PAGES

MISSING

The Canadian Engineer

WEEKLY

ESTABLISHED 1893

VOL. 15. TORONTO, CANADA, SEPTEMBER 11th, 1908. No. 37

The Canadian Engineer

ESTABLISHED 1893

Issued Weekly in the Interests of the

CIVIL, MECHANICAL, STRUCTURAL, ELECTRICAL, MARINE AND MINING ENGINEER, THE SURVEYOR, THE MANUFACTURER AND THE CONTRACTOR.

Editor—E. A. JAMES, B.A. Sc.

Business Manager—JAMES J. SALMOND.

Present Terms of Subscription, payable in advance:

Canada and Great Britain:		United States and other Countries:	
One Year - -	$2 00	One Year - -	$2.50
Six Months - -	1.25	Six Months - -	1.50
Three Months -	0.75	Three Months	1.00

ADVERTISEMENT RATES ON APPLICATION.

HEAD OFFICE: 62 Church Street, and Court Street, Toronto TELEPHONE MAIN 7404.

Montreal Office: B 32 Board of Trade Building. T. C. Allum, Business and Editorial Representative. Phone M 2797.

Winnipeg Office: Room 315, Nanton Building. Phone 8142. G. W. Goodall, Business and Editorial Representative.

Address all communications to the Company and not to individuals.

Everything affecting the editorial department should be directed to the Editor

NOTICE TO ADVERTISERS:

Changes of advertisement copy should reach the Head Office by 10 a.m Monday preceding the date of publication, except the first issue of the month for which changes of copy should be received at least two weeks prior to publication date

Printed at the office of THE MONETARY TIMES PRINTING CO., Limited, TORONTO, CANADA.

TORONTO, CANADA, SEPTEMEBER 11th, 1908.

CONTENTS OF THIS ISSUE.

TO OUR READERS.

If you are coming to the Canadian National Exhibition in Toronto in September, we would be pleased to have you call on us. Have your mail forwarded in care of our office if you do not know where you will be staying. It will be a pleasure to look after it for you.

THE QUEBEC BRIDGE.

The announcement has been made, and already the three members of the Commission entrusted with the design and erection of the new Quebec Bridge are at work.

Very little comment on the selection has been made, but it is generally believed that the Government has secured men of wide knowledge, varied experience and accustomed to handling large undertakings. They are engineers also who are as familiar with design and its details as with construction—and this is very necessary.

Some months ago we suggested the advisability of an all-Canadian Commission, or at the very least a Commission, the majority of which were engineers resident in Canada. It is to be regretted that in the appointments Canadian talent, Canadian skill and Canadian ability and industry were not more fully recognized by those entrusted with the selection. Half a dozen Boards of Engineers could be selected, the majority of each board being resident in Canada, who would carry the undertaking to successful completion.

We do not object so much to engineers from other countries drawing Canadian fees—the money will be well and justly earned. We do object to Canadian money erecting at our Eastern gateway a design that will, say, through the coming years: "Canada did not contain in 1908 engineers capable of undertaking the engineering work the country required." If Canadian engineers were capable of investigating the wreck, Canadian engineers are competent to re-erect. One familiar with the past thirty years in Canada must admit that during that period no work requiring engineering skill has been completed by the foreign engineer, but that there were resident engineers capable of undertaking equal tasks.

With the experience of the past to guide there was no excuse for seeking shelter under the phrase, "The best the world can furnish," and refuse to recognize men of standing in the engineering profession in Canada.

The Canadian practitioners in surgery, medicine and law have developed a professional spirit which has permeated into our life until it is never suggested that members of these professions be imported for important work. Canadians have made good in other professions; they have made good—they are making good in engineering, and should have a larger representation on the Quebec Bridge Commission.

The Government should at once appoint a fourth member to the Commission, and in so doing must not forget the members of the profession in Canada. Such an appointment would give Canadians a better representation, and would require a more thorough understanding by all members of the Commission of controversial points.

EDITORIAL NOTES.

The comparative statement as to building permits issued by the city of Toronto shows an improving condition in the trade. The total value of permits issued for August was $1,274,185, as against $1,201,410 for the corresponding month of last year. The total value

of permits issued this year is $7,408,430, compared with $11,440,740 last year. Since January 1st there have been 3,563 new buildings erected in the city, against 4,059 during a similar period of last year.

* * * *

The Montreal Y.M.C.A. have for the ensuing winter made arrangements to give both class instruction and demonstrations in a course of general mechanical engineering. Mechanical design, machine and engine design, boiler firing, drawing office work and elementary mathematics will be included in the course. This course should be interesting and profitable, and appreciated by the young men not in a position to secure a training in the large technical colleges.

* * * *

The building records of United States cities show a decrease every month of this year compared with 1907. In July the decrease was only trifling, but in eight months in seventy-seven cities it amounted to 27 per cent. New York shows a very marked decline, viz., 29.5 per cent.; Detroit, 18.3 per cent.; Duluth, 22 per cent.; Toledo, 32 per cent.; Portland, 15.4 per cent.; Philadelphia, 37.4 per cent. But some cities, notably Baltimore, Louisville, Syracuse, Minneapolis, exhibit an increase in building.

GLASGOW TECHNICAL COLLEGE.

Through the courtesy of the secretary and director we have received a copy of the Calendar for 1908-9 of the Glasgow and West of Scotland Technical College, 448 pages. It contains, in addition to minute particulars as to subjects, examinations, lectures, etc., a history of the college and of Allan Glen's School, the College of Science and Art, and other venerable institutions now amalgamated with it. The scope and extent of this splendid technical school is indicated in the seventeen pages occupied by the list of professors, committees, and their respective subjects. The citizens of Glasgow are proud of it, and well may they be so. At a public meeting held in 1900 a committee was formed to procure subscriptions. A building and equipment fund of over £300,000 sterling has been raised. The first section, comprising five acres of floor space, was opened in 1905; the second, mainly for the decorative trades, during the present year. The splendid pile of Scotch granite, Dumfries red stone, and white enamelled brick will, says the Calendar, "form, when completed, the largest structure of the kind in Britain."

EDUCATIONAL PUBLICITY.

"The technical treatise," so says Walter B. Snow, Publicity Engineer, of Boston, in a recent article in the American Exporter, "represents the highest standard of educational publicity, aiming toward the ultimate sale of certain products or the introduction of new methods. Such a treatise must of necessity have substantial merit from the engineering standpoint. It must take the form of a book to be sought and cherished, one to be kept on the library shelf of every progressive engineer. It may even serve as a text-book in the technical schools.

"In fact, such schools present a field for the legitimate inculcation of knowledge regarding certain devices and processes which broad-minded manufacturers assiduously cultivate. They are willing to wait for a period of years for the fruits of their effort, which can only be gathered when the graduate reaches a position of responsibility in the specification and purchase of equipment. The legitimacy of this form of publicity is frankly recognized by the schools, for their practical teachings are of necessity based upon the practical developments along engineering and allied lines in the commercial world. In fact, the technical catalogue and treatise is of necessity the forerunner of the text-book, and pending the publication of the latter must serve in its place as the medium for presenting the most recent developments and practice."

PRECIPITATION FOR AUGUST, 1908.

The table shows for seventeen stations included in the report of the Meteorological Office, Toronto, the total precipitation at these stations for the month. Ten inches of snow is calculated as being the equivalent of one inch of rain:—

Station.	Depth in inches.	Departure from average of 20 years.
Victoria, B.C.	0.7	+ 0.1
New Westminster, B.C.	1.0	— 0.6
Kamloops, B.C.	1.5	+ 0.5
Calgary, Alta.	1.5	— 1.0
Edmonton, Alta.	1.7	— 0.3
Swift Current, Sask.	1.1	— 0.7
Regina, Sask.	1.4	— 0.3
Winnipeg, Man.	2.5	0.0
Port Stanley, Ont.	4.3	+ 1.7
Toronto, Ont.	2.8	+ 0.2
Parry Sound, Ont.	3.7	+ 0.9
Kingston, Ont.	2.8	+ 0.4
Ottawa, Ont.	1.4	— 1.6
Montreal, Que.	2.8	— 0.6
Quebec, Que.	5.7	+ 1.9
Chatham, N.B.	4.1	+ 0.1
Halifax, N.S.	10.7	+ 6.4

ANNUAL MEETINGS.

Company.	Day.	Time.	Place.
Bay of Quinte Ry....	Sept. 14	3.00 p.m.	Deseronto
Oshawa Railway	" 14	2.30 p.m.	Deseronto
Thousand Islands Ry.	" 14	2.00 p.m.	Deseronto
Kaslo and Lardo Duncan Railway	" 14	12.15 p.m.	Kaslo, B.C.
Bedlington & Nelson Railway	" 14	12.30 p.m.	Kaslo, B.C.
Temiscouta Railway ..	" 15	3.00 p.m.	Quebec
Ottawa & N.Y. Ry....	" 15	3.00 p.m.	Ottawa
G.T.P. Railway	" 15	Noon	Montreal
Ontario Bank	" 16	11.00 a.m.	Toronto
Vancouver, Westminster and Yukon Ry.....	" 16	3.00 p.m.	Vancouver
Pacific Northern and Omineca Ry	" 16	Noon	Victoria
G.T.P. Branch Lines..	" 16	Noon	Montreal

In discussing steam superheating before the American Society of Mechanical Engineers, Mr. R. W. Stovel recently remarked that, in general, the less economical the prime mover is without superheat, the greater will be the advantages derived from superheat. With normally designed stations between 2 and 3 per cent. of the annual cost can be saved by the use of superheat, and in advance of determinations for each case it is as probable that this will be done by 100 degrees of superheat as by 200 degrees.

APPLICATIONS OF OIL BURNING APPARATUS.

By C. M. Ripley, E.E., New York City.

Different Problems in Heating, Steam Generation, Steel Manufacture and Fabrication, Foundry and Blacksmith Shop Work, Where Oil is Displacing Soft and Hard Coal, Coke, Electricity, and Gas.

Most Novel Application.

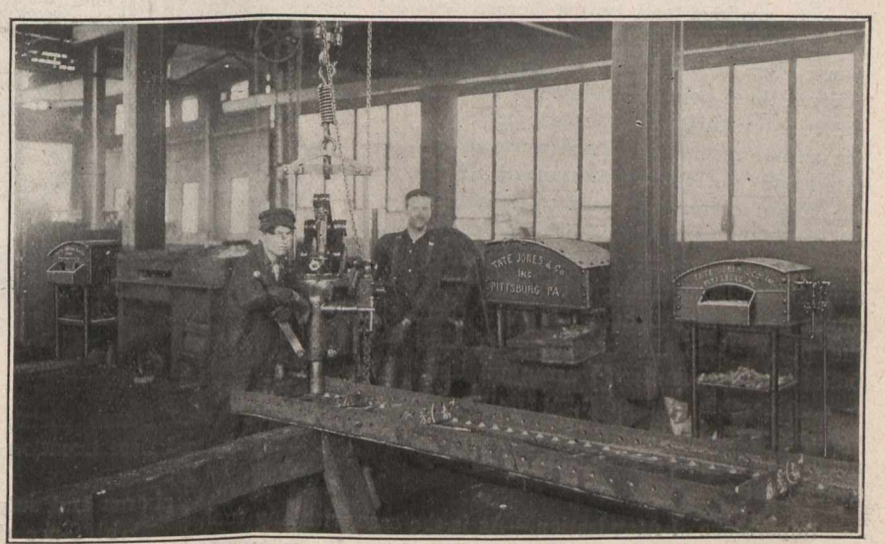
Perhaps the most unique and unexpected application of the oil burning apparatus, is in the heating of railway coaches on the electric divisions of steam railroads. The New York Central and New York, New Haven and Hartford Railroads have both installed vertical steam boilers in the electric locomotives of their new equipment, and equipped same with oil burners, pressure tanks for oil and water, and utilized the compressed air system of the train for atomizing the oil. Thus as soon as the steam locomotive is detached from the passenger train, the electric motor can be coupled on and the existing piping system of the train used to heat the cars. The expense of installing electric heaters in each car, the expense of power for these heaters and the danger that would have resulted from coal stoves, are all dispensed with in this admirable arrangement.

Oil Burners in Bridge Work.

At the plant of the Pennsylvania Bridge Company, Beaver Falls, Pa., advantage has been taken of many of the latest devices to bring about economical production and fabrication. Among these is the installation of oil burning furnaces for rivet heating, etc.

This consists of a 10,000 gallon supply tank buried in the ground outside the building and near the railroad switch to facilitate the unloading of the oil cars. A No. 0 Kirkwood oil pumping, heating and pressure regulating system located in the shop draws the oil from the supply tank, strains it, and after raising the temperature to the proper point for complete combustion, pumps it to the burners under twenty pounds pressure. Compressed air for atomizing the oil is taken from the regular shop air line, and reduced by a regulating valve to fifteen pounds before being piped to the burners. As only 150 cubic feet of free air compressed to 15 pounds is required under the Kirkwood system, for each gallon of oil burned, the air taken for atomizing is hardly felt.

There are five double-door stationery rivet forges, with hearths 16 x 24-inch, and four similar in design but 12 x 18-inch with the tank containing the oil supply located underneath, and connected to the air supply by a flexible hose. This last furnace is designed to allow of its being moved from place to place in the shop. All these furnaces are equipped with a burner so designed that there will always be perfect atomization of the oil, and also that the one lever regulates both oil and air supply; it is claimed by the makers that the ratio between the oil and air is fixed scientifically. The result claimed is that a careless or inefficient operator cannot help having an inefficient fire, and it is almost impossible to burn the rivets.



View in Steel Fabrication Plant. Oil Burners Used for Heating Rivets in Bridge Works.

Forge Shop of Car Company.

The relative merits of oil, coal and coke as fuel for the forge shop are ever open for discussion and experiment. The writer was recently allowed the favour of taking a trip through the factory of a well-known manufacturer of railroad cars and was much interested in the operation of the oil burning furnaces in their blacksmith shop.

There were seven furnaces ranging in size from 36x48 inches up to practically twice that size. These were used for heating up king pins, bar iron, etc., some to a bending temperature and others to white or welding heats. All of the seven were of the Tate Jones & Company type, and made in Pittsburg. These were designed so that only enough compressed air was supplied to the burner to thoroughly atomize the oil, while the air for combustion was supplied by forced draught by a separate piping system. Thus the air for combustion is not drawn in at the burner from the surrounding air, which always makes a noisy burner, but is forced in under a few ounces pressure, at the rate of approximately 1,440 cubic feet of free air per gallon of oil.

The writer was privileged to view some work on a lot of king pins. These were made from 2-inch billets about 20 inches long and were heated for a distance of 12 inches from the end, at the rate of 21 pins in seven minutes, at the end of which each time was white hot and a ¾ x 2-inch slot was punched through in one operation.

It has been the writer's experience that where hard coal or coke were used in the forge, that the time in tending fires and cleaning out the slag and cinders can be easily an item consuming more time than is usually believed. After witnessing the speed with which the bars, billets and plates were heated up, and the wide range of sizes taken care of, the conclusion was irresistible that, for the same floor space, the oil furnace could approximately double the output where high heats are required on work 2 inches in diameter. Where only bending or swaging heats are required, I should conclude that there is easily a 50 per cent. increase for equal floor space.

Confining the Heat.

Another decided advantage of the old furnace is the ability to confine the heat to the part to be worked. The high blast required by the coke fire when high temperatures are desired, cause considerable discomfort, and hence delay, in two ways. Not only are the flame and cinders scattered over the workmen, but the blaze comes out along the lower side of the piece and heats a greater distance than is desired. For example, I could easily take hold of a 1½-inch rod within two feet of the edge of an 18-inch heat. In my own recollection, I have known heat to run back as far as three feet and more, when taken out of a coke fire. The oil flame as applied, is concentrated more than any other and so obviates this annoying feature of blacksmithing.

The foreman of the shop is proud of a record made recently in which he heated and punched 67 of the king pins

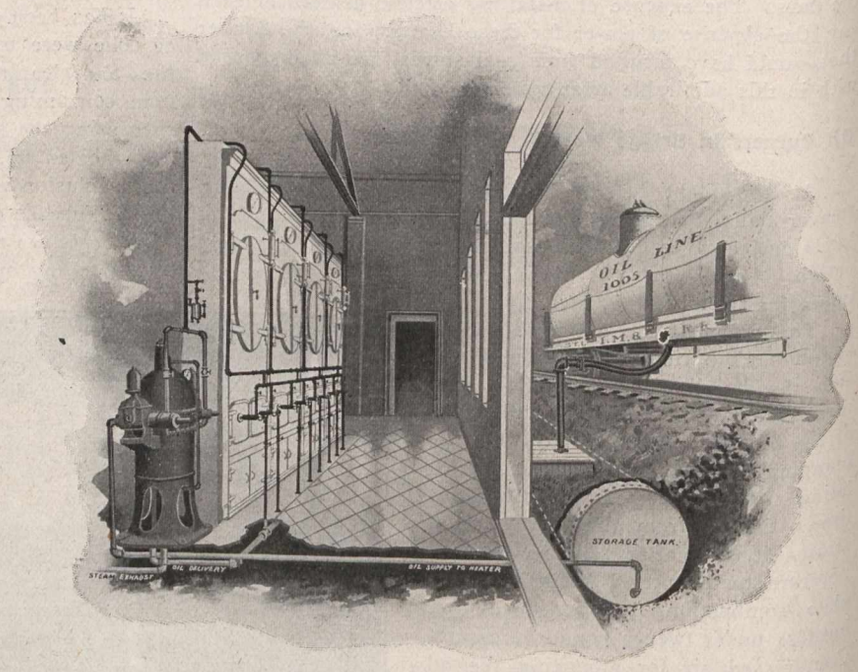
in one hour. It seems to be a reasonable conclusion that the day is past when 1¼ hours were required to heat up six 100 lb. billets and further, that the oil burning furnace is making an enviable reputation for forge shops.

Steam Generation by Oil Fuel.

Starting the Fire.—Since the oil must be atomized, the initial starting of the fire requires either a supply of compressed air to turn into the atomizing nozzle until steam pressure has been attained (when it is switched off to steam by a three-way-cock) or else a small boiler must be kept as an auxiliary. This disadvantage is made up for in the fact that by starting the oil and throwing some oil-soaked waste into the fire box, the fire is instantly in full blast; this has been found to be a great time saver in the long run, for plants that close down entirely.

Kind of Oil to Use.—Oil with a free test of 180 to 200 degrees Fahr. is considered as safe as coal, which latter has been known to ignite of spontaneous combustion. If oil with a test of 250 or 300 degrees is stirred with a red hot poker, it will not ignite, and even a shovel full of hot coals thrown on its surface, will immediately sink and be extinguished. Crude petroleum or fuel oil is the commercial name.

Storage and Temperature of Oil.—The oil is best stored when convenience and safety are both considered, in an underground tank between the R.R. track and the boiler room. The most successful result is obtained when the oil fed to the burners under constant pressure is strained and heated before fed to the furnace. Tate, Jones & Company, Inc., of Pittsburg, Pa., have covered these points well in their various bulletins on this and other subjects, and the author recommends that those interested can get fuller information from the manufacturer in regard to their fuel oil pumping, heating and pressure regulating systems for both stationary, marine and metallurgical work. It might be mentioned here, however, that the piping into the breeching of the boilers is frequently so arranged that a considerable rise of temperature is obtained by the time the oil reaches the nozzle—sometimes as high as 200 degrees Fahr.



Sectional Elevation of Steam Plant, Showing Method of Outfit. Applying Oil Burners and Best Location of Storage Tanks and Pumping

Importance of Atomization.—As is the case with any fuel, oil must be thoroughly mixed with air in order to secure complete combustion and no smoke from the stack. If the spray of oil contains some small and some large particles of oil, the larger particles being supplied no more air than the small ones, will not be burned, and the result will be a coating on the boiler tubes which is more difficult to remove than the soot deposited from a coal fire. This difficulty, however, has finally been entirely overcome by the latest design of nozzles, which give a steady fire and no smoke. In the Texas oil fields where oil is especially cheap, and in California where oil is especially dear, the results of a tour of inspection will convince anyone of the fact that burners have been obtained which are most efficient and satisfactory. The old time explosions which occurred now and then were due to the fact that the oil dripped down and later evaporated till the mixture with air became explosive. This danger has been proved a dead issue, since many of the insurance companies are giving the same rate for those using oil as a fuel, as for those using coal. Frequent tests with open flame, of boiler pits, and many months of successful operation have convinced the most sceptical that oil burners for steam boilers are practical, safe and convenient attachments even as auxiliary equipment. The best comparison to be made between oil burners of the present and of the past, is the comparison between the Welsbach gas lamps of the present, that thoroughly mix the gas with the air, and the obsolete open tip which is both inefficient and filthy.

Triple Use of Oil Burners in Steam Mills.

Oil burners can be and are being employed in some of the greatest and most progressive steel mills in the country, in three capacities:—

(1) To heat the open hearth furnaces regularly.

(2) To serve as auxiliary where gas is used.

(3) To heat the ladles and prevent explosions and consequent loss.

For Continuous Use.—In the open hearth process there has been proved a saving by the introduction of oil burners. This saving is made up by the following items, as gathered from talks with users:—

(a) A lower grade of scrap, or a greater per cent. of scrap can be used since oil is comparatively free from phosphorus and sulphur.

(b) Since the highest temperature of the oil flame is at the bottom it follows that it is directly applied to the "bath" and not to the walls, arches and doors of the furnace. It is the enthusiastic opinion of users that shutdowns for repairs to doors and brick-work are much less frequent. So much so that a run of 840 heats was made at the General Electric Company. The Midvale Steel Company and others report extremely satisfactory results also.

(c) Owing to accurate control, the furnace can be banked for two or three days and then heated full blast in twelve to sixteen hours, a thing impossible to do with a gas furnace.

(d) Small first cost as compared with producer gas systems.

(e) Large saving in labor, since furnace attendants can take care of oil burner while large corps of men is needed to operate producer gas plants of any considerable size.

(f) Efficiency has been as high as thirty-eight gallons oil per net ton of charge.

As Auxiliary Equipment.—The oil burner is made hinged so that it can be swung out of action until such time as the regular fuel supply might happen to fail. Thus it is ready at a moment's notice and the heat of the bath and walls instantly brings the flame to an efficient state.

To Heat Metal Ladles.—The swinging stand or hinged idea is used here as in the open hearth auxiliary arrangement. Thus it can be lowered into the ladle, the long nozzle reaching clear to the bottom and thoroughly heating and drying the entire ladle.

Oil Burners in the Brass Foundry.

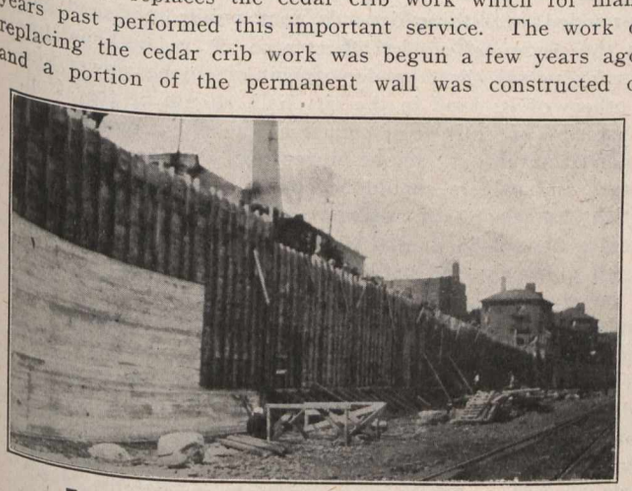
One of the largest electrical manufacturing companies in the country states that number 70 Dixon crucibles which lasted only seventeen or eighteen heats when coke was used as fuel, now lasts from thirty to thirty-two heats since the oil burners were installed in the foundry.

The same company states that the cost of fuel has been cut in half and that the annoyance, dust and expense of handling ashes has been entirely eliminated. It is interesting to note that although a brass foundry was originally built for coke, it can be easily piped for oil burners. One of the manufacturers of oil burning apparatus offers the free service of their engineering department in designing the complete layout for any foundry, showing the application of the oil burners, if the owner will but submit a sketch of the present equipment.

The writer has been much interested in chatting with the various manufacturers who have adopted oil for a fuel, and was pleased to note the general satisfaction which follows its adoption. The quiet and unostentatious development of any line of enterprise often gains a far greater lead than is generally supposed. The author is glad to be able to present to the various applications of this particular line of thought, to the engineering public, i.e., the readers of this publication.

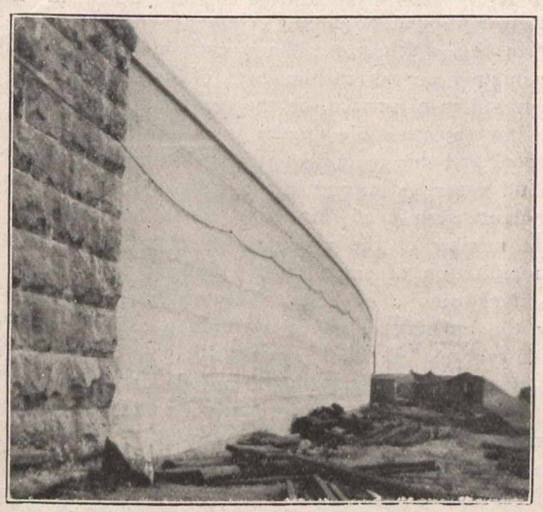
CONCRETE RETAINING WALL.

The Canadian Pacific Railway is now engaged upon the construction of the second and last portion of an extensive reinforced concrete retaining wall along a portion of the harbor of Montreal. The wall extends along the shore end of the docks, beginning near the company's elevator and passing eastward to where the company's lines leave the harbor front and curve towards the north. The wall is being given a height of from 21 to 25 feet. It retains the bank along which pass the trains operating between Place Viger Station and the stations east and north of the city, and it replaces the cedar crib work which for many years past performed this important service. The work of replacing the cedar crib work was begun a few years ago, and a portion of the permanent wall was constructed of



Face of Wall with Lagging being removed.

limestone masonry. The present reinforced concrete work begins a little below the company's elevator and extends a distance of 1,282 feet to the Voltigeurs Street subway. Limestone masonry then extends to the jail ramp, at which point the concrete wall again begins and extends some 2,100 feet to the Longueuil ferry and 600 feet down the embankment. The first portion of the work was finished some time ago, and the second portion will be completed in a couple of months. The wall has a perpendicular face. Buttresses, with a batter of one in two and one-half, extend to the rear at eight foot centres. The wall has a minimum thickness of one foot under the coping. The base slab has a depth of two feet, extending the whole length of the wall, and a width of about 15 feet, widening or narrowing to conform to the height and batter of the buttresses. Expansion buttresses occur every 300 feet. These are 2 feet 6 inches wide, the other buttresses being 18 inches. The expansion buttresses are made with a 15-inch key, extending partly into the face and partly into the buttress. In constructing these expansion joints the end of the buttress in each section is allowed to set in the form, after which the form is removed and the concrete covered with tarred paper before the next section is started against it. Owing to the key, movement in contraction and expansion only takes place longitudinally.



Showing Junction of Limestone Wall and New Concrete.

The face wall extends downward as described to within 2 feet 6 inches of the top of the foundation slab, when the batter widens out in front and rear to form a bevel foot with a base of 3 feet 9 inches more than the face of the wall. A double row of weep-holes appear in the face, one row being a foot above ground and one 2 feet 6 inches below. At five feet below ground there is a longitudinal tile weeping drain to carry off the saturation and the flow from the lower row of weep-holes.

In the chambers between buttresses there is a rock filling, the rock being about 2 feet 6 inches thick, and extending all the way up. The mixture used in the base is 1:3:5, that for the face of the wall and the buttresses being 1:3:4, ¾-inch stone being employed. The reinforcement used in the base is smooth, square bars, while for the face of the wall and for the buttresses Johnson and Kahn bars are used.

First is laid a 3-inch layer of concrete, after which comes longitudinal and cross bars. Then comes 17 inches of concrete, followed with another row of iron. Four inches of concrete finishes the slab. Forms are then put on to form the bevelled foot, 2 feet 6 inches high. From this up to the top the forms are put on in 4-foot lifts. The group of reinforcement consists of seven 1-inch and three 1¼-inch bars running along down the rear of the buttresses and hooking around the bottom row of longitudinal bars in the base. In the buttress are four ½-inch vertical rods, and ½-inch rods are also placed vertically in the face of the walls at 2-foot centres. A pair of ½-inch bars are hooked into the longitudinal face bars and run back to the rear of the buttresses at each foot in height.

As to the amount of concrete employed, it is estimated that the 25-foot sections run approximately three cubic yards and the 21-foot sections 2.5 cubic yards per lineal foot. In appearance the wall is not only massive but pleasing, a 3-inch coping being employed and the surface being smooth and well finished.

The United States Department of Agriculture has printed a circular, No. 151, on "The Preservative Treatment of Loblolly Pine Cross-arms." This bulletin contains a great deal of useful information on this important subject and is accompanied by numerous tables and curves giving the results attained.

SMOKE ABATEMENT.*

By C. H. Benjamin.

The subject of smoke abatement presents itself under three heads:—

1. The proximate causes of the evil.
2. The most efficient means for its abatement.
3. The ethical and legal questions involved.

Bituminous coal which, fortunately or otherwise, is to-day our cheapest and best fuel, all things being considered, is a compound of hydrogen and carbon together with certain non-heat producing elements which may be neglected in this discussion. When carbon, which is pure, or approximately so, as in the case of anthracite coal or coke, is burned in a furnace, be the combustion complete or otherwise, no objectionable smoke is produced. When any hydro-carbon, and this includes not only bituminous coal, but coal oils and gases, is burned in the ordinary manner, either an insufficient supply of air, too low a temperature, or insufficient mixing of the products of combustion, results in the precipitation of some of the carbon present in the form of black smoke or soot. The ordinary phenomena attending the burning of oil in a common oil lamp are excellent illustrations of this peculiarity. A long as the chimney of the lamp maintains a proper draft, a suitable quantity of air is admitted, properly heated by the fine gauze underneath the flame, and the wick is at the right height to supply the proper proportion of oil, a clear, bright flame without smoke results. Any change in these conditions produced by raising the chimney from the burner or by turning the wick too far up or down, results in imperfect combustion and a precipitation of soot. In the boiler furnace the same result is produced by putting on too much coal at one time, by an insufficient or poorly regulated draft, or by bringing the boiler too close to the fire. It is possible to prevent smoke by skilful hand-firing, but it is usually not practicable. The use of unsuitable grades of coal, ignorant and poorly-paid firemen and the overcrowding of boilers are common reasons for black smoke.

Numerous devices have been invented and patented for regulating the quantity of air to the demand and for thoroughly mixing it with the gases. Some of these are very efficient, and practically solve the smoke problem when properly cared for. The most usual form of this apparatus consists of a steam jet, which is turned on by the opening of the fire door simultaneously with the opening of an air damper above the fire. A dash-pot containing air, oil or water, slowly shuts off the steam and air after the door is closed. Some of the pictures which I shall show prove the efficiency of this apparatus. The indifference and antipathy of firemen and engineers are frequently responsible for the failure of such apparatus.

The down-draft furnace and various water arches have also been successful in abating smoke, and may be regarded as efficient means of prevention when comparatively pure water is available. If the boiler feed contains many scale-forming impurities, the repair bill on this class of apparatus is apt to be serious.

All things being considered, the mechanical stoker has gone the furthest toward solving the problem of any means yet devised. Whether taking the form of a shaking grate with inclined bars, by which the coal is gradually fed from the hopper downward under the boiler, the under-feed stoker, with the coal and air fed up from below so that all of the latter is obliged to pass through the incandescent fuel on its way to the boiler, or the travelling chain grate, which feeds the coal gradually and uniformly back from the hopper, burning as it goes, and automatically discharging the ash and clinker at the rear—these have all proved their excellence as abaters of smoke when properly set with reference to the heating surface of the boiler. The use of the brick arch or reverberatory furnace in connection with these adds much to their efficiency.

Probably the most efficient furnace in the world is the reverberatory one used in connection with open hearth steel-making where complete combustion at a high temperature is insured before the heat is used for manufacturing purposes. I look for future development along these lines as a complete solution of the smoke problem.

The temptation to bring the flame from soft coal too near the relatively cool surfaces of the boiler has hindered the progress of this improvement more than any other one detail.

To prove the efficiency of properly constructed mechanical furnaces, it is only necessary to refer to the pictures, which show the condition of the same plants before and after the change was made. There is also little doubt that these good citizens who have equipped their furnaces with the proper means for burning soft coal have benefited themselves as well as the community at large, since in the majority of cases an improvement in the smoke conditions means a more economical use of the fuel. Not only is there more heat available from coal when properly burned, but the heating surfaces of the boilers are much more efficient when free from the deposit of soot, which is a necessary accompaniment of black smoke.

The claims made by the inventors and promoters of smoke-abating devices have frequently been unreasonable, but as a result of my experience and investigation I should say that a saving of 10 or 15 per cent. in the amount of fuel burned per horse-power can reasonably be expected as a result of the abatement of black smoke. I have received personal letters from a large number of manufacturers and owners of business blocks in the city of Cleveland which confirm me in this belief. The saving in these cases was shown, not as a result of short expert tests but from a comparison of the monthly coal bills before and after making the change.

From a standpoint of public comfort and social ethics, it should make no difference whether smoke prevention is profitable to the boiler-owner or otherwise. I have no more right to pollute the neighborhood with black smoke than I would have to contaminate the water supply or throw garbage over the line fence. The production of an unnecessary amount of black smoke constitutes a nuisance, and should be so designated by law. The remedy lies either in legislative enactment or municipal ordinances, according to the provisions of the city or town charter. Once proper laws are provided, everything depends upon public sentiment and upon the personnel of the office force. It is, perhaps, unnecessary to say that the department of smoke prevention, like others of its kind in the city hall, should be free from all suspicion of graft or of collusion with either coal dealers or manufacturers of smoke-preventing devices. The inspectors and officers should be chosen on account of their practical knowledge of engines and boilers. The head of the office should be a man who is technically trained; one of good judgment and unfailing tact. His subordinates can well be stationary and locomotive engineers of good reputation and habits. The appointment for political reasons of plumbers, saloon-keepers or drug clerks to positions on the force will but make it the laughing stock of the neighborhood. It must be regarded as a technical, not a political organization. Any campaign for improvement in conditions must be at first largely of an educational nature, and resort should be had to legal measures only in extreme cases. When arrests are made it is absolutely essential to have the co-operation of the police and judiciary, so that the necessary punishment can be made without fear or favor. If the people of our cities who, after all have the supreme power, would only awake to the possibilities of this movement, the advance might be rapid.

The New York City Railway Company, early this year, secured the rights from the Pay As You Enter Car Company, of New York City, to use the pay-as-you-enter system and put on 155 cars of that type. Evidently the cars were a success, for the New York City Railway has placed an order for 75 additional cars.

* Read before the Indiana Engineering Society.

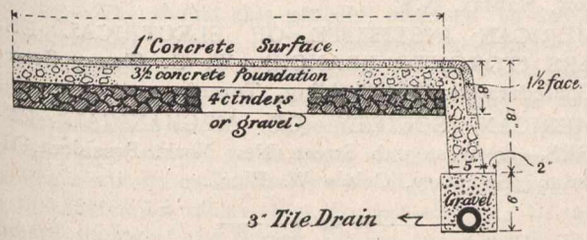
A Page of Costs

ACTUAL, ESTIMATED, AND CONTRACTED.

CONCRETE SIDEWALKS.

Plank sidewalks have been almost entirely discontinued. Brick, as a substitute, has not been a success. Concrete does not make an ideal walk, but, for want of a better, thousands of feet are laid yearly.

We give herewith the actual cost of material and labor as expended in the construction of two sections of walk



Cross Section

One section, a four-foot walk with curb, and the other a five-foot walk with curb.—

Five Feet with Six-inch Curb.

The lineal measurement of this section was 625 feet. The cost was:—

For Material—	
60 cu. yds. cinders at 85 cents per cu. yd.	$ 51 00
79 cu. yds. screened gravel at $1.50 per cu. yd.	118 50
24 cu. yds. sand at $1 per cu. yd.	24 00
9 cu. yds. pea gravel at $1 per cu. yd.	9 00
3 tons crushed granite at $3.50 per ton	10 50
87 barrels cement at $1.75 per barrel	152 25
Water	2 61
Tile, 625 at two cents each	12 50
	$380 36
For Labor—	
One foreman—six days at $3.50 per day	$ 21 00
One head layer—four days at $2.75 per day	11 00
One assistant layer—four days at $2.50 per day	10 00
Seven laborers—six days at $1.80 per day	75 60
Three teams, hauling away excavated material, two days at $4.50	27 00
	$144 60
Total cost—Material	$380 36
Labor	144 60
625 lineal feet cost	$524 96

Or 82.99 cents per running foot.

A second walk, four feet wide, with curb, and 455 feet long, cost as follows:—

For Material—	
30 cu. yds. screened gravel at $1.50	$ 45 00
18 cu. yds. sand at 85 cents	15 30
24 cu. yds. cinders at 75 cents	18 00
8 cu. yds. pit gravel for filling at $1	8 00
6 cu. yds. pea gravel at $1.50 per cu. yd.	9 00
52 barrels cement at $1.70 per barrel	88 40
Tile—455 at two cents each	9 10
Water	2 08
	$194 88
Labor—	
One foreman—five days at $3.50 per day	$17 50
One head layer—three days at $3	9 00
One assistant layer—three days at $2.50	7 50
8 laborers—five days at $2	80 00
	$114 00
Total cost—Material	$194 88
Labor	114 00
455 lineal feet cost	$308 88

Or 70 cents per running foot.

COST OF PRECISE LEVELLING.

In connection with the Georgian Bay Ship Canal surveys the Department of Public Works found it necessary to run a line of precise levels from the United States coast and geodetic bench mark at Rouses' Point, N.Y., to the mouth of the French River. Altogether 935.9 miles of precise levels were run, costing $29,648.91, or $31.36 per mile.

Compared with extensive precise levelling in other countries this rate per mile is high, but is accounted for because of the climatic conditions, which were unfavorable throughout the whole period of field work.

COST OF SURVEYS.

Sometime ago we gave the cost of outline surveys on Dominion Government survey party work. In the Iowa "Engineer" Mr. J. C. Cleghorn concludes an article on "Reconaissance of Irrigation System at Crow, Montana," with some figures as to cost of surveys.

The first party ran a fly level line from Toluca up to the Big Horn canon to determine at what elevation a canal should be started to get over the divide to Fly Creek. It was found that a diversion dam 150 feet high must be used to get a sufficient elevation. The fall of ten feet per mile in the river prevented getting the elevation by diversion higher up in the canon.

This work consisted of a level line, which aggregated about 100 miles at a cost of $10 per mile. The Big Horn High Line consisted of a level line on the falling contour tied in by a transit stadia traverse and followed by the plane table, taking sheets on a scale of 200 feet to one inch. This line was 92.8 miles long, and was followed by the Peritsa Lateral, 32 miles long. The two cost $31.97 per mile for the level and transit lines. There were 92 plane table sheets made of the Big Horn High Line at a cost of $20.87 per sheet and about that per mile. The party was composed as follows:—

Salary.

Chief of party	$133 33	per month and board.
Transitman	75 00	" " "
Levelman	60 00	" " "
Rodman	45 00	" " "
Rodman	45 00	" " "
Rodman	45 00	" " "
Chainman	40 00	" " "
Flagman	40 00	" " "
Cook	55 00	" " "
Teamster	45 00	" " "

The party ran a careful survey in the manner described. The chief of party was sometimes instrumentman, the transitman ran the table most of the time, and the levelman ran the level one day and transit the next. The first few miles were rough and on steep side hill, but beyond that the country was gently sloping.

The Fort Custer line was run a distance of forty-five miles at a cost of $22.53 per mile. This line is much nearer water than the other two; hence the drives to and from work were shorter.

Another party was put on special detail topographic sheets at the Big Horn dam site, the Fort Custer diversion site, at the Toluca Cut and at the Huntley Bluffs. This party did the careful topographic work on a scale of 100 feet to one inch, and was composed as follows:—

Chief of party at	$116 00	per month and board.
Station assistant	45 00	" " "
Rodman	40 00	" " "
Rodman	40 00	" " "
Cook	50 00	" " "
Teamster	40 00	" " "

Thirteen sheets were made at a cost of $76.92 per sheet.

Work was started at Huntley and a line ran out the Huntley Canal line a distance of thirty-six miles, the Ballantine pump line, six miles long; the Waco ditch line, a distance of nineteen miles; the Sanders High Line, a distance of forty-five miles, and a line up Tullocks Fork, eight miles. These lines were run as before, except the transit took topography along with traverse. It has the advantage of being faster. The company was composed as follows:—

Chief of party	$100 00	per	month	and board.
Transitman	75 00	"	"	"
Levelman	55 00	"	"	"
Rodman	50 00	"	"	"
Rodman	45 00	"	"	"
Rodman	40 00	"	"	"
Cook	50 00	"	"	"
Teamster	40 00	"	"	"

These lines cost $25.54 per mile. A series of topographic sheets were taken on the Waco Sanders line along the rough bluffs between the mouth of the Big Horn River and Meyers' Station, a distance of eleven miles, at a cost of $20.91 per mile.

In closing it may be of interest to state that the Huntley Canal was completed by the Reclamation Service in 1907 at a cost of $900,000.

LAYING ASPHALT PAVEMENT

The city of Yarmouth, N.S., laid during 1907, under the supervision of H. C. Cook, superintendent of streets:—

	Sq. yds.
New asphalt	2,836
Asphalt repair	4,905
Street crossings	212
Total	7,953

The cost for this work was $3,880.37, and was distributed as follows:—

	Total.	Per sq. yd. Cents.
Labor, teams, use of plant	$2,138 45	26.8
Sand and gravel	431 87	5.4
Wood and truckage	99 49	1.2
Tar	513 75	6.4
Asphalt	658 19	8.2
Freight	38 62	0.4
	$3,880 37	48.4

ENGINEERING SOCIETIES.

CANADIAN RAILWAY CLUB.—President, L. R. Johnson; 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, P.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.

MANITOBA 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 months.

CANADIAN ELECTRICAL ASSOCIATION.—President, N. W. Ryerson, Niagara Falls; Secretary, 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.

NOVA SCOTIA SOCIETY OF ENGINEERS, HALIFAX.—President, J. H. Winfield; Secretary, S. Fenn, Bedford Row, Halifax, N.S.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS (TORONTO BRANCH).—W. G. Chace, Secretary, Confederation Life Building, Toronto.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—29 West 39th Street, New York. President, H. L. Holman; Secretary, Calvin W. Rice.

SOCIETY NOTES.

Builders' Show, Winnipeg.

Quite a lot of interest has been taken in the Building Show which was held in Winnipeg last week. All the large contractors and agents for a great many lines of building material had splendid exhibits. Particular mention might be made of Messrs. Dunn Bros., of Winnipeg, who had a fine exhibit of the lines that they handle, among which were some fine samples of the work turned out by the Galt Art Metal Company; also a fine exhibit of the lines turned out by the Expanded Metal and Fireproofing Company, Toronto. C. W. Noble had a splendid exhibit of herring bone lathes and other concrete construction work. Messrs. E. R. Watson & Son displayed a fine line of their instruments and levels. Shipman Electric Company had a splendid exhibit of a great many lines of electric supplies and lighting fixtures.

Architectural Institute of Canada.

The Architectural Institute of Canada will hold their first general annual meeting at Ottawa, Ont., on September 28th, 29th, 30th, and October 1st in the Lecture Hall of the Carnegie Public Library.

Arrangements have been made for cheap railway tickets, a good programme and many side trips.

Alcide Chausse, secretary, P.O. Box 259, Montreal.

Ontario Municipal Association.

On September the 9th and 10th the Ontario Municipal Association met in the City Hall, Toronto. The discussions dealt almost entirely with matters of administration and taxation. The following officers were elected for the coming year: President, Mayor Kennedy, Owen Sound; first vice-president, Mayor Geddes, St. Thomas; second vice-president, Controller Hopewell, Ottawa; third vice-president, Alderman J. H. Shepherd, Windsor; fourth vice-president, Reeve S. Oakes, Caradoc; fifth vice-president, Controller Spence, Toronto; secretary-treasurer, Mr. K. W. Mackay, St. Thomas; executive committee, the Mayors of Toronto, Hamilton, Brantford, London and Dundas; city solicitors, W. C. Chisholm, Toronto; W. B. Doherty, St. Thomas; S. H. Kent, Hamilton, and S. R. Armstrong, Peterborough; the Reeve of Springfield and the Warden of Wentworth.

Association of American Portland Cement Manufacturers.

The Association of American Portland Cement Manufacturers will hold their next annual meeting at Hotel Pontchartrain, Detroit, Mich., on September 14th, 15th and 16th, 1908.

The mornings of the 15th and 16th will be devoted to business, while on the afternoon of the 15th the Michigan Portland Cement Manufacturers' Association has arranged, for the entertainment of the Association, a trip down the river to Belle Isle.

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.]

THE METRIC SYSTEM.

Sir,—Why should this peaceful province be bombarded with "circular" letters of the Decimal Association? One wonders whether to be amused at the fatuity of this particular letter or vexed at its disingenuousness. So long as this continent is marked out in mile sections a very large part of its thought must always be in terms of the English measures. On the ocean no enthusiast is ever likely to carry a change in the navigation tables—they are not metric. In the machinery trades of the British Empire and English-speaking America and in the cotton trade all over the world the substitution of the metric system would involve expense out of all proportion to any supposed advantage. See "The Metric Fallacy," written by two American technologists four or five years ago.

The instances given of "the forward march" of the metric system, when examined, really count for very little. Educated people of a scientific frame of mind naturally use this system whenever they can and it will undoubtedly be employed in all new scientific industries. Pharmaceutists and medical men are all chemists, and it is very obvious that in professional work they would favor the abolition of apothecary weights and measures for the metric system, in which the majority of experiments affecting their work are recorded.

In England it is lawful to manufacture, buy and sell in metric units, so that there is no obstacle in the way of a manufacturer preparing goods for metric markets. The Association wish to make the metric system obligatory and exclusive. The metric system has two distinct features—the decimal notation and its co-ordination of weights and measures. Practically we have met the first point on this side of the water by the "short ton" and the measurement of most commodities in terms of one unit only such as the foot, pound, gallon, etc. As regards co-ordination, out of every million measurements made by the man in the street I doubt if ever one calls for co-ordination. In special trades where it may be required the calculator always has his special factor at his finger ends.

It is not, of course, correct to say the metric system has broken down hopelessly in France, but after over a hundred years of legal use old measures are still employed in country districts all over Europe for wood, wine, etc., in spite of the vigorous educational propaganda.

One word on the educational aspect of the question: Every high school student who has to take up chemistry learns the metric system as a matter of course. It would be fatuous to expect more than a general acquaintance with it from others. I have used the metric system all my life, but I am not ashamed to confess I have no idea how large a hectare is. The full knowledge of the metric system is a part of specialized education and has no place of necessity in ordinary high or primary education. Sad to relate, a co-ordinated system of measures is as much out of the reach of the Anglo-Saxon race as a purely phonetic language is. A modified decimal system is with us.

The Decimal Association always drags in Lord Kelvin, but I distinctly remember a letter in the Times some years ago in which that prince of scientists praised the English system—the duodecimal—of money and measures as a great blessing to the poor in their small transactions.

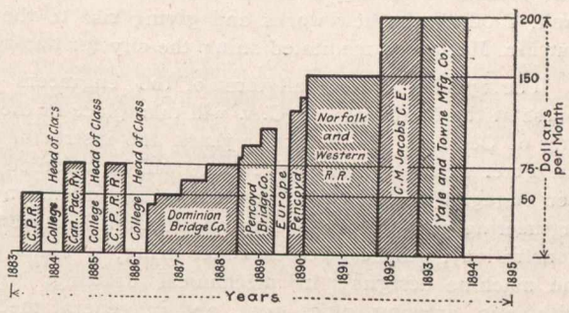
G. R. F. Prowse.

Rossendale, Man., August, 1908.

THE SALARY OF A YOUNG ENGINEERING GRADUATE.

The matter of an engineer's salary is a much discussed question.

We take pleasure in publishing a graphical record illustrating the salary and occupations of an old School of Science Graduate for the first ten years of his experience as an engineer. It will be noticed that he received a higher wage during the vacation of his college years than he did for two years after graduation, and that immediately after graduation he accepted a less salary per month than he was receiving before he attended the school at all.



MONTREAL WATERWORKS IMPROVEMENT.

Visit of Mining Engineers, Building Conditions.

(From Our Own Correspondent.)

Montreal, September 9th, 1908.

The probabilities are that another new electric plant will shortly be under construction for the purpose of supplying electric current to Montreal. The company concerned is the Montreal Electric Light Company, regarding the control of the franchise, of which there has been some litigation. The trouble has at last been settled, and it is said that New York financiers have been looking over the situation and are favorably impressed by it. It is thought that financial arrangements will soon be completed and that another rival will prepare to enter the field against the Montreal Light, Heat and Power Company.

The work of laying sidewalks, paving the streets and carrying out certain other public works in the town of St. Louis, Montreal, has at last been commenced. This is the work of improvement for which debentures amounting to $625,000 were recently sold by the town to Messrs. Hanson Brothers, the highest bidders. The town has recently received $98,000.50 from the purchasers, on account, and no further delays in carrying out the work are anticipated.

A group of Montreal capitalists, whose names are not mentioned, is reported to be interested in the development of Port Stanley as a Canadian lake port. The rumor does not receive much credence in Montreal, as it cannot be seen what object there would be in such an undertaking. The report, however, may be correct.

It is just a year ago since the contract was let by the city of Montreal to P. McGovern, of Boston, for the construction of the covered concrete conduit to run parallel with the present aqueduct, this being part of the two million dollar scheme of waterworks improvement designed for Montreal. Mr. McGovern was the lowest of four bidders, his figure being $684,815, made up as follows: 27,100 lineal ft. conduit, at $21.25 per ft., $575,875; 44,000 cubic yards rock excavation, at $2 per yard, $88,000; 10,000 cubic yards loose rock or boulders

at 75 cents per yard, $7,500; 2,400 lineal ft. piling and flooring at $5.60 per ft., $13,440. Mr. McGovern bound himself by a large deposit to complete the work by the beginning of November 1st, 1908. It would now appear that there is absolutely no possibility of the contract being completed within the time mentioned and the question is now raised as to whether or not he should forfeit his deposit. According to interviews given out by members of the water committee, however, they are disposed to deal leniently in the matter. Many delays which could not be foreseen have taken place, and in addition the work was held back by an important subcontractor, so that it is considered, apparently, that the work could not have been put through in the time mentioned, and that Mr. McGovern had done as well as possible. The result, however, will be that the work cannot now be finished till next season. Recently a break occurred in the aqueduct bank, flooding the new works and giving rise to the rumor that Mr. McGovern meditated suing the city for damages.

The opening of the fall term of the engineers' group course at the Montreal Y.M.C.A. will take place in the beginning of October. As in former years, the instructor will be Mr. Peter Bain. A new opportunity will be afforded to the men engaged in mechanical pursuits by the extension of this engineering group course. Class instruction (lecture and demonstration), will be given in boiler firing, in boiler, engine and machine designs; in mechanical drawing, workshop arithmetic, drawing, office work, and in general mechanical engineering. Estimates operating and construction costs, fuel saving, smoke prevention, and kindred appliances for increasing efficiency and economy, will be considered in detail, and form new and special features.

Montreal was taken possession of by visiting mining engineers from Great Britain, Germany and the United States, and by the members of the Canadian Mining Institute, who were showing them around on the 2nd inst. Under the guidance of Dr. Adams, Professor of Geology and Dean of the Faculty of Applied Science, the mining men inspected the McGill metallurgical equipment, afterwards taking lunch at the Montreal Hunt Club. In the evening they were entertained at the St. James' Club, eighty of them sitting down under the presidency of Mr. George Drummond, chairman of the Montreal branch. Among the well-known engineers present were: Dr. Miller, Toronto, president of the Institute; Eugene Costie, Toronto, past president; Charles Fergie, Nova Scotia; Dr. Hardman; Wm. Frechville, past president Institute of Mining and Metallurgy, of Great Britain; Hugh Marriott, the well-known expert; Walter Johnson, representing the Iron and Steel Institute; D. B. Longford, London, representing the Institution of Mining Engineers; W. I. Rees, Swansea, representing the steel industry of South Wales; Roger Beck, Swansea; Clifford Bloomer, British Iron and Steel Institute; Clifford McDairmid; Prof. H. Potomi, Berlin University; Dr. Ries, Cornell University; S. Mavor; Dr. Wupperman, Dr. Adams, and many others.

The contract for the new workshop for the Montreal waterworks at the corner of Grand Trunk and Charlevoix Street, has been let to the Montreal Ship Lining Company at $17,800, and that for the foreman's house in connection with the shops, was let to Shearer, Brown & Company at $3,952.

Three Rivers, Que.—About two dozen buildings, ranging from one to three storeys in height, are now under construction, the late fire having necessitated considerable building. As many more buildings will be commenced in a few days.

Quebec, Que.—Hon. S. N. Parent, accompanied by the three expert bridge engineers, Messrs. Fitzmaurice, of England, Vautelet, Montreal, and Modjeska, Chicago, who were appointed by the Canadian Government to re-build the Quebec Bridge, visited the site of the old structure last week and afterwards proceeded to Montreal en route to New York and Phoenixville.

Montreal, Que.—The Department of Marine and Fisheries are placing six additional flame buoys in Lake St. Peter, thus rendering the St. Lawrence channel navigable at night for steamers of 30 feet draught.

MORISON SUSPENSION FURNACES FOR INTERNAL FURNACE BOILERS.

Designers and builders of boilers, as well as engineers generally, will be interested in the seventh edition of a book entitled, "Morison Suspension Furnaces for Internal Furnace Boilers," just issued by The Continental Iron Works, borough of Brooklyn, New York City.

The book deals with the use of the Morison Suspension Furnaces, of which The Continental Iron Works is the sole manufacturer in the United States, in connection with land boilers only, in contradistinction to the application of Morison Suspension Furnaces for marine purposes. It is a finely compiled and printed volume of nearly seventy pages, bound in a serviceable cover.

There is a fund of valuable data, with numerous illustrations, including a number of important installations of Internal Furnace Boilers using Morison Suspension Furnaces, together with details of design and construction, tables of pressure and thickness, and rules for calculating same.

The designs shown are for land boilers ranging from 50 horse-power to 300 horse-power, and are intended to meet general requirements, it being explained that where boilers are designed to work under other than normal conditions, the designs are offered by way of suggestion only.

A form of Specification for Internal Furnace Tubular Boilers, which accompanies the designs, should prove an important aid.

In the latter part of the book is a partial list of installations of Internal Furnace Boilers fitted with Morison Suspension Furnaces, many of which are repeat orders, demonstrating the satisfaction this type of steam generator gives.

This is followed by illustrations and full information regarding the Morison Patent Furnace Fronts and Doors for economical and rapid firing, and which are also made only by The Continental Iron Works.

Engineers, Architects and Boiler Manufacturers will find this book of great assistance to them in the design and lay out of Steam Power Plants.

The book is printed by H. Edwards Rowland, New York City, and a feature of the text is a clever adaptation of photographs, showing various applications of the Morison furnace.

Statement of accidents during July, 1908, in the following industries and trades:—

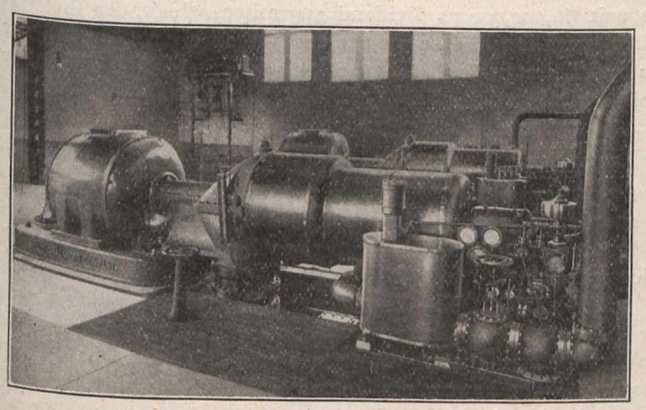
Industry or Trade.	Killed.	Injured.	Total.
Lumbering	7	5	12
Mining	7	14	21
Building trades	3	34	37
Metal trades	9	15	24
Woodworking trades	1	8	9
Railway service	20	22	42
Navigation	9	4	13
General transport	9	13	22

THE KOKOMO STEAM TURBINE POWER PLANT.

By Frank C. Perkins.

The modern steam turbine power plant at Kokomo, Indiana, is owned and operated by the Kokomo Marion & Western Traction Company. It is equipped as shown in the accompanying illustration with two steam turbines and generators of the Allis-Chalmers type, each having a capacity of 2,000 kilowatts and delivering a two-phase alternating current, having a frequency of 50 cycles per second with a pressure of 2,300 volts at the terminals of the alternator. These sets operate at a speed of 1,800 revolutions per minute with a steam pressure of 140 pounds at the throttle dry saturated and a vacuum of 28 inches of mercury referred to, 30-inch barometer at the exhaust nozzel.

The coal handling system is unique, the fuel, consisting of a comparatively low grade Indiana screenings, is brought in on a spur from the Lake Erie & Western Railway and unloaded through a trestle extending the entire length of the firing room, so that it is heaped up in front of iron doors opening upon the several furnaces. From these piles it is shoveled directly into the furnaces, which are so arranged as



Two 1,000 k.w. Steam Turbines at Kokoma Power Plant.

to obtain a relatively high heat value from the fuel—with the exercise of good management. Removal of ashes is accomplished by an inexpensive device. Instead of the customary ash-pit with track and cars, there has been installed a tunnel and screw conveyor through which the ashes are constantly transferred to a pit outside the building. There, by means of a bucket elevator and inclined conveyor, the material is discharged to storage bins at one side of the building and unloaded into cars, which take it to points along the line where it can be used as ballast.

It may be stated that the boiler equipment is set on concrete foundations reaching to bed rock, and consists of three batteries, two of which include four stirling boilers, each having a capacity of 235 horse-power, and the third comprising one Atlas water-tube boiler with a capacity of 400 horse-power. Two of the stirling boilers discharge into one stack, 6 feet x 80 feet, constructed entirely of steel, and the remaining two, with the Atlas boiler, into a stack, 6 feet x 125 feet, also of steel. The shorter of these stacks is equipped with an engine driven blower, made by the Sturtevant Company, by means of which enough draft can be induced to give temporary overload capacity to the two boilers with which it is connected. The boiler room has ventilators at the top and is very commodious with room for considerable additional capacity.

There is installed in the turbine room, above the pump compartment, a main steam header 12-inch in diameter in the form of a loop, from which each turbine unit is fed by a 7-inch pipe. Gate valves are placed between each battery of boilers and between each turbine inlet, these valves being of the Crane type with rising stems. There is also a 4½-inch auxiliary header. A proper arrangement of valves enables any part of the plant to be supplied from any boiler at will. All of the piping is made as short and direct as possible, and heat insulation is provided in the shape of heavy covering of the pattern furnished by the Johns-Manville Company. Long bends to provide for expansion, have, of course, been used wherever necessary, and the system includes Cochrane steam separator.

This plant is equipped with electrically operated pumps and feed water heaters, the condensers and all of the other auxiliaries exhausting into a heater of the Cochrane type with Surge water purifier, where a temperature of from 300 to 212 degrees F.—never less than 200 degrees—is constantly maintained. Water may be drawn from either the condenser suction of discharge pipes, from a deep well or from the city mains, and discharged into an elevated tank which feeds by gravity into the heater, and from there by gravity into the boiler feed pumps; or the water may be by-passed directly to the boiler.

Two Worthington pumps are used for supplying the tank over the heater and two Dean pumps for boiler feed. Either one of any of these two is, however, of sufficient capacity, to take care of the water system of the entire plant. The former are now being displaced by a centrifugal pump with 2½-inch discharge, driven by an induction motor supplied with current directly from the main generator busses through a step-down transformer; but the steam pumps will be held in reserve.

In reference to the water supply it may be that the water for condensation and boiler feed is taken from a creek, about 350 feet distant, through a 16-inch cast iron pipe, and discharged back to the stream through 20-inch tile. The water is drawn from a concrete basin in the creek 7 feet square inside and extending 6 feet below water mark, with walls extending to high water mark and a gate on the down stream side where the water enters. This gate can readily be closed down tight, when desired and the water exhausted by pumps in the power plant, as to facilitate cleaning the basin of sand and mud.

The turbine operating floor is 5½ feet above the boiler and pump room floor, 11 feet above the basement floor and 30 feet below the roof trusses, the foundation of each generating unit being kept entirely separate from the steel frame of the concrete flooring. Overhead is a 10-ton crane, hand operated.

In this room are placed two horizontal steam turbines and generators of 1,000 k.w. capacity each, 330 k.w. engine driven alternator operated in parallel with them, the exciters for these units, and substations apparatus, transformers and switchboard.

This plant represents the latest and best practice for power house and railway construction in the United States at the present time. It is stated that the steam turbine plant has given excellent service in a large temporary overload capacity with good regulation even under not unfavorable operating conditions. It is held that the turbines operate frequently six weeks at a time without taking the load off and in such instances only in order to make inspection.

COST OF MODERN HARBORS.

So far, the port of Hamburg, with its auxiliary Cuxhaven, has cost the State nearly $100,000,000. The dues collected do not nearly pay the expenses, the deficiency being covered from other sources out of the general revenue of the State. The amount of money represented by modern port development elsewhere is as follows:—

London	$186,700,000
Liverpool	125,000,000
Manchester	90,000,000
Glasgow	40,000,000
Newcastle	80,000,000
Bristol	30,000,000
Cardiff	30,000,000
Antwerp	45,000,000
Rotterdam	33,000,000
Marseilles	29,500,000
Havre	24,000,000
Montreal	10,000,000

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.

CONTRACTS AWARDED.

Quebec.

COWANVILLE.—Bids were received for the construction of one-half mile of permanent road on the road from Dunham to Cowansville, and Mr. P. Arthur Ruiter, of Cowansville, was awarded the contract for the price of one thousand dollars. The work is to be completed by the first day of November and will be done under the supervision of Mr. J. A. Camirand, the Government expert.

Ontario.

MALDEN.—The contract for the cement bridge on the Anderdon town line was awarded to James McGill at $240. Arthur Heaton tendered at $248.

FORT WILLIAM.—Messrs. Carter, Halls & Aldinger, engineers and contractors of Winnipeg, have also been awarded the contract for a $100,000 office building at Fort William, Ont. The building is being erected for E. H. Cuthbertson, and will be fireproof throughout, being built entirely of reinforced concrete. Messrs. Darling & Pearson are the architects.

THOROLD.—The tenders for the laying of water services were laid before the Council. There were four in number. The successful tender was Mr. Daniel Oates, who secured the work at the uniform rate of 18 cents per foot.

TORONTO.—The contract for the construction of the easterly portion of the new sea wall from Sunnyside to the Humber was let to Peter Arnot. The contract is for the construction of 1,500 feet of solid concrete wall on timber crib-work, with two landing stages. Prior to the final completion of the specifications for this work, it was ascertained that the original plans would require to be modified somewhat, further surveys showing that what had been determined as bed rock a few feet below the sandy bottom was not rock at all, but a stratum of boulders and gravel overlying clay. As the density of the strata of boulders and gravel could only be fully ascertained upon dredging away the over-lying sand in the prosecution of the work, it was decided that prices for several types of construction should be called for. The tenders were for the materials and workmanship required in the four several forms of wall proposed. The tenders received were: "A" for rubble masonry, J. E. Russel, $35,948; "B" concrete block on crib, Constructing & Paving Company, $47,295; "C" solid concrete on crib, Peter Arnot, $41,544; "D" solid concrete, Peter Arnot, $36,200. Type "C" was strongly recommended by Park Commissioner Wilson and the City Engineer.

Manitoba.

WINNIPEG.—The contract for the new Y.W.C.A. building, Winnipeg, has been let to Messrs. Carter, Halls & Aldinger of that city, the contract price being $85,000. In the gymnasium will be a suspended running track built of reinforced concrete.

Saskatchewan.

REGINA.—The contract for the structural steel work of the Collegiate Institute at Regina has been awarded to the Dominion Bridge Company, and will all be shopped in their Winnipeg works. Messrs. Wilson & Wilson are the contractors for the building, which will cost $85,000.

Alberta.

WETASKIWIN.—The contract for bridges was awarded to Henry Nelson at $230. S. J. Youngberg tendered at $300.

TENDERS.

Ontario.

CORNWALL.—Tenders will be received by the undersigned up to 12 o'clock (noon) on Saturday, September 12, 1908, for grading and sodding for new lacrosse grounds on Marlborough Street, between Third and Fourth Street. Plans and profiles, etc., can be seen at the Rossmore Annex, Cornwall. A. J. Milden, Engineer-in-Charge.

LIGHT, HEAT, AND POWER.

Quebec.

MONTREAL.—The offer of Hon. Leslie M. Shaw to the Montreal Power Company, has been received. It is understood it embraces a 99-year lease. The Shaw Company will deposit $6,000,000 as dividend guarantee, which, for the first three years is to be seven per cent., then eight per cent. for an indefinite period. They offer 110 for stock. The offer will likely be refused.

Ontario.

KINGSTON.—The city light department is figuring upon the electric lighting of Portsmouth, and there is a possibility that arrangements will be made with the village council about extending the city system into the village, providing the service will pay.

LEAMINGTON.—The electric lighting plant in this town, operated by Messrs. Starrs, Reid & Post, has been sold to Detroit capitalists. The price paid is said to have been $25,000. The newcomers intend to make extensive improvements in the plant.

NORTH BAY.—The North Bay Light, Heat and Power Company have submitted to the council a proposition, which in substance is, that they ask for a 20 years franchise, three years of which to be exclusive and that they furnish light, while by steam power at the rate of 15 cents, and 20 per cent. off. Or should they be able to run by water power, they supply light at 15 cents, with 20 per cent. off, and a further discount of 10 per cent. if paid within 20 days, and a still further discount of 5 per cent. if paid within 10 days. A meter charge of 25 cents per month in any case. Should this proposition fail to meet with the approval of the council, the company offers to sell the plant, including the gas plant to the town for the sum of $75,000.

TORONTO.—The Hydro-Electric Power Commission has accepted the tender of the F. H. McGuigan Construction Company for the building of some 300 miles of their transmission lines in South-Western Ontario. Mr. McGuigan is a gentleman well known in Canada and in the United States as an eminently successful railway man, whose executive capacity has been proven through many years of relationship with the Grand Trunk, the Great Northern and other roads. He has engaged the services of the engineering firm of Smith, Kerry & Chace, of Toronto and Winnipeg, to carry out this work now allotted to him, those gentlemen having rendered him material assistance in the preparation of the tender now accepted. Mr. C. B. Smith has been intimately acquainted with the work of the Hydro-Electric Power Commission since its inception, having been chief engineer for the first Provincial Commission, and for a period a member of the second, the present Commission; he is thus eminently fitted to advise Mr. McGuigan in his handling of this extensive contract.

Nova Scotia.

NEW GLASGOW.—Mr. Rockewell, of the Robb Engineering Company, Amherst, was in town recently placing the

machinery for the new electrical plant in the I.C.R. yard. This plant has now been completed and connections made with New Glasgow and Westville yards, which will give all the buildings and yards included in the circuit, a splendid system of lighting.

Foreign.

ST. JOHN'S, NEWFOUNDLAND.—Electric power at Petty Harbor is at present out of working order owing to continued drought. It is quite possible the electric power will not be in working order for a month, although a few days continued rain would probably put an end to the troubles. The streets are almost in darkness, the local street car service is tied up and most of the big industries are closed down.

RAILWAYS—STEAM AND ELECTRIC.

Quebec.

MONTREAL.—The Grand Trunk Railway has recently purchased ten 10-wheeled passenger locomotives from the Baldwin Locomotive Works, Philadelphia. They are what are known as the 1,000 class, which are being used on the Ottawa Division and the Montreal and Island Pond Division, and are giving good satisfaction.

MONTREAL.—The directors of the Montreal & Southern Counties Railway expect shortly to begin the construction of the first section of the new road, which will extend from their Montreal terminus in Grey Nun Street, via Common Street, Black's Bridge and Victoria Bridge to the town of St. Lambert.

Ontario.

BRANTFORD.—Johnson Bros., contractors, of Brantford, have completed the grade of the Grand Trunk Pacific from Winnipeg to Portage la Prairie, and begun work on a heavy contract sub-bed from the Grand Trunk Pacific Railway Company. This latter contract begins at Plaster Rock on Tubuque River in New Brunswick, and runs east twenty-eight miles. The country here is rough or rolling and heavily timbered, but there will be some good agricultural lands along this part of line.

ST. MARY'S.—The Ontario Railway and Municipal Board yesterday made out an order validating the debenture by-law of the town of St. Mary's for $40,000, payable by way of a loan to the St. Mary's & Western Ontario Railway Co.

WELLAND.—Mr. W. R. Robertson, superintendent of the N.S. & T. electric road, is authority for the statement that the bridge over the Welland River for the electric railway would be completed in eight weeks, and electric cars running over the bridge into Welland proper by that time. It will be a wooden trestle about 260 feet long.

Alberta.

EDMONTON.—William Pearce, railway surveyor, of Calgary, was sent north some time ago by the C.P.R. to look into the conditions of the country in the Lesser Slave Lake and Peace River districts. He travelled through that country and will now make a report to his company. It is stated, though not officially, that this is the first move of the C.P.R. towards building a line into the north country.

British Columbia.

VANCOUVER.—Collingwood Schreiber, Government chief engineer of railways, is here on his way to Prince Rupert, along with Chief Engineer Kelleher, of the G.T.P., for the purpose of inspecting the route as far as Hazelton. A number of modifications in the plan as approved by Mr. Schreiber are sought. These relate chiefly to new surveys, avoiding certain cannery properties.

SEWERAGE AND WATERWORKS.

Ontario.

NEWMARKET.—Work on the new reservoir for the town waterworks commenced. The reservoir will be located on a lot 100 feet square to the south and rear of the High School building. The foundation is only 4 or 5 feet in the ground and is some 6 or 8 feet above the foundation of the old reservoir. The new one is to take the form of a stand-pipe, built with concrete and steel, about 40 feet high and 15 feet in diameter, the contract price of which is $3,000.

TORONTO.—It is expected that the new experimental station for the testing of water and the treatment of sewage will be completed this fall. It is being built for the Provincial Board of Health.

TELEPHONY.

Ontario.

GUELPH.—The Bell Telephone Company have recently completed a new line out the Eramosa Road to Everton. This will give a more direct phone service from Guelph to Erin and Orangeville.

SIMCOE.—At a meeting called by Mayor Carter to consider the telephone service, nearly every business man was present and it was the concensus of the meeting that too high charges were being paid for telephones, and that the rural telephone line should be extended without delay. A telephone company was formed and directors appointed.

RECENT FIRES.

Ontario.

DESERONTO.—Lightning struck the charcoal shed in course of erection at the smelter here, on September 1st, and inside of three hours everything except the cupola was destroyed by fire. The works were to have been started by the Standard Chemical Company of Toronto in about four weeks. The old charcoal shed, containing about twelve thousand bushels of charcoal, the casting room, the engine and boiler houses, the ore elevator, the ore sheds, holding several thousand tons of ore, all were destroyed. The only thing left standing is the cupola, built of fire brick and iron. The loss is estimated at over $100,000.

MISCELLANEOUS.

Ontario.

COBALT.—On a conglomerate rock sixteen teams competed in a drilling contest for $350 in prizes. Price and Smith of the Kerr Lake mine won, with 24½ inches; the brothers Davidson of the Buffalo were second, with 23⅞ inches, and Rowe and Rowe of the Townsite mine sank a hole 23 1-16 inches. The teams were allowed fifteen minutes in which to drill, all the steel they wanted and a coach. Immediately after the contest A. McGuire, on behalf of himself and his partner, Welsh, challenged the winners to a contest in granite, alleging that conglomerate rock was so variable that it was not fair.

WELLAND.—One of the biggest deals that have taken place in recent months took place here on Wednesday, when the Lawlor Company and the Erie Company, with a number of smaller concerns, sold their interests to the Selkirk gas field for $150,000. F. R. Lawlor is the principal member of the company, and it is said he cleared $100,000 by the deal. The purchasers are the Producers' Natural Gas Co., Hamilton, and it intends to convert the volatile fluid into cash as soon as possible. The Producers' Natural Gas Co. is the concern which owns the greater part of the Selkirk fields, and it supplies the Manufacturers' Natural Gas Co. with its gas It has its headquarters in Hamilton.

British Columbia.

KEREMEOS.—E. L. Bogard, of Vancouver, who will be in charge of the laying of the pipe for the big irrigation ditch, arrived in Keremeos. The material for the piping comprises fifteen carloads and is expected to arrive within the next fortnight. About two months will be required for the laying of the pipe. The bridge and flume work will be carried on at the same time, and should no unforeseen difficulties arise there is every prospect of the work being completed in good

time this fall. September and October will be busy months with big gangs of men engaged.

NEW WESTMINSTER.—The new dipper dredge "Ajax" has now reached completion with the exception of a few small finishing touches. The contractors have already put the machinery through its preliminary tests, raising and lowering the dipper arm and the spuds to their satisfaction, but there will now be the Government test, lasting six or seven days prior to the removal of the dredge to Victoria harbor, where it is to work. The vessel will in all be on trial for thirty days before leaving the hands of the Polson Iron Works Co., the contractors.

Foreign.

CHICAGO.—The project of a canal from Chicago to Toledo, Ohio, cutting 500 miles from the present lake route, has been taken up by the Chicago Association of Commerce. Mr. E. S. Conway, chairman of the Association Deep Waterways Commission, who is in charge of the movement, announced yesterday in a letter to Mayor Brand Whitlock, or Toledo, that as soon as the Great Lakes to the Gulf plan is well in hand the energies of the association will be devoted to this proposed waterway. The canal, as proposed, would be 244 miles long and twenty feet deep. It would start below South Chicago, cut across Michigan, and strike the lake about the entrance of the Maumee River, ten miles below Toledo. From this point traffic could be diverted up the river to the great elevators at and above Toledo, or a straightaway run for Buffalo and Lake Ontario would be open.

NEW YORK.—John F. Allen, 370-372 Gerard Avenue, New York, the pioneer builder of Portable Pneumatic Riveting Machines, reports a recent sale through their Paris agents, Fenwick Freres & Company, of one "Allen" Jaw Riveter, 25-inch reach, 15½-inch gap, 10-inch cyl., to Stussi & Zweifel, Milan, Italy.

PERSONAL.

MR. M. M. CAMPBELL, C.E., has removed from St. Amelme to St. Claire County, Dorchester, Que.

MR. NAPOLEON TESSIER has been appointed to succeed the late Fred. Gelinas as Secretary of the Department of Public Works, Ottawa.

MR. MICHEL LA ROCHELLE, recorder of St. Henri, Que., is the other member of the Civil Service Commission. Mr. La Rochelle was private secretary to Sir Wilfrid Laurier, when he was leader of the Opposition.

PROF. ADAM SHORTT, of Queen's, has been appointed a member of the Civil Service Commission. This is the body that hereafter will have to do with the appointment of civil servants of the inside service, merit alone entering into the selections. The customs and post officer service are exempted from the commission. Professor Shortt will accept the position. He has been a resident of Kingston since 1879, and on the staff of Queen's since 1886. He will resign his professorship and remove to Ottawa. Prof. Shortt is well known on account of his success as a chairman of arbitration boards.

OBITUARY.

JAMES McDOUGALL, for the last fifteen years engineer for the County of York, passed away at his residence, 5½ McKenzie Crescent, on September 2nd, 1908. Mr. McDougall, who was 55 years of age, had been in poor health for the last two years, but his illness did not become serious until recently. Deceased occupied the post of county engineer for over ten years, being connected during that time with the construction of the Metropolitan Railway, the Mimico line and the Scarboro' line. He also had charge of the construction of a part of the Canadian Pacific line.

PATENTS.

The following is a list of Canadian patents recently issued through the office of Messrs. Ridout & Maybee, Patent Solicitors, Toronto, from whom any further particulars as to the inventions may be obtained:

Turbines, Hon. C. A. Parsons; Engraving Hollow Articles, Konrad Schwahm; Support for Antennae Wires of Wireless Telegraph Systems, The Brown Hoisting Machine Company; Metal Shingles, Galt Art Metal Company; Joint for Sheep Shearing Machines, Ralph Faulkiner; Pulleys, R. R. Gubbins; Water Purifier, John Bowie, Jr.

INDEPENDENT TELEPHONES.

The Independent Telephone Association held their third annual Convention in the City Hall, Toronto, on Wednesday, September 9th, 1908.

The President, Dr. J. F. Demers, of Levis, Que., in his address struck a very hopeful note.

Secretary F. Page Wilson reported 338 independent telephone companies on the Association list. During the past year the number of independent phones increased from 18,000 to 25,000.

T. R. Mayberry, M.L.A.-elect, spoke of the independent movement in towns and cities, giving an account of progress in South Oxford.

E. Skinner spoke on "The Independent Telephone at Railway Stations."

Regarding the crossing of railway tracks the law's provisions were arbitrary. The companies should not be required to go to Ottawa for permission. There should be a standard to conform to. Never before had the Bell Telephone Co. made such efforts to effect connections with the rural companies, said Mr. Skinner.

Addresses and papers were also given by A. R. Walsh on mutual vs. joint stock companies, Alpheus Hoover on rates, A. D. Bruce on free service, Camby Wismer, of Jordan, on division of territory, Henry Sneath on toll line connections, and M. Gee on independent telephone interests in towns and cities.

The following officers were elected: President, J. F. Demers, M.D., Levis, Que.; Vice-President, W. Doan, M.D., Harrietsville, Ont. Executive Committee—F. Dagger, Regina, Sask.; A. Ochs, M.D., Preston; C. Skinner, Sherbrooke, Que.; T. R. Mayberry, M.P.P., Ingersoll; A. Hoover, Green River; G. W. Jones, Clark; E. Hart, M.D., Brantford; Levi Moyer, Beamsville; A. D. Bruce, Gormley; C. B. Adams, Harrietsville; F. A. Dales, Stouffville, Auditor; Secretary-Treasurer, F. Page Wilson, Toronto.

The contractors and builders of Winnipeg are this week holding an exhibition, and a great many firms in the different lines of building and contracting trades are making exhibits. It is called "The Building Material Exhibition," and will be held from August 31st to September the 5th. This is a new idea in holding an exhibition such as this, but it brings before the public the advancement taking place in the many lines of building art.

TRADE INQUIRIES.

Metals.—A London firm of general merchants desired to hear from Canadian importers of metals and piece goods.

Electric Lamps.—Inquiry has been received from the London office of a Birmingham manufacturer of lamps and electric fittings for the names of Canadian buyers of such goods.

Pulp.—A London firm wishes to get into touch with Canadian manufacturers of wood pulp (chemical or mechanical).

Shellac.—A London firm of white shellac manufacturers desires to be represented in the principal Canadian towns for the sale of shellacs.