$2,202,028	\$1,465,471			50.3	50.3		100.0	100.0			
General managers, superintendents, etc.—														
Number.....	4,357	2,564	3,268	1,875	1,089	689	69.9	74.3	58.1	75.0	73.1	25.0	26.9	
Salaries.....	\$5,058,236	\$2,481,278	\$4,243,307	\$2,088,298	\$814,929	\$392,980	103.9	103.2	107.4	83.9	84.2	16.1	15.8	
Clerks and bookkeepers—														
Number.....	6,872	3,016	6,346	2,755	526	261	127.9	130.3	101.5	92.3	91.3	7.7	8.7	
Salaries.....	\$4,473,523	\$1,716,831	\$4,293,820	\$1,652,430	\$179,903	\$64,401	160.6	159.8	179.3	96.0	96.2	4.0	3.8	
Wage-earners:														
Foremen—														
Average number.....	1,434	1,000	1,344	943	90	57	43.4	42.5	57.9	93.7	94.3	6.3	5.7	
Wages.....	\$1,527,494	\$953,738	\$1,446,048	\$910,372	\$81,446	\$42,766	60.2	58.7	90.4	94.7	95.5	5.3	4.5	
Inspectors—														
Average number.....	894	571	860	546	34	25	56.6	57.5	36.0	96.2	95.6	3.8	4.4	
Wages.....	\$697,097	\$415,904	\$668,465	\$397,983	\$28,632	\$17,921	67.6	68.0	59.8	95.9	95.7	4.1	4.3	
Engineers—														
Average number.....	5,857	4,587	4,446	3,743	1,411	844	27.7	18.8	67.2	75.9	81.6	24.1	18.4	
Wages.....	\$4,453,378	\$3,259,870	\$3,484,231	\$2,721,127	\$969,147	\$538,743	36.6	28.0	79.9	78.2	83.5	21.8	16.5	
All other—														
Average number.....	26,457	17,172	24,041	15,631	2,416	1,541	54.1	53.8	56.8	90.9	91.0	9.1	9.0	
Wages.....	\$17,008,668	\$10,353,600	\$15,597,610	\$9,530,689	\$1,410,958	\$822,911	64.3	63.7	71.5	91.7	92.1	8.3	7.9	

Table 113 shows that of the total number of employees of electric light and power stations in 1907, the municipal stations employed 11.7 per cent. For the same year the proportion of the gross income reported by this class of stations, as given in Table 83, was 8 per cent. Thus the number of employees of the municipal stations is greater in proportion to their income than in the case of the commercial stations. This does not hold for all classes of employees, but is conspicuously true for general managers, superintendents, etc., among the salaried employees, and for the engineers among the wage-earners. The large number of the latter class is probably due to the fact that in the small stations which so largely predominate in the municipal stations the same employee often performs a number of different kinds of work, and the man, among his other duties, might have operated the engine, and hence would be reported as an engineer.

A comparison of the number of employees and their earnings in 1902 and 1907 shows a greater relative increase in the case of the municipal than in that of the commercial stations, although the actual increases for the commercial and for the municipal stations should be considered in connection with this statement.

The commercial stations reported approximately seven-eighths of the total number of employees in 1907 and about nine-tenths of the total amount expended for salaries and wages. This appears to indicate that in general the commercial stations pay their employees more liberally than do the municipal stations. This difference holds for both salaried employees and wage-earners, but is most marked in the case of the former. In 1907 the commercial stations reported 87.6 per cent of the total salaried employees and 91.5 per cent of the total salaries. There are two reasons for this difference. In the first place there are connected with the municipal stations no corporation officials who, in the commercial stations, receive the highest salaries of any of the employees. And secondly, many municipal stations reported salaried employees whose time was partly given to other public utilities of the municipality, and only a portion of whose salaries was charged to the operation of the electric station. Similar conditions are, to a greater or less extent, applicable to the wage-earners of the municipal stations, since many of them give part of their time only to the work of the electric plant.

Supplies and materials.—Details of the cost of supplies and materials, together with the cost of power purchased, are shown in Table 114.

TABLE 114.—COMMERCIAL AND MUNICIPAL CENTRAL ELECTRIC STATIONS—COST OF SUPPLIES AND MATERIALS: 1907 AND 1902.

	TOTAL.		COMMERCIAL.		MUNICIPAL.		PER CENT OF INCREASE.			PER CENT OF TOTAL.			
	1907	1902	1907	1902	1907	1902	Total.	Com-mercial.	Municipal.	Commercial.		Municipal.	
										1907	1902	1907	1902
Total cost.....	\$21,400,823	\$11,280,423	\$19,665,910	\$10,303,956	\$1,734,904	\$976,467	89.7	90.9	77.7	91.9	91.3	8.1	8.7
Meters:													
Number.....	31,900	27,632	28,024	25,739	3,876	1,893	15.4	8.9	104.8	87.8	93.1	12.2	6.9
Cost.....	\$426,625	\$416,994	\$378,432	\$390,569	\$48,193	\$26,425	2.3	13.1	82.4	88.7	93.7	11.3	6.3
Motors:													
Number.....	4,646	602	4,522	572	124	30	671.8	690.6	313.3	97.3	95.0	2.7	5.0
Cost.....	\$278,410	\$30,099	\$270,661	\$29,202	\$7,749	\$897	825.0	826.9	763.9	97.2	97.0	2.8	3.0
Transformers:													
Number.....	6,762	13,288	5,468	7,843	1,294	5,445	149.1	130.3	176.2	80.9	59.0	19.1	41.0
Cost.....	\$337,706	\$365,028	\$288,586	\$326,407	\$49,120	\$38,621	17.5	111.6	27.2	85.5	89.4	14.5	10.6
Incandescent lamps.....	\$3,101,252	\$1,507,249	\$3,042,738	\$1,426,224	\$148,514	\$81,025	111.7	113.3	83.3	95.3	94.6	4.7	5.4
Lamp fittings, etc. (except for arc lamps).....	\$762,593	\$177,236	\$676,339	\$154,517	\$86,254	\$22,719	330.3	337.7	279.7	88.7	87.2	11.3	12.8
Carbons, globes, hoods, and other supplies for arc lamps and repairs.....	\$1,698,205	\$1,466,852	\$1,456,927	\$1,263,528	\$241,278	\$203,324	15.8	15.3	18.7	85.8	86.1	14.2	13.9
Poles and other supports.....	\$757,379	\$346,587	\$701,081	\$319,617	\$56,298	\$26,970	118.5	119.4	108.7	92.6	92.2	7.4	7.8
Wire and cable.....	\$1,760,109	\$1,152,915	\$1,623,078	\$1,081,380	\$146,031	\$71,535	53.4	50.1	104.1	91.7	93.8	8.3	6.2
Power purchased.....	\$7,074,472	\$2,130,759	\$6,696,188	\$2,007,193	\$378,284	\$123,566	232.0	233.6	206.2	94.7	94.2	5.3	5.8
Rent of water privileges for water wheels or turbines.....	\$386,552	(²)	\$351,443	(²)	\$35,109	(²)	.....	.....	.....	90.9	.....	9.1	.....
All other materials.....	\$4,436,728	\$2,566,341	\$3,993,181	\$2,305,807	\$443,547	\$200,534	72.9	68.8	121.2	90.0	92.2	10.0	7.8
Freight, not included in cost of materials.....	\$281,792	\$1,120,363	\$187,265	\$939,512	\$94,527	\$180,851	174.8	180.1	147.7	66.5	83.9	33.5	16.1

¹ Decrease.

² Not reported separately in 1902.

The total cost of supplies, materials, etc., shows a somewhat larger percentage of increase than do salaries and wages, and the commercial stations show a larger per cent of increase in the total cost of supplies and materials than do the municipal stations. The

commercial stations reported a smaller amount as paid for meters and transformers in 1907 than in 1902. The amounts reported for these two items at the two censuses are of doubtful value for purposes of comparison, because of the uncertainty as to whether

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the questions were answered with the same understanding as to their meaning. In connection with the canvass of 1907 it was found that many stations had included, under supplies and materials, the cost of meters and transformers that had been used in connection with new work and which should have been reported under the cost of construction during the year. In 1902, when the first census of electric stations was taken, errors of this kind may have been overlooked, for it seems improbable that, in view of the increased use of meters and the general replacement of small and worn-out transformers by larger and better ones, the total cost of these machines, which could properly be classed as "Cost of supplies and materials," should be less in 1907 than 1902.

For purposes of comparison the amounts reported as paid for freight in 1907 and 1902 are of no value, be-

cause of the fact that some stations keep a separate account of freight charges and others reckon these charges in with the cost of supplies received. Thus the amounts reported are simply such part of the total freight charges as were kept separate from the cost of supplies and materials.

Of all the different items included under expenditures for supplies and materials, the cost of motors shows the largest percentage of increase. The amount paid for incandescent lamps more than doubled, and the amount paid for fittings for lamps of this character shows a still larger percentage of increase. The amount paid for carbons, globes, etc., for arc lamps was but little more in 1907 than in 1902.

Fuel.—The cost of fuel, which is reported as a single item in the foregoing tables of this report, is shown in detail in Table 115.

TABLE 115.—COMMERCIAL AND MUNICIPAL CENTRAL ELECTRIC STATIONS—COST OF FUEL: 1907 AND 1902.

	TOTAL.		COMMERCIAL.		MUNICIPAL.		PER CENT OF INCREASE.			PER CENT OF TOTAL.			
	1907	1902	1907	1902	1907	1902	Total.	Com- mer- cial.	Munici- pal.	Commercial.		Municipal.	
										1907	1902	1907	1902
Total.....	\$23,057,745	\$11,635,509	\$19,824,062	\$10,189,685	\$3,232,783	\$1,445,824	98.2	94.6	123.6	86.0	87.6	14.0	12.4
Coal.....	19,081,212	9,949,125	16,780,874	8,749,394	2,000,388	1,193,731	97.9	91.8	143.0	85.3	88.0	14.7	12.0
Crude petroleum.....	2,171,547	721,838	2,943,000	700,136	128,547	21,702	200.8	191.8	492.3	94.1	97.0	5.9	3.0
Natural gas.....	209,048	254,269	259,181	220,460	40,467	33,809	17.8	17.6	19.7	86.5	86.7	13.5	13.3
Manufactured gas.....	194,816	28,654	194,816	20,135	.....	8,519	579.9	867.5	.....	100.0	70.3	.....	29.7
All other fuel.....	710,522	687,623	547,091	499,560	.....	163,431	3.3	9.5	113.1	77.0	72.7	23.0	27.3

¹ Decrease.

Both in 1902 and 1907 approximately seventeenth-twentieths of the total cost of fuel reported represented the cost of coal. Crude petroleum was next in importance, the percentage which the cost of this fuel represented of the total cost increasing from 6.2 in 1902 to 9.4 in 1907. The cost of the three remaining classes of fuel shown formed but 5.2 per cent of the total cost of fuel in 1907 as compared with 8.3 per cent in 1902.

All of the amount paid in 1907 for manufactured gas was reported by the commercial stations, but for natural gas the proportion of the total represented by each of the two classes of stations at the two censuses varied but little from the proportions shown for coal. The use of crude petroleum appears to have been chiefly confined to the commercial stations, which reported 94.1 per cent of the total cost of this kind of fuel reported in 1907 and 97 per cent in 1902.

The states in which the central stations reported an expenditure for coal amounting to more than \$1,000,000 were as follows: New York, \$2,980,946; Illinois, \$1,997,418; Pennsylvania, \$1,899,829; Massachusetts, \$1,344,354; and Ohio, \$1,215,778. The states in which the stations reported more than \$100,000 as spent for crude petroleum were: California, \$945,251; Texas, \$728,343; and Arizona, \$167,922. Among the largest users of natural gas, with the amount spent

for this fuel in 1907, were: Ohio, \$83,979; Pennsylvania, \$67,923; Kansas, \$52,424; Oklahoma, \$29,557; and West Virginia, \$29,401. No large amount was reported by any state as spent for manufactured gas, except by California, the stations in which state reported \$150,407 or 77.2 per cent of the total amount reported for this class of fuel. Expenditures for "All other fuel," while general among the stations in the various states, were largest in those states having an abundance of timber.

Power purchased.—This constitutes the smallest of the several items of expense shown in Table 106, but shows the largest rate of increase, 232 per cent. Expenditures for electric current naturally form the greater part of this item, amounting to \$6,417,237 in 1907 and \$1,300,925 in 1902, a gain of \$5,116,312, or 393.3 per cent. The expenditure for other power—steam, water, etc.—amounted to \$657,235 in 1907 as compared with \$829,834 in 1902. Although the reported expenditure for other power was less in 1907 than in 1902, it is probable that there was no actual decrease, since the amount for 1902 included the cost of water for water wheels and turbines, which was, in 1907, not included with the cost of power purchased, and which amounted in that year to \$386,552.

The following states reported the largest amounts for power purchased in 1907: New York, \$2,105,944;

Pennsylvania, \$744,378; California, \$693,953; Michigan, \$630,532; Washington, \$365,111; Missouri, \$337,859; Massachusetts, \$295,442; and Illinois, \$263,848.

In 1907 there were 414 stations which reported the purchase of power as compared with 128 in 1902. Of the number reporting in 1907, 165 both generated and purchased current, and of the number reporting in 1902, 41 did the same. Moreover, a number of sta-

tions were found which, though fitted with dynamos, did not operate them, but purchased the current used. In 1907 there were 26 stations of this character, with a dynamo capacity of 15,688 kilowatts, as compared with 15 stations in 1902, with a dynamo capacity of 5,035 kilowatts.

Miscellaneous expenses.—Details of the expenses included in the last item of Table 106 are shown for the commercial and municipal stations in Table 116.

TABLE 116.—COMMERCIAL AND MUNICIPAL CENTRAL ELECTRIC STATIONS—MISCELLANEOUS EXPENSES: 1907 AND 1902.

	TOTAL.		COMMERCIAL.		MUNICIPAL.		PER CENT OF INCREASE.			PER CENT OF TOTAL.			
	1907	1902	1907	1902	1907	1902	Total.	Com- mer- cial.	Municipal.	Commercial.		Municipal.	
										1907	1902	1907	1902
Total.....	\$26,326,257	\$11,805,206	\$25,611,771	\$11,456,037	\$714,486	\$439,169	121.3	123.6	62.7	97.3	96.3	2.7	3.7
Rent of stations, line-wire sup- ports, conduits, etc.....	2,322,753	1,011,091	2,317,099	1,001,504	5,654	10,187	129.6	131.4	144.5	99.8	99.0	0.2	1.0
Rent of offices.....	577,193	275,007	566,472	270,446	10,721	4,561	109.9	109.5	135.1	98.1	98.3	1.9	1.7
Taxes.....	6,351,020	2,665,005	6,345,796	2,654,885	5,224	10,120	138.3	139.0	148.4	99.9	99.6	0.1	0.4
Injuries and damages.....	634,991	248,304	602,523	246,545	32,468	1,750	155.7	144.4	1,745.8	94.9	99.3	5.1	0.7
Insurance.....	1,578,205	893,567	1,467,936	827,926	110,269	65,641	76.6	77.3	68.0	93.0	92.7	7.0	7.3
Ordinary repairs of buildings and machinery.....	4,300,684	2,701,747	3,986,586	2,480,217	314,098	221,530	59.2	60.7	41.8	92.7	91.8	7.3	8.2
All other expenses not elsewhere reported.....	10,561,411	4,099,885	10,325,359	3,974,514	236,052	125,371	157.6	159.8	88.3	97.8	96.9	2.2	3.1

¹ Decrease.

More than nineteen-twentieths of the total for these miscellaneous expenses was reported by the commercial stations and less than one-twentieth by the municipal stations. Of the expense for ordinary repairs of buildings and machinery and for insurance, the proportions for the two classes of stations were practically the same in 1907 as in 1902, or more than nine-tenths for the commercial stations and less than one-tenth for the municipal. Expenditures for ordinary repairs are common to the two classes of stations, though necessarily varying in proportion to the age

and condition of the plant and the standard to which it is kept up. The proportion of "All other expenses not elsewhere reported," paid by the municipal stations was relatively small, as might be expected, since these stations have much less occasion for expenditures for many of the items included under this head, such as advertising, interest, law expenses, etc., than have the commercial stations. The municipal stations also reported relatively insignificant amounts as paid for the rent of stations, line-wire supports, etc., office rents, and for taxes.