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IN THIS NUMBER:

Illustrated Description of West Kootenay Power and Light Company's Plant.

CANADIAN ELECTRICAL NEWS AND STEAM ENGINEERING JOURNAL

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VOL. VIII. SEPTEMBER, 1898 No. 9.

LONG DISTANCE TRANSMISSION PLANT OF THE WEST KOOTENAY POWER AND LIGHT COMPANY.

THE falls of the Kootenay river, known as Bonnington Falls, in British Columbia, that have for some long time been an attractive field for the development of power, have now been harnessed and the power transmitted electrically to Rossland, the mining centre of the Kootenays, situated 30 miles distant.

Bonnington Falls is an ideal site for such a plant, the river at this point being 400 feet wide, while the water rushes over a high granite cliff, having a fall of 50 feet. At this point the Selkirk mountains rise to an elevation of over 3,500 feet above the sea level, the altitude of the river itself being about 2,200 feet, and the beautifully snow-capped peaks of the rugged range form one of the many charming and picturesque features that surround this extensive enterprise.

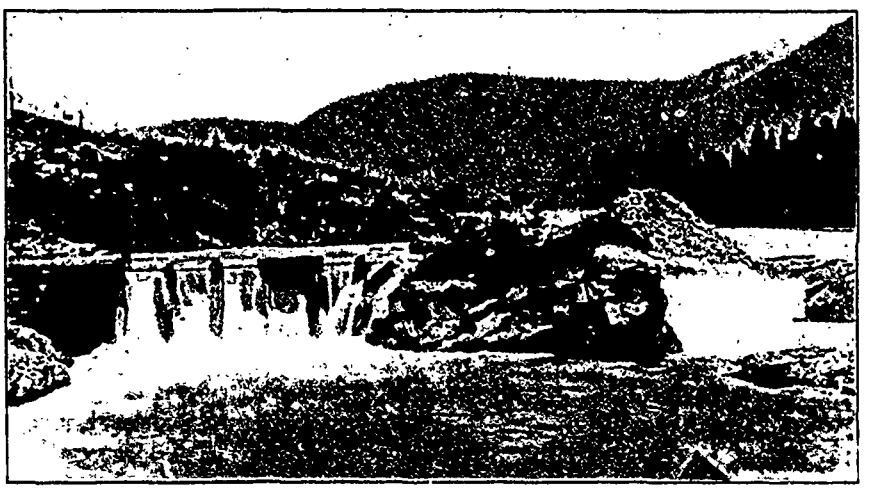


FIG. 2.—WOODEN DAM, SITUATED ABOVE CONCRETE DAM.

The determination to utilize the water power at Bonnington Falls for the development of power led to the organization of the West Kootenay Power and Light Company, which has installed and is now operating the interesting transmission plant about to be described.

The conception and commencement of the works are largely due to the efforts of Mr. Oliver Durant and Sir Charles Ross, Bart., the former as president of the company and the latter as director and engineer, in which capacity he devoted considerable time to the careful study of the engineering and financial problems involved.

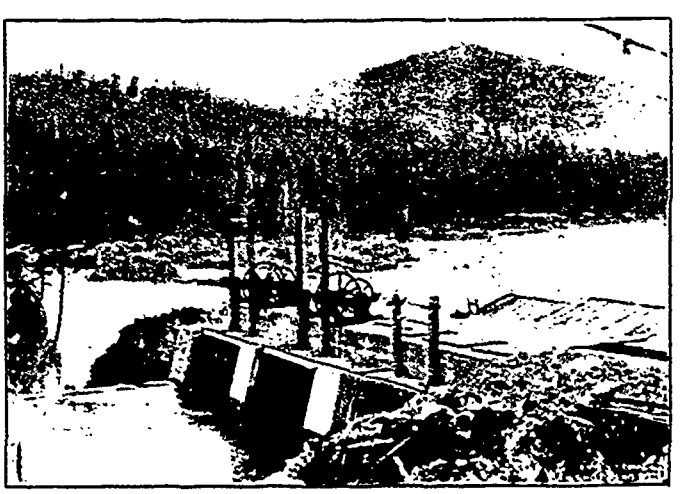


FIG. 1.—CONCRETE DAM, SHOWING HEAD-GATE IRONS.

The charter was obtained in the name of Patrick A. Largey, president of the Centre Star Mining and Smelting Company, Oliver Durant, manager, and C. R. Hosmer, manager C. P. R. Co.'s Telegraphs, and was afterwards transferred to the West Kootenay Power and Light Company.

Primary surveys were made early in 1897, but it was July of that year before the location of the plant was definitely settled and actual construction begun. The plans of the company contemplate the ultimate utilization of the entire three falls, which will give 60,000 h.p., the middle fall now being used developing 20,000 h.p.

POWER HOUSE.

The power house, shown on following page, is located on the west side of the dam. The foundations are built of cut granite; the walls of brick; the roof is of wood covered with galvanized iron; the station is 40 feet long by 60 feet wide, outside measurement, giving accommodation for two 725 k.w. and one 1,200 k.w. units directly coupled to horizontal water wheels. The height of the building from floor to ridge of roof is 40 feet, thus allowing ample room overhead for the handling of the machinery.

HYDRAULIC PLANT.

The dam, as shown in figure 1, extends across the end of the canal for a width of 60 feet. From the south corner of this dam the wing dam extends a distance of 120 feet, this being constructed of concrete, forming one side of the fore bay, which is also shown in figure 1. There is a rack in the fore bay extending the full width of the dam, and the water, after passing through this, enters the penstock, and from the penstock flows to the water wheel casing, which is really a continuation of the penstock flowing from the draught tubes into the tail race underneath the water wheel house.

From the main water wheel casing there is tapped a 26 inch pipe, which conveys the water to a 50 h.p. horizontal wheel, which is used for running the exciter. The head has a maximum of 42 feet and a minimum of 34 feet.

WATER WHEELS.

The main water wheels for this plant were furnished by the Stilwell-Bierce and Smith-Vaile Company, of Dayton, Ohio, and are of their well-known Victor type. There are two pairs of 39" horizontal wheels in each case, which are connected directly to each generator shaft. These wheels are designed and guaranteed to develop 1,180 h.p. per set. In addition to the wheels just described, there are two pairs of 12 inch wheels of the same manufacture used in operating the exciters for furnishing the exciting current to the three phase generators in the station. The governors were also furnished by the Stilwell-Bierce and Smith-Vaile Company, and are of the Geisler type, driven by a belt connected on a small pulley on the water wheel shaft. Each governor operates the gates for each set of two wheels.

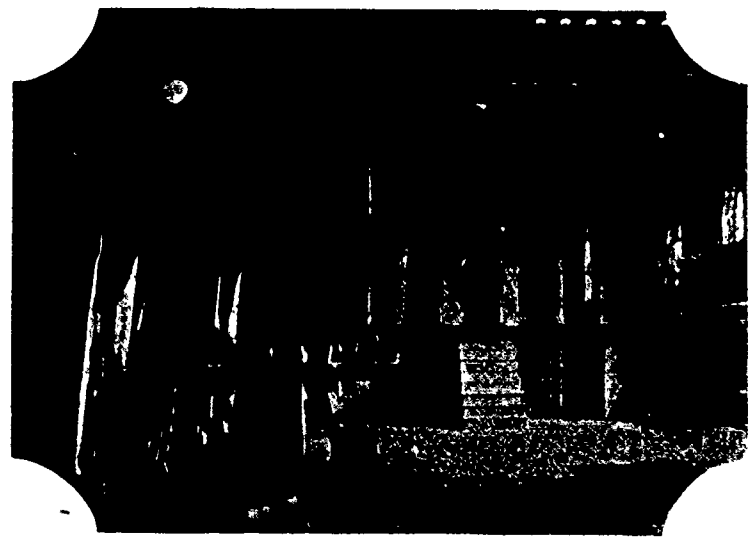


FIG. 4.—INTERIOR OF GENERATING STATION.

ELECTRICAL APPARATUS.

All of the electrical apparatus installed is of the Canadian General Electric Company's manufacture. In the generating station there are at present installed two 725 k.w. three-phase generators of the revolving field type, having 40 poles and operating at a speed of 180 r.p.m., giving frequency of approximately 60. These machines are shown in figure 2. They are of the well-known Canadian General Electric Company's type, with pole pieces built of laminated iron thoroughly insulated from each other by a coating of japan.

FIG. 3.—POWER HOUSE.

The pole pieces, field coils and armature coils are arranged in such a manner that the windings may easily be removed without disturbing the armature or the magnet yoke. The field windings are wound on bobbins and thoroughly insulated with oiled linen. The armature is of the stationary type and thoroughly ventilated by means of air ducts ¼ inch wide. The armature laminations are dove-tailed into the spider, thereby dispensing with the use of bolts through the core.

The bearings of these machines are of the self-oiling, self-aligning type, and the sleeves of cast iron lined with genuine babbit metal. The base frame of these machines is so constructed that the armature may be moved parallel with the shaft in order that the field and armature may be repaired without tearing down. The approximate weight of the revolving field is 27,000 lbs., the complete weight of each machine being 96,000 lbs. The generators are designated as A T 40-725-180, shunt wound, 1,100 volt generators.

The current is generated under a pressure of 1,100 volts and is conducted from the generator to the machine panels and from the machine panels to the transformer panels; from the transformer panels it is conducted to the primary side of the transformers and stepped up to either 11,620 volts when delta connected, or 20,100 volts when Y connected.

From the high tension side of these transformers the current is conducted to the high tension switches on the transformer panel, passing from there to the line panel, and thence to the line.

The transformers are of the air blast type, of 242 k. w. capacity each. There are at present installed two sets of three, which is ample to take care of the full current output of the generators. As a means of cooling, two 60" Buffalo blowers are used, the air from these being conducted through brick air ducts to the transformers.

Everything in connection with the power house is fire-proof in every respect.

THE POLE LINE.

The pole line is of a very substantial type of construction, being of round timber of specially selected cedar. The poles vary from 30 to 65 ft. in length, according to location. They are set 100 feet apart, or 50 to the mile, all corners and curves being properly guyed. A right of way 100 feet wide has been cleared

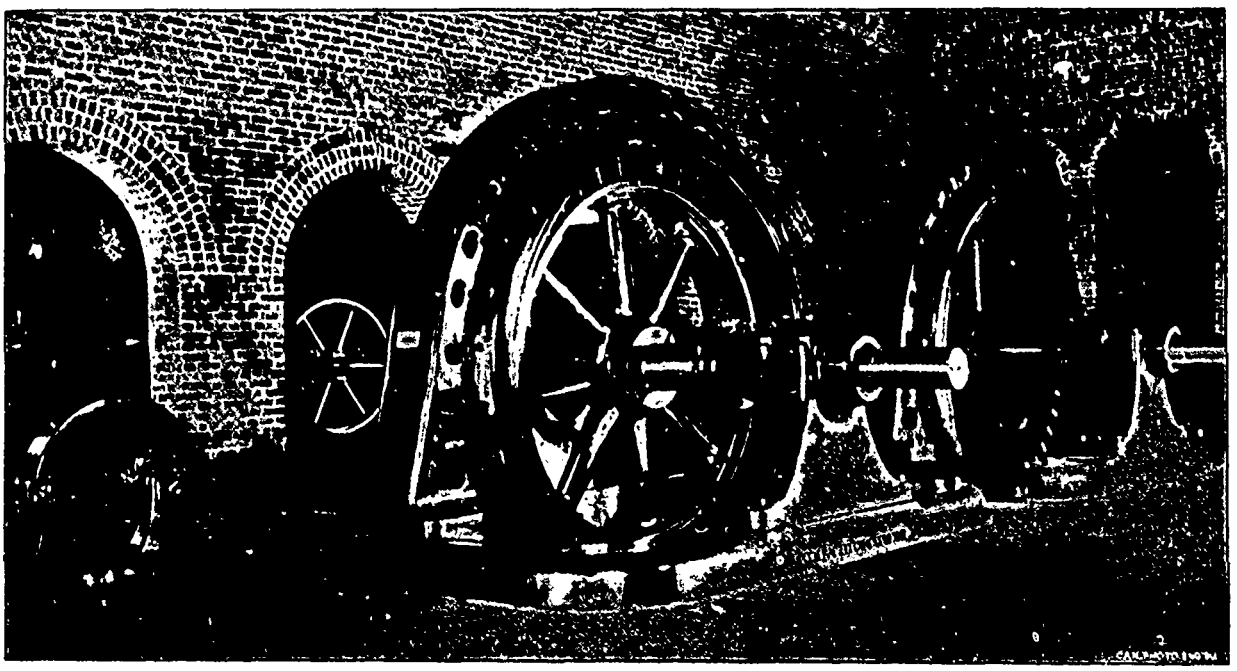
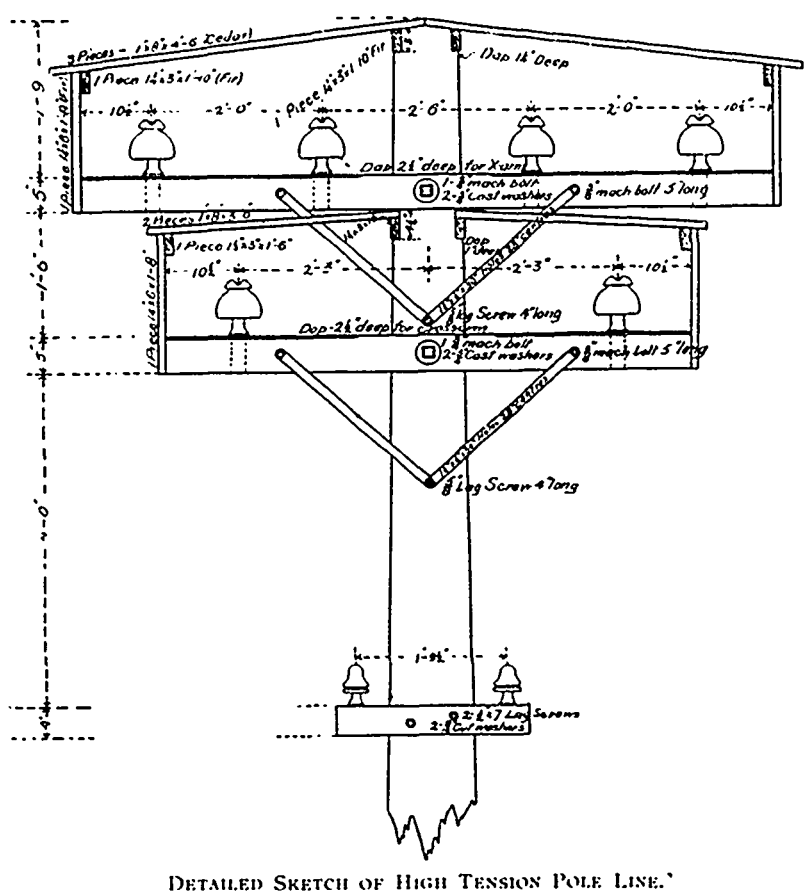


FIG. 5. VIEW OF GENERATORS AND EXCITER.

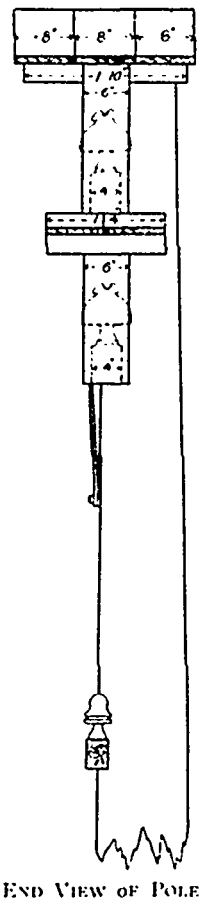
throughout the whole route, which is heavily wooded.

The construction of the pole line embodies all the best features of most improved practices in transmission work, as shown by the accompanying sketch, giving all the dimensions and details of the construction throughout. The reader will observe that the pole line has a housing 24 inches wide on each pole. On account of the many mountains encountered it was impossible to obtain a hanging insulator of sufficient mechanical strength to withstand the strain, and consequently the only way to overcome the difficulties encountered by wet snow was by the use of housing boards, as shown.

From the time winter sets in there is no wind whatever, and as the snow is of a very wet nature it piles up to a height of two feet on a cross arm 4 inches wide, remaining in this position until relieved by a chinook wind, characteristic in the western country. A single three wire, three phase circuit of No. 2 medium hard-drawn copper of Dominion Wire Company's manufacture extends from the power house to the sub-station at Rossland, a distance of 30 miles by the pole line.



DETAILED SKETCH OF HIGH TENSION POLE LINE.



END VIEW OF POLE LINE.

The following shows the material required for one pole:

Two machine bolts, diam. ¾ in., length 14 in., thread 4 in. long, galvanized; 4 machine bolts, diam. ⅜ in., length 5 in., standard, galvanized; 2 lag screws, diam. ⅝ in., length 4 in.; 2 lag screws, ½ in., length 7 in.; 4 wrought washers, diam. 7 16 in.; 2 wrought

washers, diam. 9 16 in.; 4 cast washers, diam. 13 16; 4 cross-arm braces, 1 1/4 in. × 1/4 in. × 30 in., holes 28 in. centres; 6 high potential insulators; 2 S.P.E.L. insulators; 6 locust top pins, shanks 2 in. diam., 5 in. long, standard top; 2 oak top pins, 1 1/2 in. standard; 1 fir cross-arm, 4 in. × 5 in. × 8 ft. 3 in.; 1 fir cross-arm, 4 in. × 5 in. × 6 ft. 3 in.; 1 fir cross-arm, 3 in. × 4 in. × 2 ft. 3 1/2 in.; 6 pieces cedar, 1 in. × 8 in. × 4 ft. 6 in.; 4 pieces cedar, 1 in. × 8 in. × 3 ft.; 4 pieces fir, 1 1/4 in. × 6 in. × 1 ft. 8 in.; 4 pieces fir, 1 1/4 in. × 3 in. × 1 ft. 10 in.; 4 pieces fir, 1 1/4 in. × 3 in. × 1 ft. 6 in.

The telephone line, placed four feet below the lower cross arm, is of No. 12 B. & S. hard-drawn copper, transposed every pole. The insulators used are of the type C and Redlands type, while the pins are locust, boiled in paraffine.

SUB-STATION.

In the sub-station is installed a full complement of transformers, similar to those already described. These are wound for a secondary voltage of 2,200, it being the company's intention to distribute at this voltage, and step down a second time where a lower voltage is required.

In the sub-station there is installed the necessary high tension switchboard apparatus, as well as the 2,200 volt distributing board. On this distributing board is mounted total output ammeters, as well as ammeters and volt meters for the different outgoing circuits.

The switchboards throughout are composed of blue Vermont marble panels of the Canadian General Electric Company's well known interchangeable type.

The plant has now been in successful operation for the past two months, and although very severe lightning and rain storms have been of common occurrence, not the slightest difficulty has presented itself, when operating under a pressure of 22,400 volts. Several lightning discharges have frequently entered the generating and sub-stations, but these discharges were promptly taken care of by the banks of the well-known Wirt lightning arresters installed.

The personnel of the directorate of the West Kootenay Power and Light Company is: C. R. Hosmer, manager C. P. R. Co.'s Telegraphs, Montreal; Frank Paul, Belding, Paul & Co., Montreal; W. M. Doull, Doull & Gibson, Montreal; Sir Charles Ross, Bart., Balnagown, Scotland; Oliver Durant, J. B. McArthur and John M. Smith, Rossland. The entire plant is under the personal management of Mr. L. A. Campbell.

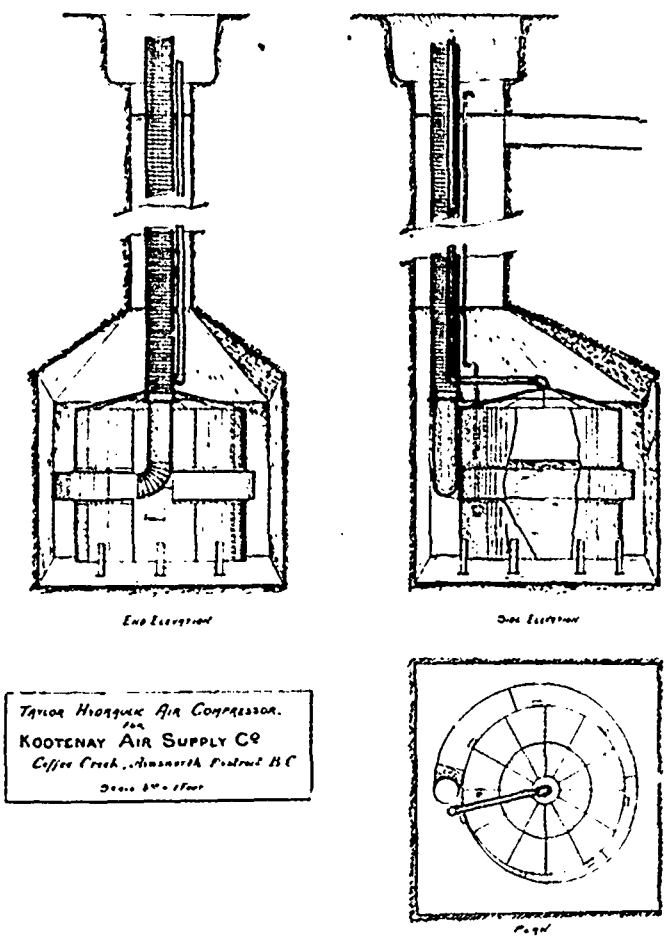
The Canadian General Electric Company have received an order from the corporation of New Westminster for one of their 150 kilowatt monocyclic alternators.

In the colliery districts of Derbyshire and Yorkshire, according to an English exchange, an electrical scheme on a colossal scale has been initiated. It is proposed to supply electricity for lighting, traction and other purposes to a district covering 2,000 square miles, and including the important cities and towns of Sheffield, Rotherham, Lincoln, Gainsborough, Newark, Nottingham, Ilkeston and Worksop. The generating station is to be at Worksop, which is in the midst of a great colliery district, where slack is plentiful at 2s. per ton.

COMPRESSED AIR PLANT AT AINSWORTH, B. C.

As a means of delivering power in long distance transmission, compressed air has lately been brought forward as one of the most economical systems, its advocates claiming advantages therefor over electric power. That our readers may understand the method of operation of a compressed air plant, and be in a position to compare the two systems, we print herewith illustrations and some particulars of the plant installed by the Taylor Hydraulic Air Company at Ainsworth, B. C., for the Kootenay Air Supply Company.

The system of utilizing compressed air is simple, its object being to supply air, uniformly in quantity and degree, by means of falling water. It relies upon the principle that falling water will entrain air and carry it down, producing compression as depth is increased, no moving machinery of any kind being required.



Coffee creek, upon which the works of the Kootenay Air Supply Co. have been constructed, is about two miles from Ainsworth, one of the oldest working mining camps in British Columbia. The creek is a rapid stream, with a flow of from 2,500 cubic feet to 8,000 cubic feet per minute, and a fall at point of utilization of one in ten. A dam, 5 feet high, has been built across the stream, and the water is conducted in a stave barrel flume 5 feet in diameter. The total length of the flume is 1,354 feet, and the pressure on same varies from five to ten pounds, dependent on the height of the stream. This flume, which is constructed with iron rods, cost about $1.25 per foot, exclusive of grading. From the flume the water runs into a receiving tank, which stands on a trestle 110 feet above the surface of the stream at the point where the discharge takes place. From the bottom of the receiving tank, a pipe, 2 feet 9 inches in diameter, descends perpendicularly from the trestle to

the ground, and then down a shaft, which is sunk below the level of the creek at the point of discharge, another 105 feet. This shaft is 200 feet in length. It is called the down-flow pipe, and is terminated at the bottom of the shaft by a large bell-shaped tank, which is open at the bottom to allow the water to escape. The water is received through the flume into the upper tank, where it rises approximately to the level of the water in the creek at the point at which it is tapped by the flume.

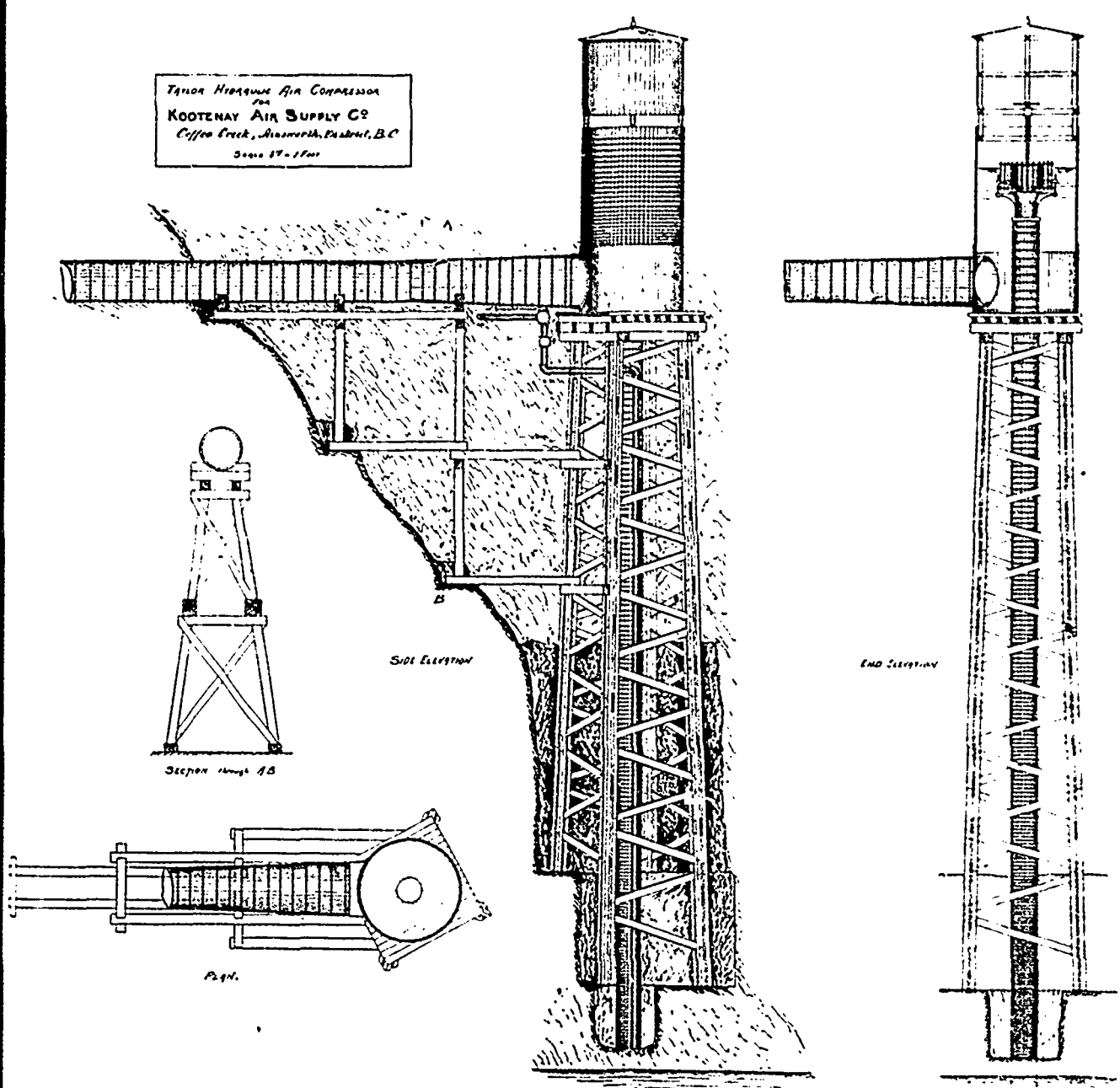
In flowing from the receiving tank to the down-flow pipe, the water passes over the orifices of a number of small tubes, which at their upper end communicate with the atmosphere; hence, the atmospheric pressure drives the air into the water in innumerable small bubbles, which are carried by the water down the flow-pipe into the receiving tank. During their downward course with the water, the bubbles are compressed, the final pressure being proportional to the column of return water sustained in the shaft and tail-race. The head under which this plant will operate is 107 feet from the level of the water in the tank to the level of the water in the creek, and the back pressure of the rising water in the shaft will equalize the pressure in the down-flow pipe, so that the severest pressure at any point on the down-flow pipe will not exceed 60 lbs.

The capacity of the receiving tank in the plant of the Kootenay Air Supply Company is 533 cubic feet. It is 17 feet in diameter and nearly 20 feet high. The down-flow pipe penetrates some seven or eight feet into this tank, there entering a basin contained inside the tank, where the bubbles in the water delivered rise to the surface, and the air and water are separated. The water passes out through the bottom of the tank, rises to the top of the shaft, outside of the down-flow pipe, a height of about 100 feet, and discharges itself again into the creek at a point about 100 feet lower down than that from which it is taken by the flume. The compression of the air contained in the receiving tank may be practically taken as that produced by the weight of water in the shaft outside the down-flow pipe, every 27½ inches of which accounts for a pressure of one pound per square inch.

The main pipe for conducting the compressed air taps the receiving tank at its highest point, and from the main service pipes conveys power for considerable distances for drills and other mining machinery in the vicinity. The plant is said to automatically regulate itself by means of a pipe led upwards until it reaches the level of the water in the tail-race, so that when more air is being compressed than is required, the water in the tube is ejected, and air passes up the pipe until the level of the water in the receiving tank is again higher than the opening of the tube.

The air is being delivered at a pressure of about 90 pounds, and is carried through a nine-inch main for two miles to the centre of distribution. It is claimed that this pipe line will convey between 400 and 500 horse power with a loss of not more than 10 per cent., and that it will discharge 4,600 cub. ft. of free air per minute.

The Kootenay Air Supply Company are said to be selling power for air drills, on the 24-hour run, at $3 per day, and it is estimated that an air drill will consume from 80 to 120 cubic feet of air per minute. The total cost of the plant is given as $30,000.



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Competition in the Electrical Field.

ESTABLISHED and reputable electric lighting and power companies have suffered much injury in the past by the operations of persons who, with little or no knowledge of the business, have proceeded to organize companies and enter fields already thoroughly exploited, slaughtering prices on all sides. There have been instances in Canada where, in towns of two thousand population, a new company has started up in competition with an existing company, the invariable result being disaster to both. In larger towns and cities conditions are to a large extent the same. The imaginary profits which electrical companies are supposed to be making, and a lack of knowledge of the expense and difficulty entailed in the operation of an electric plant, are probably the incentives which induce the promoters of new companies to invest their money in competitive undertakings. They give little consideration to the conditions as they are experienced after the franchise is secured and the plant put into operation. Then they find that the operating expenses are heavy, that maintenance and insurance represent a considerable expenditure, and that owing to variation in the load, characteristic of both lighting and power, a greater capacity in machinery must be installed than would otherwise be found necessary. There are few, if any, electrical plants in Canada paying more than a fair dividend on the capital invested, and until the cost of installation, operation and maintenance is reduced, electric light and power cannot fairly be sold at a price much lower than at present. There are, however, towns and villages in Canada in which electricity has not yet been introduced, and which would seem to offer more promising returns to prospective companies.

Peat Fuel.

IN this issue some particulars are given of the steps that have been taken looking to the employment of compressed peat as fuel. The development of this industry has been watched with keen interest, but until recently the success attained was not encouraging to the persons interested. It is said that as early as 1866 air-dried peat was used upon the eastern division of the Grand Trunk Railway, but because of the bulk and uncleanliness of the crude material, its use was discarded. It would now seem that a process has been perfected which overcomes many of the difficulties previously met with, and unless unforeseen obstacles arise, there would seem to be a promising future for the industry. It is indeed gratifying that a Canadian is again to the front with patents, covering not only Canada, but also Great Britain and the United States, for the utilization of what has heretofore been a waste product. The experiments made with compressed fuel under Mr. Dickson's patents have given exceptionally good results, showing the material to be equal to anthracite and greatly superior to slack coal, while it certainly possesses advantages, such as less smoke and ash residuum and practically no offensive gases. Steam users will welcome the advent of any innovation the object of which is to place upon the market, at less cost, a fuel equal to or better in quality than coal. The cost of coal, due in a large measure to high freight charges from the United States, has greatly retarded the development of the natural resources of Canada and checked enterprises which, under more favorable circumstances, would have given employment to a vast number of workmen. With a cheap and satisfactory

fuel at our doors, we may reasonably anticipate the greater development of our mines and the establishment of smelting works and other industries which are dependent on cheap fuel. It is yet somewhat premature to attempt to forecast the effect which the discovery of this process of manufacturing compressed peat fuel may have upon the electrical industry, but it would appear as likely to result in the greater employment of steam in competition with water power.

Future of the Storage Battery.

THE storage battery is to-day regarded with much less skepticism than a few years ago. As with all innovations and new inventions, practical demonstrations were required to convince an incredulous public that the principles involved were capable of practical application. With the growth of the storage battery industry has come a vast improvement in apparatus, in keeping with the advancement made in other branches of electrical work. Referring to recent developments in the applications of storage batteries, Mr. Joseph Appleton, in a paper read before the Engineers' Club of Philadelphia, points out that the Chicago Edison Company have installed a storage battery plant, the plates of which weigh over one million pounds, being capable of delivering 2,000 horse power for one hour. As showing the connection of the storage battery with the development of water powers for the generation of electricity, he cites the installation of a plant by the Buffalo Street Railway Company, operated in connection with a booster, which compounds it to any desired extent. Other fields in which there would seem to be a future for the storage battery are for furnishing power for car lighting, elevator service, telephone exchanges, and electric vehicles. There are certainly indications that the era of the electric carriage is near at hand, and that the next few years will witness a considerable development along this line in Canada. Proof of this is found in the appearance on the streets of Toronto of an electric delivery waggon, used for a commercial purpose only, and driven by two motors controlled by storage batteries.

The Kootenay Power Plant.

THE electrical development of the water power of the Kootenay river at Bonnington Falls, in British Columbia, and the successful inauguration of the plant, marks another step in the advancement of the electrical industry in Canada. This plant has been in operation for a sufficient time to demonstrate its thorough practicability, the machinery having moved with perfect smoothness from the beginning. While in general design the plant of the West Kootenay Power and Light Company does not differ from others installed in Canada, as for instance, one at Goldstream, in the same province, yet there are certain features in connection with its construction and operation that are quite unique and interesting. From an engineering standpoint the most characteristic feature is the method employed for the protection of the pole line from the climatic conditions peculiar to British Columbia. As is well known, the snow is of a wet, sticky nature, which, with the absence of wind, necessitates the construction of housing boards over each pole to protect the insulators and prevent short-circuiting. Two points in connection with the operation of the plant represent comparatively recent developments in the science of electricity in Canada. One is the high voltage employed, and the other the distance to which the current is transmitted. The use of such a high voltage as 22,000 is now considered quite feasible, owing to improved methods of insulation and the perfecting of safety devices, while the lessening of the loss in the line has rendered it practicable to transmit the current a distance of thirty miles, which is the length of the transmission of the plant in question. Almost simultaneously with the starting up of this plant, the machinery of the Cataract Power Company, of Hamilton, was also set in motion, the current being generated under a pressure of 22,500 volts and carried to a transformer station thirty-five miles distant, for distribution. These two plants, it is believed, will prove to be only forerunners of many other similar installations in Canada, some of which are expected to take definite shape at an early date.

ELECTRICAL EXHIBIT AT TORONTO EXHIBITION.

ONLY four electrical companies are this year represented in the machinery building at the Toronto Industrial Exhibition. Entering the building from the east we find the Royal Electric Company, of Montreal and Toronto, occupying their usual space, with a creditable exhibit under the superintendence of Mr. A. E. Payne, of the sales and engineering staff of the company. In their space proper, about 50 by 40 feet, they show one 75 k.w. S.K.C. dynamo, twenty 60 k.w. and one 40 k.w. dynamos, a full line of direct current motors and S.K.C. alternating current motors, together with transformers, street car motors and controllers, alternating current arc lamps, incandescent lamps, lightning arresters and switches, and a line of beautiful ammeters and voltmeters, made entirely of porcelain and glass, which are attracting much attention. There is also a fine marble switchboard, fitted up with all necessary instruments, including the latest novelty in the way of high tension switches, being a sliding contact switch, which is regarded as a vast improvement over the former style. A pyramid of rubber covered wire of different sizes is also exhibited in this space. In another part of the building the Royal Electric Company have in operation one type B 60 k.w. S.K.C. dynamo furnishing current for their exhibit, and two 50 light T. H. arc machines, supplying current to 100 arc lamps of 2,000 c.p. on the grounds and in the buildings.

The W. A. Johnson Electric Company are located in the same space as last year and have an attractive display, the feature of which is a 45 k.w. inductor alternator which the company have lately placed on the market. It has a steel frame, a new style of base, and a two coil field, giving perfect magnetic symmetry and inherent regulation. It has no commutator or collector rings, and there is an entire absence of heating. Two other machines are also in operation, furnishing current to incandescent and arc lamps and for power purposes. Transformers, motors, switchboard apparatus, electric fan, etc., complete the exhibit.

The Electrical Construction Company, of London, Ont., have on view their latest type of multipolar dynamos and motors. These they claim are second to none, their dynamos being especially adapted for direct current isolated lighting, and showing an efficiency in actual work of 90 per cent. Bipolar types are also exhibited, as well as a complete line of electrical supplies.

Motors, dynamos, telephones, switchboard and instruments, lamps and electric fans comprise the chief features of the display of the Jones & Moore Electric Company, of Toronto, who are gradually working their way upward in the electrical field.

CANADIAN ASSOCIATION OF STATIONARY ENGINEERS.

NINTH ANNUAL CONVENTION.

UPWARDS of fifty delegates were present at the ninth annual convention of the Canadian Association of Stationary Engineers, which opened in the Oddfellows' Hall, John street north, Hamilton, on Monday, August 8th last, at 11 o'clock a.m. Mayor Colquhoun, on behalf of the City Council, delivered an address of welcome to the engineers, expressing the hope that a successful meeting would follow. Aldermen Carscallen and Nelligan also spoke, endorsing the sentiments of the Mayor. The latter gentlemen, after reading the Association's preamble, advised careful consideration on the part of the engineers in their legislation. On behalf of Hamilton branch No. 2, the President, Mr. Robert Mackie, extended a hearty welcome to the delegates. The above felicitations were acknowledged by Mr. E. J. Phillip, Executive President, of Toronto, who appointed a committee, consisting of Messrs. Jas. Ryan, A. M. Wickens and W. G. Blackgrove, to draft a reply of thanks. This committee prepared the following response, which was afterwards forwarded to the Mayor:

"We, as a body of engineers, extend to you our hearty appreciation of your cordial and kindly address of welcome to your pleasant and prosperous city at our ninth annual convention.

"We, as a body of workingmen, do not believe in the furtherance of strikes or labor troubles of any kind. We are organized for educational purposes, in order that our employers may be benefitted thereby, and thus ensure for them efficiency, carefulness and stability to reduce operating expenses generally. It is our aim to advance the interest of those by whom we are employed. It may be interesting for you to know that there are members of this association who are worth 100 per cent. more to their employers to-day than they were ten years ago, thus showing that their admission to the society was to their benefit as well as to that of their employer.

"It is not our intention to laud our society as being the best on earth in regard to benefits, such as insurance, sick benefits, etc., but we do maintain that our society is the best organized for the advancement of its members in their calling.

"We are pleased to meet in your beautiful city, and trust that our meeting here may be beneficial to you and the manufacturer and steam user, as well as to ourselves, and hope that we may meet here again some time in the future.

"We wish to thank you for the hearty reception you have accorded us, and we assure you that we feel entirely at home here. We shall endeavor to conduct our business in the best manner possible, and trust our deliberations may be profitable to one and all.

THOS. RYAN, Montreal.
A. M. WICKENS, Toronto.
W. G. BLACKGROVE, Toronto."

PRESIDENT'S ADDRESS.

The President, Mr. E. J. Phillip, then read his annual address as follows:

I have the honor and pleasure to welcome you to this, the 9th annual convention of the C.A.S.E. The subordinate associations have chosen you to represent them at this convention, and to look after their individual interest in particular and the whole society in general. The second meeting of the executive—it was really the first, the previous one being only a meeting to get into shape—was held in this city, and I little dreamed at that time that I would occupy the president's chair at the next meeting in Hamilton; therefore, it is with pleasure that I greet you, the new members and the jolly good fellows I have met before.

While this meeting should be a criterion by which we can judge the growth of the association, we must not forget the conditions under which the C.A.S.E. is carried on. First, it is not a labor organization, nor is it an insurance society, and it cannot be called a secret or benefit society, nor is it a political or religious order; it is purely an educational institution. Therefore the growth of the order is limited for several reasons. We have not the attraction that insurance, secret, benefit or labor organizations have. The field from which we draw our members is limited and scattered, and there are few places where there are plants enough to get a number of engineers to join an association; another reason is the fact that as boys at school hate to be taught, so we grow up, and it is hard to get a man to realize that he has much to learn, and as education is the only object for joining the association, some object to letting the public know that there is anything yet for them to learn. Now, while the growth of the order is apparently small, at the same time the percentage of good done its members is much greater than any other order that I know of, as many can testify to. We meet again here this year to try and work out other ideas for the benefit of the order and each member individually.

I hope you will all give your attention to the business that will come before you, that our meeting here may result in profit to ourselves and prosperity to the society. The prospects for the coming years are brighter than for years past; times are good in this country, and when the war is settled the big country to the south of us will brighten up and their prosperity will add to ours. So that if we have grown in the past few years we will boom in the next. Hard times have had their effect on this order like all others, but hard times are a thing of the past in this country, and will be for some time to come, if I am any prophet, and if those who have been the stay of the association in the past will keep on pushing they will reap the harvest they have been looking for.

Better work has been done in the subordinate associations during the past year, in the line of reading papers and making the meetings entertaining and instructive, than other years; and it is noticeable the improvements in lodges where this matter is thoroughly carried out. I am pleased to state that Hamilton No. 2 is carrying this work out to perfection. There was one new association formed during the year in Toronto. It is a good live association and will materially help the order in Toronto and vicinity. The matter of a hand-book taken up last year was completed this. The secretary will no doubt make you a full report on the matter. I have not had the time to give to executive business that I would like, from the fact that this has been the busiest year with me that I ever experienced, in fact, it was very difficult to get away to attend this convention; in consequence of this the work has all devolved on the secretary, and, as in past years, the secretary is by far the most important officer of the executive. So much so that it has been suggested that a permanent secretary be appointed, or at least have the secretary hold office for more than one year. As it is now, it takes a man the entire year to get accustomed to the work, and then he is changed, making confusion and loss of time to both executive and subordinate lodges that would be avoided by a permanent secretary. In conclusion, brethren, I hope you will give me the support that you have given the chair in the past, and that you will attend strictly to business while there is business to be done. I wish it were in my power to do all for the C.A.S.E. that I would like, and place it at the head of all societies, where it belongs, because it is founded on education.

After the reading of the above address, the minutes of the last annual meeting, held at Brockville, were read and confirmed. The following committees were appointed:

Credential Committee—George Mackie, Peter McNaughton, George C. Mooring.

Audit Committee—W. J. Webb, Peter McNaughton, Wm. Bear.

Constitution Committee—Thomas Ryan, G. C. Mooring, Wm. Allen, Thos. Pilgrim, George Mackie.

Good of Order Committee—J. M. Dixon, W. F. Chapman, Thomas Eversfield, G. C. Mooring, J. J. Richardson.

Mileage Committee—R. C. Pettigrew, Joseph Robinson, John Fox.

Notice was given by a Toronto delegate that he would move that several minor changes be made in the constitution of the Association, after which the meeting adjourned until 10 a.m. the following day.

SECOND DAY.

After the roll call, Mr. J. G. Roberson, Secretary, of Montreal, read his annual report, which stated that during the year two associations, viz., Stratford and Wiarton, had been reorganized, and were now in a prosperous condition. The Treasurer reported that the total receipts for the year were $559.99, and the balance now in the treasury $290.04. No returns could be made regarding the hand-book issued by the Association until next year. It was likely to prove a financial success. Some discussion arose regarding the proposition to reduce the per capita tax from 70 cents to 50 cents a member, which was defeated. The above reports, as well as that of the auditor, were adopted.

A discussion followed on several proposed alterations to the by-laws. The proposal to do away with the offices of door-keeper and conductor was defeated, as was also the amendment to article X, which recommended that the executive officers do the work of the district deputy. It was decided to allow past-presidents the privileges of the convention, but that they should receive nothing for expenses. The Educational Committee presented its report.

On motion of Mr. J. M. Dixon, seconded by Mr. W. F. Chapman, it was resolved that the Executive Secretary should be appointed for two years instead of one. A proposition that the convention be held bi-ennially instead of annually in future was defeated. Mr. J. D. Taylor, of the International Correspondence School of Scranton, Pa., addressed the meeting, after which a resolution was passed recommending the school to all stationary engineers.

In the afternoon the visitors enjoyed a sail on the steamer "Acacia," and in the evening, at 8 o'clock, again assembled for business. Mr. E. G. Barrow, city engineer of Hamilton, presented a paper on "Sewage Disposal Works." Mr. Barrow briefly described the various methods of purification, and gave some interesting particulars of the sewage disposal works recently completed for the city of Hamilton under his supervision. A paper on "Oils in the Engine Room" was read by Mr. J. S. Williams, chemist. This paper was to a large extent a reconstruction, with some additional data, of a paper read before the Hamilton Association last spring, and which has already appeared in this journal. An interesting discussion followed relative to the various classes of oils, and their special uses. The following paper was read by Mr. P. McNaughton, of Montreal:

EVAPORATION AND THE RAISING OF STEAM IN BOILERS.

By P. MacNaughton.

From the title of this paper you will notice that it is to deal with two things: First, evaporation, and second, the making of steam in boilers. These two actions are often considered as if they were distinctly different, but I think it can be shown that the actions are the same in the end, and that they differ only in the way in which the end is reached. In the following remarks it will be noticed that I have tried to show how the natural action of evaporation resembles the action of making steam for power, because it is always instructive to think out how the processes which we make use of every day compare with corresponding ones in nature. Some have said that it is wasting time thinking of things in this way; if they really think so it would be wasted time; but to others it would be very instructive and pleasurable. I might say that such thoughts would be to them as salt, which, though of little use in itself as a food, still makes our food more palatable. Strictly speaking, the term evaporation is used to denote nature's method of changing water into vapor, and making steam in boilers is part of man's method of changing water into vapor, through an intermediate state familiar to all of us called steam.

The principal actions in nature in which evaporation plays a part have been noticed by all of us; they are the disappearing of the dew from the grass on a summer morning, and the frost later in the season, the disappearing of water when left standing in open vessels, and on a much larger scale the raising of water from our rivers, lakes and surrounding ocean. Now, it is usually admitted that for every action there is a cause, and the cause of evaporation in nature is the heat of the sun. It will make our problem much simpler if we consider, for instance, a bucket of water as made up of a great number of particles of water. That this is the real state of water will be seen at once if we remember that when heat is applied to water it forms steam, which is particles of water visible to the eye, and if heat be applied to steam the particles of steam are divided into smaller particles called vapor, which is invisible.

Atmospheric air, among other things, contains a certain amount of water vapor, and this water vapor as long as the sun is shining, is kept suspended uniformly through the atmosphere by the sun's heat. When the sun has set and its heat no longer acts on the atmosphere, this water vapor tends to condense to a slight extent, and with this condensation it becomes slightly heavier than the other components of the air, and so tends to sink towards the earth, so that in a calm, clear night in summer that part of the atmosphere lying next the earth contains more moisture than that which is higher up.

That the above statement points out the true state of the atmosphere at night is proven by noticing the land fogs. If we go up a mountain at the first of daylight on a calm, foggy morning, we will notice that as we ascend the fog becomes less dense until, when we have gone up about four or six hundred feet, we will be out of the fog altogether.

This layer of moist air coming in contact with the cool leaves of trees, plants or other vegetation, the water vapor which it contains is further condensed, thus forming dew. I wish it to be clearly understood at this point that the collecting of dew on the leaves of plants is owing to condensation and not to a falling of water as rain. The fact that dew only gathers on the top side of the leaf and does not collect in our houses even if all the doors and windows are open is owing to another action which has no bearing on the subject in hand.

Now we come to evaporation or the disappearing of the dew. We have the air in two layers, the moist one lying near the earth and the dry one higher up. The sun rising in the sky begins to send its rays of heat earth-ward, the layer of air lying next the earth becomes warmed first, and owing to the principle that warm air rises, it rises and the cooler air comes down to take its place next the earth. The air which is now next the earth is dry or lacking in water vapor, so the lack is made up by absorbing a certain amount of water in a state of vapor from the dew on the plants. This circulation has not continued long before all the dew is evaporated. This process of evaporation in nature does not cease when the dew has disappeared, but goes on continually, because there is always a demand for more water vapor in the air on account of it being partially condensed in the upper regions of the air; thus forming first clouds, and if condensed further the clouds form rain or snow.

We will now proceed to discuss the making of steam in boilers, and then its change from steam to water vapor, after which we will compare it with the process described above. For purposes of comparison we will turn water into steam in a boiler open to the atmosphere, that is to say, we will raise steam under a pressure of 14.7 lbs. per square inch. In this we are under the same conditions as the dew which was turned into vapor under atmospheric pressure also. We will suppose that the boiler which we are going to use is a small, circular vessel say 6" in diameter and 12" deep, which may be set over a stove hole and supplied with a steam tight cover somewhat like a piston, by using which we may vary the pressure. We will now put some water in the boiler, and place it over the fire, the cover being left off. Now, remembering that water is made up of particles held together by a force (in this case 14.7 lbs. per square inch, or whatever the barometer may read), which must be overcome before we can have steam, we are called upon to exert a force in opposition to the force holding the particles together. We do this by lighting a fire under the boiler. As the fire burns, a certain amount of the energy of the coal is transferred to the water, causing its temperature to rise until when it has reached about 212° F. the coal has transferred enough of its energy to the water to enable it to overcome the atmospheric pressure; and water pressure and steam is given off. Now we have water in a state of steam which is visible to the eye. If we watch the cloud of steam as it rises upward it will be noticed that it gradually gets thinner and thinner until at last it disappears from view.

What has become of it? We have produced the invisible water vapor and it has been absorbed by the air.

The change from steam to vapor took place like this: In a boiler it is the water which lies next the surface exposed to the fire that is first turned into steam. In order to do this the coal must transfer enough energy to the water to raise not only the atmospheric pressure, but also the pressure due to the depth of water in the boiler. Now, when the particles of steam emerge from the surface of the water they are under a less pressure than when at bottom of the boiler, and so contain more heat than is necessary to keep them as steam. This surplus heat or energy causes an expansion or bursting of steam into the smaller particles which constitute water vapor, which is absorbed by the atmosphere. This last expansion is on the same principle as when we open a try cock below the water line on a working boiler—it is not water that blows out, but steam or vapor.

We will now sum up these two operations. In the first, the heat or energy of the sun does work on the atmosphere, thus setting the air in circulation, and as a result of the air circulating water is absorbed. In the second, the heat or energy of the coal does work on the atmosphere, setting free the steam and at the same time storing in the particles of steam an energy which turns the steam into vapor when it rises into the air.

From the above conclusions we see that evaporation, or nature's method of making water vapor, and the making of steam at atmospheric pressure and its change into vapor, differ only in the two forces that produce them.

In reference to making steam in boilers there are two interesting cases besides the one which we have just discussed, namely, making steam under a pressure greater than the atmospheric pressure, and under a pressure less than the atmospheric pressure. Dealing with the first mentioned case, that is, where the pressure is greater than the atmospheric pressure: This condition can be brought about by fitting the steam tight cover on the boiler mentioned in the first case and putting some weights on it to the amount of 5 lbs. per square inch. Now, instead of steam being given off when the water is at about 212° F., it will not be given off before the temperature is 226° F. This increase in temperature is due to the fact that before steam can form in this case the coal must transmit to the water enough of its energy to raise 19.7 lbs. per square inch, instead of 14.7, as before. This condition of things comes about naturally when boiling water in mines, for as as we descend into the earth the atmospheric pressure increases, which corresponds to the added weights.

Lastly and briefly, we will consider the making of steam under a pressure less than the atmosphere at sea level. For this we would have to exhaust the air from our boiler by an air pump or other means. Then we would find that steam would be given off when the water is at a temperature less than 212° F. according to the amount by which the pressure in the boiler is less than atmospheric pressure. This shows that as there is less pressure keeping the parts together in this case than in the other two it therefore requires less energy to set the steam free. As an example of this in nature, it has been noticed by travellers going up mountains that when they get high up it takes a much longer time to boil eggs than on the plain below, although the water in giving off steam went through the same action in both places. This was due to the fact that at the top of the mountain the pressure of the atmosphere was less than at the bottom, and the water though giving off steam did not contain the heat necessary to boil the eggs. I think if these travellers had been engineers they would have piled some stones on the lid of their kettle in order to save time. In this case it is interesting to notice that although it requires less heat to raise steam at a high elevation than at the ordinary atmospheric pressure at the sea level, we do not gain anything by reducing the pressure, because when we sum up the heat required to raise the steam and the force required to reduce the pressure below the atmosphere we will find that it will amount to the same thing as if we were making steam at atmospheric pressure.

The above paper was greatly appreciated by the engineers, as was also a paper by Mr. Charles Moseley,

chief engineer of the Toronto Incandescent Light Company, which is also printed herewith :

ECONOMY IN THE BOILER ROOM.

By Chas. Moseley.

The fuel expense is one of the largest in the operation of the majority of plants, and any reduction which can be made in the amount of fuel used, while maintaining the same amount of power, is considered a direct gain. The evaporation of more than nine pounds of water per pound of coal is looked upon with suspicion by many, as it is thought impossible to obtain more than this amount in even the best designed and well regulated furnaces and boilers, especially when the firing is done by hand. Mechanically fed boiler furnaces usually give the most economical results. The actual value of the fuel depends upon the way in which it is used fully as much as on any other factor. The heat unit in the coal should be as much as possible utilized. In one pound of good steam coal there is about 14,000 B.T.U., and about 10,000 of this amount can be utilized, so that 4,000 heat units are lost.

The mixture of gases in a furnace depends on the amount of air used. One pound of coal requires, theoretically, about twelve pounds of air to burn completely, but in practice about twice this amount is required in the boiler furnace. To cause good combustion, coal requires a good draft ; the gases are consumed near the fire and the waste gases carry the heat to the boiler on their way to the stack. The boiler ought to have sufficient heating surface, or the hot wasted gases ought to travel a sufficient distance to be cooled down to about 350° F., which temperature is found high enough to produce a good draft in a stack at least 100 feet high. It is not necessary for me to state the need of keeping the combustion chambers free from the ash that is carried over with the gases to the chambers.

In "Smokeless Heat," published by the General Engineering Company, there is a paragraph entitled, "Competitive vs. Ordinary Test," which is well worth consideration, and I think we might study it with profit. In nearly all plants where a large quantity of coal is burned per day, it is a general rule to employ the least possible number of firemen, and it keeps them very busy going from one boiler to another shovelling coal in the whole time. It becomes more of the nature of slavery than anything else. Is there economy in this way of working? Let us see.

In making evaporation tests my experience has been that there is a large difference between ordinary working and working for short spells, as in making competitive tests. When we were making tests in our plant while experimenting with shaking grates, the Hawley Down Draft and the Jones Underfeed, we did so in many different ways. With the Hawley Down Draft in one particular case we fired the boiler as we would in ordinary practice, and the result was certainly a far different one from that obtained when the man stood by the furnace and attended to it alone. If we treat the fireman as being naturally lazy, I think we will be on the safe side, and you can rest assured that if he has one boiler that will do the same work as another with half the labor, even though the other takes less coal this boiler will get the most work, and the boiler that should receive constant attention will get very little consideration from him. Between competitive and ordinary working on a hand fired boiler there is actually a difference of 10 per cent. This I have proved repeatedly, and in many cases it has run up as high as 12 per cent. What does this mean? Does it mean that it would pay to have a man at each boiler and simply attend to it alone? No, it does not, for the simple reason that the less a man has to do, the less he is inclined to do, and this applies more to firemen than to anyone else.

I might state that when we were testing the Jones stoker we had long periods when we had competitive tests, and others again when we ran as in ordinary practice, that is to say, the fireman doing just precisely as he would do if no test was being made. The coal and water, however, were measured in each case. The results were simply astonishing. In the ordinary running test the Jones stoker would do about 50 per cent. more work and nearly 25 per cent. better economy, whereas in the competitive test the work done on the stoker was about 25 per cent. more and 15 per cent. increased economy, which bears out the statement that between competitive and ordinary running we have a difference of 10 per cent. Now, which is the correct way to look at this matter? Can we obtain results right along with hand firing equivalent to those obtained during a competitive test. I do not think so, because firemen as a rule do not like to be beaten, and will do their very best during a competitive test to do up the other fellow, but at the same time he is wishing inwardly that the test was over, so as to get back to the old style again.

There are many plants in Canada where very good results are obtained, if we take the results as shown by engineers into consideration, several of them showing a usual 14 lbs. evaporation per pound of coal. This, you will readily understand, is out of the question. There are also a large number where very poor results are obtained, and these poor results are due to several causes, namely: Boilers in very bad order, dirty tubes, poor setting, poor boilers, poor firemen, etc. The men who sell boiler compounds will in all probability say that you do not use enough of their compounds. Your answer to that is, of course, that there are compounds on the market that are absolutely of no use whatever, and it is simply throwing money away to buy it. I myself believe in a good compound, but will admit that it is difficult to get it. You may get one barrel (the first from a new maker) fairly good, the second of no use whatever, and so it goes. A good compound is required, and to my mind to-day we have not such a thing. All compound makers ask you in their advertisements to send on a sample of your water and they will give you the very compound you require after analysis. You, of course, know what this means—that if one brand does not work they will send another brand, of practically the same material, with another name, and you try it.

Poor boilers and poor setting: This is attributed to trying to keep down the first cost. Pay a good figure for a good boiler, and have it set by competent men.

Poor firemen: This, in my humble judgment is the most important item, and one that should receive much consideration. The fireman may not be poor, but the work he has to attend to—namely, firing too many boilers—makes him feel that he is nothing more or less than a laborer, and as long as he keeps the steam pressure up, no matter how much coal he burns or how he does it, there appears to be little or no attention paid to him. There are many places where the fireman is never thought of except when the steam pressure goes down, and when such is the case the usual deputation calls upon him to ascertain if he is asleep or not. A good fireman is really a skilled workman, and should be treated as such. He should receive a fair salary, and his employer should bear in mind that any reduction in his pay is far from being a saving. If he is cut down $2 per week, you will in all probability find your coal bill increased about $8, and there is not much economy there.

How are we to obtain better results in our boiler rooms? I think by putting in machines to do the work, and having men simply to look after them.

THIRD DAY.

Upon reassembling on Wednesday morning, the report of the Mileage Committee was presented and adopted. This fixed the total expense of travelling, etc., at $179.

Mr. W. F. Chapman reported on behalf of the committee appointed to interview the members of the Dominion government with a view of having a Stationary Engineers' License Bill passed. The Minister of Justice had stated that it was out of the jurisdiction of the Dominion government, and would have to be taken before the Provincial legislature. A new committee, consisting of Messrs. Dixon, Allan, Webb, McNaughton and Pettigrew, was appointed to take such further steps as might be deemed advisable. It was felt that a bill

Mr. W. F. Chapman,
President Canadian Association Stationary Engineers.

somewhat analagous to the Marine Engineers' bill would be satisfactory.

The Committee on the Good of the Order presented its report. It recommended that more consideration be given to educational matters.

A committee, consisting of Messrs. Ryan, Robertson and Dixon, was appointed to arrange for the publication of the Association Bulletin and reports.

In the afternoon the election of officers was proceeded with, the result being as follows: W. F. Chapman, Brockville, president; R. C. Pettigrew, Hamilton, vice-president ; J. G. Robertson, Montreal, secretary ; G. C. Mooring, Toronto, treasurer ; William Bear, Dresden, conductor ; John Wendell, Waterloo, doorkeeper.

It was decided to change the name of Toronto Branch No. 2 to No. 18, as the Hamilton Branch is known as No. 2. Berlin was selected as the meeting place for the next convention. Past-presidents' jewels were presented to Messrs. E. J. Phillip, of Toronto, and Thomas Ryan, of Montreal.

Through the courtesy of the Hamilton Street Railway Company, the delegates enjoyed a trip around the city in special cars. Invitations were accepted to visit the Museum and the Gurney-Tilden Company's works.

THE BANQUET.

On Wednesday evening the usual dinner, tendered by the local association, took place at the Waldorf Hotel. The president's chair was occupied by Mr.

Robert Mackie, and the vice-chair by Mr. Thomas Chubb. Toasts were responded to by the following: "Canada, Our Home," by Stuart Livingston; "Mayor and Corporation," by Ald. Nelligan and ex-Mayor Fleicher; "Manufacturers," by ex-Ald. A. H. McKeown; "Educational Interests," by Inspector Ballard, J. S. Williams and Percy Domville; "The Executive Head," by president W. F. Chapman, ex-president E.

MR. R. C. PETTIGREW,
Vice-President Canadian Association Stationary Engineers.

J. Philip, and Joseph Robinson; "Sister Associations," by A. M. Wickens and John Field; "Press," by E. B. Biggar. Songs were contributed by Messrs. James Jardine, George Allan, E. T. Martin, W. W. Barlow and W. G. Grant. The committee in charge of the banquet arrangements consisted of Messrs. Robert Mackie, chairman; J. Ironsides, secretary; W. R. Cornish, W. Stevens, R. E. Chilman, Thomas Chubb and George Mackie. It was conceded by all that the banquet was a complete success in every respect.

MOONLIGHT SCHEDULE FOR OCTOBER.

Day of Month	Light.	Extinguish.	No. of Hours.
	H.M.	H.M.	H.M.
1....	No Light.	No Light.	.....
2....	P.M. 6.00	P.M. 8.30	2.30
3....	" 6.00	" 8.30	2.30
4....	" 6.00	" 9.20	3.20
5....	" 6.00	" 10.00	4.00
6....	" 6.00	" 11.00	5.00
7....	" 6.00	" 11.50	5.50
8....	" 6.00	A.M. 12.50	6.50
9....	" 6.00	" 2.00	8.00
10....	" 6.00	" 3.00	9.00
11....	" 6.00	" 4.10	10.10
12....	" 6.00	" 5.10	11.10
13....	" 6.00	" 5.10	11.10
14....	" 6.00	" 5.10	11.10
15....	" 6.00	" 5.10	11.10
16....	" 6.00	" 5.20	11.20
17....	" 6.00	" 5.20	11.20
18....	" 6.20	" 5.20	11.00
19....	" 7.20	" 5.20	10.00
20....	" 8.30	" 5.20	8.50
21....	" 9.30	" 5.20	7.50
22....	" 10.50	" 5.20	6.30
23....	" 11.00	" 5.20	6.20
24....	.....	" 5.30	5.20
25....	A.M. 12.10	.....	
26....	" 2.10	" 5.30	3.20
27....	No Light.	No Light.	.....
28....	No Light.	No Light.	.....
29....	No Light.	No Light.	.....
30....	P.M. 5.30	P.M. 8.30	3.00
31....	" 5.30	" 8.30	3.00
		Total.....	189.40

When we have tight and loose pulleys and a belt to ship we naturally put the belt shipper as near the driven pulleys on the countershaft as possible. There are many mechanics who have never thought of putting the shipper anywhere else and who probably could only with difficulty be persuaded to do so. As a matter of fact there are many cases in which, where the tight and loose pulleys are of the same diameter, with straight faces, and where very quick and frequent shipping of the belt is not required, it is much better to place the shipper near the driving pulley on the lineshaft, to operate on the belt as it approaches that pulley.—American Machinist.

MR. CHARLES MOSELEY.

MANY engineers and readers of this journal will recognize in the accompanying portrait the countenance of Mr. Charles Moseley, President of Toronto No. 1, C.A.S.E., and chief engineer of the Toronto Incandescent Light Company on Terauley street. Mr. Moseley was born at Chart, Sutton, County of Kent, England, in the year 1860. At the early age of eleven years he commenced his mechanical education in the machine shop of Steaven, Hooker & Co., who were so impressed by the thoroughness of his work, and his evident ability, that they gave him full charge of their steam plant and repair shop, although at that time he was but 16 years of age. He remained with Messrs. Steaven, Hooker & Co. for over ten years. In 1884 he left his native land and sailed for Canada. Arriving in Toronto, he secured a position with Mr. John Fletcher, a well-known builder and contractor, as engineer; all the machinery on the premises being under his control. He remained with Mr. Fletcher for six years, leaving to accept a position with the Mail Publishing Co., Toronto, but after six months returned to his former employer, for whom he worked one year.

Later Mr. Moseley secured the position of engineer of the North Toronto Electric Light and Waterworks, and in August, 1893, he accepted his present responsible position as chief engineer of the Incandescent Electric Light Co., on Terauley street. The plant under his charge is one of the most efficient in the city. There are two Babcock & Wilcox boilers of 225 horse power each, fitted with two Jones stokers under each boiler, and six tubular boilers of 125 h.p. each. The engine capacity consists of one vertical compound of 600 h.p., three Armington & Sims of 200 h.p. each, and two straight lines; while two 200 kilowatt direct acting

MR. CHARLES MOSELEY.

dynamos, four 100 k.w. and four 60 k.w. machines, comprise the electrical equipment.

Mr. Moseley has always taken an active interest in the Canadian Association of Stationary Engineers, and in July last was elected president of the Toronto Association. A paper from his pen on "Economy in the Boiler Room," read at the recent annual convention of the association, will be found on another page.

QUESTIONS AND ANSWERS.

"C. B.," Kingston, Ont., writes: "Kindly inform me if mica can be reduced to an oil and by what substance. Will it form an alloy such as silver? Will mica retain its original properties when in liquid form?

ANSWER.—Mica occurs in various forms, chiefly as tri-silicate of the alkaline earth metals, usually magnesium and potassium, and cannot be reduced to an oil retaining its physical properties or elementary chemical composition. No doubt the elements composing mica could be combined with other minerals to form an alloy, but would have no particular value.

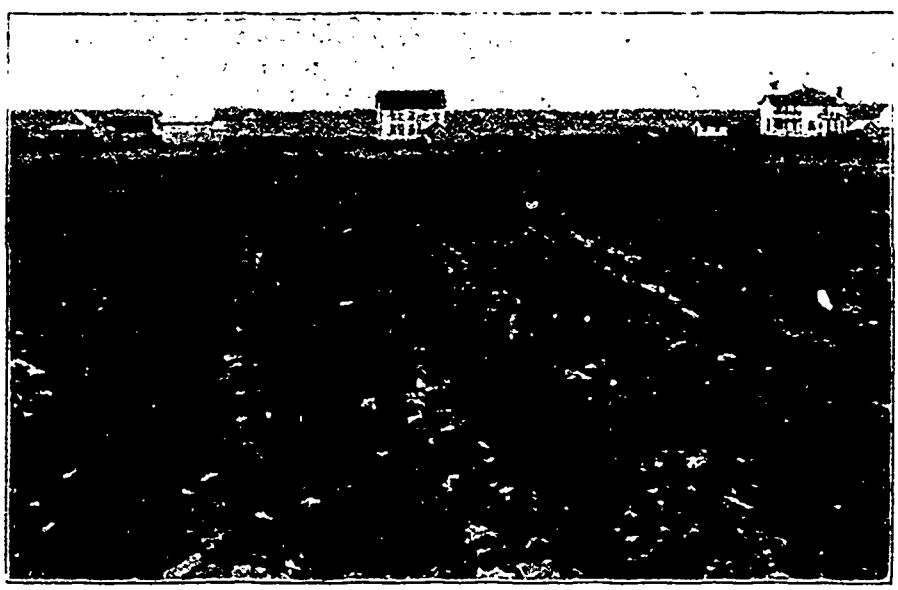
COMPRESSED PEAT AS FUEL.

In every manufacturing establishment where power is generated by means of steam, the cost of fuel is one of the largest items of expense. The possibility of securing some fuel cheaper than coal has been investigated by scientists in earlier years, but little has been accomplished that would lead them even to anticipate success. It is natural, therefore, that widespread interest is manifested in the present and prospective operations of the Canadian Peat Fuel Company, which has for its object the utilization, for the purposes of fuel, of the immense peat bogs to be found in Canada. That this particular class of fuel is destined to supersede coal may be a question in doubt, yet we believe the progress that has been made by the above-named company, and the results attained by experiments, are sufficient to warrant some reference to the subject in this journal. It is a question in which central station managers, and steam users in general, are interested.

That peat has been used as fuel in European countries for many years is well known. The method of converting it to the desired form for burning has consisted in reducing the peat to a paste by the addition of water, and then pressing the wet peat into the form of briquettes, and drying these blocks in the open air or in a kiln. Some scientists have aimed at the reduction of the moisture by different applications of artificial heat, and endeavored to increase the output of the manufactured material by various mechanical arrrangements. The objection to the above methods is that peat cannot properly be consolidated while it is wet. With a full recognition of these facts, and after much experimental work, Mr. A. A. Dickson, of Toronto, has discovered a method which would seem to entirely solve the problem of utilizing the product of peat bogs as fuel. Mr. Dickson has investigated very extensive tracts of peat bog in Canada, and has obtained a patent on a valuable machine for the conversion of the crude material into compressed peat. The Canadian Peat Fuel Company, in which he holds a controlling interest, and which is capitalized at $1,500,000, have in operation a plant at Welland, Ont., where they own a peat bog of some 5,000 acres in extent.

The origin of peat bogs is so well understood as to require little explanation. They occur in low situations, or where some natural or artificial obstacle impedes the drainage, and extend sometimes to a depth of ten feet. By virtue of their immense stores of carbon, they constitute a potential source of fuel supply.

The process of manufacture, as at present employed at the company's works near Welland, consists, first, of the excavation and drainage of the peat at the bog and its natural drying in the open air, until the material retains only approximately the same humidity as the atmosphere. It is then ready for manufacture, and the next step is the reduction or disintegration of the dried mass until it assumes a pulverized character. This is accomplished by means of a breaker, which revolves at a high rate of speed, and breaks the material to powder with iron teeth. The fibre, however, is preserved free from any undue fracture, and without liberating any of the indigenous or inherent combustible matters. From the breaker an exhaust fan draws the powder into a large hopper, from which it descends to the machine, where it is stamped into cylinders two inches wide, and of the same depth. The peat is here reduced by pressure to cylindrical blocks of about two inches in a tube without bottom, the resistance to the enormous pressure of some thirty tons being entirely obtained by the friction of the material against the side of the tube. The reduction of bulk from the raw material to the finished block is in the proportion of 6 to 1. The product ready for burning takes the form of a block about 3 inches in length and 2 inches in diameter, very hard and dense, and containing all the fibrous, carbonaceous, volatile and other materials and elements which are originally embodied in raw peat, and an amount of moisture only corresponding approximately with that in the surrounding atmosphere. The patent vertical press, built of cast steel, the invention of Mr. Dickson, with a moderate expenditure of driving power and only two formers or dies, working against a yielding resistance, has an output of about 1½ tons of pressed peat per hour, but it is proposed to build machines of much greater capacity at an early date. The gear type of compressing machine now in operation is run by a small engine, but ere long a new type of press, carrying its own steam cylinders, running at a much higher rate of speed and producing fully twice the quantity of fuel per hour, will be adopted.



PEAT BOG AT WELLAND, ONT., SHOWING BUILDINGS OF CANADIAN PEAT FUEL COMPANY.

One gear machine is in operation at the Toronto Industrial Exhibition now in progress, and a personal inspection convinced the writer of the wonderful results being accomplished. The furnace firing the boiler was fueled by the compressed peat, and a particularly bright and strong fire was observable. The fuel is said to be non-friable and weatherproof by reason of its solidity and the external glaze imparted to it by frictional contact with the forming dies. The inherent moisture of the peat is reduced to 12 per cent. The weight of the fuel is given as 83 pounds per cubic foot, while bituminous coal weighs 73 pounds and anthracite coal 93 pounds per cubic foot. Other qualities of this fuel are claimed to be freedom from sulphur, and that it makes neither smoke, soot, dust nor clinkers during consumption.

Experimental tests have been made, the results of which show that the fuel bids fair to become a strong

competitor with coal. On December 28th, 1897, a test was made at the power house of the Metropolitan Street Railway Company, North Toronto. It occupied twelve hours, and was made in competition with a first-class quality of coal. For the information of our readers, we give below the actual results as submitted by Mr. James Milne, electrical engineer :

	Coal.	Peat.
Duration of test in hours	12	7
Average E.H.P.	42	46
Average I.H.P.	60.8	65
Total fuel burned in lbs.	4,195	2 984
Average steam pressure	88	90
Average feed water temperature	102 deg. Fah.	50 deg. Fah.
Hourly fuel consumption in lbs	349.6	426.3
Fuel per E.H.P. hour in lbs. observed	8.32	9.267
Fuel per I.H.P. hour in lbs. observed	5 768	6 558
Total ash in lbs.	250	68
Percentage of ash	6 p.c.	2.28 p.c.
Relative value of fuels as per indicator diagrams (actual conditions)	100	86 3
Relative value of fuels per indicator diagrams, taking difference in feed water temperature and steam pressure into account	100	90
Relative value of fuels as per ammeter readings (actual conditions)	100	88.6
Relative value of fuels as per ammeter readings, taking difference in feed water temperature and steam pressure into account	100	92.3
Mean of No. 14 and No. 16	100	91.15

Had grate bars been arranged to suit the new fuel, it is claimed that very much better results could have been attained.

A few weeks ago a test was made on the steamer Primrose, of the Toronto Ferry Company, and the certificate of the chief engineer states that for quick steaming this fuel proved superior to coal, quantity consumed was not greater, smoke was not visible at any time, and ash was very much less. The report of the fireman running one of the Sawyer-Massey Company's portable engines at the Toronto Exhibition says: "For quick steaming I never used fuel to equal peat. It is quite as economical as coal, and in many respects greatly superior. It is smokeless, cleanly to handle, very little ash, and no sulphurous gas, consequently makes no soot to gather on the tubes. I find the stoking much easier than with coal. I banked the fire at 5:30 p.m., closing off the drafts, and found plenty of fire next morning at 7 a.m., with 60 lbs. of steam up. When the fire has burned out I find the grate bars perfectly clean."

It is contended that the cost of production is no greater than that of mining coal, while there will be a great saving in freight owing to the close proximity of the peat beds. As tracts of peat bog are to be found in nearly every part of Canada, it is the intention of the Canadian Peat Fuel Company, who control patents for Canada, to dispose of county rights. In fact, some of these have already been sold. In this way it is believed that electric lighting stations will be enabled to obtain compressed peat cheaper than slack coal, which is now used almost exclusively. Although the development of the industry has only commenced, it is reported that local companies who have secured patent rights are making quotations of $3 per ton net at the works, and it is believed that it will be possible to lower this figure considerably.

The Parry Sound Electric Light Company have, owing to increase of business, found it necessary to increase their capacity, and have closed a contract with Mr. Charles Barber, of Meaford, for a pair of 42 inch horizontal water wheels.

Later reports show that the damage to the works of the Jenckes Machine Co., at Sherbrooke, Que., by fire on the night of the 13th of August, was very much exaggerated. The fire was confined to the machine shop building, and the other departments, foundry, boiler shops, etc., were in operation as usual on the following Monday. A few days later a portion of the machine shop was started up, and the whole was in running order by the 23rd of August. The patterns, drawings and office records were preserved practically intact, and all orders for work are being accepted as usual. The principal item requiring replacement is the roof of the machine shop; this, however, is well under way. The whole of the work is being pushed with much energy, and the numerous orders in hand will suffer comparatively slight delay.

SPECIFICATIONS FOR ELECTRIC PLANT FOR CITY OF LONDON, ONT.

TENDERS were recently invited by the city of London, Ont., for the supply of an arc lighting and steam plant, upon specifications prepared by the City Engineer. At the council meeting held for the purpose of considering the tenders submitted, a letter was read from a company engaged in the manufacture of electrical apparatus, contending that the specifications were so worded as to exclude many manufacturers from tendering. We publish herewith a copy of the specifications for the arc lighting plant, and invite electrical machinery manufacturers and engineers to express their opinions as to the adaptability of the same, with a view of learning how far they meet with general approval. The specifications were, of course, prefaced by the usual instructions regarding the carrying out of the work.

SPECIFICATIONS FOR ARC PLANT.

DYNAMOS. The contractor shall furnish and install the following dynamos, apparatus and material. Four (4) arc light dynamos, direct current, each having a capacity of 100 and to have a guaranteed efficiency of not less than 86 %, 2000 candle power, 9.6 ampere, 45 volt arc lamps. Each dynamo shall be provided with an automatic regulator, which shall automatically make the proper adjustments for all changes of load from no load to full load, the adjustments to be made in such a way as not to endanger any part of the dynamo, appliances or lamps, nor to cause any perceptible change in the balance remaining in operation. These dynamos shall be of the ..... system and of the latest and most efficient pattern, mounted on a base provided with an adjustable belt tightener, so that the belt may be tightened while in operation, and capable of operating at full load for fifteen consecutive hours without increasing the temperature of any part, especially the armature, fields and commutator not to exceed 70 degrees over surrounding atmosphere or to such a degree as to endanger the insulation or decrease the efficiency of operation, shall have an insulation resistance of not less than 250,000 ohms between all parts insulated from each other; shall be adapted to operate at a speed not exceeding 900 revolutions per minute at full rated load, including 84 miles of circuit wire; shall be provided with efficient self-oiling bearings, having flexible bearings of the ball pattern and equipped with sight glasses so as to determine at all times the level of the oil in the reservoir. The armatures shall be balanced both electrically and mechanically, so that there will be no tendency to strain the shaft or to draw the armature towards either bearing so as to cause any excessive friction and heating, and no vibration. Special pains shall be taken with the insulation, protection and separation of contacts, binding posts and bare surfaces having extreme differences of potential in order to minimize the danger of accidental shocks, crosses or grounds under normal conditions of operation. The dynamos shall be so designed and automatically regulated that the power will be automatically proportioned to the number of lamps burning at any time. On each dynamo is to be placed one switch for short circuiting the armature. Each dynamo is to be equipped with a pulley of properly proportioned dimensions and having the proper width, face and diameter to successfully transmit the necessary power to operate them at their rated speed under all conditions of load. Each dynamo is to be equipped with a spare sets of brushes, and if removable segments are used, to have also a spare set of segments. These dynamos are to be placed in the lighting station in London on suitable foundations which will be furnished by the purchaser. There shall be provided with each dynamo in addition to the automatic regulator referred to above, one controller for standardizing the current and making it constant at all times under all variations of load, and also one ampere metre for indicating the current supplied by the dynamo, said ampere metre to be properly calibrated, also one main switch and two efficient lightning arresters of the ..... pattern. Supply all necessary double belting required, of first-class material.

GUARANTEE OF DYNAMOS. The contractor will guarantee each dynamo furnished to be fit for operating daily, for 18 hours of a continuous run at its rated output, or any less output, to be free from defective material, and to withstand without injury the sudden breaking of the circuit when running at full load, or a sudden short circuit of the lamp circuit, said short circuit to remain on for five minutes without any attention being given to the machine. He will undertake to replace, free of charge, each armature or field coil which may burn out, or otherwise become defective in any manner, or from any cause, within one year after the acceptance of same, unless it shall be proved to the engineer without question that the defect was due to the fault of the city's employees.

TESTING INSTRUMENTS. With the above four (4) dynamos is to be furnished one portable ammeter, Weston make, having a scale from zero to 20 amperes, the same to be dead beat, direct reading, and capable of being left in the current all the time, without damage or altering of the calibration. Also one volt metre, Weston make, scale 10 volts to 75 volts, both these are to be portable, so that the current can be read from any part of the city. Also two testing magnetos, capable of ringing through 50,000 ohms, are to be supplied with the entire plant.

ARC LAMPS. There shall be provided 350 Adams Bagnell arc lamps of 2000 nominal candle power, the same to be single carbon, having carbon holders of the proper size to hold 7/16 to 1/2 carbon. Each lamp will be provided with a switch by which it may be cut in or out of circuit; shall be regular in its feeding action, shall be free from hissing, flickering or flaming when provided with ordinary commercial standard carbons; shall have no complicated clock-work mechanism; shall contain an efficient device which shall automatically cut out a lamp for any reason defective, without interfering with the operation of the remaining lamps in circuit; shall be simple, strong and durable in its mechanical

construction, and must be thoroughly protected with a weather-proof hood of an approved design, and provided with an absolute cut-off.

LAMP GUARANTEE.—The contractor will guarantee each lamp furnished by him to be free from all defective material, and perfect in workmanship, and to be in all respects in accordance with the specifications and with the statement made by him in writing in his bid. Said insulation of lamps to be able to withstand the difference of potential of 5000 volts, if so required. No lamp will be accepted until it has been run on the circuits for a period of 90 days; if any defect should show during the period, the lamp or lamps to be replaced for new ones by the contractor.

HANGERS.—The contractor shall furnish 200 lamp hangers of a suitable design, which are to be placed on the poles extending therefrom not less than nine feet, the same to be so arranged as to permit of easy access to the lamps for the purpose of trimming same or repairing.

HANGING EQUIPMENTS.—The contractor shall also furnish 350 complete equipments, consisting of pulleys, cable ⅝ Manilla rope, reels, etc., necessary for the erecting of 350 lamps in the centre of the streets between the poles. The cables to be of iron flexible wire of sufficient strength to safely carry the weight of the complete lamps, as well as the pulleys, etc. The pulleys shall be of the latest approved safety pattern, so that in the event of a rope breaking, the lamp will not fall to the ground. These equipments are to allow for lowering the lamps to the ground for the purposes of testing or trimming.

GLOBES.—The contractor shall furnish 350 clear glass globes, the same to be not less than 12 inches high and 11 inches diameter.

CARBONS.—The contractor shall furnish all necessary carbons to start the plant.

SWITCH-BOARD APPARATUS AND CONNECTIONS.—The contractor must furnish and erect in the lighting station one marble switch-board of an approved design, with a capacity for 12 circuits and 12 dynamos, and provided with the necessary sockets, plugs, main and transfer cables, testing connections and a suitable and convenient device for holding cables when not in use. It shall be so arranged and marked that any circuit or series of circuits may be quickly connected with or disconnected from any dynamo with the least possible danger of short circuits or error. Sockets shall be so designed that it is practically impossible to short circuit, ground, or receive a shock from them. All connections shall be easily accessible, and made at back of switch-board. All wires used in making connections must be flexible, and have a carrying capacity of not less than 40,000 circular mills, and must be composed of 30 or more strands, to be thoroughly insulated and covered outside of the insulation with flexible rubber tube. All connections must be made in such a way as to ensure good and sufficient contact to prevent heating and ensure permanency. Connecting wires shall be so arranged and secured that crosses or ground are impossible in the normal operation of the plant.

ABSOLUTE CUT-OUTS.—The contractor shall also furnish 50 absolute cut-outs, which are to be placed in locations as laid out by the city engineer, for the purpose of absolutely cutting off any portion of loop of a circuit that may be necessary. These cut-outs are to be thoroughly protected from the weather and inclosed in suitable iron boxes with glass fronts.

INSTALLATION.—The contractor shall place all the above mentioned dynamos, station apparatus and switch-board in suitable locations in the lighting station at London, and furnish all the necessary wire, to be No. 4 stranded rubber covered, gauge and properly run with porcelain knobs to the different outlets in the cupola of the building, furnishing all the necessary material and leaving the dynamos and station apparatus so that the outside circuits can be connected thereto, the belts placed from the power and ready for operation.

DESIGNS.—The contractor must accompany his tender with designs of his dynamos, lamps, hangers, station apparatus, switchboard, cut-outs, etc., and furnish any other information not enumerated herein.

LINE CONSTRUCTION.—The poles must be straight, select and shave pointed cedar poles, sound and free from knots, and shall be not less than 6" diameter at the top, and poles subject to extra strain shall be not less than 7" at the top. The poles on Dundas street from Ridout to Wellington, and on Richmond street from G. T. R. to Fullarton street, shall be not less than 70 feet long, clear of the ground, and set at least 6 feet in the ground. The other poles shall be not less than 35 feet clear of the ground, and set 5 feet in the ground. The poles are to have the necessary gains carefully cut so that the cross arms make a snug fit and stand at right angles to the poles. The cross arms shall be of white pine, thoroughly seasoned, sound and free from knots, and painted. These cross arms are to be not less than 60" long and dressed to 3 x 4½", with a slight pitched top, and are to have four or more oak pins in each, fitting closely in the cross arm and nailed in place and braced with two iron braces. Pins on each side of poles where four pins or larger cross arms are to be used must be less than 17" between centres. The contractor is to furnish all the necessary glass insulators of the standard pattern suitable for the wire they are to hold. All poles on which cut-outs or lamps are placed shall be stepped with spikes not less than ⅝" square and 9" long, with heads, and to be placed on each side of the pole at distances not exceeding 3 feet apart, making a step at every 18 inches.

WIRE.—The contractor shall furnish all the necessary wire for connecting the lamps in circuits, as shown on the plan. Not more than 50 lamps are to be connected on any one circuit running out of the lighting station, and all outside wire used in this installation shall be not less than No. 6 B & S gauge pure lake copper, having a conductivity of at least 98%. This wire is to be covered with a triple covering of insulating material and braided with two braids, (samples of wire to be submitted with the tenders). Each circuit shall test out, with an insulation resistance, after everything is connected, of not less than 50,000 ohms per mile. All wires shall be so handled as to avoid kinking, and are not to be dragged along the ground, over cross arms or through trees in such a way as to injure insulation, and shall not be allowed to sag unduly between supports, proper allowance being made for contraction and expansion with changes of temperature. All necessary precautions shall be taken in passing through trees, crossing other lines, turning covers, etc. The joints shall be mechanically strong and secure so that no movements of the two ends relative to each other is possible. All joints must be carefully soldered, the joint being wiped free from any excess of flux, and the solder will be relied on only to give good electrical connection. Each joint is to be thoroughly wrapped after soldering with a good quality of rubber tape. The contractor will be expected to construct all the lines, furnishing all the necessary material and labor and connect the hangers, lamps, cut-outs, place the hoods and globes, trim the lamps and leave everything in first-class running order.

ADDITIONS AND DEDUCTIONS.—While this specification is intended to represent very closely the number of lamps to be installed, yet, as some changes may become necessary during the process of construction, the contractor must mention in his tender a price to be added to or deducted from the contract price for each lamp installed in excess of the number specified, or which shall be cancelled provided such addition or cancellation involves no change in the work already completed and shall be along the line of existing circuits. Each bidder must specify distinctly, on a separate sheet, the exact amount of material he proposes to furnish in carrying out this contract.

GUY WIRES.—The poles subjected to extra strain shall be securely guyed to the satisfaction of the city engineer. The whole of this work is to be done to the entire satisfaction of the city engineer, and the entire installation is also to conform to the rules as laid down by the Board of Fire Underwriters and subject to inspection and the acceptance of an electrical expert, who is to be selected by the city engineer.

TRADE NOTES.

The Electric Co. of Windsor, N. S., has ordered a 100 horse power Robb-Armstrong engine from the Robb Engineering Co.

Mr. Carman O'Dell, of Annapolis, N. S., is increasing his electric lighting plant by the addition of a 50 k.w. "S.K.C." generator.

The Rossland Water & Light Company have purchased from the Canadian General Electric Company two of their standard three phase motors.

The Jacques Cartier Pulp & Paper Co., of Pont Rouge, Que., have arranged to light their new pulp and paper mills by electricity. The order for the plant has been placed with the Royal Electric Co., of Montreal, and is to be installed immediately.

The Canadian General Electric Co., Limited, have placed in stock a large and complete line of transformers of their different types, from which prompt shipments can be made. The C. G. E. Co. also carry a very large and well assorted stock of all lines of electrical supplies ready for shipment on a moment's notice.

The Windsor Electric Light & Power Co., of Windsor, N.S., are enlarging their recently installed electric lighting plant. They are adding one 100 k.w. and one 40 k.w. "S.K.C." generator, with an additional complement of transformers and material. The "S.K.C." apparatus and generators are from the Royal Electric Co., Montreal.

A number of very large annunciators have recently been turned out of the factory of Ness, McLaren & Bate, Montreal, including those for the new Place Viger Hotel, Montreal; Chateau Saguenay, Chicoutimi, and Ladousac Hotel, Ladousac. All these annunciators are equipped with Norway iron gravity drops, manufactured exclusively in Canada by this firm.

A letter from the Newton Appliance Company, of New York, states that they have about 2,000 Flush switches of what is called their No. 1 tact that they offer for sale at a reduced figure. They are similar in every respect to their standard Flush switch, except that that they are three inches deep over all, which is one-half inch deeper than their standard switch. This extra depth was an error in making up the porcelain, and it prohibits their use in the standard iron boxes, in which Flush switches are used in the United States. Some 5,000 of these No. 1 switches were made up, but 3,000 were disposed of—some in Europe and some in Canada. Quotations on these switches may be obtained from their Canadian representatives, Messrs. Munderloh & Co., of Montreal.

The Wm. Sutton Compound Co. of Toronto, Limited, report that since having placed a representative in Montreal they are well pleased with the large volume of business secured from the largest and best steam users in that city and the province of Quebec. As this is a new and permanent field for their agents, the present success is more than gratifying, and they feel assured that they will have before many months the largest boiler compound trade in that district. Their business in all parts of Canada shows a marked improvement, having been 30 per cent. greater during the last six months than in the corresponding months of last year. This they claim is due to the standard quality of the Sutton boiler compound, which never fails when honestly tried. It is used extensively by breweries, steam bakeries, dyers and laundries, without the slightest injury to their products.

We are pleased to bring before the notice of our readers a new departure made by the Electrical Maintenance & Construction Company, of Toronto, who have opened an office at 609 Temple Building, with Mr. P. H. Patriarche as manager. The object of the company is to do all sorts of construction work and maintain electrical apparatus of all descriptions at an agreed rate per annum, the rate of course being governed by the size and condition of the apparatus or machinery to be maintained. This would seem to offer an inducement to manufacturers and others to use electricity to a greater extent in their operations, as in this way they can limit the cost of repairs to a fixed sum per annum. Mr. P. H. Patriarche has been for many years in the employ of the Toronto Electric Light Company, having started at the bottom and worked his way steadily upward. Under his management the company should meet with success.

PATENT RIGHTS.

Concerning the methods adopted to obtain patents in Canada, a correspondent writes to the Electrical News as follows:

When anyone secures a patent, he is generally of the opinion that he has the right to manufacture, sell or otherwise dispose of the article patented. This is without doubt a fallacy, which can readily be seen from the following:

The device may have been patented before it may have been in use in other countries for over the time limit as set by the Canadian Act respecting patents of invention. It is a well-known fact that some take a pride in openly stating that no matter what patent is granted, they can get another patent through for practically the same thing without infringing on the former patent. What is the result of this second patent? The result is invariably a law-suit, much to the detriment of the original inventor; and the burden of proof as a rule lies on the original inventor. Just as soon as any useful article has been put on the market and there is a good demand for this article (take the Auer light for example), you will find that there are certain parties who will set to work and closely examine the patents with a view of ascertaining if they can in any way be overcome, and unless the principle is patented they have great chances of success, owing to the fact that the original inventor may have been a little loose in drawing up his specifications and claims, or may have entrusted same to a second party, who, perhaps, did not realize the great importance of covering certain points; or the inventor, anxious to secure his patent, may have overlooked some of these important points. The first inventor, and the man to whom credit is justly due for the invention, may have spent a large amount of time and money in perfecting a machine, yet through a small oversight in his claims, a second party is allowed to patent practically the same machine as he invented, and for which the second party has spent neither time nor money, except in examining the patent.

I know of a case in the United States where an inventor sold his patents to a company. In this company there was a certain party who wished to get control, but who could not do so honestly, so he started out with an infringing device. Now, what method did this party adopt? He searched the patent records until he came across a device that might be construed in a measure to cover the machine he intended to get up. Bear in mind that this party knew no more about this machine before he went into this company than the man in the moon, yet he bought up this old patent and went to work on same, made the infringing device, and was in a measure successful, and will continue until the matter is definitely decided in the United States court.

You will, therefore, understand how things go; this particular party could not get control of the original company by fair means, so he set to work to make a similar machine, with a hope of being bought up in order to stop competition in this particular device. There is surely some redress. At present, however, the only redress is to take action against the users of infringing devices. It is a very costly action, and it would appear that there is room for some board of commissioners to examine patents before they are granted, and to see if same can be patented, and that they do not infringe on anything that has been previously patented.

Some patent solicitors are very straightforward in this matter, and before setting out to obtain a patent first examine the records to ascertain if the invention is new, etc. This is without doubt the proper course, but the inventor may say that he wants his patent if it is possible to get it, whether same has already been patented or not. The patent solicitor therefore proceeds, and draws up the specifications and claims, knowing full well that this particular patent is of no use whatever. The patent, however, is got through. The article is then put on the market and the war commences. The company or party owning the original invention notifies all users of the infringing device that action will be taken in the matter. Owing to the fact that it takes such a long time for a matter of this kind to be settled, and until such time as it is settled the party with the so-called infringing device is hurrying around the country taking orders and cutting prices, and making it very hard for the original company, this company, having also been at the expense of doing the missionary work in connection with this particular article, so far as advertising is concerned, cannot afford to sell the article at such a low figure, but in the meantime must come down to the figure of the second party or get out of business.

It is very true that some inventors may claim more than they are justly entitled to under the patent, but this is readily settled according to the Act Respecting Patents. We understand that the German government defends the patents taken out by original inventors, and we think there is room for such a course in this country. Canada is the easiest country in the world in which to obtain patents, for same are granted without any regard whatever to former patents issued.

MARITIME ELECTRICAL ASSOCIATION.

A meeting of the Executive Committee of the Maritime Electrical Association was held in Halifax on August 16th, at which two new members were elected. Mr. Colpitt presented the report of the local committee on arrangements for the first annual convention. It has been decided to hold the convention in the city of Halifax on Tuesday, September 27th, simultaneous with the Halifax exhibition. Therefore it will be possible for delegates to the convention to obtain cheap railway fares. Two sessions will be held, one at 9.30 a.m., and the other at 3 p.m. Invitations have been received by the executive of the association to visit the plants of the several electrical companies, and it is proposed that there should be an excursion by steamer on the harbor.

At the last meeting of the association, it was decided to furnish reports of all meetings to the Canadian Electrical News for publication.

PERSONAL.

The city council of Toronto have decided to engage Mr. James Milne, E.E., to report as to the number of electric lights required for lighting the new municipal buildings.

Mr. George F. Macdonald, of Ottawa, Ont., was elected vice-president of the International Association of Municipal Engineers at the recent convention of that association.

Mr. James O'Rourke, late engineer of the Long Pointe asylum, sailed from Montreal last month for Great Britain and Switzerland, for the benefit of his health. Mr. O'Rourke will return in November.

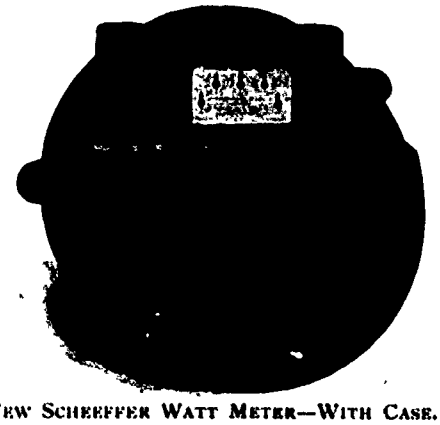
Mr. James Stevenson, who for several years has been employed as electrician by Mr. L. H. Reesor, of St. Marys, Ont., has accepted a position with the Stratford Electric Light Company.

Mr. James W. Woodward, foreman of the wire department at the works of the Canadian General Electric Company, Peterboro', has tendered his resignation, to accept a similar position with the Royal Electric Company at Montreal.

The General Engineering Co. of Ontario advise us that they have installed or are installing the following: Six improved Jones underfeed stokers for the Laurentide Pulp Co., Grand Mere, Que.; two at the C.P.R., Dalhousie sq. station, Montreal, one for Rhodes, Curry & Co., Amherst, N.S.; one for Truro Condensed Milk & Canning Co., Truro, N.S.; one for Slingsby Mfg. Co., Brantford, Ont.; twelve for Toronto Street Railway Co; one for Windsor Hotel, Montreal, and twelve for the Maritime Sulphite Fibre Co., of Chatham, N. B. The Toronto Railway plant will be one of the most complete of its kind in existence. The coal will be fed by gravity into the hoppers, and the firemen will not handle same at all. The blower plant will consist of two 90 inch steel plate fans, each capable of delivering 22,000 cubic feet of air per minute. These fans are driven direct by electric motors, and the draft automatically controlled. With the improved Jones stokers about 150 cubic feet of air at about 1½ oz. pressure at the tuyeres are required per pound of coal per minute; therefore it will be seen that with blowers of the above capacity four tons of coal can be burned per hour on the twelve furnaces; the average burning will be about 2.75 tons. Owing to the magnitude of this boiler plant, viz., 5,000 h.p., a duplicate blower system is being installed, it being realized that electric motors are not infallible. The air piping throughout will be of sheet steel and all joints rivetted. The boilers are of the Scotch marine type. The report of a competitive test made between the improved Jones and hand firing will be sent by the General Engineering Co. on application.

THE NEW SCHEEFFER RECORDING WATT METER.

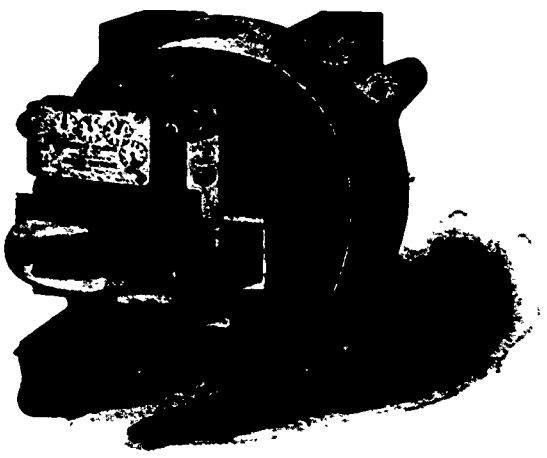
THE Packard Electric Co., Limited, of St. Catharines, Ont., has recently placed upon the market the new Scheeffer watt meter for alternating current, concerning which the manufacturers say: This meter has been devised to correct the various faults which exist in other meters to-day. It will be seen by the accompanying



NEW SCHEEFFER WATT METER—WITH CASE.

cuts that the meter is round and has a rubber band placed around the circumference, over which is placed the case. By the use of this rubber band the meter is rendered perfectly air tight and also is made perfectly dust and bug proof. It has been found that meters with cases of ordinary fitting are hampered with dust and dirt, and when such cases are used it is impossible to keep meters correct, even with frequent over-hauling and cleaning. The binding posts of the new Scheeffer meter are insulated in a most thorough manner; no ordinary holes being depended upon. These holes are closed on end, making it impossible that anything can get through the post and also doing away with the necessity of plugging the holes.

The new Scheeffer meter does away with the revolving cylinder, only retaining the revolving disc of aluminum, thereby making the moving parts extremely light, but at the same time not too delicate. The iron circuit in the magnetic system is practically a closed one, preventing stray lines of force from acting on other parts of the meter, and is therefore unaffected by



NEW SCHEEFFER WATT METER—WITHOUT CASE.

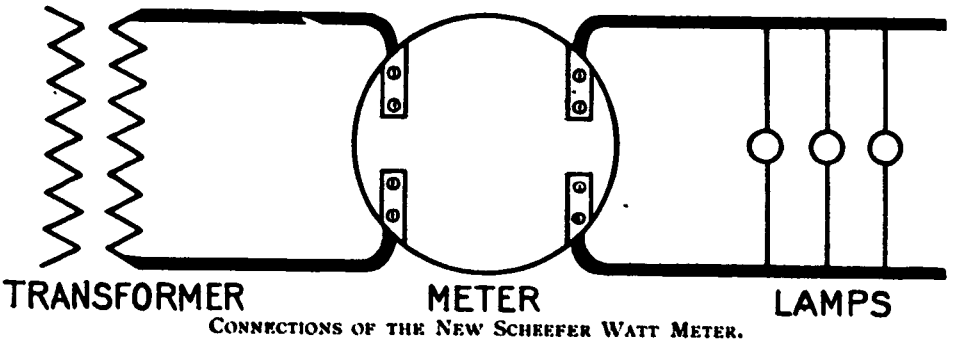
outside influences. This closed circuit is said to give the maximum effect with the minimum energy possible in construction, the shunt winding only taking from 1 to 1⅓ watts on 15,000 alternations, and not exceeding 1½ to 1¾ watts on 7,200 alternations.

One valuable feature in the new Scheeffer watt meter for central stations to consider is its correctness on inductive loads, and it can therefore be used on fan motors or induction motors, arc lamps, etc. The meter is extremely compact and requires but a small space for its placing.

It has been found by experience that a central electric lighting station can supply 30 per cent. more customers on the "meter" than on the "flat" rate. This 30 per cent. really represents wastefulness, which is inherent in the nature of the average customer and the "flat" rate. The investment in meters and their proper care make the plant equivalent to 30 per cent. larger. A central station which is in the electric lighting business for the profits on its investment can easily realize the great advantage in the use of meters. That many small villages and cities make but a small profit or the income only sufficient to pay actual running expenses, is not surprising in view of the waste and extravagance of the "flat" rate. These same stations may, by proper and economical use of meters, be made profitable.

It is not necessary to point out the evils of the "flat" rate; but it is self-evident that many customers never take the the trouble to turn out all or part of their lamps, and in places where the plant gives all night service the lamps are left burning all night. A fallacy in flat rates is the basing of charges on 50 watt lamps. A 50 watt 16 c.p. lamp is somewhat of a rarity in the market, 60 watt being about an average, and many lamps are used taking more even, 70 or 80 watts. In most small stations the voltage is kept above what the lamps are made for; even in the case of a 50 watt lamp the consumption will be higher. We have found that most small stations if they use 50 volts, keep the voltage at 55 or 60. These wastes are impossible to avoid in the "flat" rate.

A meter measures the actual consumption of current.



CONNECTIONS OF THE NEW SCHEEFER WATT METER.

The central station gets paid for actual service given the customer, and it behooves the customer to use his lights in the best and most economical way.

A LONG DISTANCE TRANSMISSION.

FRIDAY, the 26th day of August, 1898, will be memorable in the annals of electricity in Canada, being the day on which the Cataract Power Co., of Hamilton, turned the first current on to their long distance transmission line between Decew Falls and Hamilton. The water was let into the fore bays and pipe line at about 3 p.m., and at 3.30 p.m. the hydraulic plant, consisting of two 1500 h.p. water wheels, and the electrical plant of two 1000 k.w. S.K.C. generators, were turned over, the switch closed and the power transmitted to Hamilton, a distance of 35 miles, where it was utilized for lighting arc and incandescent lamps, and also for driving a 40 h.p. S.K.C. induction motor. The incandescent lamps in the sub-station in Hamilton were very artistically arranged in the form of a large star and maple leaf, and were kept lighted until far into the night. It is expected the works will start permanently within a few days.

The Canadian Manufacturers' Association have begun the publication of a Bulletin, to be issued monthly, or oftener, as occasion may require, which will contain the latest and most reliable information regarding the possibilities of the export trade of Canadian manufactures. This information is obtained from the Dominion Department of Trade and Commerce, and from the publications issued by the British and United States governments, and other reliable sources.

SPARKS.

It is the intention of the Peterboro' Light and Power Co. to erect a new power house, at a cost of about $35,000.

The town of Pembroke, Ont., is securing information as to the advisability of operating an electric light plant under municipal control.

The citizens of Britannia, a suburb of Ottawa, are anxious that the Ottawa Electric Railway Company should extend its road to that place.

The contract for wiring for electric lighting the Victoria Jubilee Hospital at London has been given to the London Electric Company, at the price of $1,300.

The Canadian General Electric Company are installing a plant for Messrs. A. B. Jardine & Co., of Hespeler, Ont., who have been enlarging their premises very considerably.

"Through the Garden of Canada" is the title of a pamphlet issued by the Hamilton, Grimsby and Beamsville Electric Railway Company, descriptive of the route and scenery of that railway.

The Canada Electric Company, Montreal, have placed an order with the Canadian General Electric Company for one 85 k.w. M. P. direct current generator, to be used at Longue Pointe Asylum.

The fine new dining and sleeping cars recently turned out by the Canadian Pacific Railway Company have been equipped with annunciators manufactured by Ness, McLaren & Bate, of Montreal.

It is worthy of note that the Cork Electric Tramways & Lighting Company, Limited, is the first company in the British Isles supplying electricity for traction and lighting from one central station.

The Canadian General Electric Company have received an order from the Citizens Telephone and Electric Company, Rat Portage, Ont., for one of their standard 2000 light single-phase alternators.

The ratepayers of Perth, Ont., have again defeated the Lanark County electric railway bonus by-law. There is now said to be a scheme on foot to connect Carleton Place and Lanark by an electric road.

The C.P.R. have installed an electric light plant in their new station at McAdam Junction, N.B. The system includes both arc and incandescent light, the company supplying lights for commercial purposes.

The Ottawa Car Company, at its annual meeting last month, declared a dividend of 8 per cent., and decided to increase the capital stock to $25,000. The demand for cars has necessitated an extension of the works.

The West Kootenay Power & Light Company, Rossland, B.C., are rapidly extending their business, and for a recent extension have ordered from the Canadian General Electric Company three large feeder panels and two transformer panels.

It is contended that the Anglo-American Telegraph Company, which practically holds a monopoly of the telegraph business in Prince Edward Island, is not furnishing a satisfactory service, and if redress is not granted, competition will be invited from other companies.

The announcement is made that the Pacific Cable Company has let a contract for laying a cable from the United States to the Phillipine Islands, via Hawaii and Ladrones. It is said that the contract will be completed in six months, and that the cost will be $10,000,000.

The Hamilton Cotton Co., Hamilton, Ont., have decided to light their mills with electricity, and have placed an order with the Canadian General Electric Company for one of their 40 k.w. direct connected generators, with marble panels.

The ratepayers of Neepawa, Man., have voted to provide $12,000 to install an electric light system and $6,000 for a telephone system. The municipal authorities want applications for the position of electrician to take charge of these plants, duties to commence immediately.

A company of Winnipeg capitalists purpose utilizing a portion of the water power on the Winnipeg river. The scheme includes the establishment of an electric railway from the mouth of the Whitemouth river to points on the Winnipeg river, and the transmission of electric power to Winnipeg.

Mr. R. H. Smith, of Tilbury, Ont., whose plant was recently destroyed by fire, has placed an order with the Canadian General Electric Co. for an entirely new plant, consisting of two 15 k.w. standard Edison D.C. dynamos and one 30-light arc machine. Mr. Smith expects to have his plant running again in about two weeks.

Ness, McLaren & Bate, of Montreal, have recently added to the list of goods which they manufacture a new line of electric bells, and are now manufacturing iron box bells and iron frame bells. These they offer in competition with the best on the market, and expect to be able to lower the present prices considerably.

The city council of Toronto, Ont., have accepted the tender of the Sprague Elevator Co., of New York, for the supply of three electric elevators, with plant for five., for the new municipal buildings. The price is $26,475. The architect states that the electric plant will operate 300 or 400 lights in addition to running the elevators.

Negotiations have been pending for some time for the purchase by an American syndicate of the Niagara Central Railway. It is said to be the intention of the syndicate, which is represented by Mr. Neelon, of St. Catharines, to convert the road into an electric system, and to extend the present line to Port Dalhousie and Beamsville.

The Waterous Engine Works Co., Limited, of Brantford, Ont., are adding to their shop capacity, and are installing a 30 h.p. induction motor from the Royal Electric Co., which is to be operated from the alternating current lines of the Brantford Electric & Operating Co. This makes over 100 h.p. in S.K.C. motors now operating in Brantford.

The Metropolitan Street Railway Company will extend their line as far as Bond's Head, and will erect a new power house at Bond's Lake. It is the intention of the company to dig a canal from the lake to Yonge street, and to have a boat service between the two points. The extension of their road to Schomberg and Newmarket is also under consideration.

Mr. Carman O'Dell, who has been operating the lighting service in Annapolis, N.S., has decided to increase his lighting plant by the addition of a 50 k.w. S.K.C. two-phase generator. He is also adding considerable to his distributing mains, covering a wider area—in fact, nearly doubling the output of the plant. The order for the generator and transformers has been placed with the Royal Electric Co.

A novel and interesting use of the Niagara Falls power is found in a large candy factory at Buffalo, in which all the machinery is operated by electric motors. The chocolate dipping machines, exceedingly ingenious devices, are operated by five horse power electric motors. In another department, a machine which turns out lozenges is driven by a thirty horse power motor.

Mr. J. T. Ayers, of Lachute, Que., has secured a franchise from that town for incandescent electric lighting. For this purpose he has placed an order with the Royal Electric Company for one of their 100 k.w. S.K.C. generators and the necessary transformers and material for the construction of the entire plant. The new plant will be driven by a water power situated about two miles from the centre of the town.

Mr. Herbert Webster, formerly of the firm of Webster & Hicks, Norwich Ont., has secured a franchise for furnishing the town with electric lighting. The Canadian General Electric Company are supplying the entire electrical equipment, which consists of a 700-light single-phase alternator, marble panel switchboard, transformers and wiring. The corporation have contracted with him for the lighting of the streets by forty 32 c.p. incandescent lamps, operated in series.

The Dundas Electric Light Co. have received a franchise from the town of Dundas to furnish incandescent lights throughout the town, and also a contract for the street lighting. Both systems must be in operation by the first of November, 1898. The entire electrical equipment, consisting of a 50 k.w. S.K.C. two-phase generator, with 500 lights capacity in transformers, and all the necessary wire and material, is to be supplied by the Royal Electric Co., and the plant is to be installed at once. Mr. Geo. H. Harper, of Dundas, will be manager of the new company.

Ness, McLaren & Bate, of Montreal, have recently put on the market a new system of office telephones, combining the best features of the magneto system and warehouse battery system, and also using an automatic return switch, dipensing entirely with the service of central exchange or operator. The Montreal Witness building, in Montreal, has been equipped with a complete system of these private interior telephones. The manufacturers claim that the advantages of combining the two systems are apparent to all users of telephone instruments.

Some years ago the Montreal, Park & Island Railway entered into a contract with the town of St. Louis du Mile End, by which they were to supply the town with a first-class electric car service on the leading streets. The company failed to carry out its contract, and the corporation took action against them. The case came up for hearing before Judge Charland, who granted the company a delay of two months in which to carry out its contract. This did not meet with the approval of the Park and Island Company, and the case was taken to the Court of Appeal, where the first judgment was confirmed. Then the company endeavored to take the case to the Privy Council, but their application for appeal was thrown out.

The second general meeting of the British Columbia Electric Railways Company, which is composed of British shareholders, was held in London, England, recently. The president stated that it was again impossible to recommend a dividend on shares, as a large sum of money had been expended in improvements. It was also necessary to ask for a further sum of £100,000, which it was intended to devote towards putting Vancouver in a satisfactory position with regard to electric power. Besides the construction of the Vancouver power house, the improvements of the year included the construction of an entirely new metallic circuit for power business and two small additions to the railway. Mr. R. M. Horne-Payne and Mr. F. S. Barnard were re-elected directors.

Mr. Nelson Moore, of Guelph, Ont., has lately completed a model of an overhead electric railway. The hardwood posts from which the cars are suspended, as well as the base and the arms, are encased in steel and rivetted to prevent vibration. Two iron sockets are suspended from the arms of the post, and into these steel rails are laid. The wheels of the car are built after the manner of bicycle wheels, with steel spokes and ball bearings, which give strength, lightness and ease of motion. The framework of the car will be of strong iron or steel, and the car is suspended from the wheels to a distance of three feet from the ground. The interior is fitted with back-to-back seats, which run the entire length through the middle and are suspended from the top. The inventor claims many advantages for his overhead road. No grading or ground work has to be done in constructing the road; no bridges are required to span streams or cross ditches and ravines. Mr. Moore claims that less power would be required to operate the cars in comparison with the present systems, and that greater speed would be obtained and more effective locomotion secured.

SPARKS.

The Bell Telephone Company have placed a new switchboard in their exchange at Toronto Junction.

The Nova Scotia Telephone Company last month declared the usual half-yearly dividend of 3 per cent

The town of Cobourg Ont, invites tenders up to October 31st for lighting the streets of the town D H Minaker is town clerk

Mr D A Childs has been appointed traffic manager of the British Columbia Electric Railway, to succeed Mr C Aird, who resigned recently

The New Glasgow, N S, Electric Company, Limited, are said to have deeded their property to secure an issue of debentures amounting to $30,000.

On August 30th a fire broke out in the power house of the London Electric Company, at London, Ont, damaging the plant to the extent of $12,000

Mr L. E Whitehead has resigned as superintendent of the Sherbrooke Street Railway, and will be succeeded by Mr R R. Smith of Worcester, Mass.

Messrs. Wm Kennedy & Sons, of Owen Sound, Ont, have just installed a 40 inch Leffel water wheel for the Water, Light & Power Company of Burk's Falls, Ont

The Bell Telephone Company has notified the Quebec city authorities of its intention to place its cables and wires underground in the central part of the city.

The Metropolitan Street Railway Company are anxious to engage in electric lighting, and are seeking franchises from the municipalities along the route of the railway

The Fire, Water and Light Committee of the Winnipeg City Council has recommended that an electric wire inspector be appointed, at a salary of $60 per month

It is rumored that the management of the Chateau Frontenac Hotel in Quebec contemplates running electric motor carriages to and from the railway stations next spring

As the result of a disagreement between the Council of the village of Weston and the Toronto Suburban Railway Company, the car service to that village was recently discontinued by the company

A new telephone company has been established at St. Valier, Que., by which communication is afforded between that place and St Rathael, St Cajetan, d Armagh, and St Phileon de Bellechasse.

At the works of the Royal Electric Company, Montreal, there is a cable under construction for the purpose of lighting two cotton factories by electricity This cable will require 32,000 lbs of copper wire, and will cost over $8,000

The Canadian Pacific Railway Co is building, at its Montreal shops, ten handsome sleeping cars, which will be lighted by electricity, the current being generated by a dynamo operated by connection with the axle in accordance with the system of the American Electric Lighting Company, New York.

The City Council of Nelson, B. C, has raised the sum of $40,000 by debentures for the purpose of purchasing the plant and franchise of the Nelson Electric Company The city now owns both the water and electric light systems Messrs. J. P. Bliss and James Spwat have been appointed city electricians

Messrs. Carroll and Smith, representing the Paris Electric and Power Company, have requested permission from the Brantford township council to erect poles and wires along the Paris road for the purpose of supplying the city of Brantford with electric power It is the purpose of the company to utilize the water power of the Grand River.

The scheme of developing the water power of the Jacques Cartier river at Ste. Catharine, near the city of Quebec, promises to be carried into execution at an early date A company has been organized, with a capital stock of $500,000, and Mr Emerson McMillin as president and Mr E. W. Cooke, of New York, as manager and vice president

The annual meeting of the shareholders of the Parry Sound Electric Light Company, Limited, was held in that town on Tuesday, August 30th The following directors were elected W H Pratt, president, Thomas S. Walton, vice president; W B W. Armstrong, secretary-treasurer J F Mosley, E J Vincent, Rev W. Evans, and J R Stone, M.D

A by law to exempt the West Kootenay Power & Light Company from taxation for ten years was defeated by the ratepayers of Rossland B C The company offered in return to supply the city with four arc lights There is a movement on foot in Rossland in favor of municipal control of the electric light and waterworks systems. The Rossland Light & Power Company asks $85,000 for its assets, which is regarded by some as excessive.

The city of Victoria, B. C, received tenders as follows for arc lamps Canadian General Electric Co., $31 25 each, R B McMicking, $22 50 each for second hand and $32.25 for new ones, Geo C Hinton & Co, $319 for twelve lamps For wire the tenderers were Geo C Hinton & Co., $374.95 for 3½ miles, Nicholles & Renouf $340 R B McMicking $392 75 Canadian General Electric Co, $42[illegible]5 The tenders have been referred to the electric light committee for a report.

It is understood that a company is being formed to develop, for electrical purposes, the water power of Chaudiere Falls, near the city of Quebec. It is proposed to light the town of Levis, to pump water for the town from the St. Lawrence and to supply electric light for the cars of the Intercolonial and other railways at Levis It is estimated that the falls will give 5,000 horse power A number of well-known capitalists, including ex-Mayor William Smith, of Montreal, and Mr Henry Menier, of Anticosti fame, are interested.

The electric light plant at Paris, Ont., was recently damaged by lightning.

The Cataract Power Co., of Hamilton, has placed an order with the Royal Electric Co. for two 250 k.w. and one 180 k.w. "S.K.C." generators.

The town council of Galt, Ont., has passed a resolution that an electrical engineer be engaged to report as to the cost of a municipal electric light plant.

It is probable that the Oshawa electric railway will shortly be extended to Cedardale, where James Robson & Sons have established a large tannery.

The town of Beeton, Ont., has taken tenders for supplying an incandescent electric light plant. Mr. John Galt, C.E., of Toronto, is consulting engineer.

Arrangements are said to have been made for the building of a smelter and refinery at Cranbrook, Ont., and for the installation of a plant for generating electricity.

The statement is made that Mr. James Ross has succeeded in his Birmingham Street Railway deal, and that the road will be converted to an electric system immediately.

The Berlin & Waterloo Street Railway Company have placed an order with the Canadian General Electric Company for two G. E. 1,000 railway motors, with controllers.

It is expected that a telephone company will be formed at Gore Bay, Ont., to provide communication between that point and Meldrum Bay, Silver Water and Evansville. The distance is 55 miles.

The Bell Telephone Company are building a line between Carberry and Neepawa, Man. The company have also in contemplation the construction of a loop line between Winnipeg and Brandon.

William Wilds, electrician of the Toronto Suburban Street Railway Company, was standing on a ladder superintending some repairs to the main wire, when the guy wire broke and he was precipitated to the ground. His leg was broken at the ankle.

The tender of the Canadian General Electric Company has been accepted for the supply of electric generators for the new Victoria Hospital at London, now in course of construction. The London Electric Company will supply the switchboard, at $420.

Messrs. Culverwell and George White Fraser, promoters of the Fenelon Falls power transmission scheme, have notified the town council of Lindsay that they are now prepared to proceed with the work, the necessary capital having been subscribed and the bonds negotiated.

J. Murphy, engineer for the Cornwall Electric Street Railway, has accepted a position in Montreal. Upon severing his connection with the company, he was presented by the employees with a beautiful smoking set as a token of esteem. The presentation was made by Mr. Taylor, superintendent of the railway.

Mr. I. A. Powers has been given, by the Ontario government, a lease of a falls on the Mississaga river, in order to develop a copper mine in the township of Gould. It is said that the falls are capable of developing over 1,000 horse power. Other applications have been received by the government for water powers on the Severn, Wabagoon and Seine rivers.

By the courtesy of the Eugene F. Phillips Electrical Works, Montreal, the ELECTRICAL NEWS has again been honored by an invitation to attend the 20th annual Rhode Island Clam Dinner tendered to the electrical fraternity by Mr. Eugene F. Phillips, general manager of the American Electrical Works, of Providence, R.I. The event takes place on Saturday, September 10th.

On August 15th the ratepayers of Barrie, Ont., by a majority of 170, voted in favor of a by-law to raise $35,000 for the installation of a municipal electric light plant. Tenders for a municipal plant were taken a short time ago, but contracts have not as yet been awarded. The Barrie Electric Light Company claims that the adoption of the by-law means the confiscation of its property, which has cost $80,000.

The Shawinigan Water & Power Company, which purposes to develop Shawinigan Falls, on the St. Maurice river, seventeen miles from Three Rivers, Que., is said to have decided to install a plant capable of developing 100,000 horse power. Messrs. T. Pringle & Son, of Montreal, and W. C. Johnson, of Niagara Falls, N.Y., are consulting engineers for the company, which is composed of Messrs. A. F. Gault, Thomas McDougall, Hon. L. F. Forget, of Montreal, and others.

ERRATA.

In Mr. Wm. Thompson's article on Corrosive and Scale Forming Agents in Boiler Feed Waters, printed in our August number, the position of illustrations marked 1 and 2 was inadvertently transposed.

THE ELECTRICAL ENGINEER INSTITUTE OF CORRESPONDENCE INSTRUCTION.

It is exceedingly gratifying to note the success which has attended the conscientious efforts of The Electrical Engineer Institute of Correspondence Instruction in its attempt to furnish to the profession of electrical engineering absolutely reliable and trustworthy instruction.

Since the organization of this Institute in the early part of the present year, we are advised that every state and territory in the United States, as well as many foreign countries, has furnished its quota of students.

No doubt much of this success must be attributed to the standard set by the Institute, since such eminent authorities as Professor Francis B. Crocker, of Columbia University; Charles F. Scott, the chief electrician of the Westinghouse Electric and Manufacturing Company; Elmer G. Willyoung, the well known electrical instrument expert; William Maver, jr., the celebrated authority on telegraphy; Thorburn Reid, the well known designer of electrical machinery, and many others are included among those who have prepared papers for the courses of the Institute.

Students and others who have investigated the methods of the Institute and examined its series of instruction papers have expressed their complete satisfaction with its methods and its work. The Institute has in this manner gained a large circle of friends almost immediately, and this circle seems to be ever widening. Many manufacturers of electrical apparatus have recognized the value of these courses of instruction to their employees and have consequently afforded the Institute every facility in their power so that its representatives might present to their employees the methods of the Institute. As a consequence students have been enrolled in most of these manufacturing establishments, and the list is growing daily.

We have no hesitation in prophesying for The Electrical Engineer Institute of Correspondence Instruction a continued and growing usefulness.

In connection with the work of the Institute, mention should not be omitted of the beautiful, artistic and interesting book of information, entitled "Can I Become an Electrical Engineer," which is sent free upon request, and which contains one of the most complete and perfect portrait collections of the prominent scientists and engineers who have succeeded in making the profession of electrical engineering what it is to-day. We strongly urge anyone at all interested in electricity to apply for this book at the home offices of the Institute, 120 Liberty street, New York.

The Roberval Telephone Co., Ltd., of Roberval, Que., is applying for a provincial charter.

Mr. Edward Slade, electrical engineer, Quebec, is at present installing a 40 k. w. plant at the Beauport asylum, to light the several buildings belonging to the institution. It is the intention to utilize the water power which they have for their water service to operate the machinery.

The fourth of the 2,200 S. K. C. generators was set up in the Chambly Electric and Mnfg. Co.'s power house at Richelieu, Que., a few days ago, and they have now ready for operation 10,000 h.p. These are the largest electrical units ever built in Canada, and the largest excepting Niagara Falls that have ever been built. Surely electricity is no longer in its infancy, neither is Canada behind in the development of the science.

SPARKS.

Cote & Coursolles, electricians, Ottawa, have lately wired the St. Lawrence Hall on St. Nicholas street for electric lighting.

Commissioner Walsh will recommend the Dominion government to construct a telegraph line from Victoria, B. C., to Dawson.

A syndicate of Montrealers are making arrangements to extend the electric light from Fraserville to Riviere du Loup and Cacouna, Que.

A first-class lineman open for engagement may learn of something to his advantage by corresponding with the editor of THE ELECTRICAL NEWS.

The Electric Reduction Co., of Buckingham, Que., are now installing the large dynamo for their electric plant. The machine weighs nearly 40 tons.

The Benallack Lithographing and Printing Company, Montreal, have ordered from the Canadian General Electric Company one of their latest type motors.

A representative of the Western Electrical Construction Co., of Winnipeg, was recently in Carberry, Man., endeavoring to secure a franchise for electric lighting.

William S. Dockrill, trading in Montreal under the name of W. S. Dockrill & Co., as electrical engineers, has formed a partnership with Ernest W. Sayer, under the former name.

The Deer Park Mining Co., of Rossland, B. C., have arranged with the Kootenay Electric Power Company for the supply of power to operate their mines. The Deer Park Company will shortly let the contract for an air drill plant.

The British Columbia Electric Railway Co., of Vancouver, B.C., have found it necessary to increase their arc lighting plant, and have placed an order with the Canadian General Electric Company for one 125 light multipole Brush arc dynamo.

The Royal Electric Company is installing in the sub-station of the Cataract Power Co., on Victoria street, Hamilton, one of their 30 h. p. S. K. C. induction motors, which is to be used in driving the fans for the air blast transformers.

The Montreal Cotton Co., of Valleyfield, Que., have placed a large increase order with the Canadian General Electric Company for induction motors, consisting of two 50 h.p., one 75 h.p., five 100 h.p. and one 200 h.p. When these are completed the Cotton Company will have one of the largest isolated electric power plants in America, the Canadian General Electric Company having already installed for this company, in generators and motors, a total of between 3000 and 4000 h.p.

The Canadian General Electric Company have just closed a contract with the Lunenburg Gas Company, of Mahone Bay, N.S., for one of their standard 100 kilowatt three phase revolving field type alternating generators. This installation is to be used for the transmission of electric current from a water power, situated about nine miles from the town of Lunenburg, and will be operated without transformers at a potential of 4,000 volts. The company have also received an order for all the wire to be used in the erection of the transmission line.

Following the absorption of the Quebec District Railway Company by the Quebec, Montmorency & Charlebois Railway Company, we learn that the latter company have also acquired the property of the Montmorency Electric Light & Power Company, which furnishes the city of Quebec with electric light and the street railway with motive power. It is understood that the purchase price was about $1,250,000. As a result of the transaction the three companies above named will be amalgamated into one concern, and it is probable that the trains of the Quebec, Montmorency and Charlebois railway will shortly be operated by electricity, and that an electric line will be built to Montmorency Falls.

Mr. John Bourke, of North Bay, Ont., has secured a contract for lighting the streets of North Bay by electricity. For this purpose he has placed an order with the Canadian General Electric Company for a 25 light wood arc dynamo, and 15 double carbon Brush arc lamps.

For some time past there has been friction between the Ottawa Electric Railway Company and its employees. The men demanded a wage of $1.50 for a day of ten hours, and while the company were willing to grant the reduction in the hours of working, they were not disposed to grant the increase in wages. An agreement has now been reached, by which all men who have been in the employ of the company three years and over will receive 15 cents per hour; those under three years and over two will receive 14½ cents per hour; those under two years and over two months, 14 cents per hour. This will apply to all men at present in the employ of the company. Those employed in future will be graded at 13 cents per hour for the first year, 14 cents per hour for the second and third years, and 15 cents thereafter. Ten hours will in future constitute a day's work; over that time will be paid as overtime.

It will be remembered that the city council of Ottawa, Ont., last spring refused permission to the Deschenes Electric Company to supply electric light and power throughout the city. We now observe that a somewhat similar charter has been granted to the Metropolitan Electric Company, represented by a Mr. Lindsay. The Metropolitan Company agree to supply light and power at the following prices: Commercial plan—16 candle power lamps per week, 12c each, no discount. Meter system—1c per ampere hour, 40 per cent. discount and 12 per cent. for cash within 15 days; meters to be charged $1.50 per year instead of $3 as at present. Arc light—2,000 nominal candle power, for places using 3 to 9 lights, 20c per light per night; 10 lamps and over, 18c per light. Electric power—1 to 4 h.p., $50 per annum; 5 to 9 h.p., $45; 10 to 19 h.p., $43; 20 to 49 h.p., $38; 50 to 99 h.p., $36; 100 h.p. and upwards, $34. In view of the granting of this charter, it is improbable that the proposed plebescite on municipal ownership of an electric lighting plant will be taken.

The fourteenth annual meeting of the Royal Electric Co., Montreal was held last month, at which the board of directors was re-elected as follows: Hon. J. R. Thibeaudeau, president; Messrs. D. Morrice, vice-president; H. L. Beique, Allan R. Macdonell, H. S. Holt, J. A. L. Strathy, A. Brunet, Edwin Hanson, Robert Cowans and Wm. H. Browne, general manager. The annual report stated that the gross amount for the year to credit of revenue accounts for the business transactions of the company aggregated $955,826. The expenditure for labor, materials, operation, maintenance and general expenses amounted to $636,057, leaving a gross profit of $319,769. From this is to be deducted interest and fixed charges amounting to $42,609, making an aggregate net profit to the company for the year of $277,160. The lights in operation are direct current arc system, 1842; alternating current, incandescent and arc, 70,089. In motors there are 1041 horse power. In additional equipment last year there was expended $101,707. This includes $58,000 for lighting stations and general construction. The increase in incandescent lights connected during the year was 7,736, or nearly as many as during the two years ending May 31st, 1897. Altogether the report was considered most satisfactory, and augurs well for the future of the company.