

CANADIAN CONTRACT RECORD

*A Weekly Journal of Engineering, Public Works,
Tenders, Advance Information and Municipal Progress*

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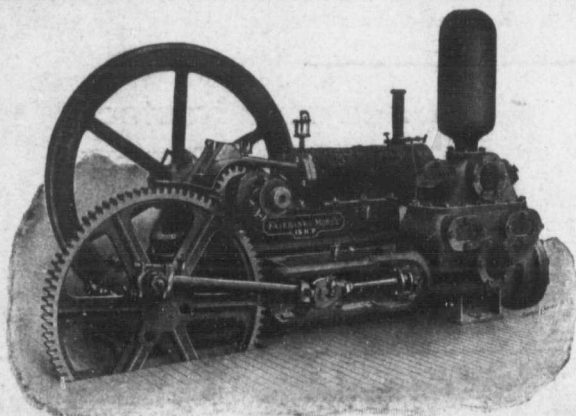
A Canadian Company organized to promote and develop for itself or other persons all commercial and industrial enterprises; to undertake the construction of all kinds of public, municipal and private works, and especially railways, tramways, water works, sewers, hydraulic and electrical installations.

The Company is supported and backed in Europe by nine of the strongest Banks, enabling it to carry through the largest undertakings, and to financially take an interest in Canadian enterprises.

The Company has a staff of competent and experienced engineers, and invites correspondence from municipal and private corporations, and from business men who require technical or financial assistance to plan, execute or construct any private, municipal or public work.

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**Simple, Compact
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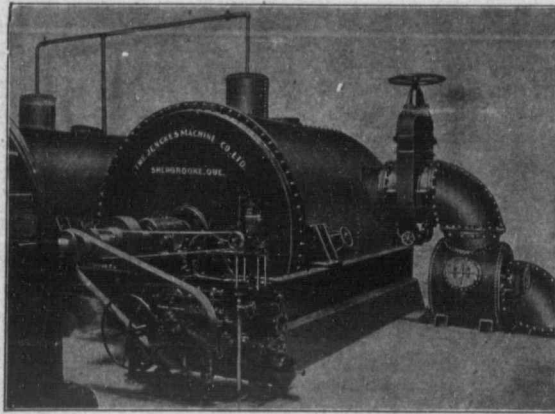
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Somerville Limited

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TENDERS AND FOR SALE DEPARTMENT

SEPARATE TENDERS

will be received up to 5 P.M. JANUARY 14TH, 1908, by Thos. McCosh, Secretary of Board of Education, Paris, Ont., for all trades required in the erection of a PUBLIC SCHOOL at Paris. Plans and specifications may be seen at the office of Simpson & Young, Architects, 17 Toronto Street, Toronto, also at Thos. McCosh's, Secretary of Board of Education, Paris. Accepted tenders will be required to make a satisfactory deposit. No tender necessarily accepted.

Corporation of the City of
Revelstoke

Notice to Contractors

The Municipal Council of the City of Revelstoke is prepared to receive tenders for constructing a Sewage System for the city according to plans and specifications which may be seen at the City Hall, Revelstoke, B.C., on and after the 28th inst.

Tenders must be sealed, endorsed on the outside, "Tender for Sewage," and reach the undersigned not later than NOON of FRIDAY, DECEMBER 27, 1907.

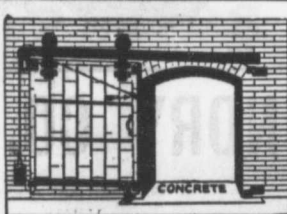
Tenders must be accompanied by an accepted cheque, payable to the Revelstoke City Treasurer, equal to five per cent. (5%) of the amount of the tender, which cheque will be forfeited if the party tendering declines to enter into a contract when called upon to do so, or fails to complete the work contracted for.

The lowest or any tender not necessarily accepted.

H. A. BROWN, Mayor.
H. FLOYD, City Clerk.
Revelstoke, B. C., Nov. 25, 1907.

The Ontario Accident Insurance Co.
ACCIDENT, EMPLOYERS, ELEVATOR AND GENERAL LIABILITY

104 St. Francis Xavier St. Montreal



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the country over endorse our Fire Door work. We make any contract undertaken a standing advertisement for ourselves.

From making the core to hanging we take all the responsibility. We have the facilities. Send us particulars, our figure will interest you.

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WM. MAHLON DAVIS,
Town Engineer, Berlin, Ont.

City of Sherbrooke
Province of Quebec

Tenders for Pipe

Sealed tenders addressed to the undersigned, and marked "Tenders for cast iron water pipe and fittings," will be received up to TUESDAY, DECEMBER 31ST, 1907, for about 576 feet 24 inch cast iron water pipe, 13,100 feet of 18 inch and 7,000 feet 16 inch, also fittings for above sizes.

The lowest or any tender not necessarily accepted.

Particulars may be obtained from
THOMAS TREMBLAY,
Supt. Waterworks.

WATERWORKS ENGINEER

requires position as Works Manager or Resident Engineer. Fourteen years experience in waterworks engineering. BOX 119, CONTRACT RECORD, Toronto.

United Counties of
Prescott and Russell.

Tenders for Iron Highway Bridge

Sealed tenders addressed to the undersigned will be received up to 12 o'clock NOON of TUESDAY, the 21ST DAY OF JANUARY NEXT, A.D. 1908, for the construction of an iron highway bridge over the Big Castor River, 120 to 125 feet span. State price for each and also for removing the old 80 to 1 span, now in use, to the site of the new bridge over the Little Castor, about one mile distant and place the same on the new abutments ready for public use.

Tenders are also asked for the masonry work required for the Big Castor bridge concrete or stone. Information may be obtained from the undersigned by letter or in person, who will visit the locality with those tendering if required.

The lowest or any tender not necessarily accepted.
By order of Council.

E. ABBOT JOHNSON,
County Clerk,
Prescott and Russell,
L'Original, Ont.

L'Original, December 16th, 1907.

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is used throughout the world. Will do more work with less labor, at a less first cost than any Excavator at present in use in Canada. For particulars write

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C. E.
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DAMS

ALSO

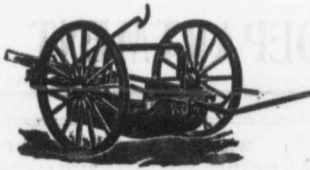
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15
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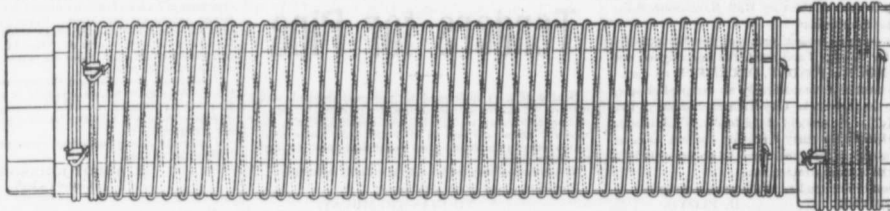
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Its carrying capacity is never decreased by rust.



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Showing special method of winding with two independent parallel wires.
The great advantage of this is, that in event of one wire becoming damaged,
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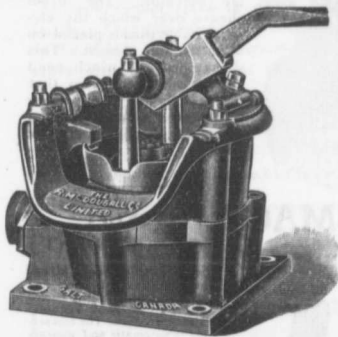
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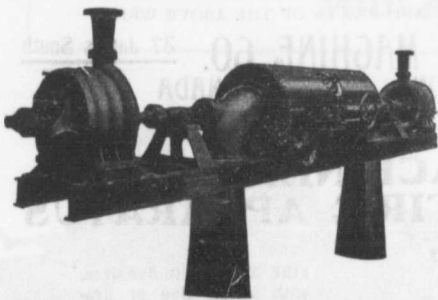
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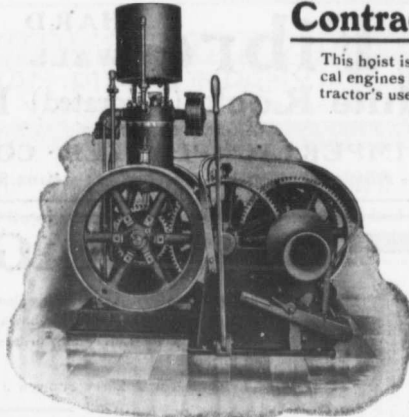
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The Eureka Concrete Mixer is adaptable to all kinds and classes of work. Easily moved and ready for work instantly when on the job. The measuring is automatic and guaranteed accurate and reliable.

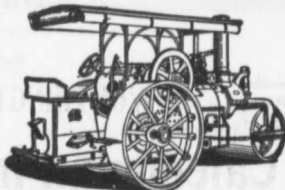
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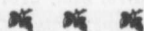
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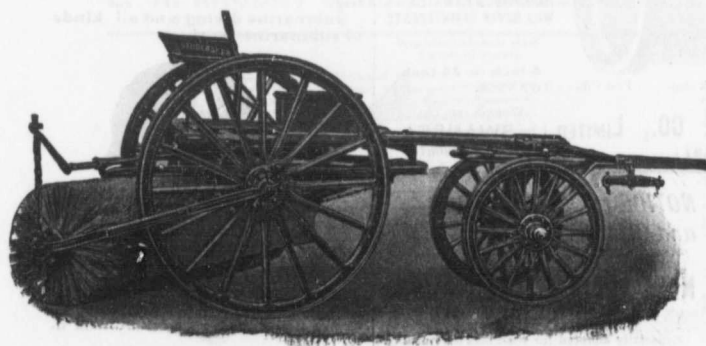
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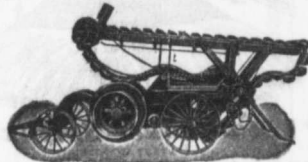
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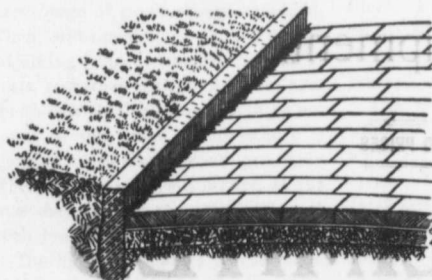
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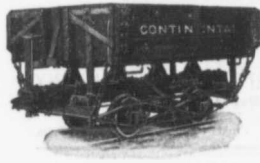
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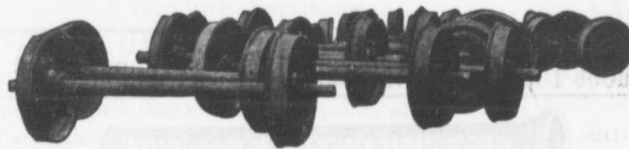
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and new address. Notify the publisher of any irregu-
larity in delivery of papers.

ESTIMATING SHOULD BE EXACT.

For the builder or architect to control the market price of labor or material is impossible, and the only reliable method whereby exact or actual cost can be obtained is to have the complete working plans and specifications. The owner should be reasonable in his demands from the builder or architect when asking for approximate estimates. On the other hand the builder should also be fair to the public—his estimates should be based on actual costs and not be mere guesswork, as appears to be the method of estimating used by many builders. They think they know instead of actually knowing that they know. They should retain copies of their estimates, particularly after the contract is secured. In preparing the estimate the cost for each item, both of material and labor, should be marked and after the entire list is made the percentage of profit should be added. Then, additional space should be left adjoining the estimated individual costs, and when the actual cost of production is obtained this should be entered in this space. The builder is then in a position to know positively where his loss or gain occurs, as the case may be, and the actual cause of such loss or gain.

The keeping separate of each item is the only possible manner by which the builder can be certain of his position.

Many of these "kept" estimates have been the means of the builder se-

curing additional work, for the reasonable prospective owner knows that it is better to let his contract to the exact and conscientious man than to the fellow who may fail through some mistake made in trusting to his memory. The builder should be as much of a business man as the manufacturers.

THE LABOR REPORT.

The annual report of the Deputy Minister of Labor, Mr. W. L. MacKenzie King, made public last week, gives an exhaustive and illuminative review of the labor conditions in Canada during the last year, with a resume of the effect of the labor legislation of the past six years. During the calendar year 1906 reports to the Department showed that some 17,741 work people in Canada received increases in wages aggregating \$12,741 per week, with a weekly decrease in the hours of employment aggregating 7,958. The total number of employes involved in trade disputes during the year was approximately 26,014, compared with 16,329 in 1905. The aggregate loss of time in working days was approximately 490,400, as compared with 284,140 in 1905. There were seventeen strikes and lockouts during the year, each involving 300 work people or more. Disputes were more numerous in the building trades than in any other, 29 out of 138 having occurred. The next highest was in the metal trades, in which there were twenty-one disputes.

Nearly half the whole number of strikes in the Dominion in 1906 took place in the Province of Ontario, 61 out of 138 strikes having occurred there. Fifty disputes ended in favor of the employers, and 41 in favor of the employes, compromises being reached in 23 other cases.

The total number of fatalities to work people was 1,107, as compared with 931 for the year 1905, an increase of nearly 20 per cent. Non-fatal accidents, resulting the permanent impairment of industrial efficiency totaled 2,745, as against 2,414 in 1905. The industry entailing the largest number of fatalities to employes was the railway service, which accounted for 252 deaths during the year. Agriculture takes second place

with respect to the number of fatalities, and fishing and hunting, lumbering and navigation, with about equal figures, come next.

CONTRACTOR'S RIGHT TO RECOVER DAMAGES.

A contractor's right to recover damages for work done under a contract subsequently taken from him has been before the United States courts for some time in an action brought by the Jonathan Clark & Sons Company against the City of Pittsburgh. This company undertook to build the Highland Park reservoir in that city, but, after carrying on the work for about three years, was ordered by the Director of Public Works to discontinue further construction under the contract. This order was issued in accordance with a contract provision giving the Director the right to stop the work if it was unnecessarily delayed or the contractor was wilfully violating any of the conditions. After the completion of the construction by other parties the contractor sued the city for retained percentages on what it had done and for extras. The city's defence was that no final estimate had been given the contractor by the director and consequently nothing was due and that the contract specifically provided that the director should act as an arbitrator in all disputes between the parties to the contract. The United States Circuit Court of Appeals has just upheld a decision of the District Court in favor of the contractor. The items claimed by the contractor were sufficiently proved, it is stated, during the trial, and the provision for a final estimate did not apply when the contractor was put off the work. The arbitration clause is also held to be inapplicable in such a case. The city's action under the clause authorizing the director to order the contractor to leave the work is held to provide impliedly for a determination of the rights of the parties by regular judicial proceedings. The case seems to be a rather unusual one, as shown by the fact that the editors of the "Reporter" could refer to nothing like it in the decisions of any court of final jurisdiction.

THE COMMERCIAL SITUATION

OPENING UP THE WEST.

While the year at present drawing to a close has been one of the greatest, if not the greatest year of railroad construction in the Canadian Northwest, the twelve months of 1908 give promise of being equally as strenuous a period along these lines, and even by September of next year a great change will have taken place in the railroad operations in the Northwest Provinces.

During the past summer hundreds of miles of grading have been put up across sections of the country that have been hitherto situated so far away from the lines of railway as to be practically isolated, and all that remains is the laying of the steel to complete the lines ready for traffic of every description.

In this regard the most notable instances are those of the C.P.R. and the Grand Trunk Pacific. During the past season the Canadian Pacific Railway has graded its extension from Yorkton clear through to Saskatoon, a distance of over two hundred miles, and with the first approach of spring the track laying, which has been commenced this fall, will be pushed through to completion. The gigantic piece of work of grading a road-bed from Saskatoon westward to join the short spur running east from Wetaskiwin on the Edmonton branch has been proceeding vigorously from both sides all summer, with the result that about 175 miles have been completed. The work of grading the intervening section will be continued in the spring, at which time also the work of laying the steel which has already been done for some distance west of Saskatoon, will be continued.

Then, too, the C.P.R. will continue work on the extension of the line north of Moose Jaw.

By the time the crop is harvested in 1908, it is fully expected that the double tracking of the main line from Winnipeg east to Fort William will be completed, and this idea, which

has been advocated for the past 20 years, will at last be carried out. Already about three hundred miles are completed, and the greater proportion of this trackage is being utilized this fall to facilitate the extensive movement of wheat to the head of the lakes.

It is stated that the work of double tracking the main line as far west as Brandon will be commenced about April 1.

On the Winnipeg Beach branch the work of putting down 80 pound rails, to take the place of the lighter ones, will be continued, and it is hoped by the opening of the regular season to install a service to the lake that, with but three stops, will land passengers there in a little more than an hour.

During the coming year thousands of men will be employed on the main line of the Grand Trunk Pacific. The grading of the line from Portage la Prairie to Winnipeg, which was well started this season, will be completed, and it is fully expected that the line from this city clear through to Saskatoon will be ballasted and ready for operation in June or July of next year. From Portage la Prairie to Saskatoon the grading was finished this fall and a long section of track laid.

West of Saskatoon and for hundreds of miles across the prairies to the foothills of the Rocky Mountains the contracts for grading are all let, and these portions of Saskatchewan and Alberta will be scenes of activity until frozen ground in the fall forces a suspension of the work.

The G. T. P. line has been surveyed through the Yellow Pass, an engineering feat which was fraught with many difficulties, and there is no doubt that the work of grading the line through this portion of the mountains will be started.

East of Winnipeg the G. T. P. has been graded and track laid to Rennie, at the junction of the C. P. R., and

the work of completing the grade in the gap between this point and the work finished west of the Winnipeg river will be concluded.

From Rennie eastward to Superior Junction, north of Fort William, hundreds of thousands of tons of rock will have to be removed, and there will be work in this district for every man available during the coming winter and spring.

NOVEMBER TRADE RETURNS.

Trade returns of the Dominion for the month of November show that the prevailing financial stringency is beginning to have a considerable effect. For the last month a decrease of \$3,621,469 is recorded in the total imports, as compared with November, 1906, while the total exports decreased by \$2,455,769. Exports of domestic products decreased during the month by \$3,231,074, while exports of coin and bullion increased by \$912,186. The duty collected during the month was \$4,940,52, a decrease of \$409,586, as compared with the corresponding month of last year.

For the eight months of the current fiscal year, however, the total imports show an increase of \$27,762,684, the total being \$259,495,184, as compared with \$231,732,500 for the corresponding months of last year. Customs duties for the eight months total \$41,112,459, an increase of \$5,676,546.

Exports, including coin and bullion, totaled for the eight months \$191,878,393, a decrease of \$4,972,391, as compared with the corresponding period of 1906. Exports of domestic products decreased by \$1,867,861. Exports of the mine increased by nearly two millions, agricultural exports increased about six and one-half millions, and exports of manufacture increased about one million. On the other hand, exports of animals and their produce decreased by over eleven millions.

DOMINION GOVERNMENT ESTIMATES FOR 1908-9.
(Concluded from last week's issue.)

HARBORS AND RIVERS.

Nova Scotia, harbor improvements and ice piers, \$20,000; Baddeck wharf, \$2,000; Barachois, combined dam and training pier at mouth of river, \$1,100; Bay St. Lawrence, harbor, \$20,500; Big Lorraine Harbor, dredging entrance channel, \$3,600; Breton Cove, extension of breakwater pier, \$6,500; Cape St. Mary, breakwater extension, \$10,800; Cariboo Island, causeway between island and mainland, \$5,500; Charlo's Cove, breakwater, \$6,000; Church Point, repairs to wharf, \$2,400; Cow Bay, Port Morien, repairs to breakwater, \$10,000; Digby, harbor improvements, including repairs to pier, \$15,000; Fort Lawrence Wharf, extension of head block, additional trestle approach, \$5,000; Glace Bay, assistance towards harbor improvements, \$3,000; Glace Bay, beach protection works, \$10,000; Grand Etang, repairs to and part reconstruction of channel protection works, \$2,500; Half Island Cove breakwater, \$5,000; Hall's Harbor, repairs breakwater, \$8,300; Harbors, rivers and bridges generally, repairs, improvements, \$30,000; Harbor Bouche wharf, \$1,200; Harborville, repairs, \$1,000; Hubbard's Point Wharf, \$1,000; Inverness, (Broad Cove) Mines, harbor improvements, \$10,000; Judique Boat Landing, \$2,000; Lake Ainslie, protected boat channel leading to wharf at Kinloch Railway Station, \$1,000; Little Harbor, wharf, \$1,500; Liverpool Harbor, removal of rocks, \$1,000; Livingston's Cove, repairs to breakwater wharf, \$1,800; Louisbourg pile wharf, site to be donated, \$2,000; Lower Selmah wharf, \$5,000; Mabon, repairs to harbor works, \$2,000; Malignant Cove, close piling end and sides of channel piers with creosoted piles, etc., \$1,200; Marble Mountain wharf, \$1,000; Margaree River, shear dams, etc., for protection of intervalle lands on northeast branch, \$1,300; McPherson's Cove, Great Bras d'Or Lake, wharf, \$3,000; Middle River (Lower) extension of shear dams, etc., \$2,000; Musquodoboit Harbor, extension of ballast wharf at Ostrea Lake, \$1,200; Neil's Harbor, removal of stone from

inner side of breakwater, \$1,000; New Harbor, to repair and strengthen breakwater at Black Point, \$2,500; North River, St. Ann's, shear dam and wing dams at foot island near head of estuary, \$2,400; New Glasgow, extension of wharf, \$3,500; Oyster Pond, extension of breakwater and dredging, \$1,200; Parker's Cove, improvements, \$1,200; Parrsboro, harbor improvements, \$9,000; Poirierville, landing pier, \$2,000; Porter's Lake, boat channel to Three Fathom Harbor, \$4,000; Port Hastings wharf, \$4,000; Port Hilford breakwater, protection of, with creosoted sheeting, repairs, etc., \$5,000; Port Hood Harbor, closing northern entrance with brush and stone work, \$5,000; Port Royal (Madame Island) Wharf, \$2,000; Portuguese Cove, breakwater and improvements, \$8,000; Port Joli West (Herring Rocks), breakwater, \$3,000; Pugwash, wharf, \$5,000; Rabbit Island, breakwater, \$4,000; Round Hill, wharf, \$450; Salmon River breakwater, extension and repairs, \$3,000; Scotch Cove (White Point) breakwater, \$15,000; Skinner's Cove, brush and stone protection work at inner end of piers and dredging channel, \$6,500; South Lake, Lakevale, opening channel from lake to St. George's Bay, inclusive of protection work, \$7,500; Surrette's Island, extension of wharf, \$1,050; Sydney Harbor, wharf on south arm near Whitney pier, \$5,000; Tancook Island, breakwater on southwest side of southeast cove, \$15,000; Tangier Harbor, wharf extension, \$1,500; Tamagouche Bay, wharf, \$1,000; West Head (Cape Sable Island), wharf, \$1,000; Yarmouth Harbor, improvements, \$10,000.

Prince Edward Island.—Harbors, rivers and bridges generally, repairs and improvements to, \$8,000; McPherson's Cove Wharf, extension, \$5,000; New London, repairs to breakwater, etc., \$2,500; Rustico Harbor, breakwater on Robinson's Island, south side of entrance to harbor, \$1,500; St. Peter's Bay, breakwater on east side of entrance to harbor, \$10,000; Souris, Knight's Point, strengthening breakwater, etc., \$5,000; Summerside Harbor, breakwater, \$50,000; Tignish, general repairs to breakwater,

etc., \$1,000; West Point Wharf, repairs, \$2,000.

New Brunswick.—Buetouche, channel through beach, \$2,000; Campbellton, wharf extension and repairs, \$10,000; Cape Tormentine, improvements and repairs, \$5,000; Caraque wharf, approach, icebreakers, etc., \$3,900; Dover, wharf on Petitcodiac River, \$800; Dorchester West, addition to, \$5,000; Edgett's Landing Wharf, bed for vessels at outer end, \$1,500; Great Salmon River, groyne and breakwater combined, \$8,700; harbors, rivers and bridges generally, repairs at and improvements, \$17,000; Lower Newcastle, wharf on Miramichi River, \$2,000; Madawaska River, extension of dyke on east side of river at Edmundston, southward, \$10,000; Mills Point, wharf, \$5,000; Mispec, extension of eastern or outer breakwater and repairs to west pier, \$4,000; Moncton Wharf, enlargement of, \$16,000; North Head, Grand Manan, breakwater wharf, \$7,000; Oak Point, wharf, \$1,600; Petit Rocher breakwater, including connection with shore, \$23,000; Pink Rock Wharf, Shepodoy Bay, extension, \$5,000; Pointe du Chene, repairs to breakwater, \$5,500; Quaco Harbor, extension of east pier, \$10,000; Richibucto, extension of piers, etc., \$3,300; Richibucto, wharf, \$2,000; River St. John, including tributaries, \$6,000; River St. John, wharfs in tide water, contribution to Local Government, not to exceed one-half of first cost of wharfs built by it, \$5,000; St. Andrews, harbor improvements, \$10,000; St. John Harbor, improvements, repairs and dredging, \$400,000; St. Mary's Wharf, new approach, \$1,000; St. Nicholas River, widening at Robertson's wharf, \$1,700; Shippegan Harbor, improvements at Shippegan Gully, \$2,750.

Quebec.—Anse a la Barbe, breakwater, \$2,000; Anse a l'Ilot, landing pier, \$3,000; Baie St. Paul, improvements to wharf at Cap aux Corbeaux, \$1,500; Barachois de Malbaie, training piers, etc., \$5,000; Batiscan, dredging approach to Richelieu & Ontario Navigation Company's wharf, \$2,000; Berthier (en bas) Wharf, repairs, \$1,500; Bic Harbor, wharf at Pointe a Cote, \$8,800; Cap St. Ignace, wharf, \$5,000; Cateauguay, wharf on

south shore of Lake St. Louis, between Woodland and Bellevue, \$1,000; Chicoutimi Harbor, improvements, \$20,000; Clarke City (Seven Islands) wharf improvements, revote of lapsed amount, \$14,600; Doucet's Landing, pile wharf, \$1,000; Douglstown Pier, addition, \$5,000; East Templeton, wharf, \$1,000; Escoumains, pier extension, \$10,000; Father Point, wharf repairs and breakwater, \$20,000; Grande Riviere (Gaspé), wharf repairs, \$5,000; Grands Mechins, breakwater, \$15,000; harbors, rivers and bridges, general repairs and improvements, \$32,000; Isle Perrot, repairs to wharf on north side, \$1,000; Isle Verte Wharf, repairs, \$1,500; Kamouraska Wharf, repairs, \$1,200; Lake Aylmer Wharf at Garthby, \$1,500; Lake Megantic, piers, \$8,600; Lake St. John, piers, repairs etc., \$3,500; Lake St. John, dredging, \$5,000; Lake St. Francis (Beauce) wharfs, \$13,000; Lavaltrie, wharf, \$5,000; Les Eboulements, repairs to wharf and shed, \$1,500; Lotbiniere and Portneuf Counties Government wharfs, improvements of approaches, etc., at Lotbiniere wharf, \$1,200; Magdalen Islands, breakwaters and piers, \$12,000; Malbay (Gaspé), boat shelter, \$4,000; Matane breakwater and landing pier, repairs, \$2,500; Montmagny, wharf on the "Bassin," \$3,000; Murray Bay, wharf renewals and repairs, \$4,800; Nicolet Harbor, repairs to jetty at mouth of river, shelter shed and dredging, \$7,200; Notre Dame du Portage, wharf, \$5,400; Paspebiac Wharf, repairs and improvements, \$2,000; Petite Decharge, Lac St. Jean, removal of rock from north bank on Ile d'Alma, etc., \$1,000; Piche Point (Lake Temiskaming) pile wharf, \$11,500; Pointe a Brousseau, breakwater, \$2,000; Pointe aux Trembles, wharf (County Portneuf), \$9,000; Repentigny, wharf, \$1,200; Rimouski, wharf improvements, \$8,000; Rimouski, dredging approach, etc., \$30,00; Rivers Ashouapmouhouan, Peribonka and Mistassini, training dykes, etc., \$5,000; Riviere aux Renards, breakwater pier, \$1,600; Riviere a la Pipe Wharf, extension and repairs, \$3,000; Riviere Batiscan, dredging channel at mouth, \$15,000; Riviere Bonaventure, training pier, \$10,000; Riviere du Loup (Fraser-

ville), harbor improvements, \$10,000; Riviere du Loup (en haut), dredging and other improvements at mouth, \$10,000; Riviere du Lievre, lock and dam, repairs, etc., \$2,000; Riviere Maskinonge, dredging, \$15,000; Riviere Ouelle, dredging, \$3,000; Riviere Richelieu, ice piers at St. Johns, \$2,000; Riviere Richelieu, improvements, \$30,000; Riviere Saguenay, dredging and other improvements, \$40,000; Riviere St. Louis, improvements, \$8,000; Riviere St. Francois, ice piers, protection walls, etc., improvements and repairs, \$2,000; Riviere St. Lawrence, ice piers at mouth of River Jacques (Laprairie), \$6,500; Riviere St. Maurice, channel between Grandes Piles and La Tuque, \$16,500; Riviere St. Maurice, dam at Grandes Piles, \$40,000; Riviere St. Maurice, dredging channels at mouth, \$10,000; Riviere Yamaska Lock, etc., repairs, \$4,500; Roberval Wharf, repairs and renewals, \$1,000; St. Alphonse (de Bagotville), addition to wharf on south side, \$20,000; Ste. Anne des Monts, harbor improvements at mouth of Grande Riv. Ste. Anne, \$3,500; Ste. Anne du Saguenay Wharf, general repairs, \$4,000; St. Charles Borromeo Wharfs, to complete, \$1,000; St. Charles, wharf on River Richelieu, \$4,800; St. Francois, Island of Orleans, approach to isolated block, \$10,000; St. Fulgence wharf, \$1,500; St. Ignace de Loyola, wharf on south side of St. Ignace Island, \$8,000; St. Jean des Chaillons, wharf, including dredging, \$5,000; St. Jean, Island of Orleans, wharf extension, \$2,000; St. Jerome Wharf, to complete, \$2,000; St. Laurent, Island of Orleans, repairs to wharf, \$3,000; St. Omer, landing pier, \$7,000; St. Pierre les Beequets, pile wharf and dredging, \$10,000; St. Simeon, wharf extension, \$10,000; St. Sulpice, wharf, \$3,000; St. Valier, wharf, \$3,000; St. Zotique, reconstruction of superstructure, \$3,500; Sorel, deep water wharf, \$50,000; Squateck, wharf on east side of Lake Temiscouata, \$2,500; Trois Pistoles Wharf, repairs, \$800; Trois Pistoles, improvement of entrances to harbor at mouth of river, \$2,500; Varennes, wharf, \$8,000; Yamaska River, dredging, \$10,000.

Ontario.—Belle River, dredging, close piling, etc., \$1,000; Beaverton,

harbor improvements, \$3,500; Blanche River, improvement, \$5,000; Blanche River, improvement of navigation on south branch, \$3,000; Blind River Wharf, dredging, etc., \$6,000; Bronte Harbor, repairs to piers, etc., \$1,000; Burlington Channel Piers, head block at east end of south pier, \$6,000; Chute a Blondeau (County Prescott), wharf, \$4,000; Cobourg, extension of breakwaters, dredging, etc., \$45,000; Colborne, wharf, \$15,700; Collingwood Harbor, improvements, \$15,000; Cannon's Narrows bridge (County Peterboro), wharf, \$1,200; Goderich Harbor, improvements, \$75,000; Gore's Landing, wharf, \$1,000; Griffith's Island (Colpoys Bay), wharf, \$2,400; Hamilton Harbor, improvements, \$30,000; harbors, rivers and bridges, general repairs and improvements, \$25,000; Kearney (Muskoka), wharf, \$800; Kincardine Harbor, repairs to piers and dredging, \$4,200; Lion's Head, extension of wharf and repairs, \$15,000; Little Current, improvement of northern channel in Georgian Bay, \$75,000; McGregor's Creek, renewal of bank protection works at Chatham, \$16,000; Meaford Harbor, improvements, \$30,000; Midland and Tiffin Harbors, improvements, \$75,000; Montreal River, improvements at Pork Rapids, \$8,000; North Bay Wharf, replanking, \$400; Owen Sound Harbor, dredging and pile protection work, \$10,000; Ottawa, wharf at foot of Rideau Canal, \$5,000; Pelee Island, wharf on North Bay, \$5,000; Peterboro steamboat landing, \$2,500; Petewawa, extension of wharf, \$11,500; Port Burwell, improvements to harbor, \$90,000; Port Hope, repairs to pier and dredging, \$15,000; Port Stanley, harbor improvements, \$38,000; Rainy River, improvement of steamboat channel at mouth of river, \$4,000; Rainy River, improvements at Long Sault Rapid, \$50,000; River Otonabee, dredging, \$5,000; River Thames, protection work at Chatham and vicinity, \$12,000; Roache's Point, wharf, \$3,200; Rondeau Harbor improvements, \$50,000; Rosport, wharf on north shore Lake Superior, \$5,000; Ruseom River, improvements of waterway, \$6,000; Sand Point (River Ottawa), wharf, \$6,800; Sault Ste.

(Concluded on Page 26)

The Liability of Contractors

Under the English authorities, where a building, which is being erected under a contract, is destroyed during the course of construction, the loss is allowed to remain where it falls. It is there held that one who has partly performed a contract upon the property of another, as a contract for repairs on a house, cannot recover for his services if the property is destroyed without fault of either party before the work is finished; on the other hand, one who has advanced money to a contractor on account of materials furnished in the construction of a house cannot, under such circumstances recover his money. But in this country the rule is in general uniform, that where one is to make repairs on the house of another under a special contract, or is to furnish a part of the materials and labor used in the erection of a house, and his contract becomes impossible of performance on account of the destruction of the house, he may recover for the work that he has done or the materials that he has furnished. In *Clearly vs. Sohler*, 120 Mass., 210, the plaintiff made a contract to lath and plaster a certain building for forty cents per square yard. The building was destroyed by a fire which was an unavoidable casualty. The plaintiff had lathed the building and put on the first coat of plaster and would have put on the second coat, according to his contract, if the building had not been burned. It was held that he could recover for the work done and the materials found. And where the contractor agrees to furnish the material for and completely finish the construction of a building, if the building is destroyed before completion the owner may recover back any money that he has advanced to the contractor on account of the work.

The cases naturally divide into two classes; in one class of cases the contractor agrees to furnish the material and do the work, and in the other his agreement is to perform work upon a building belonging to another. According to the American decisions a contractor, who agrees to construct

and finish a building for a specified lump sum is not excused from the full performance of his contract by the destruction of the work when partly completed. In such a case the loss is placed upon the contractor. Not only is he denied a recovery of compensation for the partially completed work, but he is liable to the owner for damages for failure to perform his contract and the owner may compel him to return any payments which have been made.

In *Butterfield vs. Byron*, 153 Mass., 517, the owner of a parcel of land entered into a contract with a builder by which the latter agreed to build and finish a three and one-half storey hotel upon the land. The agreement required the contractor to complete the building on or before a certain day specified, and provided a penalty for each day used beyond that time. The contractor had nearly completed the hotel and had complied with the terms of the agreement so far as he had gone when the building was struck by lightning and burned to the ground, an event which rendered it impossible to complete the work on contract time. The owner was insured, and upon being reimbursed for his loss, assigned to the insurance company any claim that he had against the builder. In an action by the insurance company to recover money due the contractor, it was declared by the court that the law is well established that, where one contracts to furnish labor and materials and build a house upon the land of another, he will not ordinarily be excused from the performance of his contract by the destruction of the building, without his fault, before the time fixed for the completion of it. In another instance, the plaintiff agreed to fill in and grade the premises of the defendant and, while he was engaged in the performance of his contract, 897 cubic yards of earth filling was washed out by the occurrence of an extraordinary freshet and without any fault on the part of the plaintiff. The earth thus washed out was replaced by the plaintiff and he claimed the right to recover therefor

at the same rate as fixed by the contract for doing the work originally. It was held that the law required that the contractor should be the sole sufferer. The contract was entire and by its terms the plaintiff was to perform certain work and accomplish certain results before being entitled to the compensation agreed upon. *Norton vs. Fancher*, 92 Hun. 463.

In *Thompkins vs. Dudley*, 25 N.Y. 272, a contractor agreed to erect and finish a school house for a specified sum, and to have it ready by a certain day. When nearly completed the structure burned down. At the time of destruction of the building there remained a small amount of painting to be done and a number of blinds to be hung and the building had not been formally accepted. An action was brought against the guarantors of the contractor's agreement to recover the money which had been paid to the contractor on account, and for damages sustained by reason of the non-performance of the contract. It was held that the plaintiffs might recover. The contractor had obligated himself to deliver a completed school house on a certain day and, under the circumstances, he had no legal justification for failing to perform his contract according to its terms.

No matter how harsh and apparently unjust the rule, which throws the loss in such a case upon the contractor, may occasionally appear to be, it cannot be denied that it has its foundation in good sense and sound legal theory. The contractor is the owner of the materials which go into the house he has agreed to build until the building is completed and formally turned over to the owner. His contract is to deliver a finished house and, until he has fully performed his contract (except in certain cases of installment contracts) he cannot be entitled to the compensation provided for in the contract. When one of two innocent persons must sustain a loss, the law casts it upon him who has agreed to sustain it, or, rather, the law leaves it where the agreement of the parties has put it; the law will not insert for the benefit of one of the parties, by construction, an exception which the parties have not, either by design or neglect, inserted in their engagement.

Tracing the Sources of Water in Cellars

An interesting article by Dr. George M. Price, sanitary medical inspector of the Health Department of New York, on tracing the sources of water in cellars, was printed in the first number of "Waterproofing." The article is in part as follows:—

The degree of dampness of the cellar, or the actual quantity of water therein is an important point, and is the first thing to be inquired for. Very large quantities of water will, as a rule, point to fresh water leaks, or tide water.

A permanently wet condition of the cellar points to ground water, a less constant wetness points to sewage or water service leaks, and a periodicity in the appearance and disappearance of the water points to tide water, or if the water appears after rainstorms, leakage of surface water into the cellar is indicated.

This should be looked for, as serving to indicate the level of high or low tides or fluctuations of the ground water level. A steadily increasing level of the cellar water points to water surface or sewage leaks.

The point of entrance may bear an important relation to the source of the water; moreover, it may indicate the direction whence the water probably comes. Of course, much care is necessary in drawing conclusions. No absolute reliance should be placed upon any one factor. Because the water seems to come from a certain point, it does not necessarily follow that the cause of the leak will be found at this point or in that direction. Water always travels along the path of least resistance, and its course being influenced by a variety of factors, its entrance often occurs at points least suspected. It occasionally becomes necessary to bale out all the water from the cellar in order to discover the original point of entrance. Where the water is very shallow, and the cellar floor even, the direction of flow can readily be ascertained by letting a few drops of tallow from a candle fall upon the surface and noting their behavior.

As a rule (but not without many exceptions) the deeper the point of entrance of the water into the cellar the further the source of the water from the house. Much depends, of course, upon the lay of the ground and nature of the soil. Fresh water leaks usually appear very deep; surface water enters at points on the cellar walls; sewage water appears at the depth of the sewer pipes.

The mode of entrance of the water into the cellar depends also upon its source. Surface water usually comes in at several points through front or rear of cellar, or from the side of the house if the ground slopes towards it; it does not come through one particular point, but through the whole area. Tide water, coming through the ground, will appear simultaneously through floor and walls of the cellar. Ground water appears through floor of cellar. Water from service leaks comes in through one or but few points, near the cellar floor. Tide water breaking through sewer pipes will enter through these pipes, particularly near handholes or traps, which are forced open by the tidal pressure. Sewages enters either by way of the house drains underneath the cellar (a usual point being at the junction of vertical soil pipe with house drain); or by way of the street or yard at the point of entrance or exit of sewer pipes.

The general appearance of the cellar water may give some indication of its source; thus clear water points to springs or water service leaks; a foul liquid points to sewer leakage; turbidity points to ground water, and a greenish salty water to tidal influence. The foregoing are some of the data which should be observed in tracing the sources of cellar water. We next examine the practical tests which may assist in the search.

As cellar water may be due to several co-existing causes, the general appearance and physical properties will not always point to the exact sources. Sewage may have been greatly purified before reaching the cellar, and

thus have the appearance of fresh water, while fresh water may be so contaminated by sewage as to give a wrong indication of its source. Tide water may be mixed with surface rain water, ground water with sewage, etc., which increases the difficulty of tracing the true source.

The chemical analysis of the cellar water is a more precise and scientific test. Such an examination determines the percentage of chlorides, calcium salts, sulphates, free ammonia, nitrates, etc., and greatly assists in differentiating between tide, ground, surface and other waters.

The sound test is applicable only to fresh water leaks, and is based upon the physical fact that water escaping under pressure from a pipe will produce a distinctive, hissing sound, which may be audible at a distance, owing to the conductivity of the pipe system. This may be better heard upon putting the ear to the pipe or to the ground over same. Once heard, the sound of a leak cannot be mistaken for anything else. It is comparatively easy to discover a distant leak in the water pipes by listening to any part of the water supply piping in the house; an underground leak in the yard pipes can often be discovered by listening at the yard hydrant.

The shutting off of the water supply is another valuable test, applicable, however, only to fresh water leaks from service pipes. In fact, it is the best and most certain test as applied to such suspected leaks. By shutting off the supply at the main stop cock of a house from which a leak is suspected and observing the result upon the water in the affected cellar we can judge whether the leak comes from the house in question; if the water in the affected cellar diminishes and eventually disappears, then this house is the true source of the cellar water; if the quantity of water does not diminish, the cause lies elsewhere. To draw correct conclusions it is necessary to wait several hours, and sometimes longer, before again turning on the water, as it often takes considerable time for the water to reach the cellars.

The color test is applicable only to sewage leaks, or leaks from sewer and

drain pipes. The test consists in dropping a suitable quantity of some distinctive dye, such as uranine or fuchsine (the former turns green, the latter red when dissolved in water), into the drain from which the leak is suspected, and observing the coloring of the water in the affected cellar; if it turns red or green, according to the dye used, it is a certain indication that the suspected pipes are defective. Some time must be allowed for the coloring matter to reach the affected spot, and many different pipes may have to be tested before the defect is located.

The foregoing tests greatly assist in determining the source of the water in affected cellars. The following is a brief summary of the typical properties characterizing the several sources of cellar water:—

The quantity of surface water is usually great; it is not constant, appearing after storms, thaws, etc., and disappearing after prolonged dry weather. The water enters the cellar at the front or rear of house, usually at the surface level, through cellar gratings, doors, windows and through walls at junction with ground. The general appearance of the water is turbid, due to the sand and rubbish it usually carries along. In uncomplicated cases this source may be readily discovered and no chemical examination is necessary. When surface water is mingled with water from other sources the others must first be eliminated before it can be detected.

Ground water is the most difficult to trace. It appears in cellars of houses situated upon marshy, boggy, water-logged soil, or filled in ground; also in very deep cellars which are below the level of the ground water in the vicinity, and in poorly constructed houses. The quantity is not very great; it has not tendency to rise above a certain level; the water appears at the bottom of the cellar at the lower point, such as pits in front of boilers, etc., and throughout the whole floor of the cellar, if same is level. The general appearance of the water is turbid, it is usually mixed with sewage, and near shores may present the appearance of sea water.

Cellar water which owes its origin

to underground springs and streams will be more constant, rise to a higher level, may enter through a number of different points and may have the appearance of fresh water. This is the most difficult to trace, and can be discovered only upon elimination of all other possible sources.

Tide water can be looked for in houses situated near the shores, when the cellars are deep and below tide level. Tide water appears periodically and rises and falls with the tide; the quantity of the water in the cellar is large, entrance is effected through walls and floor of cellars or through street and house sewer pipes. The physical characteristics are the same as those of sea water.

Leaks from water service pipes are also difficult to trace. Fresh water leaks do not depend upon the situation of the house, although deep cellars are more easily affected. The amount of water in cellars due to such leaks is very large, and is apt to be constantly increasing. The point of entrance is usually very low, near the floor, or underneath it, and usually at but one or at very few points. The physical appearance, unless contaminated by sewage, is that of fresh water. This can be verified by a chemical examination, as the cellar water possesses the approximate composition of the water supply of the vicinity. Fresh water leaks may originate at remote points and travel circuitous routes. Shutting off the existing supply is the most serviceable test to trace such leaks, and many other tests are often made before the true source is located.

Leaks from sewer pipes are not, as a rule, difficult to trace, unless they occur at very remote places or in pipes the existence of which is unmade upon various fixtures before the known and unsuspected.

CHRISTMAS TURKEY AGAIN.

A. B. Ormsby, Limited, Queen and George Streets, Toronto, on the 24th inst. gave each of the employees of their factory a plump turkey as a Christmas remembrance. This custom is an annual one with this firm, and for some years past on Christmas eve the employees, with happy faces and big birds, leave the works anticipating an appetizing Christmas dinner.

TO FASTEN EMERY TO WOOD.

For most purposes good glue makes the best cement, but where a water-proof cement is desired it may be made as follows: Melt together 1 ounce shellac and 1 ounce resin and add 1-2 ounce crystallized carbolic acid. This forms a very tenacious cement.

REINFORCED CONCRETE ROOF TEST.

In giving their sanction to a loan for the Hammersmith Public Baths and Washhouses, says "The Builder," London, the Local Government Board made it a condition that such sanction should not apply to any work in the walls and roof of the first-class bath involving the use of reinforced concrete unless the Board should be satisfied with the results of tests conducted by an independent engineer in the presence of one of the Board's engineering inspectors. The tests were conducted by Mr. W. G. Kirkaldy, acting on behalf of the Borough Council, and Mr. J. Ernest Franck, their architect.

The loading was applied by slinging cradles, carrying bags of ballast, from two of the arched roof principals at eight points, so as to represent as nearly as possible the conditions for which the roof was designed. When the roof was loaded to an extent of 50 per cent. of the permanent dead load the maximum deflection was only one-twentieth of an inch, and after removal of the load the principals were found to have recovered their original form. These results are perfectly satisfactory, and should have the effect of reassuring the timid officials to whom may be attributed the restrictive policy of the Local Government Board in regard to the employment of reinforced concrete.

Mr. Franck states several pertinent reasons for the superiority of reinforced concrete over steel construction in this roof, and points out that, apart from the future saving of maintenance charges, the initial cost has not been greater than that of steel roof trusses, if the additional works required by the Local Government Board are taken into account.

Contracts Department

News of Special Interest to Contractors, Engineers, Manufacturers and Dealers in Building Supplies.

CONTRACTS OPEN.

Arnprior, Ont.

On Saturday last the fine 4-storey brick factory of the Montreal Suspender and Umbrella Company was destroyed by fire involving a loss of \$50,000.

Baddeck, C.B.

Plans have been prepared for the erection of a fine summer residence on Kitson's Island for A. C. Ross, M. P. A start will be made early in the spring.

Belleville, Ont.

At a recent meeting of the council it was decided to proceed at once with the erection of an isolation hospital.

Brandon, Man.

City Engineer Shillinglaw has prepared estimates for considerable sewerage work next season.

It is probable that a reinforced concrete bridge will shortly be placed over the Assiniboine river near this city.

Brantford, Ont.

At the January elections a by-law will be submitted to the ratepayers for the expenditure of \$10,000 on an extension to the market building.

Calgary, Alta.

The hospital board will take fresh plans for their new building, the cost not to exceed \$140,000.

A new factory will be erected in this city next season by the Dominion Match Company.

A new warehouse is to be erected in this city by the American-Abell Engine and Thresher Company, of Toronto.

Claresholm, Alta.

Cook and Hermon are negotiating with the town for the sale of their electric light plant and a by-law to this end will be prepared.

Edmonton, Alta.

The G. T. P. recently sent their chief bridge engineer, J. G. Legrand, of Montreal, to report upon the cost of a steel bridge over the Pembina river on the line west of this city. It is estimated that the structure would cost \$250,000.

Forest, Ont.

Fire totally destroyed Fraleigh's flax mill at this place last week involving a loss of \$4,000. It is the intention of the owner to rebuild immediately.

Folly Lake, N.S.

A new plant for the manufacture of broom handles will be added to the factory of the Londonderry Iron and Mining Company, Limited, at this place.

Guelph, Ont.

It is rumored that a stock company is being formed in this city for the purpose of erecting a \$100,000 hotel next year.

Local members of the Lutheran body are taking initial steps towards the formation of a church and it is probable that a building will be erected early in the spring.

Halifax, N.S.

Owing to a generous donation of \$10,000 made by Mr. F. D. Corbett, the hospital committee will be enabled to secure plans immediately for the proposed children's hospital. This sum will about cover the cost of the building.

Hamilton, Ont.

Much damage was wrought at the Beach in the recent storm. A great quantity of work was carried away at the east end of the south pier, and the crib, together with the new steel light-house, was also destroyed.

Hastings, Ont.

It is possible that a factory will be established here by F. W. Bird and Son, of Hamilton, Ont.

London, Ont.

A special committee of the council have instructed the city solicitor to prepare a bylaw for certain extensions to the street railway. The measure will at once be placed before the directors of the company, after which it will be brought in the regular way before council.

Markdale, Ont.

With reference to the establishment of cement works here the promoters are now asking a bonus of \$100,000. The matter is in abeyance.

Meaford, Ont.

The question of rebuilding the Seaman-Kent factory, recently destroyed by fire, is receiving considerable attention and the Company are awaiting inducements from the town.

Montreal, Que.

The finance committee have set aside the proposition to buy a 5,000,000-gallon pump and have recommended that a 12,000,000-gallon pump be installed at an early date. It is probable that tenders for the latter will shortly be called for.

In connection with the proposed new higher commercial French school a sum of nearly \$50,000 has been expended in the purchase of property, for building purposes, on Viger avenue.

Northfield, B.C.

In an explosion which occurred last week at the powder house of the Hamilton Powder Works, the company's buildings were completely wrecked.

Ottawa, Ont.

A by-law is being prepared calling for the expenditure of \$39,000 for pavement construction.

City Engineer Ker and C. H. Keefer, C. E., have completed their report on the Metropolitan water power at Britannia for the purchase of which a by-law will be submitted to the property owners.

Parry Sound, Ont.

Extensions to the drainage systems of Ashland, MacDougall and Donald townships are contemplated at a cost of \$6,000 and the Minister of Public Works was recently interviewed with a view to obtaining Government assistance to the scheme.

Pentworth, Ont.

During the transit of some agricultural machinery last week the new iron bridge at this place completely collapsed.

Peterborough, Ont.

It has been decided to approach Mr. Carnegie for \$35,000 towards the erection of the proposed public library. The property left to the city in the Nicholls' legacy will probably be disposed of and a more suitable site secured.

Portage La Prairie, Man.

A by-law will likely be submitted to the ratepayers to raise \$75,000 for extensions to the waterworks.

Prince Albert, Sask.

On December 27th the ratepayers will vote on a by-law to raise \$2,500 for additional fire fighting appliances.

Prince Rupert, B.C.

Following the recent incorporation of the Canadian Fish and Cold Storage Company comes the announcement of the proposed erection of a mammoth plant at this place to cost \$250,000.

Quebec, Que.

Application will be made to Parliament next session by the Quebec and New Brunswick Railway Company for authority to construct a line from St. Charles Junction or St. Anselme to a point on the Maine boundary.

Regina, Sask.

Excavation work for the new legislative buildings will be started early in the spring.

Revelstoke, B.C.

Hon. F. W. Aylmer, Dominion Works Engineer, has received from the Government a grant of \$10,000 for the repair of the Columbia river dam.

Sarnia, Ont.

The Delaware Seamless Tube Company will establish a plant here at a cost of some \$200,000.

Saskatoon, Sask.

A site has been purchased by the Sawyer-Massey Company for the erection of an office and warehouse to cost \$30,000.

W. Sharp, representing the Imperial Oil Company, of Winnipeg, was recently in the town looking over ground for a warehouse.

The newly incorporated Wilson-Leslie Company, Limited, capitalized at \$500,000, will build a line of elevators and also a flour mill. Construction will be commenced as soon as practicable.

Springside, Sask.

It is understood that the Government are planning the installation of rural telephones in this locality.

Stratford, Ont.

All arrangements have been completed for the establishment in this city of a branch ladder factory by Boyer and Swartz, of Indiana.

An addition to cost at least \$15,000 is to be added to the Loretto Academy. Contracts have been let (see another column) and work will be started at the earliest possible date.

Sydney, C.B.

The recent explosion at the blast

furnaces which incapacitated seven men has drawn attention to the need of a hospital in this town and the Mayor has been urged to call a public meeting in connection with the matter.

St. John, N.B.

F. N. Brodie, architect, has completed plans for an addition to the brewery of the Simeon Jones Company.

Debentures of \$500,000 are to be issued for public improvements.

St. Johns, Que.

In a great blaze here last week the main buildings of the Standard Drain Pipe Company were completely destroyed. The loss is estimated at \$125,000.

Toronto, Ont.

Plans have been prepared by architect Gouinlock for a \$50,000 summer hotel to be erected on the shore at Lake of Bays, opposite Bigman's Island.

A recommendation has been submitted to the athletic directorate of the University asking for the construction of an artificial ice rink for next season.

The subject of a new gymnasium building for the University is receiving considerable attention and the Board of Governors have been asked to erect a more commodious structure at an early date.

A deputation of fruit growers recently waited upon the authorities at the City Hall for the purpose of urging the building of a new fruit market and as a result Commissioner Harris has been asked to prepare estimates. Bay-side Park is considered to afford the best site.

A new plant is to be opened in this city by the Canadian Concrete Machinery Company, who will enter the field to compete for building in artificial stone.

The chief engineer of the Colonial Engineering Company at Montreal, Mr. I. G. Reid, has offered to install a gas producer plant of 20,000 h.p. for \$2,875,000 and to light the city with arc lights at \$56 a light.

H. F. McNaughton, Secretary, Department of Public Works, wants tenders up to January 9th for rewiring the Parliament Buildings. Specifications at the Department.

Tenders for fire alarm boxes are invited by Mayor Coatsworth, chairman, Board of Control, up to January 21st. Specifications at office of Fire Department, Richmond street.

At a meeting of unattached medical practitioners held in the Temple Building last week an association was formed for the erection of a new hospital to be built by subscription and to cost

in the neighborhood of \$150,000. Various committees were appointed and the next meeting will be held early in January.

It is hoped to start work on the new central fire station early in the spring. An office building and store house will also be erected at a cost of \$35,000.

Recent building permits include: J. Russell, 3 pair semi-detached 2-storey brick dwellings, Smith street, \$12,000; H. Stevens, 2-storey and attic brick dwelling, MacDonald avenue, \$3,000; Stewart Dewar, 1 pair 2-storey semi-detached roughcast dwellings, Lappin avenue, \$2,200; S. Prest, 2-storey brick store and dwelling, Dundas street, \$2,600; James Sargent, 1 pair semi-detached 2-storey brick dwellings, Lappin avenue, \$3,000; Imperial Bank, alterations to bank, southeast corner Yonge and Queen streets, \$2,500; J. S. A. Wesley, 2-storey brick stable and storage shed, northwest corner and Sumach and Spruce streets, \$6,500; R. P. Powell, 2 pair semi-detached 2-storey brick dwellings, corner Bloor street and Manning avenue, \$8,000; Geo. Griffin, 2 1/2-storey brick dwelling, Grenville street, \$3,000; G. H. Weale & Son, 2-storey brick dwelling, Curzon street, \$4,000.

Truro, N.S.

Tenders are invited by Fred. Gelin, Secretary, Department of Public Works, Ottawa, up to January 7th for the installation of heating at the armory. Specifications may be seen on application to D. Henderson, clerk of works, this town, and at the Department.

Vancouver, B.C.

F. C. Gamble, Public Works Engineer, Victoria, will receive tenders up to December 31st for heating and ventilating the court house. Specifications at office of clerk of works, corner of Georgia and Howe streets.

A committee has been appointed to prepare plans for the enlargement of the Wesley Methodist church.

Layfield and Williams have been granted a permit for the building of the public market at \$26,450.

The Vancouver Gas Company are planning an important extension of their plant.

Robert Pidgeon, of the Pigeon Fertilizer Company, of Nova Scotia, was looking around the city last week with a view to the establishment of a local fertilizer plant.

The Park Drive Methodists have purchased a site on the north west corner of Venables and Victoria and will start building early in the spring.

By far the most notable building permit issued this year was that recent-

ly granted for a stone and concrete court house at a cost of \$500,000. Other permits just issued include: John Morley, frame dwelling, Fifth street, \$2,400; E. Faulkner, frame dwelling, Second street, \$1,500; J. E. Dadson, frame dwelling, Eleventh street, \$1,200; Robert Barker, frame dwelling, Seymour street, \$1,000; L. Gordon, frame dwelling, Third street, \$1,000; O. C. King, alterations, Eveleigh street, \$1,200; C. Manuel, framedwelling, Charles street, \$3,000; Pilkington Bros., brick storehouse, \$1,000; D. B. Carmichael, frame dwelling, Barnard street, \$1,600; F. Thordenbery, frame dwelling, Howe street, \$2,100; A. S. McMeekin, frame dwelling, Ontario street, \$1,600.

Victoria, B.C.

A permit has been taken out by the Bakeries Company, Limited, for buildings and stabling on William street to cost \$9,270. Brick and steel construction will be employed.

A new building will be erected to house the new creosoting plant and tenders will shortly be taken.

\$30,000 is to be expended upon building a new public school in this city.

Winnipeg, Man.

Many improvements were considered by the Parks Committee at their monthly meeting held last week. Plans were approved for an addition to the morgue at Brookside cemetery and for a water works system at the new suburban park. The water system is a most extensive improvement and includes the laying of a large amount of pipe, the erection of a 60-foot tower and tank, and the installation of a pumping station, pumps and inlet. J. D. Atchison's plans for a main building at the park were also examined and passed forward for approval.

The Board of Control have decided to take tenders for 200 six-inch and 25 eight-inch hydrants.

A. H. Sisson, representing the St. Louis Car Company, has been investigating the facilities and inducements offered by the city for the location of a large Canadian branch. Negotiations have also been opened with Fort William, but it is thought that a final selection will be made in this vicinity.

At the opening meeting of the new Imperial Theatre Company the directors approved the plans of architect Bristow and tenders for the material and construction will shortly be taken. Work will commence at the first sign of spring.

Tenders are invited by Wardell and Nichols, architects, up to January 15th for all trades in the construction of a building corner of Portage avenue

and Carlton street for the Ontario-Manitoba and Western Land Company.

Wolfville, N.S.

Energetic measures are being taken by the governors of Arcadia College for the purpose of raising the necessary \$22,000 in order to obtain the Rockefeller grant and the Carnegie science building.

CONTRACTS AWARDED.

Calgary, Alta.

The Calgary Power and Transmission Company have secured the contract for supplying the city with power for the next five years at the rate of \$30 per h.p. per day.

Fort William, Ont.

The C.P.R. have awarded the contract for the rebuilding of their elevator to the well known firm of Barnett & McQueen. It is understood that the figure approximates \$600,000.

Neepawa, Man.

The contract for the new post office has been let to Fusee, McFeeters and Company at \$28,000.

New Westminster, B. C.

The addition to the B. C. Packers' plant has been let to contractor Cassidy at \$40,000.

Stratford, Ont.

James Russell, the architect for the proposed \$15,000 addition to the Loretto Academy, has let the following contracts:—brick, stone and carpentry, J. L. Young; plastering, L. Hassel; painting, J. A. O'Hare; plumbing and heating, Peter & Sylvester; wiring, Wm. Bennington.

Toronto, Ont.

Denison & Stephenson, architects, have awarded the plumbing contract for the new James' warehouse corner of Church and Colborne to Maxwell and Johnson at \$707.

FIRES.

Dominion Radiator Company's building, Montreal, Que.; loss \$15,000.

Flax mill of H. Fraleigh, Forest, Ont., loss \$4,000.

Roman Catholic Convent, Lafontaine, Ont., building damaged and roof destroyed; loss not ascertained.

Buildings of Standard Drain Pipe Company, St. John, Que.; loss \$125,000.

Factory of Montreal Suspender and Umbrella Company, Arnprior, Ont.; loss \$50,000.

Transformers and electric apparatus at the Cataract Company's sub-station at Irondale, Ont.; loss \$10,000.

NEW COMPANIES.

Lymburner Limited, Montreal, P.Q., incorporated as engineers and manufacturers of machinery, capital \$75,000. Incorporators, L. M. Lymburner, H. N. Lymburner, Joseph Rivet and J. A. Boisvert, all of Montreal.

Utica Shale Pipe Company, Limited, St. Lambert, P.Q., incorporated, capital \$20,000. Incorporators, W. K. Lowden, of St. Lambert, Que., and James Rodger, D. G. Wardrope, W. M. Laurie and Philip Pare, all of Montreal.

Lewis and Smith, Limited, Toronto, Ont., incorporated as general and electrical engineers and contractors, capital \$100,000. Incorporators, H. Lewis, H. W. Wilcox, Charles M. Doolittle, T. C. Haslett and A. L. Scott, all of Hamilton, Ont.

Belleville Iron and Horseshoe Company, Limited, Belleville, Que., incorporated, capital \$10,000. Incorporators, W. M. Laurie, J. A. Hebert and Philip Pare, of Montreal, and others.

Carriere Bros. Company, Limited, Hochelaga, Que., incorporated as lumber manufacturers, capital \$150,000. Incorporators, L. A. Carriere, F. Carriere, M. Benoit, W. Levert, F. Dufresne, all of St. Louis, and others.

Nova Scotia Cement and Plaster Company, Limited, Toronto, Ont., incorporated, capital \$100,000. Incorporators, J. S. Lovell, W. Bain, Robert Gowans and Henry Chambers, all of Toronto.

Carter, Stevens Lumber Company, Limited, Toronto, Ont., incorporated, capital \$40,000. Incorporators, J. B. Bartram, Frederick Rielly, R. Eustace and V. V. Stevens, all of Toronto, Ont.

Fort Alexander Lumber and Manufacturing Company, Limited, Winnipeg, Man., incorporated, capital \$100,000. Directors, H. F. Tisdale, of Flaxton, N. D.; John Suggett and F. L. Palmer, of Minneapolis.

Provincial Land and Real Estate Company, Limited, Montreal, Que., incorporated, capital \$49,500. Incorporators, J. A. Delorme, O. J. Duquette and Ernest Gravel, all of Montreal.

BUSINESS NOTES.

According to a Montreal report the International Steel Company of Canada have gone into liquidation. The liabilities are about \$30,000.

Notice is given that the capital stock of the Page Hersey Iron Tube and Lead Company, Limited, has been increased from two millions to \$3,500,000.

C. M. Cutts and Company, hardware merchants, Toronto Junction have assigned; creditors meet December 31st.

PREPARING WOODWORK FOR FINISHING.

This is a subject worthy the careful consideration of every woodworker, as eventually a large percentage of lumber, after manufacture into some one of its manifold products, must receive some kind of finish. It behooves the machine woodworker, then, to produce smooth work, whether for paint or varnished finish.

At the outset then, planer or moulder knives must be kept in good working trim. By this is meant well-ground and whetted to a keen edge. This edge may be ever so sharp, but will not keep so unless it has the right temper. Soft metal in woodworking knives makes a poor tool, and the result is a poor product. For work that is worth while, there should be good tempered steel cutting edges.

To obtain this hardness, experience is necessary. Every man working in wood should become familiar with this requirement, and it is obtained only through daily contact and acquaintance. Planer and similar knives having steel edges laid on iron backs should not be tampered with by any but the expert in this line; they require special appliances and experienced hardening. For this purpose a forge, a pair of tongs, an open can of oil, and a piece of sandstone, or some other abrasive, are needed — and possibly a piece of iron to help draw the temper.

Having ground and filed the knife to proper shape, it should be evenly heated on the cutting edge to a bright cherry red. Be careful not to heat too much of a moulder bit, or it will become brittle and snap off like glass. When at proper heat, lift out of the fire with the tongs and dip into the oil, moving it quickly to and fro for about half a minute, then clean off the burnt oil an oxidized metal from shiny surface. Now watch closely this the face side quickly, so that it has a smooth place. Ordinarily there will be enough latent heat in the knife to draw out the now extremely brittle temper, to a medium hardness that will stand the work for which it is intended. When the surface of the knife is turning from a straw color to light blue, immerse it in the oil

and keep it submerged until cool enough to handle with the bare hands. Should there be enough heat in the knife after tempering, heat a piece of iron plate or other convenient piece of metal, and lay the knife on this hot surface until it has become hot and the temper has drawn out, as indicated above. If you have done your work well, a file will not touch the edges of your knife, and you will need the emery wheel and oil stone to keep the edge sharp. Knives thus prepared make smooth work without fuzz or rough, torn-out places. Never try to make finished woodwork from green or wet lumber; the result will be far from satisfactory, even though you should succeed in making something that looks like what the order requires.

Beyond this process there are several ways of preparing this work for receiving the finished coat. Hand sandpapering is the oldest and probably most used method of smoothing moulding, although there have been many trials of machines for this purpose. The one that seems best adapted to this, has revolving brushes faced up with slitted sandpaper, and a system of feed rolls. Flat surfaces intended for varnishing should be sanded the way of the grain of the wood. This may be done on a sander having one or more revolving drums, or on a continuous sand belt. It is possible to smooth work for varnishing on a revolving disc elbow sander, but it requires patience, the careful use of fine touching the surface of the wood lightly, to avoid deep scratches crosswise the wood.

Just a word about the proper care of this polished wood. Of course trim should be bundled with face side always turned inward, and some kind of protection under the binding twine. Used sandpaper, cut into strips and laid under the bands, is a cheap and effective protection. In bundling moulding or other millwork, care should be exercised to have the backs of the work outward. If goods are to be shipped by freight, especially local freight, too much care can not be used. Thin packing strips should be used on all moulded edges of base and trim or crates should be made to con-

tain the articles. A pleased patron will insure continued business, and neat, clean, perfect material, next to prompt keeping of promise, goes far towards procuring both.—The Wood-

SKYSCRAPER WITHSTANDS SEVERE TEST.

To what extent concrete construction has withstood the severest tests made by engineers and builders is clearly shown in the experiments made a few days ago, in the Ideal Building now under construction in Denver for the Dome Investment Company, says "Concrete Construction." All the stresses and strains that could be inflicted upon the building failed to make even the slightest impression in the way of causing any damage to the structure, and it was the general impression of prominent engineers who saw the tests that the building stands a monument to the superiority of the concrete form of building construction.

A slab of the first floor, five inches thick, was loaded with a tremendous weight of 65,000 pounds. Immediately beneath, in the basement, an intense fire was built and the temperature of the slab raised to 1,800 degrees Fahrenheit. After an hour and a quarter of this treatment the slab was suddenly cooled by water to 50 degrees Fahrenheit. It showed absolutely no crack or other effect. Under the weight the floor showed a deflection of only three one-hundredths of an inch.

The Ideal building is the first in Denver to be built entirely of reinforced concrete, all the supports, columns, stairways and walls being constructed entirely of this material. The building laws of the various cities are very stringent and explicit in their treatment of reinforced concrete buildings, and the tests to be applied, and Denver's new building code is recognized as being one of the best in the country.

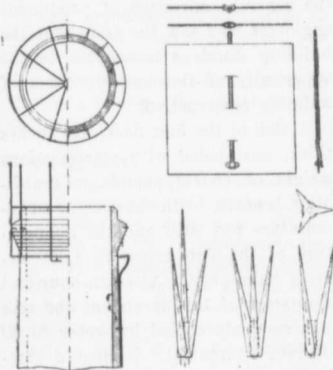
The tests of the concrete floor slab of the first floor were conducted in strict accordance with the code and under the personal supervision of Building Inspector R. V. Willison and his assistants, Messrs. McPhee

(Concluded on page 27)

Lightning Conductors for High Chimneys

In the last issue of the "Journal of the American Society of Naval Engineers," Dr. N. Monroe Hopkins, electrical engineer for consolidated power plants in the Navy Department, gives an account of some interesting experiments made to determine the behaviour and effect of high-frequency discharges upon a model chimney. The "Electrical World" of New York gives the following particulars of the experiments:

A Tesla oscillator was used capable of striking through an air gap of 4 feet, and it was estimated that the model chimney and its conductors were subjected to electrical discharges



UNITED STATES NAVY DEPARTMENT,
DETAILS OF LIGHTNING CONDUCTORS.

at a voltage of 1,800,000 and a frequency of 200,000 oscillations per second. The results of the experiments appeared to show that a high chimney could be adequately protected from damage by lightning by the use of several conductors from the top equally spaced, and the employment of a copper spider on the top of the chimney connected to these conductors. The object of the spider is to prevent a stroke following a current of hot air into the chimney. The practical conclusions from the experiments follow, those relating specifically to chimneys being in the form of specifications, which have been officially approved for the installation of lightning conductors on the brick power plant chimneys of the navy. The accompanying illustrations, Fig.

1, represent the top of the chimney, showing spider, and an earth plate and coat points.

For the complete protection of a central power plant, its roof and trusses, together with all other masses of metal without and within the building, should be metallicly connected with chimney conductors as well as to conductors running along the top of all roofing and other prominent parts of the building. Sharp points should be placed at close intervals somewhat analogous to the protection afforded by the barbed wire netting used in Europe about the buildings of dynamite factories. As the architecture of the building must necessarily dictate the precise arrangement of conductors, the specifications given below pertain only to the protection of the chimney, which, if properly provided for, because of its towering height, affords also good protection for the building.

Chimney Protection for Power Plants.—Lightning conductors shall be laid up in the form of a seven-strand cable, and each strand laid up with seven copper wires of No. 10 B. & S. gauge. For chimneys of 50 feet and less in height, two lightning conductors shall be used. For chimneys over 50 feet up to and including 100 feet, three conductors shall be installed. For chimneys higher than 100 feet, four conductors shall be installed. All heights to be considered from ground level. All conductors or cables shall be symmetrically arranged about the chimney with one cable on the prevailing weather side of the chimney. Said lightning conductors or cables to be securely attached both mechanically and electrically to independent pure copper earth plates or bars. In cases where the chimney foundations have already been filled in, instead of earth plates, earth terminals may be used, composed of pure copper bars 3 inches by 1-2 inch by 3 feet. In all cases the lightning conductor terminals shall extend to the ground water level, and in no case shall they extend less than 15 feet from the ground surface. Earth

plates shall consist of pure copper 3 feet by 3 feet by 1-8 inch.

Application of Conductors to Chimney.—Each lightning conductor shall be secured to the exterior of the chimney by means of bronze or brass anchors, without the intervention of any insulators or insulating material whatever. The brackets for attaching the ring or conductors to chimneys to be of high grade bronze or brass, and to be fitted with approved clamps for securely gripping said conductors and making good electrical connection therewith. The tongues or shanks of the anchors or brackets shall enter the masonry of the chimney a distance of at least 6 inches, and shall be at least 1-8 inch in thickness by 1 inch wide, terminating in a suitable head or angle, to prevent the anchor from being pulled out of the masonry. Anchors to be attached to conductors at intervals of not over 10 feet, and sweated to the conductors with solder at intervals of 50 feet. Conductors to terminate within 5 feet of the top of the chimney, and to be connected through the agency of suitable brass or bronze fitting and soldered to a 1 1-2 inch ring of copper attached to the periphery of the chimney by brackets spaced not over 2 feet apart; said brackets to enter the brickwork a distance of at least 6 inches and to be of approved design, with a tongue at least 1 1-2 inches in width and 1-4 inch in thickness, with a suitable angle or head to prevent pulling out. All joints in the said copper ring, as well as between the ring and conductor or conductors running down to the ground bars or plates, and including the latter, to be scraped bright, and, after making a secure mechanical joint, to be "sweated with solder." Said solder shall consist of one-half lead and one-half tin. All joints when finished shall be thoroughly washed off with water to remove every trace of soldering salts, acids or other compounds used. All joints secured by bolts or screws to be locknitted. In applying conductors where the chimney is already constructed, holes shall be drilled in the brickwork and said anchor brackets and anchors grouted in, the best Portland cement being used.

Terminal Rods for Lightning Conductors.—The copper ring shall be connected through the agency of clamps, insuring a good mechanical and electrical joint, with vertically-arranged copper rods, at least 3-4 inch diameter and 10 feet in length, the joints to be sweated with solder as before described. The copper rods to be placed equidistant around this ring, and supported in a rigid position vertically through the agency of additional anchors set in the masonry and a copper spider resting on chimney top. Rods to be arranged with a uniform spacing of practically 4 feet. This is taken to mean, for example, that 10 such vertical rods shall be provided for a chimney of 12 feet outside diameter of chimney at top.

Discharge Points.—Each rod shall terminate in a 2 point aigrette, each spur or point of this aigrette to be at least 3 3-4 inches long, the bases of which spurs shall be at least 3-8 inch in diameter, tapering to a sharp and well finished point; said aigrette to be provided with approved means to secure a strong mechanical and electrical joint with the vertical rods to which it is attached. The joints shall be sweated with solder.

Chimney Base Protection — All lightning conductors shall be enclosed at bottom with a heavy galvanized iron pipe of 1 1-2 inches diameter, and extending 3 feet into the soil and 10 feet above. Said iron pipe to be provided with approved brackets to securely hold it to the chimney, the brackets not to be over 3 feet apart.

ERECTING A FLAGPOLE.

The 45 storey Singer building, New York, represents the supreme test of the builder's art so far as skeleton construction is concerned. Before the lofty tower was reared to its present eminence, the trials and problems of the builder were many, and the crowning feature of the achievement, viz., the placing of the 90 foot steel flagpole which surmounts the dome, gave not a little trouble to the contractors before its base was safely in position at the 43rd storey.

Composed of hollow steel tubing, the pole is imbedded for 30 feet of its length in a specially constructed steel pocket, extending from the 43rd floor to the top of the tower. The portion extending beyond the tower is 60 feet, or two-thirds of its total length.

At the 43rd storey is a 10 foot length of steel tubing, its dimensions 9 3-4 inches by 10 3-4 inches outside. This is fitted at the wrought bottom into a steel shoe 18 inches square. This portion of the pole projects through the 44th floor, and is screw-jointed into a 20 foot length of smaller piping, thus bringing the socket of the pole three inches outside of the outlet ring which forms the highest part of the dome or lantern surmounting the main structure. At this point the slip-joint occurs, telescoping 9 3-4 inches outside by 8 3-4 inches inside into the 10 inch socket for a distance of 2 feet 6 inches. From there above the pole is in five sections, 60 feet over all, and tapers from the 9 3-4 inches before mentioned to an ultimate 5 5-8

inches. The four joints are accomplished by shrinking the larger over the smaller size piping for a distance of about 20 inches. In addition, each joint is tapped and bolted. At the top, the pole is closed by means of a ball-bearing truck mounted on a cast iron reducing coupling into which the king-pin is screwed.

The body of the cast iron truck containing the 2 inch by 4 3-4 inch bronze sheaves revolves about the king-pin on two steel ball-bearings to provide against the flag wrapping itself about the mast. The body of the truck is surmounted by a 3-4 inch galvanized iron rod, 3 feet long, to the top of which is attached a 12 inch copper ball. The total weight of the pole is approximately 3 tons or 6,300 pounds.

A difficulty confronted the contractors in turning over to the owners a steel flagpole, in position which they could guarantee as exempt from the effects of rust and corrosion. While ordinarily it would be an easy matter to paint a steel pole before placing it in position, this could not be safely done in the instance of the Singer building.

To obtain safety: First, the pole must be covered with a protective coating after being placed in position; second, the effectiveness of the material chosen as a resistant to atmospheric conditions of all sorts must be absolutely dependable. The first requirement was not easily met since the ordinary steeple jack was found to be disinclined to accept a commis-

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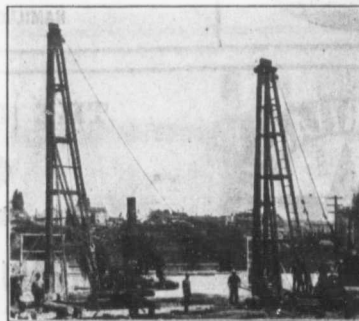
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sion involving such danger as painting a flagpole 60 feet high, 612 feet above the ground. Ultimately, E. Capelle, of New York, a steeple climber of much experience, was found willing to undertake the work. For a material which would meet the requirements mentioned above, Voltax, an anti-corrosive compound made by the Electrica Cable Company, of New York, was chosen.

In performing the feat of applying the compound, Mr. Capelle had a most interesting experience, and his statement of the conditions which obtained are of more than passing value. He states that the wind velocity at such a height ranges from 10 to 40 miles an hour at times when lower air currents show no appreciable velocity. With a stiff breeze blowing below 40 to 80 miles an hour may be registered above. In the latter case, the top of the steel pole sways in a radius of about 1 foot. This movement, contrary to general impression, is an indication of strength. If the tensile strength of either a steeple or a flagpole does not admit of a certain flexibility, high wind pressure is a dangerous factor.

LIGHT PAINT FOR MACHINERY, OR AN AMBITIOUS PROJECT.

There is a very marked tendency at the present time on the part of manufacturers of machinery to make a departure from the use of black or dark paint in finishing their product. It has been the custom for a long time to cover the heavier parts of machinery of all kinds with paint or enamel of sombre hue and the only variation which seemed permissible was an occasional striping of gilt of some bright color. During recent years a revolution has been going on in the matter of the construction and design of workshops and with it has come the demand for machinery painted some bright color. Not infrequently there is a demand for white, while light gray, buff and cream color are favorites. The recommendation for this change is that the machine shop presents a much more attractive appearance and that the light surfaces of the machinery are responsible for the reflection of a great deal of light, while the black absorbs the rays.—Scientific American.

The Government has approved of a system of county highways for the Counties of Prince Edward and Frontenac, consisting of about one hundred miles for Prince Edward, which will cost \$100,000, and sixty miles in Frontenac, to cost \$40,000. The Government will pay one-third of the cost of the work, which will be commenced in the spring.

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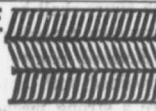
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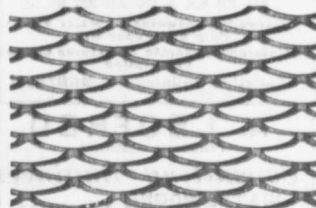
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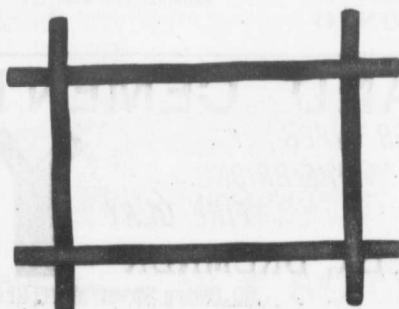
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**DOMINION GOVERNMENT ESTI-
MATES FOR 1908-9.**

(Continued from Page 14.)

Marie Wharf, dredging approaches,
\$30,000; Severn River, improvements
of waterway at McDonald's Chute
No. 1, \$1,000; Southampton, repairs
to Chantry Island breakwater, \$3,-
500; Southampton, extension of and
repairs to town dock, \$10,000; South
Nation River, improvements of water-
way, including dredging, \$1,800; To-
ronto Harbor improvements, \$120,-
000; Victoria Harbor improvements,
\$75,000; White Cloud Island Wharf,
\$1,000; Warton Breakwater Pier, re-
construction of superstructure, dredg-
ing, etc., \$1,000; Winnipeg River, im-
provements, \$10,000;

Manitoba.—Grand Marais Harbor
(Lake Winnipeg), improvements of
entrance, \$1,500; harbors, rivers and
bridges, general repairs and improve-
ments, \$6,000; Lake Dauphin, lower-
ing lake by removing obstruction from
bed of Mossy River, \$7,000; Red
River, improvements at mouth, \$10,-
000; Winnipegosis Lake, dredging
channel at mouth of Mossy River, \$5,-
000.

Saskatchewan and Alberta. — Last
Mountain Lake, improvements of nav-
igable route, \$13,000; Lesser Slave
Lake, urgent provisional improve-
ments, \$10,000; Old Man's River, di-
version of stream into its original bed
at McLeod, \$8,000.

British Columbia.—Clayoquot, west
coast of Vancouver Island, wharf, \$2,-
000; Columbia River, improvements,
\$36,500; Coquitlam, removal of ob-
structions, \$1,000; Courtney River,
improvements, \$1,500; Fraser River,
improvements of ship channel and
protection works, \$30,000; harbors,
rivers, and bridges, general repairs
and improvements, \$5,000; Kootenay
River, removal of boulders from chan-
nel at Procter, \$2,500; Nanaimo Har-
bor, improvement of north channel,
\$2,500; Salmon Arm, Shuswap Lake,
wharf, \$2,000; Skeena River, im-
provements, \$12,000; Thompson
River, removal of sand and gravel
bars, \$8,000; Victoria Harbor, dredg-
ing and removal of rocks, etc., \$50,-
000; Williams Head Quarantine Sta-
tion, improvements, \$10,000.

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SKYSCRAPER WITHSTANDS SEVERE TEST.

(Continued from page 21)

and Stuart. They were assisted by Alexander Simpson, Jr., superintendent of construction; F. C. Carstarphen, engineer of construction of the Whitney-Stein company, which has the contract for the building, and Messrs. Fallis & Stein, architects.

The floor was first loaded for the deflection test. A panel 11 feet by 7 feet 6 inches and designed to carry a normal live load of 120 pounds to the square foot, was chosen. This slab is five inches thick, reinforced by Johnson corrugated steel bars and having an ultimate breaking strength of 60,000 pounds. The slab was weighted to twice its normal load and supported in all over 65,000 pounds. This weight can be conceived when one draws the comparison that it would take a stack of ordinary magazines 1,350 feet high to balance it. This height is more than twice that of the Metropolitan Life Building of New York, one of the tallest in the country.

When the floor was thoroughly loaded a fire was built under it and the slab heated to a temperature of 1,800 degrees Fahrenheit, and maintained for an hour. This fire was more intense than could possibly occur in the use of the building.

When the slab had been subjected to this intense heat for an hour and a quarter the fire hose was turned on the slab and it was cooled immediately. The shock of cooling a heated body from 1,800 degrees Fahrenheit to 50 degrees in the presence of steam is most severe.

A searching examination of the floor slab after all these tests, failed to show a sign of failure or inherent weakness. It was entirely satisfactory. This is but one of a number of exhaustive tests which will be carried out on the various floors of this building.

A stock company has been organized and a factory for the manufacturing of glass poles has been built at Grossalmerode, a town in Germany. The glass mass of which the poles are made is strengthened by interlacing and intertwining with strong wire threads.

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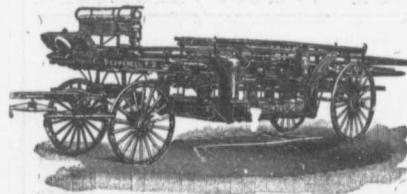
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In hot water heating systems it is customary to take practically all of the branches from the top or at an angle from near the top of the mains.

This is poor practice and shows lack of appreciation of the scientific principles upon which hot water heating depends for its efficiency. Fluids of different temperatures, contained in the same vessels, invariably arrange themselves in strata, so that the hottest are on top. In accordance with this theory, the first openings on a main will draw off the greater portion of the hot water, while the colder water will be left to find its way to the most remote radiator, suffering more or less loss of heat by radiation all the way, and reaching its destination in poor condition for the fulfilment of the desired purpose.

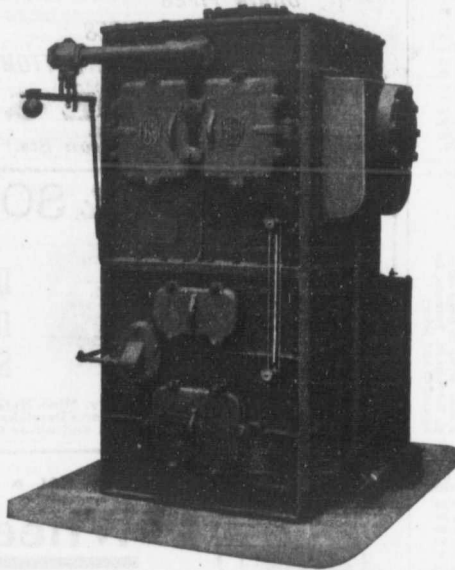
If for any good and sufficient reason this method is persisted in, the mains should be run one or two sizes larger than necessary to ensure equitable distribution of the hot water to all the radiators in the system and, in particular, to ensure the supply of a fair share of the hot water to the radiators furthest from the generator. If this is intelligently done, the water in the flow main will not enter the branch until it is heated down in the main to a point level with the outlet or side of the tee. The returns from the various radiators, that come back by way of the main return, should enter the main at the side, below the hottest returning water, which will obviate a tendency the latter often develops to back up into the return branches and retard their flow, checking the circulation and in some cases completely cutting out the radiators at the end of the line.

By taking the branches from the side of the mains quite a different result is obtained. Before the water has been heated deep enough to enter the first branch, it will have traveled quite a distance up the main. As the water heats deeper, it will travel on and in turn enter the successive branches; the hottest water, however, which is at the top of the body of water flowing through the mains, will pass on to the last branch or remotest radiator from the boiler, thus ensuring the most thorough and economical utilization of the hot water supply.

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Utilize Waste Steam to
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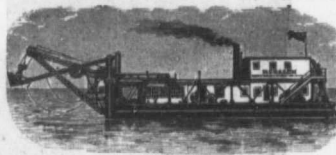
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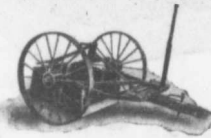
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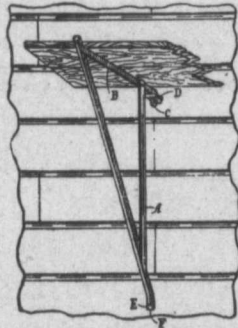
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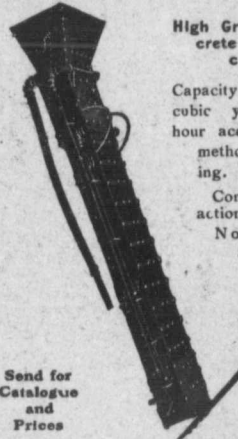
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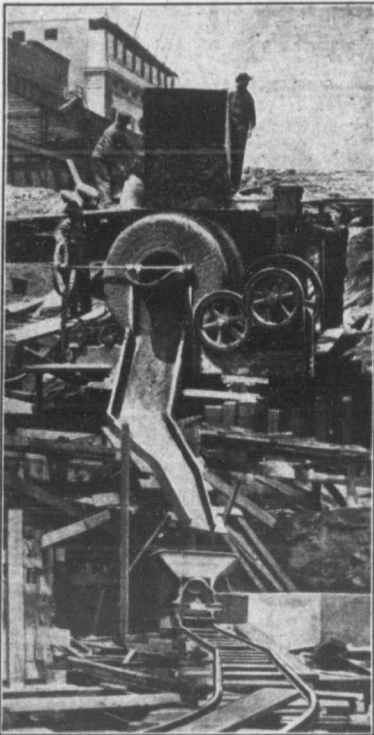
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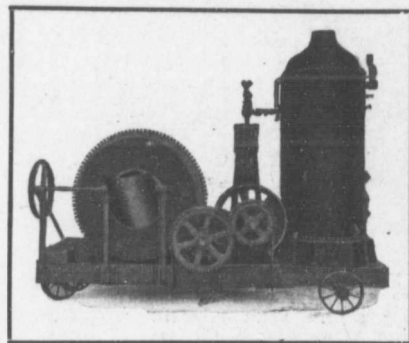
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