PAGES

MISSING

PATENTS.

Below will be found an up-to-date list of patents recently granted to Canadian inventors in Canada and United States, which is furnished by Messrs. Fetherstonhaugh & Company, patent barristers and solicitors, head office, Bank of Commerce Building, Toronto. Branches: Toronto, Montreal, Ottawa, Winnipeg, and Vancouver, Canada and Washington, D.C., from whom all information may be readily obtained.

Canadian Patents.—A. K. Cameron, Montreal, Que., Partition Construction; A. E. Crowhurst, Humber Bay, Ont., Hot Water Heating Systems; L. B. J. Thurston, Stratford, Ont., Ventilators for Cars; E. Degagne, Limoilou, Que., Sounding Devices for Vessels; J. E. Goodman, Montreal, Que., Latches; A. J. Lavoie, Toronto, Ont., Air or Gas Compressors; J. Philips, Midland, Ont., Locks.

United States Patents.—J. C. Boyle, Calgary, Alta., Portable Coasting Device; G. W. Dunlap, Vancouver, B. C. Face-Plate for Cement Block Molds

NEW INCORPORATIONS.

Lloydminster, Sask.—Scott Brothers.

Caron, Sask.—Three Links Building Company.

Nokomis, Sask.—Independent Farmers' Association.

Port Dover, Ont.—Norfolk Gas Company, $60,000. H W. Ansley, F. W. Denton, H. Denton.

Ottawa, Ont.—Aureole Mining Company, $40,000. J. B. Lewis, V. V. Rogers, I. M. Rogers.

Haileybury, Ont.—West Coleman Silver Mines, $750,000. H. D. Graham, E. A. Wright, T. H. Jessop.

Brantford, Ont.—Brantford Co-operative Association, $40,000. M. Carter, P. Noble, T. Chamberlain.

Bracebridge, Ont.—Northern Discovery Company, $40,000. G. Mahaffy, G. F. Armstrong, H. V. Kinsey.

Dryden, Ont.—Fischer Lumber Company, $100,000. L. A. Fischer, Buffalo; M. A. Sanders, R. V. LeSueur.

Winnipeg, Man.—Harpell-Stokes, $50,000; B. J. Harpell, C. W. Stokes, A. D. Harpell. Traders' Building Association, $600,000; G. F. Galt, D. K. Elliott, J. Fisher.

Montreal, Que.—Dupuis Freres, $500,000; J. N. Dupuis, J. L. Dozois, S. Beaudin. Matthews, Fortier and Monette, $75,000; W. E. Matthews, A. E. Matthews, R. G. Code.

Hamilton, Ont.—Hamilton Builders' Supply Company, $40,000; J. W. Nesbitt, J. G. Gault, J. Dickson. Nickel Copper Assets Conversion Company, $40,000; J. Patterson, J. Dixon, J. R. Moodie.

Toronto.—Sharpe Lake Mines, $120,000; H. D. Graham, E. A. Wright, T. H. Jessop. Ballantyne Lumber Company, $40,000; W. J. Foster, Hawkestone; E. Clark, A. E. Clark, Toronto. Grant Contracting Company, $25,000; A. C. Grant, R. B. Coulson, A. B. Barker. Consolidated Gold and Silver Mines of Elk and Larder Lake, $3,000,000; F. Watts, C. Scott, J. L. Galloway. Onario Development Company, $25,000; J. M. Ewing, A. G. Ross, W. S. Edwards. Lion Chemical Company, $40,000; O. Flett, A. E. Heal, M. D. McKichan. Lake Shore Wood Company, $100,000; H. M. Tedman, M. C. McCannel, H. A. Munro.

POSITIONS WANTED

CIVIL ENGINEER and SURVEYOR, age 30, who has completed one and a half million dollars worth of work during the past 2½ years, consisting of excavations, foundations. constructional steelbuildings, railroads, bridges, surveys, etc., is open for engagement. Highest references.

BOX 50,
CANADIAN ENGINEER

TRADE INQUIRIES.

The following were among the inquiries relating to Canadian Trade received at the office of the High Commissioner for Canada, 17 Victoria Street, London, S.W., during the week ending March 13th, 1908:

Lumber.—A Belgian firm desires to be placed in touch with Canadian lumber firms able to supply pit props of firwood, fully stripped of bark. (Length: 1 metre 60; 1 metre 80; 2 ms.; 2 metres 20; 20 metres 50; 3 ms. Circumference at the end 35 to 54 centimetres). They desire quotations c.i.f. Calais or Dunkirk, or the Belgian ports.

Mica.—A Glasgow firm, claiming to have an extensive connection with electrical engineers throughout the United Kingdom, desire to be placed in touch with Canadian firms in a position to export a good quality of mica.

Copper.—A London firm desires to obtain the agency of Canadian exporters of copper and nickel matte, copper phosphates, mica and other minerals; greases, tallow, paraffin wax, etc.; grain, beans, peas, and general produce.

Mica.—Inquiry has been received from a London firm for the names of producers of mica in Canada who may wish to export to the United Kingdom.

Steel.—A Lancashire firm manufacturing lattice steel for lighting and power transmission, and general iron work for tramways and railway purposes, etc., desires to hear from Canadian importers of the same.

Asbestos.—Inquiry has been received from a Montreal firm for the names of United Kingdom importers of mica and asbestos.

Tools.—A correspondent who proposes shortly to open an agency in Montreal for steel and iron tools desires to hear from exporters of such goods in the United Kingdom who might desire his services.

Sluicing Machine.—The manufacturers of an alluvial gold sluicing machine for individual miners wish to arrange for the sale of these appliances in Canada.

Flooring.—Inquiry has been received from a Lancashire firm for the names of Canadian exporters of maple block floorings. They are also interested in mangle rollers and other timber goods.

Tin Plate.—A South Wales firm holding a patent for a tinning process for tinplate works desires to introduce their patent in Canada, and would like to hear from any parties interested.

Asbestos.—A Montreal correspondent desires to hear from United Kingdom importers of asbestos.

From the City Trade Branch, 73 Basinghall Street, London, E.C.:—

Metals.—A London firm of metal refiners and merchants wishes to get into touch with Canadian firms who are prepared to ship metals, such as old copper, brass, gunmetal, nickel, zinc, etc., to this country in considerable quantities.

Oak.—A firm in Rotterdam, Holland, wishes to hear from Canadian shippers of oak.

From the City Trade Branch, 73 Basinghall Street, London, E.C.

A South of England firm desires to appoint agents in Canada for their varnishes, japans and enamels of the highest class; also coach colors.

A Glasgow firm would be pleased to hear from Canadian producers of asbestos, copper, chrome, manganese, and other minerals in demand. Samples should accompany quotations (with analyses).

A Midlands company manufacturing sanitary earthenware and tiles, is prepared to appoint suitable Canadian resident agents to introduce their goods.

A London export, import, and commission firm, who possesses an established connection among buyers of minerals in the United Kingdom, and on the Continent, invites correspondence from Canadian producers of plumbago, mica, and other minerals in demand

A London firm manufacturing hand-power, brickmaking machinery, wishes to appoint resident Canadian representatives to introduce their manufactures.

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The Canadian Engineer

WEEKLY

ESTABLISHED 1893

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Editor—E. A. JAMES, B.A. Sc.

Business Manager—JAMES J. SALMOND.

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TORONTO, CANADA, MARCH 27th, 1908.

A subscriber has for sale bound volumes of the Canadian Engineer for 1893, 1894, and 1895. What are they worth to you?

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PRODUCER GAS.

The Hydro-Electric Power Commission has presented a report regarding the cost of producer gas and other prime movers under the conditions obtaining in the Province of Ontario. The report is very comprehensive, and contains valuable data in reference to gas power plants. It will be welcomed as additional literature on the power question of Ontario.

In July, 1905, the Hydro-Electric Power Commission was created with the avowed object of regulating the generating and distributing of electric power throughout the Province. Many accepted the statement that hydro-electric power was the cheapest for all purposes; others would not accept the statement and combatted it vigorously, while others said: "You will have to show us."

It was not until the spring of 1907 that the Legislature requested the Hydro-Electric Commission to report on the cost of power production through the agency of producer gas and other prime movers.

The report has been presented—its meaning cannot well be misunderstood. The engineers of the Commission are practically unanimous in their finding against producer gas, or in fact against any prime mover other than electricity.

The enquiry has been thorough. Every feature of a power plant has been considered: the steadiness of the load, the location of the plant, space required, the fire risk, attendance necessary, capital outlay, and reliability. The statistics have been tabulated so that comparisons are made easy, and in the summaries the conclusions of the engineers are concisely stated.

The engineers of the Commission are to be congratulated on the clear, systematic manner in which they have presented their information and their practical suggestions.

We do not for one moment suppose that this report will still the controversy, Gas Producer Plants vs. Electric Power. Men do and will think of the Commission and their engineers as a body of hydro-electric experts partial to hydro-electric installations. This report leaves but one course open to the Commission and the Government. They must give us power. They must give it now, and it must be hydro-electric power.

We are of the opinion that a report made by engineers independent of the Hydro-Electric Power Commission would have been more kindly received.

FUTURE WATER POWER.

The people of Canada have spent many thousands of dollars on the development of water-power. In the coming years many thousands more will be spent, but so much has been spent and so much will be spent without sufficient data being first secured that we sometimes fear hydro-electric power development will one day receive a serious setback.

Frequently the rating of rivers and streams leading to a storage basin is confined to one season. The municipality or company do not care to wait for more information, and the engineer cannot refer to Government reports and records covering various years, so must go ahead, trusting that he has made due allowance for variation in amount of precipitation and excessive evaporation or run-off.

This is a matter for both the Provincial and Dominion Governments. The Dominion Government should increase and extend their facilities for securing, recording and tabulating the rainfall and snowfall in every section of Canada. The Provincial Governments may very properly be expected to rate the flow of the various rivers and streams of the Provinces, and it is also as important that this rating should be carried on during different seasons and throughout several years, otherwise they will be valueless.

This is a matter for engineers. They, more than any other class of citizens, appreciate the value of such records. They, better than anyone else, can discuss this matter and make plain the necessity of the work. Engineering societies might very properly take the initiative and urge the necessity of the work.

PRODUCER GAS PLANTS vs. ELECTRIC POWER.

The cost of power production through the agency of producer gas plants and other prime movers under the conditions obtaining in Ontario is dealt with fully by the recent report of the Hydro-Electric Commission.

The general summary states that users of small amounts of power will be best served by electricity where it can be obtained at a price per electric horse-power not exceeding by more than 15 per cent. to 25 per cent. the cost per brake horse-power developed by gas, gasoline or oil. Users of large amounts of power where the load fluctuates, says the report, will be justified in paying for electric power 30 per cent. more than the cost per brake horse-power obtained from gas, gasoline, etc. The summary adds that where the cost of producer gas power per brake horse-power does not work out 15 per cent. below the cost of hydro-electric power per electric horse-power it will be advisable to use the latter.

Many pages of the report are taken up with tabulated statistics. It is found that with a 500 horse-power producer gas engine running full load for 3,000 hours a year (ten-hour day), the power costs $21.86 per horse-power per year. Under the same conditions, with a 100 horse-power engine, the cost is $27.32 per horse-power per year; with a 50 horse-power, $30.66; and with a 10 horse-power, $64.70. If the conditions are changed so that the engine works 6,600 hours a year, the cost would be with 500 horse-power $36.40 per horse-power per year; with 100 horse-power, $45.54; 50 horse-power, $51.32, and 10 horse-power, $107.09.

The cost varies as the load varies, however. and in the report is a statement showing the cost when the engines are running at 75 per cent. of rated capacity. For the ten-hour day under such a load with a 500 horse-power engine the cost of the power used would be $27.43 per horse-power per year; 100 horse-power, $34.62; 50 horse-power, $39.58, and 10 horse-power, $84.37. Working 6,600 hours a year at the same load the figures are: 500 horse-power, $45.22 per horsepower per year; 100 horse-power, $56.76; 50 horse-power, $65.56; 10 horse-power, $138.61.

Cost Includes.

This cost includes fixed charges, maintenance and repairs, labor, anthracite coal at $5 a ton, oil, waste, and sundries. The fixed charges include interest on capital, invested at 5 per cent.; depreciation in machinery, 6 per cent.; depreciation on buildings, 2 per cent.; insurance and taxes, 2½ per cent., and repairs on building, 2 per cent.

The total capital cost, including building, etc., for a 500 horse-power producer gas engine is placed at $35,162, while for a 10 horse-power engine it is $1,867. The maintenance account for 500 horse-power for a ten-hour day a year is placed at $618.24; labor, $1,200; and oil, waste, etc., $750. The fuel bill, of course, varies considerably with the load factor, though not proportionately. For a ten-hour day, the engine running at full load, the yearly fuel bill is given as follows; 10 horse-power, $93; 30 horse-power, $261; 50 horse-power, $390; 100 horse-power, $750; 300 horse-power, $2,250; 500 horse-power, $3,750.

The report's figures regarding the yearly cost per horse-power for gasoline power is in most cases about double that of producer gas, while the prices regarding natural gas and steam vary greatly according to the cost of fuel, etc.

Reliability.

In reference to reliability of producer plants the report says:—

"Although the producer gas plant has not been long in commercial existence in this country as compared with other prime movers, there is no reason to anticipate that satisfactory results cannot be obtained with it where it is used within its proper limits. To ensure these results it is necessary that a producer plant be suited to the conditions under which it works, that the type is selected and the plant installed under the supervision of a competent person independent of the selling agents, and that a trained man be placed in charge of it. A power user to-day would not be justified in investing in a producer gas plant unless the estimated saving in the total cost of power was sufficient to compensate him for an unreliable service. The producer gas plant compared to the steam plant is new, and the later plants give a more reliable service than the original types, so that in the future it may be anticipated that a type of producer gas plant will be evolved which will admit of comparison with the steam engine or electric motor on the basis of reliability under ordinary working conditions. An examination of a large number of plants for the purpose of this report has shown that the average reliability of the producer gas plant at present is not sufficient to admit of any comparison with that of the steam engine or electric motor."

Mr. F. T. Stocking examined eight producer plants in Canada. Four of these he found abandoned and four giving a measure of satisfaction. Two of the four, however, were owned by firms interested in producer plants. Mr. Stocking says:—

Faulty Accounting.

"The system of accounting as employed by small users of power has no doubt led to the impression that the gas producer engine is about to become the chief means of securing power in progressive manufacturing establishments. Costs of attendance and fuel are considered to be the only factors worthy of consideration when comparing the economic value of different prime movers. The charges against capital, repairs, failures of power and numerous minor expenses are usually placed in the background or entirely overlooked. The question of load factor is also little understood by the average power user. Costs are usually based on the full load conditions, which, in the ordinary factory, obtain for only a short time, while for the remainder of the day a very much smaller load is being carried. In the majority of cases, the average day load throughout the year is less than half of the maximum for that year. The overload capacity of the average gas engine is almost nothing. In buying an engine, some margin must of necessity be left for unusually busy days, for a poorer grade of coal than the ordinary, and for at least some slight addition to the load in the future; hence, the gas engine in the ordinary factor is compelled to carry an average load of less than one-half its rated capacity. (This statement would be considered erroneous by the majority of people, but it is nevertheless true)

There are some special cases where the load can be maintained almost constant for the whole year, but these are very exceptional. It follows, therefore, that the average gas power user is paying for his power just double what he considers to be the case. This neglect of considering the effect of load factor on the costs has led, more than anything else, to an optimistic view of the gas producer question.

Location Important.

"Another erroneous impression which the public appears to hold is that a small gas producer (since it requires no smoke stack) may be placed in almost any part of a building

without bad results. In reality, the location for a producer plant should be selected with even greater care than for a steam engine, as the question of ventilation is of great importance. The exhaust is more troublesome than that from a steam engine, owing to the quantity of gas emitted and the noise. The gas plant is admitted to be less reliable, so far as continuity of service is concerned, than the steam engine.

"A small gas plant, however, has the advantages over steam, in so far that no black smoke is emitted, costs for fuel and attendance are less, and also the total yearly costs, and the plant may be started, everything being cold, more quickly than the steam plant.

"The gas plant may be used to good advantage where continuity of service is not of prime importance, and where electric power cannot be obtained or where the cost of such power is excessive. The costs of producer power are much greater than usually given. These costs are usually based on a test carefully made under full load conditions. Figures received from the users of producer power usually omit fixed and other important charges, and are almost invariably based on the assumption that the average yearly load is approximately equal to the maximum load carried."

The section of the report prepared by Mr. Emil Stern is more favorable to producer gas plants. Mr. Stern visited some twenty-four producer plants in the Eastern States, and, after referring to each plant, separately, he summarizes as follows:—

"In obtaining information the principal object was to find out what the users of producer plants are really doing, and also to allow the public to pass its own judgment on this question, enabling them to make proper comparisons between the figures offered by gas producer plant manufacturers and those offered by concerns supplying power by other means.

Producer Gas Not Total Failure.

"Up to the present time it is impossible to pass a final opinion regarding producer gas, gas producers and producer gas engines. Producer gas cannot be declared a complete success, because many plants do not give satisfaction, and are unreliable and expensive to operate, on account of high oil and water consumption, high wages, repairs, and capital cost. But producer gas cannot be considered a total failure, because many plants have been in successful operation for years, they are absolutely reliable, the attendance, repair, fuel, water and oil consumption being low.

Lack of Knowledge and Experience.

"The reason for the partial or total failure of producer gas plants will always be found due to a lack of knowledge and experience. This lack of knowledge and experience may generally be ascribed to ignorance in the design, building, installation, and operation. None of these instances have come down to a standard in Canada and the United States, and ignorance of one of these four points is sufficient, of course, to make a gas producer plant a failure. In most cases, where plants have been bought of and installed by a reliable concern, they will work satisfactorily, providing that an intelligent and reliable man is in charge of same. This last point is essential to the success of a producer gas plant.

"It is generally claimed by the manufacturer of gas producer plants and engines that no mechanic or licensed engineer is required to run the same. This is true to a certain extent, and I have found in several cases a plant in successful operation being run by a man who had no mechanical knowledge whatever. In one case a man was found in charge of the heating, boiler, gas and electric plant, who had changed from a horse driver to an engine driver over night. The manager of the factory stated that this man replaced a licensed steam engineer, who was not able to manage this plant at all, and in consequence of the change the fuel consumption had been reduced from six tons a week to three tons a week, for the reason that the steam engineer used to draw the fire as in a boiler, thus wasting half of the fuel. The fact that this firm had a licensed engineer, who was a high salaried man, shows that this change was not due to any financial consideration; it simply shows that the right class of men are not generally available to run gas producer plants.

"General experience goes to show that in most cases a green man does better work than an old steam engineer.

"In many cases manufacturers have abused their customers by doing the experimenting for them at the customer's expense. This has certainly done harm, not only to the experimenting party, but to the whole trade. In other cases it is impossible to do all the experimenting at home, for instance, if a steel company orders a 2,000 horse-power engine for blast furnace gas, it is impossible to try it in the shop, and the manufacturer should not be blamed if it takes some time to get the engine into proper shape.

"Generally speaking, producer gas is being introduced slowly but steadily. Like every new thing, it requires time for development, and we may trust that it will shortly be allowed to take its part in Canada's power generation as it already does in England and other European countries, helping to increase the industry and manufacturing capacity of our country."

ELECTRIC HEADLIGHTS ON LOCOMOTIVE ENGINES.

Owing to the numerous reports the Board of Railway Commissioners has received from its inspectors relating to the poor condition of the headlights on a large number of locomotive engines in use on the different railway systems in Canada, the Board has had under consideration the advisability of requiring the railway companies subject to its jurisdiction to use an electric system of headlights, or some other good system that will give satisfactory light for the protection of life and property.

Through their secretary, Mr. A. D. Cartwright, the Board are requesting suggestions, in writing, in reference to such a proposal.

ENGINEERING SOCIETIES.

CANADIAN RAILWAY CLUB.—President, W. D. Robb, G.T.R.; secretary, James Powell, P.O. Box 7, St. Lambert, near Montreal, P.Q.

CANADIAN STREET RAILWAY ASSOCIATION.—President, E. A. Evans, Quebec; secretary, Acton Burrows, 157 Bay Street, Toronto.

CANADIAN INDEPENDENT TELEPHONE ASSOCIATION.—President, J. F. Demers, M.D., Levis, Que.; secretary, F. Page Wilson, Toronto.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—413 Dorchester Street West, Montreal. President, J. Galbraith; Secretary, Prof. C. H. McLeod. Meetings will be held at Society Rooms each Thursday until May 1st, 1908.

QUEBEC BRANCH OF THE CANADIAN SOCIETY OF CIVIL ENGINEERS.—Chairman, E. A. Hoare; Secretary, P. E. Parent, Po. O. Box 115, Quebec. Meetings held twice a month at Room 40, City Hall.

TORONTO BRANCH OF THE CANADIAN SOCIETY OF CIVIL ENGINEERS.—96 King Street West, Toronto. Chairman, C. H. Mitchell; Secretary, T. C. Irving, Jr., Traders Bank Building.

WINNIPEG BRANCH OF THE CANADIAN SOCIETY OF CIVIL ENGINEERS.—Chairman, H. N. Ruttan; Secretary, E. Brydone Jack. Meets first and third Friday of each month, October to April, in University of Manitoba.

ENGINEERS' CLUB OF TORONTO.—96 King Street West. President, J. G. Sing; secretary, R. B. Wolsey. Meeting every Thursday evening during the fall and winter month.

CANADIAN ELECTRICAL ASSOCIATION.—President, R. S. Kelsch, Montreal; secreary, T. S. Young, Canadian Electrical News, Toronto.

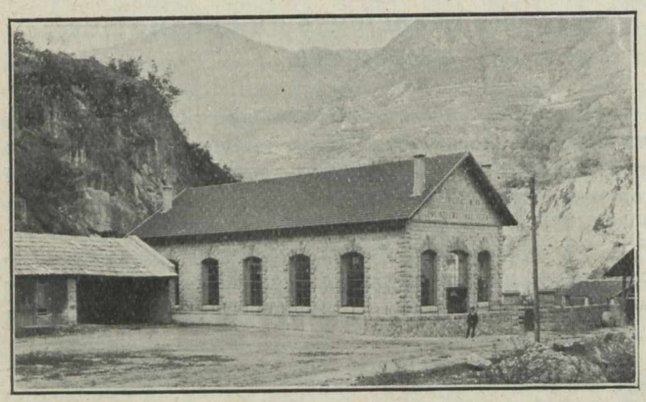
CANADIAN MINING INSTITUTE.—413 Dorchester Street West, Montreal. President, W. G. Miller, Toronto; secretary, H. Mortimer-Lamb, Montreal.

AN IMPORTANT POWER TRANSMISSION DEVELOPMENT IN AUSTRIA-HUNGARY.

By Frank C. Perkins.

One of the most interesting power plants in Austria-Hungary is the hydro-electric plant at Zwolfmalgreien in Tirol, which has a total capacity of 2,000 horse-power. This three-phase power and lighting installation was constructed by the Maschinenfabrik Oerlikon, of Oerlikon, near Zurick, Switzerland, the turbines being of the Leffel wheel type of Rasch design. The hydraulic work and cranes were installed by the Maschinenfabrik J. Ig. Rasch, of Dornbirn, Vorarlberg.

The current is transmitted by overhead and underground transmission lines, for both light and power from the Zwolfymalgreien Station to Bozen and Gries, at a pressure of 3,600 volts. The two overhead transmission lines each consists of three bare copper conductors 7 mm. in diameter, one group being utilized for the lighting current, and the other for the power current. The overhead lines are carried on wooden poles 15 meters in length, and 18 to 28 cm. in diameter at the top, the poles being placed 1.6 to 1.8 meters in the ground. The transmission line is installed along the



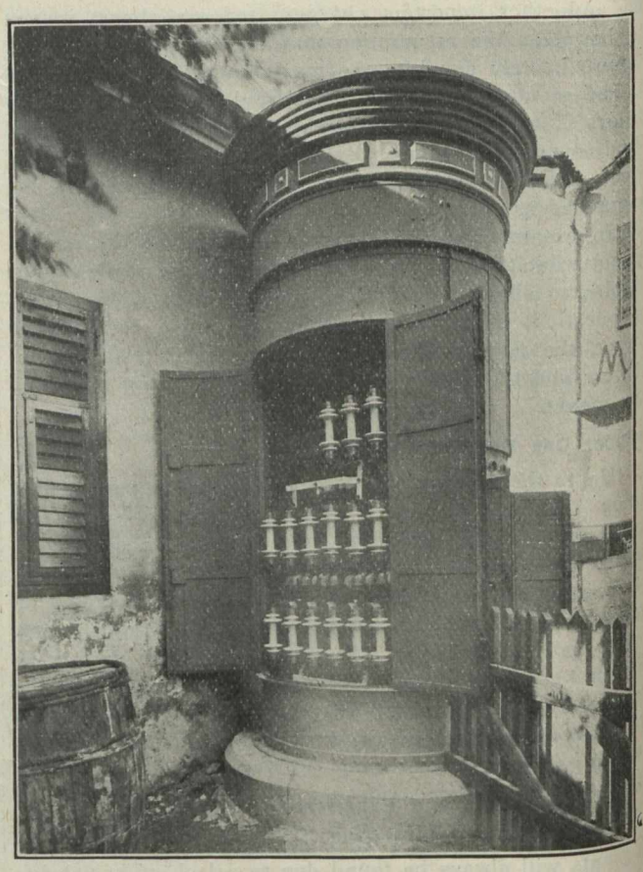
Power Station, Zwolfmalgreien.

left bank of the Eggenthalerbach, as far as Gansnerhof, where a high tension transformer tower is located, the line then crosses the stream passing along the right bank to Eisack, where a terminal tower is located. This tower contains the necessary connections and lighting arrestors for the junction of the overhead wires with the underground cables. The total length of the overhead lines is 800 meters, the weight of copper used being 1,700 kilograms, while the total length of the underground cable employed is 10090.2 meters, of which 5080.1 is a three conductor cable of 25 square millimeters section, and the remainder, which has a section of 15 square millimeters of copper for each of the three conductors is 1721.7 meters in length. These cables are insulated with paper, lead covered and iron armoured and are laid 700 mm. below the surface. The terminal tower is 6.75 meters high, of rectangular section 1.9 meters, the cement walls being 350 mm. in thickness, to various transformer houses in Bozen and Gries, where the current is transformed to lower voltages for the overhead distribution circuits.

On account of the necessity of providing drinking water for these towns, it was thought best to combine the water system with the power transmission plant, water for both being obtained from the same source.

The necessary water for the hydro-electric station is obtained from the Eggenthalerbach, which is reinforced by the waters of the Zangenbach and Welschnofenbach, and empties into the Eisack at Kardoun. The water supply for the electric station consists of 1,000 liters per second, the dam being located at a distance of 3.375 km. from the power house. The dam is 60 meters in length and 4.5 meters thick, and lies 516.1 meters above the sea level. The water is carried by means of a canal, 100 mm. wide and 2,500 mm. high, a distance of 3403.27 meters to the Wasserschloss, which is located on the side of the mountain above the power house, 511 meters above the sea level. At this point a steel pipe 416.4 meters in length conveys the water down to the power house, the net fall being 208 meters. This pipe is 5 mm. thick near the upper part, and 15 mm. thick near the power station, the diameter of the pipe being 900 mm., and it is constructed of 6 meter lengths, wrought iron being employed at the joints near the top and cast steel near the power house. The maximum discharge is 1.42 meters per second or the equivalent of 2,000 horse-power. The power station is located near Kardoun on the left bank of the Eggenthalerbach, about 700 meters from where the latter empties into the Eisack. The station has a floor area of 374.5 square meters, of which the turbine and generator room occupies 275 square meters, the switchboard room 35.4 square meters, and the workshop 29.55 square meters.

In the turbine and generator room are installed five units having a total output of 2,500 horse-power, an overhead travelling crane of 7.5 tons capacity being provided for handling the heavy parts in mounting and repairs. Four of the turbine sets are in use, the fifth being held in reserve in case of emergency. The station is lighted by a number of incandescent lamps, and three arc lamps in series using a current of 15 amperes.



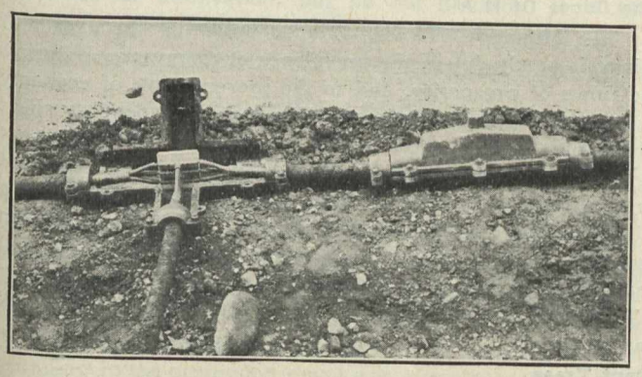
Low Tension Side of Transformer House.

The turbines each develop 500 horse-power under a head of 208 meters, and use 226 liters of water per second. They operate at a speed of 500 revolutions per minute, and are direct connected to Oerlikon three-phase alternators, supplying currents of a frequency of 50 periods per second, and 36,000 volts with cos=.8. The turbines have an efficiency of 80 per cent., and the governors control of the speed within 3 per cent. at 50 per cent. change of load, and 6 per cent. at 100 per cent. change of load. Each set is provided with a flywheel weighing 3,250 pounds, measuring 1,450 mm. in diameter, and the turbines and generators are connected by means of flexible insulating couplings.

The bore of the armature of the three-phase generators is 1,400 mm., and the armature has 72 slots, with two slots per pole per phase and two sets of 18 coils. Each coil has 17 turns of two copper conductors having a section 4 mm. x 4.6 mm. The diameter of the field magnet is 1,390 mm. giving an air gap of 5 mm. on either side. The twelve field exciting coils have each 40 turns of copper strip 3 mm. x 33 mm., the insulation being .5 mm. in thickness between the strips. The exciters supply a current of 200 amperes each, and are supplied with twelve carbon brushes, measuring 24 mm. by 16 mm. The exciter for each alternator is mounted on the same shaft with the revolving field outside of the

main building, upon a small shelf extending from the alternator frame provided for the purpose.

The switchboard room is located at the right of the generators, and is provided with the usual measuring instruments and switches for controlling the exciters and three-phase machines. A 7 K.W. transformer is provided for operating the arc and incandescent lamps for the station. The two transmission lines leave the power house through two windows after passing the usual cutouts, lighting arrestors and kicking coils.



Cable Junction Box.

The transformer houses are of the cylindrical tower type with doors, one of which allows the examination of the high tension connections, another the low tension connections, and the third the step down transformers. These transformer stations are 6 meters high and 1,600 mm. in diameter. They receive the current from the underground cables at high tension, and after transforming to a lower pressure it is carried out of the tower to the overhead lines.

The lighting circuits are supplied by twelve transformers at Bozen and Gries of 137.5 kilowatts capacity, the current for lighting having a pressure of 150 volts. There are in operation for street and residence lighting about 2,000 lamps of 5 to 25 candle power. On the power circuits, all motors having a capacity of over 5 horse-power are provided with separate transformers. The current is measured by meter and contracts are also made at standard rates per lamp per year and per horse-power per year, the service being provided day and night.

RELATION OF COAL TO BOILER EFFICIENCY.

"There are a number of opinions regarding the various coals and the boiler efficiency possible to obtain from them, but I think frequently people have been misled by changes in the method of firing, etc., which have been responsible, and not the quality of coal." So said Mr. E. G. Bailey, of the Arthur D. Little Laboratory, of Boston, in a recent address. He continues: "A fireman, in making a series of tests of different kinds of coal, cannot possibly do justice to each one of them, when they are of different character, by firing with one kind one day and another the next. He must learn how to handle the various coals in order to get the results which it is possible to obtain from them if he were firing them continuously.

"In every boiler-room the thing of primary importance is to keep steam regardless of efficiency if you are going to keep your cars moving. But in designing a plant or making changes, efficiency should be considered as well as the ability to keep steam. There are certain conditions where the boiler capacity is limited, the grate area is small, and the draft is not very strong, so that only the very best of coal can be burned. In such cases they must confine themselves to Pocahontas, New River, or George's Creek coal, regardless of the price. But if the quality of coal coming into a market be sufficiently different, and there is such difference in price that the cheaper coal would be a great saving at the end of the year, it will pay almost anyone to make decided changes in their boiler plant, if necessary, in order to take advantage of the coal which will give them the most evaporation per dollar. Many people consider the cost of a plant of primary importance, but the fuel bill will eat up the price of a new plant practically every year, so that it only takes a difference of a few per cent. in waste, as far as boiler efficiency is concerned, to repay anybody for taking very decided steps in improving boiler conditions so they will be able to burn the cheapest fuel.

"Although you do have your plant designed so you can handle the very poorest grade of coal coming into the market, there are certain conditions entering which may prevent you from getting as high efficiency as from the best of coal. One of these is moisture. The higher the moisture in the coal, the less efficiency, because that moisture must be evaporated before the water in the boiler can be. This is of very little importance, except in cases of "crop" coal, such as I spoke of a while ago, except when you travel further west. As you go through Ohio and Illinois, where the coal runs very high in moisture, this item is of considerable importance, as compared with the eastern coals. The high volatile gives a chance for loss when burned under ordinary conditions. A furnace can be designed so that all of this is burned and little or no loss results from it. Take a boiler which gave good efficiency with anthracite coal and put a gas coal of 35 per cent. volatile in that furnace, and you will have a decided loss, because your hydrocarbons are cooled before they can become completely burned. It takes a longer time to mix those gases with the air, and if the temperature is reduced before that mixture is complete, your flame is extinguished and loss results. The Chicago Edison Company has met this problem very successfully. The Illinois coal which they burn is high in ash and sulphur, and has many difficulties along the mechanical line to be considered. The volatile matter is very high, and the question of unburned gases and smoke has been a considerable annoyance, not only to them, but to other people in that district. They have now a furnace in which they have an abnormally large combustion chamber, and claim that there is practically no smoke. I have seen their stack several times and have never seen smoke coming from it."

SURVEYS NORTH OF EDMONTON.

A party of surveyors is in the city preparing for an early trip north. H. S. Holcroft, who was out last year, is at the Alberta Hotel. The destination of this party is the Peace River district, where they will be engaged for a year in subdividing and road mapping for the Dominion Government. Mr. Holcroft is taking a party of 14 men as chainmen, rodmen, axemen, and instrument men, and they will probably be out for a year. In any case they will not be back till after January 1st, 1909, and a lot of work is to be done. The supplies will be taken with them as far as the Peace River Landing, which will be used as headquarters.

G. B. Dodge, D.L.S., of the Government Topographical Department at Ottawa, has left for the north to undertake some work at the point where the 5th meridian crosses the Athabasca River. The nature of the work is to make some observations at that point, after which Mr. Dodge and his assistant will return to Ottawa. It is very light work and no extra party is being taken. The trip will be made on horseback from Athabasca Landing, where supplies will be purchased.

C. C. Fairchild, D.L.S., from Brantford is organizing a party to start for the Pembina district, where he will continue the work of sub-dividing started last year. A party of 16 is being made up and the work of securing supplies and necessities is rather strenuous. The party will remain out till late in the fall. The trip, according to Mr. Fairchild, will be made as soon as possible in order to get to the Pembina before the winter breaks up, as the trails are nearly impassable when there is no snow on the ground.

In 1907 from the Island of Trinidad there was shipped 128,740 tons of asphalt as against 125,562 tons in 1906.

AS SEEN BY OTHERS

Why?

The News.—When the City Engineer declares that a certain type of boiler is not the kind required for the pumping station, why should Council insist on shouldering it on the department?

Noise in Subways.

Inventive Age.—Investigations are being made to decrease the noise made by trains in subways. The reflection of the sound waves from the walls causes a deafening roar, unpleasant alike to travelers and to those in the vicinity. One chief cause of the noise is the friction of the wheels on the rails, especially on curves. A remedy for this has been found in replacing vehicles on fixed trucks by long cars on bogie trucks. Mufflers are also to be installed on rails and wheels, which are the principal sources of vibration. The shaking of the earth itself is to be deadened by the use of asphalt instead of concrete foundations, and the walls of the tunnels are likewise to be coated with asphalt, which has the property of absorbing sound. It is also suggested that the wheels should be made of disks, separated by some deadening substance such as wood, papier-mache or rubber.

The Bonus System.

The Mail and Empire.—That the time has come when the offering of money to industries to move from this place to that should cease everybody must admit. The plan creates uncertainty, and its results are seldom what are expected.

The Factor of Safety in Structural Design.

The Practical Engineer.—As our knowledge with regard to the nature of the stresses in materials of construction increases, the so-called factor of safety will become a much more definite quantity. At present it is a combined factor of safety and ignorance, and when we design a mild-steel structure with a working stress of 7 tons per square inch, and say that the factor of safety is 4, we do not really mean that four times the estimated load could ever occur, or that it is necessary to allow for such a large increase in load. It is necessary, however, to use such a factor in order to make ample allowance for emergencies due to additional loads and also to additional stresses that we do allow for in our calculations.

Swallowing a Camel.

Electrocraft.—The old saying about straining hard at a gnat and complacently swallowing a camel seems to find some application in the existing situation in the inspection field. New installations, which, generally speaking, have but few serious defects, are religiously inspected, whereas old installations, which frequently reek with horrors are, as a rule, calmly ignored; and all the while inspection bureaus and underwriters' associations and electrical committees take on airs of vast importance and beat the official tom-toms with great vigor.

One feels that the situation logically calls for tears, but there is such a delicious touch of human nature in it all that amusement usurps the deeper feeling. But the humor of it should not be allowed to conceal the fact that we have been making a terrible fuss over the inspection of new, and relatively safe, work and cheerfully forgetting that the real seriousness of the electrical fire hazard is mostly to be found in old and decayed installations.

Quebec's Wants.

The Quebec Chronicle.—There are four things more particularly important to Quebec in this stage of her history, ... These four things are, first the construction of a graving dock sufficiently wide and capacious to accommodate the naval leviathians of modern days; secondly, the infusion of new blood into the Harbor Commission, and its reorganization on a similar basis to that of the Harbor Commission in Montreal; thirdly, the equipment of the harbor with wharves and freight sheds, elevators, cranes, and all the requisite paraphernalia that go toward making a first-class port, such as it is fitted to become by its natural advantages; and fourthly a thoroughly friendly and satisfactory understanding with the Canadian Pacific Railway Company.

The Cause Of It All.

The Monetary Times.—The change in the aspect of things is partly due to the prevalence of extravagance during the times of prosperity, and to the present wave of economy during equally as good times. The careless, spending spirit of the past largely accounts for the tendency of the present to think twice before spending. Really easy money may not be this year. Probably during March, April, and May a slight loosening of the purse-strings will be observed. When thoughts of the harvest are in mind, Western Canada will have the ear and coin of the East. During the present trifling setback neither panic, fiasco, nor anything of that ilk has occurred.

Plant Trees.

The Brockville Times.—What is Canada doing to preserve its forest wealth? For many years we have advocated the formation of a strong Department of Forestry at Ottawa which will not only preserve what is left of Canadian forests but will also carry on a vigorous system of tree-planting with a view to the future.

Furthermore, tree-planting ought to be encouraged from one end of Canada to the other in town, village and country. Let us have plenty of trees. They are good for the land, good for the eye, good for the mind, and last—and least—they are direct revenue producers.

Railways Ask Fair Play.

The Railway World.—Hardly a week passes that some railway official does not in an address or interview bring forcibly before the minds of the producers and shippers, the baneful influence of restrictive railway legislation not upon the railroads, who have ceased their useless appeals for sympathy, but upon the shippers, the class which has inspired the attacks upon transportation interests. . . . The railroads do not ask what is unreasonable. They only demand to be allowed to earn the same rate upon their investment that is freely accorded to all other classes of business. If this permission is given them, they stand ready to do their part in the industrial development of the State.

The New Rector.

The Times.—In appointing Professor Bovey, F.R.S., Dean of the Faculty of Applied Science in the McGill University, Montreal, to the responsible position of rector of the Imperial College of Science and Technology, the governors of that institution have taken a bold step, but one for which there is ample justification, as we believe will be proved by results. . . . Professor Bovey has shown not only that he can impress influential and wealthy citizens and corporations with the advantages of advanced scientific training, but that he can also successfully organize the extensive resources provided by the liberality of such donors. Moreover, Professor Bovey's appointment to the newly-established rectorship has a wide and Imperial significance, which alone is commendable. This appointment may, therefore, be welcomed both from the practical and from the sentimental point of view, and the governors may be congratulated on having taken a step which should advance the Imperial College a stage further along the difficult path towards the realization of the high ideal which its well-wishers have imagined for it.

Mr. Sothman's Position.

The Hamilton Herald.—In the circumstances the Herald can see no reason for accusing Mr. Sothman of dishonesty in agreeing to prepare the specifications for the civic lighting plant which it is proposed to install in Hamilton. If, however, there is anything objectionable in his acceptance of this commission, the only persons who have any cause to complain are the members of the Government Commission—and they don't appear to have made any objection.

CORRESPONDENCE.

[This department is a meeting-place for ideas. If you have any suggestions as to new methods or successful methods, let us hear from you. You may not be accustomed to write for publication, but do not hesitate. It is ideas we want. Your suggestion will help another. Ed.]

ENGINEER'S EDUCATION.

Sir,—I have read with interest the article headed Matriculation Standards in your issue of February 21st, and as a graduate of the School of Applied Science would like to express my opinion of the solution of an engineer's education. Is the School of Science turning out engineers? Let me tell my experience. On receiving my diploma in the Department of Civil Engineering I applied for work, and stated as my standing in the profession that I was a graduate of the School of Science. Some engineers asked if I had any experience and offered me a position as chainman, while others wanted to know if I could make tracings, and would give me a position as draughtsman. My School of Science diploma was a joke to them all. My education had cost several hundred dollars, and I had spent the most of my twenty-one years in school, so to be offered a position at thirty dollars a month was rather discouraging. I did not find enployment as transet or level man that summer, so hired as chainman and topographer on a survey in the fall. I soon realized my position and started to educate myself in engineering, the mathematical course I received at the School of Science helped me very much, but I could not see the application of the vast amount of theory I had accumulated in the lectures. If I had taken my School of Science course over after I had a year or two experience I would have received twice the benefit, and would have been able to at once put my studies into practice.

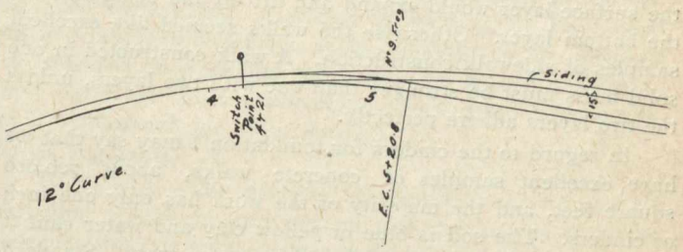
Matriculation standards do not appeal to me to be the whole solution of the problem. It would be as well for a student to finish his mathematical course in arithmetic, algebra, euclid, and plain trigonometry before he leaves the high school, this would permit the lecturer to apply these subjects in the solution of scientific problems, and lessen the work of the university staff where the student now attends lectures in algebra and trigonometry. But while the solution of these scientfic problems may be perfectly clear from a mathematical standpoint, they mean nothing to the student who does not see their application, and the high standing on entrance to the school does not help him. A student may go through his course with honors, and after he graduates he fails to make an engineer because he cannot apply the theories. It is not the honor men that make the best engineers. Young engineers should have practical experience while their education is in progress. After passing the specific matriculation examination for entrance to the School of Science, the student should get employment for at least a year as chainman, rodman, or any junior position in connection with engineering work, where he will receive experience in the life of an engineer, and this would create an ambition for the solution of problems, which he cannot yet understand. This break in his school life will make him feel the more serious side of his education, and he will commence his new studies with increased interest and energy. If he finds during this year of trial he does not care for the profession, or that he is not strong enough for the outdoor life, it is then the proper time for him to change his course, for he will never make an engineer. I heard graduates say that they had no idea the life of an engineer was so unsettled. They had visions of a city engineer's office but it did not materialize. Over half of the students that enter the School of Science do not know and are not physically fit for the life that is before them.

Yours,

Toronto, March 17th, 1908. F. F. Clark.

TURNOUT PROBLEM.

Sir,—B. A. R. asks solution of accompanying diagram. Webb (p. 279) shows that the increase in lead due to curvature is only 1½ inches.



This makes lead 72.13+.15=72.3.

Distance P F to E C=99.2–72.3=26.9.

The curve of siding would probably be lined in by eye, but should we desire to run centres we can find degree and length of curve by calculating perpendicular distance of P F to tangent of siding produced.

The angle of curve is known, being I of 26.9 ft. of 12° curve + frog angle, a total of 9° 36′.

With these as data we find curve to be a 7° 14′, with a length of 132.2 ft.

March 24th, 1908. Yours, A.

CONCRETE SIDEWALKS.

Sir,—I notice in your issue of March 20th a set of specifications for sidewalks as adopted by the Convention of the National Cement Users' Association at Buffalo; also a letter from a town engineer enquiring what should be good specifications for concrete walks.

While I have every respect for their specifications and will admit that standard practice demands a bottom layer and top layer, still I have obtained excellent results with the following specifications, and would prefer to use them altogether.

Foundation.—Foundation shall consist of one inch of well tamped cinders or gravel.

Concrete Walks.—The concrete walks shall be four inches in thickness, and shall be composed of one part by volume of approved Portland cement, two parts by volume of clean, sharp river sand, and four parts by volume of screened river gravel, size ¼ inch to 1 inch. Said concrete shall be mixed rather wet, and immediately after being put in place shall be tamped with a wooden tamper of approved size, and then immediately afterwards floated with a wooden float. The gravel has now disappeared, and is a considerable distance under the surface, and at the proper time said surface, which consists of mortar 1:2, shall be troweled and marked in the usual way. The rails at the sides are to be dressed on the inside, and after the concrete has been put in place, a spade or shovel shall be worked along the edge two or three times so as to give the four-inch face a smooth, neat appearance, and which will leave sufficient mortar 1:2 to round off the edges of walk in the usual way. The joints in walk shall be cut with a sharp thin steel plate, and sufficient sand added to make a good joint. It shall then be troweled over and re-cut and finished in the usual manner.

The result is a walk which has no separating layers, but is in one solid mass, and is much stronger and more durable. As some of our walks have been down now for 8 or 10 years, and the markings are not yet worn off, it will be a very long time before any gravel ever shows on the surface, and if it does, it will then wear very slowly. One of the best samples of concrete walks that I have noticed, is a walk on Woodward Avenue, Detroit, which has gravel showing in the top layer.

Where two layers are used, they sometimes separate or crack, which is due, no doubt, to the method of construction.

With machine work, the contractor usually puts down several square yards of foundation concrete, and then in an hour or more, returns and puts on the surface layer. In the meantime the initial set has commenced in the foundation layer, the sun has dried its surface, it has been disturbed by the laborers walking on it, and the surface has been damaged to a certain extent from the dirt adhering to the men's boots. What chance has a top layer of concrete to adhere properly to a surface like this? Yet a great many jobs are carried on in that manner. I have noticed cases, where on a hot day, the surface layer would expand and lift up and separate from the bottom layer. Otherwise the walks seemed like excellent samples of sidewalk construction. A walk constructed in one solid mass must be stronger than one with two layers, unless the two layers adhere perfectly.

In regard to the cinders for foundation I may say that we have excellent samples of concrete walks, about 700,000 square feet, and the majority of the work has only one inch of cinders. The soil is blue or yellow clay and water cannot penetrate it. We have no walks heaved from frost. Standard practice calls for 6 or 8 inches of gravel or cinders, but that is, in my opinion, absolutely unnecessary, as it has so proved here. To prevent the walks from expanding and breaking our curbs, a one inch space is left between the walk and the curb, and another one inch space about fifteen or twenty feet distant.

I do not think that the surface of a walk should be richer than 1:2, because the surface when troweled becomes too glassy and slippery.

I would suggest that if the mixture 1:2:4 seems objectionable, then a mixture of 1:2:3, four inches thick, would finish without any difficulty. The same number of men, with a machine, will construct nearly double the amount of walk in a day, as they do not have to move back to put on any top layer. One or two extra finishers are necessary to keep up with the work.

Yours,

George S. Hanes,

Windsor, March 23rd, 1908. City Engineer.

SOCIETY NOTES.

American Society of Mechanical Engineers.

The next monthly meeting of the American Society of Mechanical Engineers will be held in the Auditorium of the Engineering Societies Building, New York, on the evening of April 14th. The general subject of the meeting is "The Conservation of Our Natural Resources."

Dr. Henry S. Pritchett, president of the Carnegie Foundation for the Advancement of Teaching, will be one of the speakers, and will discuss the "Relation of the Engineer to the Body Politic."

The Dominion Forestry Association.

At the annual meeting held at Montreal last week the following officers were elected for 1908-9. W. B. Snowball, of New Brunswick, president; Thomas Southworth, Deputy Minister of Crown Lands for Ontario, vice-president; and A. H. D. Ross, Ottawa, secretary.

Architectural Institute.

The Private Bills Committee to-day reported Mr. J. Walsh's bill to incorporate the Institute of Architects of Canada in an amended form. The name was changed to Architectural Institute of Canada. Clauses giving the Institute power to hold examinations and grant certificates of efficiency and to establish classes of membership were struck out, along with clauses providing that any person who ceased to be a member should not have any interest in or claim upon the funds and property of the Institute.

Applied Science Undergraduates, McGill.

A special meeting of the Undergraduate Society of Applied Science was convened on Friday evening, March 20, to hear an address by Mr. J. G. G. Kerry, M.C. Soc. C.E., and one of the Commissioners appointed by the Government to investigate into the causes of failure of the Quebec Bridge.

From his previous connection with the University an enthusiastic reception was assured, both from the students and from a number of outside engineers who were present.

His address, delivered in his free and easy style of oratory, dwelt with the method of construction of the bridge other than with the findings of the Commission. Mr. Kerry outlined some of the difficulties which the Phoenix Bridge Company had to surmount first in the design of a structure absolutely without precedent, and secondly in the training of an army of men to operate machines specially designed for the manufacture of the individual members. He also mentioned some of the difficulties experienced from our climatic conditions and lack of rail connection in the early stage of construction. One expression used by the speaker and worthy of note was, "The history of the Quebec Bridge is that of a good army and a poor general."

He quoted an eminent engineer as saying that a school boy can calculate stresses in a member, but it takes an engineer to design details, and followed up his statement by showing lantern slides of the elaborate system of connections which he termed unique in bridge design.

The appreciation of Mr. Kerry's address was enhanced by the fact that this was the first time that one of the members of the Commission had appeared before an engineering society in this connection since the report was given to the Government.

Manchester Association of Engineers.

Before a recent meeting of the Society Mr. S. L. Pearce read a paper on Steam Turbine Engineering. The author said that the modern turbine owed its rapid development very largely to its association with electrical engineering. The simple impulse turbine was naturally associated with the name of De Laval, and in small units from 300 horse-power downwards it was in far more extensive use than any other type. The principal losses in the De Laval turbine occurred at the nozzles. The steam consumption for any rated output from 10 to 200 k.w. with absolute pressure of 160 pound 27½ in vacuum and no superheat varied from 23 pounds to 37 pounds per kilowatt hour. Compound impulse turbines were represented by the Rateau and the Zoelly. For the former few independent steam consumption tests were available, but manufacturers' figures showed for 1,000 k.w. Rateau 22 pounds of steam per kilowatt hour, and for a 475 k.w. 19.8. The Zoelly turbine has been recently built in units of 5,000 k.w. each. A feature of this type of turbine was the very low steam consumption at the lower loads, and its steady running, important points for electrical work. The Curtis turbine had been largely utilized in the United States, where there were at present installed or under construction for electrical work alone one million k.w. Tests made on a Curtis turbine showed in a striking manner the importance of a high vacuum and high degree of superheat for this type. Dealing with the Parsons' turbine, he would point out that the guaranteed steam consumption of the new 6,000 k.w. Willans-Parsons set at the Stuart Street Station, Manchester, with 190 pounds steam pressure, 27 in. vacuum and a superheat of 100 degrees F., was 15.85 pounds per kilowatt hour on full load, corresponding to 10.75 pounds per i.h.p. hour. At three-quarter load the figure was 16 pounds and at half-load 16¾ pounds. Messrs. Brown Boveri were now building two sets of 8,000 k.w. capacity on the Parsons principle for Buenos Ayres. The Westinghouse Company were adhering to the double-flow Parsons type.

STEEL RAILS.

Since the manufacture of steel rails has been commenced in Canada the total imports of rails have heavily declined. In 1901 we imported 3,472,509 dollars worth of rails, in 1906 1,197,170 dollars worth, and in the first nine months of 1907 1,867,865 dollars worth.

CONSTRUCTION NEWS SECTION

Readers will confer a great favor by sending in news items from time to time. We are particularly eager to get notes regarding engineering work in hand and projected, contracts awarded, changes in staffs, etc. Printed forms for the purpose will be furnished upon application.

LIGHT, HEAT, AND POWER.

Ontario.

WATERLOO.—The council of the town of Waterloo, request that as far as transmission line, plant, machinery and appliances are concerned, provision be made for 685 horse-power and that the usual form of contract be forwarded for consideration by the council.

OTTAWA.—A deputation representing the municipality and Board of Trade of Belleville, waited on Hon. Geo. P. Graham, Minister of Railways, to ask that the city be given the right to develop electric power at dam No. 2 of the Trent Valley Canal, north of the town of Trenton. On completion of the canal it is estimated that from 8,000 to 12,000-h.p. will be available at this point. A few days ago a deputation from Trenton preferred a similar request for the right of the town to develop power at dam No. 2. The Minister told the deputation to-day that, pending the completion of the canal, the Government's policy with respect to leasing power rights along it had not yet been decided upon.

BELLEVILLE.—J. G. King, chief engineer for the Dominion Government, was here recently, in consultation with the Harbor Commissioners, the City Council and the Board of Trade, with a view of devising some prevention of spring floods. He recommends that the Provincial Government be appealed to to build two dams in the river, which would furnish power enough to run the gas plant and waterworks while alleviating the flood, and will suggest to the Dominion Government that the channel be dredged sufficiently deep to permit an ice breaker to enter the river and break the ice, and that a powerful tug be located here each winter for the purpose of keeping the mouth of the river clear of ice.

Quebec.

SUTTON.—Arrangements are being made for lighting this village with electricity, the current to be furnished from the plant at Richford, Vt.

MONTREAL.—The Westmount Light Committee reported receiving the following offer from Messrs. Ross & Holgate to take over the town electric light plant:—"In view of recent discussions in connection with the earning capacity of your electric light plant we have expressed the belief that your equipment could be leased by an operating syndicate or firm for a good rental over and above all costs. We desire to state that if it appears advisable to lease your electric plant we are prepared to offer and do hereby offer the following:—If granted a five years' lease of your electric lighting property we will pay all operating costs, all fixed charges, including interest, sinking fund, and depreciation, and in addition will pay you a rental of $10,000 a year. The above may be considered by you as a firm offer, open until February 29th, 1908, leading up to a formal contract, in which contract all details will have to be carefully worked out so as to safeguard the interests of both parties. If this general offer appeals to you we will be glad to take the matter up in detail with your representatives in order to arrange an agreement." In a further letter, Messrs. Ross & Holgate released the time limit for acceptance of their offer to any reasonable time.

Manitoba.

WINNIPEG.—The Winnipeg Electric Railway Company will shortly be given one year's notice to place all its wires in the central portion of the city underground. This was practically decided at a meeting of a sub-committee of the board of works recently.

Saskatchewan.

PRINCE ALBERT.—The report of Mr. C. H. Mitchell, on the Prince Albert power development, which we mentioned in our issue of the 13th, should have read:—"He states 10,000 horse-power can be developed for about $1,000,000, a portion of which can be secured as an initial development not exceeding 2,000 horse-power, at a cost of $350,000." The above was in a report in December, 1906. At that time Mr. Mitchell also reported on a smaller proposition for Prince Albert, on Shell River, 11 miles distance, in which 1,000 horse-power could be obtained for about $160,000."

British Columbia.

VICTORIA.—The decision reached by the city council regarding a high-pressure system was that in the proposed high-pressure salt water system of fire protection there should be a duplicate source of power so that in case one failed the other could be used.

TENDERS.

Ontario.

PALMERSTON.—Tenders will be received until April 14th, 1908, for the following contracts: Contract A, subdivision (1), labor, etc., for constructing waterworks system; subdivision (2), cast-iron water-pipe, valves and hydrants. Contract B, the supply and erection of a steel stand pipe. J. H. Hyndman, Esq., town clerk. Messrs. Galt & Smith, consulting engineers, 23 Jordan Street, Toronto.

TORONTO.—Tenders will be received for Toronto Island Breakwater Extension until April 24th, 1908. J. G. Sing, Resident Engineer, Toronto. (Advertised Canadian Engineer).

Quebec.

MONTREAL.—Tender for supplies will be received until 27th of March, 1908, for supplies required on the canals of the Province of Quebec, during fiscal year 1908-09. Ernest Marceau, superintending engineer canals, P.Q.

QUEBEC.—Tenders endorsed "Tender for St. Pierre Les Becquets Landing Pier," will be received until April 25th, 1908, for the construction of a Landing Pier at St. Pierre Les Becquets, County of Nicolet, Que. J. L. Michaud, resident engineer, Merchants Bank Building, Montreal.

Nova Scotia.

HALIFAX.—Tenders for Annapolis Royal Ice Piers will be received until April 24th, 1908, for the construction of three ice piers in the Annapolis River at Annapolis Royal, Annapolis County, N.S. C. E. W. Dodwell, Esq., resident engineer, Halifax, N.S.; E. G. Millidge, resident engineer, Antigonish, N.S.

Manitoba.

BRANDON.—A special meeting of the board of works committee was held recently to consider the tenders for the proposed bridge over the Assiniboine River at First Street. Some eight tenders were received. The tenders for concrete structure ranged from $53,000 to $73,000, and the steel tenders were from $45,000 to $60,000. After a long discussion it was decided to recommend to the council that a concrete structure be erected by the city under the supervision of the city engineer, his estimate of $48,250 being lower than any concrete tender received.

WINNIPEG.—The board of works has made the following recommendations to the City Council for works in hand. The board recommends that a sewer be constructed in Charles Street from Manitoba to Alfred, at $996, the work to be done under J. W. Astley, engineer of construction. Contracts for the following works are to be given to Dobson & Jackson: Sewer in Polson, from Powers to Sinclair, $38,578; sewer in Carruthers, from Main to McGregor, $4,686.10; sewer in Manitoba, from Sinclair to Battery, $1,479. The tender of

the Canadian Iron and Foundry Company of Fort William, for high pressure water pipe at $13,833.75, is recommended for acceptance. The contract for specials is to be awarded to the Manitoba Iron Works at $944.83. The acceptance of the tender of the Rensselaer Manufacturing Company, of Troy, N.J., for values for the high pressure system at $362.45, is recommended. Five high pressure hydrants at $208 each are to be purchased from the Camden Iron Works, Philadelphia, Pa.

WINNIPEG.—Tenders addressed to the chairman of the Board of Control will be received until March 27th, 1908, for a second hand single track, through truss, and two span steel railway bridge, one span 155 feet to 165 feet in length, and one of 100 feet to 115 feet in length. The bridge must be in good condition, and be able to safely carry a 10-wheel locomotive with 34 tons on a rigid wheel base of 14 feet 10 inches, followed by a rolling load of 3,000 pounds per lineal foot of track.

Alberta.

EDMONTON.—Tenders will be received up to the 10th day of April, 1908, for the construction of a 70-mile wire fence around Buffalo Park, situate in Townships 42, 43, and 44, Ranges 6, 7, and 8, in the Province of Alberta. H. Douglas, Commissioner of Dominion Parks, Edmonton.

British Columbia.

VICTORIA.—Tenders will be received up to the 30th day of March, 1908, for the supplying of certain water meters, as per specification, copies of which can be obtained at the office of the purchasing agent, City Hall, Victoria, B.C. Wm. W. Northcott, Purchasing Agent, City Hall, Victoria, B.C.

RAILWAYS—STEAM AND ELECTRIC.

Alberta.

McLEOD.—The new line of the Canadian Pacific Railway between Lethbridge and MacLeod, on the Crow's Nest branch, will be built this year. Tenders for this work are now being asked for. The old line south of the river is being abandoned owing to the severity of grade. On the north side of the river, which will be crossed by the great Lethbridge bridge, now under construction, a grade will be had of less than two-tenths per cent.

Ontario.

HAILEYBURY.—A deputation of thirty men from Haileybury went to Toronto last week and called upon the Temiskaming and Northern Ontario Railway Commission. They asked that a spur line be run from a point on the T. and N. O. line about half a mile south of the town, down to Haileybury wharf, so as to complete freight connection via the navigation companies with the C.P.R. at Temiskaming, sixty-five miles south, on Lake Temiskaming. This proposed line will be of service chiefly to the large lumbering and brickmaking concerns along the lake shore. The spur would be about one and a half miles long, and would cost $27,000. Mr. Frank L. Somerville, consulting engineer, Toronto, accompanied the deputation.

OTTAWA.—An electric line is proposed here, taking in Prescott, Brockville, Lyn, Athens, Perth, Lanark, and other places, making a belt line of about 200 miles in length.

ORILLIA.—The Canadian Northern Railway will run into Orillia this summer. This is the statement made by Messrs. McKenzie & Mann to the deputation which visited Toronto recently to ask that the Ontario Government guarantee the bonds of the railway for the construction of a branch from Orillia to the main line at Udney.

BRACEBRIDGE.—G. A. Begg has issued a writ against A. M. Orpen for $13,750 for failing to complete the Bracebridge and Trading Lake Railway according to alleged contract and for $750 cash alleged to have been paid.

MISCELLANEOUS.

Ontario.

FORT WILLIAM.—The Canadian Iron and Foundry Company made the first cast of car wheels on March 12th.

CAMPBELLFORD.—The ratepayers of Campbellford have carried a by-law to give the Canadian Steel Company a site of five acres and exemption for ten years, and to supply them with power at $10 per horse-power. Campbellford Council is developing five thousand horse-power, out of which it has sold the steel company 1,500 horse-power. The company will commence at once to erect buildings at a cost of $60,000, and will put in the largest steel plant in Ontario.

BERLIN.—Four local improvement by-laws were given their first and second readings here recently. The by-laws provided for the issuing of debentures aggregating the sum of $40,973.69, divided as follows: Grading and gravelling streets, $13,665.87; grading portion of Queen Street, $402.94; sewers, $16,196.32, and cement sidewalks, $10,708.56.

OWEN SOUND.—During the past week an engineer of the Dominion Public Works Department had a staff of men at work taking soundings of the harbor and the outer channel with a view to continued dredging operations. Additional supplementary estimates were brought down on Monday night in the Commons. These cover expenditures made so far during the current fiscal year or to be made before the end of the present month which ends the fiscal year and are not included in the expenditures passed last session. In the five millions of dollars and over which these latest estimates include, Owen Sound harbor is set down for dredging to the extent of $14,200.

Manitoba.

WINNIPEG.—A motion to have a Louise bridge by-law prepared to be submitted to the people was carried recently. The city engineer has already estimated the cost of the improvements to the bridge at $112,000. A portion of that amount can be met by sale of the present superstructure.

WINNIPEG.—General Manager McLeod, of the Canadian Northern Railway, who has just returned from a trip to Cuba in the interests of Mackenzie & Mann projects, states regarding the plans of the Canadian Northern, that construction work will begin as soon as weather permits, and that the tenders in connection with the joint terminals contract will be called for in a few weeks. He spoke of a new station for Brandon as being under consideration.

Alberta.

WETASKIWIN.—A by-law was carried to raise $18,000. The money is to be used in boring for gas.

MEDICINE HAT.—Three by-laws voted upon recently authorizing the issue of debentures, which aggregate $75,000, were all carried. The money will be expended as follows: $40,000 for extension of waterworks mains; $25,000 for extension of gas system, and $10,000 for the erection of a market building.

PERSONAL.

MR. F. A. COMBE, of Montreal, has left for Vancouver, B.C., to prepare a report for Ross & Holgate on the water, steam and power plant of that city.

MR. WM. HENDERSON has been engaged by the Water Commissioners of Smith's Falls as superintendent of the Water Works Department. He is a qualified electrical engineer of Glasgow.

MR. R. R. HEDLEY, appointed by the Dominion Government to investigate mineral conditions in the Western provinces, more especially British Columbia, is in Toronto this week.

MR. G. GLENDINNING, who was concerned in the promotion of the University and other mines at Cobalt, and who is interested in mineral propositions in various parts of the continent, has returned to Toronto after a six weeks' visit in British Columbia. He says that conditions there are very satisfactory, although the financial stringency has been felt to some extent.

MR. JUSTICE MABEE, of the Ontario High Court, has been appointed to the chairmanship of the Railway Commission in succession to the late Hon. A. C. Killam. It was announced a fortnight ago that this appointment had been offered to Judge Mabee, but that His Honor was not inclined to make the change. His objections, however, have since been overcome and Mr. Mabee will shortly take up the duties of his new position.

ORDERS OF THE RAILWAY COMMISSIONERS OF CANADA.

Copies of these orders may be secured from the Canadian Engineer for a small fee

4437—March 11—Approving grade revision of C.P.R. Company's main line between Hector and Field, B.C.

4438 and 4439—March 11—Authorizing Bell Telephone crossing over C.P.R. at Poplar Plains Road, ½ mile west of North Toronto Station, Ontario, and at Mark Street, Ashburnham, ¼ mile east of Peterborough Station, Ontario.

4440—March 11—Authorizing C.P.R. to operate its trains on its line or track where the same crosses the track of the G.T.R. by means of an overhead bridge at Tottenham, Ont.

4441—March 12—Approving by-law of Montreal Park & Island Railway Company, authorizing its secretary to prepare and issue tariffs of the tolls to be charged for all traffic carried.

4442—March 12—Approving location of G.T.P. Railway Company's station in Section 14, Township 46, Range 10, west of the 4th meridian, Alberta.

4443—March 12—Approving location of G.T.P. Railway Company's station in Section 4, Township 46, Range 10, west of 4th meridian.

4444—March 12—Approving location of G.T.P. Railway Company's station in Section 7, Township 43, Range 1, and the north-east quarter of Section 13, Township 43, Range 2, west of the 4th meridian.

4445—March 12—Approving location of G.T.P. Railway Company's stations at the following points, viz.:—1. On Section 20, Township 36, Range 6, west 3rd meridian, approximate plan mileage 7.5. 2. On Section 19, Township 36, Range 7, west 3rd meridian, approximate plan mileage 14.5. 3. On Sections 20 and 21, Township 36, Range 8, west 3rd meridian, approximate plan mileage 19.0. 4. On Sections 27 and 28, Township 36, Range 9, west 3rd meridian, approximate plan mileage 24.5. 5. On Section 14, Township 36, Range 10, west 3rd meridian, approximate plan mileage 29.5.

4446—March 12—Approving location of G.T.P. Railway Company's stations as follows:—1. Station on Sections 29 and 30, Township 35, Range 11, west 3rd meridian, approximate mileage 40.0. 2. Station on Sections 29 and 30, Township 35, Range 13, west 3rd meridian, approximate plan mileage 52.5.

4447—March 12—Approving location of G.T.P. Railway Company's stations as follows:—1. On Section 31, Township 35, Range 14, west 3rd meridian, approximate plan mileage 60.0; fourth terminal. 2. On Section 30, Township 36, Range 15, west 3rd meridian, approximate plan mileage 68.0.

4448—March 12—Approving location of G.T.P. Railway Company's stations in the north half of Section 4, Township 12, Range 15, west of the 1st meridian, Manitoba.

4449—March 12—Approving location of G.T.P. Railway Company's station in Section 4, Township 12, Range 16, west of the 1st meridian, Manitoba.

4450—March 12—Approving location of G.T.P. Railway Company's station in the west half of Section 16, Township 17, Range 29, west of the 1st meridian, Manitoba.

4451—March 12—Approving location of G.T.P. Railway Company's station in the north-west quarter of Section 23, Township 29, Range 22, west 2nd meridian and the south-east quarter of Section 27, and south-west quarter of Section 26, Saskatchewan.

4452—March 12—Approving location of G.T.P. Railway Company's station in the north-west quarter and the south half of Section 34, Township 19, Range 32, west 1st meridian, Saskatchewan.

4453—March 12—Approving location of G.T.P. Railway Company's stations as follows:—1. On Section 32, Township 51, Range 20, west 4th meridian, approximate plan mileage 90.0. 2. On Sections 15, 16, and 21, Township 52, Range 21, west 4th meridian, approximate plan mileage 95.5. 3. On Sections 2 and 3, Township 53, Range 22, west 4th meridian, approximate plan mileage 101.5. 4. On Section 16, Township 53, Range 23, west of 4th meridian, approximate plan mileage 110.5.

4454—March 12—Approving location of G.T.P. Railway Company's stations as follows:—1. On Section 36, Township 43, Range 3, west 4th meridian, and on Section 1, Township 44, Range 4, west 4th meridian, approximate plan mileage 76.0. 2. On Section 13, Township 44, Range 5, west 4th meridian, approximate plan mileage 83.0.

4455—March 12—Approving location of G.T.P. Railway Company's stations as follows:—1. On Section 9, Township 45, Range 8, west 4th meridian, approximate plan mileage 3.0. 2. On Sections 27 and 28, Township 45, Range 9, west 4th meridian, approximate plan mileage 9.5. 3. On Section 27, Township 46, Range 11, west 4th meridian, approximate plan mileage 23.5. 4. On Section 12, Township 47, Range 12, west 4th meridian, approximate plan mileage 28.5. 5. On Sections 35 and 36, Township 47, Range 13, west 4th meridian, approximate plan mileage 36.0.

4456—March 12—Approving location of G.T.P. Railway Company, stations as follows:—1. On Section 13, Township 48, Range 14, west 4th meridian, approximate plan mileage 42.5. 2. On Section 30, Township 48, Range 14, west 4th meridian, approximate plan mileage 48.0. 3. On Section 30, Township 49, Range 16, west 4th meridian, approximate plan mileage 62.0. 4. On Section 4, Township 50, Range 17, west 4th meridian, approximate plan mileage 66.0. 5. On Sections 21 and 22, Township 50, Range 18, west 4th meridian, approximate plan mileage 72.5. 6. On Sections 35, Township 50, Range 19, west 4th meridian, and on Section 1, Township 51, Range 19, west 4th meridian, approximate plan mileage.

MARKET CONDITIONS.

Toronto, March 26th, 1908.

Outdoor signs of spring cause a flutter of activity here and there in building circles. Another week or two will almost certainly see much brisker movement. In some directions prices are easier; lumber is not, but structural steel is lower and the brick market easier.

Mail advices from Great Britain show depression at mid-March in manufactured iron and steel, but the raw material was in strong demand. Stocks of Cleveland pig were being steadily depleted, and were at the lowest point since 1904. Scotch brands were also in strong request, and prices advanced 1s. 6d. to 2s. per ton. At the same date tin was firmer, lead easier, spelter quiet and not particularly firm.

The following are wholesale prices for Toronto, where not otherwise explained. Higher prices are quoted for broken quantities:—

American Bessemer.—Fourteen-gauge, $2.45; 17, 18, and 20-gauge, $2.60; 22 and 24-gauge, $2.65; 26-gauge, $2.80; 28-gauge, $3.

Antimony.—Quiet, but inquiries are coming in more freely; we quote 11½ to 13c.

Bar Iron.—$2.10 base, from stock to the wholesale dealer.

Beams and Channels, $2.75 to $3, according to size and quantity; angles, 1¼ by 3-16 and larger, $2.65; tees, $2.90 to $3 per 100 pounds. Extras for smaller sizes.

Boiler Heads.—25c. per 100 pounds advance on boiler plate.

Boiler Plates.—¼-inch and heavier, $2.50. Supply probably adequate and quotations still firm.

Boiler Tubes.—Lap-welded steel, 1¼-in., 10c.; 1½-in., 9c. per foot; 2-in., $9.10; 2¼-in., $10.85; 2½-in., $12; 3-in., $13.50; 3½-in., $16.75; 4-in., $21 per 100 ft.

Building Paper.—Plain, 32c. per roll; tarred, 40c. per roll.

Bricks.—Common structural, $9 to $10 per thousand, wholesale; small lots, $12. March is proving a busy month. Red and buff pressed are worth $18 at works.

Cement.—The price of Canadian manufactures of cement to the dealer in thousand barrel lots and up is $2.15, in cotton bags, including cost of packages, on car, Toronto. The dealers' price to the contractor up to car-load lots without package price, are general at $1.95 per barrel in cotton bags and $2.10 in wood, weight in each case 350 pounds.

Detonator Caps, 75c. to $1 per 100; case lots, 75c. per 100; broken quantities, $1.

Dynamite, per pound, 21 to 25c., as to quantity.

Felt Paper—Roofing Tarred.—Market steady at $2 per 100 pounds. Numerous orders in for prompt delivery 1st April.

Fire Bricks.—English and Scotch, $32.50 to $35; American, $25 to $35 per 1,000. Demand is fair.

Fuses—Electric Blasting.—Double strength, per 100, 4 feet, $4.50; 6 feet, $5; 8 feet, $5.50; 10 feet, $6. Single strength, 4 feet, $3.50; 6 feet, $4; 8 feet, $4.50; 10 feet, $5. Bennett's double tape fuse, $6 per 1,000 feet.

Galvanized Sheets—Apollo Gauge.—Sheets 6 or 8 feet long, 30 or 36 inches wide; 10-gauge, $3.25; 12-14-gauge, $3.35; 16, 18, 20, $3.50; 22-24, $3.70; 26, $3.95; 28, $4.40; 29 or 10¾, $4.70 per 100 pounds. Stocks very low.

Ingot Copper.—Has been fluctuating abroad, and a good deal sold for forward delivery in the belief that prices are going up. Local price continues at 13¾ to 14½c.

Lead.—Holding its own at 4½c. Easier in England.

Lumber.—Some sales have taken place of white pine, various cuts, at practically the same prices as last year. Dressing quotes at $32. to $35 per thousand for usual lengths, and stock sizes of boards; $38 to $40 for special lengths; common, as to grade, $24 to $28; culls, $22. Norway pine and Southern steady; hemlock, $19 to $21.50, as to size. Spruce flooring, $27 wholesale, $30 retail; shingles, B.C., sluggish, at 25 to 30c. off list; laths quiet, No. 1, $4.40 on track; No. 2, $3.90.

Nails.—Wire, $2.55 base; cut, $2.70; spikes, $3.15.

Pitch.—Quiet at 75c. per 100 lbs.

Pig Iron.—Summerlee No. 1, always in demand, generally for small lots, quotes now, nominally, $27; Glengarnock, $26.50; No. 2, $26; Cleveland, No. 1, $23.50, $24; Clarence, No. 3, procurable in Montreal, price here $23 to $24. In Scotch and Cleveland pig the British market is firm with upward outlook.

Steel Rails.—80-lb., $35 to $38 per ton. The following are prices per gross ton; Montreal, 12-lb. $45, 16-lb. $44, 25 and 30-lb. $43.

Sheet Steel.—In moderate supply; 10-gauge, $2.65; 12-gauge, $2.70.

Tar.—Market unsettled, $3.50 per barrel the ruling price.

Tank Plate.—3-16-in., $2.65.

Tin.—Is firming up all the time; is very firm in England. Price here continues 31½ to 32½c.

Tool Steel.—Jowitt's special pink label, or octagon drill steel, 10½c. per pound; Capital, 12c.; Conqueror, highspeed, 70c. base; Velos, highspeed, 60c. base.

Zinc.—Very little doing, we quote 5½c

Montreal, March 26th, 1908.

So far as the United States is concerned, the pig iron markets are practically unchanged. According to reports, the iron and steel interests which gathered together in New York last Friday, decided not to make any reduction in prices in finished material. Enquiry is said to have improved somewhat, particularly for low-grade metal. There has been practically no change, either in prices or conditions, during the past two or three weeks.

The local market is assuming its usual aspect for this time of year, and many enquiries are being received by merchants for delivery upon opening of St. Lawrence navigation. Thousands of tons have been booked during the past week or ten days at firm prices. Only a few consumers have covered for their needs, and further good orders are looked for very shortly. The market is difficult to gauge, but it would seem wise for buyers to look after their requirements of English and Scotch metal now, as all available information points towards higher figures being asked.

Antimony.—The tone of the market seems a shade stronger. Price is 10c. per pound.

Bar Iron and Steel.—The market is steady. Bar iron, $2.00 per one hundred pounds; best refined horseshoe iron, $2.25, and forged iron, $2.15; mild steel, $2.05; sleigh shoe steel, $2.05 for 1 x ⅜-base; tire steel, $2.05 for 1 x ⅜-base; toe calk steel, $2.50; machine steel, iron finish, $2.15.

Boiler Tubes.—The market holds steady, demand being fair. Prices are as follows: Two-inch tubes, 8 to 8¼c., 2½-inch, 11c.; 3-inch, 12 to 12¼c.; 3½-inch, 15 to 15¼c.; 4-inch, 19¼ to 19½c.

Building Paper.—Tar paper, 7, 10, or 16 ounce, $2 per 100 pounds; felt paper, $2.75 per 100 pounds; tar sheathing, No. 1, 60c. per roll of 400 square feet No. 2, 40c.; dry sheathing, No. 1, 50c. per roll of 400 square feet, No. 2, 32c.

Cement—Canadian and American.—Canadian cement, $1.70 to $1.75 per barrel, in cotton bags, and $1.95 and $2.05 in wood, weights in both cases 350 pounds. There are four bags of 87½ pounds each, net, to a barrel, and 10 cents must be added to the above prices for each bag. Bags in good condition are purchased at 10 cents each. Where paper bags are wanted instead of cotton, the charge is 2½ cents for each, or 10 cents per barrel weight. American cement, standard brands, f.o.b. mills, 85c. per 350 pounds; bags extra, 10c. each, and returnable in good condition at 7½c. each.

Cement—English and European.—English cement is unchanged at $1.70 to $1.75 per barrel in jute sacks of 82½ pounds each (including price of sacks) and $1.95 to $2.05 in wood, per 350 pounds, gross. Belgian cement is quoted at $1.70 to $1.80 per barrel in bags, and $2.05 to $2.20 per barrel, in wood.

Copper.—Prices are considerably lower than a week ago, although the tone of the market is firm at present.

Iron.—Prices for delivery after the opening of St. Lawrence navigation are approximately as follows: No. 1 Summerlee, on cars, Montreal, $20.50 to $21 per ton; No. 2 selected Summerlee, $20 to $20.50; No. 3, soft, $19.50 to $20; Cleveland, $18.50, and No. 3 Clarence, $18; No. 1 Carron, $22 to $22.50; Carron special, $20.25 to $20.75; Carron, soft, $20 to $20.50. Stocks on spot are light. Clarence No. 1 is quoted at $20.50 to $21; Clarence No. 3 at $19 to $19.50; Carron No. 1 at $24.50 to $25, and Carron, soft, at $22.50 to $23, cars, Montreal.

Lead.—Trail lead is quoted at $5.95, ex-store.

Nails.—Demand for nails is steady, prices being $2.30 per keg for cut, and $2.25 for wire, base prices.

Pipe—Cast Iron.—Trade dull and prices steady at $36 for 8-inch pipe and larger; $37 for 6-inch pipe, $38 for 5-inch, and $39 for 4-inch at the foundry. Gas pipe is quoted at about $1 more than the above.

Pipe—Wrought.—The market is firm but dull. Quotations and discounts for small lots, screwed and coupled, are as follows: ¼-inch to ⅜-inch, $5.50, with 54 per cent. off for black and 38 per cent. off for galvanized. The dis-