GAS AND ELECTRIC NEWS

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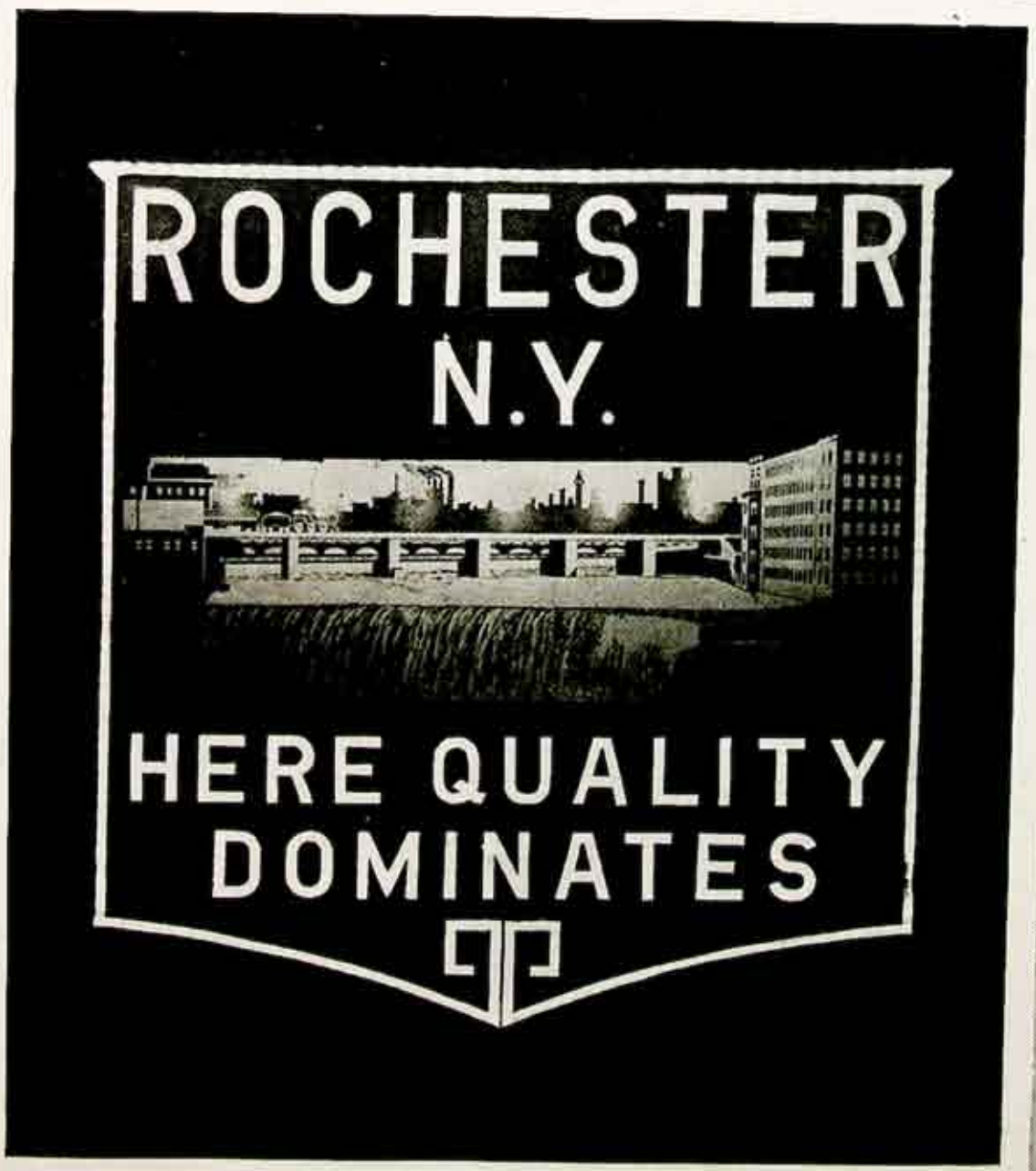


SUCCESS

"What is the secret of success?" asked the Sphinx.
"Push," said the Button.
"Never be lead wrong," said the Pencil.
"Take pains," said the Window.
"Make light of everything," said the Fire.
"Be up-to-date," said the Calendar.
"Never lose your head," said the Barrel.
"Do a driving business," said the Hammer.
"Aspire to greater things," said the Nutmeg.
"Find a good thing and stick to it," said the Glue.
"Do the work you are suited for," said the Chimney.

—*Selected.*

GAS AND ELECTRIC NEWS

Vol. 4 MARCH, 1917 No. 9

Testing Meters at the Gas Shop

VINCENT HODDICK

THERE are probably relatively few persons who realize the amount of detail and care required to remove, test and repair a gas meter from the time it is disconnected at a customer's service until it is finally sealed by the State Inspector ready for use again. A short article covering some of the principal manipulations might therefore be of interest.

After a meter is removed it is of vital importance that it should be carefully protected so that it can be tested as nearly as possible under the same conditions that existed at the time the meter was in service. Upon disconnecting a meter the fitter immediately caps the tube screws (where the piping connections are made) with tin caps which are provided for this purpose. The meter is handled very carefully and is kept in an upright position until it is returned to the meter shop where it is placed upon a receiving or check

rack. The meter's size, number, index and address is carefully compared with the fitters removal slip by the night clerk or checkers who designate that the meter has been "checked in" by placing two X chalk marks on the front panel of the meter. From the racks the meters are taken to the meter proving rooms where they are allowed to remain from twelve to twenty-four hours without removing the tube seals, in order to secure a temperature throughout the meter mechanism equivalent to that of the testing room.

After a gas meter has once been in service and has been subjected to the action of the gas, it is important to keep the tube caps securely closed on account of the unfavorable action of the atmosphere on the meter valves and diaphragms. The valves often carry a small amount of condensation on their surface, while the diaphragms will hold a certain amount of gas oil—both valves and diaphragms are therefore materially affected if exposed to the atmosphere.

Before testing the meter, the tester looks for the check marks on the front panel and if these are not visible the meter is set aside and the foreman's attention is called to the same. He then removes the tube seals and proceeds to test the meter with a device called a "Meter Prover." The unit of measure for gas is a cubic foot, *i. e.*, the volume occupied by 62.231 pounds of distilled water at a temperature of 62° Fahrenheit and 30 inches barometer. As volumes of gas or air cannot be handled like water or solids, special means must be adopted to effect the measurement of the gas or air to be passed through a meter for testing purposes. This is done by using the test measuring tank, or Meter Prover as illustrated in figure 2.

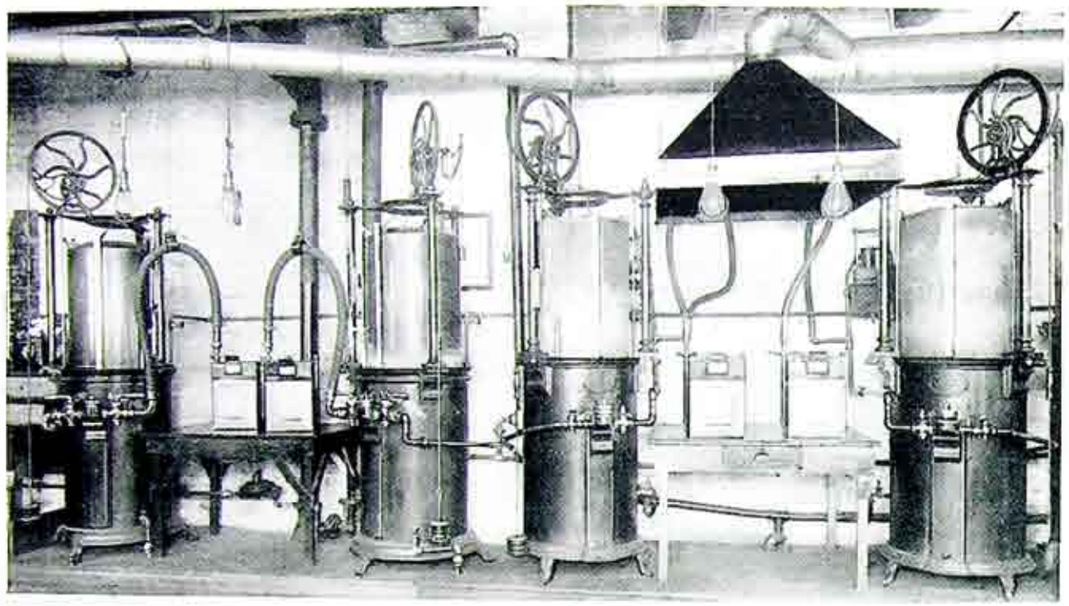


Fig. 2. Row of Gas Provers installed at the Gas Shop. Meters are connected to show how test is made.

To arrive at accurate results in testing gas meters close attention must be given to a great many details. To merely connect a meter to the prover and pass a small quantity of air through it without strict regard to the following rules is simply an approximation, not a test. To test a meter accurately the prover must be mathematically correct, set level, duly counterpoised and adjusted so as to give uniform pressure from top to bottom during the movement of the bell in the tank. The water in the prover, the air in the bell and the meter to be tested must all have a temperature (suitable thermometers are attached to the prover) uniform with the air of the room in which the tests are made, and all of these temperatures must be kept uniform during the entire testing period. After filling the holder with air and making sure that all connections to the meter are tight, about 1½ cubic feet of air is passed through the meter as a preliminary test. On this "run" the air is shut off when the pinion finger rests exactly on one of the divisions of the "proving head" (2 ft. test dial) of the meter. The prover tank is then re-filled and by means of an adjusting valve the pointer on the tank is set at the zero mark on the scale. The prover valve is then opened and when the index finger on the meter test dial has made one complete revolution showing that two cubic feet of air had passed through the meter, the valve is instantly shut off. If the quantity registered by the meter corresponds exactly with that registered by the prover the meter is correct, but if more is registered by the prover than by the meter, the meter is slow—if less, the meter is fast. Meters are tested with an initial pressure of 1½" of water at the inlet pipe under two different speeds—one with a full open outlet, the other with a checked opening, restricting a five light meter (smaller and larger sizes in proportion) to a capacity of thirty cubic feet per hour. The purpose of the two tests is to secure uniformity of proof for whatever speed the meter may meet in service. All test readings are made in duplicate, the original is sent to the office and the duplicate is attached to the meter. "OK," or the percentage of error under the two tests is marked on the meter with chalk, in order to indicate what adjustment might be necessary.

Fig. 3. Gas meters connected for "Pilot Test."

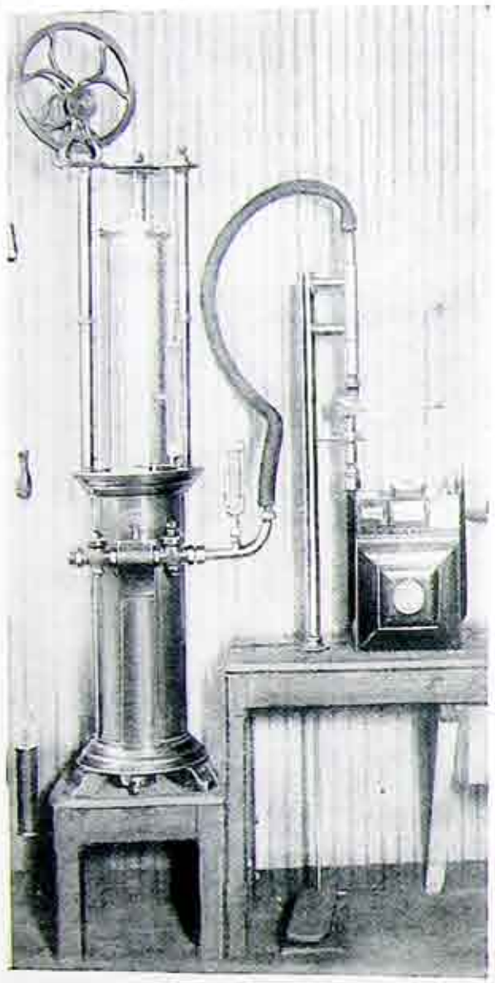


Fig. 4. Automatic Prover used for final "proving" of gas meters.

Meters that test "OK" on this preliminary test and have been in service for less than two years are sent to the pilot test bench for the "pilot test" to insure against inside leakage. This test is made by connecting the inlet to the meter with a gas supply—a pilot burner is placed on the outlet, and after the gas is lighted it is turned down to a very small flame. With the meter operating under this exceedingly small consumption, it is necessary to make sure that the meter will make a complete revolution of the tangent within a reasonable period (practice indicates the various periods for various size meters) of time. This rather severe test is made to detect a by-passage of gas from inside leakage, leaky diaphragms and valves or lost motion from wear to prevent the meter from operating and recording correctly. If the leakage is detected the meter is taken apart and inspected for the cause of the leakage.

All meters tested and found in error, or having been in service over two years, are sent to the "opening up room" where the top, back plate, back and front are removed for inspection. If the diaphragms pass inspection as to condition and leakage they are sent to the oiling table to be reoiled. After this has been done the meter case is carefully cleaned out, the diaphragm is tested under pressure (3 to 6 inches) for leakage, the back and front plates of the meter are re-soldered on, and the meter is sent to the "fitting-up bench." At the "fitting-up bench" the packing is removed from the stuffing boxes, valve seats and valve covers are reground and tried for

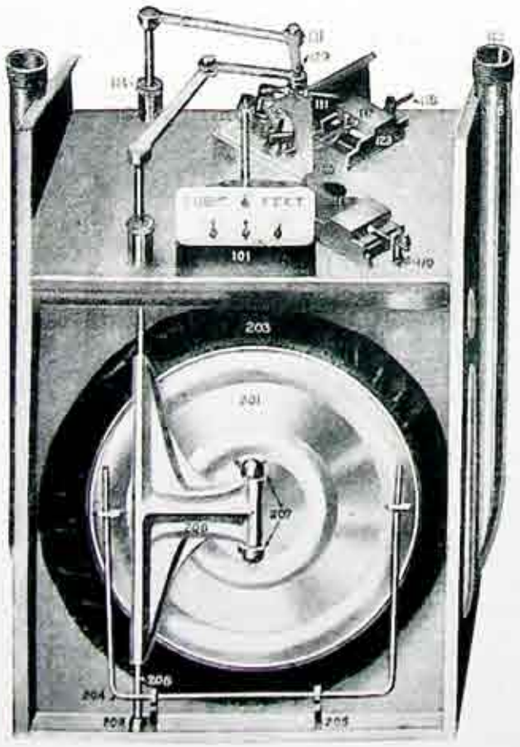


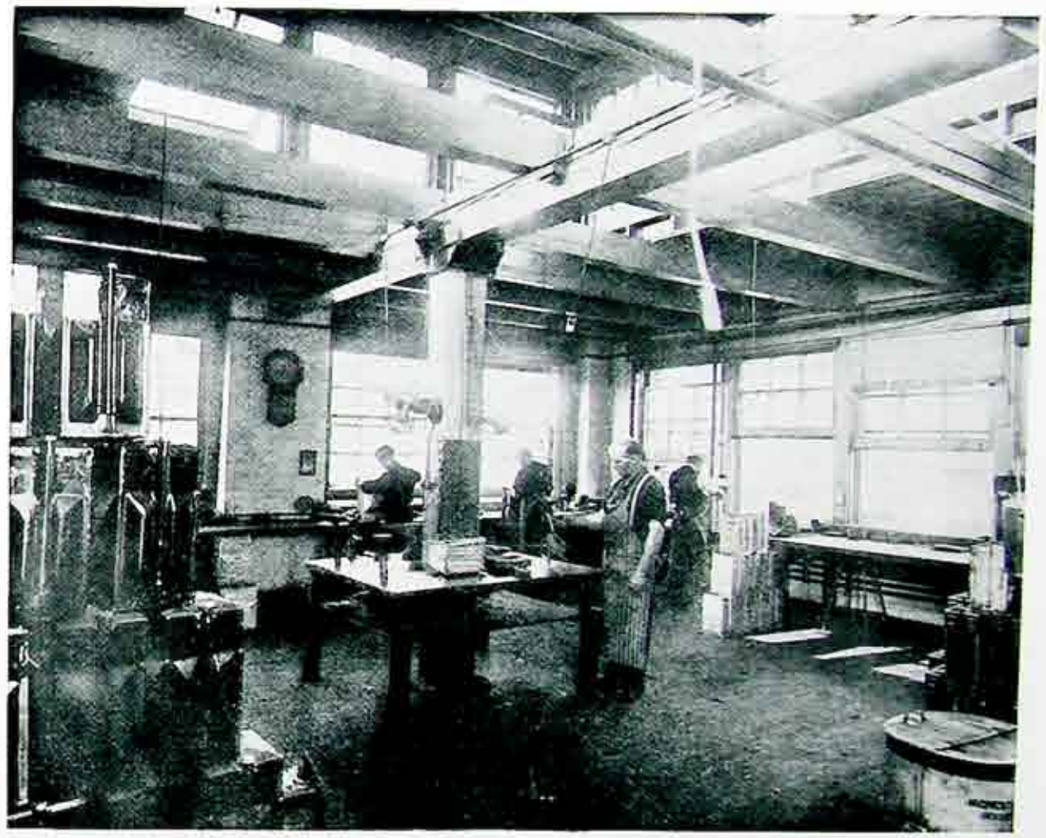
Fig. 5. Gas meter showing part of interior mechanism.

tightness, and the meter top is carefully washed out with gasoline. The stuffing boxes are then repacked and the back plate resoldered before the meter is ready for pressure, pilot and proof tests.

Should the diaphragms fail to pass inspection, they, with the index, are removed, and the case is sent to the boiling out tank where all paint and foreign matter is removed by a caustic soda bath. It is a good policy to replace fittings into the same meter from which they have been removed. This is insured by placing all the small parts taken from a meter into a numbered canvas bag, the duplicate number of which is wired to the meter. A new diaphragm is then installed and the meter takes the same course as "the oiled meter."

Finally the meters are sent to the provers for adjustment as previously described, and after the adjustments have been made the top is soldered on and the meter is sent to a pressure test tank where it is submerged in a tank of water and subjected to a three pound air test for the purpose of locating any leaks that may exist in the outside case or top.

After the meter is painted it is sent back to the meter provers for final test by the State Gas Inspector who is under the jurisdiction of the Public Service Commission. After the meter passes the State Inspector he solders on a numbered brass seal, and also stamps the date of inspection in red sealing wax on the top as shown in figure 1. A careful record is made of each meter—date of inspection, makers number, and the state seal number are all carefully recorded by the Inspector. The meter is then ready for service on the consumer's premises.



Industrial Gas Engineering Problems*

IVAN LUNDGAARD

INDUSTRIAL progress has three distinct vehicles for forward movement, *viz:* discovery, science and the arts.

The discoverer uncovers new physical phenomena, the scientist coordinates these phenomena and formulates their general physical laws, and the arts make useful application of these physical facts and laws.

Both reason and history will affirm the statement that true progress is most rapid when its three vehicles or means of promotion succeed each other in order mentioned; the art of application without the aid of science is like a vessel at sea without charts.

Without further generalization, I'll get down to the business at hand—the industrial gas engineering. An engineer, to fulfil his mission must combine within himself the discoverer, the scientist and the artisan. Without all three he is unbalanced and unfit to shoulder the responsibilities placed upon him.

The whole development of the industrial gas field bears witness to the existence of an unbalanced condition of a most serious character. I make this indictment not in the spirit of deprecatory criticism, for I realize fully the difficulties confronting us, but because I am going to ask that all who are directly or indirectly responsible for progress in this field make renewed efforts and further engineering progress for the benefit of the industry.

The principal discoveries in the gas fuel field are of comparatively ancient origin, but the scientific treatment accorded, for instance, the phenomenon of gas combustion is woefully inadequate. We are today unable to determine by computation the flame temperature of a given gas with any degree of certainty. Such a determination involves the use of specific heats of various gases at high temperatures and the phenomenon of dissociation.

The laws of specific heats laid down by Mallard and Le Chatelier are heralded by some engineers and scientists as being basic facts, and denounced by others as grossly exaggerating the variations caused by higher temperatures.

Dissociation is something very few authors dare to mention in terms approximating certainty, in view of the almost complete lack of research data. Industry demands higher and higher furnace temperatures and these phenomena should not be permitted to long remain in the present state of obscurity, in view of their growing importance.

Can anybody justify the use of the term "science," as applied to our knowledge of the various phenomena of heat transfer? We speak glibly of conduction, radiation, and convection, but pin us down to facts in regard to almost any simple practical problem and you will be met by an empty stare.

What about our knowledge of the effect of high temperature on various construction materials? Is it sufficient, or do we need more data? Most decidedly we do.

Let us consider for a moment the effect of flame temperature.

The highest temperature that could be obtained by the combustion of a certain gas under ideal conditions has been termed its theoretical flame temperature. In practice the actual flame temperature reached is much lower than the theoretical flame temperature, and depends upon the perfection of the insulation of the flame and the amount of air used to sustain combustion.

Let us assume that we desire to heat a piece of steel to 2,200° F., and we have before us two furnaces, one capable of maintaining a temperature of 2,600° F., and one only 2,400° F., both consuming the same amount of gas.

When first inserted, the steel would heat about 10 per cent faster in the furnace having the higher temperature, but near the finishing temperature the speed of heating would be twice as great. The higher-temperature furnace would complete the heating of the steel in perhaps 60 per cent of time, and consequently save a corresponding amount of gas.

In the case cited the attainment of a high-furnace temperature can readily be appreciated as being of tremendous economical importance. Preheating of the air and the gas only 200° F., would accomplish that difference between the two furnaces. Why is it that preheating is not generally resorted to for high temperature operations, particularly when the preheating can so easily be arranged by the use of the exhaust gases from the furnace and therefore consume no additional fuel?

We have in the City of Rochester several regenerative furnaces consuming about 4,000 cubic feet of gas per hour each. Had these furnaces not had regenerative chambers the gas consumption would have been conservatively estimated twice what it now is, so that regeneration saves 4,000 cubic feet of gas per hour per furnace. With gas at 40 cents, the hourly saving is $1.60, and as these furnaces operate 800 hours per year, the yearly saving is $12,800.00. I can assure you that the maintenance of the regenerative apparatus cost much less than 10 per cent of the yearly saving.

It seems to be a generally accepted rule that regeneration has no justification in the field of small furnaces, and it is claimed to be borne out by tests that this should be so. I saw one regenerative furnace once that was a failure. The necessity for balanced draft conditions in the furnace chamber was so utterly overlooked that the hot gases blew out through the door cracks instead of going back to the regenerator.

A good many furnace operations are subject to limitations of temperature because of the work to be done in the furnace. The maximum obtainable flame temperature can therefore not be used, and part of it must be dissipated either by excess air or by direct heat loss.

The flame temperature of gases bears about the same relation to a furnace as voltage does to an electric motor. The speed of a motor can be controlled by dissipation of voltage in armature resistance, but the efficiency of operation suffers accordingly. The furnace regenerator gives us the means of returning to the furnaces the dissipated heat much as the field-controlled motor by strengthening of the field creates additional counter electromotive force within itself and saves the current input. The ideal regenerative furnace can theoretically operate full efficiency regardless of furnace temperatures, while the simple furnace must throw away heat to accommodate various furnace temperatures.

WHAT STANDS IN THE WAY OF DEVELOPMENT ALONG THESE LINES?

It is the inertia of old habits, lack of appreciation, and unwillingness to back up our faith with the cash necessary to get the information we need. It is true that the scientists have not given us the complete fundamental theories, but we know some things and we can find out more, and maybe we can get the scientific institutions to give us a lift if we try. Let us try.

Another much neglected principle is counterflow heating, where the material to be heated is brought into the

*Given at Joint Meeting of A. G. I. and N. C. G. A. Industrial Fuel Men, Friday, January 26th, Consolidated Gas Co. Auditorium, N.Y.

hottest part of the furnace against the out-going gases. This generally involves the use of heating machines of some kind, except for the heating of gases and liquids. I believe that this field is capable of material extension and must be given serious attention.

In large furnaces the matter of quick and convenient means of loading are important both from a labor saving and gas economy point of view. The open furnace door dissipates heat at a tremendous rate.

Many furnace builders do not put insulation on their furnaces while a little of it certainly is a good investment, and in most cases the best insulation we can get is cheap when you consider the benefits of it. Remember that gas is a relatively expensive fuel and that we must be careful what we do with it. What constitutes good practice when one burns soft coal, is not likely to be right for gas.

After all details of furnace design have been properly taken care of there remains another just as important side to the question, namely, proper operation.

The furnace must be operated at the proper temperature for the work to be done in it and sometimes the chemical composition of the furnace gases is a factor, as in heat treatment of steel. In all cases correct proportioning of gas and air is of prime importance.

Some progressive appliance builders have developed and applied various methods of positive automatic control, but universal practice is to leave the matter to the judgment of the furnace man. How much good gas is wasted every day by these furnace operators would be hard to guess, but I venture to say that if the truth were known it would be unpleasant knowledge to any man with true economic consciousness.

Should we not give our attention to means of correct proportioning of gas and air—stimulate their development and use? Most decidedly we should.

I have so far talked about a good many things, many of them old stories to most of you, but I don't believe the repetition has been harmful, if I may venture to give my personal opinion.

I am now going to talk about the stumbling block. You know there is one and a good big husky one at that.

I am going to fancy that one of the furnace builders present at this meeting took my talk seriously and went home to his shop and built a furnace well insulated, with liberal regeneration, balanced draft, positive control of mixture, automatic temperature regulation, perfected charging apparatus, and on the whole built a device as nearly right as possible.

It is when he tries to cash in on his ingenuity that he runs into the stumbling block, and his fall is very likely to cost him his financial neck.

He can't sell this perfect thing. Why? Because gas furnaces are sold on the basis of price competition. Gas furnace builders know this and act accordingly. They are forced to do it to save that beforementioned important organ, the financial neck.

We, the industrial gas men of the gas companies, are the ones who can effectively guide the efforts of furnace manufacturers. The responsibility is in the last analysis, ours, not theirs. Our biggest and most neglected problem is to give quality a fair chance. Let us accomplish that and the other things will follow.

Price competition alone will not give quality a fair chance. Bare price competition is destructive. Fair competition is the biggest constructive element that progress knows of. Let us attempt to remove this stumbling block of unfair competition.

The first step in this direction is to find means of comparing performance of fuel appliances so that when you ask for bids on a furnace, for instance, you will not only be able to obtain price, but information as well in regard to its behavior when in operation. To do this we must have definite and fair rules for tests of furnaces to give answer to such questions as have to be answered.

To illustrate. You ask for bids and want information on the following points:

1. Maximum gas consumption for given air and gas pressures.
2. Maximum temperature that the furnace will stand continuously.
3. Time required to reach this temperature with maximum rate of gas consumption.
4. Gas consumption to maintain a given temperature with the furnace empty and door closed.
5. Maximum temperature variation in the oven space.

Having received the answer to these or other questions that might be decided upon and feeling some of the integrity of the bidder, you are in a position to intelligently award the order for the furnace.

But it would be hopeless to try to obtain such information without having previously established definite and reasonable test specifications acceptable to both the manufacturer of the device and the buyer.

Those bidders who do not receive orders under this system will quickly learn the reasons why and set about to remedy the defects of their product.

It will not be a case of the survival of the fittest, but rather the survival for fitness. High standards never destroy; they always promote business. The complete absence of performance standards for gas appliances is the saddest reflection on the status of the art and something to get to work on the sooner the better. Honest and earnest manufacturers will certainly welcome a change in the situation and give their hearty co-operation in the establishment of fair, reasonable and practical performance standards.

What One Cent's Worth of Gas Will Do

Will cook the cereal, boil the coffee and boil eggs for the breakfast of a family of six. Will toast forty slices of bread. Will bake enough biscuits for the breakfast of a family of six. Will heat an ordinary bedroom for about one hour. Will heat enough water for shaving for the average man for two weeks. Will heat the baby's bottle for eight feedings. Will heat milady's curling iron every day for three weeks. Will bring two gallons of cold water to boiling. Will furnish ten gallons of hot water. Will furnish over two hours' continuous ironing. Will cook enough soup for a family of six. Will fry chops for two meals for a family of six. Will fry enough waffles for six people.—Selected.

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Vol. IV MARCH, 1917 No. 9

Accident Prevention

A DISCUSSION of "Accident Prevention" today will necessarily follow a fairly well blazed trail, along which the pioneers and experts of the gospel of "Safety First" have strewn maxims and admonitions. Perhaps there is nothing new to say, but at any rate there are new men and women in this organization of ours, of which most of us are justly proud, and to these and to those of the "Old Guard" who have become forgetful, this article is written. Perhaps it will stand out like the horizontal arm and the red light of the railroad semaphore, flashing back a timely warning. Statistics, are again a forcible reminder that a renewed enthusiasm for accident prevention is a necessary "Order of the Day."

Everyone has had some accident, either trivial or severe, which was caused by a relaxation of attention, or a forgetfulness to always bear in mind the possibilities of accident which invariably attend everything we do. Who has not felt ashamed to have become the victim of his own thoughtlessness? It is a trait of human nature to think well of ourselves, and in many cases to compare ourselves favorably with others. Is it not a reasonable assumption that those who become injured under the same conditions through which others pass uninjured, are actually lacking in some quality of thoughtfulness or judgment which indicates either a lesser degree of intelligence, or a traitorous disregard for the dictates of intelligence? If this is true then we individually owe it to our own self-respect, to so regulate our thoughts and actions that the intangible mental qualities which differentiate us from each other, will be able to protect our health and strength, to avoid mutilation of our bodies, to avoid sickness, suffering and loss to ourselves and to those who are dear to us.

Everyone knows that accidents can be and are constantly prevented. Sometimes it is through the introduction of safety appliances or through changed methods of work. In most cases, however, it is due to the exercise of reasonable care and judgment, through heeding the warnings of the senses with which nature has endowed us. No one likes to be injured, no one likes to be responsible for, or even to see a fellow creature injured, no one likes to endure the sarcastic smiles or comments which sometimes follow up the injury caused by carelessness. The remedy is simple. It consists of a frank acknowledgment of that fundamental weakness of human nature to which all are susceptible, *viz.*, thoughtlessness; and then a determination backed, among other reasons, by pride and self-respect, love of life and health and family, to keep our senses on the job during our waking hours. As we intelligently reflect and courageously act, so do we in some degree atone for past mistakes. So too both present and future rewards are ours, in freedom from accident.

"The best safety device is the careful man." How many good books have been written about safeguards! How many illuminating and forceful statistics have been laboriously compiled to show the frequency of accidents and their causes! How many eloquent sermons have been preached at the living and over the dead, all in the cause of "Safety First!" Why be resentful to be called careless? Who is not at times?

Everyone is entitled to his own opinions and to his own freedom of action so long as his opinions and actions do no harm to himself or others. Find all the fault you wish therefore with such screeds as this, ridicule if you choose the efforts of your associates to protect themselves and you. Remember, however, that the brave man accepts his own responsibilities, pays his own shot when the cigars come around, and does his best to play the game of life square, including co-operation in this mighty cause.

Discipline

MANY of the accidents which are now occurring may be eliminated by discipline—not after the accident occurs nor as administered to an offender; but the kind of discipline which originates within the man, which he applies to himself.

True discipline is an education, a development of faculties by instruction and exercise; it is a training to act habitually in accordance with established rules; it is a training to obey either a superior or one's own mind immediately without question.

Lieutenant Barnard addressed the "rookies" at Fort Sheridan on discipline as follows: "I am to talk to you on discipline, and I want to say that I mean more than saluting your superior officer. Salutes are only surface indications of discipline, not the substance. Perhaps the best definition of discipline describes it as an intelligent and trained subordination of self for the accomplishment of a common aim. Discipline means prompt and unquestioning obedience. To illustrate: Two men are walking along a river bank. One farther from the river than the other, cannot see through the high weeds. The man near the river cries 'throw me a rope'. If the two are undisciplined, most likely the other man will say 'what do you want with it,' or 'I haven't any handy' or 'come and get it,' but if they be properly disciplined, the rope will be secured and thrown immediately and the life of a drowning man saved."

Frequently it is necessary to act quickly in order to avoid a serious injury. For instance, some one may call out "shut off the steam," or "pull the switch." In a group of well-disciplined men, where no one calls out orders unnecessarily the order will immediately be carried out and a possible accident averted.

Certain rules are formulated to govern certain working conditions which have been found, by long and broad experience, to be hazardous; or some practices have been found to be dangerous and requests have been made to discontinue such practices. If the man concerned has properly disciplined himself, he will immediately conduct himself accordingly. But if he has not the discipline, he will say "I've been at the job a number of years and do not think it is necessary to follow the rule," failing to consider that his is the experience of only one man and of narrow scope; while the man who has the proper discipline will be governed by the rule and will avoid injury to himself or others. —*Safety Bulletin.*

The Use of Gas in Printing a Newspaper

SAMUEL S. AMDURSKY

WE all look forward to the news which the daily paper will bring us. We pay our penny to the newsboy and he hands us the printed sheets—we read hurriedly perhaps, the paper is cast aside, and as with most things that surround us and are a part of our daily life, we do not stop to think of the work required to produce it ready for our use. In the process of issuing an edition of a newspaper, the use of gas plays an important part which can be shown by following some of the steps that a news item goes through from the time it is handed to the editor until we read it in the newspaper.

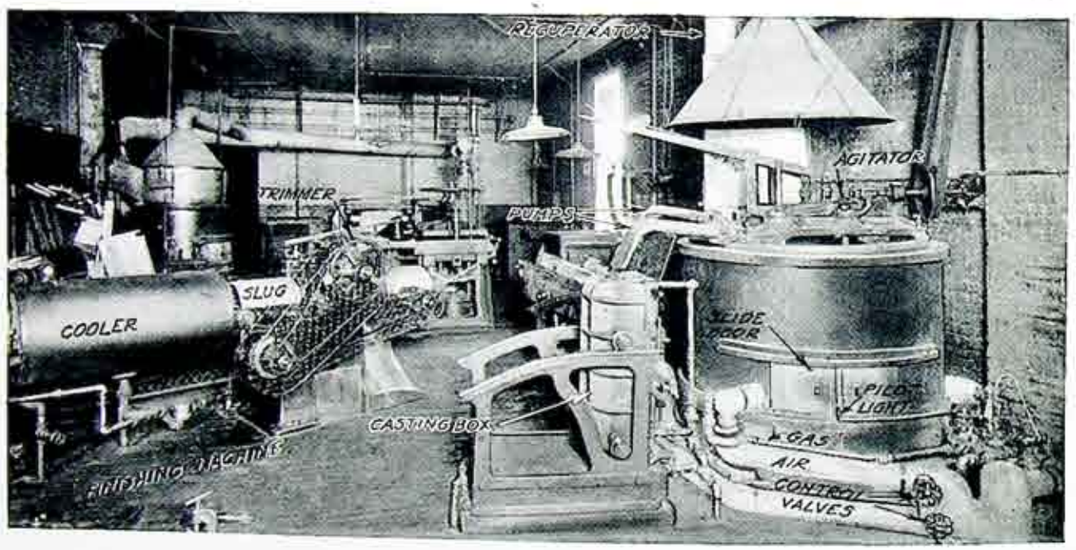


Fig. 1. Stereotype room at "Union and Advertiser" showing gas-fired recuperative furnace, casting box and finishing machine.

After a news item is criticised by the editor it is sent to the composing room where it is given to one of the many operators of the linotype machines to be "set up." The linotype machine is a device that will cast a whole line of type at one time. This almost human machine consists of a series of cams, gears, levers, melting tank and other mechanical refinements, and is operated from a keyboard similar to the keyboard of a typewriter. Each letter or character marked on the keyboard has a corresponding matrix chute which contains 20 to 30 matrices. When the operator desires to formulate a line he strikes the letters on the keyboard in their consecutive order and the corresponding matrices are brought down to a segregating slot which will hold sufficient characters to make up one line. After one line of matrices is segregated it is automatically carried to what is known as an "elevator" which raises the matrices and inserts them into the mouth of the type metal tank where a small pump forces the molten linotype metal against the matrices to form the corresponding letters or words into one casting. After the casting is made, just enough time elapses to allow the metal to cool sufficiently before it is removed to a device which shaves the casting until its height is .918 inches, the standard height of newspaper type. The casting is then released and drops down to its place in a collecting box, while the matrices are automatically removed to a distributing rack which releases the different matrices to their corresponding chutes to be used again.

The metal used in making these castings is called linotype metal and consists of 85% lead, 12% antimony and 3% tin. The melting point of this alloy is approximately 525 degrees Fahrenheit. The presence of antimony gives the alloy hardness and the property of expanding upon cooling, thus allowing a sharp cast to be made on the letters. Tin is added to increase the strength of the alloy, and also to reduce the melting point of the composition. In order to prevent the temperature of the metal reaching a point where the constituents will oxidize, thereby changing the composition of the metal, a thermostatic valve is often used to hold the temperature within small limits. As shown in figure 5 some linotype machines also have an automatic feeding device which keeps the metal tank filled to a certain level. The above factors are very important and there is no fuel that could be used to better advantage for these purposes than gas.

After the news item is composed by the linotype operator it is transferred to a "bank" where a proof is taken and sent to a proofreader who corects any misspelling, punctuation or makes any other changes that he sees fit. The lines (since single letters cannot be taken out) to be corrected are sent back to the linotype operator for their recomposition, and the corrected composition is then sent to the compositor who is instructed by the news distributor what particular page this news item is to be located on. The compositor accordingly sets up the news item in the "chase" or mold corresponding to the page desired. The composed chase is then sent to the stereotype foundry where the surface of the chase is inspected to insure that no letters project above the required height. A "matrix paper" is then placed over the chase—this is covered with a blanket and the whole is put through a heavy rolling machine several times so that the paper matrix will take the impression of the projecting letters.

The matrix paper is made up as follows: A paste is made of a composition of flour, starch, alum and boiling water—the compound is stirred over a gas-fired hot plate until it boils and is then left to cool. A sheet of blotting paper about the size of a news sheet is coated with the paste, and two sheets of red rag paper are pasted to it—the combination thus formed is called a "backing." This backing is set in a damp place for about a day, after which additional paste and two sheets of tissue paper are added to make the finished "mat." After the impression is taken the matrix and chase are removed from the rolling machine and placed on a steam table which

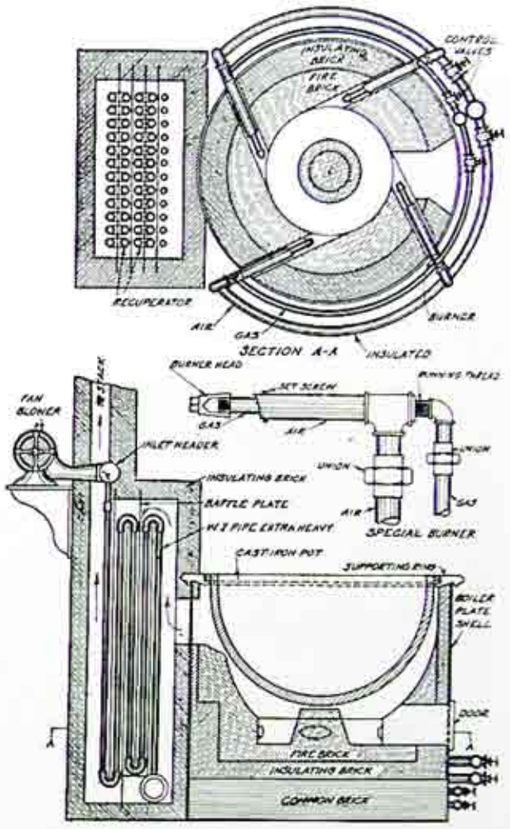


Fig. 2. Diagram of gas-fired linotype furnace with recuperator. Detail of burners is also shown.

resembles a press similar to a hand-copy press used in offices. Underneath the table is located a gas-fired boiler which furnishes the steam used to dry the matrix at about 100 pounds pressure, while air under 80 to 100 pounds pressure is used to force the heavy plate down on the matrix (a heavy blanket is used between the matrix and plate) to complete the impression. After the matrix is dried it is removed to a trimming machine where it is cut to size. All blank spaces are backed up by pieces of felt to prevent these spaces from becoming warped. The matrix is then ready to be placed on the "matrix heater." This gas-fired heater has a curved surface which shapes the matrix so that its contour is the same as that of the stereotype "casting box."

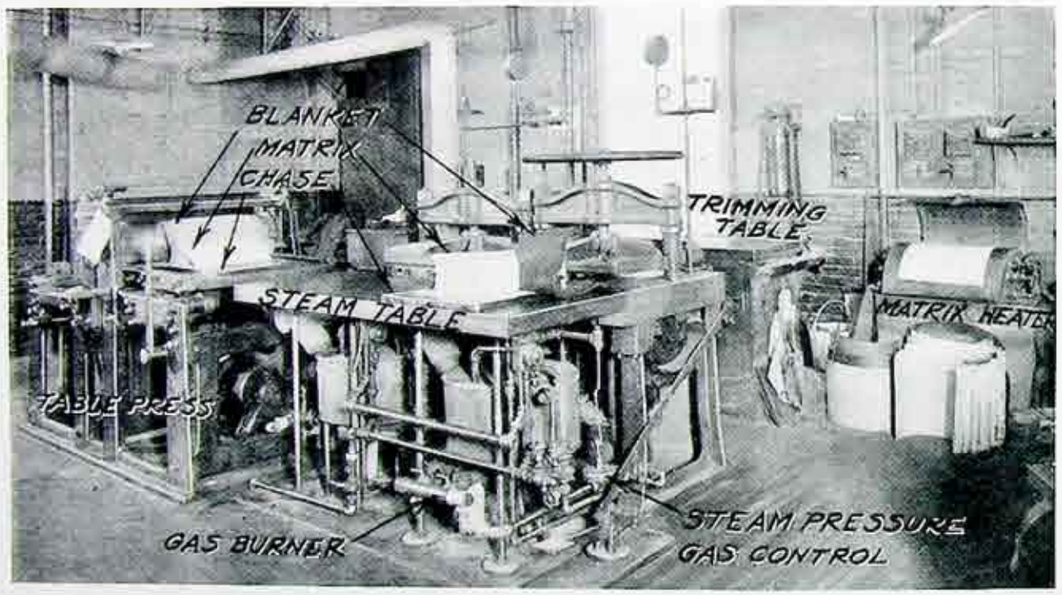


Fig. 4. Picture of rolling machine, steam table and matrix heater, showing how impression is made and matrix is formed ready to be placed in the casting box.

From the heater the matrix is placed in a heated casting box so shaped that the finished stereotype plate or casting will fit the roller on the printing press. The metal used in making this casting is called stereotype metal and depending upon whether it is grade A or grade B it is composed as follows: 72% lead, 20% antimony, and 8% tin; or 79% lead 16% antimony and 5% tin. The former melts at 535 degrees Fahrenheit, whereas the latter will melt at about 550 degrees Fahrenheit. In order to allow for the chilling which occurs when pouring any molten metal, the alloy is kept at a temperature of 60 degrees above the melting point. If the temperature should drop much below this, the metal will "freeze" before it reaches the inside of the casting box, thus casting a non-uniform plate. On the other hand, if the temperature should increase more than 60 degrees above the melting point of the alloy, the tin will oxidize and burn out, causing the remaining alloy to be hard and brittle with a decided decrease in its compressive strength. It is obvious then that very close temperature regulation is a necessity, and the ideal fuel for this purpose is gas.

From the casting box the stereotype plate is placed in a finishing machine which not only trims the sides of the casting but also cuts and removes the tail-piece and cools the casting. The plate is then inspected for defects and if found satisfactory it is sent to the press room to be mounted on a drum press.

The printing press is a complicated machine which has large rolls of newsprint paper located at either end. The paper from the rolls, which is double the width of an ordinary newspaper passes through a series of rollers before it reaches the plate roller from which the news is printed. After passing the stereotype plate it is put through a folding and cutting mechanism and is then ready to be distributed.

The stereotype foundry is about the only department that could effectively speed up an edition of the newspaper, and unless the stereotype furnace can be depended upon for quick temperature regulation the progress of the issue is retarded. With coal or coke as a fuel the operation of the furnace is dependent upon the weather, the quality of the fuel and the skill of the attendant. The temperature of the metal can not be controlled, and the result is oxidization of the alloy due to the poor regulation of the temperature. Tin will melt at about 450 degrees Fahrenheit, and will burn to form tin oxide if heated to 700 or 800 degrees. The other constituents, lead and antimony, act in a similar way. With gas the speed of the furnace is dependent only upon the opening of the valves which can easily be controlled by an inexperienced operator. After the desired temperature of the metal is once attained it can be kept within 5 or 10 degrees easily.

A sketch of a gas-fired stereotype melting furnace which has recently been installed in one of the local newspaper plants is shown in figure 2. This furnace was first designed by this Company, and after erecting and experimenting with it in the Gas Shop for a long period the results proved it to be the most economical soft metal furnace of which the Company has any knowledge. It consists of a re-constructed coal furnace equipped with proper gas burners, and is so lined as to give a uniform and efficient distribution of heat. Attached to the furnace is a recuperator or economizer which consists of a set of coils connected in multiple to inlet and outlet headers, the whole being surrounded with insulating brick to reduce the radiation losses to a minimum. Baffle plates are inserted between the coils to direct the flow of waste gases over the effective surface of the coils. As shown by the arrow heads, the air passing through the coils absorbs most of the waste heat of the flue gases surrounding the coils and returns it to the furnace. When a mixture of gas and air (about 7 parts air and 1 part gas) burns, part of the heat of the flame is required to heat the air to the flame temperature. If, therefore, the air is heated before it mixes with the gas, less heat is required to bring the mixture up to the flame temperature thus resulting in a lower gas consumption

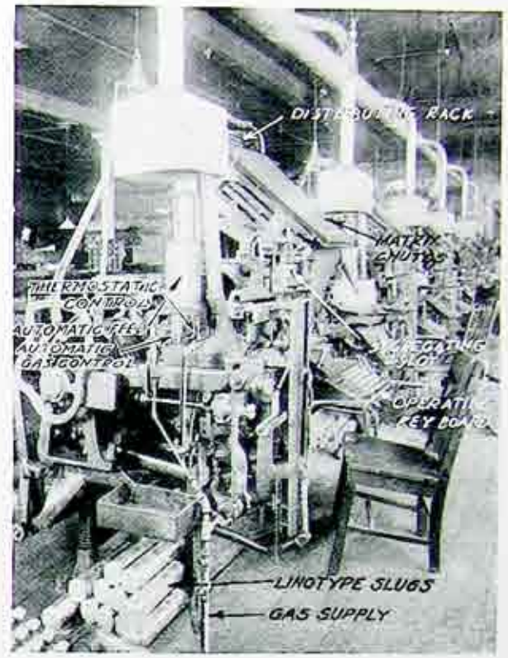


Fig. 5. Row of linotype machines equipped with gas burners to melt metal.

—or greater efficiency. An economizer of this design will save from 30% to 35% of gas that would be consumed without its use.

A detailed sketch of the burner used in this type of furnace is shown

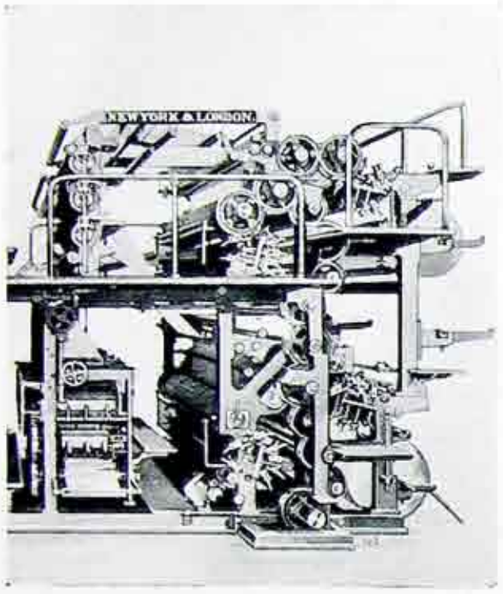


Fig. 6. One half of double quadruple newspaper press.

in figure 2. This burner was also designed by this Company and consists of a burner head A containing a series of small openings drilled radially at an angle of about 40 degrees. The gas flows through these openings while the air passes over them to be thoroughly mixed with the gas. In order to keep a uniform mixture it is necessary to have the burner head in the center of the air pipe. This is accomplished by three radial set screws which are equally spaced on the air pipe B. Unions are left in both the air and gas lines at the burner to remove the entire burner. To facilitate the removal of the burner head without too much trouble, a square head C is located at its end. It is only necessary to use a socket wrench to remove the burner head. A burner of this design cannot back fire and gives a thorough mixture of air and gas.

A furnace of this design will melt from 6 to 8 pounds of stereotype metal with one cubic foot of 600 B. T. U. gas. With the coal furnace it was necessary to keep a slow fire burning all night and to charge the furnace at 4 a. m.; at 7 a. m. one of the day operators was on the job to remove the ashes and liven up the fire, and finally by 8.30 a. m. the temperature would be up to about 575 degrees. With the gas furnace only one of the several burners is lighted at 6 a. m. by the night watchman, and at 8 a. m. the metal is up to a temperature of 620 degrees which is maintained the entire day by merely manipulating the valves, thus insuring that the composition of the metal is always uniform. The gas furnace is not dependent upon the weather conditions, nor does the heat value of the gas vary. The space formerly used for a coal bin may now be used to better advantage for other purposes. The exhaust fan is used only for a short period each day, due primarily to the elimination of dust and ashes. With a coal-fired furnace the stereotype room is a most uncomfortable place in which to work in the summer months. This condition is relieved almost entirely by the use of a properly designed and insulated gas furnace.

The Old Coal Stove

The old coal stove that grandmother used
Had ashes and cinders and dust;
And a coal hod, a poker, a shovel and tongs,
All grimy and coated with rust.
When grandpa got up in the morn with a grouch,
He'd pull on his pants with a jerk,
And cuss like a trooper 'cause the fire was out—
Poor grampy was late at his work.

Now mother she uses a pretty gas range,
A model of beauty and grace.
No ashes to mar the linoleumed floor,
No dust the white walls to deface.
When daddy gets up, he touches the "Rutz"
And smiles while the rich coffee 'percs';
He tucks a good breakfast right under his belt
He's John on the spot at the Works.

—E. L. KENNARD, *Billing Dept.*

Gasoline Testing at the Company Laboratory

HERMAN J. HALSTRICK

IT is a matter of common knowledge among motorists that, owing to the enormous increase in the use of gasoline driven cars the quality of gasoline has steadily decreased somewhat during the last few years. This is due to the increasingly large quantities of heavy distillates in the gasoline which formerly were put into kerosene. The result to motorists has been difficulty of starting in cold weather, fouling of the cylinders with carbon deposit, and sometimes contradictory. This was very plainly shown by two representative samples which were examined at the Laboratory—according to the Baumé test the one of poorer quality had a higher rating and also approached kerosene more nearly than did that of better quality. The Company buys about one thousand gallons of gasoline weekly and it soon became evident that a better method of testing should be adopted. To be of a practical value, the method used

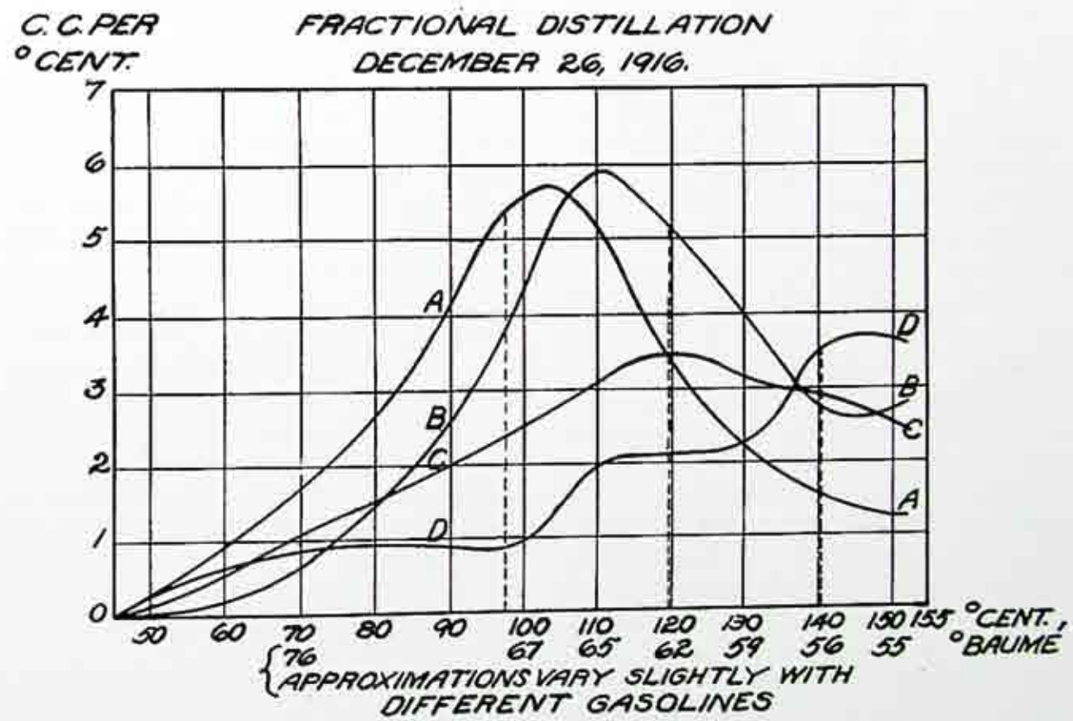


Fig. 1. Curves showing characteristics of four gasolines from different sources, as tested at the Laboratory.

in many cases, a decrease of mileage has been obtained.

There are methods of determining how much of this very low test gasoline is contained in any given mixture of gasoline. Specific gravity commonly expressed in degrees Baumé, is a test generally used in the commercial grading of gasoline, but it is exceedingly unreliable and should indicate the value of a particular gasoline as expressed in (1) ease of starting, (2) mileage obtained, and (3) freedom from carbonizing trouble. "Fractional distillation," by which a separation of the various parts of the gasoline is affected, gives an indication of the utility for these purposes, and is the method now employed in the Laboratory. The

fractional distillation method is based on the fact that gasoline is a complex mixture of various hydro-carbons each having a distinct boiling point. When such a mixture is boiled in a distilling flask as shown in figure 3, the hydro-carbons pass off successively, those having a lower boiling point passing off first. However, there is considerable overlapping and in order to bring about a sharper separation a "still head" filled with glass beads is inserted between the flask and the condenser. As the vapors ascend through the beads the hydro-carbons of higher boiling points condense and drop back into the flask, continuing to do so until all of the lighter portions have passed off. The condenser which brings the vapor back to liquid form so that its volume may be measured is simply a tube surrounded by running cold water. The condensed fraction drops into a bottle as shown. While a sample of average gasoline is being distilled the temperature of the vapor rises from say 45° to about 200° Centigrade at which point nothing more is left in the flask. The bottle at the end of the condenser is changed at certain arbitrary points, *viz.*, 50, 75, 100, 125, and 150 degrees Centigrade so that a series of fractions is obtained from room temperature to 50 degrees, 50° to 75°, 75° to 100°, etc. A thermometer with its bulb close to the outlet indicates at all times the temperature of the vapor. The percentage composition of the gasoline is obtained by comparing the volume of these fractions with that of the sample. It should be understood, however, that this method is not an analysis for individual compounds, the points mentioned above are simply arbitrary.

The reason for separating the gasoline into various parts is that each portion has definite advantages and disadvantages. The portions with lower boiling points vaporize more easily and completely, thus giving complete combustion which enables the engine to be started easily. The portions with high boiling points cause increased carbon deposit in the cylinders, but will give an increase in mileage provided the carburetor is efficient and well adjusted. A lack of these latter conditions will produce reversed results.

Early in the winter a comparison was made of four gasolines as sold by various gasoline refineries. The results are shown in the accompanying graphs and table. It is interesting to note the astonishing variation where more similarity might be expected. "A" is a gasoline of much better than average quality, "B" is about average, "C" is rather poor, and "D" is a very poor quality composed largely of kerosene. In interpreting the graphs is should be remembered that the nearer the peak of the curve is toward the left, *i. e.*, toward higher temperatures, the better the gasoline. The area under the curves indicates the quantity distilled, so that if most of the area is to the right of a given point, say 100°, the interpretation is that the bulk of the sample is distilled above 100°. In preparing the accompanying table a somewhat arbitrary division into high, low and medium tests has been made, *viz.*, 73 B°., 65, 59, and kerosene, and the residue remaining in the flask when 150° is reached has therefore been called kerosene. Although there is a possibility for difference of opinion, 150° is given by various authorities as the beginning of kerosene.

SOURCE OF GASOLINE	(73° B) High Test	(65°B) Med. Test	(59°B) Low Test	Keroesne	Degrees Baumé
A	up to 100° C 49%	100°-125° C 28%	125°-150° C 13%	Over 150° C 9%	67.6
B	25	36	22	17	62.3
C	27	22	20	30	61.8
D	17	14	20	48	61.8

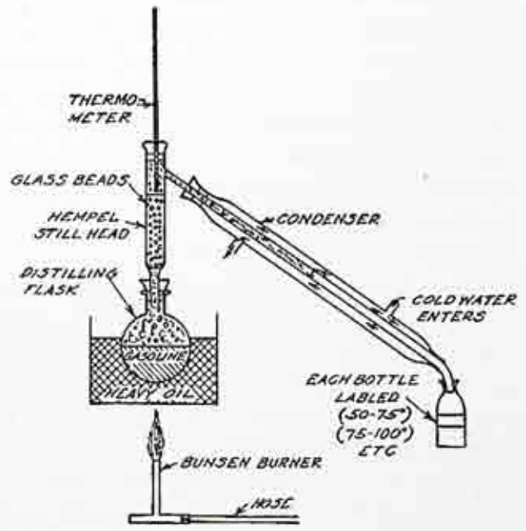


Fig. 3. Set-up of apparatus used at Laboratory for testing gasoline.

Gasoline has three geographical sources: the eastern, the mid-continental and the Californian fields. There are also three methods of production: the simple distillation of crude petroleum, the breaking up by heat of heavy hydro-carbons into lighter ones and finally the extraction by compression and washing from natural gas. A comparsion of the properties ascertained in the Laboratory with the tables furnished by the Federal Government will fix the source of the gasoline with a fair degree of accuracy.

Gasolines are at present in a transition period. For this reason the data now collected on each shipment will have a special value in the future when conditions have become more settled. It may be a coincidence, but since testing was started at the Laboratory there has been a noticeable improvement in the quality of gasoline furnished to the Company.

New Assembly Room

THE Company has rented most of the floor space of the third floor in the building adjoining the Main Office on the north. About two-thirds of the space is occupied by the Purchasing Department, while the remainder—a large room in the front part—has been equipped as an assembly or meeting room. The assembly room has been a pressing need for a long time. The Friday morning meetings, educational meetings, evening classes, Women's Club meetings, etc., will all be held in this room in the future.

A new double dissolving model C Baloptican has been purchased for use in the Company's educational work. The lamp will be located in the new assembly room but will also be used for the talks which are being given to the public. The lamp can be operated either by an arc or by an incandescent lamp, and it will therefore be suitable for any condition that might be met. A large 9′ x 9′ aluminum screen mounted on a spring roller is also part of the equipment.

"He who will not profit by the experience of the past, gets knowledge when trouble overtakes him."—Kaffir Proverb.

New Telephone Board at Andrews Street

THE increased demand on the telephone system for some time past has necessitated an increased capacity in equipment. This need has been met by the installation at Andrews Street of a sub-switchboard on both the Bell and the Home system. To this sub-switchboard will be connected all the Company phones in the operating departments, (that is, departments located outside the Main Office,) while the phones in the general offices will be connected to the main switch board as in the past,—thus giving a more elastic system. The outdoor telephones which in the past have been Bell phones have been changed over to the Home system and are connected direct to the board at Andrews Street instead of the Central board of the telephone company.

This installation of the sub-switchboards will relieve the main board of all the interdepartment calls except those originating in or coming to the phones in the Main Office, and thereby leave the operators free to give better attention to the telephone service with the public. This division of the telephone service will also enable the operators on the subboard at Andrews Street to give their undivided attention to the operating departments in time of trouble, while the operators at the main board are busy with the customers of the Company reporting lights out, etc.

After the new installation is working satisfactorily the trunk lines connecting the Company's internal system with the system of the Telephone Company will be "plugged through" to the Andrews Street board at 11 P. M. and all-night service at Clinton Street will be closed.

However, to take care of possible calls *outgoing* from the Main Office after 11 P.M. the telephones in Room No. 1 will be connected through to Andrews Street exchange thus allowing night service from those phones.

Baseball Banquet

THE Railway and Light Baseball Club's Second Annual In Shoot was held at Kane's Hotel, Charlotte, on Saturday, February 10th. Baseball is said to be a national charity that keeps 40,000,000 fans moving during the hot spell, and as a result it keeps the United States in the temperate zone. Forty fans and players kept moving on the night of the 10th, it was zero weather, and when play finally ended, forty hits and runs were recorded in an errorless game.

Ray Connell pitched a perfect game, and during the 9 innings each player and fan was served the same number of hits and fouls.

OYSTER COCKTAIL
CREAM OF TOMATO
BROILED WHITEFISH
CREAMED POTATOES
CABBAGE SALAD CELERY
STUFFED OLIVES RADISHES
BROILED CHICKEN
FRENCH FRIED POTATOES
FRENCH GREEN PEAS
APPLE PIE COFFEE

After the batting rally Mr. E. Kennard attempted to recite the history of baseball for the past fifty years. Shouts filled his ears, he asked for friends, he tried valiantly, but finally had to give up with a threat that he might have to commit an "overt act" to gain his point.

Mr. F. W. Fisher recalled the success of the past season, he predicted even greater success for the next season, and assured the team that all the employes look upon it with pride.

Ray Guppy as toast-master made a hit every time he came to bat, in spite of the taunts of the spectators. But Guppy didn't play the entire game—he had an altercation with the umpire who finally had him arrested and fined.

Manager Stokes tried to interfere but in order to quell the wrath of the spectators he had to resist so that the game could proceed—for a run in time saved the nine.

The boys played cards, much musical talent was brought forth, and before the last shouts of "good night" were heard the Banquet had proved itself a hit.

Women's Club Meeting

THE March meeting of the Women's Club was held in the new Assembly Room in the Annex, Thursday evening, March 8th. After a very brief business meeting, the President introduced the first speaker of the evening—Miss Carrie Flarida, State Organizer of the Women's Suffrage Party, who gave an exceedingly interesting talk on suffrage. Miss A. B. Zachart of the Rochester Public Library, who was the guest of honor and speaker at the Annual Banquet of the Club, then told stories in her very delightful style. Altogether the meeting was a most interesting and enjoyable one, and the kindness of Miss Flarida and Miss Zachart in devoting their evening to the Club was deeply appreciated.

Educational Work

ACCOUNTING COURSE OF THE NATIONAL ELECTRIC LIGHT ASSN.

EIGHTEEN men from the Consumers' Billing Department have subscribed to the Accounting Course of the National Electric Light Association. The Company will advance the money, which will be paid back in small installments. Meetings will be held every Wednesday night at 6:30 o'clock. Mr. E. C. Scobell, Mr. Fred Patterson and Mr. W. T. Nolan will act as leaders for the classes.

Lectures for the Public

THE three lectures, one on "Gas", one on "Electricity" and one on the "Genesee River" as recently prepared by the Company's Educational Bureau for the public have been delivered before the following organizations during the last few weeks.

"Electric" talk: Monroe Association of the National Association of Stationary Engineers; Young Men's Club, St. Mary's Church; Mechanics Institute; Men's Club, St. Stephen's Church.

"Gas" talk: Science Club, West High School.

"Genesee River" talk: Men's Club, Central Church.

Organizations desiring to have these lectures presented may communicate with Frederick W. Fisher, Employment and Safety Manager, who will arrange to have the lectures delivered in so far as prior engagements permit.

Bowling Challenge Accepted

THE challenge sent forth by West Station last month was accepted by five sturdy bowlers who had the spirit—Railway and Light Bowling Spirit—and as a result West Station was "scalped." The battle took place on the night of March 2nd at the Rochester Club—result:

Office	Works
696	652
681	703
765	702

"42 Centimeter" Hutchings "Horseshoe Haftenkamp
"Pushball" Lundgaard "Suresplit" Harrison
"Strikes" Gould "Spare" Crawford
"Commonball" DeWolfe "Cleanup" Van Ripper
"Hit-em-again Scobell "Kingpin" Whitney

The Three Parts

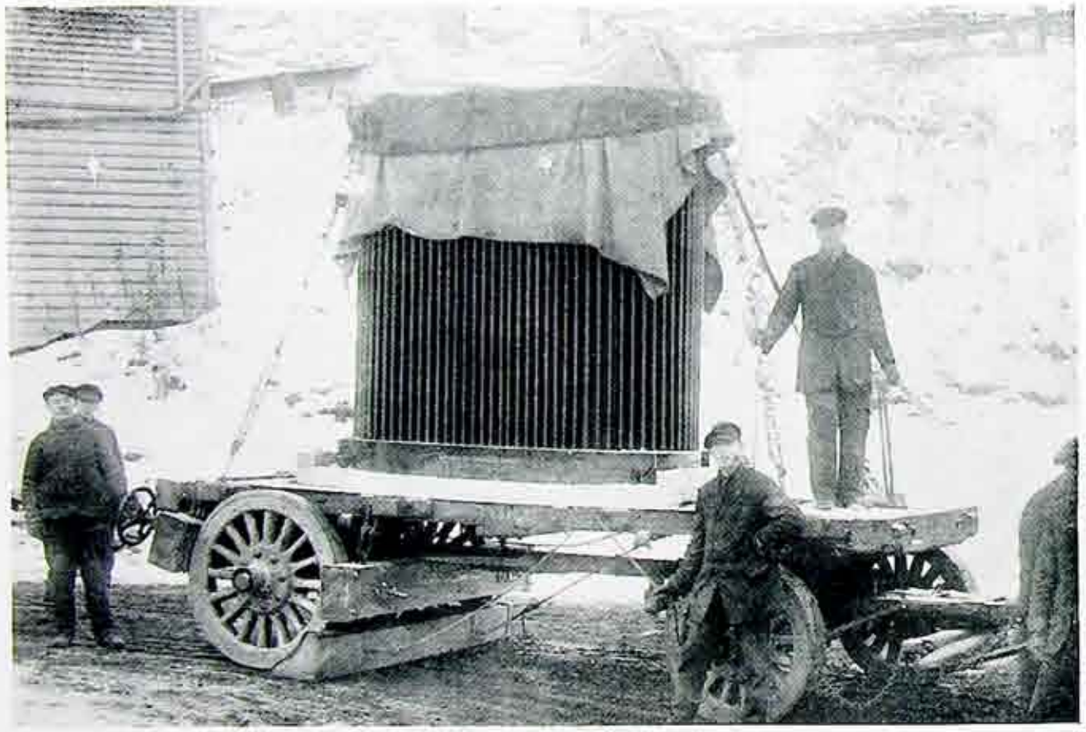
A politician says his next statement will be divided into three parts. Instinctively we recall the announcement of a mountaineer preacher, who said to his flock: "Brethren, I hev decided t' divide my sermon in three parts. Th' fust part I'll understand an' you won't. Th' second part you'll understand an' I won't. Th' third part nobody'll understand."—*Montgomery Advertiser.*

An Effective Brake for Transporting Heavy Loads Down an Incline

ALBERT H. LAMEY

THE Construction Department often has to transport heavy material down very steep roadways. The form of brake shown in the accompanying illustration was developed and has been found to be a great asset. As shown, two heavy blocks attached to the truck hang to about the center of the back wheels, both in front of the wheel and in back. These blocks are essentially a vice which grips the rear wheels and is controlled by means of two rods which run from the hand wheel at the rear block to a nut on the front block as shown. This brake alone will safely conduct a load of ten tons down a steep incline, but for heavier loads and as a safeguard, additional precautions are taken. The block shown resting on the ground in front of the rear wheel is shaped to coincide with the rim of the wheel, and as this block drags on the ground there is a tendency for the rear wheels to ride over it.

In cases where a load heavier than ten tons is being hauled it is necessary to put a team of horses in back of the wagon and hitch it to the block which drags on the ground, thus making a secure holdback. In transporting a load from twenty to twenty-five tons it is necessary to attach two teams, but if loads ranging from twenty-five to fifty tons are hauled a hoisting engine is attached. The pull on the rope attached to the block has the same effect as if the horses, or hoisting engine were holding back a heavy load. The illustration shows an eleven ton transformer being taken down the Falls Street Hill to Station 3 nearby.



Picture of eleven ton transformer after it had been transported down the Falls Street Hill.

Gas and Electricity in the Home

BY THE GAS DEMONSTRATORS

Miss Frances E. Moore, Miss Mona A. Pratt and Miss Irene Walsh

Study

IN every business concern those who do the buying have expert knowledge of their particular line of goods. How often does the housewife who has the business of buying for the family possess this same expert knowledge? Housekeeping is just as much a business as running a factory, and knowledge and success have the same relative positions.

At present the problem of buying for the family is the topic of much talk and writing and one must be careful to choose between that which is good authority and that which is not. Last month it was suggested that the reading of some of the pithy government bulletins might help the housewife to gain a better knowledge of the foods she is buying. In addition to studying and reading one must have practical knowledge, and that is best gained by observation and experience. Perhaps you can arrange with your butcher to have him explain the different cuts of meat and their relative values. Try different brands of canned goods (from different markets and groceries if necessary) and compare them. Often when you ask for a can of peas or tomatoes without specifying, you are given the most expensive brand when a much cheaper grade would be satisfactory for a particular purpose.

Like every business that of being a home-maker requires study and experience.

The two very practical bulletins listed below can be had for the asking. Are you interested?

COST OF FOOD—Flora Rose
CORNELL READING COURSE—Agric. Dept., Cornell Univ., Ithaca, N. Y.

This bulletin outlines in a very practical way the needs of the body and explains what is meant by true economy.

U. S. DEPT. OF AGRICULTURE, Washington, D. C.
"Farmers' Bulletin No. 717."

FOOD FOR YOUNG CHILDREN

This bulletin was written under the personal direction of Dr. Langworthy, Chief of Home Economies, and explains in sensible housekeeper's terms the general rules for child feeding.

Tested Recipes

ORANGE PUFFS

2 tablespoons butter
¾ cup sugar
1 egg
½ teaspoon salt
½ cup milk
1½ cup flour
2 teaspoons baking powder
1 teaspoon vanilla

Cream the butter, add sugar gradually and egg well beaten. Mix and sift flour, baking powder and salt; add alternately with milk to first mixture. Turn into individual pans and bake about twenty minutes. Serve with Orange Sauce.

ORANGE SAUCE

½ cup sugar
1 cup boiling water
1½ tablespoons flour
2 tablespoons butter
Juice of 1 orange
Rind of ½ orange

Mix sugar and flour, add water gradually, stirring constantly; boil five minutes, remove from fire, add butter, orange juice and rind.

APPLE PUDDING

2 cups pastry flour
4 teaspoons baking powder
1 teaspoon salt
2 tablespoons sugar
2 tablespoons butter
½ cup milk
Apples
Sugar, Cinnamon

Pare and slice apples and place in baking dish and sprinkle over sugar, cinnamon and a little water. Place in oven and while mixture is heating through make batter with flour, etc., as for baking powder biscuits. With spoon place this batter over the apples and bake in moderate oven about ½ hour. Serve with Brown Sugar Sauce.

BROWN SUGAR SAUCE

2 tablespoons butter
1 tablespoon flour
1 cup brown sugar
1 cup water

Melt butter, add flour and sugar. When well mixed add water gradually, stirring constantly, boil 5 minutes.

ROUND STEAK EN CASSEROLE

Two pounds round steak cut about an inch thick. With a meat pounder or edge of saucer pound in ¼ cup of flour, on each side. Sear in pan one cup of carrots and one cup of onions. Put these in casserole. Then cut the meat into pieces about two inches square and sear in pan, and put on top of vegetables in casserole. Season with pepper, salt and bay leaf. Lastly pour over one pint of strained tomatoes. Cook slowly about two hours.

CODFISH BALLS

2 cups codfish — 1 egg
2 cups mashed potato — seasonings

Cover fish with water and slowly bring to boiling point. Drain, shred and add potato, seasonings and egg slightly beaten. Shape into balls or cakes. These may be rolled in flour and sauted in frying pan or rolled in egg and cracker or bread crumbs and fried in deep fat.

LIMA BEANS

Soak beans over night. Cook in boiling salted water until soft. Season with pepper, salt and butter and serve. They are also very delicious when combined with either a white sauce or a tomato sauce.

BAKED BANANAS

Remove skins from six bananas and cut in halves lengthwise. Put in a shallow baking pan. Mix two tablespoons melted butter, one-third cup sugar, and two tablespoons lemon juice. Baste bananas with one half the mixture. Bake twenty minutes in a moderate oven basting during baking with remaining mixture.

WAFFLES WITH MAPLE SYRUP

1¾ cups flour — 1 cup milk
3 teaspoons baking powder — Yolks 2 eggs
½ teaspoon salt — 1 tablespoon melted butter.

Mix and sift dry ingredients: add milk gradually. Yolks of eggs well beaten and melted butter. Cook on greased hot waffle-iron. Serve with maple syrup.

CORN MEAL PAN CAKES

1½ cup boiling water — 2¼ cups flour
½ cup corn meal — ⅓ cup sugar
1½ cup milk — 1½ teaspoonfuls salt
1 egg well beaten — 3½ teaspoonfuls baking powder.
2 tablespoonfuls melted butter.

Cook corn meal in boiling water five minutes, add milk and cool. Add dry ingredients sifted together, lastly add egg, well beaten, and melted butter. Use all level measurements.

Feminine Facts and Fancies

Salads may be garnished in numbers of ways that add greatly to their appearance, as well as to their taste. A simple garnish for individual portions of salad, may consist of a single olive, grape, cherry, cranberry, strawberry or pickles, pimentoes, nut meats, tiny radishes, cheese balls, capers, dates, marshmallows or a dot of jelly.

❖

Small articles made of celluloid such as combs, barrettes, etc., can be mended with collodion. Prepare a new surface on broken parts by scratching and then put on collodion or liquid court plaster, press together and let stand twenty-four hours.

❖

After preparing fish for cooking, the fishy odor may be removed from one's hands by washing them in water which contains a few drops of ammonia.

❖

To keep silverware bright without constant polishing, keep a lump of camphor on the shelf or in the drawer where the silver is kept.

❖

If possible, add flavoring after the mixture cools as much of its strength will otherwise pass off in steam.

❖

In moving clothes from the line work will be saved if they are pulled into shape and folded.

❖

Heat lemons before squeezing them and you will get a great deal more juice.

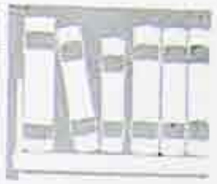
Pat went to a druggist to get an empty bottle. Selecting one that answered his purpose, he asked:

"How much?"

"Well," said the clerk, "if you want the empty bottle it'll be one cent, but if you have something put in it we won't charge anything for the bottle."

"Sure, that's fair enough," observed Pat. "Put in a corl."—*Country Gentleman.*

Auditing



Monthly Report on New Business

Net Increase in Consumers in January 1917

	Dec. 31, 1916	Jan. 31, 1917	Increase
Gas	72,721	72,724	3
Electric	22,282	22,403	121
Steam	43	43	.....
	95,046	95,170	124

Net Increase in Consumers in Twelve Months Ending Jan. 31, 1917

	Jan. 31, 1916	Jan. 31, 1917	Increase
Gas	69,223	72,724	3,501
Electric	19,783	22,403	2,620
Steam	41	43	2
	89,047	95,170	6,123

Statement of Consumers by Departments as of Jan. 31st.

Jan. 31st	Gas	Electric	Steam	Total	Increase
1908	37,333	5,343	....	42,676	.....
1909	40,681	5,713	....	46,394	3,718
1910	45,269	6,345	....	51,604	5,210
1911	50,442	7,781	14	58,237	6,633
1912	55,217	9,358	19	64,594	6,357
1913	59,904	11,818	23	71,745	7,151
1914	64,681	14,073	27	78,781	7,036
1915	67,815	16,998	37	84,850	6,069
1916	69,223	19,783	41	89,047	4,197
1917	72,724	22,403	43	95,170	6,123
Inc. in 9 Yrs.	35,391	17,060	43	52,494	52,494

Net Increase in Consumers by Months

	1915	1916	1917
Increase in January	364	252	124

Company's Savings Depositors

STATEMENT TO MARCH 1st, 1917

No. of depositors March 1, 1917	95
Increase during February, 1917	5
Amount deposited during Feb	$750.50
Total deposits to March 1, 1917	$8,516.26

Miscellaneous Data

	Jan. 31, 1916	Jan. 31, 1917	Increase
Miles of Gas Main	435	443	8
Miles of Overhead Line	1,763	1,815	52
Miles of Underground Cable	1,043	1,062	19
Miles of Subway Duct	906	942	36
No. of Street Arc Lamps	4,204	1,576 (Dec.)	2628
No. of Street Incandescent Lamps	4,422	7,461	3,039
Total No. of St. Lamps	8,626	9,037	411
No. of Employees	1,032	1,097	65
Amt. of Payroll (Mo.)	$82,428.04	$96,065.02	$13,636.98

Report of Treasurer of Employees' Benevolent Association of Rochester Railway and Light Co., for Month of Feb. 1, 1917

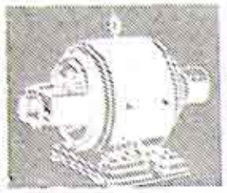
Receipts

Bal. on hand 1st of month		$3,982.06
Dues—Members	$476.07	
Dues—Company	476.07	
Assessment No. 3—Mem	.25	
Assessment No. 4—Mem	.25	
Assessment No. 5—Mem	2.50	
Assessment No. 3—Com	.25	
Assessment No. 5—Com	2.50	
Group Life Insurance	15.65	
Mem. Additional Life Ins	294.98	$1,268.52
Total		$5,250.58

Disbursements

Sick Benefits	$619.99	
Accidents on Duty Ben	35.96	
Group Life Insurance	2,279.55	
Medical Examiner's Exp	7.50	
Mem. Additional Life Ins.	397.50	$3,340.50
Bal. on hand Mar. 1st, 1917		$1,910.08

Members in good standing Jan. 31, 1917	718
Affiliated during February	10
Unaffiliated during February	4
Gain	6
Total Membership ending Feb. 28, 1917	724



Sales

Illumination of Skating Rink at Eastern Widewaters

FRANK TAYLOR

FOR several winters the Park Board has provided a skating rink for the public by flooding the Eastern Widewaters. In order to make skating possible in the evening, the rink in the past has been illuminated by means of 500-watt lamps placed on temporary posts supported on the ice. This method of illumination has not been satisfactory,

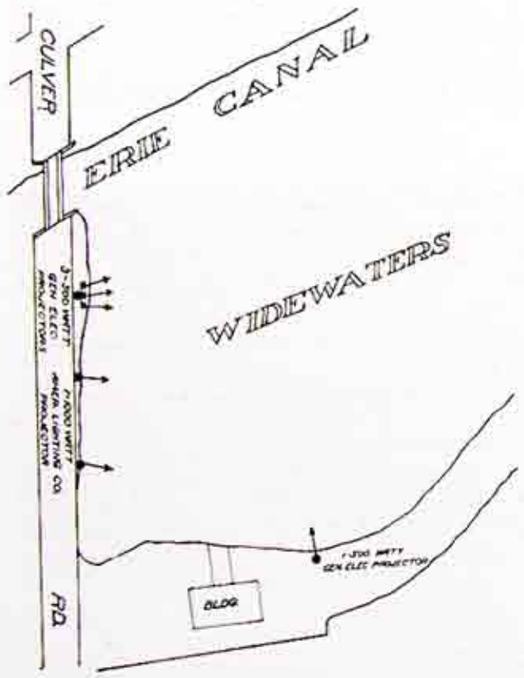


Fig. 1. Diagram showing location of projectors at the Eastern Widewaters.

due to the fact that the lights were placed comparatively close to the surface of the ice, causing considerable glare or blinding effect. The lighting on the ice was also decidely spotty; that is, it would be very bright beneath the lamps and dark between lamps. The posts were in the way of the skaters and were so frail that some were broken, or if not broken the vibration caused by persons hitting the posts was severe enough to break the lamps.

This year a different scheme was adopted—no lights were placed on the skating surface. All the illuminating was done from the sides of the rink by means of projectors or searchlights similar to those used on the construction work at Station No. 5. Poles located on Culver Road on the west side of the rink offered an easy means of supporting the projectors. The accompanying diagram shows the location of these projectors and the general direction in which the beams of light were directed.

This method of illuminating large areas has obviously many advantages over any other system. The units may be placed out of the way, and are of large size so that the cost of installation is a minimum. In this case use was made of existing poles which also kept down the cost. Playgrounds illuminated by this system make the use of Parks possible at night during the Summer months by the children. It is perfectly easy to play baseball, basketball and many other games in a park illuminated by artificial light. The Park Board in Rochester has this matter under consideration at present.

In a short time the Buffalo, Rochester and Pittsburgh Railway's power house at Lincoln Park will be shut down and the entire power load will be connected to this Company's lines. The car repair shops, round house, coal hoists, transfer tables and the machine shops are all located at

Views showing illumination of skating rink at the Eastern Widewaters by means of six projectors located as shown in diagram on opposite page

Lincoln Park. In addition to the power load, the lighting of the extensive railroad yards requires considerable electricity, the average day load being 150 kilowatts and the night load 75 kilowatts. While most of the power is used at Lincoln Park, part of it is used to operate an air compressor plant at Brooks Avenue, one and one-half miles away.

The present power plant generates two phase electricity at 230 volts which is raised to 2300 volts for distribution about the yards and also to the Brooks Avenue plant. As this Company's voltage is 4100 volts and that of the Buffalo, Rochester and Pittsburgh Railway is 2300 volts, special transformer connections will be required. Temporarily, this voltage will be supplied by two banks of transformers, the first bank being connected in Star Delta to reduce the voltage to 230 volts, and the second bank will be connected Delta Delta to raise this voltage from 230 volts to 2300 volts. The permanent installation however will consist of an auto transformer which will transform the voltage from 4100 direct to 2300 volts.

❖

The Eastman Kodak Company has installed a large pipe line from Lake Ontario to the Kodak Park plant, through which the total water supply for the "Park" is to be pumped. The pumping station is located on the Lake shore some distance west of the pumping plant of the Rochester and Lake Ontario Water Company. The Eastman Company has contracted with the Railway and Light Company for the supply of power to operate this pumping plant. It is expected that at first the load will be about 600 kilowatts and the plant will be so operated as to take advantage of the off-peak option on Three-Rate Schedule. It is proposed to operate the plant on two shifts, with a demand of approximately 600 kilowatts during the night hours from 10 P. M. to 6 A. M., and a demand of 300 kilowatts from 6 A. M. to 2 P. M.

An overhead line for serving this load is to be installed upon the present pole line extending along the B. R. & P. right-of-way.

❖

The largest and one of the most interesting outdoor construction jobs which is under way this spring is that of the Barge Canal Harbor. The work will consist chiefly of deepening the river channel, building retaining walls, and connecting the Barge Canal with the river. Excavation work has been commenced in South Park to make the connection between the river and the Kerbaugh contract east of the Park.

A 200-horsepower electric motor driven air compressor plant will be installed near Brooks Avenue for the operation of rock drills in the river bed. A stone crushing plant will be erected on the west side of the river near the railroad bridge. A concrete mixing plant of large capacity will be installed and moved along the river bank as the progress of the work requires it. This machinery as well as the pumps and general machinery will be electrically operated. The Yale and Reagan Company of Chicago, has this Barge Canal contract.

❖

A new 5-stage centrifugal pump manufactured by the Alberger Pump and Condenser Company is being installed at the Charlotte Pumping Station of the Rochester and Lake Ontario Water Company. This pump has a capacity of 4,000 gallons per minute or about 6,000,000 gallons per day of 24 hours. It will be driven by a 440-volt, 600 H. P., alternating current induction motor. In order to deliver the rated capacity against a varying pressure a booster pump was installed to take care of the variation. Briefly, the main pump works against a constant pressure while the booster pump takes care of any pressure variations. The booster pump is a DeLaval single-stage, centrifugal pump and is driven by a 200-horsepower variable speed, direct current motor.

❖

The electric installation in the C. E. Kohlmetz building on North Water Street has been completed, the motors are running on Railway and Light service, and the engine which formerly was used for power is shut down. The motors are of 20, 15, 7½ and 5 horsepower capacity. Gas heated steam boilers are used to supply steam to some of the shoe machines on the top floor.

❖

Plans and specifications for a lighting and portable motor installation are being prepared for the Selden Motor Vehicle Company. A new one-story structure 65 feet by 185 feet is to be erected to afford space for service work on trucks. This expansion will result in an additional connected load of approximately 10 kilowatts about equally divided between lights and motors.

❖

Mr. Ernest T. Kuhs, who is operating steam drills and pumps on the Barge Canal Harbor contract, has recently changed to air drills supplied with air from an electrically driven compressor, and he has also installed electrically driven centrifugal pumps.

❖

The 150-horsepower motor which is to replace a Corliss engine driving a large ice machine at the Kondolf Brothers Ice Company, has just arrived in Rochester after a three months' journey from Montana. It will be installed within a short time.

❖

The Steam Department recently completed the steam main from Station 2 to the Fire Department Headquarters on Central Avenue. This main will also supply steam to the Hotels Bristol and Savoy.

❖

The Rochester Herald has recently signed a contract for steam and electric services for its new building on Aqueduct Street. Steam will be supplied from Station 26.

❖

The Millham Realty Company has installed in its building on North Water Street a 15-horsepower motor to operate two elevators.

Recent Gas Installations

Vetz Bros. of 590 Joseph Ave., sausage manufacturers, Mr. P. Christman of 183 Lyell Ave. and Mr. H. A. Ihrig of 3 Parsells Ave., have ordered gas equipment for their smoke houses.

❖

The E. A. Edwards and Son Company has purchased two sections of Garland Ranges and one Broiler to displace coal equipment in its new and up-to-date cafeteria.

❖

The Lineatime Company has purchased proper gas burners to heat the solution tanks and saw-dust bath in its Plating Department.

❖

Mr. Wm. Whitfield of 62 State Street recently installed a 2 H. P. gas-fired steam boiler in his hat factory.

❖

The Rochester Candy Company has purchased necessary equipment to change two of its coke-fired furnaces to gas.

❖

The Seneca Hotel has installed two sections of Garland Ranges to displace coal equipment.

❖

The Y. W. C. A. Cafeteria has purchased two sections of Garland Hotel Ranges.

Electric Generation

OWING to the installation of two machines at Station 35, it was found necessary to move the motor department which occupied the basement, to Station 26. The floor space will be utilized for a transformer installation, and as the transformers are of the self-cooling type they occupy a greater space than the standard water cooled transformer. Provision is also being made for future rotary transformers and 11000/4150 transformers which will be used for future 3-phase, 60 cycle feeder circuits. The machines will be one 1000 KW Edison rotary, and one 2000 KW railway rotary which will supply twelve additional railway feeders from this station. As the basement floor rests on solid rock thus requiring drilling and blasting, the excavation required to obtain the necessary head room for this installation will be somewhat difficult.

❖

Excavating work is under way at Station 34 for the installation of a 1250 KW transformer to be used for supplying energy for a 1250 KW Edison booster type rotary converter. The transformer will be of the self-cooling type similar to those which will be installed in Station 35. This Edison rotary will very materially improve the voltage conditions in the north-eastern section of the city.

❖

Ground has been broken for the German-American Button Co.'s substation to be located in the rear of its plant on Champeney Terrace. This station will consist of three 100 KW transformers for power load, and three 50 KW transformers for lighting. The building will be of concrete construction, all conduits for secondary conductors being laid beneath the floor. A distinct feature of this building will be louvers placed in the windows in the transformer room for ventilation, making a circulation of air positive at all times.

Gas Distribution

WORK has been practically completed in the new concrete purifiers. Final tie in connections were made on February 28th, making the entire series available for water gas purification at the present time. Subsequently the line from the new plant will be tied in, and these boxes will be used for purifying the coal gas made at Station West. These new boxes, in connection with the original concrete purifiers, have a total capacity of 32,000 bushels of purifying material. On the basis of Mr. Crisfield's formula for efficient purifying capacity, these boxes should operate efficiently for about seven million cubic feet of coal gas per day, or nearly double the capacity of the new plant as now building.

❖

A meeting of the Gas Production Committee of the Empire State Gas and Electric Association was held in the Engineering Societies Building in New York City on February 19th. The meeting was devoted to a discussion of the first month's experiences of operation on the new calorimetric standard which went into effect January 1st. Suggestions were made for standardized tabulation of data which can later be analyzed and published for the benefit of the gas companies in general.

❖

About 2,000 tons of gas coal have been taken from the storage pile at East Station to help out the fuel situation at Station 3.

Recent Accidents

Mr. Herman A. Smith, of the Canandaigua Gas Light Company, was pushing a wheelbarrow up a plank to a coke pile when the wheelbarrow slipped from the plank causing Mr. Smith to strike his face on the coke. As a result a small piece of coke entered his eye.

Mr. M. J. Murphy, of the Line Department, was standing on the ground under a street lamp which was being changed. When the lineman on the ladder attempted to remove the burned out lamp the globe bursted, and a particle of glass entered Mr. Murphy's eye.

Mr. Wm. Sutherland and Mr. Harry J. Eckerson, of the Electric Construction Department, had their face and arms burned quite badly by a potential transformer which exploded due to a short circuit which developed in it while they were phasing out a 4150 volt line.

Mr. W. E. VanEpps, of the Gas Street Department, was striking a chisel bar with a sledge hammer when his foot slipped on the pavement, causing the sledge to glance off the chisel and strike the instep of the foot, breaking five bones.

While walking through a cellar on his way to read a gas meter Mr. T. J. Mury, of the Meter Reading Department struck his face against a gas jet and received a cut under his right eye.

Mr. C. J. Decker, of the Canandaigua Gas Works, slipped on an icy plank while wheeling a barrow of coke and severely strained the muscles in his back.

Mr. John DeVelder, of the Electric Meter Department, strained his back recently while removing conduit from a building.

Mr. Richard Barry, of Station 3, had a piece of steel fly into his eye while drilling a hole with an electric drill inside of a boiler.

Personals

James F. Hamilton

Mr. James F. Hamilton, former General Manager of the Schenectady Railway Co., has been appointed General Manager of the New York State Railways, Rochester Lines, succeeding Mr. E. J. Cook.

Mr. Hamilton has been in the electric railway field since 1896 and in coming to Rochester, he becomes General Manager of the Rochester Railway and Light Company's largest electric power consumer.

Mr. E. J. Cook, former General Manager of the New York State Railways, Rochester Lines, has been appointed Chief Engineer of all lines of this system. Mr. Cook came to Rochester in 1907, having been identified with electric railroads since 1886. The combined system will now receive the benefit of Mr. Cook's expert railway engineering ability.

❖

Mr. A. M. Beebee has returned from his trip to Jamaica B. W. I.

Mr. E. Littlefield, tunnel inspector at Station 5, has resigned to take up other activities.

Miss Helen Damm, of the Meter Reading Group, spent Washington's Birthday in New York City.

President Andrews was in Rochester a few days last month looking after some street railway business.

Mr. Fred Klein has been appointed Inspector in the Employment and Safety Department.

Mr. Patterson and Mr. Durfee recently made a trip which included Chicago, Cleveland and Detroit.

Miss L. Rogers, of the Balancing Group, is confined to her home with a broken knee.

Mrs. Elizabeth Hamblett, of the Billing Group, has been transferred to the Relief Group.

Mr. Maurice Sheehan, machine man at the Gas Works, fell in front of his home recently and fractured his arm.

Miss Mary Killeen, of the Tabulating Group, who has been ill for the past ten days has been able to resume her duties.

Mr. Floyd Owen, a recent graduate of West High School, has been employed as assistant in the Employment and Safety Department.

Mr. Ward Reed, of the Billing Group, has resigned to accept a position with the Aetna Life Insurance Company as traveling auditor.

Mr. Kenneth Richmond, of the Construction Force at Station 5, returned to M. I. T. to complete the last term of his college work.

Mr. and Mrs. E. R. Crofts have been twice blessed. A boy, John William, Jr., arrived on February 15th and he promises to be an active playmate for his older sister.

Mr. and Mrs. C. G. Brown, (Laboratory) are very happy over the arrival of Lillian Grace Brown on February 20th. Lillian's brother appears very happy also.

Mr. Ray Stephany, of Co. G, 3rd New York Inf., having completed his term of three years under the National Defense Act, has been furloughed to the National Guard Reserve.

Mr. Henry Brill, of the Payroll Department, has left the Company to enter the employ of the Rochester Electric Supply Company. His position has been filled by Miss Marion Hoffman.

Mr. F. Doody, transferred from the Line Department to the Relief Group, filling the vacancy caused by the resignation of Mr. R. Guppy, who has accepted a position with the R. T. French Co.

Mr. Henry Reirdon, transferred from the Meter Reading Group to the Collection Group, to fill the vacancy caused by the resignation of Mr. Jos. Garin, who has accepted a position with the city as a water meter reader.

The Despatch Heat, Light and Power Company has secured rooms in the Clark Building, Fairport, where a display of gas ranges and other gas appliances will be shown in anticipation of the distribution of gas in that village; which will be well under way in the coming Spring. Mr. J. W. Brown, solicitor, will be in charge of the exhibit and will push the selling campaign in Fairport.

Miss Jeanette J. McGuire, daughter of Mr. and Mrs. J. W. McGuire, and Mr. Lester H. Miller of Station 6, were united in marriage on January 31st. Mr. and Mrs. Miller left for an Eastern trip, and after returning home they were very pleasantly surprised by the gifts presented to them by the boys at Station 6.

Miss Helen E. Zimmermann, formerly of the Stenographic Department, and Mr. George R. Bellis, of this city, were married on Wednesday, February 28th, at the bride's home, No. 259 Electric Avenue. Rev. F. F. Fry of the Church of the Reformation officiated at the ceremony which was witnessed by about twenty-five guests including those from out of town. Mr. and Mrs. Bellis left on a Western trip, and upon their return they will reside at 24 Bennett Street.

It's All in the State of Mind

If you think you are beaten, you are,
If you think you dare not, you don't;
If you'd like to win but you think you can't,
It's almost a cinch you won't.

If you think you'll lose, you're lost,
For out of the world we find
Success begins with a fellow's will;
It's all in the state of mind.

If you think you're outclassed, you are;
You've got to think to rise.
You've got to be sure of yourself before
You can ever win a prize.

Life's battles don't always go
To the stronger or faster man;
But sooner or later the man who wins
Is the man who thinks he can.

—Walter D. Wintle.

The Du Bois Press
of Rochester