

GAS AND ELECTRIC NEWS

PUBLISHED BY

THE ROCHESTER RAILWAY & LIGHT CO.

VOL. 3

FEBRUARY 1916

No. 8



Station 2-A at Upper Falls

GAS AND ELECTRIC NEWS

Vol. 3

FEBRUARY, 1916

No. 8

Noteworthy Features of Station 2-A

BY F. J. HOWES

THE effect of "modern improvements" is just as pronounced in the matter of power plants as it is in that of household or any other kind of equipment. The contrast between the new and the old is shown very plainly in the accompanying cut of Station 2-A with old

tion when it is put in, hardly gets started before somebody comes along with something better. It is necessary then to throw away what is perfectly able to do what was expected of it, and to spend a large sum of money for something which will accomplish the same result at a



Forebay and Gatehouse of Station 2-A

No. 2 Station in the background. Station No. 2, occupying about fifteen times the total space occupied by Station 2-A, had a total hydraulic capacity of slightly less than half that of Station 2-A, and a total steam capacity of less than one-half the capacity of the new steam turbine recently ordered for Station No. 3.

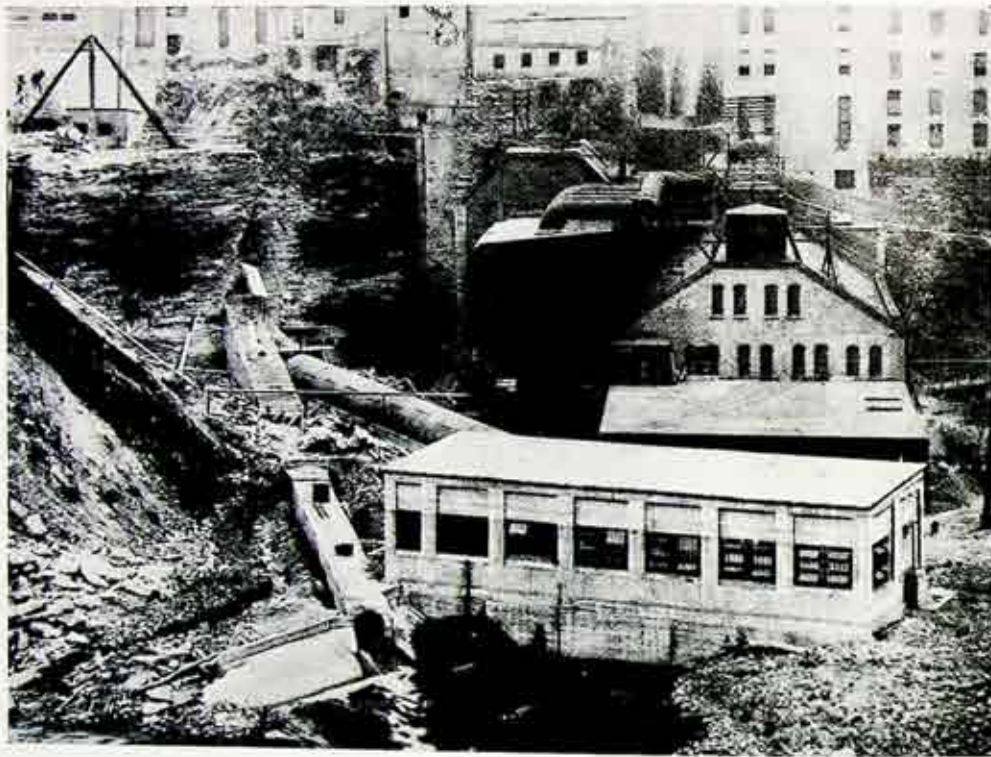
One of the big problems of managing an electrical service company results from the fact that a piece of apparatus which seems the last word in perfection of design and construc-

somewhat smaller annual operating expense. Inasmuch as the cost of labor and materials is continually increasing, the plant would otherwise have to operate under conditions which would continue yearly to fall farther and farther behind what other companies in the same line of business were able to do with the latest "last word," and behind what is absolutely necessary to keep production costs down to where the central station company can serve its customers at a rate which will

attract them. For this reason it was decided to build Station 2-A along such lines that if it were necessary to scrap the plant entirely at the end of five years' operation, it would have fully paid for itself in that time by the saving it had made.

With this end constantly in view, Station 2-A was built along lines

which contribute nothing whatever to the efficient running of a purely business proposition. Another factor contributing to the low cost at which the Station was constructed was that it was done on force account, under the very able direction of the Company's Field Engineer, Mr. F. W. Fisher, saving for the Company the



Sta. 2 and Sta. 2-A, Showing Penstock and Siphon

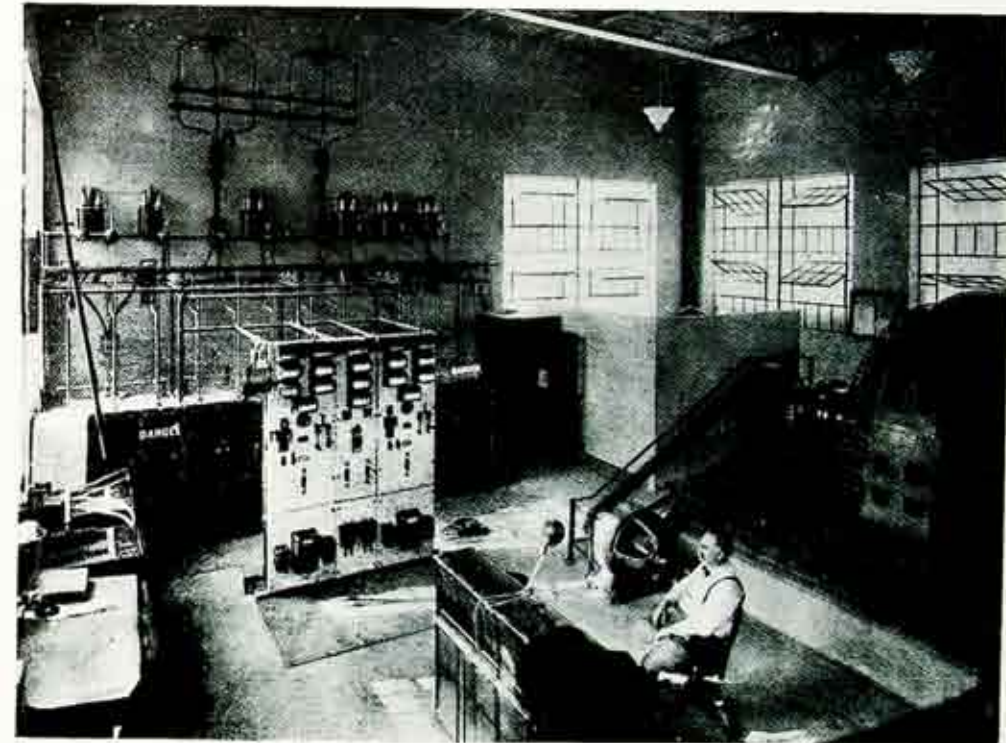
that have made it a unique plant in many ways. It is believed to be the cheapest hydroelectric generating station per kilowatt of capacity in the western hemisphere, having been completed at a cost of only \$37.00 per kilowatt of rated capacity. This is about one-fourth of the average unit cost of hydroelectric stations throughout the country. The low cost is partly due to the absence of such features as brass railings, terra cotta tile walls and floors, or tapestry brick veneer, that are characteristic of many modern power plants, but

usual contractor's profit. Weather conditions were ideal throughout the construction period, and the river behaved itself in an unusually mild manner.

The simplicity of the plant is due in large part to the fact that it is a generating station, pure and simple, with no substation equipment for controlling the distribution of power in a system of outgoing feeders. The entire product of this station is delivered to the tie line which runs from Station 3 to Station 4. The generating equipment consists of two

turbine driven units. One has a capacity of 3,000 kilowatts, the other 1,500 kilowatts. They were made of unequal size, for the reason that in this way a higher year-round efficiency can be obtained than by dividing the load equally. This is because a hydraulic turbine has a comparatively low efficiency on loads smaller

The relation between the speed and the load of a water turbine is always so definite that a very slight change of one causes a corresponding change in the other. Under ordinary conditions of operation the speed of the turbine is kept practically constant by the automatic action of the governor which takes care of variations in



Interior of Sta. 2-A, Foreman A. D. Rees in Foreground

than half its full capacity, and the load is so variable that at times less than 1,000 kilowatts are carried at this station. This would require much more water if carried by a 3,000-kilowatt unit than if carried by a 1,500-kilowatt unit. It was planned that the smaller unit should carry all loads up to its full capacity, the large unit all loads between 1,500 and 3,000 kilowatts, and both units together all loads between 3,000 and 4,500 kilowatts.

The load on the plant is controlled by means of the same governors which regulate the speed of the turbine,

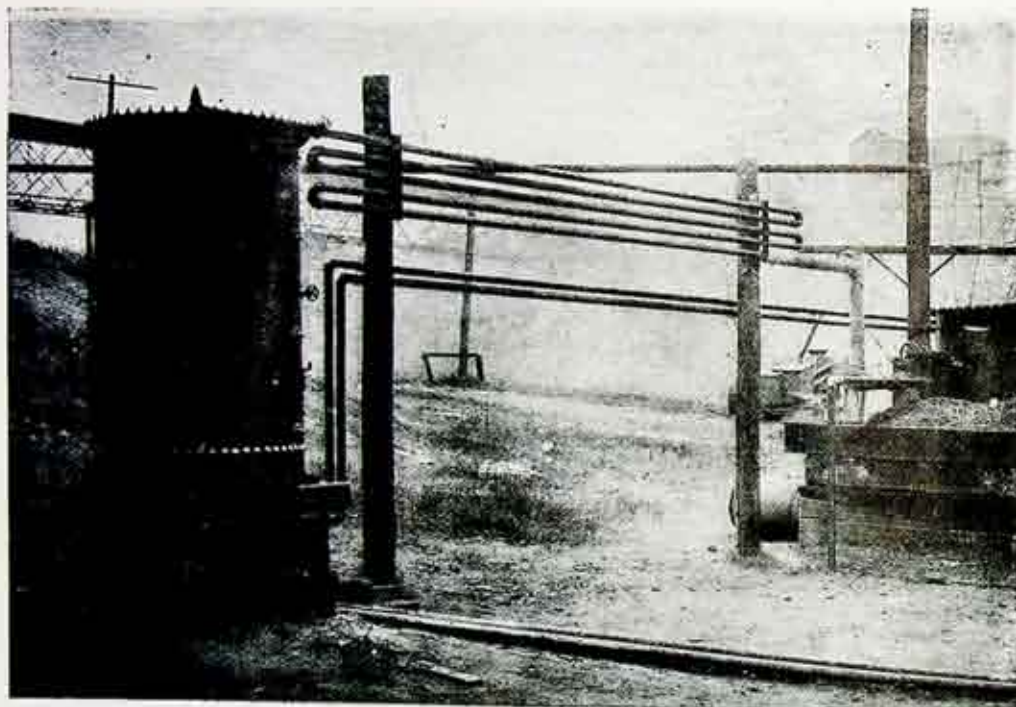
load by opening or closing the turbine gates, thus admitting more or less water as may be required to maintain constant speed under varying load. If it is desired to carry a higher load than exists at any time in order to relieve Station 3 or the Niagara System (both of which operate in parallel with Station 2-A) any change of load can be had by simply changing the relation which exists between the load and the speed of the governor. It is arranged so that this may be done at the switchboard, within easy sight of all the meters and indicating instruments. (To Be Continued)

Oil Tar Recovery

BY WILLIAM H. EARLE

IN the manufacture of Carburetted Water Gas, it is necessary to remove from the crude gas such components as are not permanent gases at ordinary temperatures, in order to establish the equilibrium of

into the purifiers, and on through the meters into the distributing holder. During this journey from machine to holder, the gas is continuously dropping out portions of its moisture and tarry vapors, which are collected at



Oil Tar Still at Gas Works

the finished product as a fixed gas. This cleansing process is accomplished by a combination of condensing by means of temperature reduction, and scrubbing by mechanical methods.

It is not the purpose of this article to discuss the various processes by which the gas is relieved of its undesirable constituents. It is sufficient here to note, that from the superheater, or final fixing chamber of the water gas machine, the gas passes through a wash box, and a tubular water condenser into the relief holder, then through mechanical scrubbers

a common point as a heterogeneous mixture of water, tar, lamp black, and emulsions of the same. The disposal of this mixture, and the recovery from it of its valuable constituents, becomes then, a problem of its own.

As with any accumulation of immiscible liquids, there is an immediate tendency for the mass to separate itself as completely as possible into strata of water and tar. To assist the process, the liquor is passed through a series of separators, which are concrete boxes partitioned by curtain walls in such a manner that

the material is forced to travel at slow velocity and with a minimum of agitation, in reversing up and down currents. In this way, the heavy tars settle to the bottom, and are pumped into suitable storage tanks, while the clarified water travels on through coke filter beds into the river.

The following table shows the results of a survey of the pit of No. 7 Holder on January 20, 1915.

Sample No.	Depth below water line	Specific Gravity	Per cent. Water	Per cent. Light Oil
1	5'-6"	1.0000	100	...
2	9'-6"	1.0069	74	11
3	13'-6"	1.0140	53	10
4	17'-6"	1.0284	44	9
5	21'-6"	1.0357	37	11
6	25'-6"	1.0662	25	6

So far, the problem is simple, and through gravimetric sedimentation in the separators, and subsequently in the storage tanks, large quantities of nearly water free oil tar are recovered. This oil tar is of value as a fuel, as a wood preservative, and as road tar. There is also accumulated a large quantity of material which is essentially an emulsion of tar, lamp black, and water, which will not separate by gravity. Being an offensive material which cannot be discharged into sewers or streams, it has been customary to pump it into holder pits, and forget it. As long as the available storage facilities are sufficient, it presents no further problem, and yet, laboratory tests have shown that the emulsion, when broken down, yields good proportions of light oil, and oil tar. By light oil, is meant an oil whose specific gravity is less than 1, and which distills off with water between 212 and 230 degrees Fahrenheit.

Repeated laboratory tests showed that such material as is represented by samples 3-4-5-6 is low enough in water content, and high enough in light oil content to make recovery of the light oil a simple distillation process. Investigations also indi-

cated that when the light oil, and a portion of the water were removed from the emulsion, the emulsifying properties of the material were destroyed, and the residue would separate into tar and water by the ordinary sedimentation methods. Inasmuch as estimates made at the time of the above survey indicated an accumulation of approximately 500,000 gallons of emulsion, and the market offered a substantial demand for both light oil and oil tar, it was decided to attempt a practical distillation of the material.

The still is a steel tank of 43 inch inside diameter, and 72 in. high, having an available capacity of 300 gallons. The heating unit is a continuous spiral coil of 1 in. extra heavy steel pipe, containing 122 lineal feet of pipe and presenting approximately 39 square feet of heating surface. Steam at about one hundred pounds gauge pressure is conducted to the coil by a one-inch pipe, but for control purposes, the steam is throttled through a half-inch needle valve. At the top of the still is a two-inch off-take, leading into the condenser. The condenser consists of five lengths of 2-in. iron pipe, made up with return bends, and up to the present serving as a simple air condenser, no cooling water being used. The condenser discharges into a receiving tank of 500 gallons capacity, where the oil and water distillate is allowed to stratify, the oil periodically being pumped off into storage tanks. The still is also provided with suitable piping for filling and emptying, with test cocks, thermometer, and other accessories.

The operation is very simple. The still is filled to an established point with material from the emulsion zone of the relief holder. Steam is turned on at the needle valve, and the liquor is slowly heated to about 216 degrees Fahrenheit. Distillation begins at that point, and the temperature is not allowed to rise above 230°.

Figure 2. This machine is about 15 in. long and operates similar to an adding machine. It has twelve numerical keys which correspond to the twelve divisions in each column of the card, and perforations are made as the card automatically goes from right to left. These perforations have a numerical value and the information required is represented by special codes. After these cards are punched, they are ready for the Sorter, Figure 3. This is a machine about 5 feet high, having a capacity of sorting 12,000 cards per hour. The perforated cards are inserted at the top of the machine and are automatically fed downward and as they pass over a single brush, an electrical contact is made through these perforations. For example, if this contact is made on "1," the card is passed downward through a slot which deposits this card in pocket number one, and there being twelve different pockets which correspond with the twelve divisions of the fields previously referred to on the card, the cards are sorted into their proper groups and are ready for tabulation.

The Tabulator, Figure 4, consists of five counters, (the cut showing only four, this machine being used previous to the tabulation of gas sales) and in addition to tabulating the number of cards or accounts, it totals the cubic feet of gas, amount of gas, electric demand, kilowatt hours and amount of electric sales; this being done in one operation. The cards are fed in this machine in a similar way as in the sorter, passing over a series of brushes which make an electrical contact through the perforations and operate the counting mechanism. For example, if on the last three columns, "1," "9" and "2" were punched, it would denote an electric bill of \$1.92, and the contact through these perforations would register on the cyclometer dial

in the units, tens and hundreds column, \$1.92.

Again referring to Figure 1, I will endeavor to explain the data and information secured through the medium of these machines. This card, you will note, is used in classifying the gas and electric income. In the upper left hand corner, are the num-

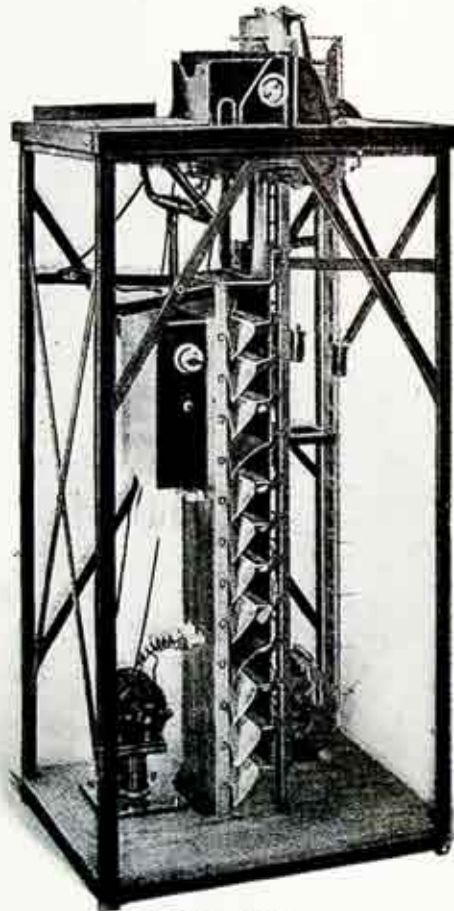


Fig. 3. Sorter.

bers one to twelve, which denote the month; and the first three vertical columns, the ledger. This particular card shows this account on ledger No. 109 and December sales. The next four columns denote the street. All streets in the city are coded by numbers and in this case the card is punched "736," which is Main Street East, and the house number designated by the next four numbers is No. 137. Up to this point, the

perforations made on the card are for the identification of this account. Next comes the class of business. This we have coded from one to seventy, "1" being "Residence Lighting;" "2," Office Lighting; "3," Department Stores; "4," General Store Lighting, etc. In the card above referred to, you will note that it is punched "4," which would be sorted into "General Store Lighting." By sorting on this field of the card and tabulating the same, the number of consumers is obtained, the total demand, total kilowatt hours and amount of sales, for each of the seventy classifications of business. On the next two columns of the card, is denoted the tax district; Rochester being district "1;" Gates, "2;" Iron-quoit, "3," etc.

Sorting and tabulating is done in a similar way as the business classification and these figures form the analysis of the report of the State Board of Tax Commissioners.

Next is punched the number of days which this meter reading covers and the next two columns denote the class of revenue. In sorting on this classification, the A. C. and D. C. light and power, railroad corporations, municipal lighting, other electric corporations, etc. are separated. There are thirty-three classifications on the revenue, and these figures are taken as the analysis of the Public Service Commission report. The next column marked "Schedule" refers only to the gas sales; "Schedule "1," being 95c gas; "2," 90c gas, etc. On the next four columns, is recorded the cubic feet of gas; on the next five, the amount of the bill. By referring to the card, it will be seen that the amount of gas consumed is 1800 cubic feet, the amount of the bill being \$1.71. On this particular account, no demand instrument was installed and for this reason the following columns marked "Maximum Demand" are skipped. As

this consumer has both gas and electricity, "26" kilowatt hours are punched and the amount of the electric bill is \$2.08; and on the last column of the card the "8" is punched, meaning that the rate paid is the regular maximum rate of 8 cents. On the last column of the card the income is classified as to amount of sales, according to the different rates now in force; "1" denoting "Three Rate, Class One;" "2," "Three Rate, Class 2;" "3," "Three Rate, Class 3," etc. Number "9" is perforated for all guarantee

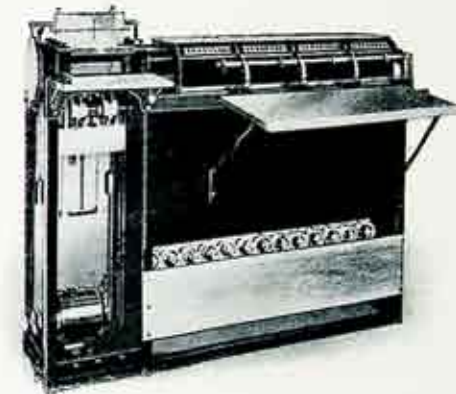


Fig. 4. Tabulator.

charges and by taking the guarantee charges from the regular 8 cent rate it gives a check on the extensions of all 8 cent bills before these bills leave the office. This is also followed out on other rates as well, which I consider a very important factor of the Tabulating Department. When the bills are finished on a certain ledger in the Consumers' Ledger Department, they are sent to the Tabulating Department and cards are punched from these bills, a list being taken from the ledgers and sent at the same time. The perforated cards must total to agree with this list which proves that the bills and ledgers are correct. If any variation occurs, the cards are checked against the bills to determine whether or not an error is made in computation.

At the present time, there is being made out on this sales card, five distinct reports and in the near future additional reports will be made on the gas and electric sales, as to the amounts of the bills. This will be valuable data to compare with the cost of carrying both gas and electric accounts.

All classifications of appliance sales are computed by this department, the information being taken from

and by sorting on the last column, the auto, parcel post, Front Street and Clinton Avenue deliveries are divided, and the report of the number of lamps delivered and the number of deliveries made is computed, reported to the Auditing Department, and checked against the cost of these deliveries. This classification applies strictly to the accounting work and has eliminated much additional work in the Appliance Department as the

Month	Day	Order No.	Charge No.	Account No.	Material	Party	Commission	Revenue	Gas	Electric	Other	Total
11	11	192	K-1	65	10	10	4.98	333.25				333.25

Fig. 5. Appliance Sales Card.

the original appliance orders and perforated on the appliance sales cards, Figure 5. The first six columns denote the month, day and ledger; next, the order number and after this the charge number, which gives a quick reference to the original order. The next twelve columns are used for the account number which shows the revenue to which this particular sale is to be credited. In this case, it is 192/K-1; class of material is "65," which is the code for "Gas Range Sales." The party making the sale is solicitor No. 10; the commission due is \$4.98 and the amount of sale, \$333.25. By the analysis of the 390-N3 account, which is the sale of incandescent lamps, a special code on the class of material divides the "Mazda" and "Gem" lamp sales;

results can be obtained in about two hours time in sorting and tabulating cards. These cards are punched each day as the completed orders are sent from the Appliance Department after being billed to the consumers. In addition to the part of the work strictly pertaining to the accounting, the kinds of material sold are analyzed by coding this material as follows: Chafing Dish—"1;" Disc Stoves, "2," etc. A report is also made of the amount of commission due on each solicitor's completed order.

This department has also applied this system to the "Consumers' Deposits Record" and to the monthly "Installation Report." It will undoubtedly be extended to apply to other branches of the Company's work in the future.

Meeting of the Production Committee of the Empire State Gas and Electric Company at Binghamton, N. Y.

BY R. D. DE WOLF

At a meeting of the Production Committee held at Binghamton, on January 14th, this Company sent seven representatives, namely, R. D. DeWolf, I. E. Powell, P. J. Drumm, C. E. Walker, G. Haap, C. Gardiner, and W. H. White. There were about forty different companies represented at this meeting. The principal topics for discussion were production costs, centrifugal boiler feed pumps and boiler room meters.

Most of the morning session was taken up in an analysis of production costs. A number of the companies were prepared to present figures covering their costs of operation, but due to differences in the accounting methods they were not rigidly comparable. While the data presented was very interesting and instructive it was not felt that the results were conclusive largely for this reason. Quite definite plans were outlined for the next meeting at which it is hoped more definite data can be submitted made up in accordance with instructions to be sent out by the Chairman of the committee beforehand. Roughly comparable figures were given indicating that as a rule the labor cost is about 20% of the total cost of production. This of course, varies greatly with the load factor. The analysis of costs presented by the Rochester Railway and Light Co. was unusually complete, and will enable the Company to make valuable comparisons very easily.

In the afternoon session the first subject taken up covered the use of centrifugal boiler feed pumps. It was anticipated that a great many arguments pro and con would be submitted on this subject. It developed that all those who had centri-

fugal boiler feed pumps were glad they had them and those who still operated the old reciprocating type hoped to replace them with centrifugal pumps at the earliest possible date. The evidence not only indicated that the centrifugal pump costs far less in the way of repairs and maintenance, but gives far more satisfactory operating results.

The discussion on boiler room meters covered steam flow meters, draft gauges, and CO₂ meters principally. Those who had installed CO₂ meters, while thinking they were a fairly good device, were not enthusiastic about them. The principal criticism directed against them was the necessity of constant supervision and frequent overhauling.

Some very interesting experiences on the part of other central station companies were related. One company had experienced very much the same trouble that this company has had due to a dry salt being carried over from the boiler through the superheater into the turbine. In this particular plant the result was that the operators had to take the top off of the turbine in order to clean out the blading. The dry powder had adhered very firmly to the turbine blades forming a hard scale which had baked on. It had been the practice of this company to inject about one quart of lubricating oil into the turbine each time that it was shut down, and this oil had apparently formed a gummy coating on the turbine blades, to which the dry powder adhered very readily. When they discontinued using the oil the amount of powder deposited on the turbine blades was very greatly reduced.

In the afternoon the entire party was taken out on a special car to inspect one of the plants of the Endicott-Johnson Shoe Co., which is one of the largest shoe manufacturing concerns in the country.

Gas and Electric News

Published Monthly by the
ROCHESTER RAILWAY and LIGHT CO.
34 Clinton Ave. N., Rochester, N. Y.

FREDERICK W. FISHER *Editor*
PHILIP F. STEPHENS *Assistant Editor*
DWIGHT C. ROCKWOOD *Photographer*

Department Correspondence Staff	
Sales	
H. O. STEWART	<i>Industrial</i>
JOS. P. MACSWEENEY	<i>Domestic</i>
Electric Operation	
A. S. MACDOWELL	<i>Generation</i>
ARTHUR J. WAGNER	<i>Distribution</i>
Gas Operation	
WILLIAM H. EARLE	<i>Manufacture</i>
WILLIAM F. SKUSE	<i>Distribution</i>
Auditing	
F. H. PATTERSON	
Engineering and Construction	
H. C. DEFFENBAUGH	

Vol. III FEBRUARY, 1916 No. 8

This Company, of which each of us is a part, is of a magnitude and has an importance which to many is not immediately apparent. The statistics of Company business, which are expected to be a regular feature of this magazine, do not tell the whole story, however illuminating they may be.

Rochester is particularly fortunate in possessing very many enterprises of a diversified nature, some of which are of large magnitude. These are pointed to with pride as we "boost for the town." We tell our out-of-town friends that business depressions do not affect us as seriously as most cities are affected. We describe with enthusiasm our famous water supply, sewers, parks, stores, fire and police departments. We enumerate the birth, death and health statistics, and we become eloquent over our churches, schools and hospitals. Why do we not likewise enthuse over our public service corporations which supply us with heat, light, power and transportation? Why are we not describing the good service, excellent street lighting, and the fair

and honorable treatment accorded to our patrons when we become town boosters?

To some extent this is being done, for the employees and the public in general realizes our good as well as our bad qualities. Many of us, however, have been too busy giving service to concern ourselves with our particular relation to the Company and with the Company's relation to the City. Those of us who come directly in contact with the public are almost always well received, and we want to spread the feeling that we are absolutely on the level and are conducting our business as well as it is humanly possible to do so.

It is true that the Rochester Railway and Light Company is one of the largest enterprises in Rochester. Practically all the stores, and a large proportion of the residences rely on it for artificial light. Thousands of homes rely on it for fuel for cooking. Many large enterprises rely on it for electric energy and steam heating. It has lessened the cost of living, and made the daily burdens of thousands lighter. It is contributing to the safety of the city, and to its business, social, moral, educational and religious life. It employs as fine a body of men and women as it is possible to find in the whole world.

Why shouldn't we be proud of it and boost for it, and mention it as one of the features which makes Rochester attractive? As individuals and as members of it we have not only the right but the duty to entertain a proper respect for ourselves and for the Company.

Modesty is usually a virtue, conceit rarely. The sane and well balanced individual, however, can combine them in the right proportions, and a little reflection along these lines may show some of us that we have been neglecting our opportunities. A proper perspective is always necessary for efficient service.

Think What Less Than a Cent a Day Will Do!

A noteworthy example of Co-operation, was ratified at the special meeting of the Employees' Benevolent Association on January 27th. By a vote of 149 to 7 of the members present, the Association approved of the successful efforts made by General Manager James T. Hutchings and the trustees, to render insurance through the Association cheap and adequate.

The meeting was presided over by Superintendent W. C. Gosnell. Mr. H. P. Brewster, President of the Rochester Savings Bank, spoke on the subject of, "Savings," and Mr. H. P. Gould, Association Secretary, presented a financial report for the past year.

Mr. J. T. Hutchings outlined the history of the Association and the work accomplished.

As originally organized it was planned by the Association to pay a death benefit of \$1,000. It was found, however, legally impossible to make this benefit more than \$400 without incorporating as an insurance company. The Association and the Company realizing the inadequacy of this amount, have for several months been working with various insurance companies, on the establishment of "Group Insurance." Many Insurance Companies write a cheaper insurance than the standard rate, for a group of several hundred applicants. This is economically possible for the reason that the expenses of insuring this group are much less than were the same persons of the group insured as individuals. The average ages are used to determine an average premium.

The Aetna Life Insurance Company gave the best policy for the least money, and its provisions are as follows:

Each member of the Association is insured with the Aetna Life In-

urance Company for \$600 in addition to the \$350.00 Association insurance previously in effect. To pay for this Group Insurance, the dues of the members have been increased 25c per month, the Rochester Railway and Light Company contributing an equal amount. There is no additional medical examination.

Now in addition to this insurance, Association members are given the privilege of taking out with the Aetna Company within six months, without medical examination, additional insurance, at the standard rate for the age of the person insured, up to a maximum of \$2400.00. A disability clause provides for cessation of premium in case of total disability and payment of the policy in twenty equal annual payments. In case the disabled member dies before the final payment, the balance less interest at 5% will be paid his heirs in a lump sum.

Upon leaving the employ of the Company the Association insurance ceases, but the Aetna Insurance (\$600.00 plus the additional taken) can without medical examination be converted within 30 days into a standard policy of equal amount, upon the payment of the difference between the standard rate and the Group rate.

As a practical example. Assume William Blank to be a member of the Association in good standing, and receiving \$18.00 per week in wages from the Company. Mr. Blank has been paying the Association \$0.39 per month in dues and was entitled to a sick benefit of \$9.00 per week. He paid death assessments of 25c each and was entitled to a death benefit at the rate of 50c per member up to a total of \$400.00. Mr. Blank will now pay \$0.25 per month in addition to the \$0.39 previously paid, and to this the Company will add \$0.25, with the result that for the total sum of \$0.89 per month, \$0.64

of which is paid by Mr. Blank, he is entitled to sick benefits and is insured up to a total of \$1000.00 when the membership is 700. Now assume that he is 40 years old and desires a total insurance of \$2500.00, or \$1500.00 additional. From the table the rate for this age is \$8.74 per thousand and \$1500.00 or 1½ thousands will cost 1½ times \$8.74 or \$13.11 annually or \$1.084 per month. Thus Mr. Blank is insured at the rate of 50c per member up to a total of \$400.00 plus \$600.00 at a cost of 25c per month plus \$1500.00 at a cost of \$1.084 per month which with the present membership is approximately \$2500.00.

The total cost then for this insurance and sick benefits is \$1.724 per month plus death assessments which are not expected to average over 12c per month. Each year the premium on the \$1500.00 item will be larger but on the other items it will remain the same, as the Association agrees to meet slight changes in the premium to be paid on the \$600.00 item, if any, from the treasury. The foregoing is all possible without medical examination. In case Mr. Blank is laid off but not discharged, he can by payment of the monthly premium, keep the insurance in effect, and upon leaving the Company can convert the \$600 and \$1500.00 items as first stated.

This insurance for any age is very much cheaper than any other insurance which can be obtained from any company under any circumstances whatever. At a cost of 25c per month or less than one cent per working day a member can insure himself, without examination for \$600.00. And furthermore, all insurance companies exclude elderly persons, whereas this plan includes Association members up to an age of 85 years.

Altogether this arrangement is highly satisfactory to the great ma-

ajority of the members of the Association. The fact that the General Manager received a unanimous rising vote of thanks at the meeting is an indication of the appreciation which the Association members and their families felt for the plan.

After the meeting refreshments were served and dancing took place, Moll's Orchestra furnishing music for the large and happy gathering.

Prize Paper Contests

For the purpose of arousing greater interest in the operation of the Company's business, a system of cash prizes for written papers on Company work has been instituted. Prize Contest Groups have been formed as follows:

PRIZE CONTEST GROUPS

Group A—Electric Generation, Electric Construction. Includes all Electric Stations and Sub-Stations, Electric Wiremen, Electric Construction and Repairs, General Construction and Repairs.

Group B—Electric Distribution. Includes Overhead, Underground, Subway, Steam Distribution, Meter, Motor and Right of Way Departments.

Group C—Gas Manufacturing, Gas Street. Includes Gas Works, Gas Holder and Gas Street Departments.

Group D—Gas Shop, Purchasing and Stores, and Transportation.

Group E—Industrial Sales, Engineering, Drafting and Records, Domestic Sales and Service Improvement.

Group F—Accounting, Clerical. Includes Consumers Ledger Department, Stenographic, Mailing, Auditing, Contract, Tabulating, Statistical, and Treasury Departments.

In each of these groups two prizes are offered, a first prize of \$15.00 and a second prize of \$10.00.

Papers will be judged in the sequence of their importance to the Company, and will be rated in ac-

cordance with the following general classification.

1. New and instructive ideas which are analyzed to practical conclusions.
2. Description of new practices, standardizations and methods, showing possibility of economy or of further development.
3. Descriptions of present operation.
4. Abstract generalities.

It is recognized that certain employees have had greater advantages in the way of education and experience than others, and in order to encourage the development of the latter class and to secure from them papers which they would not attempt to write in a general competition, it has been decided to eliminate all Superintendents from these contests.

The Company reserves the right to reject any or all papers that do not come up to a minimum standard of value, and to have read in Sectional meetings or printed in the Company magazine, any or all the papers or abstracts therefrom, that are accepted.

All papers must be limited to 1800 words, and must be written in ink on one side of the sheet only.

Writers are advised that it is helpful to prepare a brief abstract, and to sub-divide the paper with short headings. The Company's Drafting Department will assist on request, in the preparation of illustrative sketches.

All papers must be sent to Mr. F. W. Fisher, Safety Engineer, who will acknowledge their receipt.

The Contest will close September 1st, 1916, and the awards will be made as soon thereafter as possible.

A well known Rochester woman, recently said: "There are two bills which I am always delighted to pay; taxes, gas and electricity. In both cases, I get so much for my money."

New Chisel Bar Holder

Mr. William Enos of Station 3 has invented a chisel bar holder which is the most practical device of its kind that has come to the attention of the Company.

In the ordinary method of using a drill, bull point or chisel bar, one man holds the bar in his hands, while another strikes it with a sledge. There have been many accidents caused by the striking sledge slipping



from the end of the bar and bruising the fingers of the man holding it in position. Injury to the eyes has also been caused by flying bits of steel or rock. The new device permits the man holding the bar to remain far enough away to be out of reach of the sledge, and more out of range of flying chips.

The holder consists of a hollow handle through which passes a loose fitting rod. The handle is expanded at the drill end into a Y-shaped yoke. The rod is expanded at the drill end into a closed loop, and is threaded at the other end to receive a wing nut. The drill is placed within the loop, and the wing nut, which bears against the holding end of the hollow handle, is tightened. This draws the drill into the Y-shaped yoke holding firmly. The operator then simply has to hold the drill in position for the striker, and to rotate it somewhat, in order to cut a clean hole.

Annual Meetings

The annual meeting of the stock holders of the Rochester Railway and Light Company was held at the office of the Company, No. 34 Clinton Avenue, North, Rochester, on Tuesday the 18th day of January, 1916, at 10 o'clock. Mr. G. A. Hollister presided and Mr. J. C. Collins acted as Secretary of the meeting. All the acts of the Board of Directors of this Company, and of its Executive Committee, and also all acts of officers of this Company appearing in the records during the past year were approved, ratified and confirmed. The following were elected Directors of the Company for the ensuing year:

Horace E. Andrews	Edward Bausch
Daniel M. Beach	John Carstensen
Thomas W. Finucane	Albert H. Harris
Granger A. Hollister	Walter N. Kernan
Alexander M. Lindsay	Edward G. Miner, Jr.
Robert M. Searle	Alfred H. Smith
Henry A. Strong	Harold S. Vanderbilt
	William K. Vanderbilt, Jr.

The following were elected Inspectors of Election for the ensuing year:

E. C. Scobell	F. H. Patterson
	C. B. Evans

The annual meeting of the stock holders of the Eastern Monroe Electric Light & Power Company was held at the office of the Company No. 34 Clinton Avenue, North, Rochester, January 10th, 1916, at 10 o'clock. Mr. G. A. Hollister presided, and Mr. J. C. Collins acted as Secretary. The following were elected Directors for the ensuing year:

Horace E. Andrews	John Carstensen
Walter N. Kernan	Wm. K. Vanderbilt, Jr.
Horace E. Andrews	Daniel M. Beach
John Carstensen	Albert H. Harris
Walter N. Kernan	Alfred H. Smith
	William K. Vanderbilt, Jr.

The same Inspectors were elected for this Company for the ensuing year as for the Rochester Railway and Light Co.

The annual meeting of the stock holders of the Despatch Heat, Light

& Power Company, was held at the office of the Company, East Rochester, N. Y., Jan. 10, 1916, at 12 o'clock noon. Mr. R. Parkinson presided, and Mr. J. C. Collins acted as Secretary of the meeting. The following were elected Directors for the ensuing year:

Horace E. Andrews	John Carstensen
Walter N. Kernan	Wm. K. Vanderbilt, Jr.
Horace E. Andrews	Daniel M. Beach
John Carstensen	Albert H. Harris
Walter N. Kernan	Alfred H. Smith
	William K. Vanderbilt, Jr.

The same Inspectors were elected for this Company for the ensuing year, as for the foregoing Companies.

Flame Temperatures in Gas Furnaces

BY I. LUNDGAARD

When gas is burned with just sufficient supply of air to make the combustion complete, and without loss of heat due to radiation or contact with cooler bodies, the highest temperature that is possible through combustion of gas is obtained. This is called the theoretical flame temperature and while it is never obtained in practice, it is a quantity that can be determined by computation and is very useful in analyzing operation of gas furnaces. The flame temperature will be lower when an excess of air is supplied or when not enough air is mixed with the gas before combustion.

If we assume that a furnace is to be operated at a temperature of 2,000° Fahrenheit and that a theoretical flame temperature of 3,000° is obtainable, the difference between the flame temperature and the furnace temperature is available for productive work in the furnace. 1,000° of sensible heat then, can be utilized while 2,000° must be wasted. If by careless operation the flame temperature is only 2,500° instead of 3,000°, the available heat is reduced to one-half of what it formerly was and the gas consumption has been greatly

increased. In the first place, the fact that only 2,500° of flame temperature is obtainable indicates inefficient combustion because this lower flame temperature is the result of an excess of air, which means a lower efficiency. In the second place, only half as much sensible heat is available for productive work in the furnace. In the third place, due to the lower temperature, the heating takes about twice as much time thus entailing double the radiation losses from the furnace. In the case cited, in all probability the gas consumption for doing the same amount of work will be four times as great when the furnace is operated at a 2,500° flame temperature instead of the obtainable 3,000° flame temperature. Men who are conversant with the operation of gas furnaces have learned through experience, that there is a great difference in the speed and efficiency of furnaces according to the method of operation, and the above phenomena explains to a very large extent the reason for these differences.

An Unusual Investigation

BY F. A. YATTEAU

Mr. M— lights the halls of his four story apartment building by gas; the meter recording the same being located in the front of the cellar of one of the stores. His bills ordinarily range from eight to eleven dollars a month, and a December bill of nearly sixteen dollars caused him to enter a complaint.

He expressed the opinion that a meter recently installed in one of the apartments was feeding through the meter for the hall lights and requested an immediate investigation. A man from the Complaint Department was sent with him to test out the line, but was unable to do so owing to the rooms being locked. At the request of Mr. M—, the hall meter was shut off to facilitate investigation. Mr. M— was warned

by the Company's employee that the Company should not be held responsible in case of accident caused by turning on the meter if Mr. M— turned it on himself, which the office men suspected was his intention.

It was agreed that the office man would meet Mr. M— at the building later in the day when the new tenant was expected to be at home, but the former was too busy at the time so Mr. Ransley of the Gas Shop was sent in his stead. Upon meeting Mr. M—, Mr. Ransley tested out the newly installed meter and found it feeding properly. He then turned on the meter for the hall lights and observed the two foot dial to move quite perceptibly. He again shut off this meter and proceeded to look for the cause by tracing the line from the meter. After pulling away a large pile of empty packing cases, he found a rubber hose attached to a "T" in the line, and leading through a wooden partition and up through the floor to a room occupied by a colored gentleman who was sound asleep in his bunk. The hose terminated at a "Perfect Heater" turned on full. Now, it doesn't take half a thought to understand what would have happened if this meter had been turned on by an inexperienced person, and credit is certainly due Mr. Ransley for his persistency in the search.

Company Men "Make Good"

Mr. J. W. Brown of the Domestic Sales Department, sold, and Messrs. Walter Drew, George Harris and Walter Hanifan of the Gas Shop, installed, a furnace connection for Mr. W. W. Bickford of 38 Faraday Street recently. The bill came back from Mr. Bickford with the following: Gentlemen:

The writer is more than pleased with the job from the salesman to the men who performed the work.

Yours respectfully,
Walter W. Bickford.

Mechanical Refrigeration

BY A. C. RISSBERGER

Mechanical refrigeration has entrenched itself so deeply in our present day life that it is absolutely indispensable. Sixty-five of the refrigerating plants in Rochester are on the Company's lines. These plants are capable of producing about 800 tons of refrigeration every 24 hours, and it takes over 1500 horsepower in motors to operate them. It is indeed interesting to look over the long list and see how we meet electric refrigeration service at every turn.

It is necessary to cool the milk we get in the morning to a low temperature, because at a temperature above 50 degrees the bacteria content increases very rapidly. In meat markets and packing houses mechanical refrigeration is used because a temperature of about 34 degrees is required to keep the meats in perfect condition. Canneries and food manufacturers of all kinds cool the products that are ultimately bought from the grocers; while manufactured ice, due to its superiority in various ways, is slowly replacing the natural supply. The immensity of ice consumption is shown by the fact that over 1.2 tons of ice are used per capita per year.

Nature does not supply certain foods the entire year and the cold storage plants come to the rescue. In the manufacture of ice cream the mixture is first frozen to a soft consistency. It is then allowed to flow into cans which are placed in hardening rooms whose temperature is kept below zero. The florist brings to mind the hothouse, but there are many cut flowers, ferns and bulbs that are kept in rooms near the freezing point. In our hospitals mechanical refrigeration keeps the food in a perfect condition and makes ice for use of the patients, while in many restaurants, cafes and hotels it renders a service just as valuable. Many factories furnish their em-

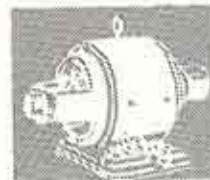
ployees with water at the proper temperature for drinking, while some hotels, office buildings and department stores are just as progressive. The furrier uses refrigeration for his storage rooms, keeping the furs soft, fluffy and free from moths. Many of the large refrigerating plants are located in breweries, and in the case of factories we have just begun to touch the number of uses of mechanical refrigeration which could not be accomplished with ice.

Several plants are installed in private residences, but up to the present time, unfortunately, we have not found a satisfactory machine which is cheap enough for the average man. Progressive and up-to-date apartment houses are furnishing refrigeration to their tenants, keeping the temperature of the refrigerators at about 36 degrees, 365 days a year, because they realize that it is far superior to ice in every way.

Occidental Absorption of Oriental Wisdom

In his memoirs Lord Charles Beresford, mentioning a fort on the Yangtse River, relates: "I noticed a battery of 60-ton muzzle-loading guns that were loaded by depressing their muzzles into the magazine. I ventured to suggest that any carelessness in sponging out the guns might result in blowing up the magazine. The General said that the English mandarin was extraordinarily clever, that a year previously a magazine had blown up in precisely that way and had killed 42 men. *They had then rebuilt the magazine on exactly the same plan.*"

Can anyone reading this, recall parallel instances, say of factories rebuilt after destruction, reconstructed schools, theatres and business blocks? Cases of apparent acceptance of Chinese methods and wisdom in "Enlightened" America?—*Safety Engineering.*

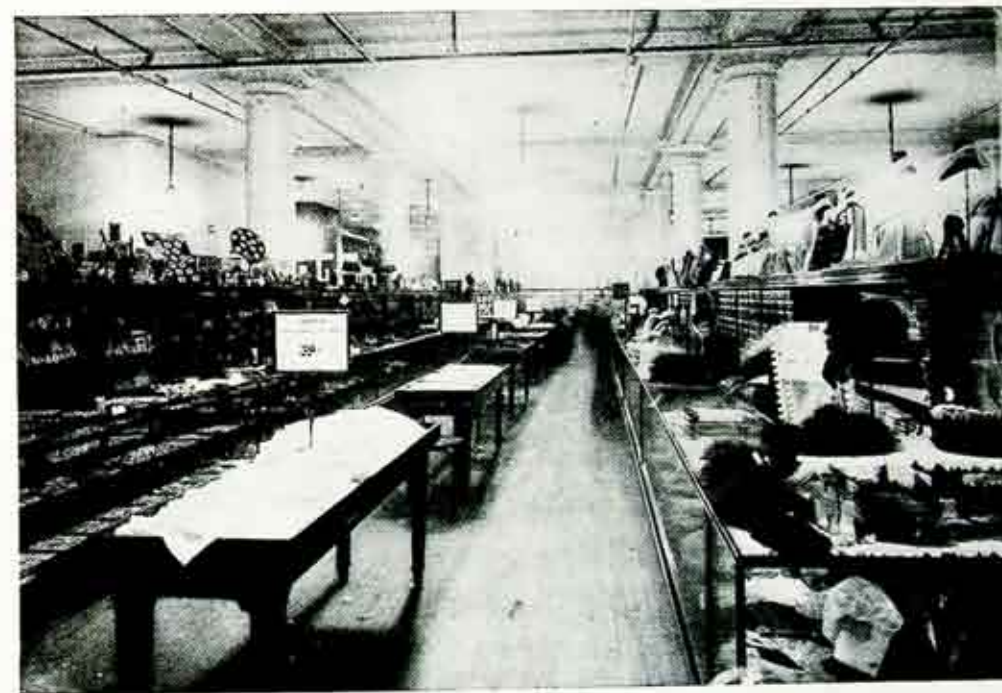


Sales



One of the best installations of artificial daylight illumination is to be found on the ground floor of the new building of the McCurdy-Robinson Company. In the center of each bay is an ornamental fixture equipped

found that this sort of light did not show up the goods to their best advantage and that light equal to daylight or even containing more blue than daylight was necessary. On this account the arc light has been



Artificial Daylight Illumination, McCurdy-Robinson Co.

with a 750-watt nitrogen lamp and a Trutint opal globe.

Illumination such as furnished by this type of installation is the most desirable kind for department stores, on account of it being very much like daylight.

One of the chief obstacles to the use of incandescent lamps in department stores has been, in the past, the color of the light. All incandescent lamps give off light containing considerably more red and yellow light than there is in daylight. It was

practically the only light used in department stores.

The Trutint opal globe used at the McCurdy-Robinson Company absorbs the surplus red and yellow light. The result is a very effective light similar to daylight. The globe itself is like the ordinary opal globe except that it is blue tinted.

This equipment has many advantages over the old arc light. The chief advantage however, is that of maintenance. The old arc light had to be cleaned, adjusted and fitted with new

carbon rods about three times a week. The new lamp will burn approximately a thousand hours without attention. It is also somewhat more efficient than the arc lamps which were replaced.

The installation was used throughout the holiday season and was found to be especially good for the exhibition of colored goods, showing all the various colors just as they are in daylight.

About six years ago, Mr. Adam A. Long, who was a tenant and a power consumer in one of the Company's buildings, found it necessary to obtain larger quarters. This he did by building a new plant at the corner of St. Paul Street and Avenue E. The different kinds of power available for use were thoroughly discussed with the Company's representatives and the relative merits and demerits of each were explained. However, he installed a gasoline engine, and, being a mechanic of exceptional ability, was able to overcome to a reasonable degree the inherent difficulties of the gasoline engine. Since that time the Company's representative has made a periodic canvass of the installation and on November 4th was allowed to make a trial installation of electric power. The service was entirely satisfactory and when the first bill was presented, it showed a marked decrease in the cost of power. The Company now has Mr. Long's order for the motor, belting and pulley which was originally installed free of charge, for experimental purposes.

The Ryede Specialty Works has recently installed a large electric welder which is being used to spot-weld those joints in gum vending machines which were formerly riveted. The welder reduces the cost of making joints and does a better job than can be done with rivets.

It is interesting to know what business has been done in the sale of electric appliances in the Clinton Avenue office during the weeks preceding Christmas in the years 1914 and 1915. The following statement for the two years shows that the year 1915 had an increase of 28% over the year 1914.

Item	1914	1915	Increase
Irons.....	23	30	7
Toasters.....	24	30	6
Percolators.....	7	8	1
Electric Pads.....	8	9	1
Radiators.....	5	2	(Dec.) 3
Table Grills.....	4	9	5
Vacuum Cleaners.....	2	1	(Dec.) 1
Washing Machines.....	1	1	0
Specialties.....	7	14	7
Totals.....	81	104	23

We believe this result was obtained by co-operative effort on the part of the employees of the Domestic Sales Department, and the improved conditions of the display room which has meant greater efficiency and has resulted advantageously to the Company.

General Manager Royal Parkinson of the Despatch Heat Light and Power Co., announces the sale of over \$4000 worth of gas consuming appliances in East Rochester, in anticipation of the gas service to be furnished next spring.

The A. J. Bolton Company is erecting a two-story building on Ames Street, where heels and lifts for shoes will be manufactured. The Rochester Railway and Light Co's. service will be used to operate their 60-horsepower load.

Mr. Marquardt has increased the number of field inspectors from two to ten. The work of this force consists in improving the efficiency of all gas consuming appliances on the consumer's premises.

One of Rochester's newest industries, the Unitube Auto Radiator Corporation, has been connected recently to the Rochester Railway and Light Co's. service. This company will manufacture a new type of automobile radiator. Among the advantages claimed for the radiator are: that it does not clog, has 150% greater cooling capacity than any other radiator, will not break by freezing, and can be removed in sections.

On Wednesday evening, January 26, in the rooms of the Rochester Engineering Society, Mr. I. Lundgaard acted as "pilot" for a group of Industrial Engineers in an informal discussion of, "High Temperature Furnaces for Industrial Purposes." The meeting was well attended and brought out some good discussion.

Mr. B. B. Yeomans is experimenting with special gas burners to displace gasoline equipment on the button pressing machines at the Shantz Button Company. Mr. Yeomans has just completed the installation of a gas fired boiler at the plant of the Diamond Wax Paper Company. This boiler is to be used for heating the rolls on the machines and melting wax.

The wheat shipped to the local flour mills during the last three months, has been found to be very tough and so hard to grind that considerable additional power is required to turn it into flour. For this reason, the VanVechten Milling Co. has installed an additional 50 H. P. motor.

Mr. Lundgaard says he is so pleased with the savings plan that he intends to have Mr. Gosnell save his entire salary.

The question now is—"Who is he going to live on?"

The Ballad of the Defunct Meter and Its Executioner

By "H. Crow" (ALIAS H. C. D.)

There once was a little gas meter,
What measured the gas for the heater;
You put in a quarter
Whenever you 'orter;
And thereby became a repeater.

Along came a guy with a bug
Hid back of the map on his mug;
He thought he'd get hear,
So the meter to beat
He plugged up the slot with a slug.

Next day there appeared a collector,
Who for slugs was a lightning detector;
So the guy with the bug
Took an ax and "kerchug!"
He swatted the meter and wrecked her.

At once there appeared a fat copper
With a gun which was a big whopper,
He looked at the meter,
And grabbed the big cheater,
And locked him up quick in the hopper.

Says the Judge to the contemptible sinner!
"With the gum machines your plan is a winner,
But when you try it on gas,
You dum bloomin' ass,
You'll be the guest of the jail for your dinner."

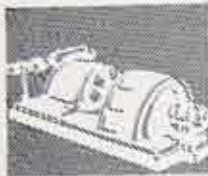
So they led him right back to his cell,
Though the sucker he hollered like —,
And now the big cheese,
When a meter he sees,
He says things that I wouldn't tell.

Unique Ad for Gas

A real swimming pool with real pickaninnies a-swimming in it is the unique window display which the Laclede Gas Company has at its place, Eleventh and Olive streets, St. Louis.

A Humphrey automatic gas heater, which will supply hot water from any faucet in the building with which the heater is connected, stands in one corner of the pool attached to a shower bath, making the scene all the more attractive.

As might be supposed this scene is a tempting one for the small boy, regardless of race or color, who spends much time peering enviously in from the sidewalk outside.—Public Service.



Electric Generation



The deepening of the Genesee River bed from Court Street to the falls at Central Avenue was described in a recent issue.

The diversion of the water to the west side of the river entailed the loss of hydraulic generation at Stations 4 and 6. The contract was let with the understanding that the contractor would reimburse all water-right owners for any loss they might suffer due to any of his operations in the river. The energy available from the limited head and generating capacity at Station 6 is small in comparison to the energy available from the stations at the upper falls. Station 6 is chiefly valuable from regulating the supply of water to the stations at the upper falls. This fact being taken into consideration, a flat rate for each day that the water is diverted from Station 6 was agreed upon by the contractor and the Rochester Railway and Light Company.

At the Central Avenue Dam, Brown's Race is entitled to one-half of the river flow and Station 4 Race to the other half. This Company owns three-fourths of the flow in Brown's Race and has capacity at Station 2-A sufficient to utilize 900 cu. ft. of water per second. The other owners cannot utilize more than 300 cu. ft. per second thereby limiting the total maximum flow in Brown's Race to 1200 second-feet. On the other side of the river is Station 4 with a capacity of about 1100 cu. feet per second. The total water that can be used on both sides of the river at the upper falls is thus about 2300 second-feet.

It is assumed that when the total river flow is less than 1200 sec.-ft.,

all the water can be used by Brown's Race and that this Company suffers no loss. This is approximately true and is due to the efficient machinery of Station 2-A.

Any river flow in excess of 1200 second-feet can not be used by Brown's Race, and if diverted from Station 4 represents a loss to this Company.

The river flow since the last of September, when the water was first diverted, has been much greater than that of the average year. It has exceeded 1200 second-feet a large share of the time and as a consequence the diversion from Station 4 has been costly. In order to be free from such expense as soon as possible, the contractor hastened to excavate that portion of the channel between the Central Ave. Dam and the intake to Station 4 Race. That done, a cross wall was built from a point just above the intake, on the east side of the river to the diverting wall in the center of the stream. At points downstream from the cross wall, three gates were opened in the diverting wall and since that time Station 4 has been getting its full share of water.

On February 1st work preparatory to dismantling the 1,100 K.W. Allis-Chalmers engine at Station 3 was commenced. This engine was installed at Station 3 in 1902, being one of the original engines. It is now being taken out to make way for the new 10,000 K.W. turbine which will be installed this fall. This unit is still in excellent operating condition, but due to the advance in the

art there is practically no demand for engine units of this size and the machine will consequently be scrapped.

The work of dismantling this unit will probably extend over a period of 4 to 6 weeks at the end of which time the work of excavating the rock for the new turbine will be immediately started. The new turbine will be installed during October and November so that it will be ready to deliver power to the lines during the peak load of next winter.

Preparatory work is now under way for the installation at Sta. 6, of a 2200 K.W. 60 cycle Edison rotary convertor which is considerably larger than any conversion unit installed to date. This machine will be placed adjacent to a 1700-K.W. 25 cycle Edison rotary installed two years ago. At that time the Station was laid out for four additional rotaries of 1700-K.W. capacity, but the development of the art and the Company's increasing load made it economical to install a larger unit. The comparative sizes of the rotaries are as follows: 1700-K. W. rotary, 9.0 ft. x 8.5 ft., weight 35 tons; 2200-K. W. rotary, 13.0 ft. x 9.5 ft., weight 53 tons.

It is difficult to predict the size of the next rotary to be installed at this Station, but it is safe to assume that it will be of 3000 or even 4000 K.W. capacity.

The contract has been let for a 1500 K.W. railway rotary to be installed at Station 5. This will operate on the 25 cycle system, and will permit of two small railway water driven generators being shut down which will render the additional water available for the larger units thereby effecting an economy of operation. In this connection the Company is fortunate in having available suffi-

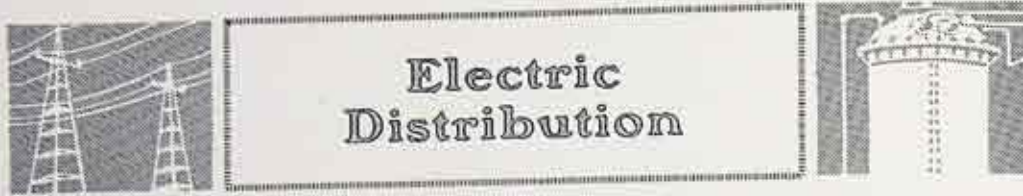
cient copper for connecting the rotary to the Railway System as the leads at present used for the Allis engine driven generator at Sta. 3 (which is being scrapped to make room for the new 10,000-K.W. turbine) will be taken to Station 5 for this purpose. At the present price of copper this means a saving of approximately \$1200.

A very unfortunate accident occurred at Sta. 6 on Jan. 28th, which resulted in Station Foreman B. E. Noyes being very painfully burned about the face and hands. Mr. Noyes was taking some measurements on the A.C. end of a 1700-K.W. 25 cycle rotary, using a brass tip rule for this purpose. In some way the brass tip caused a short circuit between the phases resulting in a very brilliant flash which tripped out the circuit breaker of the machine. As Mr. Noyes wore glasses his eyes were not burned, but the hand holding the rule was burned to the arteries. This will probably incapacitate him from work for a considerable period of time.

This accident carries a lesson that no measurements should be taken under live machinery and in no case should a brass bound rule be used.

Just how well the Operating Department have made use of the possibilities of Station A-2 is indicated by the fact that in 1915, Station 2-A generated 23,239,000 kilowatt-hours, whereas the most ever generated by old No. 2 Station on one year was 6,133,259 kilowatt-hours in 1907, using at that time about two-thirds as much water as 2-A used in 1915.

Mr. R. D. DeWolf, Mechanical Engineer of the Company attended the Annual Convention of the National Guard and Naval Militia of the State of New York at Albany, on January 28 and 29th.



The General Railway Signal Company is erecting a new building, at its Lincoln Park site, which is to be equipped and used entirely as a machine shop. The large amount of power to be used made it necessary for the Signal Company to decide whether it would add to its present power plant, which is wholly direct current, or purchase power from the Railway and Light Company. The Company proposed to supply 25 cycle power at 11,000 volts from its T. H. Symington Company line, and since the plant will be in operation from twenty to twenty-four hours per day the two rate schedule would apply to advantage. As the cost of purchased power compared very favorably with the cost of generating it in the Signal Company's own plant, the decision was to contract for the supply of as much power as is required in the new building.

The machinery that will be installed is to be equipped largely with individual motor drive. Those machines requiring speed changes will have direct current motors, while machines running at constant speed will be grouped and the various groups driven by alternating current motors. There will be more than 100 motors in the building, totaling about seventeen hundred horsepower, two-thirds of which will be direct current and one-third alternating current.

The use of direct current motors requires the installation of apparatus to convert the 25 cycle alternating current to direct current at the proper motor voltage. The Signal Company was fortunate in finding some second hand equipment exactly suited to its requirements and ac-

cordingly purchased three rotary converters of 250 kilowatts capacity each. In all probability the direct current load can be carried by two rotaries, leaving the third available in case of emergency. In reducing the alternating current voltage from 11,000 to the proper voltage for the rotaries, which is 156, and for the alternating current motors, which is 220, two steps will be made. Each rotary has its own transformer of 2300 volts primary and 156 volts secondary. To step down from 11,000 to 2300 volts the Signal Company will secure from the Railway and Light Company three 250 kilowatt transformers which were removed about a year ago from the line that served the H. S. Kerbaugh Barge Canal Contract. Another bank of transformers of about 200 kilowatts capacity and having a voltage ratio of 2300 to 220 will be installed to supply the 25 cycle alternating current motor load. All of the transformer and converting equipment with the necessary protective and switching apparatus, etc. will soon be installed in a building adjacent to the new machine shop.

On January 21st, the Distribution Department completed the 11,000 volt service. This is one of the largest single installations that has been added to the Company's system recently.

In October a new 115,000 C. M., 3-phase, 60-cycle, 4150 volt, underground line was installed from Station No. 6 to a cable pole at East Avenue and Rockwood Sts. This new line connects at this point with circuit No. 328, which has been supplying

both East Rochester and a section in the southeastern part of the City. It therefore furnishes an independent line to East Rochester and at the same time relieves the city circuits No. 323 and No. 328 of the East Rochester load. This relief will in time extend to circuit No. 329 from Station 35 through West Avenue and Genesee St.

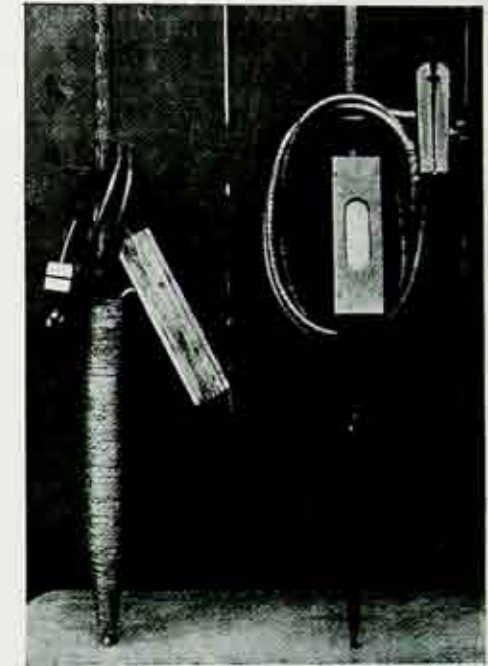
This line renders useless the booster station which was temporarily located on the Upton Cold Storage Company's property in Brighton. This station was erected to provide for the voltage drop occasioned by the addition of the load of 450 K. W. of the Merchants Despatch Transportation Co. in East Rochester. The regulators which it contained have been installed in Station No. 6 in connection with the new line.

The underground department under the supervision of Mr. Swarthout did all the work on this line in the record-breaking time of thirteen days.



Messrs. Alcott, Swarthout and Montignani were in Buffalo, N. Y. recently for the purpose of examining a cable testing device made by the Buffalo General Electric Company and successfully used on its system for several years. The device consists of a Geissler tube in series with a condenser and a grounding clamp. These are mounted on an insulated stick which is provided with a metal point to be applied to the cable "under suspicion." One of the advantages of this device is that the energizing of the tube is a static phenomenon and therefore actual metallic contact with the conductor under test is unnecessary. In the demonstration performed before the representatives of the Rochester Railway and Light Company a quite distinct illumination of the tube was obtained when the point of the testing device was applied to the outer surface of a heavily insulated 11,000 volt cable. One of the instruments

is at present under construction in this company's laboratory and will be tried out on the local system. The



45,000 kilowatt terminal station and the line department headquarters of the Buffalo General Electric Company were also visited.



In the installation of risers by the Electric Meter Department, under the immediate supervision of Mr. Consler, a marked economy has been effected by a combination of good supervision and good team work. As the work is now done, different men specialize on the indoor and outdoor parts of it, respectively, and one gang of two men can complete four jobs per day.



The attractive decorations at the Bal-Masque of the Mystic Shrine, held at the Armory on the 9th, represented strenuous labor on the part of the decorators. This Company's employees, Mr. A. L. Body and his able assistants did nearly all of the required electrical work on the day of the event.

The Subway Department under the supervision of Supt. T. H. Christie, reports a very busy and successful year for 1915.

The following work was done by the Department:

Concrete Lamp Poles Set

Octagon poles, 13 feet long.....	213
Common poles, 12 feet long.....	432
Replacing broken poles.....	6

Total..... 651

Iron Lamp Poles Set

E. P. Morris poles.....	215
E. P. Morris poles replaced.....	6
26-ft. 3" top poles.....	3
26-ft. 3" top poles replaced.....	3
26-ft. poles set in rear lot.....	1

Total..... 228

Subway Laid

6-way tile.....	96,829 lin. feet
12-way tile.....	18,000 lin. feet
18-way tile.....	8,600 lin. feet
4-way tile.....	3,550 lin. feet

Total..... 126,979 lin. feet

There are 100 manholes in the down-town section which have gas mains running through them. The mains have been surrounded with reinforced concrete, which is a safeguard in case of short circuiting of cables, as it prevents an explosion of gas.

Mr. Christie also reports that the electric pump is doing good work pumping out manholes.

The Underground Department reports the following work completed in street lighting for the month of January.

Location	No. Lamps Installed	Class
Murray St.	20	E
Jay St.	26	Q-1
Myrtle St.	15	E
Selye Terrace	6	Q-1
Commercial St.	10	Q-2

Mr. Winfield S. Branch of the Underground Department was presented with a son on New Year's Eve.

Mr. Seth Creighton, formerly associated with the Station Electric Construction Department, has been appointed Foreman of the Line Department. Mr. Creighton's experience in the electrical operating field, covers both station installation and overhead line construction. This experience makes him a valuable asset to the Distribution Department, also the very capable head of a department that covers a predominant and important field in electric distribution.

Mr. John Logan of the Line Department, who has been with the Company for a period of seventeen years in the capacity of a first-class lineman, has been appointed Assistant Foreman of the Line Department. Mr. Logan is well qualified to fulfill this position, as his experience has covered every phase of overhead distribution work.

The removing of the aluminum, and the substitution therefor of copper cable on the 60,000 volt Niagara transmission line from Station 33 to Mortimer, is completed. The work has progressed very rapidly and satisfactorily under the able supervision of Mr. John Cox.

Mr. William Carroll, of 30 Bloss Street, who has been employed as Foreman in the Subway Department for the past 10 years, died Dec. 22, 1915.

Big opportunities are strong and sturdy and will always be found far ahead. You must go some if you catch a big opportunity.

The more you travel the stronger you get. The faster you go, the more speed you acquire. Hence, everything depends on your gait and your staying power.

On the road you will find friends, overtake enemies, who have given up the chase. They will tell you that opportunities are all gone. They don't know, for they are not up where opportunities are.—*The Mixer.*



Gas Manufacture



The sewer which carries away the waste liquors from the ammonia still, the drainage from the retort house, and surface water from one yard drain has given considerable periodical trouble from stoppages. Attempts to scour it out with water and steam, and to rod it out have been only partially and temporarily successful. Following a recent stoppage, a short section of the sewer was cut out, and was found heavily incrustated with lime. A Liberty Water Turbine Boiler Tube Cleaner, which has been superseded in boiler service by air driven tools, was put at work removing the lime with such success, that a connection was made to a water line supplying water from the elevator pumps at 150 pounds pressure. With that force the entire section of troublesome sewer has been cleaned clear down to the metal.

Mr. A. H. Lamey merits the acknowledgment of a splendid bit of co-operation which he recently contributed. The Gas Works was in need of a steel tank to use in connection with the new oil tar still. On January 12, at 8:30 A. M. a tank at Station 2 was inspected which was satisfactory. At 9:30 Mr. Lamey was consulted in regard to getting it out of the old station, and down to the Works. He was very skeptical, at first, of being able to undertake it until the following week. However, convinced of the importance of prompt delivery, he agreed to do his best to get it up to the street level on the next day. But—at 2:30 P. M. of that same day, five hours after the conversation, a company truck delivered the tank at the Gas Works.

Mr. Alexander M. Beebee has been engaged as Cadet Engineer at the works. Mr. Beebee is a Rochesterian, a graduate of East High School, and of the Electrical Engineering College of Cornell University. Since graduation in 1915 he has been doing efficiency engineering for the German American Button Company.

Mr. Frank L. Merz, who has been clerk at the coke office for the past eleven years, is now doing clerical and photometric work at the plant. Mr. Merz entered the Company's employ in 1897, and took charge of the coke office in 1905.

Mr. Joseph P. Haftenkamp, Gas Works Supt., attended a banquet of the Western New York Alumni of Michigan Agricultural College in Buffalo on Tuesday evening, January 25.

Number 2 Boiler, a 260 H. P. boiler of the Babcock and Wilcox Sterling type, is now equipped with a General Electric Type F-S4 steam flow meter. This is the fourth meter of its kind to be installed here.

Gas oil is being delivered at intervals, at the State Street siding of the R. W. & O. branch for storage in the 750,000 gallon tank adjacent to Station No. 3.

On January 11, the retort house stokers had a taste of the old methods of hand drawing, while repairs were made on the Bronder machines.

Mr. Patrick Lewis, Yard Foreman, has been ill for several days.



Gas Distribution



Messrs. W. Spears and C. Reid of the Gas Street Department, and A. Hooper of the Drafting Department, have a big job on their hands in making a large wall map. The map will measure 5 ft. x 7 ft. and will be constructed to a scale of 600 ft. to the inch. It will show the entire gas transmission and distribution system with the exception of the Twenty-Third Ward (Charlotte) and Summer-ville. The various sizes of the mains will be clearly shown in color. The location of all the street regulators or governors, the gate valves, and drips will also be indicated. The present wall map which has done faithful service since 1904 has at last worn out owing to the great extensions of the mains in the last decade which necessitated a great amount of alteration on the map in order to show the new extensions and improvement work.

The Company and the Gas Street Department as well, have been very fortunate in the comparatively few street leaks that have been encountered so far this winter. Whether this has been due to the open season or to the thorough inspection and repair of leaks during the summer months of 1915 is a matter of opinion, although both factors have probably helped out. Gas leaks in the street, a troublesome and expensive matter for all Gas Companies, usually make their presence known in the coldest part of winter. On account of the few leaks reported it is figured that nature has effected a considerable economy in the Company's behalf this year. In this connection it may be said that welded joints are planned for all new work.

Foreman James Fahy has put it up to Superintendent Haftenkamp to deodorize the fuel oil which the Gas Works is furnishing the Transportation Department as a substitute for gasolene. Mr. Fahy does not care to have his nose which he has trained to detect gas leaks, imposed upon.

The following figures will show the amount of new main and new services installed by the Gas Street Department, and also the number of new gas consumers as indicated by the gain in meters installed by the Gas Shop during the years 1914 and 1915:

Linear Ft. of New Mains				
Year	2, 2½ and 3 in.	4 in.	6 in.	8 in.
1914	2428 ft.	15532 ft.	49900 ft.	1962 ft.
1915	890 ft.	16927 ft.	54973 ft.	

Number of New Services	
1914	
Not including 312 renewals of old ¾ in. and 1 in. services.....	2298
Stubs left for vacant lots.....	416

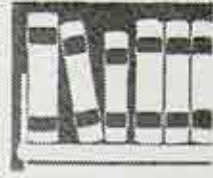
1915	
1½ in.....	2349
2 in.....	48
2½ in.....	12
3 in.....	4
Stubs for vacant lots.....	600
Total Consumers as indicated by gain in gas meters.	
Jan. 1, 1914.....	64532
Jan. 1, 1915.....	67608
Jan. 1, 1916.....	69090

Foreman James Fahy of the Gas Street Department has had an experienced pipe welding operator from Buffalo giving instructions to several of his workmen. It is planned to weld the pipe on the new East Rochester gas line to be laid next spring.

At present the Gas Meter Shop is repairing about one hundred meters daily.



Auditing



Monthly Report on New Business

Net Gain in Consumers in Twelve Months Ending December 31st 1915			
	Dec. 31, 1914	Dec. 31, 1915	Gain during Year
Gas.....	67,763	69,090	1,327
Electric.....	16,687	19,664	2,977
Steam.....	36	41	5
	84,486	88,795	4,309

Statement of Consumers by Departments of December 31st 1915

Dec. 31	Gas	Elec.	Steam	Total	Increase Each Yr.
1908	40,564	5,683		46,247	
1909	45,080	6,354		51,434	5,187
1910	50,275	7,737		58,012	6,578
1911	55,038	9,267	19	64,324	6,312
1912	59,667	11,458	23	71,148	6,824
1913	64,532	13,997	24	78,553	7,405
1914	67,763	16,687	36	84,486	5,933
1915	69,090	19,664	41	88,795	4,309
Gain in 7 years	28,526	13,981	41		42,548

Increase By Months

	1914	1915
Gain in January.....	228	364
" " February.....	231	144
" " March.....	281	247
" " April.....	469	460
" " May.....	564	306
" " June.....	451	544
" " July.....	426	132 (Dec.)
" " August.....	619	289
" " September.....	653	459
" " October.....	681	460
" " November.....	574	548
" " December.....	756	488
Net gain in year.....	5,933	4,309

Company Savings Depositors

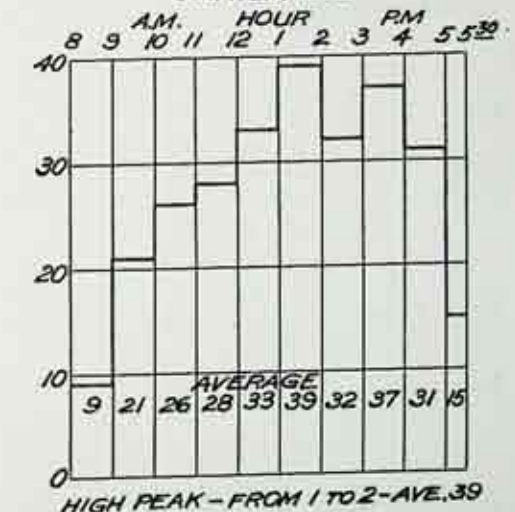
FIRST MONTH'S STATEMENT

No. of Depositors.....	31
Amount Deposited.....	\$117.50

Miscellaneous Data

	Dec. 31 1914	Dec. 31 1915	Gain in One Yr.
Miles of Gas Mains.....	421	435	14
Miles of Underground Cable.....	972	1,037	65
Miles of Overhead Line.....	1,632	1,746	114
Miles of Subway.....	202	231	29
No. Street Arc Lamps.....	4,384	4,248	136(Dec.)
No. Street Incandescent Lights.....	3,486	4,264	778
Total No. of Street Lamps.....	7,870	8,512	642
No. of Employees.....	896	1,019	123
Amount of Pay-roll (Mo.).....	\$82,763.94	\$87,191.30	\$4,427.36

APPLICATION DEPT. CURVE SHOWING AVERAGE NO. OF ITEMS PER HOUR - WEEK ENDING JAN. 21, 1916.



During the past week Mr. Houlihan, of the Application Group, kept a record of the number of calls made by applicants and others, with a view to learning when the peak loads occur, resulting as shown above.

Employees Benevolent Association

Herewith is submitted a report covering operations of the Association for the six months' period ending December 31, 1915.

Receipts

Treas. of Old Assoc.....	\$1,195.39
Special Fund, Old Assoc.....	3.62
Unclaimed Benefits Old Assoc.....	7.50
Int. on Bank Balance Old Assoc.....	4.11
Int. on Bank Balance New Assoc.....	37.37
Dues from Members.....	1,745.61
Dues from Roch. Ry. and Lt. Co.....	1,745.61
Initiation Fees from Members.....	87.00
Initiation Fees from Roch. Ry. and Lt. Co.....	87.00
Roch. Ry. & Lt. Co., on Organization	602.00
Old Organization Assessment.....	0.25
Sale of Buttons.....	0.50
Death Assessment No. 1 (Feeley).....	167.50
Total.....	\$5,683.46

Disbursements

Sick Benefits.....	\$ 745.60
Accident Benefits—Off Duty.....	163.02
Accident Benefits—On Duty.....	205.86
Death Benefit.....	125.00
Doctors' Examinations.....	111.00
Purchase of Roch. Ry. and Lt. Co. Bond.....	975.00
Bond Int. Receivable.....	12.50
Total.....	\$2,337.98
Balance on Hand Dec. 31, 1915.....	\$3,345.48

NOTE—Sick and accident benefits were paid to 68 employees during the past six months, total time off being 934 days.

Assets

Cash on Hand in Bank.....	\$3,345.48
Bond, Roch. Ry. & Lt. Co.....	975.00
Bond Interest Receivable.....	25.00
Total.....	\$4,345.48

Liabilities

Due on account J. Stuart Feeley's death.....	\$ 217.50
Surplus.....	\$4,127.98

NOTE—The average membership of the Association is 63% of the average number of employees in the service of the Company ending Dec. 31, 1915.

In the Billing Department there are now two Burroughs Automatic Billing Machines and four Todd Protectograph Machines in operation and working very satisfactorily on the output of the combination gas and electric bills. For the information of those who are not familiar with these machines, it may be stated that the Burroughs Automatic Billing Machine, which looks very much the same as an ordinary adding machine, prints the first and second readings, makes the subtraction and inserts it, prints the date of issue and the due date of the bill. The Todd Protectograph machines, which are similar to the ordinary Todd Protectograph machine for protecting checks, print the amounts, gross penalty and net on the bills. The output of these machines is over 3,000 bills per day.

A Relief Group has been formed in the Consumers' Bookkeeping Department under the supervision of Mr. John H. Stokes, whose scope of work will comprise the furnishing of supply help to the various groups which are operating with reduced help, due to sickness, vacations or other causes of absence. This group will also do all extraordinary work coming up from time to time, such as the opening of new ledgers, new meter read slips, etc. The object of this innovation is to obviate as far as possible the necessity of the overtime which is spent in that department at present. The management feels that if possible all overtime should be eliminated.

A new plan of detailing men from one department to another is being tried out in the Auditing Department. Certain men have been detailed for a week and while it means a temporary loss of efficiency where an individual takes up new duties, the results in reducing peak loads more than outweigh the temporary losses.

The Gas Bill

BY L. W. LAYMAN

Did you ever stop to consider what you would do if you did not have gas to use; if you had to go back to the days of wood and coal, which we all remember in connection with our boyhood days? How we used to hate that job of carrying up the wood or coal. Well! you would be "doing it" today and that old coal pail and wood box would, as of yore, always be empty and the stove full of ashes. Besides this, you would have to buy the coal and wood.

Another relic that should be remembered is the old kerosene oil can and the filling of those lamps should be recalled. No doubt you left this duty for your Mother or Sister to fulfill. At any rate, it was a most unpleasant task for someone.

Just ask yourself this question—"Would I buy coal and oil, carry them up from the cellar every day, and fill the stove and lamps for the price I pay for gas every month?" After all, is it not worth the amount of the gas bill to be relieved of all this?

Now the reason why you often think your gas bill is higher than it should be, is that gas is so clean and convenient and always ready at a second's notice, that you use it often and do not realize that the meter is keeping track of it and will tell you at any time just how much you have used.

Just think this over and you will reach only this conclusion—that the gas bill is not so high when one considers the inconveniences that can be avoided and the values received.

In view of all this, would you go back to the old ways?

The prepaid meter readers have been placed under the supervision of Mr. L. A. Newman, who also has charge of the regular meter readers. This has been done, partly to improve the organization by consolidating relative work, but largely on account of the fact that the prepayment meters are being replaced by regular meters and will soon be a negligible quantity. During December 1, 116 prepayment meters were removed, reducing the number installed to 13,882. When it is remembered that the number of prepayment meters installed as of January 1st, 1915 was approximately 22,000, it will be seen how rapidly these meters are being replaced by regular meters.

The new meter read slips which are prepared in the Addressograph Department went into effect February 1st. These slips involve the printing of names, addresses and data regarding the meters installed for some 87,000 accounts, and the work will be performed largely by the new Relief Group which has been established.

The labor cost of operation of the Gas Bookkeeping Department, together with certain statistics in that connection, have been written up on the blackboard in that department so the employees and supervisors may be kept informed regarding the expense of operation of their respective groups.

Miss Charlotte Baker, of the Appliance Department, has donated a complete file of back numbers of Gas and Electric News to the Rochester Public Library.

Mr. Henry Brill, who was formerly Shop Messenger for the Company has been transferred to Room No. 10 where he has been placed in charge of the voucher files.

During the month of December the Order Department issued a total of 9,856 orders and 10,783 orders were completed.



Engineering and Construction



Mr. Hugh Boyd, who, for the past four years has been in the employ of the Company as Designing Engineer, left this City on January 19th for Salt Lake City, Utah, where he has entered the employ of the U. S. Mining, Smelting & Refining Company. Mr. Boyd was graduated from the Brooklyn Polytechnic Institute in '06 and was for several years with the Lackawanna Steel Company of Buffalo, N. Y., before coming to this Company. During his stay with this Company he made many friends, and his associates regret his departure. The members of the Engineering Department presented Mr. Boyd with a kodak in order that they might know something of the land "where salt is used not only for table consumption but for scenery as well."

Mr. Henry Harvie, of New York City, is now employed as Designing Engineer in the Engineering Department. Mr. Harvie has been associated with hydroelectric engineering during the last 12 years; notably with the New York Water Supply Commission, the Ontario Power Company and the Lake Superior Power Company, as Designing and Chief Engineer. He is a graduate in Civil Engineering, University College, London, England.

Mr. W. D. Kring is doing structural designing work in the Engineering Dept. Mr. Kring was graduated from Clarkson College of Technology in 1913. He has been employed on the Barge Canal and has also been connected with the Public Service Commission on Subways in New York City.

Mr. Charles M. Whelan has recently entered the Engineering Department where he will assist in construction work. Mr. Whelan was formerly with this Company but in January, 1914, he left for Portland, Oregon, where he was employed in the U. S. Reclamation Service. He spent some time in California, Michigan and Texas before returning to this State.

Mr. E. R. Crofts, a graduate of Cornell University, class of 1910, and formerly connected with the Ontario Power Company and the Keystone State Construction Company of Philadelphia, has entered the Engineering Dept. where he will do structural designing work.

Mr. Philip F. Stephens has been commissioned 2nd Lieutenant in the 3rd Regiment of Infantry of the National Guard of New York, and he has been assigned to duty in Company H of this regiment.

Mr. H. C. Deffenbaugh delivered a very interesting paper on Rates at the January meeting of the American Institute of Electrical Engineers. The subject was ably handled and brought forth a lively discussion.

Mr. Howard Harding is to have charge of the steam designing work formerly done by Mr. Hugh Boyd, and Mr. L. I. Hall will have supervision of the drafting work for the Engineering Department.

Mr. Ivan Meyer has been employed in the Drafting Department on arc circuit and power circuit plotting.