

STATE OF MICHIGAN

"

FIFTEENTH ANNUAL REPORT

OF THE

BUREAU OF LABOR

AND

INDUSTRIAL STATISTICS



UNDER DIRECTION OF

COMMISSIONER OF LABOR



BY AUTHORITY



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STATISTICS GATHERED ON

ELECTRIC LIGHTING, GAS AND WATER PLANTS IN MICHIGAN

INVESTIGATION OF 1897.

The question of collecting statistical details relative to municipal and private ownership of gas works, electric light and water works, was first suggested by Hon. Carroll D. Wright, United States Labor Commissioner, and after some discussion by correspondence and in National convention, the Labor Commissioners and officials of the various Bureaus of Statistics in the several states agreed that the undertaking was a worthy one and would produce most interesting and valuable statistics.

This line of investigation was commenced by our worthy predecessor, Commissioner Morse, and the work was well advanced when we assumed our duties as Commissioner, on the 1st of May, 1897.

We found this investigation largely in the hands of Hon. John Holbrook, who had been specially appointed and detailed to do this work by Commissioner Morse. Mr. Holbrook was subsequently appointed our Deputy Labor Commissioner, and this particular branch of work was placed solely in his charge, though others were detailed to assist him.

It would be an oversight on our part if we failed to especially compliment our worthy Deputy upon his efforts and the excellent report that hereafter follows.

DEPUTY HOLBROOK'S REPORT.

In collecting statistics on electric lighting, gas and water plants, some little difficulty was experienced in securing intelligent and truthful answers to some of the questions on the schedules, especially on electric lighting, not entirely from a desire to evade them but in many instances because the object in gathering them was not clearly understood, many believing that it was being conducted largely in the interest of municipal ownership, and others that it was for the purpose of taxation, and where plants were owned by private parties or by corporations they hesitated and in a few instances refused to give the information required, but in a large majority of cases answers were freely and willingly given.

But the occasion of the greatest difficulty was due to the fact that the parties were unable to give the information, owing to the faulty or loose methods in bookkeeping.

This was found to be true more especially with municipal plants, but few of them being able to give but little more than the first cost of the plant, the amount paid for labor, the number of lights in use and the charge for the same. In but few instances could the cost of the light be ascertained, either in private or municipal plants.

This condition suggests the necessity of a uniform and comprehensive system of keeping accounts, and in this connection attention is called to the fact that in England the law prescribes and enforces a uniform system of bookkeeping for electric lighting plants, whether municipal or corporate, and at the end of the year a report is made showing the output, the cost of the light to the producer, profits made and other particulars in detail.

Municipal Lighting.

Municipal ownership of electric lighting plants has proven entirely successful where the same careful management prevails as is found in private business affairs.

The success or failure of municipal ownership depends entirely upon management, and the almost universal opinion seems to be that it is poor economy to entrust the management of a lighting plant to unskilled and incompetent men simply because their services can be secured for less money than those who possess some knowledge of electrical mechanism and are skilled in its application.

By the employment of competent assistance better service is secured, the lights are more satisfactory and less breakage occurs, which in the course of a few years more than makes up the difference in the cost of skilled and unskilled labor.

Again, a change of administration in a city or village is frequently followed by a like change in management and care of the lighting plant, the dominant party frequently installing a politician where an electrician is much more needed.

In all cases where inquiries were made in cities where municipal plants were operated the opinion was unanimous among the business men that employes should be selected for their competency and fitness by boards that are strictly non-partisan, if it were possible to secure such boards, and that a person's usefulness to his party should be no guarantee as to fitness to operate a lighting plant.

The sentiment favoring municipal ownership seems to be gaining strength in Michigan, and many well managed and profitable plants might be mentioned if thought advisable.

A very amusing and somewhat truthful comment on municipal ownership is made in an article published in an English periodical devoted to electric lighting and electrical appliances, in which it severely criticises this country for failures in an enterprise which is being very successfully managed in their own country. We produce the article in full, believing that it may be of some interest.

"Municipal ownership of electric lighting plants, the most discussed of all questions of municipal polity, is the more insidious that it comes

dressed in the sheep's woolly garb of a philanthropist, which to the uninitiated and ignorant has an alluring and plausible aspect, but to the experienced are plainly visible the wolf's deadly fangs, which in every instance sooner or later lacerated the taxpayer. The authors and promoters of this alluring scheme are either visionary theorists, who have no practical knowledge of its manipulation, or unscrupulous politicians who, desiring to pose as benefactors to the municipality, hope to ingratiate themselves in the hearts of the voter and thus secure political plums for themselves and their henchmen * * * Municipal ownership is contrary to the spirit of republican institutions * * * Just as sure as a nation becomes a commercial producer competing against its own citizens, just so sure will the seeds of its own disintegration be sown. * * * Municipal ownership is a source of danger to the commonwealth, in that it affords a great opportunity for fraud. Municipal corruption is so common and so well known that it needs no argument to prove the danger of opening a new avenue of power in the hands of unprincipled public officials."

"The above lines are extracts from an article which occupies the place of honor in a recent number of an American technical journal and they embody what is practically the unanimous opinion of the great American industries with regard to a policy which in this country is gaining more extensive support every day. They form an eloquent commentary on the results of a hundred and twenty years of republican government, and they make us sad and thankful. Poor Uncle Sam! He has made the world ring with his boasting. He has whipped creation until it is a wonder it has a back left for further castigation. He has constituted himself the very synonym for everything that is progressive, enlightened, and free, and he has to confess at last that he hasn't attained even the rudiments of a nation's pride—honest administration of public business. His chosen representatives are ravening wolves. His elected officials are self-seeking scoundrels, whose first thought is to rob those whose stewards they are. The commonwealth is the enemy of the citizen, and the duty of the latter is to cry "hands off!" to those whom he, having appointed them to manage his affairs, cannot trust round the proverbial corner. Well-a-day! A nation of slaves ruled by an iron hand might have some excuse for such an attitude of mind. A nation of rogues would be logical in giving their officers credit for their own proclivities. But that a nation of loyal and patriotic citizens should give vent to such a whine, or tolerate for a day such a state of things, is past our comprehension. Talk about effete institutions indeed! Surely, in a country where venality is the acknowledged badge of public office, where plunder is the avowed object of public men, where corruption rules and stalks supreme, the chances of the future are poor indeed and the lessons of the past unlearned."

Electric Lighting in Cities.

Sixty-nine electric lighting plants in cities were visited, of which forty-nine were owned by corporations or individuals and twenty by municipalities.

They represent an investment of \$5,423,450, and were assessed at \$1,071,800 and paid in salaries and wages \$224,588 per year.

These plants have a capacity of 15,087 arc lights of 2,000 candle power and 215,260 incandescent lights of 16 candle power.

The average cost per month for arc lights is \$6 and for incandescent lights 64 cents.

The average cost by meter is 15.6 cents per 1,000 watts.

The lowest charge per month for arc lights is \$3 and for incandescent lights 16 cents.

These prices are for single lights without reference to the number taken, which of course would bring much less according to the number used.

Electric Lighting in Villages.

Seventy-two lighting plants in villages were visited, of which fifty-one are owned by individuals or companies and twenty-one by municipalities.

They represent an investment of \$832,625 and are assessed at \$201,800, and pay in wages and salaries \$74,800 per year.

These plants have a capacity of two thousand nine hundred and five arc and sixty-one thousand three hundred and thirty incandescent lights.

The average cost per arc light is \$6.55 per month and 61 5-10 cents per month for incandescent lights, or by meter 14.1 cents per thousand watts.

The lowest price for arc lights per month is \$2 and the highest \$8.33, and for incandescent 30 cents and \$1. By meter 8 cents is the lowest and 20 cents the highest charge per thousand watts.

Water Works in Cities, 1897.

Statistics were gathered from 62 plants in cities, of which 46 were under municipal control and 16 were owned by companies or individuals.

They represent an investment of \$14,676,817, of which amount the municipal plants are credited with \$12,667,817 and those owned by individuals or companies \$1,970,822 and are assessed at \$802,150. Municipal plants being exempt from taxation.

Three hundred and ninety-eight thousand two hundred and seventeen dollars was paid in wages and salaries during the year, and the average monthly receipts was \$2,109.92.

The capacity of these plants is 345,000,000 gallons per day and the actual daily consumption is 94,673,000 gallons.

The cost of pumping 1,000 gallons of water, without considering interest on the investment or depreciation of plant, is 2.9 cents, and the average cost to consumers where meters are used and not more than 1,000 gallons per day are consumed is 21.2 cents.

The average cost per month for residences where meters are not used is \$4.72 per year and for lawn sprinkling \$3.64.

This average is taken from the lowest charge made for residences and the lowest rate for lawn sprinkling.

Water Works in Villages.

Statistics were gathered from 67 plants in villages, of which number 61 were under municipal control and 6 were owned by companies or individuals.

They represent an investment of \$1,414,350, of which amount \$1,302,250 is credited to the municipal plants and \$112,100 to those owned by companies or individuals, and they pay in wages and salaries per year \$47,478.

The capacity of these plants is 82,109,000 gallons per day and the average daily consumption is 9,797,915 gallons.

The cost of pumping 1,000 gallons of water, without considering interest on investment or depreciation of plant, is 2.6 cents, and the average cost to the consumer where not more than 1,000 gallons per day are used is 27 cents.

The average charge for residences for the year is \$3.98 and for lawn sprinkling for the season \$2.91.

Gas Plants.

Statistics were gathered from 25 gas plants, of which there is but one under municipal management.

The owners and managers of these plants are doubtless as truthful as people usually are and are classed among our most successful business men, but when it comes to enlightening a canvasser as to the cost of gas per 1,000 cubic feet they possess a wonderful faculty for not giving the information, and instances are known where their memories have totally failed them when that subject was introduced.

One case in particular is worthy of notice. A superintendent of a large plant gave the canvasser to understand that they could produce gas at about 50 cents per thousand cubic feet, but afterwards told a mutual friend that they could produce it for less than one-half of that amount, so that the average price as shown by the accompanying table may be regarded as a little high.

The amount invested in the 25 plants is \$7,564,346 and are assessed at \$1,823,100, and employ 373 men at an average salary of \$629. Making a total amount of \$234,700 paid for wages and salaries for the year.

The average capacity of these plants is about 200,000 cubic feet in 24 hours and the average consumption about 100,000 cubic feet.

The average cost for gas per 1,000 feet without considering discounts is, for lighting \$1.44 and for fuel \$1.15, and the average cost for producing same, including interest on the investment, taxes and depreciation of plant, is 78 cents per thousand cubic feet.

TABLE SHOWING STATISTICS FROM WATER

Name of plant.	Location.	Ownership— Municipal, corporation or private parties.	Cost of plant.	As- sessed valua- tion.	Cost to consumers.		1,000 gals. by meter.
					Residence and lawns.		
Adrian Water-works Co. ¹	Adrian	Corporation	\$145,000	\$120,000			
Albion City Water-works	Albion	Municipal					
Alpena City Water Co.	Alpena	Corporation	160,000	*	\$4 00	\$5 00	80 10
Ann Arbor Water Co. ¹	Ann Arbor	Private parties	282,635	80,000	5 00	5 00	20
Au Sable Water Co.	Au Sable	Corporation					
Battle Creek Water-works	Battle Creek	Municipal	255,903	none	4 00	4 00	13
Bay City Water-works	Bay City	Municipal	860,369		5 00	3 00	10
Benton Harbor Water-works	Benton Harbor	Municipal	97,488				
Bessemer Water-works	Bessemer	Municipal	30,000		8 00	5 00	40
Big Rapids Water-works	Big Rapids	Municipal	100,000		4 00	5 00	10
Cadillac Water-works Co.	Cadillac	Corporation	75,000	63,000	4 00	2 25	40
Charlotte Water-works	Charlotte	Municipal	70,000				
Clare Water-works	Clare	Municipal	14,000		4 00	2 00	
Coldwater Water-works	Coldwater	Municipal	42,500		4 00	2 00	10
Detroit Water-works	Detroit	Municipal	5,228,255		4 00		07
Dowagiac Water-works	Dowagiac	Municipal	42,585		4 00	3 00	35
Escanaba Water-works Co.	Escanaba	Corporation	85,000	5,000	6 00	2 50	40
Flint City Water-works Co.	Flint	Corporation	189,000	58,500	5 00	5 00	25
Gladstone Water-works	Gladstone	Municipal	45,000				15
Grand Haven Water-works	Grand Haven	Municipal	52,000		4 00	4 00	08
Grand Rapids Water-works	Grand Rapids	Municipal	1,323,309		4 00	2 00	
Grand Ledge Water-works	Grand Ledge	Municipal	24,000		4 00	2 00	10
Greenville Water-works	Greenville	Municipal	50,000		4 00	2 00	
H. D. Campbell & Sons Water Co.	Traverse City	Individuals	50,000	12,000	8 00	1 50	40
Harrison Water-works	Harrison	Municipal	9,000		4 00	3 00	
Hastings Water-works	Hastings	Municipal	38,178		4 00	4 00	50
Hillsdale Water-works	Hillsdale	Municipal	75,000		4 00	2 00	12
Hudson Water-works	Hudson	Municipal	36,900				10
Holland Water-works	Holland	Municipal	60,000		3 00	3 00	10
Ionia City Water-works	Ionia	Municipal	112,000		4 00	4 00	15
Iron Mountain Water-works Co.	Iron Mountain	Corporation	285,000	150,000	5 00	5 00	30
Ironwood Water-works Co. ²	Ironwood	Corporation	226,000				40
Ishpeming Water-works	Ishpeming	Municipal	148,000		6 00	2 50	
Jackson Water-works	Jackson	Municipal	276,500		5 00	5 00	15
Lansing City Water-works	Lansing	Municipal	264,834		4 00	1 00	40
Lapeer Water-works	Lapeer	Municipal	50,000		5 00	2 00	40
Ludington Water Supply Co.	Ludington	Corporation	142,000	50,000	6 00	6 00	25
Manistee Water Co.	Manistee	Corporation	210,000	45,150	6 00	6 00	30
Marine City Water-works	Marine City	Municipal	42,000		4 00	1 00	
Marquette Water-works	Marquette	Municipal	209,000		6 00	7 00	
Marshall Water-works Co. ³	Marshall	Corporation	100,000	50,000	5 00	5 00	35
Mason City Water-works	Mason	Municipal					
Menominee Water Co.	Menominee	Corporation	350,000	100,000	5 00	5 00	20
Monroe Water Co.	Monroe	Company	138,000	59,000	5 00		40
Mt. Clemens Water-works	Mt. Clemens	Municipal	70,000		4 00	3 00	15
Mt. Pleasant Water-works	Mt. Pleasant	Municipal	15,000		3 00	3 00	
Midland Water-works	Midland	Municipal	22,000		5 00	5 00	
Muskegon Water-works	Muskegon	Municipal	264,500				
Negaunee Water-works	Negaunee	Municipal	65,000		6 00	3 00	
Niles City Water-works	Niles	Municipal	78,000		4 00	4 00	20
Niles Water-works Co. ⁴	Niles	Corporation	45,000	10,000	4 00	4 00	20
Owosso City Water-works	Owosso	Municipal	105,000		4 00	4 00	15
Pontiac City Water-works	Pontiac	Municipal	110,000		5 00	5 00	12
Port Huron Water-works	Port Huron	Municipal	440,000		4 00	4 00	10
Saginaw Water-works	Saginaw	Municipal	862,363		4 00	4 00	11
St. Clair City Water-works ⁵	St. Clair	Municipal	31,000		4 00	4 00	
St. Ignace Water-works	St. Ignace	Municipal	41,000		6 00	3 00	
St. Joseph Water-works	St. Joseph	Municipal	86,500		5 00	5 00	15
Sault Ste. Marie Water-works ⁶	S't Ste. Marie	Municipal	115,000		8 00	2 00	
Stanton Water-works ⁵	Stanton	Municipal	10,000		4 00	5 00	40
Wyandotte City Water-works	Wyandotte	Municipal	60,000		4 00	3 00	07
Ypsilanti Water-works	Ypsilanti	Municipal	150,000				

¹ In the hands of receiver.² Exempt from local tax.³ In hands of receiver since 1894.⁴ Reservoir 106 feet above city.⁵ In connection with electric light plant.⁶ Power furnished by the Electric Light and Power Co.

* Exempt.

PLANTS IN CITIES IN MICHIGAN, 1897.

No. of pumps.	Name of pumps.	Capacity of pumps in gallons.	Steam or water power.	Average daily consumption in gallons.	Cost of pumping 1,000 gallons.	Monthly receipts.	Salaries and wages per year.
2	Holly-Gaskill	3,000,000		450,000			
5	4 Walker, 1 Rotary	5,000,000	Steam	1,800,000	\$0 02	\$1,708	\$3,668
3	1 Knowles, 1 Gordon, 1 Deane	5,800,000	Steam	902,567			8,340
2	Blake	4,000,000	Steam	505,000	03.5	1,020	5,300
1	1 Gaskill, 2 each Holly-R. and Quad	10,500,000	Steam	2,500,000	07 1/4	1,953	3,620
2	Houghs and Worthington	3,000,000	Steam		03.2		1,630
2	Worthington	1,750,000	Steam	45,000	02	125	1,600
3	Holly	4,000,000	Steam	2,000,000	05	275	1,200
2	2 Worthington, 1 Gaskill	5,500,000	Steam	900,000	03	1,000	4,000
2	Walker	1,500,000	Steam	275,000	02.8		
2	Walker	600,000	Steam	450,000	06	80	1,300
2	Hughes	3,000,000	Steam	374,000	02.5	736	1,650
4	1 Allis, 3 Hooley & Co.	92,000,000	Steam	36,000,000	00.4	44,815	232,117
2	Holly	2,000,000	Steam	300,000	03		2,300
1	Worthington	2,000,000	Steam	600,000	01	350	2,180
3	Holly and Holly-Gaskill	7,000,000	Steam	750,000	01.5	1,500	3,175
2	Buffalo	2,500,000	Steam	400,000	02.5	250	1,440
2	Worthington and Walker	2,000,000	Steam	300,000	02	244	2,374
4	2 Butterworth, 1 Nordberg, 1 Holly	31,000,000	Steam	11,000,000	00.5	7,465	22,141
2	Laidlow, Dunn-Gordon	1,500,000	Steam	200,000	02	75	480
2	Deane	2,000,000	Steam	240,000	07	325	1,300
4	Walker	4,000,000	Steam	1,000,000	04	1,250	2,400
2	Walker	750,000	Steam	45,000	06	60	900
2	Deane	2,000,000	Steam	250,000	03.3	298	1,300
2	Blake	2,500,000	Steam	535,000	01.6	475	1,020
2	Houghs	2,000,000	Steam	270,000	03.2	291	1,600
3	1 Nordberg, 2 Walker	3,000,000	Steam	420,000	02.2		1,800
2	Smith-Vaile	2,000,000	Steam	400,000	04.5	455	2,580
2	Gordon	4,000,000	Steam	380,000	04	1,590	3,200
2	Dean	4,000,000	Steam	500,000	05		6,710
3	Worthington	5,000,000	Steam	700,000	02.5		780
2	Holly	12,000,000	Steam	800,000	03	2,300	5,550
3	1 Worthington, 2 Holly	8,000,000	Steam	1,284,500	03.2		4,444
2	Walker	1,500,000	Steam	890,000	01		1,120
2	Holly-Gaskill	5,000,000	Steam	1,057,000	02	1,190	3,400
3	Holly-Gaskill	7,000,000	Steam	670,000	03.3		7,400
2	Walker	2,000,000	Steam	500,000	01.6	500	1,480
2	1 Gaskill, 1 Worthington	6,000,000	Steam	2,779,000	04		4,260
2	Worthington	2,000,000	Steam				
3	Deane	6,000,000	Steam	900,000	03		4,100
2	Worthington	3,000,000	Steam	500,000	03	1,025	1,900
2	Blake	2,000,000	Steam	600,000	03.6	110	2,000
2	Deane	1,500,000	Water	500,000		90	600
2	Gordon	1,500,000	Steam	500,000	02	150	1,440
2	Worthington	4,000,000	Steam	750,000	04	600	2,450
2	Gordon	3,000,000	Steam	270,000	02		1,020
2	Gravity		Gravity		00.5		650
2	Gordon	1,000,000	Steam	350,000	03	105	2,542
2	Worthington	3,000,000	Steam	1,000,000	01.5	500	2,700
3	Holly-Gaskill	19,000,000	Steam	3,684,000	00.7	3,515	7,300
4	Holly-Gaskill	24,000,000	Steam	6,854,000	01	3,350	13,700
2	Walker	1,500,000	Steam	500,000	01	340	790
2	Deane	2,000,000	Steam	175,000	08.5		1,850
2	Hughes	3,000,000	Steam	352,000	03.2		
1	Walker	2,000,000	Steam	1,000,000	02.5		5,000
2	Walker	1,000,000	Steam	200,000	01.8	70	555
1	Hughes	3,000,000	Steam	276,000	02	400	1,500
2	Laidlow, Dunn-Gordon	5,000,000	Steam	800,000	04	830	3,360

TABLE SHOWING STATISTICS FROM WATER

Name of plant.	Location.	Ownership— Municipal, corporation, or private parties.	Cost of plant.	As- sessed valua- tion.	Cost to consumer.		
					Residence and lawns.	1,000 gals. by met- er.	
Alleghen Water-works	Alleghen	Municipal	\$40,000		\$3 00	\$2 00	\$0 40
Alma Water-works	Alma	Municipal	10,000		5 00	3 00	40
Bellaire Water-works Co.	Bellaire	Corporation	11,000		5 00		
Birmingham Water-works	Birmingham	Municipal	19,000		5 00	3 00	
Baraga Water Co.	Baraga	Individuals	10,000				
Buchanan Water-works	Buchanan	Municipal	25,000		3 00	3 00	35
Caro Water-works Co.	Caro	Corporation	25,000	exempt	6 00		25
Cassopolis Water-works	Cassopolis	Municipal	15,000		4 00	3 00	35
Cedar Springs Water-works	Cedar Springs	Municipal	8,000		4 00	2 00	
Charlevoix Water-works	Charlevoix	Municipal	33,000		4 00	2 00	
Constantine Water-works	Constantine	Municipal	23,000		4 00		
Crystal Falls Water-works	Crystal Falls	Municipal	16,000		5 00	3 00	
Decatur Water-works	Decatur	Municipal	15,000		3 00	3 00	10
Ewart Water-works	Ewart	Municipal	20,000		4 00	4 00	
Fenton Water-works	Fenton	Municipal	30,000				20
Flushing Water-works	Flushing	Municipal	20,600		4 00	4 00	
Frankfort Water-works	Frankfort	Municipal	12,000		4 00	3 00	
Farwell Water-works	Farwell	Municipal	12,000		3 00	3 00	
Fremont Water-works	Fremont	Municipal	7,000				
Grayling Water-works Co. ¹	Grayling	Private	6,100				
Hancock Water-works	Hancock	Municipal	34,700		free		
Hart Water-works	Hart	Municipal	12,000		2 00	2 00	
Harbor Springs Water Co.	Harbor Springs	Private parties	20,000	\$7,950	10 00		40
Highland Park Water-works	Highland Park	Municipal	23,000				
Holly Water-works	Holly	Municipal	11,000		3 00	3 00	
Howell Water-works	Howell	Municipal	40,000		5 00	3 00	25
Howard City Water-works	Howard City	Municipal	14,000		3 00	3 00	
Ithaca Water-works	Ithaca	Municipal	33,000		4 00	3 00	
Kalkaska Water-works	Kalkaska	Municipal	20,000		3 00	3 00	
L'Anse Water-works	L'Anse	Municipal	18,000				
Lowell Water-works	Lowell	Company	35,000	500	6 00	3 00	30
Lyons Water-works ²	Lyons	Municipal	6,000				
Manton Water-works	Manton	Municipal	11,000		4 00	1 00	20
Marcellus Water-works	Marcellus	Municipal	10,000		3 00	2 00	
Mancelona Water-works	Mancelona	Municipal	18,000		5 00		
Milford Water-works	Milford	Municipal	20,000		4 00	4 00	15
Nashville Water-works	Nashville	Municipal	19,000		3 00	3 00	
Newberry Water-works	Newberry	Municipal	6,500		4 00	4 00	
Northville Water-works	Northville	Municipal	42,000				
Otsego Water-works	Otsego	Municipal	18,000		2 00	2 00	
Oscoda Water-works	Oscoda	Municipal	15,000		3 00	4 00	
Oxford Water-works	Oxford	Municipal	20,000		3 00	3 00	20
Plymouth Water-works ³	Plymouth	Municipal	36,000		4 00	2 00	40
Plainwell Water-works	Plainwell	Municipal	22,800		2 00	3 00	
Pentwater Water-works	Pentwater	Municipal	9,000		3 00	4 00	20
Petoskey Water-works	Petoskey	Municipal	55,000		4 00	3 00	12
Portland Water-works Co.	Portland	Company	30,000		5 00	5 00	
Richmond Water-works Co.	Richmond	Municipal	19,000		4 00	2 00	20
Romeo Water-works	Romeo	Municipal	35,000		4 00	3 00	20
Rochester Water-works ⁴	Rochester	Municipal	25,000		3 00	3 00	
Shelby Water-works	Shelby	Municipal	15,000		3 00	3 00	10
South Haven Water-works	South Haven	Municipal	50,000		3 00		28
Sturgis Water-works	Sturgis	Municipal	30,000		4 00	1 50	25
St. Johns Water-works	St. Johns	Municipal	65,000		4 00	3 00	30
St. Louis Water-works	St. Louis	Municipal	26,000		5 00	5 00	
Tecumseh Water-works	Tecumseh	Municipal	35,000		4 00	3 00	35
Thompsonville Water-works	Thompsonville	Municipal	2,000		6 00		
Three Oaks Water-works	Three Oaks	Municipal	8,000		4 00		
Three Rivers Water-works	Three Rivers	Municipal	50,500		4 00	4 00	
Trenton Water-works	Trenton	Municipal	12,800		6 00	1 00	
Union City Water-works	Union City	Municipal	22,000		3 00	2 00	30
Vassar Water-works	Vassar	Municipal	30,000		5 00	3 00	25
Vicksburg Water-works	Vicksburg	Municipal	12,000		3 00	2 00	
Quincy Water-works	Quincy	Municipal	18,500		4 00		
Wakefield Water-works ²	Wakefield	Municipal	5,000				
White Cloud Water-works	White Cloud	Municipal	11,950		3 00		
Whitehall Water-works	Whitehall	Municipal	17,000		4 00	3 00	

¹ For fire protection almost entirely.² Fire protection only.³ Supply from spring 105 feet above the village.⁴ Supply 150 feet above the village.

FIFTEENTH ANNUAL REPORT

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PLANTS IN VILLAGES IN MICHIGAN, 1897.

No. of pumps.	Name of pumps.	Capacity of pumps in gallons.	Kind or power.	Average daily consumption in gallons.	Cost of pumping 1,000 gallons.	Monthly receipts.	Salaries and wages per year.
1	Walker.....	1,125,000	Water..	608,000	\$0 00.7	\$250	\$850
3	2 Walker, 1 Smith-Vaile.....	1,750,000	Steam..	310,000	02	100	840
3	1 Holly, 2 Knowles.....	2,000,000	Water..	.....	.....	100	1,200
12	Hughes.....	1,500,000	Steam..	50,000	01	.....	480
12	.....	1,500,000	Steam..	.....	.....	.....	1,250
12	Walker.....	3,000,000	Steam..	113,915	03	100	960
2	Deane.....	1,000,000	Steam..	60,000	6	.....	1,000
1	Laidlow-Dunn-Gordon.....	750,000	Steam..	55,000	05	.....	200
1	Smith-Vaile.....	500,000	Steam..	130,000	02	50	600
12	Worthington.....	1,500,000	Steam..	180,000	03	200	1,000
12	Ferry.....	1,000,000	.....	150,000	02	65	400
12	Buffalo.....	1,000,000	Steam..	150,000	04.2	100	770
1	Worthington.....	500,000	Steam..	60,000	02	.....	365
12	Walker.....	1,250,000	Steam..	250,000	02	125	600
12	Walker.....	1,500,000	Steam..	125,000	05	300	1,050
12	Laidlow-Dunn-Gordon.....	2,000,000	Steam..	100,000	02	.....	700
12	Smith-Vaile.....	1,500,000	Steam..	100,000	03.5	60	600
12	Walker.....	1,500,000	Steam..	25,000	09	35	650
3	2 Walker, 1 Wolverine.....	1,500,000	Steam..	60,000	04.5	.....	700
12	.....	.....	Gravity..	.....	.....	.....	175
1	1 Worthington, 1 Smith-Vaile.....	2,000,000	Steam..	300,000	02	none	1,460
1	Laidlow-Dunn-Gordon.....	1,500,000	Gravity..	50,000	01	.....	408
12	Duplex, Worthington.....	2,500,000	Steam..	80,000	02	.....	880
12	.....	.....	.....	.....	.....	.....	.....
12	Walker.....	1,500,000	Steam..	200,000	02.8	137	480
12	Walker.....	1,500,000	Steam..	250,000	03	.....	1,140
12	Walker.....	1,500,000	Steam..	80,000	01.5	.....	1,200
3	Downey.....	1,500,000	Steam..	150,000	04	.....	1,440
12	Walker.....	1,500,000	Steam..	100,000	03	50	480
12	Gravity.....	.....	Gravity..	80,000	01	.....	75
1	1 Smith-Vaile, 1 Knowles.....	1,350,000	Water..	140,000	02	250	700
1	Holly.....	864,000	Water..	.....	01	.....	75
12	Walker.....	1,500,000	Steam..	100,000	02	.....	420
1	Deane.....	850,000	Steam..	100,000	03	38	850
12	Blake.....	1,500,000	Steam..	150,000	02	100	480
12	Worthington.....	1,500,000	Steam..	200,000	03	.....	1,200
12	Hughes.....	1,500,000	Steam..	150,000	02	30	365
12	Smith-Vaile.....	1,500,000	Steam..	80,000	05.5	.....	900
12	Gravity.....	.....	Gravity..	400,000	.....	100	675
12	Walker.....	1,500,000	Water..	400,000	.4	47	300
12	Blake.....	1,500,000	Steam..	300,000	01	26	960
12	Walker.....	1,500,000	Steam..	300,000	01.5	50	500
12	Gravity.....	.....	Gravity..	.....	.....	83	120
12	Walker.....	1,500,000	Water..	560,000	01	50	200
12	Walker.....	1,000,000	Steam..	300,000	03.3	56	800
3	1 Knowles, 1 Walker, 1 L.-D.-G.....	3,000,000	Water..	250,000	01.2	450	1,020
12	Deane.....	1,000,000	Steam..	200,000	03	250	820
12	Cook.....	275,000	Steam..	100,000	03	45	840
12	Hughes.....	1,500,000	Steam..	146,000	02.3	125	1,200
12	Gravity.....	1,000,000	Gravity..	100,000	01	none	none
1	Downey.....	220,000	Steam..	100,000	02	85	800
12	Hughes.....	750,000	Steam..	250,000	02	250	720
12	Gordon.....	1,200,000	Steam..	83,000	08	300	1,570
12	Gordon.....	2,000,000	Steam..	165,000	02	350	1,800
12	Holly.....	1,000,000	Steam..	100,000	01.5	133	1,360
12	Blake.....	2,000,000	Steam..	350,000	02	150	690
12	Blake.....	1,000,000	Steam..	.....	.....	8	.....
1	Dean.....	225,000	Steam..	60,000	02.5	.....	300
12	Walker.....	3,000,000	Steam..	200,000	04	225	1,115
12	Worthington.....	750,000	Steam..	.....	.....	.....	800
12	Smith-Vaile.....	1,500,000	Steam..	150,000	04	183	360
12	Holly.....	1,500,000	Steam..	200,000	03.5	90	520
12	Smith-Vaile.....	1,000,000	Steam..	42,000	05	12	480
1	Fairbanks, Morse & Co.....	250,000	Steam..	200,000	.....	.....	835
12	Prescott.....	1,000,000	Steam..	.....	01	.....	480
12	Walker.....	500,000	.....	100,000	02	59	550
12	Walker.....	1,000,000	Steam..	75,000	04	50	720

TABLE SHOWING STATISTICS FROM ELECTRIC

Name of plant.	Location.	Ownership— Municipal, corporation, or private parties.	Cost of plant.	As- sessed valua- tion.	Capacity	
					Arc lights.	Candle power.
Albion Electric Light Co.	Albion	Corporation	\$35,000		60	2,000
Alpena Electric Light Co.	Alpena	Corporation	30,000	\$22,500	100	2,000
Ann Arbor Electric Co. 1	Ann Arbor	Corporation	60,000	25,000	175	*
Adrian Electric Light and Power Co.	Adrian	Corporation	144,000	25,000	160	2,000
Battle Creek Electric Co. 2	Battle Creek	Municipal	30,000		300	2,000
Bay City Electric Light Plant 3	Bay City	Corporation	164,000	5,000	310	2,000
Bay County Electric Light Co. 1	Bay City	Corporation	50,000	6,000	225	2,000
Spencer Electric Light & Power Co. 4	Belding	Corporation	26,000	2,500	none	
Big Rapids Electric Light Co.	Big Rapids	Corporation	30,000	2,500	95	2,000
Fairman Electric Light Co.	Big Rapids	Corporation	50,000	25,000	50	1,200
Bessemer Electric Light Co.	Bessemer	Corporation	50,000	25,000	212	1,200
Cadillac Electric Light Co.	Cadillac	Corporation	44,000	12,000	180	1,200
Charlotte Electric Light Co.	Charlotte	Corporation	10,000	4,000	90	2,000
Clare Electric Light Co.	Clare	Corporation	38,000		60	2,000
Coldwater Lighting Plant	Coldwater	Municipal	715,000		130	2,000
Detroit City Lighting Plant 5	Detroit	Municipal			1,600	2,000
Mutual Electric Co.	Detroit	Corporation		129,000	1,250	2,000
Edison Illuminating Co.	Detroit	Corporation	371,000	253,000	3,400	2,000
Electric Light and Power Co.	Detroit	Corporation	90,000	80,000		
Dowagiac City Electric Light Plant 6	Dowagiac	Municipal	13,000			
East Tawas Electric Light Plant	East Tawas	Municipal	6,000		40	2,000
Escanaba Electric Light Plant	Escanaba	Municipal	51,000		90	1,200
People's Electric Light Co.	Flint	Corporation	75,000		110	2,000
G. R. Electric Light & Power Co.	Grand Rapids	Corporation	150,000	60,000	710	2,000
Peninsula Light and Power Co.	Grand Rapids	Corporation	20,000		125	2,000
Edison Electric Light Co.	Grand Rapids	Corporation	164,000	45,000	150	2,000
Grand Haven Electric Light Plant 7	Grand Haven	Municipal	14,000		100	1,200
Grand Ledge Electric Light Plant	Grand Ledge	Municipal	12,000		50	2,000
Greenville Electric Light Co. 4	Greenville	Corporation	35,000	6,000	60	2,000
Hastings Electric Light Co.	Hastings	Corporation	28,000	8,000	115	1,500
Peninsular Electric Light Co.	Houghton	Corporation	201,500	21,500	300	*
Howell Electric Light Co.	Howell	Corporation	15,000	6,000	95	2,000
Holland Electric Light Plant	Holland	Municipal	33,400		60	2,000
Hudson Electric Light Co.	Hudson	Corporation	20,000	8,000	80	1,500
Iron Mountain Electric Light Co.	Iron Mountain	Corporation	50,000	7,000	120	1,200
Ishpeming and Negaunee E. L. Co.	Ishpeming	Corporation	145,000	20,000	200	2,000
Twin City Electric Light Co. 8	Ironwood	Corporation	100,000	40,000	95	2,000
Ionia Electric Co.	Ionia	Corporation	50,000	10,000	110	2,000
Jackson Electric Light Co.	Jackson	Corporation	254,000	30,150	300	2,000
Kalamazoo Electric Co.	Kalamazoo	Corporation	76,500	12,000	500	*
Kalamazoo Electric Light Works 10	Kalamazoo	Municipal	43,200		200	2,000
Ludington Electric Light Co.	Ludington	Corporation	44,000		180	1,200
Lansing Electric Light Plant	Lansing	Municipal	96,500		270	2,000
Lapeer Electric Light Co.	Lapeer	Corporation	9,900	4,500	80	1,200
Marshall Electric Light Plant	Marshall	Municipal	50,000		125	2,000
Marquette Electric Plant 11	Marquette	Municipal	100,000		130	2,000
Marine City Electric Light Co.	Marquette	Corporation	20,000		30	2,000
Menominee Electric Light Co. 12	Menominee	Corporation	97,000	28,000	150	1,200
Monroe Electric Light Co.	Monroe	Corporation	70,000	8,000	150	1,500
Muskegon Electric Light Co. 13	Muskegon	Corporation	125,000		280	1,200
Mt. Clemens Electric Light Co.	Mt. Clemens	Corporation	56,000	12,000	80	2,000
Niles Electric Light Co.	Niles	Municipal	42,000		120	2,000
Newberry Water and Light Co.	Newberry	Corporation	4,000			
Standard Electric Light Co.	Pontiac	Corporation		9,000	150	2,000
Edison Electric Light Co.	Pontiac	Corporation	23,000	4,000		
Port Huron Electric Light Co.	Port Huron	Corporation	200,000	28,000	200	1,200
Reed City Electric Light Co.	Reed City	Corporation	28,000	7,000	50	2,000
Saginaw Electric Co. 13	Saginaw	Corporation	50,000	30,000	145	2,000
Bartlett Illuminating Co. 13	Saginaw	Corporation	50,000	3,500	100	1,200
Swift Electric Light Co. 14	Saginaw	Corporation	200,000	48,000	300	2,000
Stanton Electric Light Plant 15	Stanton	Municipal	5,750		65	2,000
St. Johns Electric Light Plant	St. Johns	Municipal	35,000		80	1,200
St. Ignace Electric Light Plant	St. Ignace	Municipal	7,500		75	2,000
St. Joseph & Benton Harbor Elec. Co. 16	St. Joseph	Corporation	10,000	1,150	120	1,200
Traverse City Electric Co. 17	Traverse City	Private par.	15,000	3,000	35	2,000
Boardman River Electric Light Co.	Traverse City	Corporation	70,000	10,000	100	2,000
Wyandotte Electric Light Plant	Wyandotte	Municipal	12,000		110	2,000
Ypsilanti Electric Light Plant 18	Ypsilanti	Municipal	22,000		90	2,000
Ypsilanti Electric Light Co.	Ypsilanti	Corporation	30,000	7,500	60	1,200

1 One 40 K. W. Power Generator.

2 One 45 K. W. Power Generator.

3 All lights for use of city.

4 One 35 K. W. Power Generator.

5 No commercial lighting.

6 These lights are 32 C. P. * 1,200 and 2,000 candle power.

7 Arc lights for city only.

8 Two 60 K. W. Power Generator.

9 Four 60, and two 45 K. W. Power Generators.

10 For city lighting only, cost \$46.36 per light per year.

LIGHTING PLANTS IN CITIES IN MICHIGAN, 1897.

of plant.		No. of lights in use.		Cost of light to consumers.			Number and kinds of dynamos.		Salaries and wages.	Power-steam, or water.
Incandescent.	Candle-power.	Arc.	Incandescent.	Arc lights per month.	Incandescent.		Arc.	Incandescent.		
					Per month.	Per 1,000 watts.				
650	16	60	1,500	\$5 00	\$0 60	\$0 15	2 T. H.	1 T. H.	\$200	Steam.
1,800	16	70	2,000	6 25	75	20	2 Brush	1 Gen. Electric	286	Water.
3,100	16	135	2,790	6 00		14	2 Brush	2 T. H.		
1,000	16	160	1,500	6 25		14	5 T. H.	1 Gen. Electric	325	Steam.
3,200	16	200	2,000	5 00	65	15	6 T. H.	3 T. H.	600	¶
1,000	16	220	700	free			3 Wood	1 Wood	352	Steam.
5,000	16	176	5,500	5-13 50	75c-82		5 West.	5 T. H.	1,300	Steam.
1,200	16, 32		800	5 00	50c-81			1 Gen. Electric	125	Water.
1,350	16	95	1,800	3 00	\$0 25	10	1 W. E., 1 West.	1 Nat., 1 T. H.	180	Water.
600	16	25	600	3 00	25		1 T. H.	1 T. H.	125	Water.
1,800	16	4	1,600	5 00	1 00			3 T. H.	250	Steam.
2,300	16	144	1,800	7 00	60	15	1 Wood	2 T. H.	300	Steam.
1,800	16	82	1,400	8 33	75	20	2 T. H.	1 West.	300	Steam.
1,000	16	60	1,000	5 00	50		1 Fort Wayne.	1 Fort Wayne.	65	Steam.
2,000	16	99	3,600	5 00		05	3 West. Elec.	2 National	220	Steam.
		1,590					16 West. Elec.		6,600	Steam.
30,000	16	500	25,000	4 00	1 00	20	20 Brush	7 West., 8 G. E.	1,400	Steam.
34,000	16	500	70,000	\$		20	Edison		3,500	Steam.
		100	23,000	6 00	1 00	20			1,400	Steam.
700	16		124					1 West.	62	Steam.
500	16	26	400		50			1 National	80	Steam.
2,000	16	60	1,000	6 50	75		1 T. H.	1 Wood	247	Steam.
2,400	16	90	3,000	6 30	1 00	15	3 T. H.	2 Gen. Electric	330	Steam.
3,500	16	700	3,500	8 00		10	10 Br., 8 Fuller.	4 West.	1,165	Water.
1,000	16	25	1,200	5 00	60		1 Standard	1 West.	100	Water.
13,000	16	340	17,289	8 50		20	3 T. H.	7 Edison	1,289	Steam.
2,000	16	75	1,300		25	10	1 Wood	1 Wood	135	Steam.
1,000	16	25	1,200	5 00	60		1 Standard	1 West.	100	Steam.
650	16	40	1,300	6 00	1 00	32	2 T. H.	1 T. H.	130	Water.
2,000	16	34	2,000	5 00	50	15		2 Gen. Electric	136	Steam.
11,250	16	265	13,000	8 00	63	15	6 T. H.	6 T. H. & G. E.	1,250	Steam.
		75	2,000	6 00			2 West. Elec.		125	Steam.
2,820	16	59	2,941	5 00	40	15	1 Standard	1 Edison, 1 Nat.	240	Steam.
650	16	80	650	5 00	60	15	1 Schuyler	1 Schuyler	100	Steam.
4,000	16	67	2,720	8 00	60	20	3 Brush	3 T. H.	315	Steam.
2,300	16	99	2,000	9 00	90	20	4 T. H.	2 T. H.	1,200	Steam.
4,650	16	89	4,200	10 00	1 00	25	2 Brush	4 T. H., 1 Nat.	600	Steam.
1,500	16	80	2,000	9 80	75	20	3 T. H.	1 T. H.	300	Steam.
4,000	16		5,000	5 00	50	12	6 T. H.	3 Gen. Electric	1,000	Steam.
10,000	16	200	5,000	7 50	1 00	20	4 T. H.	4 T. H., 2 Wood	700	Steam.
		200					2 West. Elec.		380	Steam.
1,040	16	94	2,300	6 00	75	15	4 Brush	1 T. H.	250	Steam.
5,000	16	250	4,600	6 50	75	12	6 T. H.	2 T. H., 1 Wood	500	Steam.
1,400	16	65	1,400	5 20	50	15	1 Wood	1 Wood	160	Steam.
1,800	16	116	1,500	3 00	38	12	2 Brush	1 Wood	220	Water.
1,500	16	101	2,200	6 00	40		2 West.	1 West.	350	Water.
1,500	16	23	900	5 00	1 00	15	1 Wood	2 Wood	325	Steam.
4,700	16	69	4,500	6 00	50	15	2 Brush	1 T. H.	525	Steam.
1,200	16	150	1,300	6 00	70	17	3 Schuyler	1 T. H.	635	Steam.
2,000	16	225	6,135	6 00	1 00	16	9 Brush	2 Brush	640	Steam.
2,000	16	70	2,000	7 00	75	20	2 T. H.	2 T. H.	325	Steam.
2,000	16	98	2,008	3 50	50	08	3 T. H.	1 Wood	120	Water.
		8	1,500	8 33	80	15			75	Steam.
		112		5 00			2 Standard		125	Steam.
1,200	16		1,200		60	10		4 Edison	150	Steam.
3,000	16	165	3,000	6 33	65	15	4 T. H.	2 Gen. Electric	800	Water.
1,000	16	50	800	5 00	50	10	1 West. Elec.	1 Wood	150	Water.
1,500	16	125	1,500	6 50	1 00	15	1 Wood	1 Slatery	400	Steam.
4,800	16	40	5,000	6 25	50	15	2 T. H.	3 Gen. Electric		Steam.
5,000	16	200	5,000	6 25		15	6 Brush	5 West.	1,000	Steam.
1,000	16	19	778		50		1 Wood	1 Wood	50	Steam.
1,150	16	50	1,500	4 80	50	15	2 T. H.	2 T. H.	150	Steam.
		51		5 00			2 Standard		65	Steam.
2,000	16	103	3,000	8 00	75	20	T. H.	Gen. Electric	300	Steam.
1,800	16	35	4,000	5 00	40	15	1 W. E.	2 W. H.	200	Steam.
4,000	16	57	3,000	5 00	40	15	2 T. H.	2 Gen. Electric	400	Water.
700	16	60	850	5 00	16 1/2		2 West. Elec.	1 West.	100	Steam.
		88		3 00			3 Jenney		140	Steam.
1,800	16	38	2,200	5 00	75	15	1 Wood	1 Slatery	145	Steam.

§ 16c per 1,000 watts. ¶ 35c to \$1.75. ¶ Steam and water.
 11 City pays \$5 per month for arc lights. 15 No commercial arc lights in use.
 12 Two 80 K. W. Power Generators. 16 Two power generators.
 13 One 75 K. W. Power Generator. 17 This is known as the H. D. Campbell & Sons plant.
 14 One 125 K. W. Power Generator. 18 Lights for city cost \$36 per year.

TABLE SHOWING STATISTICS FROM ELECTRIC

Name of plant.	Location.	Ownership— Municipal, corporation or private parties.	Cost of plant.	As- sessed valua- tion.	Capacity	
					Arc lights.	Candle power.
Harrison Electric Co. 1.....	Allegran	Private parties	\$31,000	\$11,500	110	1,200
Edison Light and Power Co.....	Allegran	Corporation	20,000	8,000	35	1,600
Athens Electric Light Co.....	Athens	Corporation	11,700	1,500	50	1,200
Pioneer Electric Light Co.....	Au Sable	Corporation	20,000	.....	50	1,200
Baraga Electric Co.....	Baraga	Corporation	8,000	.....	50	1,600
Bronson Electric Light Co.....	Bronson	Corporation	6,500	2,000	50	1,200
Brooklyn Electric Light Co.....	Brooklyn	Private parties	7,000	1,000	.....	.....
Buchanan Electric Co.....	Buchanan	Private parties	29,000	1,000	110	2,000
Caro Electric Light Co.....	Caro	Private parties	10,000	5,500	40	2,000
Carson City Electric Co.....	Carson City	Corporation	9,000	2,000	30	2,000
Cassopolis Electric Light Co.....	Cassopolis	Private parties	5,000	4,000	.....	2,000
Chelsea Electric Light Co.....	Chelsea	Corporation	28,000	15,000	110	2,000
Chesaning Electric Light Co.....	Chesaning	Municipal	6,000	.....	30	2,000
Charlevoix Electric Light Co.....	Charlevoix	Corporation	12,000	3,000	110	2,000
Clinton Electric Light Plant.....	Clinton	Municipal	10,000	.....	100	1,200
Constantine Electric Light Co.....	Constantine	Corporation	8,000	4,000	.....	.....
Croswell Electric Light Co.....	Croswell	Corporation	4,200	1,500	.....	.....
Crystal Falls Electric Light Plant.....	Crystal Falls	Municipal	8,000	.....	.....	.....
Dowagiac Electric Light Co.....	Dowagiac	Corporation	16,850	10,000	.....	.....
Durand Electric Light Plant.....	Durand	Municipal	10,750	.....	40	2,000
Dundee Electric Light Co.....	Dundee	Corporation	12,000	4,500	35	1,200
Eaton Rapids Electric Light Co.....	Eaton Rapids	Private parties	8,000	2,500	30	2,000
Ewart Electric Light Plant ²	Ewart	Municipal	6,000	.....	20	1,200
Fenton Electric Light Co.....	Fenton	Corporation	16,000	5,000	50	2,000
Flushing Electric Light Plant.....	Flushing	Municipal	5,700	.....	20	2,000
Fowlerville Electric Light Co.....	Fowlerville	Private parties	7,000	4,100	60	2,000
Frankfort Electric Light Co.....	Frankfort	Private parties	8,000	1,800	24	2,000
Gladwin Electric Light Co.....	Gladwin	Corporation	3,200	800	35	2,000
Hart Electric Light Plant.....	Hart	Municipal	6,000	.....	50	2,000
Hillsdale Electric Light Co.....	Hillsdale	Municipal	25,000	.....	75	1,200
Howard City Electric Co.....	Howard City	Private parties	4,500	1,500	85	2,000
Holly Electric Light Co.....	Holly	Corporation	11,600	7,000	30	2,000
Homer Electric Light Co.....	Homer	Corporation	5,300	3,000	50	1,200
Imlay City Electric Light Co.....	Imlay City	Private parties	8,000	.....	60	1,200
Ithaca Electric Light and Power Co.....	Ithaca	Corporation	23,700	4,000	30	1,200
Jonesville Elec. Light and Power Co.....	Jonesville	Corporation	12,000	3,000	50	1,200
Kalkaska Electric Light Co. ³	Kalkaska	Corporation	3,000	.....	20	1,200
Leslie Electric Light Co.....	Leslie	Corporation	10,000	5,000	50	2,000
Lowell Electric Light Plant.....	Lowell	Municipal	24,000	.....	190	1,200
Manchester Electric Light Co.....	Manchester	Private parties	10,000	8,000	.....	.....
Mancelona Electric Light Co.....	Mancelona	Private parties	5,000	.....	75	2,000
Mariette Lighting Plant.....	Mariette	Municipal	19,500	.....	35	1,500
Mendon Electric Light Co.....	Mendon	Corporation	13,000	6,500	50	2,000
Milford Electric Light and Power Co.....	Milford	Corporation	10,000	.....	30	1,500
Midland Lighting Co.....	Midland	Corporation	8,500	2,500	70	1,200
Mt. Pleasant Electric Co.....	Mt. Pleasant	Corporation	18,000	6,000	70	1,200
Newaygo Electric Light Co.....	Newaygo	Private parties	5,200	.....	20	1,200
Globe Furniture Electric Co.....	Northville	Corporation	10,000	4,500	100	2,000
Ovid Electric Light Plant.....	Ovid	Municipal	6,000	.....	30	2,000
Otsego Electric Light Co.....	Otsego	Corporation	15,000	3,000	40	2,000
Oxford Electric Light Plant.....	Oxford	Municipal	11,000	.....	35	1,200
Paw Paw Electric Light Plant.....	Paw Paw	Municipal	20,000	.....	56	* 1,200
Edison Electric Light Co.....	Petoskey	Corporation	27,000	24,000	50	2,000
Plainwell Electric Light Co.....	Plainwell	Corporation	7,000	2,500	70	1,600
Portland Electric Light Plant.....	Portland	Municipal	20,000	.....	.....	.....
Rockford Lighting Co.....	Rockford	Private parties	2,500	800	.....	.....
Shelby Electric Light Plant ⁴	Shelby	Municipal	4,000	.....	.....	.....
South Haven Electric Light Plant.....	South Haven	Municipal	15,000	.....	50	1,200
Sturgis Electric Light Co.....	Sturgis	Private parties	18,000	7,000	.....	.....
Standish Electric Light Co.....	Standish	Corporation	5,400	.....	15	1,200
St. Clair Electric Light Plant.....	St. Clair	Municipal	15,000	.....	40	2,000
St. Louis Electric Light Co.....	St. Louis	Private parties	15,000	4,000	30	2,000
Springport Electric Light Co.....	Springport	Private parties	6,000	.....	.....	.....
Tecumseh Electric Co.....	Tecumseh	Corporation	20,000	8,800	80	1,200
Thompsonville Electric Light Plant ⁵	Thompsonville	Municipal	3,000	.....	.....	.....
Three Oaks Lighting Plant ⁵	Three Oaks	Municipal	4,100	.....	.....	.....
Three Rivers Lighting and Power Co.....	Three Rivers	Corporation	32,000	14,000	90	2,000
Union City Electric Light Plant.....	Union City	Municipal	5,000	.....	30	.....
Vassar Electric Light Co.....	Vassar	Corporation	4,000	2,000	30	2,000
Vicksburg Lighting Plant.....	Vicksburg	Municipal	6,500	.....	25	1,200
West Branch Lighting Co.....	West Branch	Private parties	3,150	2,000	35	2,000
Williamston Electric Light Co.....	Williamston	Private parties	8,775	.....	50	2,000

¹ 100 K. W. Power Generator.² Arc lights for village only.³ The incandescents only are 65 candle power.⁴ No commercial arc lights, street lights free.⁵ No commercial arc lights.

* And 2,000.

LIGHTING PLANTS IN VILLAGES IN MICHIGAN, 1897.

of plant.		No. of lights in use.		Cost of light to consumers.			Number and kind of dynamos.		Salaries and wages.	Power—Steam or water.	
Incandescent.	Candle-power.	Arc.	Incandescent.	Arc, per month.	Incandescent.		Arc.	Incandescent.			
					Per month.	Per 1,000 watts.					
3,300	16	90	2,850	\$5 25	\$0 75	-----	1 Stan., 1 T. H.	1 West., 1 T. H.	\$200	Water.	
1,800	16	26	2,000	4 50	75	-----	1 T. H.	2 Edison	125	Water.	
500	16	2	250	3 00	50	-----	-----	-----	-----	-----	
650	16	5	800	5 00	50	-----	1 T. H.	1 T. H.	250	Steam.	
1,000	16	5	600	8 33	75	-----	-----	1 Wood	100	Steam.	
500	16	11	460	5 00	60	\$0 20	-----	-----	40	Steam.	
800	16	10	423	5 00	80	10	-----	2 T. H.	-----	Steam.	
1,200	16	49	1,000	4 17	50	-----	1 T. H., 1 Stan.	1 T. H.	160	Water.	
500	16	18	400	5 00	60	15	-----	1 West.	72	Steam.	
600	16	26	400	6 00	75	13	-----	1 Standard	1 National	70	Steam.
-----	16	6	475	5 00	40	12½	-----	-----	35	-----	
1,300	16	51	625	7 00	75	15	1 T. H., 1 Wood	1 Heisl'r, 1 W'd	70	Steam.	
750	16	23	700	3 33	50	10	1 Standard	1 Standard	60	Steam.	
1,500	16	23	950	6 00	50	10	-----	1 West.	170	Steam.	
650	16	37	540	3 50	35	-----	1 Wood	1 Slattery	-----	Steam.	
700	16	-----	466	-----	35	-----	-----	1 Heisl'r	60	Water.	
500	16	1	416	-----	50	-----	-----	1 Wood	60	Steam.	
750	16	-----	900	-----	50	-----	-----	1 West.	50	Steam.	
1,300	16	-----	1,200	-----	75	20	-----	1 Mayo	140	Water.	
1,000	16	22	1,600	5 00	75	12	1 Wood	1 Wood	90	Water.	
750	16	29	600	5 00	50	-----	1 T. H.	1 T. H.	80	Steam.	
-----	16	36	-----	6 00	-----	-----	1 T. H.	-----	100	Water.	
800	16	16	900	-----	35	-----	1 Standard	1 Standard	50	Steam.	
2,100	16	42	1,500	5 00	50	15	1 T. H.	1 G. E., 1 Nat.	175	Steam.	
1,000	16	-----	-----	5 00	-----	12	-----	-----	75	Steam.	
100	100	40	100	5 00	1 00	-----	2 West. Elec.	-----	90	Steam.	
500	16	12	400	5 00	50	20	1 Standard	1 T. H.	60	Steam.	
900	16	3	500	4 33	33	-----	-----	1 West.	30	Water.	
1,000	16	20	450	-----	40	-----	1 Wood	1 Wood	40	Steam.	
1,500	16	55	1,651	-----	1 25	10	1 Wood	1 Wood	130	Steam.	
1,600	16	5	650	5 00	50	-----	-----	-----	125	Steam.	
600	16	26	500	5 00	-----	15	1 Standard	1 Fisher, 1 Nat.	100	Steam.	
600	16	7	600	4 25	80	-----	-----	1 United Elec.	45	Water.	
800	16	13	430	4 00	50	-----	1 Detroit motor	2 Detroit mot'r	40	Water.	
850	16	30	850	5 00	50	15	1 T. H.	2 T. H.	100	Steam.	
500	16	36	720	5 00	75	-----	1 Schuyler	1 West.	83	Steam.	
-----	16	20	7	5 00	2 50	-----	1 T. H.	-----	40	Steam.	
-----	16	38	-----	5 00	-----	-----	1 West. Elec.	-----	55	Steam.	
1,500	16	52	1,035	4 16	40	10	1 Wood	1 Wood	125	Water.	
500	16,30	-----	500	-----	60	-----	-----	1 Gen. Elec.	35	Water.	
1,200	16	16	640	5 00	1 00	-----	-----	2 Baine	65	Steam.	
500	16	3	400	-----	50	-----	-----	1 West.	80	Steam.	
650	16	33	600	5 00	60	15	1 Standard	1 T. H.	70	Steam.	
750	16	22	700	4 16	50	-----	1 Brush	1 West.	185	Steam.	
600	16	34	500	5 00	50	-----	1 Sperry	1 G't Western	75	Steam.	
1,350	16	58	750	4 50	50	20	2 T. H.	1 T. H.	140	Steam.	
160	16	4	155	4 16	50	-----	-----	1 Edison	35	-----	
1,000	16	10	900	5 00	50	-----	-----	1 Heisl'r	88	Steam.	
1,200	16	25	1,000	5 00	65	13	1 Standard	1 Standard	160	Steam.	
1,500	16	26	550	4 00	75	20	1 Wood	1 Slattery	130	Steam.	
750	16	35	1,600	4 00	50	10	1 Wood	1 Wood	63	Steam.	
600	16	56	1,400	2 00	35	08	2 Standard	1 West.	97	Water.	
2,600	16	64	2,600	6 00	50	15	1 Brush	4 Edis'n, 1 F. W.	160	Water.	
1,100	16	40	500	2 50	40	-----	-----	-----	100	Steam.	
2,000	16	34	1,200	3 33	50	-----	-----	1 Wood	125	Water.	
310	16	-----	350	-----	50	-----	-----	1 Jenney	100	Water.	
600	16	14	450	-----	30	-----	-----	-----	40	Steam.	
2,000	16	-----	1,200	3 50	35	-----	1 Wood	1 Wood	90	Steam.	
600	16	13	900	7 50	80	20	-----	-----	85	Steam.	
750	16	34	1,500	4 16	-----	15	1 West. Elec.	1 West.	125	Steam.	
750	16	12	400	4 00	40	-----	1 Wood	1 Wood	90	Steam.	
1,000	16	12	600	7 50	75	-----	-----	-----	50	Water.	
650	16	-----	525	-----	50	08	-----	1 T. H.	-----	Steam.	
650	16	60	1,000	5 40	60	-----	1 T. H.	1 T. H.	135	Steam.	
600	16	7	200	-----	50	-----	-----	1 Wood	65	Steam.	
750	16	12	232	-----	35	-----	-----	1 Slattery	50	Steam.	
1,750	16	65	1,750	5 00	75	15	-----	-----	200	Water.	
900	16	-----	1,200	-----	75	16	-----	2 Heisl'r	70	Water.	
250	16	29	265	5 00	50	-----	1 Jenney	1 Commercial	72	Steam.	
600	16	23	250	4 50	50	12	1 Wood	1 Wood	51	Steam.	
300	16	35	300	5 00	50	-----	1 Schuyler	-----	90	Steam.	
210	16	40	150	5 00	-----	15	1 Standard	-----	78	Steam.	

NOTE.—Abbreviations for name of dynamos: Stan. for Standard, T. H. for Thompson-Houston, Stan. Elec. for Standard Electric, Gen. Elec. for General Electric, West. for Westinghouse, Nat. for National, West. Elec. for Western Electric.

TABLE SHOWING STATISTICS FROM GAS PLANTS IN MICHIGAN, 1897.

Name of plant.	Location.	Ownership by municipality, corporation or private parties.	Cost of plant.	Assessed valuation.	Capacity of plant for 24 hours per 1,000 feet.	Selling price per 1,000 feet.		Cost per 1,000 feet.	Salaries and wages.	No. of men employed.	No. of wells in use.
						For light.	For fuel.				
Adrian Gas Co.....	Adrian.....	Corporation.....	\$75,000	\$39,000	50,000	\$1 80	\$1 30	\$0 50	\$7,893 95	13	.....
Albion Gas and Coke Co.....	Albion.....	Private parties.....	22,000	8,000	11,000	1 70	1 30	.....	2,840 00	4	.....
Ann Arbor Gas Co.....	Ann Arbor.....	Corporation.....	60,000	40,000	180,000	1 80	1 00	.....	6,750 00	13	.....
Alpena Gas Co.....	Alpena.....	".....	60,000	20,000	20,000	1 80	1 50	1 00	2,040 00	4	1,500
Excelsior Gas Co.....	Benton Harbor.....	".....	65,000	10,000	30,000	1 50	1 25	1 00	3,220 00	9	500
Big Rapids Gas Works.....	Big Rapids.....	Private parties.....	10,000	5,000	75,000	1 50	1 00	85	1,600 00	3	800
Coldwater Gas Light Co.....	Coldwater.....	Corporation.....	27,000	10,000	50,000	1 50	1 25	75	4,500 00	8	1,000
Detroit Gas Co.....	Detroit.....	".....	4,000,000	1,164,000	890,000	1 15	1 80	.....	9,480 00	128	.....
Escanaba Gas Works.....	Escanaba.....	Municipal.....	19,000	.....	50,000	1 50	1 50	89	1,200 00	2	400
Grand Rapids Gas Co.....	Grand Rapids.....	Corporation.....	2,100,000	251,000	1,500,000	1 00	1 00	50	52,500 00	90	8,500
Ionia Gas Light and Coke Co.....	Ionia.....	".....	45,000	15,000	60,000	1 45	1 25	83	3,700 00	7	900
Isperming Gas Light Co.....	Isperming.....	".....	22,000	4,000	100,000	1 50	1 00	1 10	.....	2	150
Kalamazoo Gas Light Co.....	Kalamazoo.....	".....	280,000	74,200	550,000	1 25	1 00	78	14,000 00	28	2,500
Lansing Gas Light Co.....	Lansing.....	".....	97,000	39,800	160,000	1 50	1 25	91	4,300 00	6	1,000
Manistee Fuel and Gas Co.....	Manistee.....	".....	40,000	.....	250,000	1 00	1 00	25	2,000 00	3	25
Marquette Gas Light Co.....	Marquette.....	".....	100,000	9,500	30,000	1 50	1 20	1 16	3,979 00	6	600
Menominee Gas Light and Fuel Co.....	Menominee.....	".....	41,200	5,400	100,000	1 50	1 25	20	2,800 00	4	1,000
Muskegon Gas Light Co.....	Muskegon.....	".....	65,000	.....	85,000	1 50	1 00	65	2,000 00	5	3,000
Niles Gas Light Co.....	Niles.....	".....	64,000	7,500	150,000	1 50	1 00	95	2,100 00	3	500
Owosso Gas Light Co.....	Owosso.....	".....	48,800	9,000	160,000	1 50	1 50	1 06	3,100 00	5	900
L. R. Medbury Gas Works.....	Pontiac.....	Private parties.....	50,000	24,500	60,000	1 50	1 25	57	3,090 00	3	288
Port Huron Gas Light Co.....	Port Huron.....	Corporation.....	48,346	25,000	125,000	1 00	1 00	37	4,400 00	16	3,000
Saginaw Gas Co.....	Saginaw.....	".....	150,000	40,000	75,000	1 30	1 00	.....	4,500 00	7	1,100
Mutual Gas Co.....	St. Johns.....	".....	25,000	8,000	.....	1 50	1 50	84	720 00	2	450
Ypsilanti Gas Co.....	Ypsilanti.....	".....	40,000	21,200	90,000	1 50	1 25	.....	3,500 00	6	1,200