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Reinforced Concrete Bridges

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ONE DOLLAR A YEAR

Published Monthly by
The Monetary Times Printing Co.
62 Church St., Toronto, Ont. Limited

TEN CENTS A COPY

Reinforced Concrete Bridges

The Lyndhurst reinforced concrete bridge, St. Thomas, Ont., shown herewith, has a clear span of 116 feet, and is said to be the longest span of its kind in Canada. The bridge is 22 feet wide. It has a 16-foot roadway and a 4-foot sidewalk, and, including rail, floor, etc., contains about 1,470 cubic yards of concrete.

A 50-foot Arch Bridge at Buttonville, Ont., built at a cost of $2,400.

The intrados of the arch is a three-centred circle, having radii of 4 feet, 30 feet and 162 feet. The extrados is a segment of a circle with a radius of 323 feet. The intrados at the crown was 30 feet 6 inches above the footing, the arch having a rise of 18 feet, being 2 feet thick at the crown and 3 feet thick at a point 24 feet out from the crown. The arch was filled in at each end with creek gravel, well packed and rammed before the floor was laid.

Lyndhurst Arch Bridge, St. Thomas, Ont.

The abutments rested on hard pan, and the footings were 4 feet below the bed of the creek. The concrete in the abutments is composed of one part cement and nine

parts gravel. In this part of the work large stones were embedded in the concrete. These stones were separated enough to be each completely surrounded by concrete, and not nearer the face of the work than 3 inches. The concrete in the arch, spandrel walls, wings, etc., was composed of a mixture of one part cement, two parts sand and four parts screened gravel and crushed stone. The spandrel walls were battered on the inside from 4 feet thick at the ends to a foot thick just below the level of

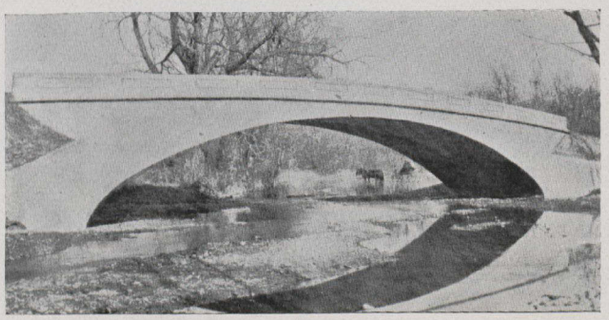
Concrete Bridge near Hornby, Ont., of 30-foot span. The bridge floor is reinforced with four 12-inch "I" beams 30 feet long. Net cost less than $900.

the floor. The wing walls were 12 feet long and 1 foot thick. They were supported by two counterfort walls running back to the abutment and sloping up to within 2 feet of the top of the wing walls. The tops of the wings and the base of the railing were finished off with a mortar facing 1 inch thick, composed of one part cement and two parts sand. The Kahn system of reinforcing was used throughout.

The concrete girder bridge at Mapleton, Ont., shown herewith, has a forty-foot span clear between abutments. The foundations of abutments extend 3 feet

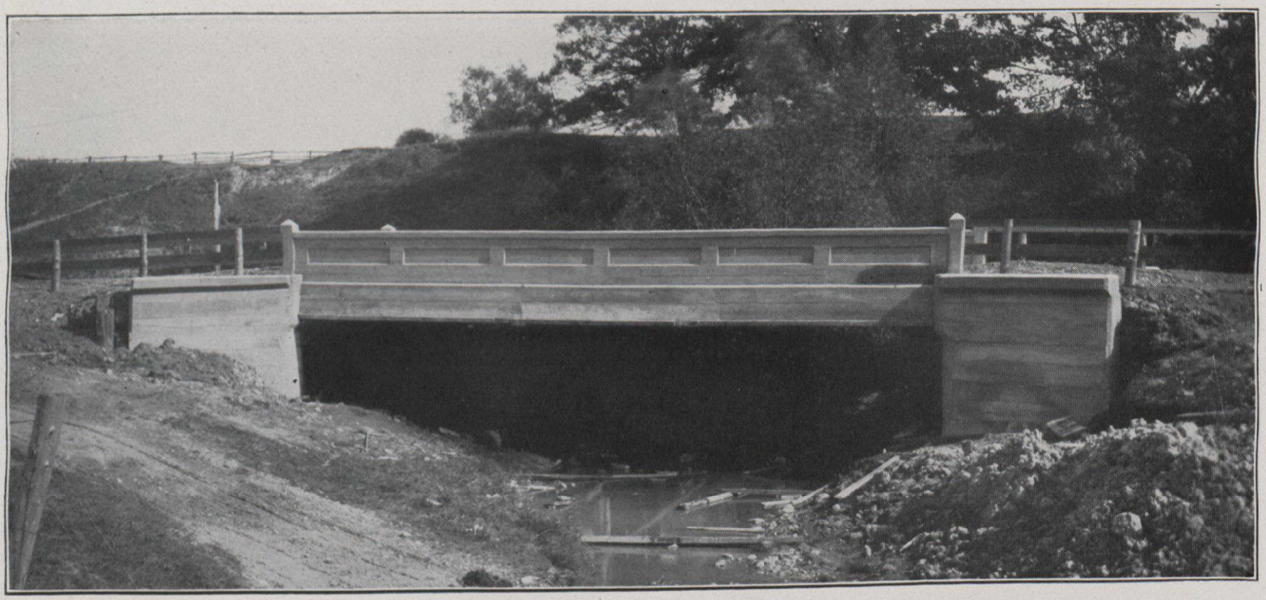
An Artistic Bridge Design, Indiana—36-foot Span.

below the bottom of the creek, and are on hard pan. The abutments and wings are built up with a mixture of one part of Portland cement to seven parts of creek



An 80-foot Span at Rockville, Indiana.

gravel and sand. The beams, floor and railing are in the proportion of one of cement to two of broken stone and



A 40-foot Beam Span, Mapleton, Ont.

The contract price of the bridge, exclusive of the steel, was $9,399. The steel was supplied by the city of St. Thomas, about 18¼ tons being used, costing $1,453. The bridge was designed by Jas. A. Bell, city engineer, St. Thomas, and Mr. A. Gillies was inspector-in-charge.

four of sand; the floor surface, one of cement, two of sand and one of broken stone.

The total cost, including building of railing for one hundred feet on each end and filling in of approaches was $1,458. The engineer was J. A. Bell, St. Thomas, Ont.; contractor, J. W. Chivers, Belmont, Ont.

Cement Siding Construction

C. W. NOBLE*

While reinforced concrete construction has made marked progress when used as floors, beams, columns and footings, it has advanced very little in competition with ordinary types of brick and wood outside walls. The reason for this seems to be due to the fact that the cost of form work for walls is very much higher than form work for structural members which will lie horizontally, and the use of brick is so eminently satisfactory that the desire for a substitute is evidently not felt.

Another reason lies in the difficulty of putting up a concrete wall and getting the structure absolutely plumb and free from wind. The blotchy and discolored appearance of a concrete wall also makes it very unpopular when compared with the neat and uniform appearance of brick work.

There is, however, a type of outside wall construction in cement recently evolved in the States and receiving considerable notice in Canada. It consists of the use of herringbone lath attached to studs, either of wood or metal, and plastered with Portland cement plaster. The appearance resulting from this construction is not blotchy, the effect being very similar to that of a building covered with galvanized sheet iron. The walls are also free from wind, and the general appearance is good.

The construction is built in one of four ways: First, the studs may be of wood, the lath being attached to one side only and plastered on the outside and on the inside between the studs. This last coat, of course, is applied on the clinch of the first coat, and aids materially in stiffening the building. It is omitted in some cases. The studs in this construction are capped by a plate, which binds the walls together and serves as a sill for the roof rafters. The wall is, therefore, a carrying wall.

The second type consists of the application of a layer of herringbone lath to the inside of the studs after the construction has just been completed as described for the first type. This interior coating of lath is plastered on the inside, but cannot be plastered between the studs.

The third type consists of the use of metal studs instead of wood, with one layer of lath on the outside as before. In this case the studs are usually very small, not exceeding ¾ of an inch in depth, and the plaster coats are more numerous, building the entire wall up to perhaps 1¾ inches in thickness. The wall will not carry loads, and consequently must be sustained on a framework, consisting as a rule of wood or steel girts running horizontally and spaced about ten feet apart, and sustained in their turn by columns, which also support the roof trusses.

Still another modification is made by the use of two or three inch metal studs instead of ¾-inch studs just mentioned. These deeper studs are lathed and plastered on both sides, and as a result an air space is obtained. The field for this type also is limited to positions where the wall is carried by the columns rather than intended to sustain any load.

Probably one of the oldest instances of the first-mentioned type of cement siding construction, that is, the one in which herringbone lath is attached to one side only of wood studs, exists in the plant of the United Zinc and Chemical Co., Argentine, Kansas. This company manufactures sulphuric acid as a by-product of the smelting of zinc and lead ores. The fumes resulting from this manufacture are so noxious that all vegetation in the immediate neighborhood is frequently destroyed.

Bonner Springs Portland Cement Co., Kansas City, of cement siding construction.

The structural materials which may be used in such a plant are limited. The slightest portion of lime in a brick will expand under the action of the acid fumes and crack the wall. Structural steel is very seriously attacked, and if used at all must be protected by a very expensive coating, consisting mainly of oxide of lead. Galvanized iron has practically no life. Wood loses a portion of its strength, but not its entire value, but Portland cement is not affected. As a result of these difficulties the first buildings constructed were entirely of wood, except one where the first risk was unusually great, and here the first described type of cement siding was used.

* Structural Engineer, Toronto, Ont.

About three years ago this winter this plant of the United Zinc and Chemical Co. took fire and was entirely destroyed with the exception of the cement siding building and one or two smaller structures which were not in the same group with the rest of the buildings, and consequently not exposed to the flames. The cement building had at this time been up fifteen years, and had shown a remarkable record. During this time it had been exposed to the worst possible conditions, and had shown no signs of deterioration. It had withstood a fire which destroyed its neighbors on three sides. Its cost was very slightly, if any, more than the cost of the wood buildings which had been burned.

The directors of the United Zinc and Chemical Co., therefore, decided that cement siding construction was what they wanted in their future buildings, and the entire plant was rebuilt in this way. In reconstruction, however, they decided to use even better buildings than the one which had stood the test, and consequently built with metal studs lathed on both sides and supported on heavy timber girts and columns.

The Canadian Northern Railway some five years ago erected in Winnipeg a roundhouse according to the second method described; that is, with a double layer of metal lath and plaster on wood studs, giving an air space, which is very desirable in that climate. Unfortunately for the construction the amount of lime to be used in plastering was not carefully watched.

The first coat might be described as a lime plaster somewhat tempered with cement, and the succeeding coats were cement plaster. The bond between lime and cement is not a perfect one, and as a consequence the Winnipeg roundhouse is now badly disintegrating under the action of the frost.

That this result is not necessary is proven by the numerous instances of similar construction in the United States. The climate in Winnipeg is not a severe one in its result on buildings. Once frozen, there is no further tendency to disintegration in a wall, but every time it thaws and freezes the frost crystals attempt to get in their work. In Winnipeg a wall will freeze and thaw probably not more than ten times through the course of a winter.

In Kansas and Missouri, while there are many instances of this construction being used successfully, a wall freezes and thaws twice a day all winter, easily six or eight times as often as it does in Winnipeg. The fact that these structures stand in that climate is due to the fact that they do not attempt to make any appreciable difference in the composition of their first and succeeding plaster coats.

This Winnipeg roundhouse is a good illustration of the weatherproof qualities of cement siding. At the same time that it was built the Canadian Pacific Railway built in Winnipeg a roundhouse, using 13-inch solid brick walls. Both buildings are almost exactly alike, being very similar in size, and both constructed according to the standard roundhouse details. Both of these are heated by a fan system, which was installed by the same heating company, according to their own details, and with their guarantee as to the results. Presumably the heating system was alike in both cases.

A roundhouse is very hard to heat. The doors are frequently opened to permit of the passage of engines, and steam from locomotives and cinders is constantly exhausting into the atmosphere. As a result, unless the building is kept warm, the air inside is an impenetrable fog all winter.

During the very severe winter two years ago the Canadian Pacific roundhouse was found almost uninhabitable. It was impossible to keep it warm, and frost collected from 2½ to 3 inches thick on the inside of the brick walls.

Concrete Viaduct, built by the City of Toronto, for carrying sewer pipe over Sunnyside Avenue Ravine.

The Canadian Northern roundhouse, on the contrary, had no frost on the walls. Some difficulty regarding the fog was experienced and the walls dripped constantly, but only froze in the immediate neighborhood of the doors.

Under the terms of their guarantee the Canadian Pacific compelled the heating company to install a larger heating apparatus, but the Canadian Northern expressed themselves as satisfied. This gives a comparison between the weatherproof qualities of 13 inches of brick and of cement siding when constructed with an air space, which, it might be added, is much the cheaper construction of the two.

The types consisting of metal lath and metal studs is generally used when a steel frame building is constructed, and is, therefore, more often substituted for corrugated iron rather than for brick. The girts are spaced ten feet on centres, and the studs are lathed only on one side and plastered on alternate sides until the total builds up to 1¾ inches of thickness. This type of construction is used in many instances in the States as a covering for Portland cement plants.

In some cases the inside plaster coats are omitted, and the resulting wall is then only from ⅝ to ¾-inch

thick. This saves money, and may or may not be justifiable, according to the use of the building. The succeeding coats may be applied later if desired.

The hollow type, with metal studs, having two layers of metal lath, is used wherever warmth is desired. The weatherproof qualities as compared with brick are fully as good as when constructed of wood. Whenever constructed with a steel or wood frame there is considerable saving as compared with brick in the cost of the foundation, which becomes a series of isolated piers instead of a continuous trench filled with concrete.

The construction also adapts itself readily to openings of any desired size. For example, in some of the buildings of the United Zinc and Chemical Co. the bottom ten feet was all opening, the wall only starting ten feet from the ground. Such construction would be impossible with brick except at a very great expense.

There has recently been patented in Canada by Mr. J. A. Jamieson, Montreal, a trussed fabric for use in cement siding construction. This will span four feet without the use of studs, and when plastered on both sides is about ¾ of an inch thick. It has been used in several instances, notably in the addition to the plant of the Dominion Bridge Co. and in the side walls of the Government grain elevator at Port Colborne.

In this discussion reference has been made several times to the herringbone type of metal lath. It is, of course, not to be understood that herringbone is the only metal lath that can be used, but it gives greater satisfaction on account of its superior stiffness. The studs are usually spaced 16 inches on centres, and there seems to be no metal lath unless it is ribbed that is stiff enough to span this distance without undue bagging. Other grades are cheaper per yard, but require more studs.

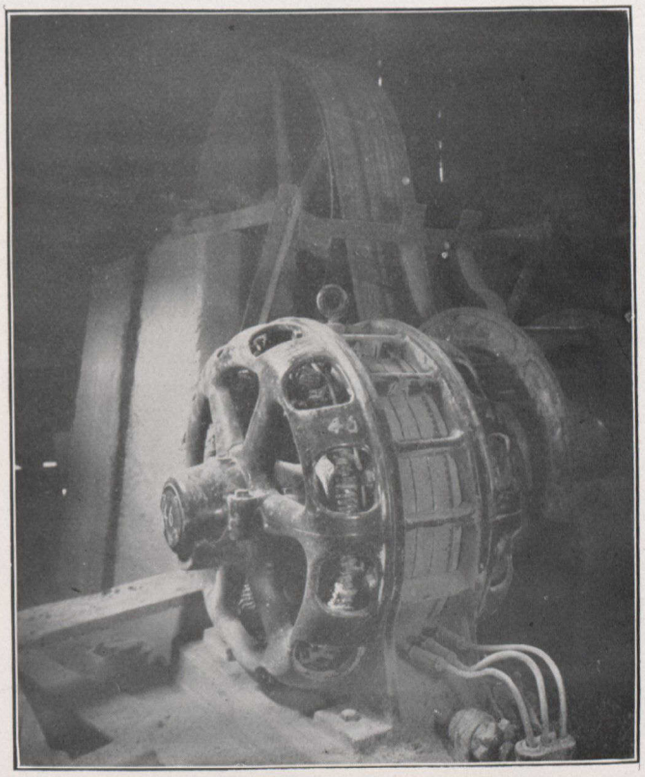
The only precaution necessary in constructing cement siding is that indicated in the discussion of the Winnipeg roundhouses; that is, there must be no great variation in the composition of the different plaster coats. It is very difficult to handle Portland cement mortar unless some lime is used, as it is cold and lifeless under the trowel. Sufficient lime can be added without danger if, instead of mixing it directly with the cement, it is dissolved in the water used in mixing the mortar. A bushel or so of lime should be put in the bottom of the barrel from which the water is taken and stirred with a spade from time to time as more water is added to the barrel, only being used when the lime has settled again to the bottom. This will give a perfectly uniform result without any danger of excess of lime or destruction of weatherproof quality.

ELECTRIC POWER AS APPLIED TO CEMENT PLANTS.*

It is only within the last ten years that the manufacture of Portland cement has been attempted to any extent in Canada, and in its earlier stages was all made by what is known as the wet process. In 1905 a plant was erected at Point Ann, Ont., for the manufacture of cement from limestone and by the dry process, and since then there have been eight or more similar plants erected.

In most of the earlier plants the method of driving was solely mechanical, the only electrical apparatus being a small generator for lighting. In the modern plants, where hydro-electric power has been available, motor drive has been used throughout, and this practice has been followed in a few of the mills generating their power by steam. Although the general practice at the present in plants having steam equipment is to drive the heavy machinery from line shafts having slow-speed Corliss engines, either belted or direct connected thereto and the outlying equipment and conveying apparatus electrically, an American company, owning ten mills in the United States and one in Canada, have incorporated this design in all their plants.

Cement mills as a rule are very dusty, and the usage that electrical apparatus gets in them is conceded to be the hardest possible. Although some of the later designers have made an attempt to protect the motors by means of motor sheds, most of the mills at present in operation do not have the least semblance of a cover or dust-guard. Motors will operate quite satisfactorily in the dust and dirt, but a careful pursuance of the maintenance and repair accounts of protected and unprotected motor equipments will show a marked difference in favor of the protected apparatus.



A 100 H.P. Motor driving Gates Tube Mill through Lenix Drive.

In some of the older plants the use of direct-current motors was attempted, but without much success unless the motors were well covered.

One American plant using D.C. equipment constructed canvas sheds around the motors, which were direct connected to short jack shafts projecting through the cover, having the pulley and one bearing outside. This allowed the motor to be completely enclosed and yet have enough space for ventilation. To-day, constant-speed induction motors of the squirrel-cage type are being used almost exclusively, and are giving excellent satisfaction.

On account of the lower cost 60-cycle apparatus has been installed in a number of mills, but in the writer's estimation this has been a mistake, because most of the drives require a large amount of excess

* By D. M. McCargar, Assoc. A.I.E.E.

power to start, and with motors around 30 cycles this can be accomplished much more easily than with the higher frequency apparatus; and then again, the motors can be obtained in standard frames at much lower speeds. Slow-speed motors will cost more and will be much heavier, but the slower-speed machine will soon give evidence of its superiority over its higher-speed brother.

The prevalent dust has been the source of a lot of trouble in electrical apparatus, not so much from getting in the windings as from the increased belt tension necessary to get the belts to drive. This trouble led one company in Canada to have most of its motors built with excessively large shafts, and they found that they got much better service out of them. As an illustration, this plant had a number of 30 horse-power motors built with a 3⅛-inch pulley journal, the outboard bearing being left standard at 1 15-16. The company in question had more mechanical than electrical troubles with their motors, and the chief one was with bearings. They have recently installed four 100 horse-power motors with 5-inch journals, each 15 inches long. This may seem excessive bearing surface to the ordinary motor user, but for the service intended, viz., driving tube mills through Lenix drives, it proved to be none too much.

Another source of trouble that has come to the fore in this particular branch of motor usage has been the excessive overloads that the motors are required to start. It has become the practice to equip all heavy driven machines with clutches, which has lessened this trouble some, but at that the service is none too light. Tube and ball mills have been the worst offenders in this respect; motors that drive the mills when up to speed would not budge them from rest. And then it is almost impossible to empty conveyors and elevators when a mishap occurs which requires their shutdown; and this means that the motor will be called on to start the conveyor or elevator from rest with a full load, and, if the motor is of any size, it means a big drain on the system until the motor comes up to speed; for, with the heavy overloads to start, the motor will not do it on a low auto-transformer tap, and therefore, has to be started with almost if not full line voltage. On this account the writer has found it much more satisfactory to not equip motors under 20 horse-power with compensators, but to put an oil switch on same, providing the generating capacity is large enough to stand the shock.

In one cement mill in Canada, after four years' experience with multipoint starters, the company have discarded same and installed plain one point apparatus, with specially designed contacts to eliminate delays when renewing same. This was occasioned by the unskilled workmen, whose duty it was to start these machines, leaving them too long on starting position, and very often leaving them on an intermediate starting position for running, which always proved disastrous to the coils. It was also found that there were very few motors in the plant that could be started much under 85 per cent. of full voltage, so that the lower voltage positions on multipoint starters were useless. This company have now installed starters with but one starting position, and with a spring device on the moving element which makes it impossible to leave it on the starting contacts. They have also installed a main line knife switch, connected in the leads to motor switchboard ahead of all control and protective apparatus. This saves time and eliminates all danger of attendants receiving shocks when renewing fuses or filing compensator contacts.

The excessive torque necessary to start most cement-making machinery and the frequent overloads that they are subject to brings up the question, whether it is advisable to install a motor large enough to drive the average load and rely on its overload capacity to carry the occasional extra work it is called upon to do, or to install a motor that will be carrying about full rated load when the driven machine requires the greatest amount of power.

Now, with the first case we are getting an ideal condition as regards power factor and efficiency, but the motor is working at a fairly dangerous temperature most of the time. This condition would be all right in the case of factories running ten hours a day, where the motor is not called on for more than six hours' continuous service, but for cement mill work, which means that the motor has to operate twenty-four hours a day for seven days a week, it is too risky. It is much preferable to install the larger motor in all cases where the machine is subject to frequent overloads and sacrifice the gain in power factor and efficiency, and if necessary install a synchronous motor for the purpose of taking care of the wattless current. *Using a synchronous motor for this purpose would require that the motor should not be required to carry much load, but it could be utilized to drive a small generator for lighting.

Although some plants have been designed with the lights deriving their power through transformers from the same bus bars as the power equipment, it will be found much cheaper to install a separate lighting set. The frequent stopping and starting of large motors causes a very irregular voltage curve, with its attendant injury to the lamps.

To sum up, motors for cement mill work should be of the squirrel-cage induction type, and should have ample bearing surface, should be slow speed, and if possible should have the frame iron cut away around the back of the stator. This allows the dust to be blown out thoroughly and exposes the laminators to the air, giving them more of a chance to dissipate the heat. They should have more clearance than for ordinary work; in fact, the standard clearance of small motors is altogether too close for cement mill service. This can be overcome by having a slight amount ground off the rotors during manufacture. Each process of manufacture, such as rock-crushing and drying, raw grinding, coal pulverizing, etc., should have a separate supply circuit, protected by an approved type of automatic circuit-breaker, and should have all the conveyors and elevators pertaining to this department connected to this particular department's circuit, whether they are in the same building or not. This eliminates shutdowns in all other departments and centralizes the trouble to the department in which it occurs.

Motors should be provided with a dust-proof shed, and, in the case of large motors, with a clutch wherever possible, even if this means longer counter-shafts and more bearings. With an equipment of this kind, viz., slow-speed induction motors, well housed, and provided with clutches where possible, it will be found that the maintenance and repair accounts will check up closely with most of the other applications of motor drive, notwithstanding the severe and dusty service, and that a

* An article on the use of synchronous motors as a condensor and a diagram for the determination of the capacity of same by H. W. Price, B.Sc., will be found in the Proceedings of the Engineering Society of the University of Toronto.

big saving will be effected in belt and oil bills compared with mechanical drive, and that the system can be operated with less attendance.

There should be no hesitation in installing electrical drive in cement mills, for it will prove its superiority over all other methods of driving by continuity of service and by the flexibility with which it can be operated, and it will also prove that the power bill will be just as small, if not smaller, when compared with all other methods of driving.

A PIONEER IN THE CANADIAN CEMENT INDUSTRY.*

On the eve of the first Canadian Cement Convention I think it might be of interest to many to make reference to the pioneer of the Canadian cement industry, the late Mr. Richard Judson Doyle.

He was born February 9th, 1835, in Hants county, Nova Scotia, where his father was a Baptist minister.

The late Richard J. Doyle, one of the pioneers in the Canadian cement Industry.

He left his home when quite young, and finally came to Owen Sound in 1853. Here we find him engaged in several lines of business. Through his perseverance, energy, and general business ability he succeeded as a rule in the most different and difficult enterprises. He was agent for an insurance company, and for some time a wood dealer. He also manufactured fireproof paints, for which medals were given him at the Exhibitions in Paris and Philadelphia.

In 1879 he bought land at Shallow Lake, nine miles from Owen Sound, Ont. Here it was thought that oil was present, but investigation proved that it was not the case. Later, Mr. Doyle imagined that the marl bed at Shallow Lake might contain phosphates of commercial value. Samples were sent to a chemist and analyzed, and again he was disappointed. These tests, however, as we shall see later, were an important link in the chain of circumstances that led him into the Portland cement industry. A brickyard was also erected on the place, and one of his pet ideas was to make firebricks from the common brick clay, which, of course, was impossible. Suffice to say that it represents to us a man of great perseverance.

Mr. Doyle, hearing some of his friends remark that Portland cement was composed of lime and clay, and how important an industry its manufacture was in England and the Continent of Europe, at once made up his mind that this was something worth looking into. The technic of cement making was in those days unknown in this country; therefore, for a man of his age, and with already so many enterprises, to take up a difficult subject of this kind, and study it and experiment, was certainly out of the ordinary. From the above mentioned analyses Mr. Doyle knew that he had one of the raw materials for Portland cement, and as for clay, this was in abundance in the locality.

With his usual energy he at once began this new work. His first testing-kiln was built in the cellar under his office, where compositions of marl and clay in different proportions were burnt. Later, he built a larger kiln, with a capacity of three barrels of cement from each charge. This was the first kiln of this size erected in Canada. It can still be seen at the family estate, about three miles from Owen Sound. These experiments must have required considerable time and much work and courage; the latter, because his friends and acquaintances began to think, as the time passed by apparently without any kind of success, that it was a foolish undertaking. That it must have taken him years of work is easy to understand, as he had no knowledge of chemistry, which is so important in cement-making. There are many stories connected with his family, showing the energy with which he worked. It was nothing unusual for him to work all day and the greater part of the night. It was also quite common to find almost every available dish in the house filled with various samples of marl, clay, cement, etc.

At first he was assisted by Mr. Tolton, and later by Mr. Wm. Robinson and Mr. W. McKay. He employed an Englishman, who claimed to be a cement expert, but whom he soon found knew less about cement than he did himself. Finally, he succeeded in making a cement that gave, neat, seven days' test a tensile strength of 675 pounds per square inch. I have not been able to get any exact data as to the time when the experimenting began, as some of his papers could not be located. However, it could not have been later than 1887. A company was organized in 1888 or the beginning of 1889. It was incorporated as the North American Chemical Mining and Manufacturing Co. Mr. Doyle was its first president. Mr. Wm. Robinson was sent to England to get some samples of cement tested and to study the cement industry in general. He became acquainted there with Mr. F. Ransome, the patentee of the rotary kiln.

Grasping the idea of the importance of this kiln, Mr. Robinson bought one for his company. Mr. Doyle claims in some of his letters that this was the first one on this continent. The kiln did not, however, prove a success, and was, therefore, abandoned. From a report in the Toronto Globe of August 24th, 1889, we find that Mr. Doyle's company was then in a position to turn out 134 barrels of cement per day. The company was later changed to the Owen Sound Portland Cement Co.

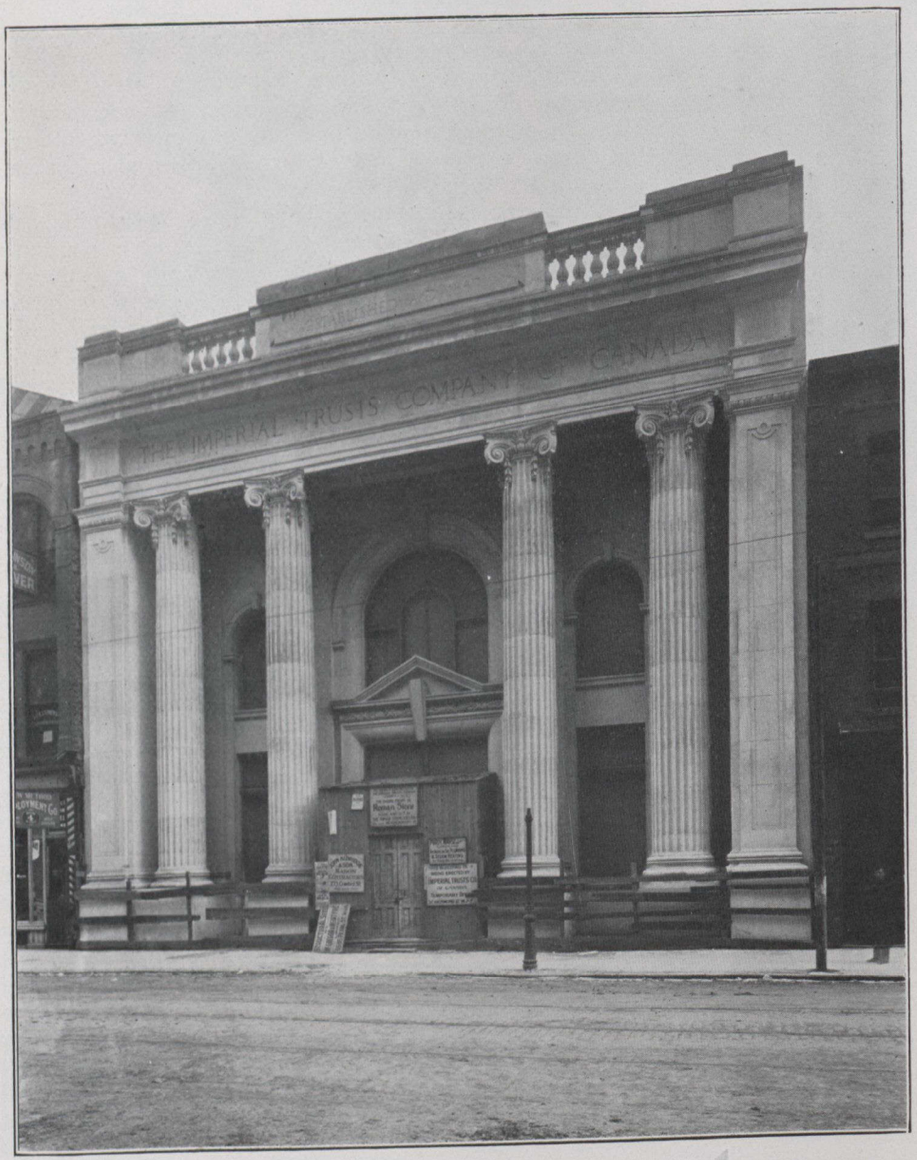
Mr. Doyle lived to see his enterprise in cement manufacturing a great financial success. He died October 26th, 1903.

* By A. G. Larsson, C.E.

Office Building of the Imperial Trusts Co.

RICHMOND STREET, TORONTO

The new office building of the Imperial Trusts Co. on the south side of Richmond Street, Toronto, a few steps from Yonge Street, reflects the greatest credit on the architects, Messrs. Chadwick & Beckett, and on the various contractors employed on the work. To us who are particularly connected with the use of cement, the most interesting part of the building is the front, which is composed entirely of Roman stone, supplied and set by the Roman Stone Co., of this city.



Office Building of the Imperial Trusts Company, Richmond Street, Toronto.

The stone is made by the well-known Stevens process of moulding in sand. That this is one of the best methods of manufacture is unquestioned by competent authorities. On account of its being a little more expensive than tamped stone, architects are often forced to use the latter when their preference lies with the former. Fortunately, such was not the case with this building, and the results more than justify the expenditure.

The accompanying cut of the front shows the excellent design of the whole, and some details of the carving are seen in the smaller illustrations. The carving was executed by Messrs. Adamson & Wicks, of this city, and their work included making the clay models, cutting the wood patterns and re-carving the stone. This method of re-carving after the final set of the concrete is easily accomplished with Roman stone, and no way of moulding has yet developed by which a degree of sharpness in the arrises can be attained that is in any way superior to it.

The interior of the building is not yet completed, and the absence of the doorway prevents one from realizing the large scale of the design, although the adjoining buildings and the man's figure at the side give some assistance. The columns are 33 ft. 9 in. high over all, and their diameter is 4 ft. at the base. The sections are 3 ft. high, and are hollow, an 18-in. hole running from top to bottom, thus making them considerably lighter for handling without sacrificing their strength. The lower column sections weigh two and a half tons each, and the cap weighs two tons, but there are heavier stones than these, the two end pieces of the cornice weighing over three tons each and the column bases slightly less. The main architrave is not solid, the front and back having ledges, formed by the mouldings on their inner sides, which carry the panelled soffit. These front and back pieces span the distance between the centres of the two middle long; they are reinforced by a light columns, and are each 20 ft. 2 in. "I" beam, cast in the stone. The architrave carries only its own weight, the frieze, cornice and parapet being supported by heavy "I" beams, resting on the column caps.

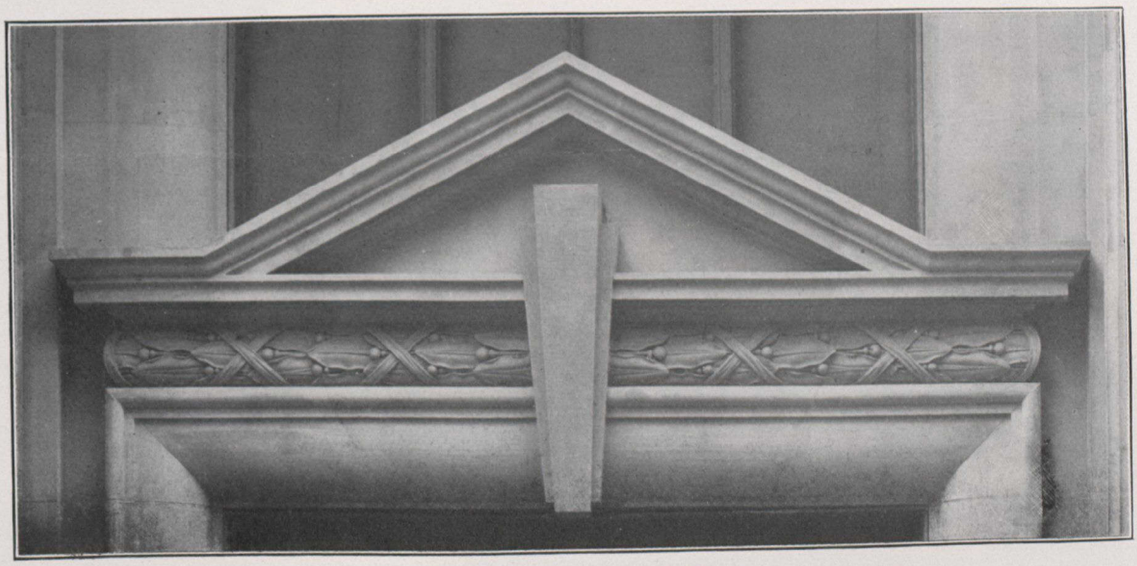
Roman stone is made of Dyckerhoff (German) cement and white marble. While this cement costs just twice as much as the best native brands, it has given such excellent and uniform results that the manufacturers do not care to endanger their reputation by putting on the market a product of which they are not absolutely sure. They are continually experimenting with native cements, and they report highly satisfactory results, but the condition of absolute certainty cannot be reached in a few weeks, or even months, and until then they prefer to make no change. The marble is obtained from the company's quarry at Tweed, and is a pure white crystalline limestone. It is an excellent material for their purpose, although the stone from the levels which are being worked at present is somewhat too coarse in the grain to be used as a building stone.

The proportions of the mix are about 3½ to 1. To those of us who have given a little thought to the subject of mixing cement this does not carry much information, as the value of a mix is almost more dependent on the grading of the aggregates than of the actual proportion they bear to the cement. It was, therefore, most interesting to see the various arrangements at the Roman Stone Co.'s factory for crushing and screening the marble to the proper sizes and then automatically mixing the correct amount for each batch. With the method of moulding in sand it is possible to use a sufficient quantity of water to crystallize all of the cement, which manufacturers who use rigid moulds find next to impossible to secure if they do not want to wash the stone out of their machines or collapse when it is taken out of the form. This method also prevents the use of a facing material, but that is anything but a disadvantage; the stone is the same all the way through and when there is any cutting required, no harm is done if its interior composition happens to be exposed.

All of the stone on this building was tooled after the stone was hard, which not only entirely eliminated the corrugated metal effect produced by a grooved pattern or mould, but also cuts through the surface and exposes the particles of marble beneath. The machine tooler used by the Roman Stone Co. is the invention of its superintendent, Mr. J. B. Heighington, and gives perfect satisfaction. The United States patent was contested for over a year, apparently by parties who realized the value of the machine and attempted to claim some of its advantages.

With everything considered, this building is one of the finest examples of cement stone on the continent, and we should be proud to have in our midst architects who appreciate such excellence of material and a manufacturer who can satisfy their demands.

Column Cap, showing Detail of Carving.



Detail of Frieze at Front Entrance.

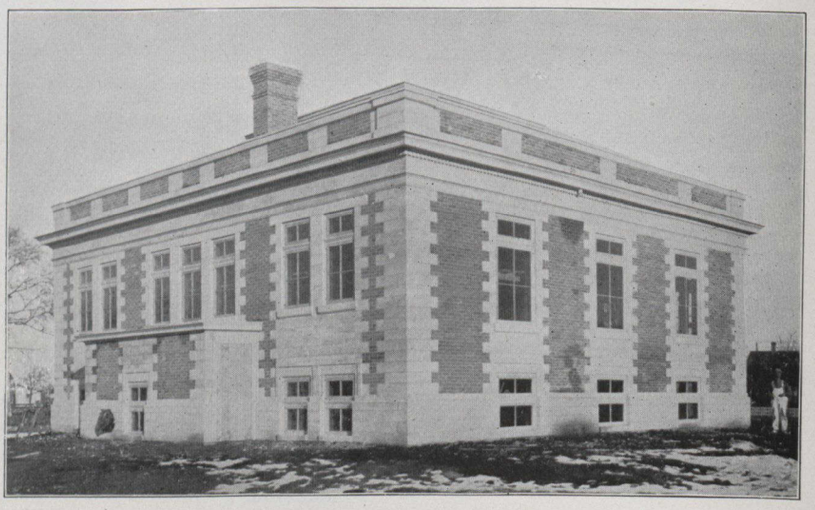
A LARGE CEMENT CONTRACT.

There is evidence on every hand that the Canadian West will experience a busy building period during the present year. Reports from all parts of the West speak of buildings contemplated and construction work to be carried out during the coming season. As an evidence of this, John Gunn & Sons, engineers and contractors, of Winnipeg, have contracted with the Canadian Portland Cement Co., Toronto, Ont., for eighty thousand barrels of Star cement. This will be shipped by vessel direct from the Port Colborne works of the above company. Three hundred and twenty thousand cotton bags will be required for the transportation. It will probably be shipped in lots of ten thousand barrels as required by the Winnipeg contractors. An idea of the magnitude of this order may be gained from the fact that, were it to be transported by rail, thirty train loads of twenty cars each would be required. This is said to be the largest single contract for cement ever let in Canada. Cement stands for progress. There is no better sign of the prosperity and development of a country than the annual consumption of cement, which also applies to a province, city or community.

What is said to be the first house to be built of concrete at St. John, N.B., is being erected by a resident of Fairville, a suburb of St. John. Now that a commencement has been made in that city, watch concrete houses grow.

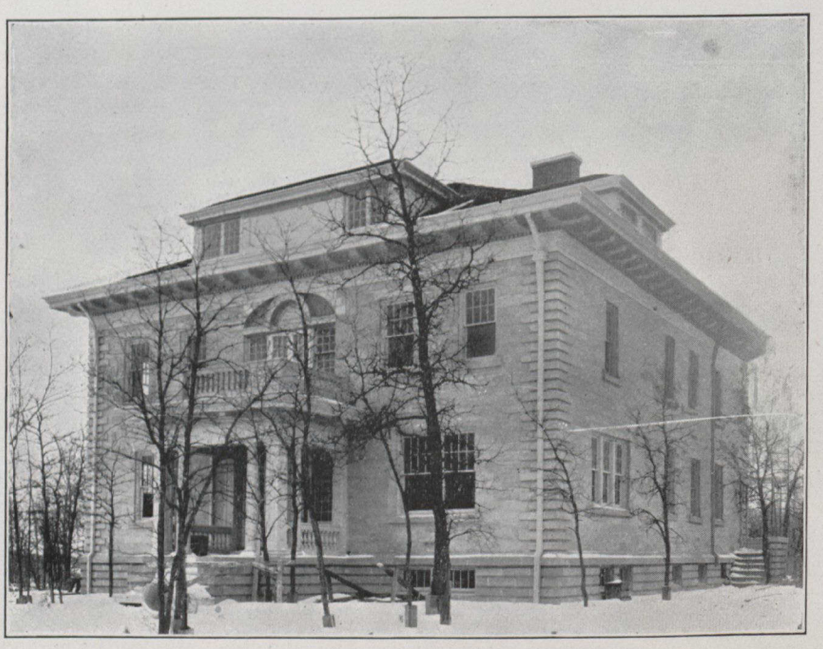
Concrete Block Construction

As further showing the influence of good concrete block work in Winnipeg we show this month views of a costly house and a public building, which illustrate what may be accomplished when the architects and concrete block manufacturers are able to work in harmony. The public building shown is that of the side and rear of the Carnegie Library at Selkirk, Man., and is a very fine example of the combination of concrete blocks and brick. Twelve-inch plain blocks were used in the foundation to grade line, then twelve-inch, white, tool-faced blocks to water table, and above that eight-inch, white, tool-faced blocks in combination with a two-brick wall of red sand lime brick. The water table course is partly composed of a row of four-inch blocks, which are carried as a projecting course partly around and over each basement window. Sills, lintels and copings are of white artificial stone. This building is 46 ft. 6 in. by 48 ft. in size, with a 12 ft. basement, and will cost under $10,000. Mr. Wm. Fingland, of Winnipeg, is the architect.



Carnegie Library, Selkirk, Man.

The large colonial house, of which Mr. H. B. Rugh is the architect, is the residence of Mr. J. Y. Reid, on Wellington Crescent, which is the best residence street in the city of Winnipeg. This house is built entirely of concrete blocks, including basement partitions and cistern. A 12 in. block is used for the basement, and then from above the special water table it is an 8 in. grey-tool-faced block, with 9½ in. grey, plain-face, quoin-corner blocks. All sills, lintels, etc., are faced with the same material, which is a mixture of one part Parthenon cement and two and a half parts of fine, white sand, the resulting color being about that of Bedford sandstone. The water table blocks, 12 in. quoin blocks in basement above grade and the quoin-corner blocks are somewhat different from the ordinary concrete block construction. Shutters are to be added to the windows in the spring. The colonial idea is carried out in the inside finish and decoration, making altogether one of the most artistic and handsome homes in the city. Cost, complete, will be about $20,000. We are indebted to the Perfection Concrete Co., of Winnipeg, for the illustrations, and we congratulate them on the ability shown to carry out the architect's desires.



Residence of J. Y. Reid, Wellington Crescent, Winnipeg.

The prospect for the building trades in Toronto this year is good, in so far as amount of work promised goes. The City Architects' Department is preparing plans for various new municipal buildings. Among these are new fire hall and police station at East Toronto and fire hall on Perth Avenue, and an addition to the main pumping station. Then there is the General Hospital and the additions to Western and Isolation Hospitals, some University buildings and a technical school and several warehouses. Considerable interest is being manifested by brick and concrete interests in the trunk sewer. Alternative tenders for brick or concrete construction show a big difference in prices. The lowest tender for concrete was $19.77 per lineal foot and for brick $33.13. The question will shortly be settled, when a report will be furnished by experts on the relative merits of the two materials. The brick interests have organized to make a strong fight, and have collected all the possible information to uphold their end. However, no sound argument can be raised against the use of cement construction, while the difference in price favoring cement is very considerable, indeed. Cement construction is meeting with favor on every hand, and any prejudice that has heretofore been felt against its use is gradually diminishing in the minds of right-thinking people. The section of sewer which the Board proposes to construct first is the section between Jarvis Street and the Don River, beginning on Wilton Avenue, and takes in 6,386 feet. The difference between the lowest tenders was $84,039.76 in favor of concrete construction for this section, which will be about one-fifth of the total sewer.

The concrete block industry is receiving favor everywhere. The progress it is making may be seen on every side. The industry has made a phenomenal growth during the last few years, taking the place of wood, brick and stone structures on every hand. This naturally follows, since the concrete block is cheaper, more efficient and convenient than other building materials for this class of work. Those who have watched the growth of this branch of the cement industry undoubtedly notice the growing favor of this form of construction with architects and engineers, and the opposition and suspicion, evident in some quarters in the past, rapidly transforming to a welcome. There is no longer the same desire among architects and builders to confine their entire attention to one material, as we see the gradual adoption of concrete in many forms and in combination with stone and other materials. We show herewith a concrete block residence, built for Mr. R. H. Smith, of London, Ont. It is a fair type of what can be done with the ordinary building block machine in dwellinghouse construction. This structure is 22 x 46 ft., and contains eight rooms. It is modern in its equipment, and cost $2,100. The walls are built from concrete blocks, which, in the basement, are 10 in. thick, with 3 in. core opening. In the first storey they are 8 in. thick, with 2½ in. core opening, and the top storey, 8 in. thick, with 3 in. core opening. The building having 3 in. core opening in the top storey and 2½ in. core opening in the first storey gives a fairly equal distribution of crushing strength without adding excessive weight to the walls of the structure. The piers which support the verandah columns of this structure are built from concrete blocks. The columns are built from solid concrete. The builder of this residence has erected several similar dwellings in London, and is well pleased with concrete block

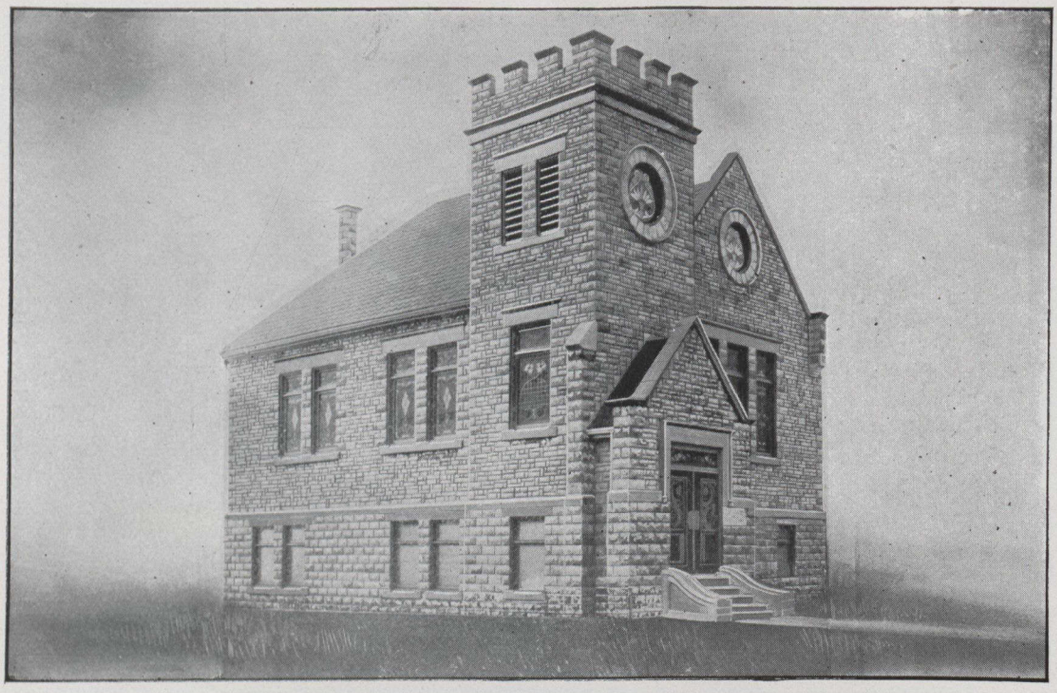
Concrete Block Residence of Mr. W. J. Howlett, London, Ont.

Residence of R. H. Smith, London, Ont., built of Concrete Blocks.

dwellings. The other dwelling illustrated is 22 ft. by 30 ft., and contains eight rooms. It was built at a cost of $2,000, and is modern throughout. It was built of concrete blocks of broken Ashlar design, which have a very pleasing effect, and very much resemble cut stone. The walls of the basement are composed of blocks 10 in. thick; first storey, 9 in. thick; second storey, 8 in. thick, with 2½ in. core opening throughout. The verandah and steps are also built of concrete, and are ornamented with two Grecian lawn vases, made from solid concrete. The above products were made on machines furnished by the London Concrete Machinery Co., to whom we are indebted for the accompanying illustrations.

We show herewith a view of the Salem Church at Derwent, Ont., which is built of concrete blocks. The entire walls of the structure, window heads, window caps, curbs, steps and the entire exterior work except the roof is of concrete. The structure cost $6,500. The auditorium has a seating capacity of two hundred and twenty-five. The seating is arranged to radiate from pastorum, which is in one corner of the building, the choir gallery being situated in an alcove immediately to the right. The auditorium has a very pleasing effect, and is noted for its acoustic properties. The basement is fitted up for schoolrooms, libraries, etc. The walls of the basement of this structure are built by the double overlapping system. The inside of basement is finished with concrete blocks, no wainscotting or painting being required. The concrete blocks on the inside are of vertical tooled design. Several other churches have been built in Western Ontario under the same method of construction, and not the least sign of moisture has yet

appeared on any of the inside walls. The mason work was done by Mr. Scott, contractor, of London, and the building was superintended by Mr. Charles Beatty, Derwent, Ont., who manufactured the concrete blocks and other products on the ground where the building is erected. Concrete blocks offer a wide field for original design, and are destined to play an important part in all forms of construction work in the future. We illustrate below a residence built of concrete blocks, supplied by Messrs. Vining Bros., manufacturers, Niagara Falls, which presents a handsome appearance, and is but another example of artistic possibilities of concrete blocks.



Concrete Block Church, Derwent, Ont.

Handsome Concrete Block Residence.

Canada's First Cement Convention

As we go to press everything is practically in readiness for the big Toronto exhibition and convention of March 1st to 6th, and a large and enthusiastic attendance is assured. Encouraging reports from all parts of Canada and the United States are to hand. Marked interest is being manifest in Canada's convention. The Convention is being held at a comparatively quiet season. Single fare rates have been granted over the lines of the Eastern Canadian Passenger Association, and a reduced rate may probably be obtained over certain other lines. The King Edward Hotel, King Street East, Toronto, will be the official headquarters, where the programme will be given and business meetings held. The proximity of the St. Lawrence Arena and the above hotel will add greatly to the convenience of delegates.

We give herewith the names of some who are contributing papers and who will address the Convention. As may be seen from the list, some of the best authorities, covering nearly every line of cement work, are represented on this programme, and visitors to the Convention will have the experience of these men, and may hope to hear a programme of the highest order. Of those coming from the United States special mention might be made of Mr. Richard S. Humphrey, of the Structural Materials Testing Laboratories at St. Louis, Mo., who will in all probability be present to address the Convention; Capt. John Stevens Sewell, War Department, Washington, D.C.; Sanford E. Thompson, Newton Highlands, Mass.; Meril Watson, New York; F. A. Norris, Boston, Mass.; E. G. Perrot, Philadelphia, Pa., and Charles D. Watson, Pittsburg, Pa. The contributions by these gentlemen, together with a carefully selected list of papers by prominent engineers and others in Canada, should complete a programme of unusual interest. This list includes the names of A. W. Campbell, Deputy Minister of Public Works, Toronto; W. J. Francis, C.E., Montreal; C. W. Cadwell, Windsor, Ont.; M. Morssen, C.E., Montreal; A. G. Larsson, Owen Sound; Prof. E. Brown, McGill University, Montreal; C. R. Young, Toronto University; A. W. Burge, Toronto; F. Barber, J. C. Chadsey, Toronto, and others. The programme to date, giving subjects to be covered, order, etc., is now all but completed.

Below are given the names of exhibitors, at the time of going to press, at St. Lawrence Arena. In each case the location and number of spaces is given. There will be little or no change in the positions assigned:—

Peerless Brick Machine Co., 130...	Minneapolis.
Wadsworth-Howland Co., 88.....	Boston, Mass.
F. M. Jackson, 1.....	Akron, N.Y.
Marblecrete Products Co., 118.....	" "
Sun Portland Cement Co., 128-129..	Owen Sound, Ont.
Oneida Community Co., 110-111....	Oneida, N.Y.
Concrete Publishing Co., 78.....	Detroit, Mich.
"Concrete Review," 83.....	Toronto.
Contract Record, 51.....	"
Construction, 69	"
Concrete Engineering and Construction Co., 138.....	"
Trussed Concrete Steel Co., 72, 89..	"
Roman Stone Co., 9, 10, 11.....	Toronto.
Canadian Art Stone Co., 31, 54....	"
Expanded Metal Co., 43.....	"
W. D. Beath & Son, 44.....	"
A. B. Ormsby Co., 37.....	Toronto.
Canadian Portland Cement Co., 80	"
Canadian Ornamental Iron Co., 117	"
Imperial Plaster Co., 82.....	"
Bowman & Connor, 12.....	"
Thorn Cement Co., 32.....	"
Clarke & Monds, 147.....	"
Mussens Limited, 76, 77, 84, 85....	Montreal.
Morrsen & Co., 162.....	"
Montreal Rolling Mills, 42.....	"
Terranno Flooring Co., 161.....	"
B. Greening Wire Co., 81.....	Hamilton.
Canada Wire Goods Co., 38.....	"
London Concrete Machinery Co., 119, 120, 121, 122.....	London.
Ideal Concrete Machinery Co., 70, 71, 90, 91.....	"
Hobbs Manufacturing Co., 79.....	"

Mr. P. Gillespie, A.M., C.E., President Canadian Cement and Concrete Association.

Multiplex Concrete Machinery Co., 112	Toledo, O.
U. S. Steel Products Co., 19, 20, 21, 22	Buffalo, N.Y.
Industrial Chemical Co., 17.....	Swansea, Ont.
Koehring Machine Co., 52, 53.....	Milwaukee, Wis.
Brantford Roofing Co., 148, 149....	Brantford, Ont.
Goold, Shapley & Muir, 73.....	" "
National Portland Cement Co., 92..	Durham, Ont.
Cement Tile Machinery Co., 45, 46.	Waterloo, Iowa.
Galt Art Metal Co., 44.....	Galt, Ont.
Senator Mill Manufacturing Co., 47.	"
Wettlaufer Bros., 74, 75, 86, 87....	Mitchell, Ont.
Brown Hoisting Machinery Co., 103, 104	Cleveland.
R. W. Hunt & Co., 39, 40.....	Chicago, Ill.
U. S. Gypsum Co.....	"
Ransom Concrete Machinery Co., 23, 24, 61, 62.....	Dunellen, N.J.

The "Canadian Cement and Concrete Review" will be represented at Section 83, St. Lawrence Arena. We want to see you all.

Canadian Cement & Concrete Review

TORONTO - MONTREAL - WINNIPEG

An Illustrated Monthly Journal for the discussion, consideration, and development of all that pertains to this great and growing industry.

PUBLISHED ON THE FIFTEENTH OF EACH MONTH, AT 62 CHURCH STREET TORONTO BY THE MONETARY TIMES PRINTING COMPANY, LIMITED.

Editor: Alfred E. Uren. **Telephone Main 7404.**

WINNIPEG OFFICE: 315 NANTON BUILDING. G. W. GOODALL, Business and Editorial Representative.

MONTREAL OFFICE: B 32 BOARD OF TRADE BUILDING.

Present Terms of Subscription, payable in advance:

Canada and Great Britain .... $1.00 per annum.

United States and Foreign Countries..... $1.50 "

ADVERTISING RATES ON APPLICATION.

Changes of Advertisement Copy should reach the Head Office by the 5th of each month.

Mark on your calendar the date of the Toronto Cement Exhibition, March 1st to 6th, and come prepared to become a member of the Association. Your co-operation is needed.

EDITORIAL.

Within a few days Canada's first Cement Convention and Exhibition will be in full swing. The exhibitions conducted during the past by various cement associations in the United States have, in most cases, been highly successful. They have, and are, attaining the desired end of educating the general public along cement and concrete lines. It is with this object in view that the Cement and Concrete Association of Canada laid the foundation for this, its initial effort. Like similar organizations, the educational side should predominate, and the Association be kept from commercial influences, so apt to prove detrimental to its best interests. Everything points to a big attendance and a successful Convention.

Had a prophecy been made, even a decade ago, that the cement industry would reach the proportions and occupy the place in the building world that it holds to-day, it would doubtless have been received with derision. The history of this wonderful material in nearly every country has been one of rapid progress and development. The tide of its expansion has flowed on from year to year, until to-day one hardly dares predict future developments or place a limit on its possibilities and achievements. The world's output of Portland cement during the last decade has increased enormously. This is particularly marked in Canada and the United States, where many new plants have been erected and old ones enlarged. While the recent financial depression has sobered the imaginations of many, there seems no indication that the supply and market of the future has been overestimated. In the eastern countries the spread of the trade is becoming particularly noticeable. Many countries that hitherto have imported the cement required for home consumption are erecting plants for manufacture, a fact which must possess considerable significance for foreign shippers. The production of cement in America has now reached the enormous figure of upwards of fifty million barrels annually, while twenty years ago not over forty thousand tons of Portland cement were manufactured. Few industries have made so remarkable progress. The advance has been smooth and even, unmarked by setbacks and devoid of the usual alternations of prosperity and adversity, characteristic of other industries. The recent depression has, however, had its effect on the cement manufacturers, many of whom have called a halt, in some cases for an indefinite time. In the scramble for business they have hovered around the cost mark. While competition and close prices benefit the community, excessive lowering of prices cannot permanently endure. The inactivities in the building trade are sufficiently depressing to manufacturing interests without undue price lowering, and, while low prices have undoubtedly improved quality, the margin of profit has been reduced accordingly. Prices will doubtless come to a level ultimately, as there does not seem to be a desire, on the part of any of the Canadian companies to create a pre-eminent hold on the market.

The fifth annual convention and exhibition of the National Association of Cement Users was held in Cleveland, Ohio, during the week of January 11th, this year. In the matter of attendance, excellence of the papers and calibre of the contributions, and dignity which characterized the discussions, the Association has little either to regret or to apologize for. Its aims at gathering valuable data for the use of its members, at disseminating authoritative information, at standardizing practice and specifications goes steadily on. Its task in these fields is a large one, because it is dealing with a new and comparatively unknown material, but it is undertaking it with intelligence and carrying it through as expeditiously and as thoroughly as can well be expected. All parts of Canada and the United States were represented on the floor of the Convention. President Humphrey is an outstanding figure. As a presiding officer he is ideal. With him the work of the chairman is a serious and responsible matter. Irrelevant matters are never introduced. Dignified, courteous, and firm, he holds the discussion to the subject under consideration, is prompt in his rulings, and rarely makes an error of judgment. In consequence, the business before the house is expeditiously handled, and none of the Convention's time is lost in discussions foreign to the matter in hand. The programme covered almost the entire field. The President's address was, in brief, a plea for fireproof building construction. Mr. Morris, Boston, contributed a timely article on the artistic possibilities of artificial stone. Excellent papers by Mr. Leonard Wason, Boston; Henry G. Quimby, Philadelphia, and Emile G. Perrot, Philadelphia, on the costs of concrete structures, elicited some lively discussion. However, one could not help but think that the programme erred by attempting too much. The discussions, while usually spirited, were often, because of the press of time, unfortunately very brief. The projection lantern was largely employed. The Committee on Insurance, Laws, and Ordinances presented an interim report which

contains some interesting information. The inflammable nature of many of our buildings, and the consequent excessive destruction of property by fire, have rendered the annual toll on the community at large one of monstrous proportions. In consequence, the insurance rates which the companies find it necessary to impose make fire insurance an expensive luxury to the insured. The committee has gone to a great deal of trouble in securing data as to the cost of insurance on various types of structures in which reinforced concrete is used. There are, of course, in addition to the character of the building, many other influences which affect insurance rates. Among these may be mentioned the inflammable nature of the contents, the surroundings, and the facilities for fighting fires. Because of these it is very difficult to observe anything like uniformity in the rates collected in the various instances on buildings apparently similar in construction. These values, however, are quoted:—

Average rate of insurance on concrete buildings per $100	$0 36
Average rate of insurance on steel fireproofed buildings per $100	20
Average rate of insurance on slow-burning construction per $100	75
Average rate of insurance buildings of joist construction per $100	90
Average rate of insurance on buildings entirely of wood per $100	4 00
Average rate of insurance on buildings of all classes per $100	1 15

It is interesting to note that of the 150 individual cases instanced, approximately 50 per cent. fall below the first-mentioned rate, viz., 36 cents per $100. There seemed to be a feeling that as knowledge of the fire-resisting qualities of concrete becomes better known to the various rate-making organizations, more equitable premiums will prevail. Much important work still lies before this committee. To a visitor, the dominating features of the Convention were the very apparent desire on the part of the delegates to apprehend the truth, to adopt methods and standards that experience has proved to be reliable, to countenance only what is truthworthy and to eliminate whatever experience has proved to be defective or unsound. Boldness must be tempered with conservatism; in the main, the beaten paths must be followed. The "Experience Meeting" proved a veritable clearing-house for ideas, and was one of the most helpful items on the programme. Members were encouraged to talk, and if a speaker had anything to say and could say it, an attentive and earnest audience was assured. The National Association of Cement Users is gaining in caste, and its status as a semi-scientific body and as an independent and responsible organization is improving yearly. The original policy of its promoters, to maintain it free from objectionable communication, has been rigidly adhered to.

A statement regarding conditions in the American Portland cement industry during the year 1908 has been prepared by Mr. Edwin C. Eckel for the United States Geological Survey, which shows a falling off in the output for the year 1908.

Although detailed figures are not yet obtainable, an estimate based on the information available indicates that the production of Portland cement in the United States was somewhat less than forty million barrels. This compares as follows with the output of recent years:—

	Barrels.
1905	35,246,812
1906	46,463,424
1907	48,785,390
1908 (estimated)	40,000,000

The falling off from the 1907 output was heavy, and is particularly notable because it is the first decrease shown in any year by the American cement industry since its inception. The decrease was not uniformly distributed throughout the country, for New York, Pennsylvania, and New Jersey will probably show the highest percentages of loss, while in some portions of the West and Middle West the decrease was relatively slight.

During the year several small companies went into the hands of receivers, and the financial stress also led to a change of control in a group of plants operating chiefly in the Pacific States. A fortunate effect of the depression was that it put a stop, temporarily, to the flotation of fraudulent or doubtful cement securities; though with improvement in general business conditions it is likely that promotion schemes will again be taken up on an even larger scale than before the depression.

The year 1909 opens with heavy stocks of cement on hand at most mills, but with good prospects for a steady, though slow, revival in the cement trade. It is unlikely that this revival will be sufficiently rapid to push mills to their capacity during the year, and it is, therefore, possible that the high record for output made in 1907 will remain unbroken for another year at least. The total maximum capacity of existing plants is now about 60,000,000 barrels a year.

Despite the business depression, or perhaps partly because of it, there have been a number of important technical and industrial developments in the cement industry during 1908, and others are still pending. These will be discussed in the Survey's final report on cement production, which will be issued early in the spring.

A glance at the following figures, which have been compiled by the British Chamber of Commerce in Egypt, giving the quantities and values of the whole of the cement landed in Egypt during the past five years, plainly shows the strides the imports from England have made during this period, and also the hold which Belgium has, at the present moment, on the Egyptian market. The trade to-day is practically in the hands of Belgium, England, and France:—

	Belgium. Per cent.	England. Per cent.	France. Per cent.
1903	35	15	40
1905	43	31	20
1907	37	30	21

ADVERTISING THAT COUNTS.

Messrs. the "Canadian Cement and Concrete Review," Toronto, Ont.:

Gentlemen,—Through our advertisement in your esteemed journal we have secured a contract for about six hundred square feet of our cement tiling at Newmarket, Ont. We are more than pleased with the results obtained from advertising in your valuable "Review."

Truly yours,
GUSTIANA BROS.,
Hamilton, Ont.

GERMAN CEMENT SPECIFICATIONS.

At the December 9th, 1908, meeting of the Association of American Portland Cement Manufacturers a summary of the year's proceedings of the Association of German Portland Cement Manufacturers was given. A revision of the standard cement specifications in that country as contained in a recent bulletin will be found of interest. These specifications differ from the standard American specifications in the sense that they embrace under a single head both methods of manipulation and standard specifications; and, further, that in each section there is given (1), the specification itself, and (2), right below it, full explanations under the title of "essential principles and explanations." In this way the reader or the tester has before him on a single page the actual requirement of the specification and the reasons for its adoption, and the methods for its use."

The definition of Portland cement is given as follows: "Portland cement is a hydraulic cementing material with not less than 1.7 parts by weight of lime to 1 part by weight of soluble silica + alumina + iron oxide, prepared by fine grinding and intimate mixing of the raw materials, burning at least to sintering and fine grinding. To this cement shall not be added more than 3 per cent. of other material for particular purposes. The maximum magnesia content shall not exceed 4 per cent. and the sulphuric anhydride shall not exceed 2½ per cent." It will be noted in this connection that the sulphuric anhydride has been raised from 2 to 2½ per cent.

Under the head of packing and weight the following is the specification, and, as the "Essential Principles and Explanations," together with the obligation of the association, are of considerable interest they are also given below: "Portland cement is packed in sacks and barrels. The packages must carry, besides the gross weight, the term 'Portland cement,' and the name of the manufacturer clearly printed thereon. Loss by sifting out and variations from the standard weight to the amount of 2 per cent. are allowable.

"Essential Principles and Explanations.—As various weights are in use in sacks as well as barrels, it is absolutely necessary to give the gross weight. By the term Portland cement the purchaser shall be assured that the material is in accordance with the definition given above."

The Association of German Cement Manufacturers obligates and controls its members to maintain the standard conditions given above and the therein required properties for Portland cement. This obligation reads: "The members of this association are permitted to bring into the market under the term 'Portland cement' only such material as is prepared from an intimate mixture of lime and clay materials as essential ingredients, burning to sintering and subsequent grinding to the finest of flour. They obligate themselves not to recognize as Portland cement any material which is prepared otherwise than above stated, or which during or after burning has been mixed with foreign bodies, and to look upon the sale of other material under the name of Portland cement as deceiving the purchaser. These requirements are not to forbid the addition of not more than 3 per cent. of other material to the Portland cement for the purpose of regulating the setting time. The members of the association further obligate themselves to furnish Portland cement which will in all respects meet the requirements of the Prussian Minister of Public Works. When a consumer requires cement for a particular purpose, coarser ground than the requirements, or colored, its preparation is allowable. If a member of the association offends the above given obligation, he shall be expelled from the association. His expulsion is made known publicly. The manufactured product of each member of the association is tested yearly in the laboratory of the association at Karlshorst, near Berlin, and the results are given out at the general meeting of the association."

Setting.—"The initial set of normal Portland cement shall not take place in less than one hour after gauging. For particular purposes a quicker setting Portland cement can be prepared; such cement, however, shall be so marked on the package.

"Essential Principles and Explanations.—The initial set of normal Portland cement should require at least one hour because the beginning of the setting is important; on the contrary, if a definite interval of time is required for the hard set, it is of less value in the use of Portland cement if the process of hardening is completed in a shorter or longer time. Possibly specifications concerning the setting time should, therefore, not be limited too closely."

Constancy of Volume.—"Portland cement must be volume constant. It shall be recognized as decisive proof of this when a part of neat cement, prepared on a glass plate and protected from drying out, placed under water, after twenty-four hours, shows no sign of curvature or cracking on the edge after a long time."

Fineness of Grinding.—"Portland cement shall be ground so fine that it leaves a residue of not more than 5 per cent. on a sieve of 900 meshes per square centimeter, the width of the mesh of the sieve being .22 mm." (Translator's note.—Corresponding approximately to a sieve having 76 meshes per linear inch, width of the mesh being 0.0087 inch.)

Strength Tests.—"The binding strength of Portland cement shall be determined by testing a mixture of cement and sand. Tests shall be made for the compression and tensile strength according to uniform methods by means of test pieces prepared the same way and of the same area and with the same apparatus. The compression tests are to be made on cubes of 50 sq. cm. (7.75 sq. in.) surface, and the tensile tests on test pieces having a least section of 5 sq. cm. (.775 sq. in.)."

Compression and Tensile Strength.—"Slow-setting Portland cement shall show at least 160 kg. per square centimeter (2,275 lbs. per square inch) compressive strength when tested with three parts by weight of standard sand and one part by weight of Portland cement after 28 days' hardening (1 day in air, 27 days in water). The tensile strength shall be at least 16 kg. per square centimeter (227 lbs. per square inch). The strength of quick-setting Portland cement is generally less at 28 days than that given before. On this account the strength specified should be regulated by the setting time.

"The compression strength must be at least 200 kg. per square centimeter (2,844 lbs. per square inch) by testing after 1 day in moist air, 6 days in water and 21 days in air of a temperature of from 15 to 30 degrees C. (59 to 86 deg. F.); the tensile strength shall be at least 20 kg. per square centimeter (284 lbs. per square inch). Compression tests may be made at an earlier time, after 1 day in moist air and 6 days in water, when the compressive strength shall be at least 120 kg. per square centimeter (1,706 lbs. per square inch).

Street Pavements*

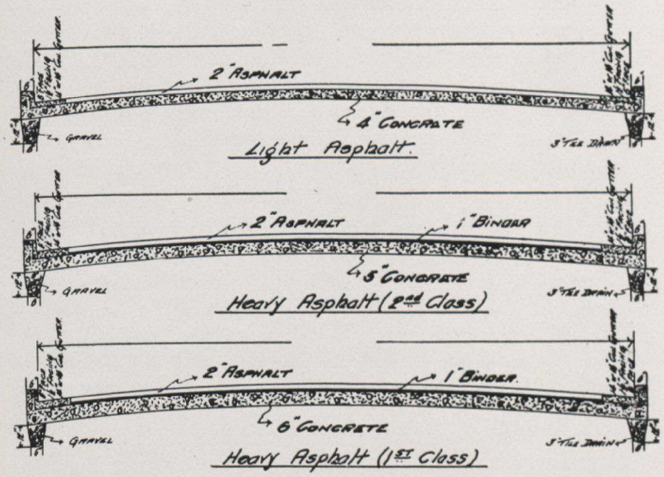
The subject of Street Pavements is always of more or less interest, even to those not specially connected with their construction. It will, therefore, be the aim of this article to give a few details regarding those pavements which have been found to be most suitable for the traffic to be met with in a large city.

Asphalt.

The asphalt pavement is probably the most popular and at the same time the most economical pavement to be had for general city traffic where grades are not too steep (say, up to 3 per cent.), and where traffic is not too congested.

In Toronto there are two kinds, viz., heavy and light.

Heavy asphalt pavement consists of a Portland cement concrete foundation 6 inches in depth composed of 1 cement, 3 sand and 7 stone, an inch of binder and two inch of surface. The above dimensions have proved suitable for the heaviest traffic in this city for a period of from 8 to 10 years. Of course, repairs are necessary



from time to time to keep these pavements in shape for the guarantee period, which up to the present time has been ten years.

The light asphalt pavement is composed of a 4-inch Portland cement concrete and a 2-inch asphalt wearing surface. This pavement is laid on light traffic or residential streets, and is guaranteed for ten years.

It is proposed, however, to replace this light asphalt pavement with a heavier construction of 5-inch concrete, 1-inch binder and 1½ or 2-inch surface, as it has been found that the traffic conditions on a street, once it is paved, increases so materially that the surface has a tendency to creep, and it is thought that the binder will prevent this.

A granolithic gutter, composed of 1 cement, 1 sand and 3 granite chippings is laid next to the curb on the green concrete foundation, so as to insure a thorough bond. The depth of the gutter is the same as the thickness of the pavement surface, and from 14 inches to 16 inches wide. The price of this surface, including foundation, is 25 cents a lineal foot.

Originally the asphalt was laid right up to the curb, but was found to rot and disintegrate under the action of water, so the granolithic gutter was substituted. However, the granolithic surface is so hard and brittle that it becomes cracked and broken, and in the near future some other substitute will have to be found.

Concrete curb is now used altogether, and is found to be very satisfactory, there being no tedious delays, as often occurred in the days when stone curb was so extensively used. The materials for concrete curbing are almost always on hand or easily procured, while the same cannot be said in regard to stone curbing.

The concrete curbing is usually constructed in conjunction with the foundation, so that a thorough bond is secured.

The concrete curbing is 6 inches thick and varying in depth according to the class of roadway to be constructed. The face and top of curb to a depth of 1½ inches are composed of same mixture used in gutters, while the core is composed of a 1:2:5 mixture. The cost of this curb is about 30 cents per lineal foot.

The cost of a heavy asphalt pavement will average $2.25 per square yard, and of a light asphalt $1.55.

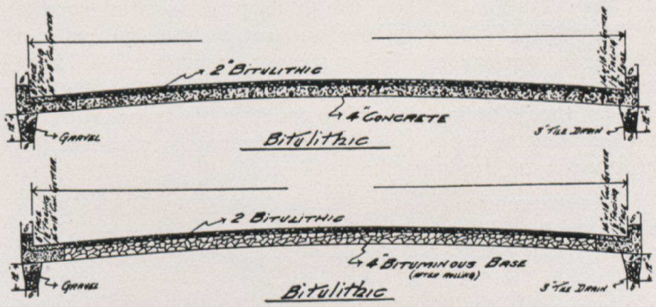
For details of these pavements see cross-section 1, 2 and 3.

Bitulithic.

The bitulithic pavement is a patent pavement controlled in Toronto by the Warren Bituminous Co. It has proved fairly satisfactory, and costs about $2.25 per square yard.

The foundation is either broken stone, thoroughly rolled to a thickness of 4 inches, and then sprinkled heavily with a bituminous cement so as to insure the particles of stone being well cemented together, or a 4-inch Portland cement concrete composed of 1 cement, 3 sand and 7 stone. On the foundation is spread the surface mixture to a depth sufficient to roll down to 2 inches after thorough rolling.

The surface mixture is composed of graded stone,



varying in size from 1 inch to an impalpable powder, proportioned in such a manner as to reduce the voids to a minimum.

The cementing material is a patent bituminous preparation, added in such quantities to thoroughly coat all particles and fill all voids.

The surface when rolled is flushed with a special bituminous cement, called a flush coat composition, and then stone chippings are rolled in so as to fill all surface voids, thus roughening the surface and making it less slippery.

* G. G. Powell, B.A.Sc., Roadways Dept., Toronto, Ont.

The bitulithic pavement can be laid on steeper grades than asphalt, but our experience in Toronto shows that a 5 per cent. grade is about a maximum for this class of pavement for satisfactory results.

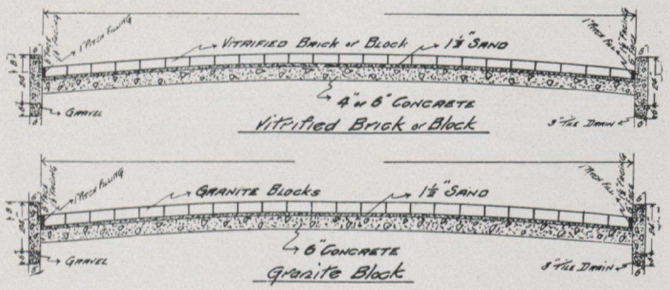
Details of curb and gutter are same for this pavement as for asphalt. See Section 4 and 5.

Vitrified Brick or Block.

The vitrified brick or block pavement is probably one of the most serviceable pavements in existence today, provided due care is taken in the selection of the paving blocks. It is a trifle more costly than asphalt or bitulithic, being worth about $2.55 on 6-inch concrete and $2.25 on 4-inch concrete. The main objection to this class of pavement is the noise, and up to the present time nothing has been discovered that will do away with this objection.

Fillers of various kinds to be used instead of grout have been experimented with, but with only partial success.

The foundation as in the other permanent pavements is of concrete, either 4 inches or 6 inches thick, according to the traffic, and of the proportions mentioned previously. On this foundation is spread a layer of sand from 1½ inches to 2 inches in thickness, and upon this



bed the blocks are laid in parallel rows at right angles to the curb, breaking joint so as to give about one-third bond.

The blocks are then watered and carefully gone over in order to discover any defective ones, either for quality or conformation. When the blocks are culled to the satisfaction of the engineer and properly rolled with a heavy surface roller, the joints are carefully filled with grout, run in in two or three operations. The bottom half of the joint is filled with grout in the proportion of 1 of cement to 2 of sand; the top half with grout in the proportion of 2 cement to 1 of sand.

An expansion joint from ½ inch to 1 inch wide is left on either side of the pavement next to the curb. This joint is then filled with pitch. (Section 6.)

The curb usually constructed with vitrified block pavements is 24 inches deep and 6 inches wide, with an 1½-inch granolithic wearing surface on the top and on the face for a distance of 8 inches from the top. The price per lineal foot for this class of curb is 42 cents.

Granite Setts.

Granite sett pavement is laid in much the same manner as a vitrified block pavement, except that on account of the large size and irregularity of granite setts they have to be paved; i.e., properly bedded in sand cushion and levelled one by one. This method of laying the blocks increases the cost considerably, price per yard of granite block pavement being $3.50. (Section 7.)

[In addition to the forms of pavement described above, the author also gives details in regard to macadam, asphalt block, cedar block and wooden block pavements.—Ed.]

HOLLOW CONCRETE FENCE POSTS.

A series of experiments in the construction of hollow concrete fence posts, conducted by Prof. C. A. Ocock, of the Department of Agricultural Engineering of the University of Wisconsin College of Agriculture, will be found interesting. The economy of construction and the durability of the homemade concrete fence post have been sufficiently demonstrated to the farmer, so that there is a constant demand upon the agricultural engineering department of the university for detailed information as to the construction of such posts. For three years Prof. Ocock has made and used on the college farm hollow posts, which he has found fully as strong as the solid reinforced posts, much lighter to handle, and materially cheaper in construction. It is constructed with little additional labor, and with a saving of four pounds of cement to each post.

The mixture used is the ordinary 1:2:4, which includes one part cement, two parts sand and four parts stone, none of which is larger than will pass through a three-quarter-inch screen. The forms used are the ordinary ones, four inches wide, four inches deep, and seven feet long. For reinforcement a quarter-inch round steel rod is placed in each corner, the distance of its own diameter from the outside of the post. Each end of this rod is bent at right angles for about two inches to anchor it firmly.

In making the hollow posts a two-inch core, composed of four pieces of wood is necessary. A central pieces of wood, one inch square, is surrounded by four flat pieces, rounded on the outer side, forming the round core. When the post is finished, the central square piece is withdrawn, allowing the four other pieces to be removed. When the core is used, the mould must have end gates, with two-inch holes, for the removal of the core.

For attaching the fencing to the post, the longest galvanized staples should be put in at suitable distances on one side while the concrete is soft, after the points of the staples have been spread to secure them firmly in the concrete. To fasten the fence to these staples, short pieces of No. 12 or 14 wire may be used.

The hollow reinforced concrete post, although requiring a little additional labor, saves enough concrete to offset this extra work, and at the same time is lighter to handle, and practically as strong as a solid post.

COMING CONVENTIONS AND EXHIBITIONS.

Canadian Cement and Concrete Convention, March 1 to 6, 1909. Exhibition at St. Lawrence Arena, Toronto, Ont.

Cement Products Exhibition Co., Chicago, February 18 to 25, 1909.

North-Western Cement Products Association, Minneapolis, March 2nd to 4th.

Ontario Provincial Good Roads Association, Toronto, March 3rd and 4th.

Mutual Fire Underwriters' Association of Ontario, during first week of March.

BUILDING IN FREEZING WEATHER.

A great deal of outdoor building has been carried on throughout the entire winter in Winnipeg, and the supposed severity of the winter does not prevent building activity, even when the mercury reaches its lowest level. Among the work carried on continuously throughout the present winter, special mention may be made of the Crescent Apartment Block, Bank of Nova Scotia building, curling rink on Turby Place, Union Depot, Broadway, new Redwood Bridge, Roslyn Apartments, Roslyn Road. It has not been considered the slightest hardship to do out-of-door work on these buildings. While special precautions may be found necessary in the placing of concrete during very cold weather, it can be carried on successfully at a very low temperature. A contemporary gives the following precautions to be taken in erecting concrete work during low temperatures:—

1. Heating Grates.—Encase the building with canvas and place heating grates or salamanders under the floor being concreted. Keep the building at a uniform

A Concrete Cattle Barn at Duluth, Minn.

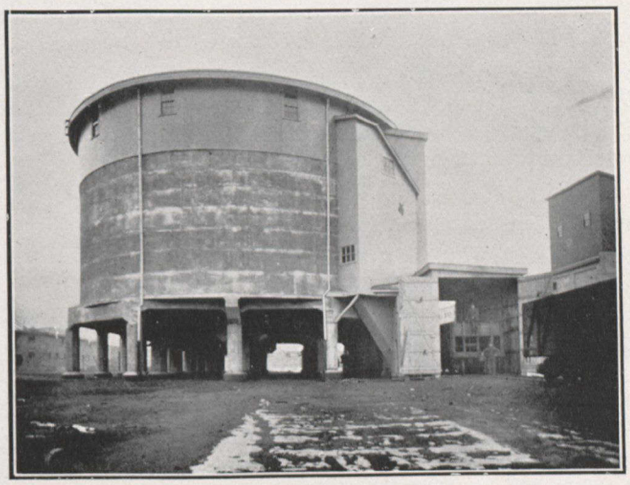
temperature of about 60 degrees. Do not allow intense heat to come in contact with the concrete, as it will dry out the concrete before it has set.

2. Covering the Concrete.—Cover the concrete after being laid with some good insulating material, such as sawdust, straw, cement bags, manure, etc. Be sure to cover the concrete work before stopping work at night, even though it is warm during the daytime.

3. Salt and Calcium Chloride.—Salt dissolved in the water used in mixing concrete helps to prevent freezing by lowering the freezing point. A 5 per cent. solution (by weight) of common salt is ordinarily used and is not detrimental to strength when so used. Calcium chloride has an advantage over salt in that it reduces the freezing to a lower point. Dissolve in the water needed to properly mix the concrete two pounds of calcium chloride for each bag of cement used.

4. Heating the cement, sand, stone and water used in the concrete is helpful, but the materials must never be heated to a temperature of over 100 degrees, as the strength of the concrete will be weakened.

5. Removing Falsework.—Be sure that the concrete is thoroughly set (not frozen) before any centering is taken down. Leaving all the upright supports in place, remove the sides of the columns and beam boxes and thoroughly examine the concrete. Then remove the slab

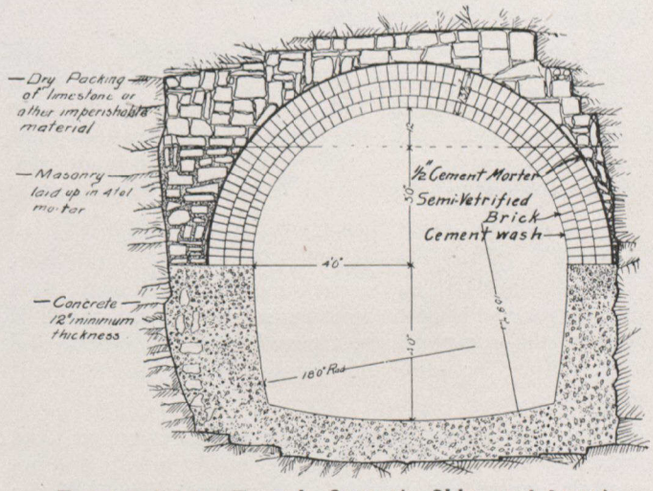


Coal Pocket of Reinforced Concrete, Montreal, Que.

centering, and lastly the main supports. Leave the centering in place a few days longer rather than take chances. Do not take down the centering too soon.

CONCRETE IN TORONTO TUNNEL.

The drilling of the Toronto intake tunnel was started during October, 1907; the heading met during July, 1908, having tunnelled a distance of 5,038 feet. The concrete, side walls and brick arch were built concurrently with the drilling. Concreting was done on day shift, the bricklaying at night, but speed was handicapped by the small area of the tunnel. The tunnel has the common horseshoe sections, eight-foot horizontal and



Toronto Intake Tunnel—Concrete Sides and Invert.

vertical diameters. It is lined with a three-ring brick arch, while the side walls and invert are of concrete, 12 inches thick, and proportioned 1:2:4. The overbreak over the arch was dry-packed, except the haunches, which were laid up in mortar. The side walls and invert were concreted to the rock. The accompanying view shows a cross-section of the Toronto tunnel, with its concrete sidewalks and invert.

Trade Topics

It is said that the bricklayers of Toronto have organized to make a fight in order to have the trunk sewer to be built constructed of brick in place of concrete.

D. Robertson & Co., Limited, have been incorporated with a capital stock of $50,000. Head office, Toronto. The company will quarry, manufacture and deal in stone, lime, Portland cement, bricks, drills, and so forth.

The Kingston Board of Works has accepted a contract for cement for use in sidewalk construction which will save the city upwards of $3,000 over the prices paid last year. The city will use some 500 barrels.

Mr. J. F. M. Stewart has been appointed general manager of the Point Anne Quarries, Limited, which will operate quarries at Point Anne, near Belleville, and put crushed stone and rubble on the Toronto market.

E. R. Beckwith, consulting engineer, Kingston, Ont., is preparing plans for the erection of a large hotel. Estimated cost, $150,000; to be built of reinforced concrete, concrete blocks and terra cotta hollow tiles.

The National Portland Cement Co., of Durham, was one of the more fortunate companies during the past year, when the depression was seriously felt. This plant showed a gross profit of about $40,000 and a net profit of $25,000.

Among the features of the annual Convention of the Canadian Society of Civil Engineers at Toronto was a visit to the Port Colborne plant of the Canadian Portland Cement Co. on January 29th and the Government elevators at that place.

Mr. R. Kirkland, chief chemist, Saxon Portland Cement Co., Cambridge, England, has been appointed manager of the New Collos Portland Cement Works of the Coltness Iron Works, Wishaw, Lanarkshire, N.B. This is a 60,000 ton per annum plant, and will be in full operation within a short time.

In the January number of the "Review," in the description given of the Avenue Road retaining wall, Toronto, the name of the contractors, the Warren Bituminous Paving Co., of Toronto, was omitted. The contract for constructing the bitulithic pavement also included the construction of the concrete retaining wall.

It is said that the Colonial Portland Cement Co., of Wiarton, is to be reorganized. The official liquidator, E. R. C. Clarkson, has arrangements under way, it is said, that will result in complete reorganization. The assets of the company are approximately $500,000, and the liabilities, including the bonded indebtedness, about $400,000.

Upwards of seventy-five members attended the banquet of the Quebec Association of Architects following their annual convention at Montreal. The officers for the ensuing year are as follows: President, J. J. Resther; first vice-president, Thomas Raymond; second vice-president, J. Rawson Gardiner; secretary, J. E. B. Vanier; treasurer, W. S. Maxwell. Council—Messrs. G. A. Ross, Jos. Venne, G. A. Monette, J. Ouillet, L. Lemieux.

Builders and contractors of Halifax, N.S., are looking for a busy season in the building trade during the coming season. Already there is considerable work in sight, including All Saints' Cathedral, skating rink, post-office building, roundhouse and railway shops, Technical College building, Children's Hospital, City Market building, Infants' Home, extensions in connection with Dalhousie University, as well as church and other buildings.

The New York Central System, through its Engineering Department, have been investigating the use of Ideal concrete Blocks in the building of some of their minor construction. They recently let a contract for the erection of an interlocking switch tower at Indiana Harbor, Indiana, on the main line to Chicago, this tower to be entirely constructed of concrete blocks, including foundation and superstructure. They will use 2,500 24-inch, white-faced Bush hammered design blocks.

WHAT OTHERS ARE SAYING ABOUT CEMENT.

Notwithstanding the fact that there are evidences on every side, few people yet realize to what an enormous extent Portland cement is now used for building purposes of all kinds. The manufacture of cement, while yet in its infancy, has already become one of the most important industries, employing thousands of hands.—Ottawa Citizen.

Toronto property owners are entitled to vote their choice of whether brick or cement will be used in the construction of the trunk sewer. A cement sewer is said to be just as serviceable and durable as brick and to cost $200,000 less. An extra cost of $200,000 is the heavy price the property owners may be asked to pay for the possibility of being held up by brick manufacturers. The City Council has called for plebiscites on issues of less importance than the $200,000 question, whether the trunk sewer should be built of cement or brick. That question should be left to a vote of the property own rs next January, even if the brick sewer work was to stand over in the meantime.—Toronto Telegram.

Building Inspector Harrison, of this city, has voiced a crying need that is calling alike in Calgary and all over the Dominion and the American continent, from Mexico to the northern limits of civilization. It is the need of fireproof buildings that are fireproof. So many times have alleged "fireproof" buildings proven to be death-traps that more care should be taken in their construction. For stone, or brick, or concrete walls do not make a fireproof building when the floors, stairways, windows, laths, doors, frames and sashes are of inflammable wood. . . . A building of stone, or brick, or concrete, with concrete floors, steel girders well covered with concrete or some similar substance, with metal where the wood now is in the windows, would be a real fireproof structure.—Calgary Herald.

The most useful and consoling bit of knowledge that the disaster has brought to us is the fact that the houses in Messina built of reinforced concrete were undamaged by the earthquake. Perhaps consoling is hardly the right word to apply here, and the usefulness of the knowledge may be limited by the fact that even in localities subject

Machinery and Supplies

AN IMPROVED CONTRACTOR'S BUCKET.

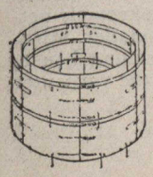
An improved form of bucket for use in concrete, asphalt and other contracting work has been placed on the market. These buckets have a countersunk hoop on the inside top rim, riveted through the staves, and outer top hoop, which makes it impossible for the staves to drop out or become loose, and in consequence the bucket cannot fall apart, even when dried out. Each hoop passes under the strap to which the ball is attached, thereby making it impossible for the hoops to drop o, as the strap is riveted through the staves above, below or through each hoop. The bottom is double, and cannot be forced out, and it is doubly reinforced by the strap. These buckets are 12¾ in. in diameter at the top and 10½ in. high, and are handled by Mr. J. S. Barron, 127 Franklin Street, New York.

FRIGITE FOR WINTER WORK.

Freezing weather, with its problems to the concrete worker, is here. The Trussed Concrete Steel Co., of Detroit, Mich., offers to the trade a crystalline chemical compound called Frigite, which is dissolved in the water used for mixing the concrete, and by preventing the freezing of the water to which it is added allows the cement to set as under normal temperature conditions. Laboratory experiments and tests have demonstrated the efficiency of Frigite under severe weather conditions. It not only allows concrete to develop full strength, but causes an increase of from 10 to 15 per cent. It also renders concrete over 50 per cent. more impermeable to water.

SILO CURBS.

We show herewith a concrete silo curb. Instructions for its use are furnished by the London Concrete Machinery Co. as follows: Dig a trench about 2 feet deep in the ground. Fill this trench up with rough concrete made of 1 part cement to 8 parts coarse gravel. Then set out your silo curbs in a perfect circle, having them level at all points. They should be so adjusted as to make the silo with walls vertical on the inside, but having a taper on the outside. A silo 12 feet in diameter and 30 feet high should have walls about 12 inches thick at the base, and should have a gradual taper, finishing 6 inches thick at the top. After the rings have once been set out in a perfect circle no difficulty is experienced in perfect form each time the rings are set up, as both rings are not removed at once. A glimpse at the illustration will show that silo curbs are built of two outside and two inside sections. After the first and second sections have been filled with concrete, the bottom section is removed and placed on top of the second section, which remains in place until the one which has been placed on top of it is filled, the section below always holding the top rings in perfect position while the concrete is being placed therein. A silo 12 feet in diameter and 30 feet high can be erected in six days with three men. It will require 32 yards of gravel or sand and 28 barrels of cement. Large stone may be tamped into the wet concrete during the course of construction, and by this method the silo can be built with less cement than here indicated.



ENAMEL FOR CONCRETE BRICK.

Enamels are now on the market for enameling concrete brick, as well as clay products, without calcing them. Frequent attempts have been made to replace dull surfaces in the past. Concrete brick cannot be heated to the same excessive temperature as clay brick, and difficulty has been encountered in coating them with glass enamels or porcelain. Mr. Paul Fuchs, 611 Carmen Avenue, Chicago, who is a specialist in this line, has invented a process by which concrete brick as well as clay products can be enameled without calcining them. The blocks or brick are merely heated to a temperature up to 500° Fahrenheit, or, in other words the enamel is baked on instead of being vitrified or fused.

CONCRETE PILES.

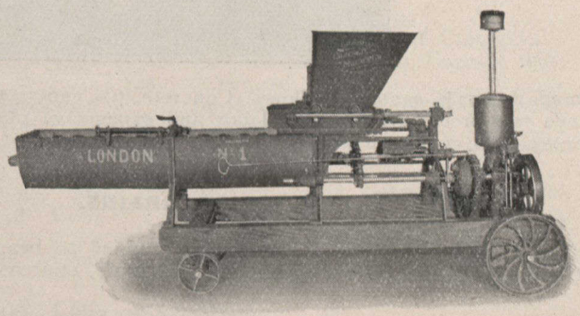
In order to afford engineers, architects and others interested in foundation construction an opportunity of familiarizing themselves at first hand with its methods, the Raymond Concrete Pile Co., of New York and Chicago, will give at the coming Chicago cement show working demonstrations of its system of making and placing concrete piles. The Raymond system consists of placing a sheet steel shell in the soil by means of a collapsible steel core, withdrawing the core and thereupon filling the shell, previously subjected to a searching examination, with concrete. The entire operation will be shown at the Raymond Company's booth. A model pile-driver will be employed in the placing of the shells.

THE JACKSON SYSTEM OF BUILDING.

The Jackson System of Economic Building is described in an interesting pamphlet issued by the F. M. Jackson Co., of Akron, N.Y. Its application to residence, office, factory and warehouse buildings is described in this pamphlet. It claims to solve the problem of a strong, fireproof and dampproof building at a lower cost than a frame building of the same dimensions. This company claim for their system an absolutely dry wall, simplicity of design and low cost. The F. M. Jackson Co. will be represented at the Toronto Exhibition.

CONCRETE MIXER.

We show herewith a new, automatic, continuous batch concrete mixer, manufactured by the London Concrete Machinery Co. It has a capacity of forty yards per day, and is supplied with a 2½ horse-power gasoline engine.



THE MANITOBA GYPSUM COMPANY.

The various products manufactured by the Manitoba Gypsum Co., Limited, Winnipeg, Man., are conveniently arranged in catalogue form, a copy of which has reached our office. The plant of the above company is located at West Winnipeg, and is one of the most modern on the continent. The gypsum rock is brought from quarries near the north end of Lake Manitoba.

FENCE POST MACHINE.

Among the various devices for the manufacture of concrete fence posts our attention has been called to the Victor Concrete Fence Post Machine, an improved screw-feeding device, which proportions the material and forces it into the boot of an elevator. This carries it up and throws it into the mixing bowl, where it is caught by a series of ploughs, and is turned over as the water is applied by a revolving sprinkler. The bottom of the mixing bowl is opened by a slide, which allows the material to feed into the mould, which is round and made from sheet steel. Four moulds, with the reinforcement already in place, stand on a reel, ready to be filled, small end down. As the mould is filled it is raised 120 times a minute to consolidate the concrete, and when com-

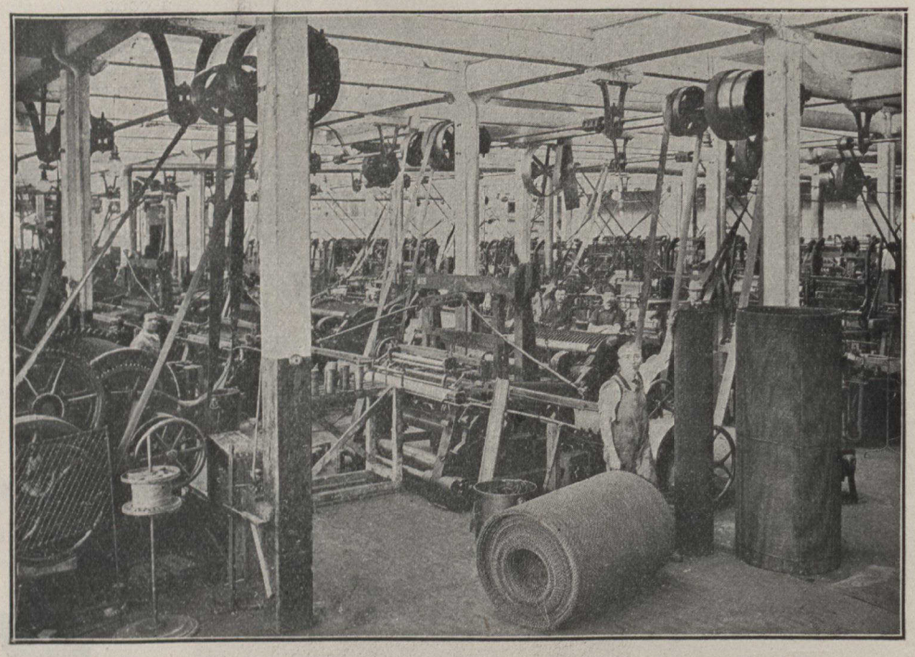
plete another is turned into its place. It is claimed that moulds can be filled at the rate of sixty an hour. When finished the mould is picked up by a small crane and placed upon a rack, where they are left to set. After about twelve to sixteen hours the moulds may be removed and the posts left to season for a month, when they are ready for use. It is claimed that with this machine three men can turn out 200 a day, and that a post 7 ft. long, 5 in. diameter at the base, and tapering to 3½ in. diameter at the top can be made for 17½ cents as follows: Concrete, 6½ cents; two pounds reinforcement, 6 cents; labor and expense of plant, 5 cents; total, 17½ cents.

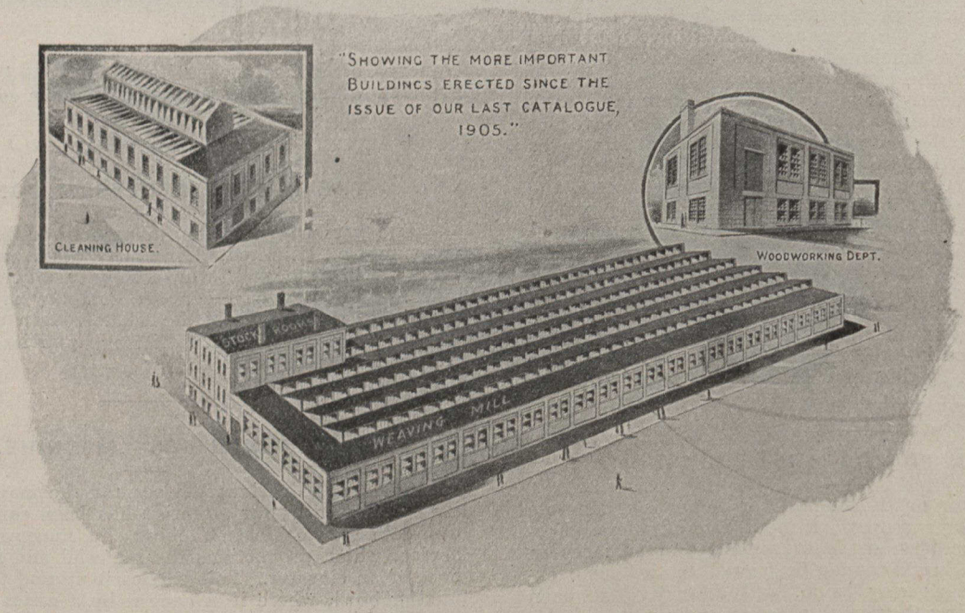
CONCRETE FOR HOUSE DRAINS.

Since concrete has been successfully applied to beams, cantilevers, columns, floors, walls, arches, roofs, staircases, conduits, sewers, and in numerous other cases; why could not it be applied to drains, is a question that is raised. The weak point in a concrete beam was its slight resistance to tension. This deficiency was met in reinforced concrete by the introduction of mild steel—material offering a very high resistance to tension—to supplement the strength of the concrete. The comparatively small amount of reinforcement necessary to a drain pipe would be met by the use of steel rods of very small section, and, therefore, at very low cost.

WIRE SUPPLIES.

The B. Greening Wire Co. have made extensive additions to their plant and buildings at Hamilton, Ont., during the past eighteen months. The new weaving mill, which is 260 ft. long by 130 ft. wide, is a splendid structure. Provision has been made at one end of this building for further extensions if desired. This building is devoted entirely to wire weaving machinery, where heavy looms, some of fifteen tons, make the heavier wire goods, such as smokestack netting, mining screens, and smaller looms for smaller work. The other buildings shown are the wire mill cleaning house, which has a capacity of fifty tons per day, and the carpenter shop, which is isolated from the other buildings, the increased yard room being used for the different kinds of lumber. The older buildings are devoted to various processes, such as wire rope spinning, perforation of metals for various purposes, wire drawing and galvanizing, manufacture of chains, etc.





ANNUAL INDEX

FOR

Canadian Cement and Concrete Review

JANUARY - DECEMBER

1908

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OBITUARIES.

PORTRAITS.

Publications Reviewed

Air Compressors.—The Thos. H. Dallett Co., Philadelphia, Pa., send us a 24-page illustrated catalogue, No. 100, which describes air compressors. Size, 6 x 8.

Concrete Brick.—Particulars regarding enamel concrete bricks relative to their manufacture and advantages are described and illustrated in an attractive folder, furnished by the Enamel Concrete Co., Des Moines, Iowa.

Jackson System of Economic Building.—A pamphlet issued by the F. M. Jackson Co., Akron, N.Y., describes the above system and its application to modern building construction.

Geology and Mineral Resources.—A report on the geology and mineral resources of New Brunswick, accompanied by a map showing the mineral resources of the Province. By R. W. Ells. A. P. Low, Deputy Minister, Department of Mines, New Brunswick.

Don'ts on Concrete.—We are in receipt of an attractive little 1909 calendar, issued by Concrete and Construction Engineering, Demar House, Haymarket, London, S.W., where attention is directed to twenty-seven "Don'ts on Concrete." It is a useful office calendar and a handy reference.

Concrete Buildings.—The Turner Construction Co., 11 Broadway, New York, in a recent issue, Bulletin No. 5, present many interesting features of the recently completed factory and office building of the Keuffel & Esser Co., in Hoboken, N.J. The concrete reservoir, with a capacity of 157,000 gallons, is constructed in one strong structure, 50 by 25 feet high.

Concrete Blocks.—We are in receipt of the December number of Idealite, issued by the Ideal Concrete Machinery Co., of South Bend, Ind., and London, Ont. This bulletin describes the treatment of concrete surfaces, recognition of concrete blocks and other information of interest. Views are shown of block residences of fireproof stucco construction and stucco pebble on concrete blocks.

Expanded Metal.—The North-Western Expanded Metal Co., Chicago, Ill., have issued a publication, entitled "Overcoated Houses—Examples of Exterior Cement Work." An endeavor is made to show owners of frame houses the ease with which a transformation of their home can be effected by an exterior application of cement mortar. Residences overcoated by the North-Western Expanded Metal Co. are illustrated in this catalogue.

Cement Machinery.—The London Concrete Machinery Co., London, Ont., have prepared a large and well-illustrated catalogue, which is just off the press. This catalogue illustrates many cement-working appliances, gives instructions for handling concrete for different classes of work, as well as figures and estimates of various forms of construction. Many of the types of machinery manufactured by this company are illustrated therein.

Wire Fabric for Reinforcing Concrete.—A catalogue describing the National System of Concrete Reinforcement, which has been placed on the market by the National Wire Cloth Co., Sandusky, O., has been received. This system is a woven wire fabric and a chair or clamp for supporting and holding in a rigid position the bars used as slab reinforcement. The wire fabric is not welded or twisted in any way, the connection being made with a metal tie, made and applied separately.

Gypsum.—The Manitoba Gypsum Co., Limited, Winnipeg, Man., send us a 36-page illustrated catalogue that is of particular interest. It describes "Empire" brands of cement, wall plaster, wood fibre plaster, asbestos, hard wall plaster, ever-ready plaster finishes, sheet plaster, etc., as well as many other products manufactured by this company. Some interesting views are shown in this catalogue of Wnnipeg residences, Edmonton buildings, and several of the larger type of public buildings where the products of this company have been used.

The Present and Future of the Cement Block.—The above is the name of a little pamphlet prepared by J. Augustine Smith, secretary Ideal Concrete Machinery Co., South Bend, Indiana. It deals with cement blocks in regard to manufacture, availability and cost, and was read by the author before the National Association Convention at Cleveland, Ohio, January 11th to 16th, 1909. An appendix contains views of sample Ideal concrete building blocks and data as to character of blocks, size, weight, materials, displacements, percentage of voids and other information of interest.

Directory of Portland Cement Manufacturers for 1909.—A 1909 directory of Portland cement manufacturers, together with the manufacturers of gypsum and lime, compiled and published by The Cement Era, 842 Monadnock Block, Chicago, has been sent us. This is a neat, little pocket edition of about 220 pages. Besides containing a list of the cement companies in Canada and the United States, there is an alphabetical list of officers, superintendents and chemists of the various companies. It also contains a list of lime and gypsum companies, list of brands and a buyers' guide.

Reinforced Concrete.—We are in receipt of Bulletin No. 11, issued by C. A. P. Turner, M. Am. Soc. C.E., Suite 816, Phœnix Building, Minneapolis, Minn., with many examples of the Turner system of reinforced concrete construction. This catalogue contains 72 pages, a large part of which is illustrations of buildings in all parts of the United States and Canada under construction and completed, and where the Turner system has been employed. The opening pages deal with the adaptability of this system to various forms of construction, column tests, ornamental concrete work, etc. This is a splendidly prepared catalogue.

Market Conditions

Toronto, Feb. 13th, 1909.

The cement market is still dull and depressed, and the manufacturing plants are not looking for any immediate change. Although the Ontario and Eastern demand is far from encouraging, the Western market shows signs of improvement. During the month the Canadian Portland Cement Co. contracted for 80,000 barrels with John Gunn & Sons, contractors, of Winnipeg, to be shipped by water from their Port Colborne plant. This is one of the largest orders recorded in Canada. There are at present in sight constructive work that will require a large quantity of cement, but prices will be low. Much confidence exists in Canada of improved activity in business following the turn of the year. When such an improved condition of affairs does come, advantage will be taken of it in various directions to advance prices. Prices in general remain unchanged, although an advance in the price of cement is earnestly sought after by manufacturers. Dealers in supplies are looking for much more business than was obtainable during the spring season of 1908. Toronto prices in general are unchanged and are as follows:—

Broken Stone.—Broken stone in mixed sizes for making concrete vary from $1.25 to $1.50, f.o.b. Toronto, with a slight increase for smaller sizes and screenings. Gravel suitable for roofing purposes sells at $1.60 to $1.70 per yard.

Canadian and American Cement.—Prices are being quoted by a number of manufacturers at prices much below those quoted here, which are the general prices quoted up to the present time. Prices being quoted by some at present will be found exceedingly low, although it is probable that prices will be placed on a more permanent basis shortly. Canadian cement manufacturers' price to the dealer in thousand barrel lots and up is $1.55 to $1.75 in cotton bags, excluding cost of packages, on car, Toronto. For quantities up to carload lots, ex-

package, dealers' prices range accordingly, and range up to $1.85 per barrel, in cotton bags and $2.10 in wood, weight in each case 350 pounds. Bags are repurchased at 10 cents each if in good condition, there being four to the barrel; weight of bags, 87½ pounds each, net.

Concrete Blocks.—Prices for concrete blocks vary according to the quality, style, amount of material per block, etc. The following complete list of different size cores for both faced and unfaced blocks gives the prices, f.o.b. Toronto, local conditions regulating the prices to some extent: 8 x 8 x 16-inch blocks, faced, with 4-inch core opening, 22c.; 3-inch core, 23c.; 2-inch core, 24c.; corner or angle blocks, 1c. higher in each size; opening, 20c.; 3-inch core, 21c.; 2-inch core, 22c.; corner blocks same price, the proportions being 1 part cement to 5 parts gravel, and facing 1 part cement to 1½ parts sand.

English and European Cement.—Prices for English and European cements remain fairly constant at $2.50 per barrel, in wood, per 350 pounds gross.

Lumber.—The following are the quotations for lumber suitable for making forms for concrete per 1,000 feet, f.o.b. shipping points: Hemlock, 2-in. plank, $16; 2 x 4 scantling, $12; spruce, good mill culls, 2-in., $14. For dressing one or two sides the prices will be about $1.25 in advance of quoted prices, and for dressing and matching about $1.75.

Sand.—Sharp river sand of best quality, laid down at Toronto, and suitable for concrete work, is quoted at about $1.35 per cubic yard. The prices vary according to the quality, and range from 95 cents to $1.35 for other purposes.

Montreal, Feb. 12th, 1909.

Movement in building materials in general may be described as limited. Although considerable construction work is in view and builders and contractors are hopeful of a busy spring season, this has not as yet to any great extent affected the dealers in supplies. The cement market continues dull and prices are still low, with little improvement in sight. While the volume of business being done at present is small for this time of the year, there is a hopeful feeling that the spring months will witness increased activities in the building trade and that better prices will be obtained, although it is doubtful if the price of cement will increase materially for some time yet. The following are local prices:—

Broken Stone.—Crushed stone, one-inch size and over, $1 per ton, and smaller than one inch, $1.50 per ton at the quarry, Montreal. For ½-inch silica, gravel or crushed stone for concrete or roofing work, $2 per ton, Montreal, is quoted.

Canadian and American Cement.—Prices hold practically unchanged at $1.65 to $1.75 per barrel, in cotton bags, and $1.90 to $2.05 in wood, weights in both cases 350 pounds, in carload lots at Montreal.| There are four bags of 87½ pounds each, net, to a barrel, and 10 cents must be added to the above prices for each bag. When in good condition, bags are repurchased at the same figure, 10 cents each. Where paper bags are wanted instead of cotton, the charge is 2½ cents for each, or 10 cents per barrel weight. American cement, standard brands, f.o.b. mills, 85 cents per 380 pounds; bags extra, 10 cents each, and returnable in good condition at 7½ cents each.

Cement Hollow Blocks.—Those measuring 18 inches long by 8 inches high or one square foot, are quoted at 27 to 35 cents per block, the thickness being 8 inches. The cement used is 1:2:5, the face being one of cement and two of sand.

English and European Cement.—English cement is still quoted at $1.70 to $1.90 per barrel in jute sacks of 87½ pounds each (including price of sacks), and $2 to $2.20 in wood, per 350 pounds gross. Belgian cement is $1.75 to $1.85 per barrel, in bags, and $2.05 to $2.20 in wood.

Firebrick.—American firebricks sell at from $40 to $45 per 1,000, while Scotch and English prices are quoted at $40 to $50.

Lime.—Lump lime, $8 to $10 per ton, delivered in Montreal. Hydrated lime, $13 to $14 per ton, bags extra.

Lumber (for Moulds).—Quotations per 1,000 feet in carload lots, f.o.b. shipping points, at mills in vicinity of Montreal: Hemlock, 2 x 4 scantling, and 2-in. plank, dressed on one side, $15 to $18. Spruce, good mill culls, 2-in., tongued and grooved and dressed on one side, $15 to $18; rough, $1 less in each case.

Plaster.—Hard wall plaster, sanded and ready for use, $7 to $8.50 per ton, delivered in Montreal; bags extra.

Sand.—Shippers of sand, such as is suitable for mixing with cement and crushed stone, quote $1.35 per cubic yard, laid down at Montreal. This is for good, sharp river sand, washed and screened. Other qualities of sand used by builders, not suitable for concrete work, may be had as low as 90 cents per cubic yard.

Winnipeg, Feb. 12th, 1909.

The local market has been very dull for the first part of this year, but in all probability it will brighten up from this time forward.

Messrs. John Gunn & Sons, who have the contract for the municipal power plant at Point di Bois, hace already this month placed a large order for cement with a Toronto concern for 80,000 barrels of Portland cement. The price quoted in this order is said to be very low, giving small margin, and the dealers in the West are objecting to cement manufacturers selling direct, as it certainly spoils their business.

Cement for some time has been cut very low on the local market, and has been sold for some time back down around $2 per barrel, although the dealers quote the prices given below.

The building activity in the West this year has already commenced, and already the building permits for the month of February are four times as large as for the total of the whole of February last year.

The Great West Life are to erect a handsome office building, which will be of reinforced concrete construction, and when finished will be a handsome addition to the fireproof buildings in Winnipeg.

(Continued).

(Continued from page 42.)

to seismic disturbance communities do not build their houses with an eye to the occurrence of earthquakes. If that were so, the ideal material would be the Japanese arrangement of matchboard and paper. But undoubtedly this fact from Messina is another triumph for a material which is slowly but surely making its way. Two of the many advantages claimed for this treatment of concrete, in which iron wire or thin slips of steel are embedded, are illustrated by a subsidence—producing an earthquake effect on a small scale—and by a fire. In the one case the building as a whole would settle down, perhaps with a lateral tilt, without any danger of collapse. And against fire ferro-concrete is proof. Its steel skeleton is protected from the heat, and there are no immense steel beams or girders to warp under fire and pull the building to pieces.—Glasgow Herald.

The recent formation of the Concrete Institute in Great Britain directs attention anew to the rapid increase in the use of concrete. Probably it is not too soon already to say that this quarter century marks the beginning of an age of concrete. It is an age rather than the age, because it has been proved that the Egyptian pyramids were laid in concrete. There was a time not so long age that superficial thought had it that concrete was a menace to the use of steel, but no thought of a succession of ages in the modern development of the use of materials is reasonable. The developments which bring about the use of these materials do not spring of the materials, but arise from without, from the demand for materials suited to the achievement of ends already conceived. Concrete is not used, and steel is not used, because the material has recently been discovered, but because it has come to the minds of men to do certain things for which it readily appears these materials are adapted. As it is with structural steel in particular that concrete would compete if there were general competition at all, it is to be noted that statistics of tonnage production of structural shapes would show the effect, if there were a tendency to curtail the use of steel. The production of structural shapes, however, in 1907 showed only about the decrease, from 1906, which could be expected from the sudden slowing down in industry towards the close of the year. The decrease was only 9 per cent., while the production of 1907 was more than double that of any year previous to 1900. No observable inroad, therefore, was made in the consumption of structural shapes, despite the fact that steel in this form probably wears less, and involves less need of replacement, than steel in any other form, so that nearly all the work done in past years remains.—Toronto World.

CANADIAN PATENTS RECENTLY ISSUED FOR IMPROVEMENTS IN CONCRETE STRUCTURES, APPLIANCES, ETC.*

Manufacture of hydraulic cement, B. Enright, No. 113851, Sept. 1, 1908; cement-applying machine, W. F. Lambenschlager, No. 113853, Sept. 1, 1908; cement, T. Jones, No. 114007, Sept. 8, 1908; process for the manufacture of cement, W. E. Snyder, No. 115900, Dec. 29, 1908; reinforcing device for concrete structures, J. F. Sempson, No. 113864, Sept. 1, 1908; truss for reinforcing concrete construction, Owens & Wright, No. 113927, Sept. 8, 1908; reinforced concrete structure, S. Burrowes, No. 114316, Sept. 29, 1908; concrete mixer, P. A. Kœhring, No. 114591, Oct. 13, 1908; concrete mixing drum, P. A. Kœhring, No. 114592, Oct. 13, 1908; reinforced concrete, Skinner to Oneida Community, Limited, No. 114640, Oct. 20, 1908; concrete forms, apparatus for raising, Towell & Sinks, No. 114796, Oct. 2, 1908; reinforced concrete, Oneida Community, Limited, No. 114909, Nov. 3, 1908; reinforced concrete construction, R. H. Aitken, No. 114972, Nov. 3, 1908; truss for concrete construction, Maxwell to Maxwell Concrete Steel Co., No. 115040, Nov. 10, 1908; concrete mixer, S. Knisley, No. 115210, Nov. 17, 1908; concrete conveyor, Buzzel & Larkin, No. 115476, Dec. 8, 1908; concrete constructions, reinforced, T. Timaksiam, No. 115519, Dec. 8, 1908; concrete constructions, reinforced, R. T. Byers, No. 115520, Dec. 8, 1908; reinforcement for concrete or cement construction, W. C. Gabriel, No. 115957, Jan. 5, 1909; concrete cart, Baker to Sterling Wheelbarrow Co., No. 116113, Jan. 19, 1909; concrete mixer, Goold, Shapley & Muir Co., Limited, No. 116117, Jan. 19, 1909.

* Furnished by Messrs. Fetherstonhaugh, Dennison & Blackmore, Star Building, 18 King Street West, Toronto.

CORRESPONDENCE.

WHITE CEMENT AND SAND.

Sirs,—Why do not those dealers in sand, lime, crushed stone, etc., who advertise in "Canadian Cement and Concrete Review" deal in and advertise white sand and white Portland cement, as, from reading your journal, I see those goods are procurable in this world of ours, and why are business men so slow in procuring and advertising the same? If some of them do not look after these materials I will be compelled to go into a new business myself as sand and cement dealer. Why does not our Chicago friend, who signs "P. F.", advertise his enamel for concrete bricks? To the above dealers I would say, Wake up!

Peterboro', Ont. F. M.

INCREASED ECONOMY AND EFFICIENCY.

Sirs,—Any suggestions tending to increased economy and increased efficiency in the connections tabulated below will be greatly appreciated. The cost of ascertaining the merits of the various new materials advertised by personal experiment makes this course prohibitive. Special needs in my case are in the use of these materials for small concrete cottages, stores, all one and one-half and two storeys in height:—

Roofing—Is the shingle still "secundus nulli?"

Floors, walls, partitions, outside upper storey walls and gables—stucco vs. block.

Fireplaces, bathroom floors, heating, waterproofing —Is this necessary in block manufacture?

Continuous vs. single air-space block. In Canada has the former given satisfaction claimed when used without lath and plaster; that is, plastering "direct?"

Pincher Creek, Alta. G. W. H.

Cement Building Stone

Increasing favor is being shown manufactured cement stone everywhere. During the past two years the improvement in this wonderful building material has been marvellous. Architects and builders are alive to the rapid progress it is making and to its remarkable possibilities. There are few among the general public who

realize just what can and is being accomplished, especially along artistic lines, with manufactured cement stone. Endless designs are fashioned in this material, as true and perfect as skill can make them. We illustrate herewith a few designs, showing what is being accomplished along decorative lines, and from which a splendid idea of its possibilities may be obtained. During the coming

cement show, to be held in the St. Lawrence Arena, Toronto, during the week of March 1st, among the exhibits that should receive the attention of the architects and contractors those of artificial or manufactured building stone should receive special notice. The improvement in white Portland cement over the grey and the waterproofing cements have made cement stone equal, if not better, than natural stone. This stone is guaranteed not to discolor or stain, and there are no unsightly rust or saw marks. Round corners, crazing or hair cracks are overcome. Carefully-made experiments have shown its crushing strength and fireproof qualities to be greater than natural stone. It can be moulded or cast in any shape desired, or can be bent or

carved the same as natural stone. The cost, too, is a big factor in its favor. Designs may be carried out in this material at nearly any price desired, according to the nature of the work. To-day, cement stone is being recommended by many of the best architects. Excellent examples of its adaptability may be seen in nearly all our

Queen's Court Apartments, Jarvis Street, Toronto.

towns and cities. We show herewith a view of Queen's Court Apartments, Jarvis Street, Toronto, faced with cement stone manufactured by the Canadian Art Stone Co., Price Street, Toronto, to whom we are indebted for the accompanying illustrations.

WHERE TO BUY

A Cement and Concrete Trades Directory

For the Assistance of Engineers, Contractors and Purchasing Agents

For Index to Advertisers see Page 39.

Architects—Concrete.
Adamson, Jas. E. Montreal.

Bags.
Bates Valve Bag Company, Cleveland, Ohio, U.S.A.

Block Machines—Concrete
Ideal Concrete Machinery Co., Ltd., London, Ont.
London Concrete Machinery Co., London, Ont.
Mussens Limited, Montreal, Que.
Stinson Reeb Builders Supply Co., Ltd., Montreal.
Vining Bros. Mfg. Co., Niagara Falls, Ont.

Brick Machines—Cement.
London Concrete Machinery Co., London, Ont
Mussens Limited, Montreal, Que.

Building Supplies
Lewis & Sons, T., Hamilton, Ont.
Manitoba Gypsum Co., Ltd., Winnipeg, Man.
Pedlar People, Oshawa, Ont.
Siemon Bros., Ltd., Wiarton, Ont.
United States Gypsum Co., Chicago, Ill.

Cars—Dump.
Owen Sound Iron Works Co., Owen Sound, Ont.

Cement—(Portland).
Britnell & Co., Ltd., Toronto, Ont.
Commercial Cement Co., Ltd., Winnipeg, Man.
Canadian Portland Cement Co., Ltd., Toronto and Montreal.
Hartranft Cement Co., Wm. G., Montreal.
Lakefield Portland Cement Co., Lakefield, Ont.
Lehigh Portland Cement Co., Ltd., Toronto, Ont.
Mussens Limited, Montreal, Que.
Ontario Lime Association, Toronto,
Rogers Supply Co., Toronto, Ont.
Ont.
Stinson Reeb Builders Supply Co., Ltd., Montreal.
Thorn Cement Co., Toronto, Ont.
Western Canada Cement & Coal Co., Ltd., Exshaw, Alta.

Cement Testing.
Bowman & Connor, Toronto.
Donald, Dr. J. T., Montreal, Que.
Milton Hersey Co., Ltd., Montreal, Que.
Toronto Testing Laboratories, Toronto, Ont.

Construction—Reinforced Concrete.
Jackson, F. M., Akron, N.Y.
Loignon, A. & E.. Montreal, Que.
Noble, Clarence W., Winnipeg, Man.
Steel Concrete Co., Ltd., Montreal, Que.
Trussed Concrete Steel Co. of Canada, Ltd., Toronto.

Crushers.
Mussens Limited, Montreal, Que.

Engineers—Reinforced Concrete.
Gearing, H., Toronto, Ont.
Gunn & Sons, John, Winnipeg, Man.
Hunt & Co., Robt. W., Montreal, Que.
Loignon, A. & E., Montreal, Que.
Newman & Co., Wm. Winnipeg, Man.
Trussed Concrete Steel Co. of Canada, Ltd., Toronto.

Fire Bricks.
Ontario Lime Association, Toronto, Ont.
Stinson Reeb Builders Supply Co., Ltd., Montreal.
Williamson, J W., Montreal, Que.

Fireproof Materials.
Ormsby, Ltd., A. B., Toronto, Ont.
Rogers Supply Co., Toronto, Ont.
Taylor, J. & J., Toronto, Ont.

Floors—Bridge, Warehouse.
Expanded Metal and Fireproofing Co., Ltd., Toronto.

Gearings—Cast Steel and Iron.
Owen Sound Iron Works Co., Owen Sound, Ont.

Guards—Window.
Canada Wire Goods Co., Hamilton, Ont.
Greening Wire Co., The B., Hamilton, Ont.

Joist Hangers.
Taylor Forbes Co., Guelph, Ont.

Lime.
Ontario Lime Association, Toronto, Ont.

Machinery—Cement and Concrete.
Cement Tile Machinery Co., Waterloo, Iowa.
Hepburn, John T., Toronto, Ont.
Mussens Limited, Montreal, Que.
Owen Sound Iron Works, Owen Sound, Ont.
Senator Mill Manufacturing Co., Galt, Ont.

Mills—Ball and Tube.
Owen Sound Iron Works, Owen Sound, Ont.

Mixers—Cement and Concrete.
Goold, Shapley & Muir, Ltd., Brantford, Ont.
London Concrete Machinery Co., London, Ont.
Mussens Limited, Montreal, Que.
Senator Mill Manufacturing Co., Galt, Ont.
Stinson Reeb Builders Supply Co., Ltd., Montreal.
Wettlaufer Bros., Mitchell, Ont.

Moulds.
Mussens Limited, Montreal, Que.

Ornamental Iron Work.
Canada Wire Goods Company, Hamilton, Ont.

Portland Cement—(see Cement).

Plants—Cement.
Owen Sound Iron Works, Owen Sound, Ont.

Pulverizers.
Owen Sound Iron Works, Owen Sound, Ont.

Reinforcing for Concrete—Bonding Steel Bar, Expanded Metal, Lathing, etc.
Canada Wire Goods Co., Hamilton.
Expanded Metal and Fireproofing Co., Ltd., Toronto.
Greening Wire Co., Ltd., B. Hamilton, Ont.
Mussens Limited, Montreal, Que.
Noble, Clarence W., Winnipeg, Man.
Stinson Reeb Builders Supply Co., Ltd., Montreal.
Trussed Concrete Steel Co. of Canada, Ltd., Toronto.
United States Steel Products Export Co., Buffalo, N.Y.

Rope—Wire.
Mussens Limited, Montreal, Que.
Greening Wire Co., The B., Hamilton, Ont.

Sand, Water Washed.
Sand & Dredging Co., Toronto, Ont.

Screens.
Canada Wire Goods Co., Hamilton, Ont.
Greening Wire Co., The B., Hamilton, Ont.
Mussens Limited, Montreal, Que.

Stone—Art.
Canadian Art Stone Co., Toronto, Ont.
Roman Stone Co., Toronto, Ont.
Ont.

Stone—Crushed, Sand and Gravel, etc.
Britnell & Co., Ltd., Toronto, Ont.
Christie, Henderson & Co., Ltd., Toronto, Ont.
Maloney & Co., John, Toronto,
Rogers Supply Co., Toronto, Ont.
Stinson Reeb Builders Supply Co., Ltd., Montreal.

Tanks.
Expanded Metal and Fireproofing Co., Ltd., Toronto.
Owen Sound Iron Works, Owen Sound, Ont.

Tiles.
Gustiana Bros., Hamilton, Ont.

Tile Machines.
Cement Tile Machinery Co., Waterloo, Iowa.
London Concrete Machinery Co., London, Ont.

Tools—Cement and Concrete.
Mussens Limited, Montreal, Que.
Wright, W. G., Hamilton, Ont.

Wire.
Canada Wire Goods Company, Hamilton, Ont.
Greening Wire Co., The B., Hamilton,
Stinson Reeb Builders Supply Co. Ltd., Montreal.

(Continued from page 42 D.)

It is stated that the dealers who had large stocks on hand last year have now got their surplus worked off, and all those who are in the cement business look for an increase in price before the spring opens.

The price of lumber has gone up, and instead of the usual discount of 25 per cent. since the 1st of February a discount of only 5 has been allowed. It is stat d that this is due to renewed activity in the building trade. We quote prices for the local market as follows:—

Canadian and American Cement.—Canadian cement manufacturers' price to the dealer in 1,000-barrel lots and up is $2.25 to $2.40 in cotton bags, excluding cost of packages, on car, Winnipeg. For quantities up to carload lots, ex-package, dealers' prices range accordingly, and are general at about $2.55 per barrel, in cotton bags, the weight in each case 350 pounds. Bags are repurchased at 10 cents each if in good condition, there being four to the barrel; weight of bags, 87½ pounds each, net.

Sand.—Sharp river sand of best quality, laid down at Winnipeg, and suitable for concrete work, is quoted at about $1.35 per cubic yard. The prices vary according to the quality, and range from $1.25 to $2 for other purposes.

POSITION WANTED

A first-class concrete finisher on sidewalks, one that can handle a gang of men, and not afraid of work, have tools of my own. Open for engagement in spring, willing to go anywhere. Address, C. TAYLOR, 1188 Queen St. West, Toronto. Tel. Park 351.

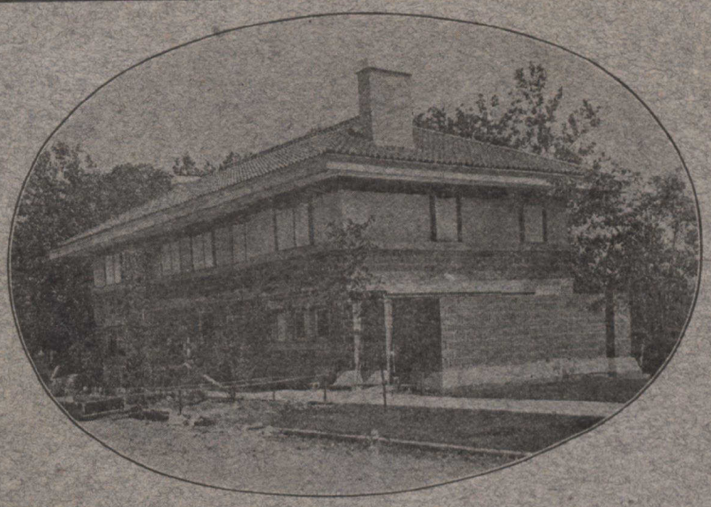
WANTED

Responsible parties to undertake the manufacture of Medusa Waterproof Compound in Canada, on royalty, under my Canadian patent. Only successful material for rendering concrete waterproof.

S. B. NEWBERRY,
Sandusky, O.

IDEAL PRODUCTS.

The Ideal Concrete Machinery Co. expect to have an excellent exhibit of their products at the coming Exhibition. They will occupy four spaces, and have spent a great deal of time in the preparation of their Toronto display, which, they believe, will be the best they have ever shown.

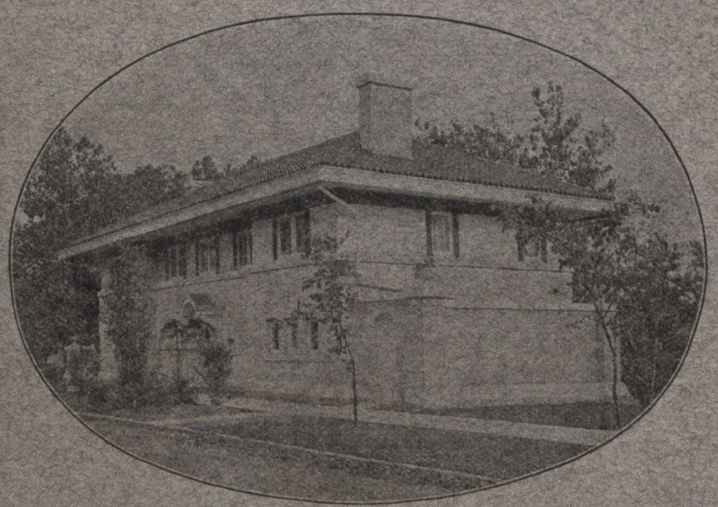


A New System of Fire-proof Stucco Construction with the IDEAL

Face-Down, Interchangeable

Concrete Block Machine

See Our Exhibit, Coliseum, Chicago, Feb. 18-24, 1909



ONE of the great advantages of the IDEAL Concrete Machine is its adaptability to stucco construction, now so popular and so rapidly growing in popularity.

Stucco construction of the "IDEAL" type is practically perfect. The stucco is applied over special IDEAL Concrete Blocks as shown in the upper illustration. These blocks provide a perfect base for stucco without expense of metal or other lathing. By the "IDEAL" system the structure is fire-proof, time-proof and offers greatest resistance to cold. It is in every respect superior to the usual flimsy wooden building covered with a shell of stucco. The lower illustration shows the finished beauty of "IDEAL" stucco construction, its cost comparing favorably with any other method.

Other advantages of the IDEAL machine are its adaptability, rapidity, simplicity and little cost of operation. On one machine may be produced practically any shape or design of block required. It is the only machine legally built on the "face-down" principle, permitting rich facing material with coarser material for back of block.

We have a complete line of Concrete Machinery, including Mixers, Brick Machines, Sill and Lintel Machines, Sidewalk, Step and Sill Molds. Illustrated catalogue free.

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