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The Canadian Engineer

ESTABLISHED 1893

Issued Weekly in the Interests of the

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Editor—E. A. JAMES, B.A. Sc.

Business Manager—JAMES J. SALMOND.

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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: 330 Smith Street. G. W. Goodall, Business and Editorial Representative.

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TORONTO, CANADA, MAY 15th, 1908.

Have you a copy of the Canadian Engineer for February 21st, 1908, to spare? There's a month's extension of subscription in it for you.

CONTENTS OF THIS ISSUE.

Editorial:	Page.
College Testing Laboratories.....	343
Foundrymen's Convention	343
Leading Articles:	
Boiler Feed Pump	7
La Salette Landslide	344
Practical Advice	344
Handling of Ashes	345
Correspondence:	
Dynamite Explosions	349
Reforestation and Runoff	349
Railway Board Orders	346
A Page of Costs	347
Society Notes	348
Construction News	351
Market Conditions	353

Any reader not wishing to bind their copy of the Canadian Engineer of May 1st, 1908, would confer a favour on us by returning same to this office, as the issue is completely exhausted.

COLLEGE TESTING LABORATORIES.

A week ago we published a paper on "Reinforced Concrete Columns," prepared jointly by Mr. P. Gillespie, Lecturer in Theory of Construction, Faculty of Applied Science, Toronto University, and W. G. Swan, Demonstrator in Strength of Materials in the same Faculty. We do not call particular attention to the article because of the material it contains, or because of the subject treated, the interest taken in the paper and in the method of treatment of the subject of concrete reinforcing is abundant evidence of the value of the contribution, but because of the position we think college testing laboratories should fill in carrying on investigations in the field of engineering.

College testing laboratories should carry on systematically series of tests and experiments dealing with those questions of public interest which come naturally within their field. Their students would be more interested in experiments, the practical application of which they may see, than conducting day after day experiments which go to prove the correctness of well-known laws. The published results of such tests would do much to impress upon the public the value of such work and the necessity of more liberal financial support.

Sometimes we hear it said that public opinion is not fully alive to the needs of our colleges and universities. If that be true it is also true that many of our universities and colleges are not alive to present-day problems, or if they are, they do not offer to aid in their solution. College testing laboratories can be made very useful in awakening interest in higher education and of practical service to the engineer. There are many questions that engineers are anxious to investigate, but which they cannot approach without the aid of well-equipped laboratories—laboratories much larger and more fully equipped than are usually found in connection with engineers' offices. The engineering societies and clubs would be acting wisely if they would appoint committees to report on the possibilities of carrying on investigations into the steel rail question, waterproofing of cement, consumption of smoke, strength of concrete pipe. These and many other subjects require to be more fully studied, and in no way can this be done better than by associating the practical engineer and the college professor, supported by public funds.

AMERICAN FOUNDRYMEN'S CONVENTION.

Toronto has been long known as the Convention City. In 1908 she is not going to misrepresent the name. Already this year the city has been the meeting place of National as well as Provincial gatherings, and early in June an association of international influence will foregather.

The coming Convention of the American Foundrymen's Association, June 8th to 12th, promises an unusually instructive meeting—not only instructive, but also enjoyable, for every preparation has been made to entertain the visiting foundrymen and their friends.

The object of the exhibition is to conduct an exhibit of foundry supplies and equipment which shall be educational in its character; and it is undoubtedly true that these exhibits bear as much fruit as do the papers which

are read before the Association. Neither would be complete without the other.

The first exhibition was held three years ago in Cleveland, Ohio. Then 25,000 square feet of space was sufficient. The Toronto exhibition will require five times as much space, and the attendance and interest will be proportional.

A NEW DEPARTMENT.

With this issue we are opening a new department—a department of Costs. Costs readily divide themselves into three classes—actual, estimated and contracted. Figures of estimated costs and the figures for contract prices are not hard to secure, but figures of actual costs and the proper distribution of the various items of costs, as labor, material, superintendence, are difficult to secure—difficult to secure for two reasons, one reason being that too few contractors and engineers keep an exact check on work done, and the other, and the more real, is that those who have exact figures representing costs regard them as their trade secret. The first difficulty we hope to overcome by outlining from time to time simple methods of bookkeeping that will encourage the more systematic study of costs. The second difficulty we are not up against—as yet.

LA SALETTE LANDSLIDE.

Dr. H. W. Ells, of the Geological Survey, who went to Notre Dame de la Salette the day after the landslide there, has made a report on the occurrence. Dr. Ells' report in part is as follows:—

"The length of the slide along the River Lievre from north to south was about 1,350 feet, with a maximum breadth of 350 to 400 feet. The height of the clay bank affected was about sixty feet above the present level of the river.

"The clay areas in which the landslides occur are bounded on both sides by hills of Laurentian rocks, granite and gneiss mostly, and the original clay deposits rest upon these rocks, which often show smoothed or glaciated surfaces, which have been caused by the action of the glacier ice. The known slides, however, do not move along the rock surface, but along partings in the clay deposits.

"When these deposits are undisturbed the clay is usually the blue, tough and plastic variety known as Leda clay. These are in places covered by sandy deposits known as Saxicava sands. The clay lies often in thick beds, nearly horizontal, or with a gentle slope towards the river, and the layers are generally separated by thin beds of arenaceous silt. This silt when saturated with water rapidly passes into a semi-liquid condition, and under the pressure of the overlying clay body tends to destroy the equilibrium of the whole mass, when the pressure of the upper portion, through the weight of the absorbed moisture, causes a slide in the direction of least resistance, which is usually furnished by some river valley.

"The direct cause of the slide or slip at this place was evidently the formation of a crack or fissure a short distance back from the front of the river bank. By this fissure the water from the surface, which was in a saturated condition from recent snow or from rainfall, percolated downward to an inclined bed of clay, which is exposed in the basal portion of the slip, dipping towards the river at an angle of 18 to 20 degrees. The pressure of the overburden evidently forced the overlying mass outward to the river. Here the ice, which was a foot or more in thickness, was lifted and carried eastward, up and over the low slope on which the village was placed, which had an elevation of about 10 to 15 feet above the river level. It was without doubt the sudden and rapid movement of the ice which destroyed, not only the greater part of the village, but a large portion of the people as well, since they were still in bed, and the action was too

sudden to admit of escape in many cases. The attendant wave of water from the river washed the debris of the ruined buildings, along with a number of bodies, to the slope of the hill, in the rear, where much of it was deposited at an elevation of about fifty feet above the stream. The receding wave swept away the greater part of the ice and the ruined buildings, with a number of the imprisoned bodies and carried them down the river toward Buckingham. The whole catastrophe could have taken but a few minutes. The channel of the stream was blocked by the sliding clay and silt and the water was dammed back to a height of eight to ten feet, which caused minor injuries in the north end of the village. This slide was, therefore, due to the breaking down of the front of an old landslide."

After reviewing previous landslides in the district Dr. Ells says:—

"The causes of these St. Lawrence and Ottawa landslides may be briefly summed up thus:—

"1. The silty and arenaceous nature of the Leda clays, rendering them capable of absorbing and retaining a large amount of water; and

"2. The increased precipitation during the seasons when these landslips occurred, which saturated the deposits and gave them greater weight than usual. These conditions doubtless produced unstable equilibrium of the beds, resulting in displacement and a flow of the semi-liquid portion, the more coherent clays breaking down as described and mixing with the soft materials produced a tumultuous mass of mud, clay and sand, which descended into the nearest valley.

"It does not appear possible to adopt any special methods to prevent these occurrences, and the simplest means to prevent loss of life is to place buildings at a suitable distance from the front of clay bluffs or shores where these sometimes unstable clay deposits are specially liable to be affected by the conditions already indicated. The loss of life at Salette is attributable in large part to conditions of ice which are not likely to be repeated, if proper precautions are taken as regards the locations of residences."

PRACTICAL ADVICE.

In a recent address at the Massachusetts Institute of Technology Mr. Leonard C. Mason, president of the Athaw Construction Co., of Boston, gave some sound, practical advice to the students in civil engineering.

Speaking from the standpoint of extended personal experience in concrete construction, Mr. Mason emphasized the importance of conforming to business customs rather than attempting to do the unusual, the necessity of becoming familiar with methods of simple accounting, and the acquirement of special knowledge regarding estimating and costs, particularly of details. With especial force he pointed out the fundamental requirement of power to control men—its almost inborn character—and the difficulty of developing it. His hearers were warned against the mistake of ignoring the advice of superintendent, foreman, or even the workman, who, on account of close association with the work, may often be in a position to offer most helpful suggestions. Stress was laid upon the benefit of keeping in touch with the experiences of competitors and the adoption of the most modern methods of construction.

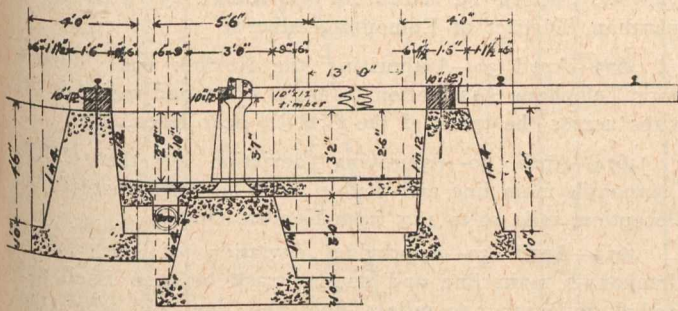
The close of Mr. Mason's address was devoted to a consideration of the new Edison type of concrete house and the difficulties attendant upon its successful construction. It was shown that the forms must be absolutely tight, sufficiently strong and securely held to withstand the pressure of the concrete, light enough and small enough to be easily handled, and durable enough to permit of continuous use. One of the greatest obstacles to success, especially in the hands of the inexperienced, was pointed out to be the difficulty of keeping the stone and gravel in suspension, and the prevention of air pockets.

THE HANDLING OF ASHES.

One of the most important features in connection with the despatching of locomotives at roundhouses is the ashpit, over which the fire is cleaned, and into which the ashes are dumped; also the means for removing the ashes from the pit and loading them on to cars.

The first form of ashpit for this purpose was constructed with its sides immediately under the rails of the track upon which the locomotive would come on to the turntable, and thence to the roundhouse. The track is usually called the "incoming" track.

These pits were of different lengths, according to the number of engines arriving per day. They would be of sufficient depth so that a man could stand in them, and conveniently work a hoe or scraper at either end of the



Cross Section of Pit.

ashpan and draw the ashes out, allowing them to fall into the pit. The locomotive would then be moved off the pit into the roundhouse, and the ashes would be shovelled out of the pit on to the surface of the ground, and while this was being done another engine could not come over that portion of the pit, but, if the pit was long enough, it could have its fire cleaned at another point on same. If, however, not long enough for this, it would have to wait until the ashes in the pit were thrown out, or else have its ashes dumped in the same place, which would soon result in the pit becoming full of ashes, so that it would be absolutely necessary for the engines to be kept off the pit until the ashes were thrown out. It was, therefore, better, after each engine had had its fire cleaned, to throw out the ashes, no matter whether the pit was long or short. This was not only expensive in the handling of ashes, but often caused delay to power.

The ashes now at the side of the pit had to be thrown on to the cars, and if the pit was long there would require to be a sufficient number of ash cars to correspond to the length of pit, so that the ashes thrown out of pit at any point could be thrown on to a car. If the switching out of cars when loaded and placing of empty cars was not regularly attended to, a pile of ashes would collect at the side of the pit, and in winter time would freeze on account of having been wetted as they are drawn out of the pan to prevent the dust from getting on the engine. The removal of the frozen pile would cost still more, and in summer, if hostlers were not very careful, the steam from the cylinder cocks would blow the ashes over the engine. The only satisfactory way, therefore, of doing this work was not to allow the ashes to accumulate in the pit or at the side of the pit.

To overcome the difficulties above outlined different improvements have been introduced. In some cases buckets have been placed in the pit to receive the ashes direct from the pan, and when the engine was moved off the pit the buckets would be hoisted and dumped on to the ash car and the bucket returned again to the pit, but until the buckets were replaced another engine could not come on to the pit. This, therefore, was objectionable on account of delay to engines.

Other arrangements have been introduced where a bucket on wheels would run down rails on an inclined plane, entering the pit from the side by going underneath the rail. This form would not keep the engine waiting while the bucket was being drawn out when full, but it worked

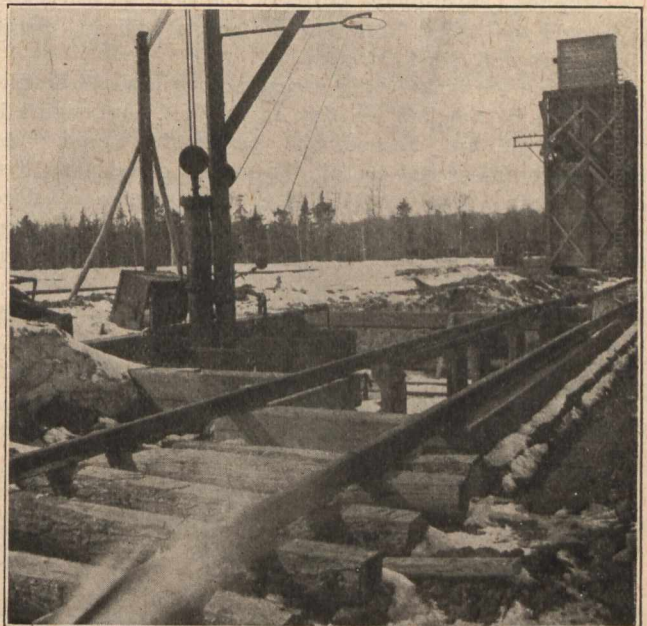
from one end of the ashpan only, and a second apparatus of the same type would be needed to dispose of the ashes at the other end of the ashpan.

It further would dump the ashes on a car at the same point as each following bucketful was drawn up, and the car would need constant shifting. The arrangement was further objectionable, as the rails upon which the bucket ran upward extended over the ash car track, preventing a high car from being loaded by hand.

There is another form of ash pit, known as the "Open-side Ashpit," with depressed ash car track. This pit has the rail on one side, supported on columns or standards, and the ashes can be shovelled out from the side; the man doing the work of shovelling stands at the side of pit on the same level as bottom of pit, and in order that he will not have too high a throw for the ashes the ash car track is depressed, the rails being about on a level with the bottom of ashpit. With one shovelling, therefore, the ashes are thrown from the bottom of ashpit on to car.

With this kind of pit there need be no delay to engines, but it is expensive, as in the first place the ashes are all loaded by hand, and where many engines are coming in the pit must be long, and there would require to be sufficient cars to cover its full length; also, a laborer cannot throw ashes over a high-sided car and heap them up, consequently more cars are needed. Watering facilities are also needed to cover the length of a long pit of this description so the ashes can be wetted at whatever point the engine may be stopped. These arrangements, if not properly protected, will freeze, and a free use of water washes the ashes into the drain, floods the depressed track and covers it with ice.

It must also be remembered that where the first engine comes on a long pit it is placed at the end nearest the turntable; other engines follow and take positions on the pit, and the work of fire-cleaning is begun as each engine is placed. When the first and second have had their fires cleaned, the third may only have its fire half done. This



Bird's Eye View of Pit.

prevents that portion of the pit which was occupied by the first and second engine being used until the third has had its fire cleaned and is moved off the pit.

The accompanying photograph gives a view of an ash pit which was designed by C. R. Ord, master mechanic of the Atlantic Division of the Canadian Pacific Railway, and which was installed in the Muskoka yards, the new divisional point on the C. P. Railway, Toronto-Sudbury line.

From this view it can be seen that the locomotives can be moved on and off the pit without in any way interfering with the removal of ashes, as the loaded buckets are drawn out under the rail, and while the loaded bucket is being hoisted, if need be, the empty one can immediately be pushed under to receive any remaining ashes, or to be ready for another engine. There are four buckets in the pit, two

for each end of the ashpan. They hold 1,500 pounds of ashes, and have smokebox netting in the bottom to let the water run out, but prevent large cinders from blocking the drain.

The tracks upon which the buckets move are made of common iron piping, and steam passes through them in cold weather, keeping the oil from freezing on wheels of buckets, and also keeping the pit free of snow and ice in the winter time.

At each end of the pit extra openings can be seen under the rails for the men to get under the engine and rake the ashes from each end of ashpan, and avoid the danger of crawling between the wheels. When the men are in position at each end of pan, the buckets stand immediately in front of them, and the ash hoes are kept at each end of the pit between the rails, and can be drawn forward when needed. There is also a very convenient arrangement for each man for wetting the ashes. A pair of pipes come through the side of the pit at each end, one for steam, and the other for water. Valves are placed just clear of the pit wall, and beyond the valves the two pipes are joined in one, to which a length of hose is attached. When not in use, in cold weather, the water valve is shut, and a slight escape of steam keeps the hose from freezing. Water can be used for wetting the ashes, or steam for thawing frozen ashpans.

With the crane for hoisting the buckets, a very heavy load of ashes can be put on a car to any desired height. The dumpings can be distributed over the car, and one shift only is needed to fill it from end to end. The next car can be then drawn into position by the crane.

Two of these pits have been in operation, one at McAdam, N.B., and the other at Brownville, Me., for over two years, and have given perfect satisfaction during two of the hardest winters experienced for many years. The cost of labor of loading ashes on to cars has been one cent per ton. Average time taken to draw buckets from under engine, dump ashes on car, and replace under engine is three minutes. In ordinary business one man on each shift has hoisted the ashes, hoed out one end of ashpan, placed the ash cars and dried the sand.

With two crews handling incoming engines, about fifty engines can be handled per day on this pit. An engine is put on the pit, fire cleaned, and put in the house. The following engine is put on pit by second crew. The first crew, returning from engine-house, take charge of third engine, which they coal, sand, and water, and by this time the second engine has the fire cleaned, and is ready to move on the turntable.

The pit is 36 feet long between the rails to give room to work the hoe. Outside of rails it measures 27 feet, and is, therefore, bridged by one rail. The width from rail to ash car track is 15 feet.

The ash buckets are five feet long, and are so situated as to suit engines with long or short ashpans.

ORDERS OF THE RAILWAY COMMISSIONERS OF CANADA.

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

4664—April 14—Authorizing the Chatham, Wallaceburg and Lake Erie Railway Company to temporarily operate the crossing at grade with the Grand Trunk Railway on William Street, Chatham, Ontario, pending the installation of interlocking plant and derails.

4665—April 7—Recommending to the Governor-in-Council, for approval by law No. 105, of the Quebec Harbor Commissioners.

4666—April 29—Authorizing the C.P.R. to cross with its track the track of the C.N.R. Company's spur to the Bird's Hill gravel pit in Section 16, Township 11, Range 4, Province of Manitoba.

4667—April 16—Authorizing the C.P.R. to construct its railway across road allowances at one hundred and twenty-six points on its Pheasant Hills branch, Province of Saskatchewan.

4668—April 30—Authorizing Toronto and Niagara Power Company to erect its transmission wires across the tracks of the C.P.R. north of Toronto Junction, County of York, Ont.

4669—April 30—Authorizing the Toronto and Niagara Power Company to erect its transmission power wires across the tracks of the C.P.R. at Lambton Park, County York, Ont.

4670—April 30—Authorizing Madame P. H. Roy, for St. Johns Waterworks Company, to lay water pipe under the tracks of the G.T.R. at Allen Street, St. Johns, P.Q.

4671—April 30—Approving deviation in the location of the C.P.R. main line and double track at Scovil, mile 130 to 132.

4672—April 30—Authorizing the G.T.P. to cross with its line or tracks the tracks of the Edmonton and Slave Lake Railway, Section 15, Township 53, Range 25, west fourth meridian, District of Edmonton, Alberta.

4673—April 30—Authorizing the Norfolk and Tillsonburg Telephone Association to erect, place and maintain its wires across the track of the C.P.R., near Eden, Ont.

4674—April 30—Approving deviation of the C.P.R. Company's main line and double track between Busted and Deception, mile 16 to 19.5 from Kenora, Ont.

4675—April 30—Approving deviation of the C.P.R. Company's main line and double track between Snell and Hodge, mile 113.2 to mile 114.90, new line, and mile 113.2 to mile 114.83, old line, from Ignace.

4676—April 30—Approving deviation of the C.P.R. Company's main line and double track between Edison pine, mile 99.4 to mile 109.9, old line, and mile 99.4 to mile 110.4, new line, from Ignace.

4677—April 30—Authorizing the New Brunswick Telephone Company to erect its aerial wires across the tracks of the C.P.R. at Arthur Raymond's house, near Woodstock, N.B.

4678—April 30—Authorizing the New Brunswick Telephone Company to erect its aerial wires across the track of the C.P.R. at Moore's Mills, N.B.

4679—April 30—Granting leave to the Consumers' Gas Company of Toronto to lay and maintain an eight-inch cast iron gas pipe under the track of the C.P.R. on Dovercourt Road, Toronto, Ont.

4680—May 7—Ordering that the Canadian Classification No. 13 be amended by the addition of a carload rating of third class on books in boxes or cases (item 30, page 12), and that the amendment become effective not later than May 20th, 1908.

4681—May 7—Authorizing the South-western Traction Company of London to erect its transmission wires across the track of the G.T.R. at a point approximately one mile north of St. Thomas, at Lyndhurst Road, Ont.

4682—May 5—Ordering that the I.C.R. and G.T.R. be absolved from the agreement with the C.P.R. re rates to Fredericton on traffic from points west of Montreal, which were raised from 2½ cents to 8 cents per hundred pounds.

4683—May 1st—Authorizing the corporation of the town of Aylmer, Ont., to lay water main under tracks of Canada Southern Railway within the limits of the town of Aylmer, Ont.

4684—May 7—Approving maximum freight tariff of the Klondike Mines Railway Company, submitted for the approval of the Governor-in-Council, April 21st, 1902.

4685—May 5—Varying Order of the Board No. 3238, dated July 3rd, 1907, so as to permit the railway companies, subject to the jurisdiction of the Board, to equip passenger coaches with one fire extinguisher instead of two.

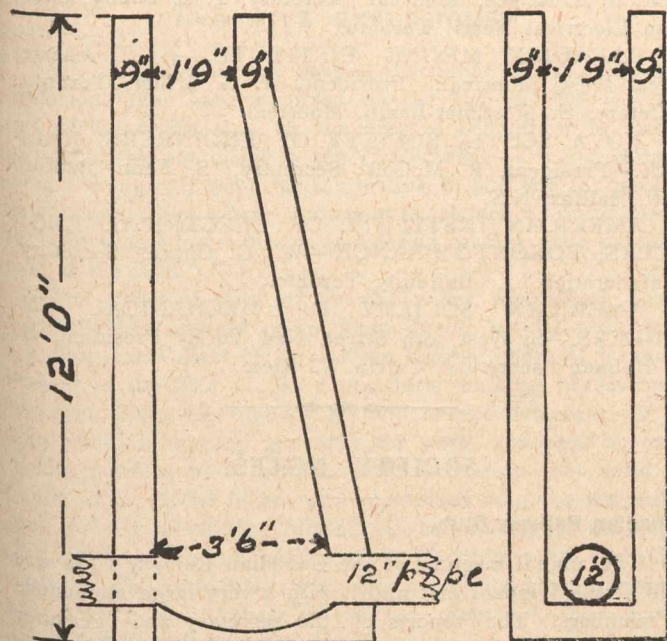
4686—May 7—Authorizing the G.T.R. to construct and operate a branch line of railway or spur at a point on Lot No. 157, Parish of St. Blaise, County of St. Johns, P.Q., thence in a westerly direction across Lot 158, in the said parish, the Grand Bernier Road and Lot 157 to the premises of the People's Specialty Company, Grand Ligne, P.Q.

A Page of Costs

ACTUAL, ESTIMATED, AND CONTRACTED.

Cost of Concrete Manhole.

The cost of concrete work is variable. Each unusual condition entering into the work has its own influence. Sometimes it is the cost of material, again it is the cost of erecting forms. Herewith is given an example of actual



costs and a detailed statement of how the costs are distributed. From the sketch it will be seen that nothing very unusual in the shape of forms was encountered, the great waste being that the lumber used was so cut up that it could not be used again:—

Lumber for forms (price includes delivery at work),	
300 F.B.M., at \$30 per M.....	\$ 9 00
Labor for forms, 70 hours at 32½ cents per hour....	22 75
Sand and gravel, delivered, four yards at \$1 per yard	4 00
Cement, five barrels at \$2.25 (delivered).....	11 00
Labor, mixing and placing concrete, 13 hours at 22½ cents per hour	2 92
Total	\$49 67

Total cubic yards concrete in manhole, 4.08 cubic yards, which made the cost per yard of concrete \$12.17 per yard.

Cost of Street Paving in Edmonton, Alta.

Jasper Avenue is being paved with bitulithic pavement with a six-inch concrete base for \$3.45 per square yard. Namayo Avenue and First Street are being paved with carbolinium wood blocks, made by the W. J. Harvey Company, of Vancouver, with six-inch concrete base, at \$3.40 per square yard. The Bitulithic Company, of Winnipeg, have the contract for laying double track electrical railway line on Jasper Avenue, consisting of six inches of concrete, wood block paving and nine-inch concrete girders under the rails; seven-inch 80-pound Lorain Steel Company, rails; track allowance, 18½ feet in width; contract price per lineal foot, \$16.27, including paving. For the same class of construction on First Street, \$11.65 per lineal foot; contract awarded to W. J. Carter, of Edmonton. The same class of construction of Namayo Avenue, but two feet narrower, per lineal foot, \$10.40, W. J. Carter, contractor.

Concrete Bridge.

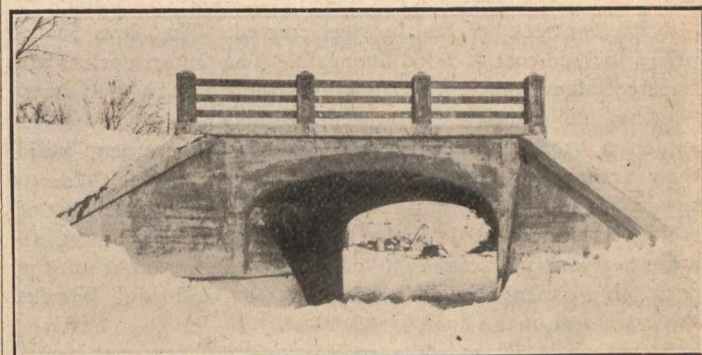
A detailed statement of the cost of a reinforced concrete bridge is given in a report by R. H. Parsons, assistant

city engineer, Ottawa, to the chief engineer, Mr. Newton J. Ker.

The principal dimensions are as follows: Span, 20 feet; length, 46 feet; rise, 4 feet 10 inches; thickness of abutment at springing line, 5 feet 6 inches; thickness of arch ring at crown, 18 inches. The arch is built on a skew of 17 degrees. The arch ring is reinforced with Clinton electrically welded fabric, with 3 by 12 inch meshes and ¾ inch gauge. The reinforcement was placed about three inches above the under surface of the arch at the crown, and is firmly anchored in the abutments by steel rails. The crown of the arch is about eight feet above water level when the water is in the canal. There are four wing walls.

The bed of the creek was excavated until a solid foundation was reached, and on this the forms for the abutments were erected. Considerable trouble was caused by the water from the melting ice and snow, which ran into the trenches, and forced us to pump until the concrete was above the level of the creek bed.

The concrete was mixed in the proportion of 1, 3 and 7 for the main part of the abutment with a fine mixture, 1, 2 and 5 about an inch thick for a facing. The concrete in the arch ring was mixed 1, 2 and 5. The abutments were both brought up to the springing line of the arch and sloped upwards towards the back to form a shoulder for the arch to rest against. The arch itself was built in rings about ten feet wide. Work was carried on continuously on each ring until it was complete. A three-inch layer of concrete was spread over the forms, which had been previously erected, then the Clinton fabric was laid down on this and fastened to the rails in the abutments. The rest of the concrete was then placed in 6 inch layers up to the required thickness. The top of the arch was plastered with cement mortar to make it water tight. In the coping on the parapet walls iron rods were inserted in the proper places to tie the concrete posts for the railing to the coping. The rails were moulded in separate forms, and are 3 inches by 9 inches, and about 9 feet 6 inches long. There are two ¾ inch iron bars about an inch above the bottom of each of them. After the rails had set for a sufficient length of time the forms for the posts were set up, the rails taken out of their forms and the ends inserted in openings cut in the post-moulds in the proper places. These were then filled with concrete



O'Conner Street Concrete Arch.

and allowed to stand several days before the forms were removed. Very little finishing was needed to give the railing a pleasing appearance.

The above work was started about April 1st, 1907, and was completed six weeks later. There was considerable delay on account of bad weather.

Summary of Cost of Concrete Arch on O'Connor Street.

Total cost, including material, labor, excavation,	
etc.	\$4,971 14
Total yardage in arch.....	620 yds.
Average cost per cubic yard.....	\$ 8 02
This is divided in detail as follows:—	
Concrete—	
Labor	\$ 849 09 or per cu. yd.. \$1 37
Material	2,607 70 or per cu. yd.. 4 20
Total	\$3,456 79
	\$5 57

Moulds—
 Labor \$ 397 24 or per cu. yd. . \$0 64½
 Material 574 82 or per cu. yd. . 0 93

Total \$ 972 06 1 57½
 Excavation 394 81 or per cu. yd. 0 56½

Cost per cubic yard, not including reinforcement,
 in arch \$7 71

Cost of Reinforced Concrete in Arch.

Yardage in arch 92 cubic yards
 Cost of reinforcement \$192 48
 Cost of reinforcement per cubic yard. \$2 09
 Cost of plain concrete, as above. 7 71

Cost of reinforced concrete \$ 9 80

COMPARISON OF COST.

The following table shows the average cost for steel bridge superstructure built by the Nova Scotia Government, and by the Ontario Government. The prices for Ontario are taken from the Report of Ontario Public Works for 1905, and th. costs for Nova Scotia taken from the report of the Nova Scotia Public Works Report for 1906:—

Length of Span.	ONTARIO.		N.S.	
	Width of Roadway.		Width of Roadway.	
	14 ft.	16 ft.	15 ft. (By average).	15 ft.
	\$	\$	\$	\$
40 feet	550 00	600 00	575 00	475 00
45 "	.....	.....	.....	500 00
50 "	675 00	750 00	712 50	550 00
60 "	875 00	1,025 00	950 00	600 00
70 "	1,125 00	1,250 00	1,187 50	800 00
75 "	.....	.....	.....	850 00
80 "	1,300 00	1,475 00	1,387 50	1,000 00
90 "	1,450 00	1,600 00	1,525 00	1,200 00
100 "	1,775 00	1,950 00	1,862 50	1,300 00
120 "	2,300 00	2,575 00	2,437 50	1,700 00
125 "	.....	.....	.....	1,750 00
140 "	3,275 00	3,500 00	3,387 50	2,500 00
160 "	.....	.....	.....	3,400 00

These prices are for the steel erected. The Nova Scotia prices include cost of wood floor laid. The Ontario prices are for steel alone, erected, but having strength enough to carry (but not including cost of) a concrete floor.

In a great many cases the Ontario Government build their bridges with permanent floors, this, of course, adds to the cost of the bridge, not only on account of the extra cost of the floors, but the whole bridge has to be increased in strength and therefore in weight, to carry the extra weight of the floor, thus giving an additional cost to the bridge besides the extra cost of the floor.

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, 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.

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. May 21st, Mr. A. B. Lambe will read a paper on "Electric Heating Devices."

CANADIAN ELECTRICAL ASSOCIATION.—President, R. S. Kelsch, Montreal; 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, R. McColl; 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.

Canadian Railway Club.

The annual meeting of the Canadian Railway Club was held at the Windsor last night, with a very large attendance of members. The reports of the secretary and treasurer showed that the club was in a flourishing condition. One hundred and thirty-six new members were admitted last year, making a total membership of 682. The election of officers resulted as follows: President, L. R. Johnson, assistant superintendent of motive power of the C.P.R.; vice-president, H. H. Vaughan, assistant to the vice-president of the C.P.R.; second vice-president, A. A. Maver; Executive Committee, J. H. Callahan, Jas. Coleman, A. A. Goodchild, T. McHattie, A. W. Wheatley, and W. N. Dietrich; Audit Committee, W. H. Evans, W. H. Stewart, and C. Manning; secretary, James Powell; treasurer, S. S. Underwood.

Canadian Electrical Association.

The eighteenth annual Convention of the Canadian Electrical Association will be held in Toronto during the month of June. The local arrangements are in the hands of a strong committee, who are making every arrangement for the entertaining of a large delegation. In arranging the programme, the Papers Committee have considered the whole electrical situation from both a commercial and political standpoint, being guided by the fact that Niagara power seems destined to be distributed throughout a large area of the Province of Ontario. Mr. T. S. Young, Confederation Life Building, Toronto, is secretary.

Union of Canadian Municipalities.

The eighth annual Convention of the Union of Canadian Municipalities will be held at the city hall, Montreal, on July 15th, 16th, and 17th next, just preceeding the Quebec Tercentenary celebration, to which many intending delegates are anxious to proceed at the close. An unusually large and representative attendance is expected, and the occasion promises to be one of great interest. G. S. Wilson, assistant secretary, 107 St. James Street, Montreal.

An order for 2,500 tons of steel rails for use on the Grand Trunk Pacific Railway, from the Prince Rupert end, were recently shipped by a long route. These rails were made at Pittsburg and shipped to New York, thence across the Atlantic, through the Suez Canal and Indian Ocean and up the Yellow Sea to Kope, and there laden on the Blue Funnel Line steamer "Teucer," thence taken across the Pacific to Vancouver.

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.]

DYNAMITE EXPLOSIONS.

Sir,—Having noticed several accounts of the various explosions that have occurred on the line of the G.T.P. east of Winnipeg, and, as the biggest percentage of them seemed to be put down to the carelessness of the workmen, I thought it would be interesting to you and the public in general to get a true statement in regard to these same explosions and to conditions in general as they exist on that part of the road.

The cause of most of the explosions where men have been killed or injured is no doubt due to carelessness, but not altogether. Part of it, and the biggest share of it, may be laid at the door of the contractors, walking bosses and foremen. They let anybody go and handle dynamite. If a man comes into camp and asks for work, and says he can handle powder, he is put to work, providing they need a powder-man. If he is not an experienced man, he not only runs the risk of blowing himself up, but endangers the lives of the men in the cut beneath him. But this is not the only cause of the accidents. The old, experienced powder-men are getting their share of it, too. Some of them have handled dynamite so long that they have grown careless of the danger. There are a hundred ways in which these explosions might occur. Frequently it is the fault of the walking boss, who tries to rush things too much. Sometimes the cause is loading a warm hole that has not been allowed to cool sufficiently after it has been sprung. I have seen them when in a hurry take a steel drill to ram powder down the hole, and some of them will go to any extreme rather than let themselves run out of muck. I have seen a hole loaded ready to fire and for some reason miss, and the foreman would keep the whole gang working in the face of the cut while he extracted the tamping and made preparations to fire again.

There is no regular way of thawing dynamite. Some stand it up against a log in front of a fire; others put it in a can of hot water, and a few have regular thawing cans. There are various other ways, but these are the three principal methods used. There is only one way around this; that is, a rigid inspection by the Government, and for all powder men to be made pass an examination, and when accidents do happen, to have a Government man on the spot to make out a report. If accidents that happen through carelessness or neglect on the part of those in charge of the work, they should be punished for it in the same way any other criminal would, for it is practically nothing else, more nor less, than wholesale murder the way that the work is being carried on now. There is one contract back from Vermilion that is known as the Graveyard, and it is well named, as they have a graveyard right on the work, and they make good use of it, too. I do not say that all the accidents are the fault of the contractors, nor do I say that all the contractors are careless, but, without mentioning names, it is easy enough to pick out those that are. There are a few who are doing everything in their power to avoid accidents, etc., and have pretty good records. All the men on the construction pay one dollar per month for medical fees and doctor, but in some cases they get very little return for their dollar. A year ago this spring I was in camp back from Dryden. A company composed of well-known Ottawa men hold this contract. There was one doctor there for a long stretch of right-of-way. A young Scotchman was hurt, breaking his leg, and men were sent out to find the doctor.

At the end of three and a half days he showed up. It was not the doctor's fault; he did the best he could. Still, that is what the laborers are paying their dollar per month for. It would have been the same if there had been a big accident and a dozen men, all broken and smashed up, would have lain in agony for three or four days till they could get a doctor. It would not have been so bad had the roads been in shape that a team could have been sent out to town with them, but the roads were so bad that it was all a man could do to get through them. This is only one instance, and there are lots of them to be found to-day.

Now, as to the working conditions on the road. A laborer receives 15 to 17½ cents per hour. Of course, wages are low this winter, but that did not excuse the contractors from putting on an enormous price on everything they sold to the workmen. Boots of the commonest, roughest, cheapest kind, that could be bought anywhere for from \$1.50 to \$2.25, were charged up to the men at \$4.50, and everything else accordingly. Board is charged at the rate of 65 cents per day, which is reasonable. I have worked on various parts of this section of the G.T.P., and these conditions existed in a great many of the camps I was in.

V. A. Robertson.

Pipestone, Man.

LEVEL ADJUSTMENT.

Sir,—Recently when running check-levels going north I found that my elevations continued to increase at the rate of about one-tenth of a foot per mile. I checked, and still found the elevations rising.

The adjustment of my instrument, a 14-inch Dumpy, is as nearly perfect as possible. I took 500-foot sights, which did not vary more than five feet either way, and was very careful to have the rodman swing the rod at every turn. Can you account for this?

Yours truly,

Sag.

May 8th, 1908.

REFORESTATION AND RUNOFF.

Sir,—Professor Fernow is a long-standing authority on forestry and related subjects, and his various reports and papers form a large part of the literature in this field of inquiry. I have read his letter on "River Regulation on the Grand River" in your issue of the 1st inst. with great interest.

Literature on the subject of rainfall, runoff, conservation and river flow is voluminous. The transactions of the American Society of Civil Engineers have, perhaps, the largest part of it that is of practical value. There is also much on record in the bulletins of the Forestry Division, United States Department of Agriculture (much that we owe to Professor Fernow), and of the United States Geological Survey. With all inquiry there are still phases of the subject on which there is diversity of opinion and doubt. Among American investigators may be cited Rafter—whose paper, "Relation of Rainfall to Runoff," United States Geological Survey, Water Supply and Irrigation Paper No. 80, may be called a classic—Vermuele, King, and others. Most of them hold that there is greater percolation of ground water in forested areas. In the Grand River basin the disappearance of springs has been directly attendant on deforestation, though extensive under drainage has no doubt had some effect. The head drainage areas of most of the large European rivers differ greatly in declivity, and in climatic, geological, and general surface conditions from that of the Grand River, which is comparatively a very small stream. As Professor Fernow well says, it is largely a question of local conditions. That in the Grand River basin forestation is favorable to water conservation and continuity

of river flow there is no manner of doubt. I might refer to my paper, "The Grand River . . . Effect of Deforestation and Swamp Drainage" (Transactions Canadian Society Civil Engineers, 1905).

Recent approximate gaugings indicate the minimum flow of the Grand River to be only about one-quarter of one per cent. of the flood flow above the outlets of two tributaries, which are more steady. This means that one day of flood passes more water than a year's flow at the minimum rate.

Everyone who has given attention to the subject will agree with Professor Fernow that definite investigation must be the first step toward improvement: a full topographical survey, precipitation records, stream gaugings, etc.

There is one further item in Professor Fernow's letter to be commented on. He says: "The floods in large rivers are conditioned by quite different phenomena, rapid snow-melting and continuous rains. Here the value of the retarding quality [of forestation] becomes nugatory." The Grand River can be called a large river only for a very short time in the year, and it is undoubtedly largest when snow melting and rains come together. The normal season's snowfall on the head drainage area is about 110 inches. The past winter was one of unusually heavy snowfall. A large part of the snow remains until spring, and then, in the open fields, melts very quickly with a few warm days, especially with attendant rain. In the woods, however, melting of the snow is much slower, whether with or without rain. Absence of leafage does not nullify this retarding effect, but it is materially greater with continuous leafage, such as of the heavily timbered evergreen swamps, which covered a large part of the area in question, and which were so dense as to be almost impenetrable except in winter on snowshoes. With large continuous areas of forest or wooded swamp the retardation of snow melting is much more effective than with detached small areas.

This retardation Professor Fernow appears to have neglected. It renders the effect of forestation anything but nugatory; on the contrary, the effect is positive and potent.

Yours truly,

W. H. Breithaupt.

May 9th, 1908.

RAILROADING IN WEST AFRICA.

A most amusing and instructive lecture on railroad survey and construction work from Sekundi, on the west coast of Africa, inland to Ashantee, was delivered by Hilder Daw, C.E., before the Montreal Council of the Royal Arcanum on Monday evening, May 11th. The lecture was really a recital of personal experiences while Mr. Daw was serving as a Government Civil Engineer, where you are expected to die, added interest being centered in a large number of lantern slides, kindly loaned for the occasion by Dr. Todd, who went to Africa in connection with Scientific Research, regarding the devastating sleeping sickness. Without exaggerating discomforts and climatic deterrents, Mr. Daw gave the technical men present the torrid aspects of railway pioneering as distinct from the frigid prevailing in Canada—mosquitos being substituted for black flies, "explosive" tinned meats for frozen, diluted mud for drinking water instead of cracked ice, and quarreling, superstitious, often dishonest natives, for the imported Jap, Italian or Hungarian. Clearing party methods through virgin dense underbrush—the right of way and a chain on each side of it, no tumbling being permitted—track-laying at the rate of a mile a day, the facility and freedom with which engineers nearer the base appropriated supplies, mechanical or for messes, were dealt with by the lecturer greatly to the enjoyment of his audience. Mr. Daw regards the Gold Coast, its malarias and adversities notwithstanding, as the world's future cotton fields—when swamps are drained, mosquitos exterminated, and missionaries have a common sense religion for Ashantee people, from whom the American, West Indian Negroes were originally sold into slavery, often to very religious, but very thrifty leaders of Church thought.

SURVEYORS LEAVE FOR THE NORTH.

Eighteen members of the Dominion Government Alaska boundary survey party in charge of J. D. Craig, Ottawa, left for the north to-night by the steamer "Princess May." A. J. Brabazon will this year co-operate with the American survey party south of Juneau.

They will ascend the Stikine River to the scene of their summer's labors. On a tributary of that raging waterway last fall, when on their way out, Mr. Craig's party had a close call on account of their boat striking a submerged log, and being shattered to fragments. All the cameras, survey instruments, as well as the photographic plates, representing a portion of the official records, were lost. Subsequent efforts shortly after the accident, and again during the season of low water in December, to recover these articles proved unsuccessful. As a result the particular work they were engaged at will have to be done over again.

The visitors will shortly be followed by other survey parties, which will outfit and engage assistants here. It is expected that it will take at least three years more to complete the surveys to the Arctic ocean.

IMPORTANCE OF THE CHEMIST.

In a very interesting paper, entitled "The Chemist and the Community," Mr. Arthur D. Little shows that "few of the industries upon which the prosperity of the country and the comfort and material well-being of its inhabitants depend have not experienced within a generation changes so profound and so far-reaching in their effect as to be fairly described as revolutionary. It is within the truth to say that in the great majority of cases these changes have been initiated or accelerated by chemists. It is unnecessary, even if it were possible, to catalogue the materials for which, at prices permitting their general use, the community is indebted to the chemist. They comprise a large proportion of the things which are regarded as among the necessities of life, without which comfortable, or even decent, living would be impossible. With reference to productive industry generally it may be said that in many instances the chemist is the most effective agent for standardizing materials, controlling the course of processes, and minimizing wastes.

"The chemist has been similarly active in respect of matters pertaining to the public health. One has but to recall the splendid pioneer work in connection with the study of public water supplies in Massachusetts, work which is still regarded everywhere as the standard for other communities. The sanitary engineer cannot work without the chemist, the physician relies upon him for the most potent means for avoiding or arresting disease or alleviating suffering, and domestic economy and science make increasing demands upon the laboratory.

"In no way has the community benefited more than through the 'diffusion of useful knowledge among men,' and few, if any, agencies for the diffusion of such knowledge have worked to better purpose than the Smithsonian Institution, which stands as an enduring monument to the wisdom and public spirit of Smithson, who was a chemist.

"There are, perhaps, as many as ten thousand chemists in the country; the census of 1900 gives 8,847, as contrasted with 125,000 lawyers and 93,000 doctors. In the light of these figures, who shall say that the chemist has not borne his part as should the Happy Warrior in the fight against ignorance, material obstacles, and the phantasms of the mind?"

Excavation is being made for a four storey structure, 110 feet by 75 feet, on the corner of Strachan Avenue and King Street, Toronto, for the Massey-Harris Company. Material, brick, warehouse construction. This is an addition to the company's large array of storehouses for stock.

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.

RAILWAYS—STEAM AND ELECTRIC.

Ontario.

BRANTFORD.—Assistant Engineer Adams is engaged in making a survey of the railway route to Holmdale, pronounced impractical by the Grand Trunk Railway.

Manitoba.

WINNIPEG.—The first installment of the new locomotives for the G.T.P. arrived from Montreal, and have been sent west for construction on the line from Portage la Prairie west. The engines are numbered 51 to 55. They are uniform 61-ton locomotives, and of the latest model for work on prairies.

WINNIPEG.—Mr. J. G. Legrand, chief bridge engineer of the Grand Trunk Pacific, from Montreal, is now in the city, and will inspect sites for three big bridges across the Red and the Assiniboine Rivers in Winnipeg. Two of these bridges are to be thrown across the Assiniboine between the present Main Street bridge and the C.N.R. bridge at the junction of the Red and Assiniboine. Near the present Main Street bridge will be the double tracked G.T.P. bridge for passenger traffic to the Union Depot, and near the C.N.R. bridge will be a four-tracked bridge for freight traffic. The exact sites for these bridges have not been selected, and, after being settled upon, a great deal of preliminary preparation will be necessary before construction work begins. The other bridge is the big one to be built by the city and Governments for railway and vehicular traffic between Winnipeg and St. Boniface. Mr. Legrand will consult with the National Transcontinental engineers on the site for this bridge.

Saskatchewan.

MELVILLE.—Melville is a regular Western railroad town, and is supposed to be the junction on the main line of the G.T.P. road and of the proposed line starting at or near North Portal, passing through Regina to Melville and going north thirty miles to Yorkton, and on to Hudson Bay at or near Fort Churchill. The J. D. McDiarmid Co., of Winnipeg, were given the contract late in the fall for the roundhouse, containing 12 stalls, and a large machine shop, about 50 by 200 feet, on concrete foundation and built of brick. These will soon be ready for occupancy. The Company are putting in the turntable now. The Carter, Halls & Aldinger Co., of Winnipeg, were given the contract for the depot, and the appearance of the same, as it is just finished, shows a building that would do credit to a large city. The general impression is that there is nothing better from Winnipeg to the mountains on any of the railroads. The building is 40 by 140 feet, and is built on concrete foundation; is heated by steam, having an independent plant, all wired and equipped for electric light, which will be generated at the roundhouse. A. M. Rice, of the engineers' department, has looked after the railroad's interests, and the general opinion is it is a record-breaker.

LIGHT, HEAT, AND POWER.

Ontario.

MERRITTON.—H. L. Aitkens, consulting engineer, of Toronto, has submitted to the council his estimate of the cost of an electric light plant to be owned by the municipality. It is as follows: Wire, \$1,410.52; poles, \$752.78; supplies, \$502.14; arcs, etc., \$275.50; transformers, \$882.70; engineering and contingencies, \$382.46; total, \$4,207.10.

PORT HOPE.—The plant of the Port Hope Electric Light and Power Company was totally destroyed by fire.

The town has been plunged into darkness for an indefinite time as a result of the fire. Several manufacturing establishments have been deprived of power for the time being. The fire loss will total \$50,000.

SEWERAGE AND WATERWORKS.

Ontario.

LONDON.—The city council to-night decided to submit the new water scheme to a vote of the people on June 22nd. The scheme is to cost \$500,000. A. O. Graydon, city engineer.

MARKDALE.—By nine of a majority the ratepayers of Markdale decided to expend \$20,000 on a system of waterworks.

ST. THOMAS.—As a consequence of the agitation raised by the Yarmouth Council and Board of Health to remedy the nuisance arising from the city sewage emptying into Kettle Creek, steps will be taken to improve upon this system. A scheme has been introduced in the form of a system of septic tanks and filter beds, used extensively throughout Ontario, and which, it is thought, will redress the complaint more satisfactorily than anything else. At a recent meeting of the council City Engineer Bell was instructed to prepare an estimate of the cost of installing such a plant, which would include the system, as well as the land necessary. His estimate was \$30,500.

WATERLOO.—A by-law to authorize the issue of debentures for \$5,000 for the extension of the waterworks mains was passed here recently.

British Columbia.

VANCOUVER.—It was plainly stated at a recent meeting of the Board of Works that the schemes of sewerage on which the city is now entering were on such a scale as would demand the passage of another large money by-law covering the field just as soon as the trunk sewers, on which the larger part of the present by-law money is to be expended, are completed.

CONTRACTS AWARDED.

Ontario.

CLINTON.—The municipality proposes installing a system of waterworks, and the supply is to be secured from an artesian well. James Peat & Sons, of Petrolea, have been awarded the contract for the drilling of an eight-inch well to a depth of 350 feet.

GANANOQUE.—Mr. F. Dolan's tender for concrete sidewalks and curbs has been accepted. The names of persons tendering and prices are as follows:—

	Walks, per sq. ft. Cents.	Crossings, per sq. ft. Cents.	Detached Curb, lineal ft. Cents.
R. J. Wilson	14	20	20
H. A. Pruner, H. Winstanley and T. P. Simpson.....	13½	23	33
Frank Dolan	13¾	13¾	16
F. E. McDonald	14	25	25

TORONTO.—The coal contracts for the city waterworks plant for the year ending May 31st, 1909, have been awarded. The Milnes Coal Co., of Toronto, get the contract for the bituminous slack coal at \$2.75 per ton, which was just one cent lower than the Rochester and Pittsburg Coal and Iron Co., which secured the contract for the bituminous run-o'-mine coal at \$3.40 per ton.

Ontario.

KENORA.—After keen competition the Allis-Chalmers Company were awarded the contract for the 2,500-barrel mill at Kenora. They were represented by J. F. Harrison and J. Hammell. Nordike and Norman were represented by L. I. Zigler and James Pie. The Stratford Milling Company was represented by W. D. Cray, of Stratford, formerly of Milwaukee.

Manitoba.

WINNIPEG.—Acting on the recommendation of the Building Committee, the Parks Board yesterday decided to award the contract for erecting the pavilion at Assiniboine Park to Claydon Bros. at \$17,360.

British Columbia.

VANCOUVER.—The Board opened the tenders for the supply of sewer pipe for the year recently. Three firms were in the field, Messrs. Evans, Coleman & Evans, representing the British Columbia Pottery Co.; Morrison & Morrison, representing the Clayburn works, and Rennison & McDougall. The tender of Evans, Coleman & Evans was the lowest all round, and the tender was awarded to that firm. The accepted prices on the ordinary pipe per foot were as follows: 4-inch, 14 cents; 6-inch, 16½c.; 8-inch, 23c.; 10-inch, 35c.; 12-inch, 46½c.; 14-inch, 56½c.; 16-inch, 66c.; 18-inch, 86c.; 20-inch, \$1.15; 24-inch, \$1.60.

TENDERS.

New Brunswick.

CAMPBELLTON.—Tenders will be called for until May 21st, 1908, for 16,200 feet of 16-inch cast iron pipe, tested to 300 pounds pressure. John T. Reid, town clerk. (Advertised in the Canadian Engineer.)

Quebec.

KNOWLTON.—Tenders for a public building, Knowlton, Que., will be received until Thursday, May 21st, 1908, for the construction of a public building at Knowlton, Que.

MAGOG.—Tenders for a public building, Magog, P.Q., will be received until Monday, May 18th, 1908, for the construction of a public building at Magog, P.Q.

SOREL.—Tenders will be received at the Department of Marine and Fisheries, Ottawa, up to the 18th day of May, 1908, for the furnishing of one machine for bending steel boiler plates, to be delivered at the Government shipyard at Sorel, P.Q.

Ontario.

BRANTFORD.—Tenders will be called for until May 21st, 1908, for furnishing and laying 5,450 feet sewer pipe. T. Harry Jones, city engineer. (Advertised in the Canadian Engineer.)

FORT WILLIAM.—Tenders are being invited by the Grand Trunk Pacific Railway of Canada for the erection at Fort William of a grain elevator with a capacity of 2,000,000 bushels.

GUELPH.—Tenders will be received until May 18th, 1908, for high duty pumping engine, water tower and foundation and 3,000 feet cast-iron pipe. Davis & Johnson, Berlin, engineers; J. J. Hackney, manager of Waterworks. (Advertised in the Canadian Engineer.)

NIAGARA FALLS.—Tenders will be received until May 18th, 1908, for furnishing and erecting one three million gallon electrically-driven turbine pump. J. H. Jackson, A.M.C.S.C.E., City Engineer; H. J. Spencer, Secretary. (Advertised in the Canadian Engineer.)

OTTAWA.—The time for receiving tenders for the British Columbia Fishery Cruiser will be extended from the first of May until the first of June next. F. Gourdeau, Deputy Minister of Marine and Fisheries.

OTTAWA.—Tenders will be received at the Department of the Interior, Ottawa, up to noon of the 8th day of June, 1908, for the furnishing of forty-five thousand iron posts, small size, and thirteen hundred iron posts, large size, for use on the survey of Dominion lands, to be delivered in specified lots at Winnipeg, Man., Saskatoon, Sask., and Edmonton, Alta. P. G. Keyes, Secretary, Department of the Interior.

TORONTO.—Tenders will be received until Tuesday, 2nd June, 1908, inclusive, for the construction of (a) steel transmission towers; (b) transmission line cable; (c) Erection, complete, of transmission system, according to plans and specifications to be seen at the Commission's office, Continental Life Building, Toronto. Tenders must be sealed and addressed: Hon. Adam Beck, Chairman, Hydro-Electric Power Commission, Toronto, Ont.

Alberta.

EDMONTON.—Tenders are asked for the following work in connection with a bank building at Cranbrook for the Imperial Bank of Canada by May 23rd. 1. Excavating, concrete, brickwork, marble work, carpenter and joiner's work, roofing, plastering and painting. 2. Electric light. 3. Plumbing, heating and sheet metal work. R. P. Barnes, architect, Edmonton.

British Columbia.

VICTORIA.—Tenders will be received until Tuesday, the 26th May, 1908, for the supplying of certain Gate Valves for the Victoria Works. W. W. Northcott, purchasing agent.

MISCELLANEOUS.

New Brunswick.

WOODSTOCK.—Mr. Gibert Murdock, of St. John, has been awarded the contract of making a new survey of the town of Woodstock. The contract price is said to be \$1,000.

Quebec.

QUEBEC.—Another heavy action was issued in the Superior Court, when a local law firm, on behalf of H. J. Lyons, contractor, of Montreal, entered suit for one million dollars against the Matane and Gaspé Railway, and James Mitchell, contractor, of New York. The object of this action, it appears, is to prevent the Company signing a contract with Mr. Mitchell.

Ontario.

GUELPH.—Somewhat of a scandal has been unearthed here in connection with the letting of the \$25,000 contract for tile pipe for the waterworks, in which Canadian companies were concerned, to buy over a contract let to the Lyth Company, of Buffalo. Three Canadian companies tendered, being all some \$500 above the American company's tender, who were awarded the contract. The cry of "home production" was raised, but had no effect, and it now develops that one of the companies, or their agent, wired the American company to drop their contract, excusing themselves on the ground of high duty charges, the Canadian firm to make good for the deal. The Water Commissioners sent Manager Hackney to Buffalo, who closed the deal and secured a \$5,000 bond.

Manitoba.

SAULT STE. MARIE.—The Algoma Steel Company followed the recent shut-down of the rail mill by blowing our blast furnace No. 1. No. 2 will blow out this week. This will leave every branch of the steel industry here idle, thus shutting 1,500 men out of employment. The Company in a statement says that owing to financial troubles Canadian railroads refuse to place orders for rails. This is the first shutdown since the resumption after the collapse of Clergue's old Consolidated Lake Superior Company. The plant is the second largest in Canada.

WINNIPEG.—A letter from the Decarie Manufacturing Company, of Minneapolis, was read at a recent meeting of the Health Board, proposing another test of the incinerator plant. The Company wishes to operate the plant day and night for thirty days and dispose of all kitchen garbage, combustible refuse or rubbish, dead animals, and night soil according to the terms of the incinerator contract, the Decarie Company to have full charge of the test, the city to deliver the material to the plant and bear the expense of operating it. The Company agrees that the cost of incineration will not be more than 35 cents per cubic yard, and if the day-to-day collection of garbage is insufficient the city is to deliver enough refuse from the nuisance grounds to keep the furnaces in continuous operation. The test would

be made without prejudice to the interests of either the city or the Company in the suit over the incinerator now pending in the courts.

Alberta.

CALGARY.—By a decisive vote the ratepayers decided that \$25,000 should at once be expended on public improvements. The money will be used to improve the new Island Park, install sewers and extend the water system of the city. Fifteen thousand will also be used to put two subways under the C.P.R. tracks.

TABER.—The Government bridge, which is to span the Belly River about two miles north of the town, is under construction. Superintendent Simons is in charge of the construction of the structure. The site of the bridge will be about 100 yards below the present location of the ferry. The bridge is to be about 850 feet in length, will cost in the neighborhood of \$100,000, and will probably take one year in its construction.

British Columbia.

NEW WESTMINSTER.—G. A. Keefer, Dominion Government resident engineer, recently took up with the Government the matter of appropriations for public works in his district. The Government has decided to furnish another dredge for harbor work on this coast, but are undecided whether to purchase a modern dredge, constructed in Germany, and is now for sale, or build one in Canada.

PERSONAL.

MR. HERBERT C. BURCHELL, manager of the North Sydney Cement Company, has been offered by the British Colonial Office the appointment of Director of Works for Jamaica.

MESSRS. ROBERT W. HUNT & CO. now occupy with their Bureau of Inspection and Testing Laboratories, Rooms 614, 615, 619 Canadian Express Building, McGill Street, Montreal.

MR. W. S. GIBSON, B.A.Sc., paid us a visit last week. Mr. Gibson has just returned from a two years' stay in Ceylon Island and Southern India, where he has been engaged with extensive experiments connected with the pearl fisheries.

MR. J. D. FRASER, of Sydney, Nova Scotia, will take the position of general manager of the Atikokan Company's blast furnace plant, Port Arthur. He has had extensive experience, having been employed in some of the largest Eastern plants.

MR. R. A. BAINBRIDGE, of Vancouver, who has for some time past been acting as assistant to the chief engineer, C. E. Cartwright, of the C.P.R., has been appointed divisional engineer on the E. and N. Railway on construction and maintenance.

MR. WESLEY R. MASON, who resigned the Detroit district management of the American Car and Foundry Co. in February, 1907, to accept the general managership of the Dominion Car and Foundry Co., with headquarters in Montreal, has retired from the latter position.

MR. NORMAN GIBSON, B.A.Sc., of Winnipeg, has been appointed engineer of construction for the city of Brandon to superintend, under City Engineer Shillinglaw, the construction of the new cement bridge over the C.P.R. tracks and the Assiniboine River at First Street.

MARKET CONDITIONS.

Toronto, May 14th, 1908.

Increased activity of demand is hardly noticeable by merchants yet, although warmer weather has encouraged retail trade and also enables prosecution of building. In the lumber trade hemlock and spruce are more active, while Southern pine and Norway pine are easier in price. Canadian white

pine holds its own at a fair demand. Yards are not as empty of lumber as they were a year ago, and the mills will shorten production a good deal this season.

Improvement in the hardware and metal trades comes but slowly. Metals other than steel and iron show no change in price, but no great firmness of tone. Prices of steel are now nearly on a parity with those of former dull seasons. The efforts of the Amer Steel Company to keep up prices have been long manifest. Still, the fact of the Pennsylvania Railroad's issue of \$40,000,000 four per cent. bonds is an encouragement to believe in an improvement of railway constructional activity before very long.

The following are wholesale prices for Toronto, where not otherwise explained, although for broken quantities higher prices are quoted:

American Bessemer Sheet Steel.—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.—Not a great deal doing, 9½ to 10c. is present price.

Bar Iron.—\$2 base, from stock to the wholesale dealer.

Beams and Channels.—Active demand from Toronto builders; prices continue to be \$2.50 to \$2.75, according to size and quantity; angles, 1¼ by 3-16 and larger, \$2.55; tees, \$2.80 to \$3 per 100 pounds. Extra for smaller sizes.

Boiler Plates.—¼-inch and heavier, \$2.50. Fair supply, prices steady. Boiler heads 25c. per 100 pounds advance on plate.

Boiler Tubes.—Prices are lowered by the manufacturers; no overstock here in wholesale hands. Lap-welded, steel, 1¼-in., 10c.; 1½-in., 9c. per foot; 2-in., \$8.50; 2¼-in., \$10; 2½-in., \$10.60; 3-in., \$12.10; 3½-in., \$15.30; 4-in., \$19.45 per 100 ft.

Building Paper.—Plain, 32c. per roll; tarred, 40c. per roll. Much has gone out on May 1st, which went out last year at April 1st. Orders are all small.

Bricks.—Common structural, \$9 to \$10 per thousand, wholesale; small lots, \$12; there is a good demand. Red and buff pressed are worth \$18 at works.

Cement.—Price of Canadian makes to the dealer in 1,000 barrel lots and up is \$1.75, in cotton bags, on car, Toronto. The dealers' price to the contractor up to car-load lots without package price, are general at \$1.80 per barrel in cotton bags and \$2 in wood, weight in each case 350 pounds. April demand was good; prospect for May is fair; prices are unchanged.

Copper, Ingot.—Transactions mostly small; price 13¾c. for large purchases, 14¼c. for small.

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. A good many small orders.

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

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 10¼, \$4.70 per 100 pounds. Stocks very low.

Iron Pipe.—Black, ¼-inch, \$2; ¾-inch, \$2.25; 1-inch, \$2.72; 1¼-inch, \$3.68; 1½-inch, \$5.28; 2-inch, \$7.20; 2½-inch, \$8.64; 3-inch, \$11.50; 3½-inch, \$18.40; 4-inch, \$24.15; 4½-inch, \$30.40; 5-inch, \$34.55; 6-inch, \$38; 7-inch, \$43.50; 8-inch, \$56. Galvanized, ¼-inch, \$2.85; ¾-inch, \$3.05; 1-inch, \$3.57; 1¼-inch, \$4.83; 1½-inch, \$6.93; 2-inch, \$9.45; 2½-inch, \$11.34; 3-inch, \$15.12.

Lead.—Market not yet firm; price, \$4.

Lime.—In plentiful supply and moderate movement. Price for large lots at kilns outside city 21c. per 100 lbs. f.o.b. cars; Toronto retail price 35c. per 100 lbs. f.o.b. car.

Lumber.—A moderate movement of pine is reported, and the supply is adequate. The price holds its own. Dressing, we quote, \$32 to \$35 per thousand for usual lengths (12, 14, and 16 ft.) and stock sizes of boards, and \$38 to \$40 for special lengths, common stock boards, as to grade, \$24 to \$28; culls, \$22. Southern pine and Norway pine are somewhat easier. Hemlock moves more freely and quotes at \$19 to \$21.50, according to size. Much spruce comes from the East and is in better demand; the price asked for flooring is \$27 wholesale and \$30 retail. Shingles, B.C., in more active demand, retailing at \$3.75 per thousand. Laths are quiet, No. 1 quote at \$4.25 on track, No. 2 at \$3.75.

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

Pitch.—Fair demand at 75c. per 100 lbs.

Pig Iron.—More pig is selling; Summerlee quotes: No. 1, \$25.50; No. 3, in car load lots, \$22 to \$23 here; Glengarnock, \$25.50; Clarence, No. 3, \$19.50 to \$20; No. 1 Cleveland, \$20 to \$22; Old Country market is still firm.

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.—There is some activity in a small way; \$3.50 per barrel the ruling price.

Tank Plate.—3-16-in., \$2.65.

Tin.—Firmly held abroad by speculative interests; price here continues at 33 to 34c.

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Montreal, May 14th, 1908.

The United States pig iron markets are in even more unsettled condition than they have been during the past three or four months, owing particularly to the report of a break in the understanding which previously existed among the producers for the maintenance of prices at a fairly high level. Certain independent furnaces have been selling at \$1 to \$2 per ton lower than the united interests, and as the large producers found this interfering with their business they have decided to take orders at the best figure obtainable. The result is that northern and southern furnaces are now open to sell at what is considered in some cases to be less than cost. Consumers have been claiming that lower prices were necessary to permit of their securing business and it is now for them to show that their contentions were justifiable and that larger orders can be obtained at lower figures. The position to-day is that there is practically no combine or understanding as to prices for pig iron, but it is doubtful if very materially lower figures will be arrived at, the contention being that prices are to-day in many cases higher than some sales have recently been made at. This is a question which will, no doubt, be governed by the position of ore and coke supplies.

The English and Scotch markets continue fairly strong, fluctuations in market prices being almost entirely a matter of speculation. Recent advises, however, are not quite so optimistic and on some hands it is contended that prices may reach a lower level owing to decreasing demand. The fact that all negotiations to prevent the shipbuilders lockout have failed, will materially affect the iron and steel trade. There are also rumors that American producers have sold iron to Continental points in competition with English iron. This may have the effect of lessening the export demand. Generally speaking, however, the situation is not quite so satisfactory as it has been, especially in view of the fact that stocks in store are again beginning to show a slight increase.

Locally there continues to be a fair demand for foundry iron and apparently the volume of business is increasing somewhat. The bulk of Canadian business is, however, being taken by local furnaces which are large producers. English and Scotch metal will continue to come in, and will be used

by foundrymen who make special class of casts. The price of import metal continues fairly firm and will only be affected in case English and Scotch markets show a decided fall. Cables received up to the present have, however, not quoted lower figures.

Antimony.—The market is firm and sales are being made at 9½ to 10c. per lb.

Bar Iron and Steel.—Demand is picking up a little and merchants think they have turned the corner for the time being. Steel prices dropped 5 to 10c. all around the first of the month, but are again steady. Bar iron, \$1.90 per 100 pounds; best refined horseshoe, \$2.15; forged iron, \$2.05; mild steel, \$1.95; sleigh shoe steel, \$1.95 for 1 x ¾-base; tire steel, \$2 for 1 x ¾-base; toe calk steel, \$2.45; machine steel, iron finish, \$2.05.

Boiler Tubes.—The market holds steady, demand being fair, prices are as follows:—2-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 steady at \$1.85 to \$1.90 per barrel in jute sacks of 82½ pounds each (including price of sacks) and \$2.20 to \$2.30 in wood, per 350 pounds, gross. Belgian cement is quoted at \$1.75 to \$1.85 per barrel in bags, and \$2.05 to \$2.20 per barrel, in wood.

Copper.—The market is steady at 14 to 14½c. per pound. Demand continues limited.

Iron.—The steamships are now arriving at Montreal with iron from Great Britain, and as a result the spread between the prices quoted for spot business and business to arrive has disappeared, the latter prices now prevailing. The following are quotations for pig-iron now arriving;—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.

Lead.—Trail lead is weak and prices are steady at \$3.80 to \$3.90 per 100 pounds, ex-store.

Nails.—Demand for nails is moderate, but prices are steady at \$2.30 per keg for cut, and \$2.25 for wire, base prices.

Pipe—Cast Iron.—The market shows a slight improvement in demand, now that spring is opening up, but prices are easy at \$34 for 8-inch pipe and larger; \$35 for 6-inch pipe; \$36 for 5-inch, and \$36 for 4-inch at the foundry. Gas pipe is quoted at about \$1 more than the above.

Pipe—Wrought.—The market is quiet and steady at last week's range:—¼-inch, \$5.50, with sixty-three per cent. off for black, and 48 per cent. off for galvanized; ¾-inch, \$5.50, with 59 per cent. off for black and 44 per cent. off for galvanized. The discount on the following is 68 per cent. off for black and 58 per cent. off for galvanized; ½-inch, \$8.50; 1-inch, \$16.50; 1¼-inch, \$22.50; 1½-inch, \$27; 2-inch, \$36; and 3-inch, \$75.50; 3½-inch, \$95; 4-inch, \$108.

Spikes.—Railway spikes are in fair demand, \$2.60 per 100 pounds, base of 5½ x 9-16. Ship spikes are steady at \$3.15 per 100 pounds, base of 5½ x 10 inch and ¾ x 12 inch.