Chapter Title: Private Electric Light and Power Companies

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CHAPTER 13

PRIVATE ELECTRIC LIGHT AND POWER COMPANIES

§ 13a. The Census Data

The Census Bureau secures records from electric light and power companies at five year intervals. Censuses were taken in 1907, 1912, and 1917.[1] This spacing of time is such that estimates for each year of the period under consideration can be made with a reasonable degree of accuracy. The Census data, of course, were not collected with a view to answering the questions brought forward in our particular inquiry and hence are not entirely adapted to our needs. It is believed, however, that the official figures afford a basis for estimates that serve the present purpose fairly well.

The methods of interpolation used, of course, give only approximations; but, owing to the advantageous location of the Census dates, it is not likely that they have given rise to errors of any moment.

There are doubtless certain inaccuracies in the amounts recorded for the Census years themselves. For example, some rent and some interest on short time loans are doubtless paid to individuals, and employees receive some recompense for injuries. Presumably, however, all of these amounts are quite small. On the whole, it is believed that the figures shown in the study approximate the facts rather closely.

The way in which the Census figures have been used is shown in Table 13A.

Certain explanations are necessary concerning the nature of some of the items in Table 13A. For the reasons stated in Section 9b, income received as interest or dividends from other companies is not included in the value product of this industry. The income from operations less expenses should give the gain which is to be distributed among the owners of the plants. Interest paid to bondholders is included among "Expenses." To arrive at the gains of all investors, this item should be added to the dividends paid from operating receipts.

The Census records small payments for damages and legal expenses. Evidently, money paid for lands flooded or property destroyed represents

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[1] Professor Edmond E. Lincoln of Harvard University, who has been in charge of this part of the Census, has kindly criticised the results here presented. While he cannot be held responsible for the estimates given, his suggestions were most helpful and the report has been materially improved by their incorporation.

TABLE 13A

THE CENSUS FIGURES FOR THE ITEMS COMPOSING THE NET VALUE PRODUCT OF PRIVATE ELECTRIC LIGHT AND POWER PLANTS IN THE CONTINENTAL UNITED STATES

Item	Millions of dollars		
	Census of		
	1907	1912	1917
Gross Income from Operation.......	$159.7 a	$274.0 b	$477.8 c
Total Expenses d.................	123.0 e	216.0 f	391.0 g
Net Profits from Operation........	$ 36.7	$ 58.0	$ 86.8 n
Payments to Employees: i			
Wages........................	$21.2 h	$33.0 h	$52.0 h
Salaries......................	10.7 h	22.6 h	34.4 h
Total......................	$31.9	$55.6	$86.4
Payments to Investors: j			
Net Profits from Operation.......	$36.7	$58.0	$86.9
Interest on Funded Debt.........	26.8 k	40.5 l	61.0 m
Total.....................	$63.5	$98.5	$147.9
Total Value Product of Industry....	$95.4	$154.1	$234.3
Per cent of Value Product Received by Employees................	33.4	36.1	36.9

a *U. S. Census of Central Electric Light and Power Stations*, 1907, p. 159. In 1912 33.4 per cent of "All Other Income" was from investments. The same percentage (or $1,880,000), has been deducted in 1907.

b *U. S. Census of Central Elec. Light and Power Stations*, 1912, p. 89.

c *U. S. Census of Central Elec. Light and Power Stations*, 1917, p. 155; interest and dividends from investments excluded.

d Excludes sinking and reserve funds.

e In 1912, sinking and reserve funds constituted 1.69 per cent of miscellaneous expenses, hence 1.69 per cent of the 1907 miscellaneous expenses, or $834,000 have been deducted.

f *U. S. Census of Central Elec. Light and Power Stations*, 1912, p. 95.

g *U. S. Census of Central Elec. Light and Power Stations*, 1917, pp. 160–161.

h *U. S. Census of Central Elec. Light and Power Stations*, 1917, p. 120.

i There should be included here any amounts paid to employees as compensation for injuries. Professor Edmond E. Lincoln, special statistician for the Census Bureau in this line, assures us that this amount is less than $100,000; hence no entry has been made.

j No item is entered under this head for rents because Professor Lincoln states that the amount of rent going to individuals is "wholly negligible" practically all being paid "for stations, equipment of various kinds, use of lines and conduits, water privilege, etc."

k *United States Census of Elec. Light and Power Stations*, 1907, p. 61.

l 4.5% on funded debt, the rate being estimated from the *U. S. Census of Central Electric Light and Power Stations* for 1917, pp. 103 and 115.

m 4.7% on funded debt, the rate being estimated from the references cited under "l."

n Fraction over ½.

no net gain and therefore adds nothing to private revenues. Some damages doubtless are paid to injured employees, but the amount is stated by authority to be negligible.

By the process just described, it is believed that, for the Census years, the respective shares of the value product of the industry going to the persons working for hire and to the persons who take the risk and expect to secure remuneration for the investment of their efforts or property from the residuum of the net receipts have been fairly well differentiated. If the share of the employees is divided by the total value product of the industry and the quotient is multiplied by 100, the resulting product represents the approximate percentage of the value product going to the employees,—a group that, by contract, holds the primary claim against the net product of the enterprise.

§ 13b. The Net Value Product and Its Distribution

Table 13A completes the inquiry for the Census years, but, under the plan of campaign determined upon, it is necessary to estimate the value product and its distribution for each year from 1909 to 1918. Some basis of interpolation is therefore essential. The criteria depended upon for this purpose are derived from the annual reports of 19 typical electric light and power companies as quoted in Moody's *Manual*. The respective totals of net earnings, operating expenses, interest on funded debt, dividends, and corporate surplus have been calculated for each year from 1907 to 1918 for the entire group of corporations and are recorded in Tables 13B and 13C.

It is assumed that the ratio of profits of all concerns to the net earnings of the 19 typical corporations is a relatively stable quantity and that its changes can therefore, be well depicted by a smooth curve determined by the ratios for 1907, 1912 and 1917. Similarly it is assumed that the respective ratios of salaries and wages paid by all plants to the total operating expenses of the 19 selected corporations are relatively fixed, varying along a smooth curve rather than oscillating violently, and that the same holds true of the ratio of bond interest paid by all concerns to the interest on the funded debt reported by the sample corporations. The treatment of the data according to these assumptions yields the results set forth in Tables 13B, 13C, and 13D.

TABLE 13B

AN ESTIMATE OF THE TOTAL NET PROFITS OF PRIVATE ELECTRIC LIGHT AND POWER PLANTS IN THE CONTINENTAL UNITED STATES

A	B	C	D	E
Year	Total net earnings of 19 typical electric companies a (Thousands)	Total net profit of all private plants as shown by Census d (Thousands)	Ratio of total net profits to net earnings of typical companies	Estimated d net profit of all private plants B × D (Thousands)
1907.....	$15,652	$36,704	2.345 b	$36,704
1909.....	18,438			
1910.....	21,422		2.310 c	42,600
1911.....	23,023		2.303 c	49,330
1912.....	25,293	58,046	2.300 c	52,950
			2.295 b	58,046
1913.....	26,884			
1914.....	27,747		2.322 c	62,420
1915.....	31,154		2.362 c	65,550
1916.....	34,585		2.420 c	75,400
1917.....	33,798	86,857	2.489 c	86,100
1918.....	33,898		2.570 b	86,857
			2.655 c	90,000

a Compiled from various numbers of Moody's *Manual of Corporation Securities*.
b Computed by division.
c Interpolated along a smooth curve.
d For references, see Table 13A.

TABLE 13C

AN ESTIMATE OF SALARIES AND WAGES PAID BY PRIVATE ELECTRIC
LIGHT AND POWER COMPANIES IN THE INTERCENSAL YEARS

Year	Total operating expenses of 19 typical electric companies a (Thousands)	Salaries paid by all plants (Census figures d) (Thousands)	Ratio of salaries paid by all plants to expenses of typical companies	Estimated total salaries paid by all plants e (Thousands)	Wages paid by all plants (Census figures d) (Thousands)	Ratio of wages paid by all plants to expenses of typical companies	Estimated total wages paid by all plants e (Thousands)
1907...	$23,571	$10,739	.456 b	$10,739 d	$21,196	.899 b	$21,196 d
1909...	27,740		.541 c	15,000		.896 c	24,850
1910...	31,734		.574 c	18,220		.892 c	28,300
1911...	33,571		.596 c	20,000		.888 c	29,800
1912...	37,338	22,637	.606 b	22,637 d	33,021	.894 b	33,021 d
1913...	39,804		.602 c	23,980		.878 c	34,940
1914...	42,458		.593 c	25,190		.867 c	36,800
1915...	44,078		.582 c	25,660		.858 c	37,800
1916...	50,615		.562 c	28,460		.842 c	42,600
1917...	62,825	34,439	.548 b	34,439 d	52,035	.828 b	52,035 d
1918...	72,220		.525 c	37,970		.811 c	58,550

a Compiled from various numbers of Moody's *Manual of Corporation Securities.*
b Computed.
c Interpolated along a smooth curve.
d See Table 13A for references.
e Operating expenses of typical companies multiplied by the appropriate ratio.

TABLE 13D

AN ESTIMATE OF THE PAYMENTS OF BOND INTEREST MADE BY PRIVATE ELECTRIC LIGHT AND POWER COMPANIES IN THE IN-TERCENSAL YEARS

A	B	C	D	E
Year	Index of interest on funded debt paid by 15 reporting corporations *a*	Bond interest paid by all plants. (Census figures *b*) (Thousands)	Ratio of C to B	Estimated bond interest paid by all plants (Thousands) B × D
1907.........	20,692	$26,842	1.297 *c*	$26,842
1909.........	20,038			
1910.........	22,096		1.432 *d*	28,705
1911.........	23,965		1.503 *d*	33,218
1912.........	24,520	40,450	1.575 *d*	37,757
1913.........	25,415		1.650 *c*	40,450
			1.724 *d*	43,816
1914.........	24,675			
1915.........	27,055		1.800 *d*	44,415
1916.........	29,350		1.880 *d*	50,861
1917.........	30,000	61,000	1.957 *d*	57,453
1918.........	33,382		2.033 *c*	61,000
			2.108 *d*	70,368

a Compiled from various numbers of Poor's and Moody's *Manual of Public Utilities*.
b For references, see Table 13A.
c Computed by division.
d Read from a smooth curve.

It is of interest to note the fact that the industry shows an unusually steady increase in all lines throughout the decade. Profits, wages, and bond interest have each nearly trebled. No violent fluctuation appeared anywhere.

The next step in the usual procedure followed in these studies is to divide the total share of entrepreneurs and property owners into two parts; namely, disbursements, and business savings. This apportionment has been based upon the proportionate division of the net gain of the previously mentioned reporting corporations between dividends and corporate savings.

The corporations were separated into three classes based upon size. Ratios were separately computed from the totals of each class and the arithmetic average of these three ratios is the quantity here presented. This method prevents the domination of the results by the large corporations which probably form a much larger proportion of the sample than of the industry as a whole.

TABLE 13E

AN ESTIMATE OF THE TOTAL DISBURSEMENTS MADE TO THE STOCK AND BOND HOLDERS BY PRIVATE ELECTRIC LIGHT AND POWER PLANTS

A	B	C	D	E	F	G
Calendar year	Net profits of all companies [a] (Thousands)	Fraction of net profits saved by sample corporations	Savings of all concerns (Thousands) C × B	Dividends of all concerns (Thousands) B — D	Bond interest paid by all concerns [b] (Thousands)	Total disbursements to stock and bond holders (Thousands) E + F
1907......	$36,704	.5346	$19,622	$17,082	$26,842	$43,924
1909......	42,600	.3072	13,087	29,513	28,705	58,218
1910......	49,330	.3634	17,925	31,405	33,218	64,623
1911......	52,950	.3251	17,215	35,735	37,757	73,492
1912......	58,046	.2974	17,263	40,783	40,450	81,233
1913......	62,420	.3208	20,024	42,396	43,816	86,212
1914......	65,550	.1939	12,710	52,840	44,415	97,255
1915......	75,400	.3064	23,104	52,296	50,861	103,157
1916......	86,100	.3691	31,784	54,316	57,453	111,769
1917......	86,857	.2888	25,088	61,769	61,000	122,769
1918......	90,000	.2253	20,282	69,718	70,368	140,086

[a] See last column of Table 13B.
[b] See Table 13D, Column E.

It is now in order to measure the purchasing power of that share of the total value product of the industry which was paid to the stock and bond holders.   This is done in Table 13F.

TABLE 13F

THE PURCHASING POWER OF THE SHARE OF THE STOCK AND BOND HOLDERS IN THE VALUE PRODUCT OF PRIVATE ELECTRIC LIGHT AND POWER PLANTS

A	B	C	D	E	F	G
	Corporate savings			Interest and dividends paid		
Calendar year	Thousands of dollars [a]	Index of construction costs [b]	Value at prices of 1913 (Thousands) $\frac{B}{C}$	Thousands of dollars [c]	Index of prices of goods used by the wealthier classes [d]	Value at prices of 1913 (Thousands) $\frac{E}{F}$
1909....	$13,087	.927	$14,118	$58,218	.965	$60,330
1910....	17,925	.953	18,809	64.623	.983	65.741
1911....	17,215	.945	18,217	73,492	.990	74,234
1912....	17,263	.983	17,562	81,233	1.000	81,233
1913....	20,024	1.000	20,024	86,212	1.000	86,212
1914....	12,710	1.013	12,547	97,255	1.011	96,197
1915....	23,104	1.002	23,058	103,157	0.999	103,260
1916....	31,784	1.088	29,213	111,769	1.081	103,394
1917....	25,088	1.252	20,038	122,769	1.225	100,220
1918....	20,282	1.448	14,007	140,086	1.406	99,634

[a] See Table 13E, Column D.

[b] Indices derived from Bureau of Labor Statistics combined, with weights assigned as follows: Building labor 3, Metals and metal products 2, Building materials 1.

[c] See Table 13E, Column G.

[d] An average of the indices for those classes spending respectively $5,000 and $25,000 annually for consumption goods. See § 2c.

Table 13F indicates that when price variations are eliminated corporate savings show little difference at the beginning and end of the decade; but that the disbursements to investors rose sharply during the first half of the period and then became nearly stationary, presumably because of the prevalence of relatively fixed rates in the face of rising costs of operation.

Table 13G is devoted to showing the fraction of the net value product going to the employees.

TABLE 13G

THE ESTIMATED TOTAL VALUE PRODUCT OF PRIVATE ELECTRIC LIGHT AND POWER PLANTS AND ITS DISTRIBUTION

(Continental United States, 1909–1918)

(Values all in thousands of dollars)

| Year | Share of stock and bond holders | | | Share of employees. Salaries and wages [c] | Total value product of industry [d] | Per cent of value product going to employees |
	Retained in business [a] (Savings)	Amounts withdrawn from business [b]	Total			
1907.......	$19,622	$43,924	$63,546	$31,935	$95,431	33.5
1909.......	13,087	58,218	71,305	39,850	111,155	35.8
1910.......	17,925	64,623	82,548	46,520	129,068	36.0
1911.......	17,215	73,492	90,707	49,800	140,507	35.4
1912.......	17,263	81,233	98,496	55,658	154,154	36.1
1913.......	20,024	86,212	106,236	58,920	165,156	35.7
1914.......	12,710	97,255	109,965	61,990	171,955	36.0
1915.......	23,104	103,157	126,261	63,460	189,721	33.4
1916.......	31,784	111,769	143,553	71,060	214,613	33.1
1917.......	25,088	122,769	147,857	86,474	234,331	36.9
1918.......	20,282	140,086	160,368	96,520	256,888	37.6

[a] See Table 13E, Column D.
[b] See Table 13E, Column G.
[c] Derived from Table 13C by combining wages and salaries.
[d] Sum of two preceding columns.

It is clear that the employees receive a smaller share of the value product in this industry than in most other fields. This may be due to the large amount of investment per employee, the small amount of labor required per unit of output, or perhaps to some other reason. That it is not primarily the result of paying much lower average wages than other industries is indicated by the entries in Table 13H.

TABLE 13H

AN ESTIMATE OF THE AVERAGE ANNUAL EARNINGS OF EMPLOYEES OF PRIVATE ELECTRIC LIGHT AND POWER COMPANIES

A	B	C	D	E	F	G	H
Calendar year	Average number of employees actually at work	Fraction of those attached to industry actually working	Number attached to industry $\dfrac{B}{C}$	Total wages and salaries paid e (Thousands)	Average annual earnings per employee e attached to industry $\dfrac{E}{D}$	Index of prices of goods consumed by manual and clerical workers f	Annual average earnings at prices of 1913 $\dfrac{F}{G}$
1907....	42,066 a	.96 b	43,920 c	$31,935	$727		
1909....			55,000 d	39,850	725	.955	$759
1910....			60,500 d	46,520	769	.978	786
1911....			67,000 d	49,800	743	.984	755
1912....	71,395 a	.98 b	72,830 c	55,658	764	.994	769
1913....			78,500 d	58,920	751	1.000	751
1914....			84,100 d	61,990	737	1.01	730
1915....			89,000 d	63,460	713	1.03	692
1916....			94,000 d	71,060	756	1.10	687
1917....	94,679 a	.97 b	97,700 c	86,474	885	1.29	686
1918....			101,500 d	96,520	951	1.58	602

a *U. S. Census of Electric Light and Power Stations*, p. 120.
b Roughly estimated.
c Computed by division.
d Interpolated along a smooth curve.
e See Table 13G.
f Bureau of Labor Statistics index carried back by means of a special study; see Table 2C.

It is evident that the purchasing power of the average earnings has failed to keep pace with the rising price level. Whether this is due to the substitution of a poorer grade of employees or a failure to raise wage rates in proportion to the increase in the price level is not indicated by the data at hand.

It seems impracticable to measure with any degree of accuracy the output per employee or per capita for other periods than the Census years. Those years are so spaced, however, that a comparison based thereon answers many of the essential queries. The data appear in Table 13I.

TABLE 13I

NUMBER OF KILOWATT HOURS PRODUCED PER EMPLOYEE AND PER
CAPITA BY PRIVATE ELECTRIC LIGHT AND POWER PLANTS

A	B	C	D	E	F
Census year	Kilowatt hours generated a (Millions)	Average number of employees actually working a	Kilowatt hours generated per employee $\dfrac{B}{C}$	Population of the Continental United States (Thousands)	Kilowatt hours per person in the United States $\dfrac{B}{E}$
1907.........	5,573	42,066	132,480	87,321 c	63.8
1912.........	11,032	71,395	154,520	95,338 b	115.7
1917.........	24,399	94,679	257,700	103,059 b	236.7

a *U. S. Census of Central Electric Light and Power Stations*, 1917, pp. 75 and 120.
b Estimated by means of a special study; see § 2a.
c Census estimate quoted in *Statistical Abstract of U. S.*, 1916, p. 676.

A glance at the table shows a remarkable increase in the amount of current generated for each employee at work, and also for each person in the country. Whether any part or all of the increased production per employee is due to greater diligence on the part of the average worker could only be determined by further investigation. It is clear that electrical energy produced by commercial plants is playing a rapidly increasing rôle in meeting the power requirements of our industries.