

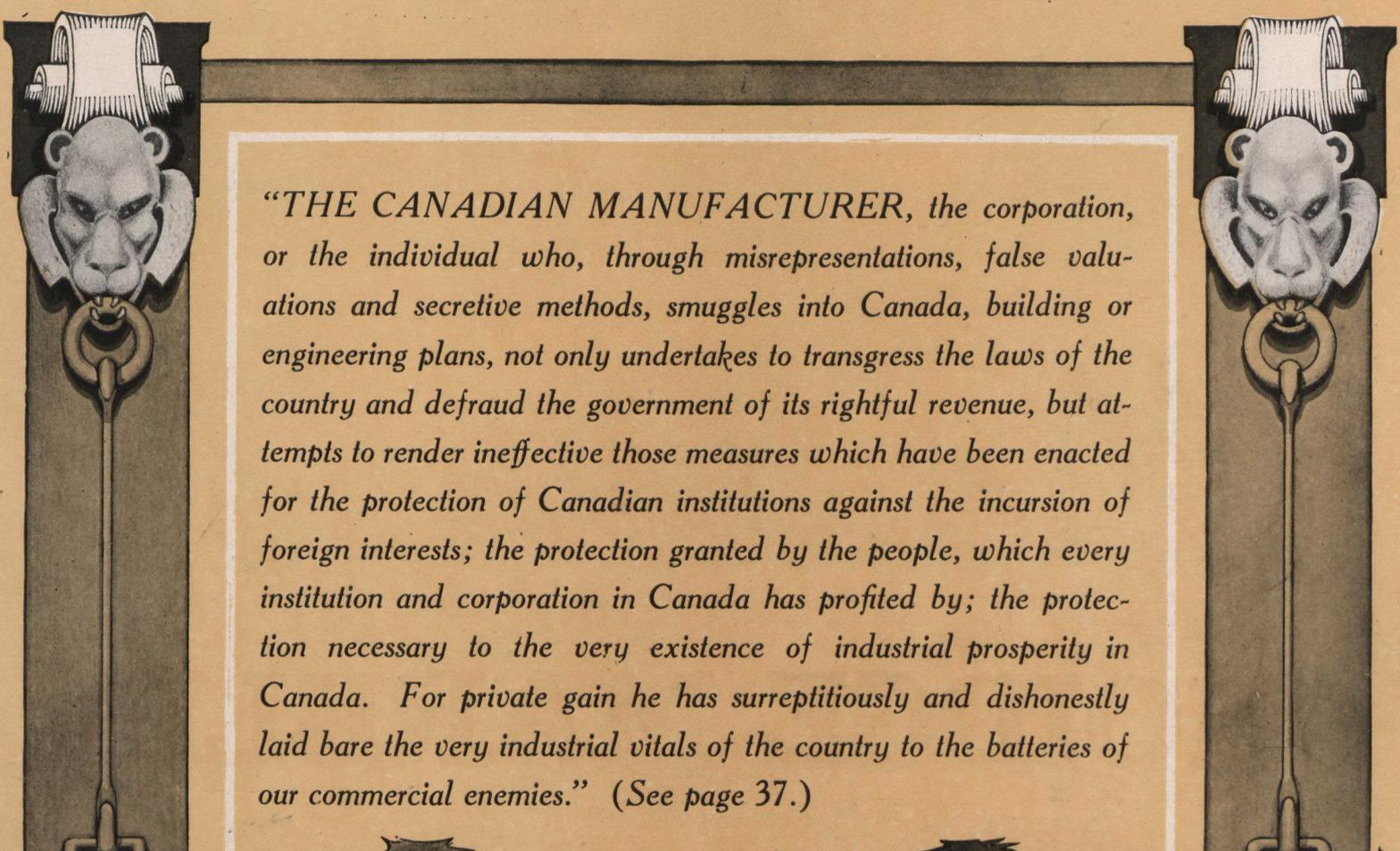
CONSTRUCTION

“ A JOURNAL FOR THE ARCHITECTURAL ENGINEERING AND CONTRACTING INTERESTS OF CANADA ”

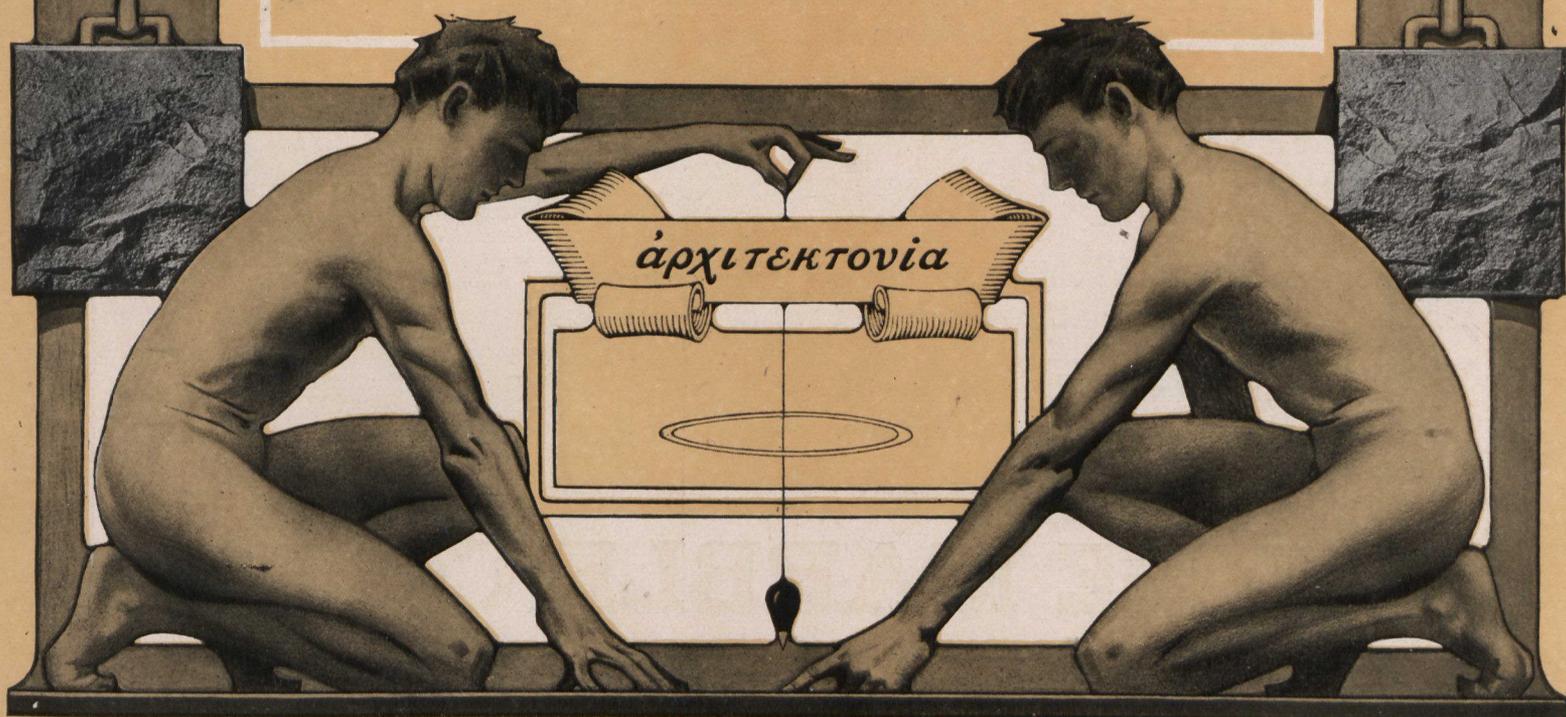
Vol. 2, No. 5.

MARCH, 1909

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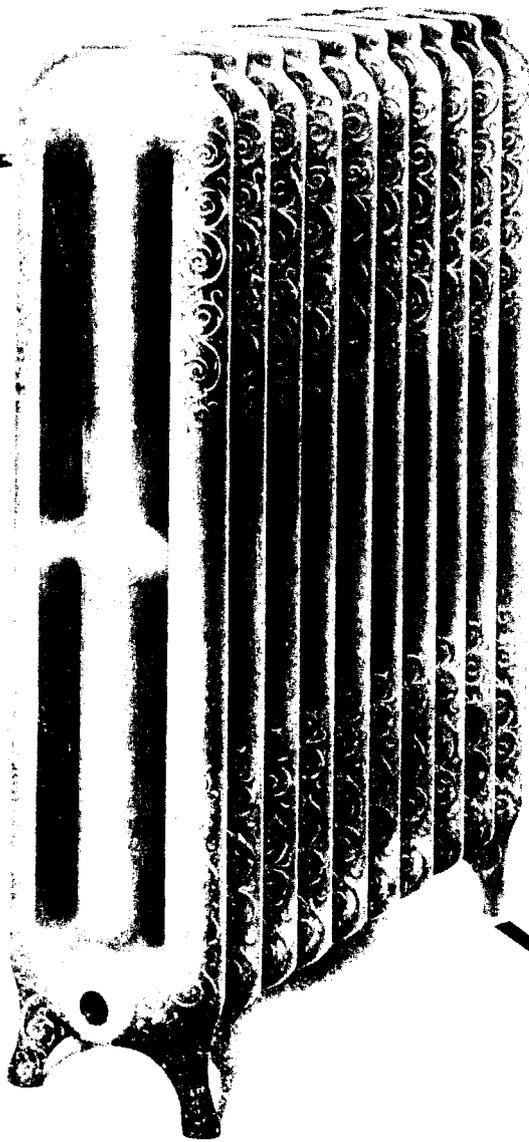
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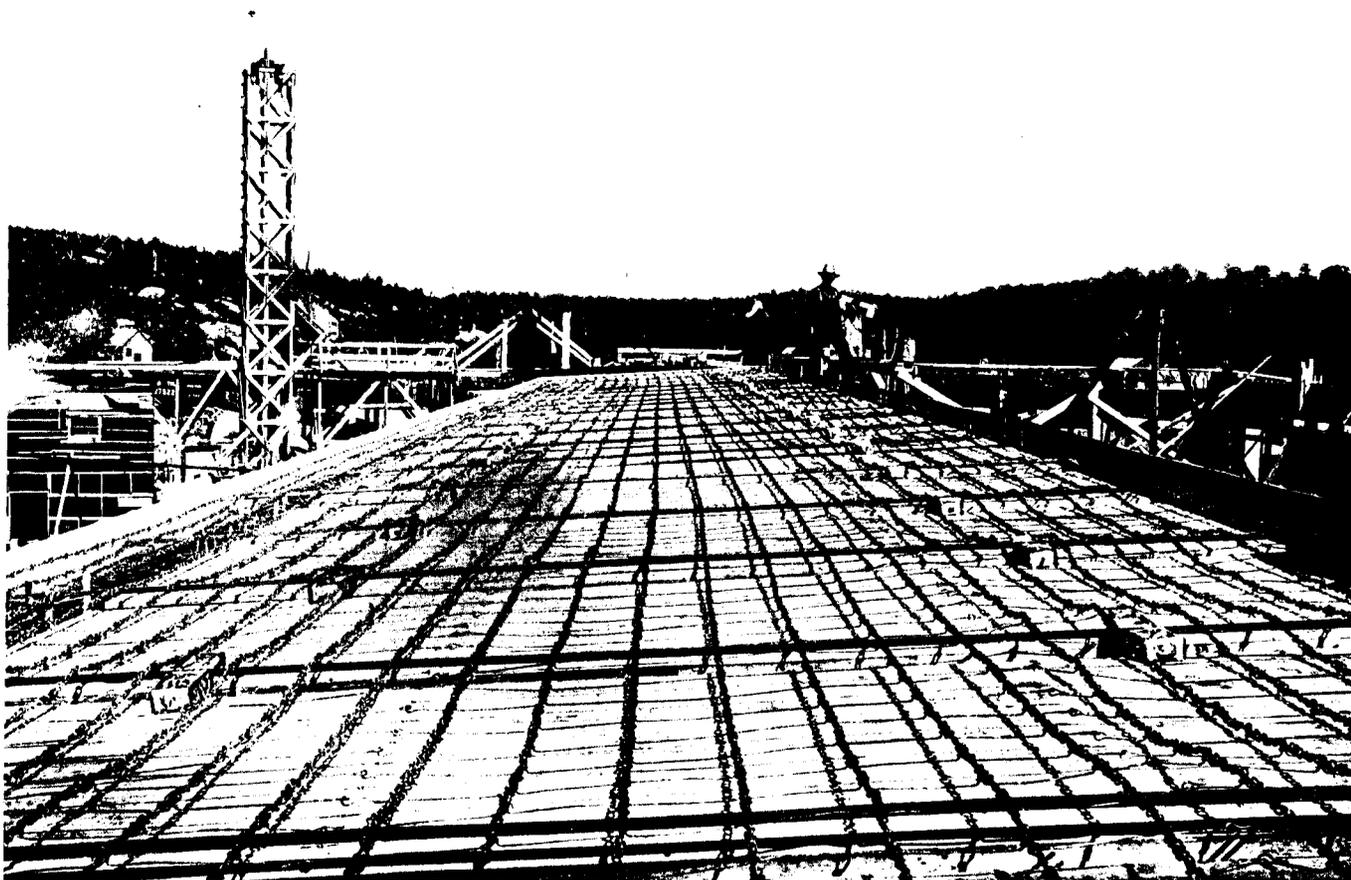
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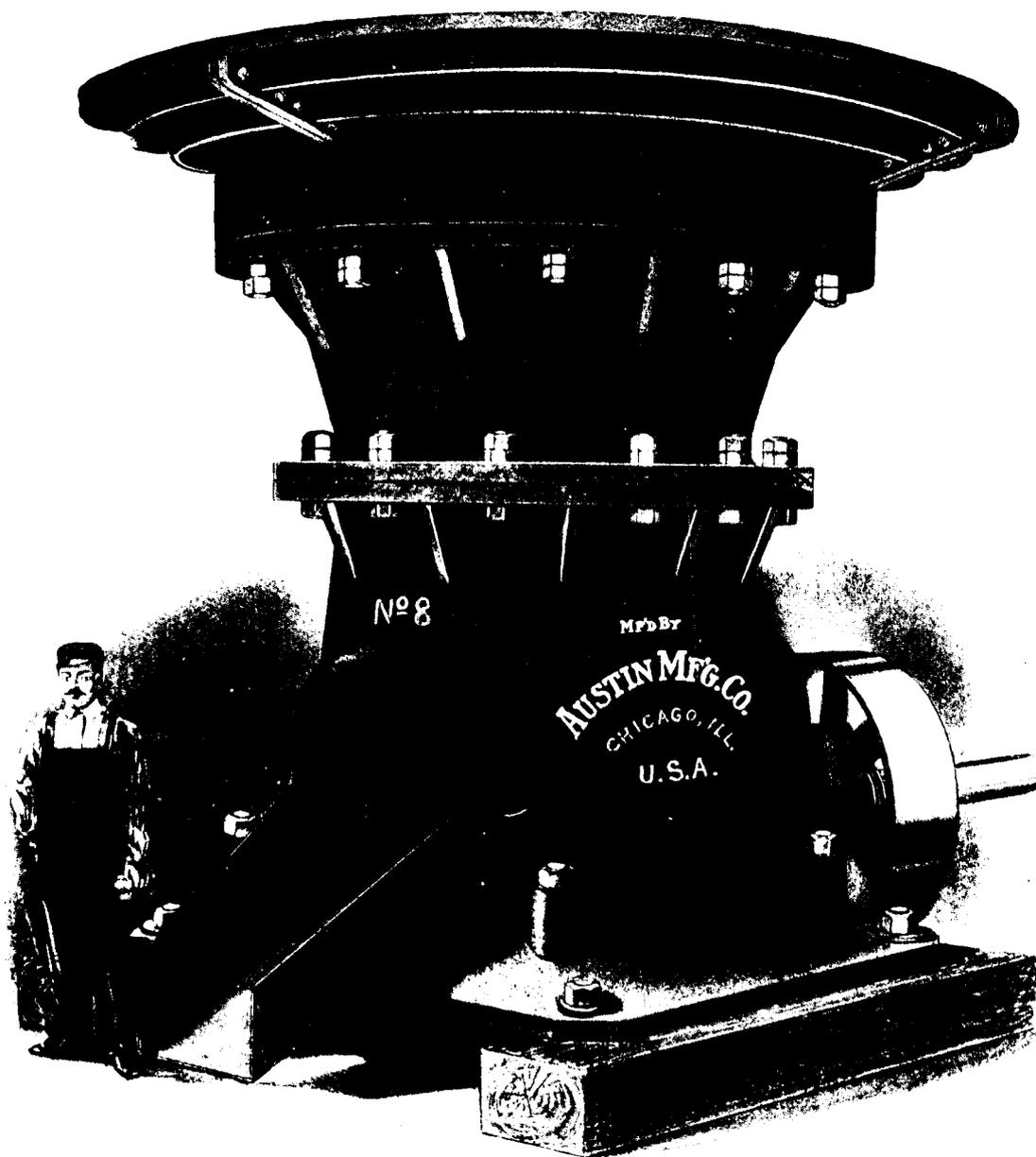
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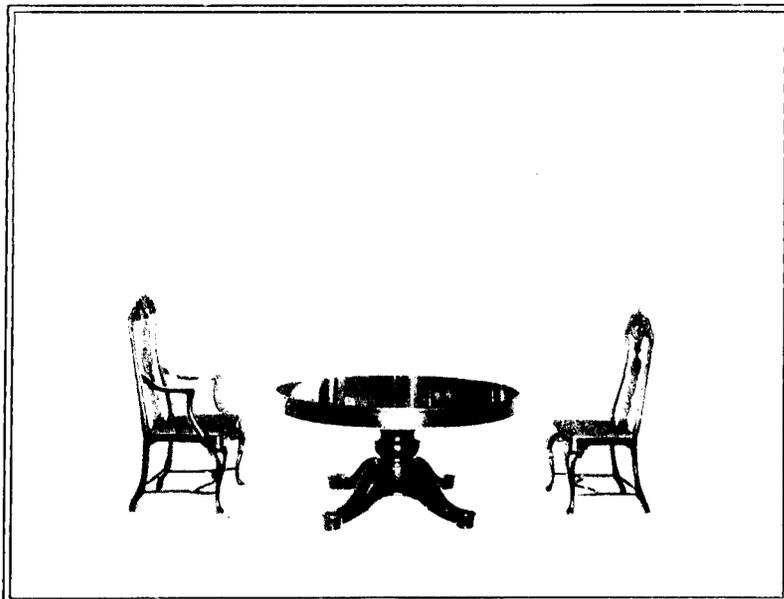
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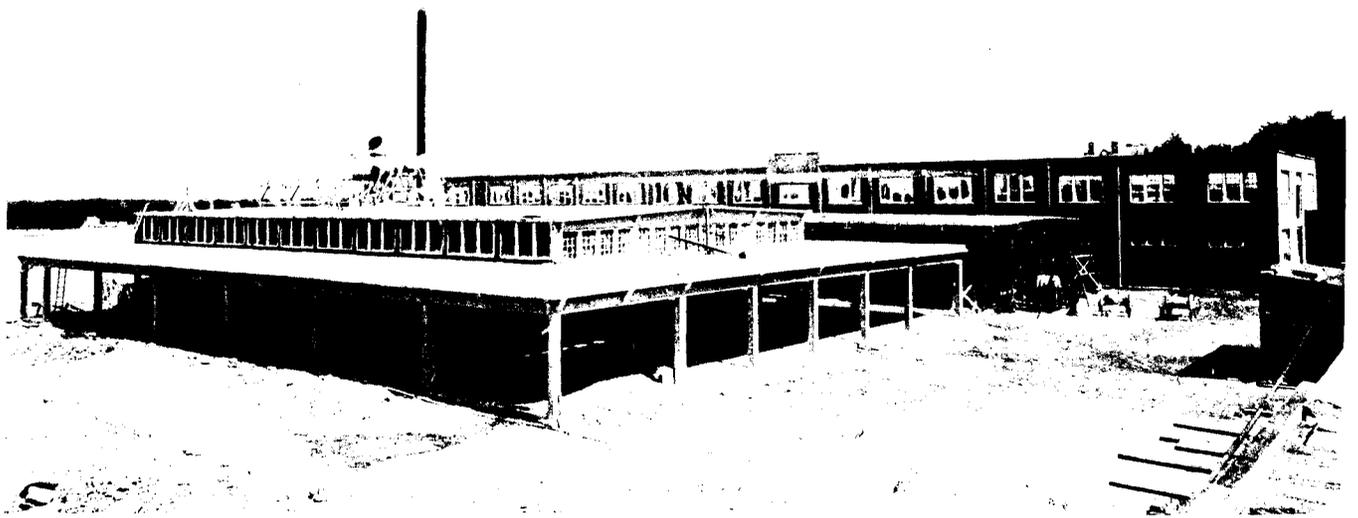
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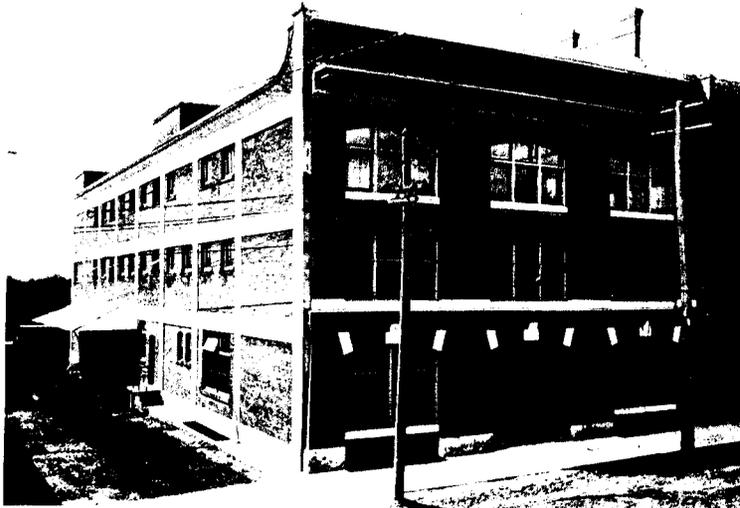
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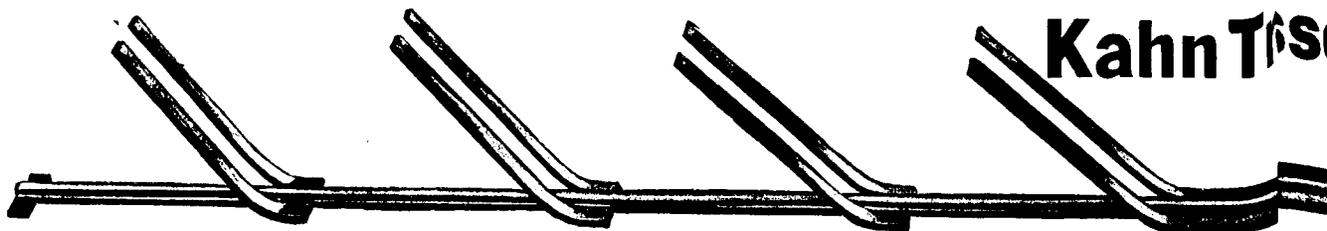


Foster & Sons' Building, Wholesale Grocers, Brantford.—Stewart & Winton, Hamilton, Architects.



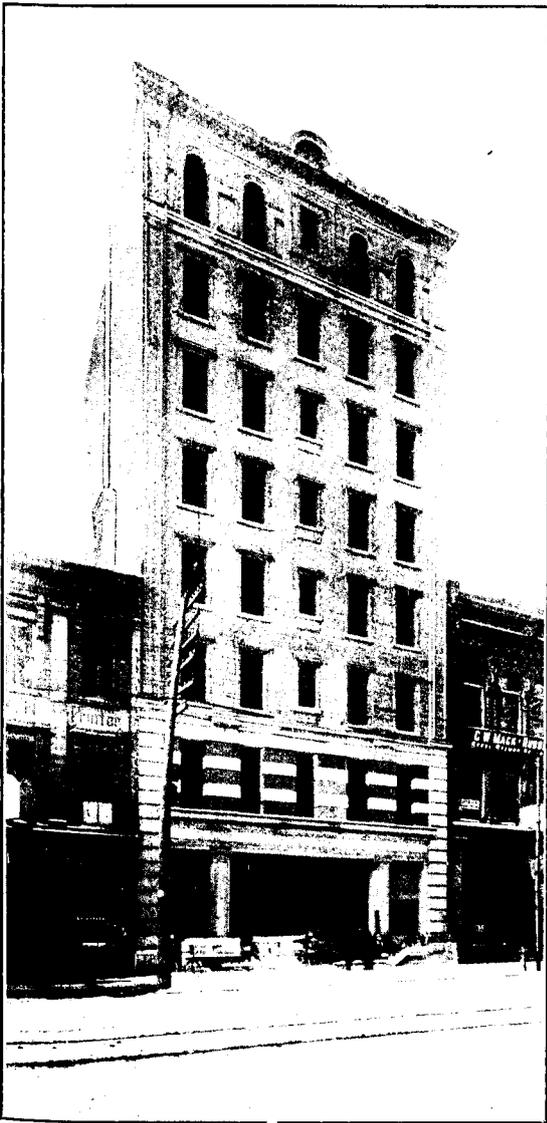
Branch Canadian Bank of Commerce, Woodstock.—Albert Kahn, Detroit, Architect.

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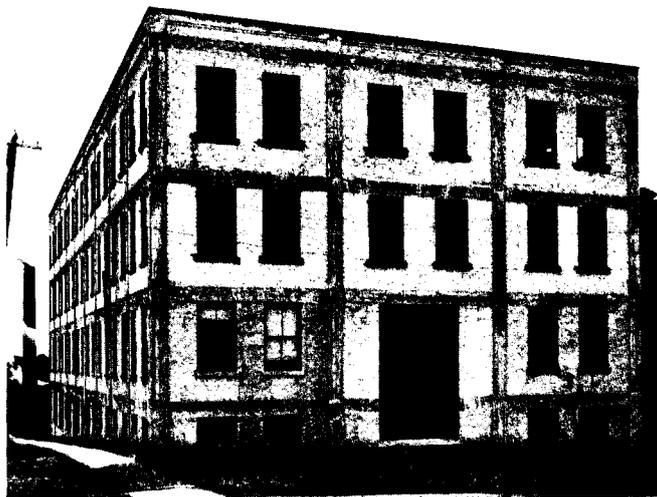


SYSTEM

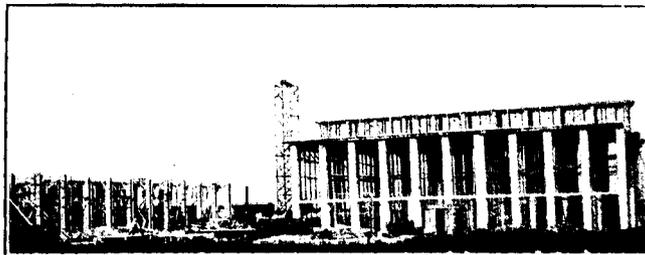
Requirement of REINFORCED CONCRETE Construction



Mossop's Hotel, Toronto.—J. P. Hynes, Toronto, Architect.



Merchants Rubber Company's Building, Berlin, Ont.—Chadwick & Beckett, Toronto, Architects.



Canadian Billings, Spencer Building, Welland.

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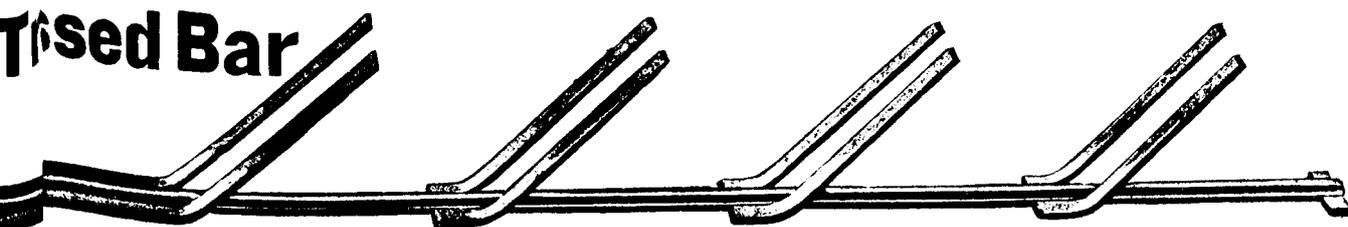
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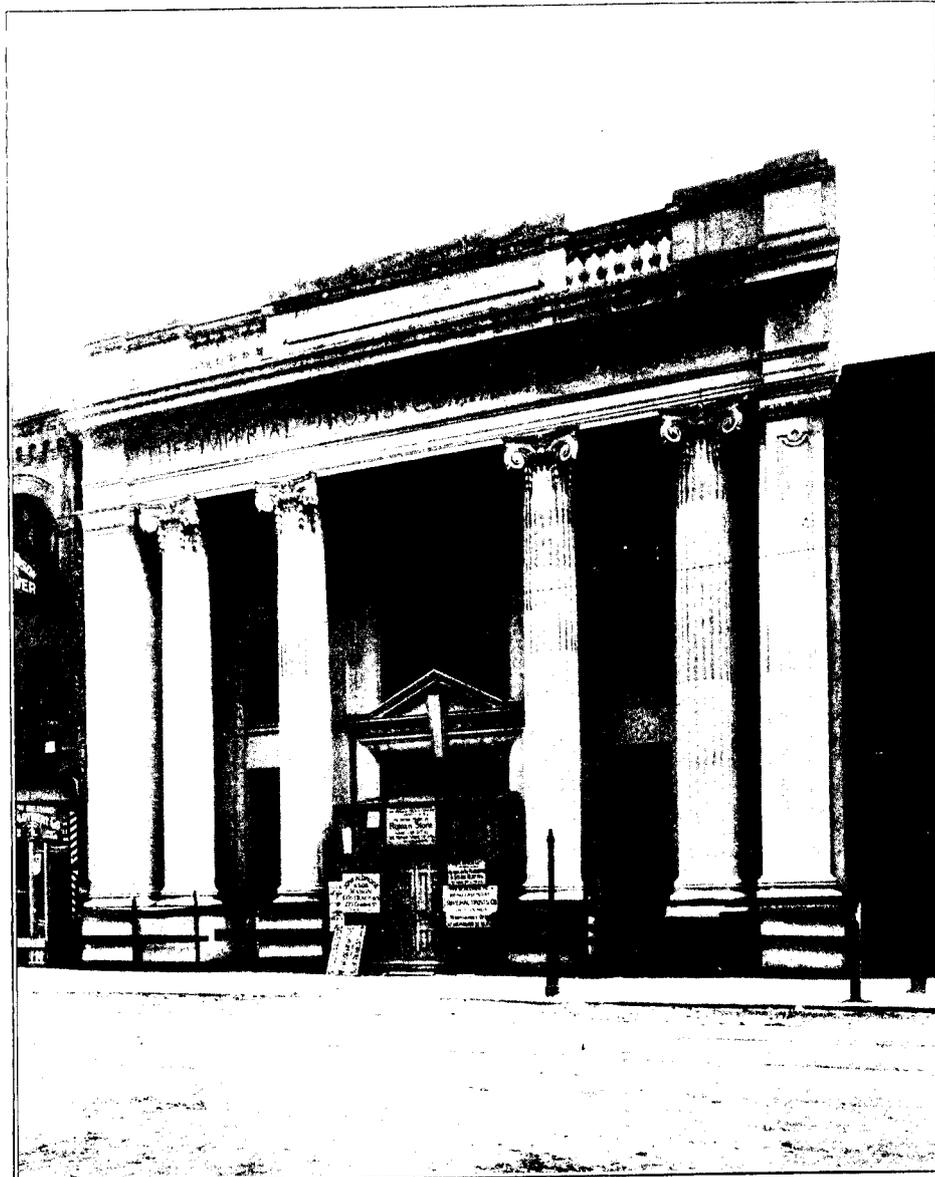
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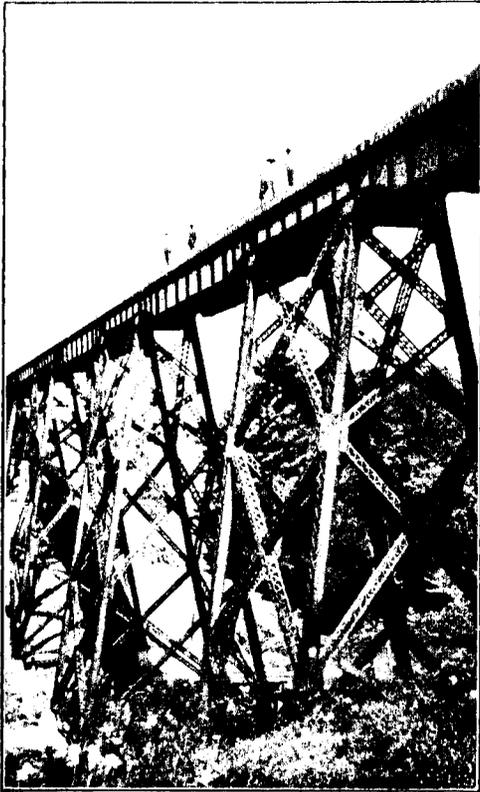
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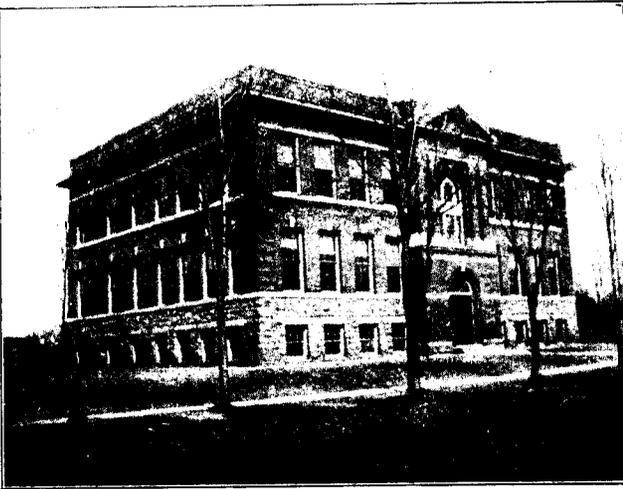
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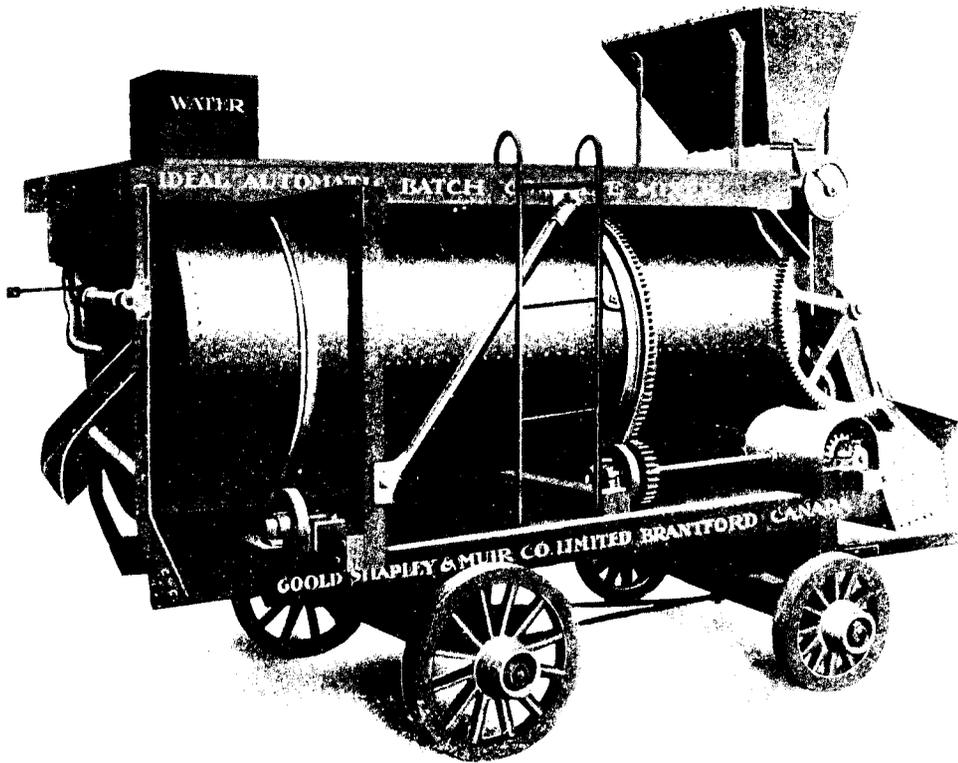
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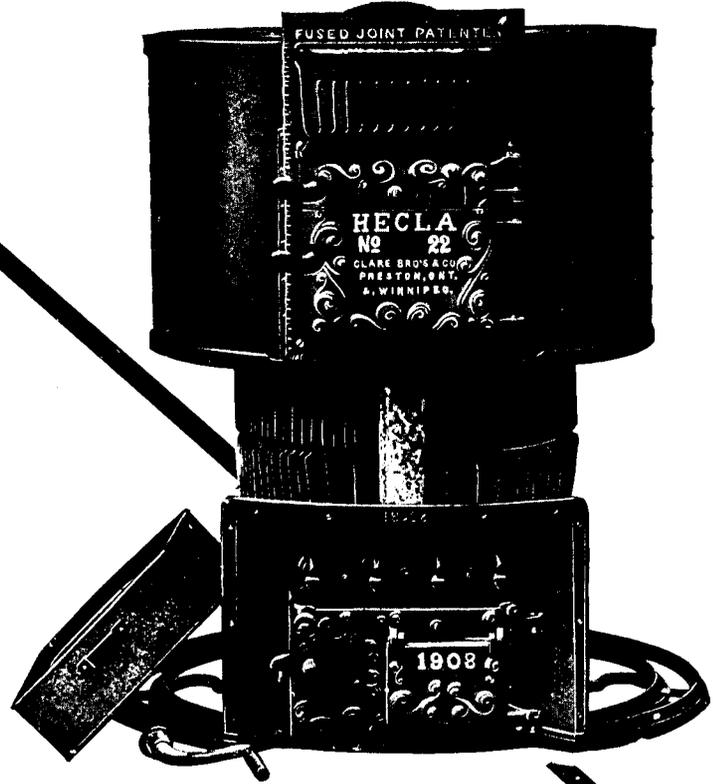
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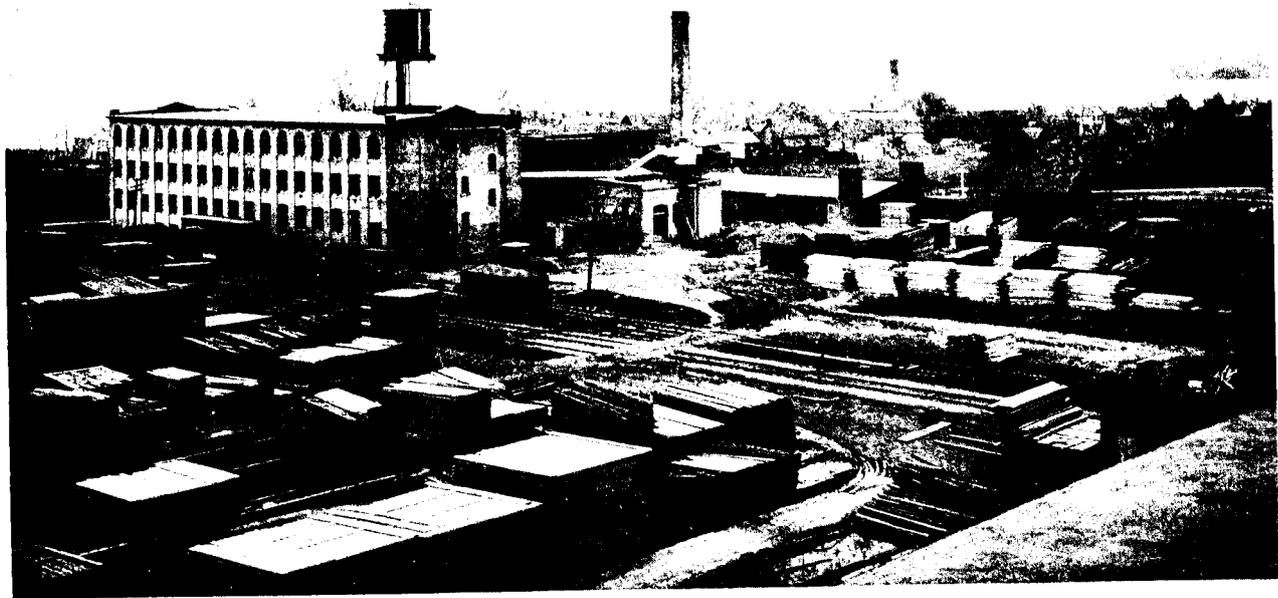
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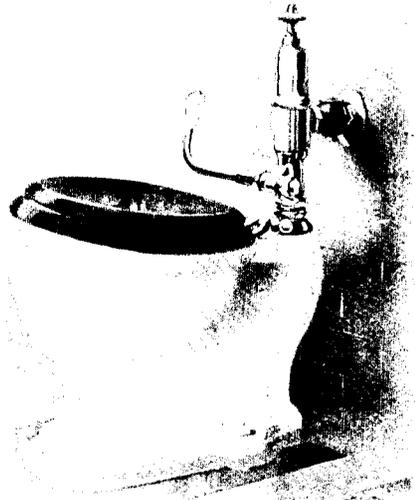
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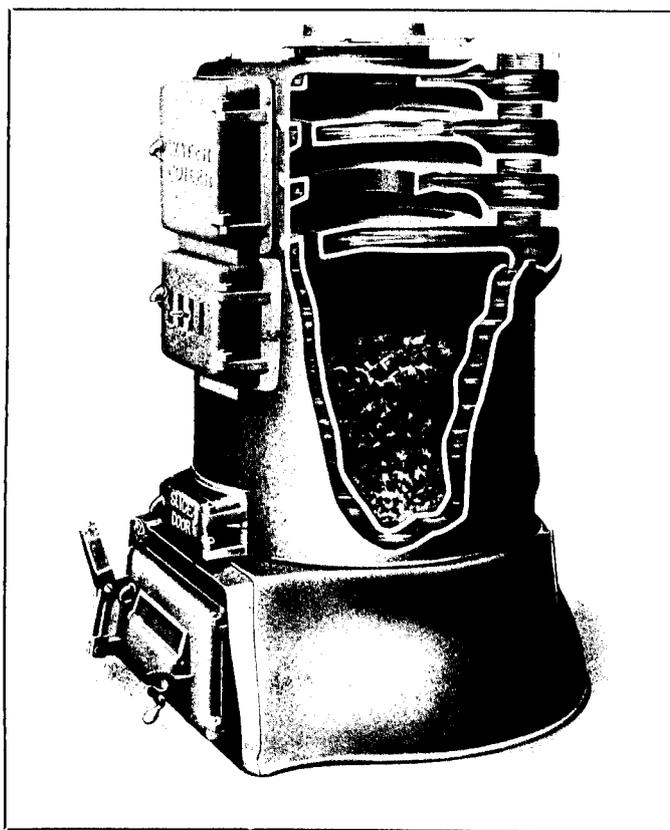
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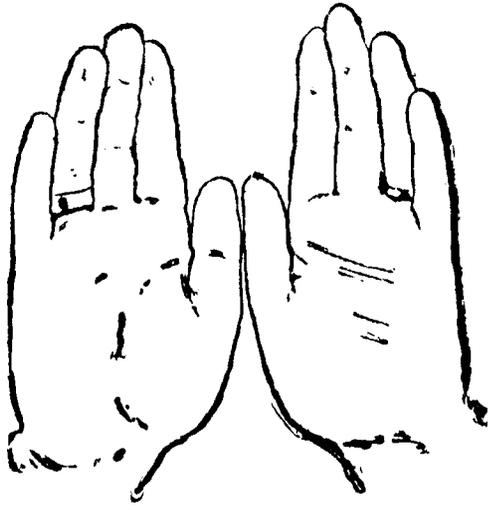
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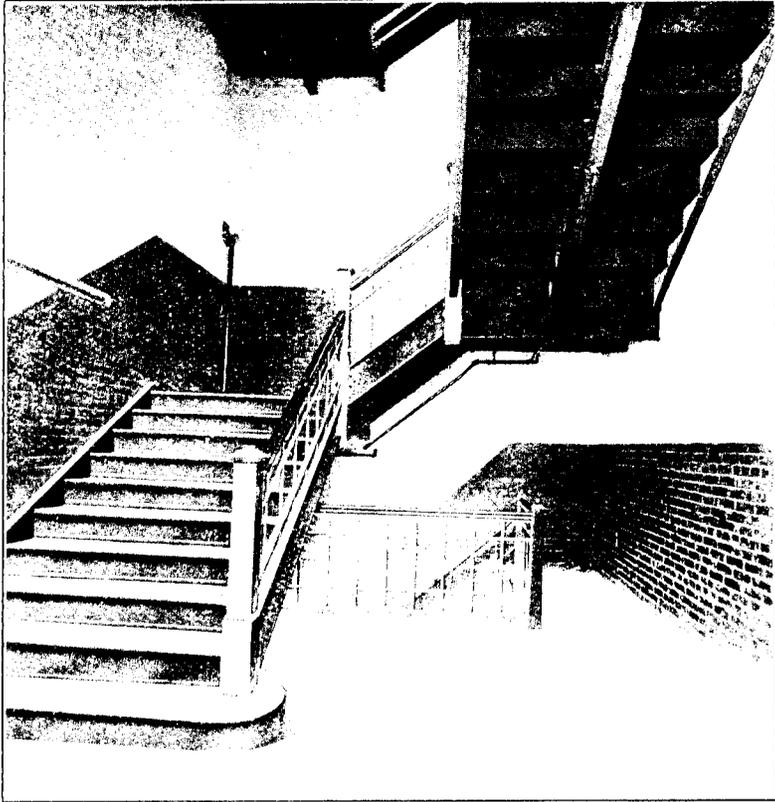
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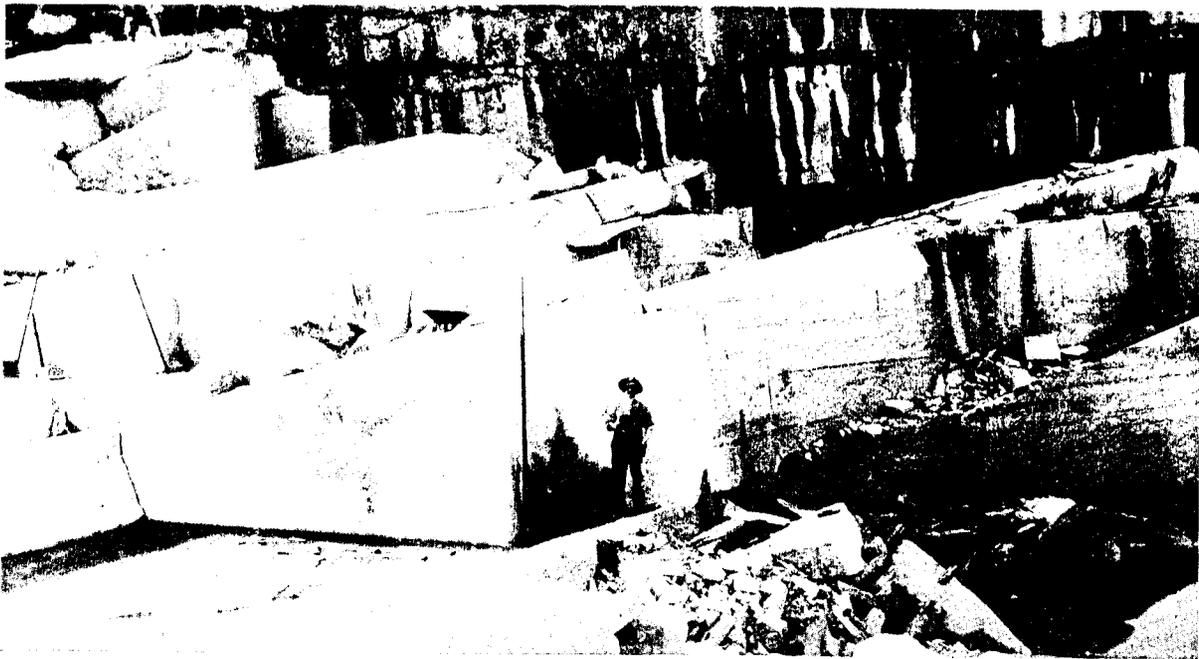
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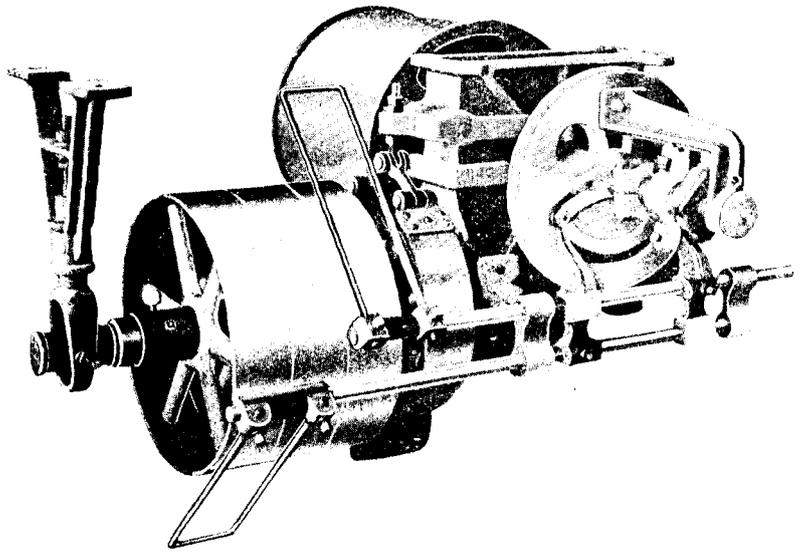


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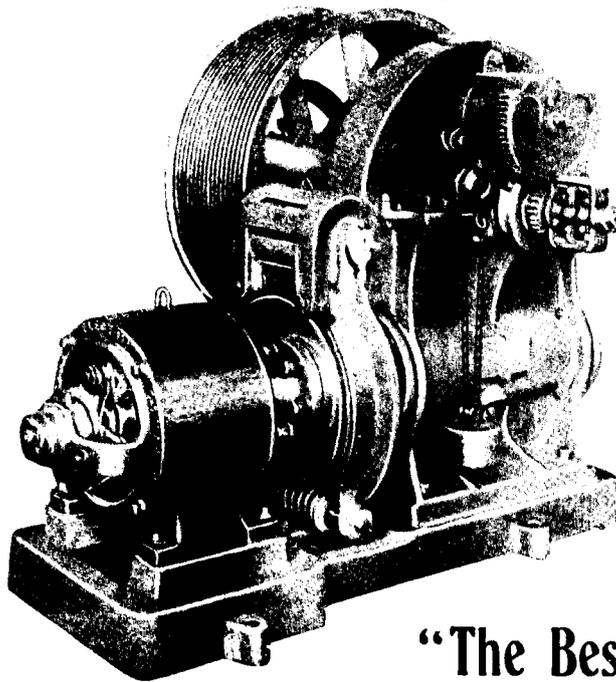
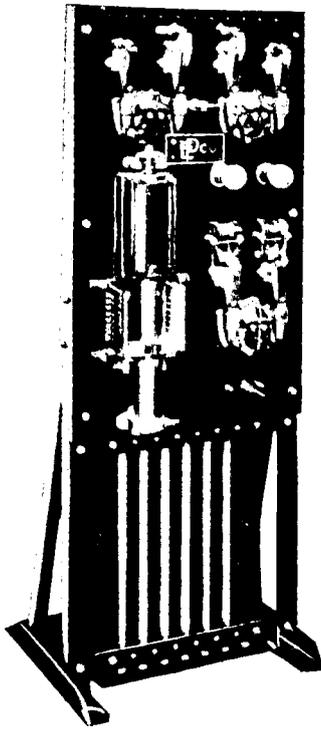


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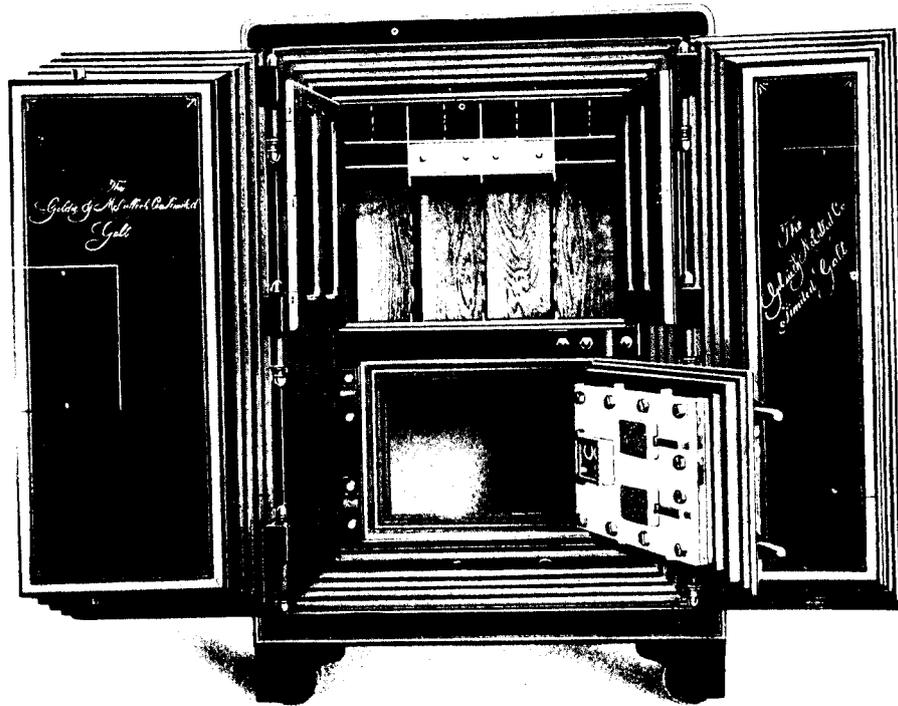


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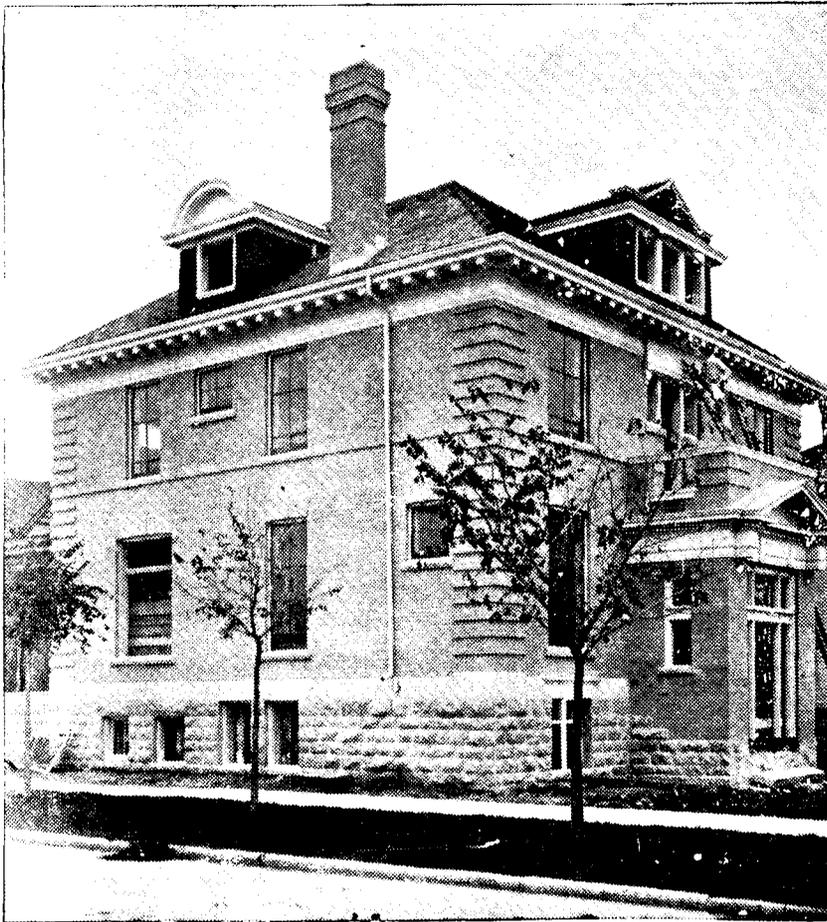
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'CONSTRUCTION'

.. A JOURNAL FOR THE ARCHITECTURAL ..
ENGINEERING AND CONTRACTING INTERESTS OF CANADA

Vol. 2

March, 1909

No. 5

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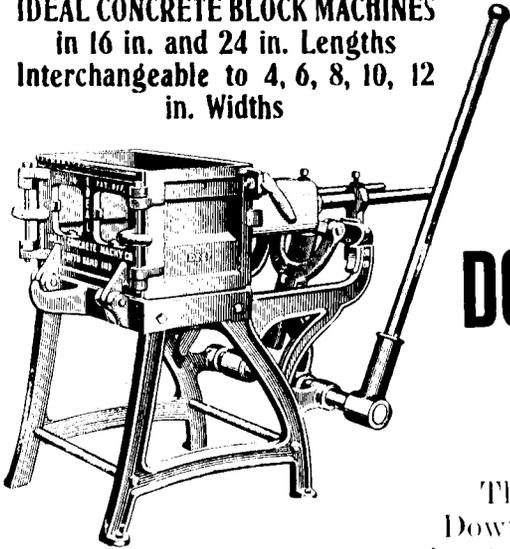
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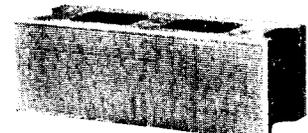
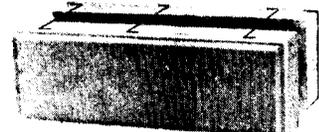
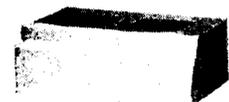
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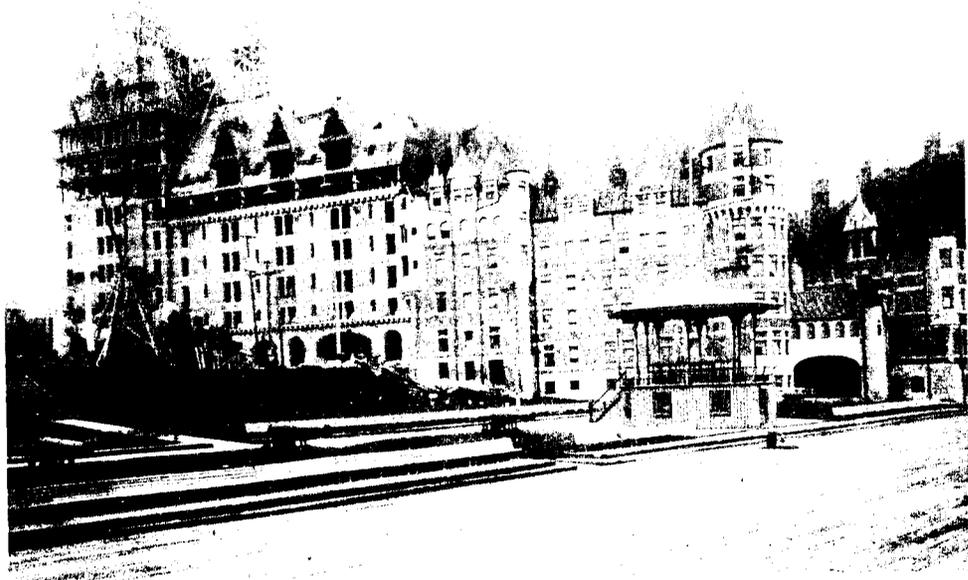
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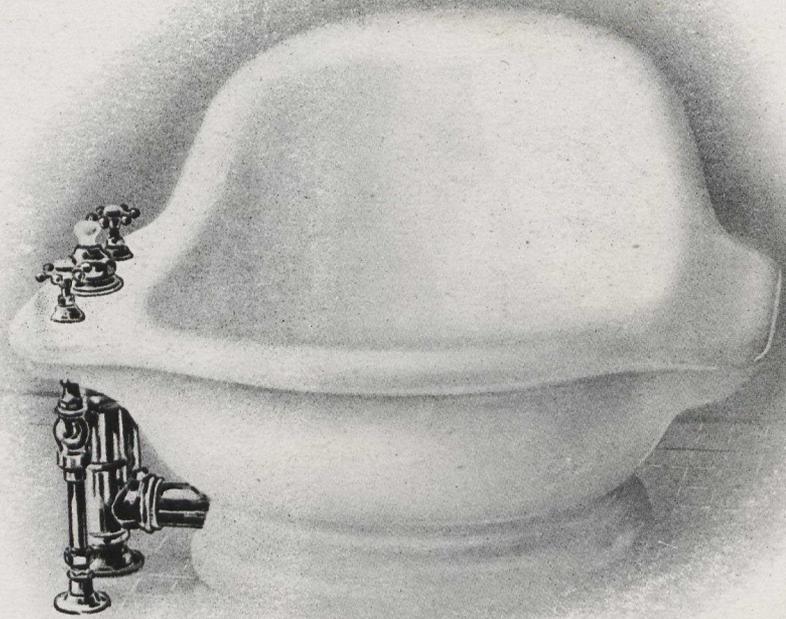
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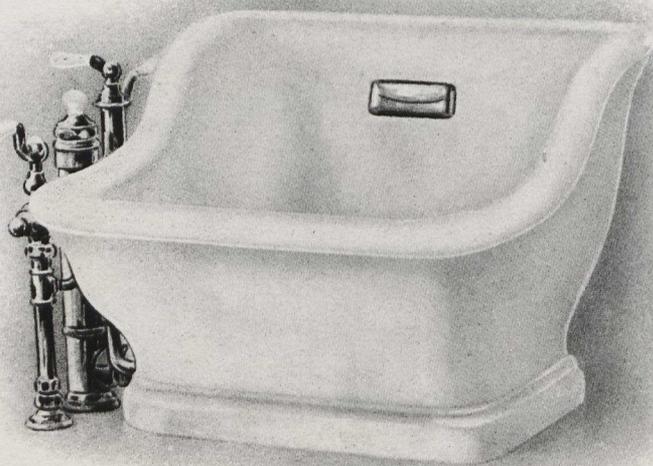


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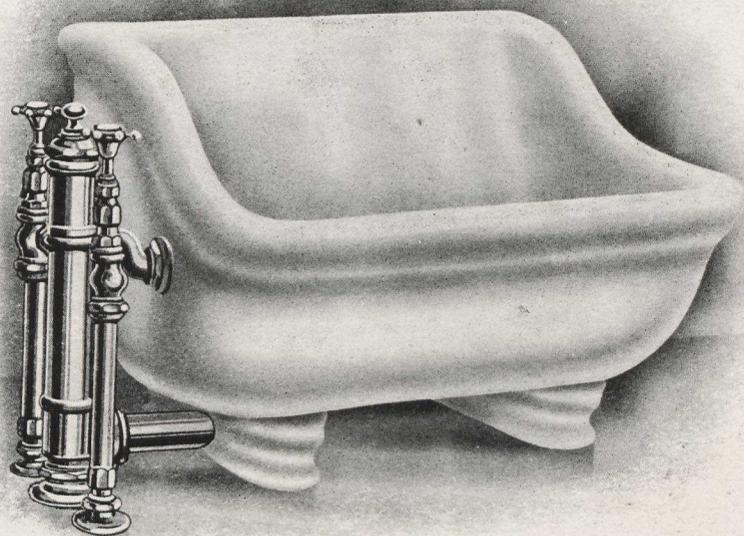
“*ALEXANDRA*” WARE—PLATE F. 030.—FIRST GRADE ENAMELLED OUTSIDE AND INSIDE SITZ BATH WITH BASE. NICKLE-PLATED, LOW DOWN BELL SUPPLY AND WASTE FITTING WITH CHINA INDEXES ON VALVES AND CHINA KNOB ON WASTE. *DIMENSIONS*—LENGTH OUTSIDE, 34 INCHES; WIDTH OF ROLL RIM, 3 INCHES; WIDTH OUTSIDE, 31 INCHES; DEPTH INSIDE, 10 1-2 INCHES.



“*ALEXANDRA*” WARE—PLATE F. 031.—FIRST GRADE ENAMELLED OUTSIDE AND INSIDE SITZ BATH. NICKLE-PLATED COMBINATION SUPPLY LIVER SPRAY, BIDET AND WASTE FITTING WITH CHINA HANDLES AND WASTE KNOB. *DIMENSIONS*—LENGTH OUTSIDE, 29 INCHES; WIDTH OF ROLL RIM, 2 1-2 INCHES; WIDTH OUTSIDE, 26 INCHES; DEPTH INSIDE, 10 1-2 INCHES.

Alexandra Sitz and Foot Baths

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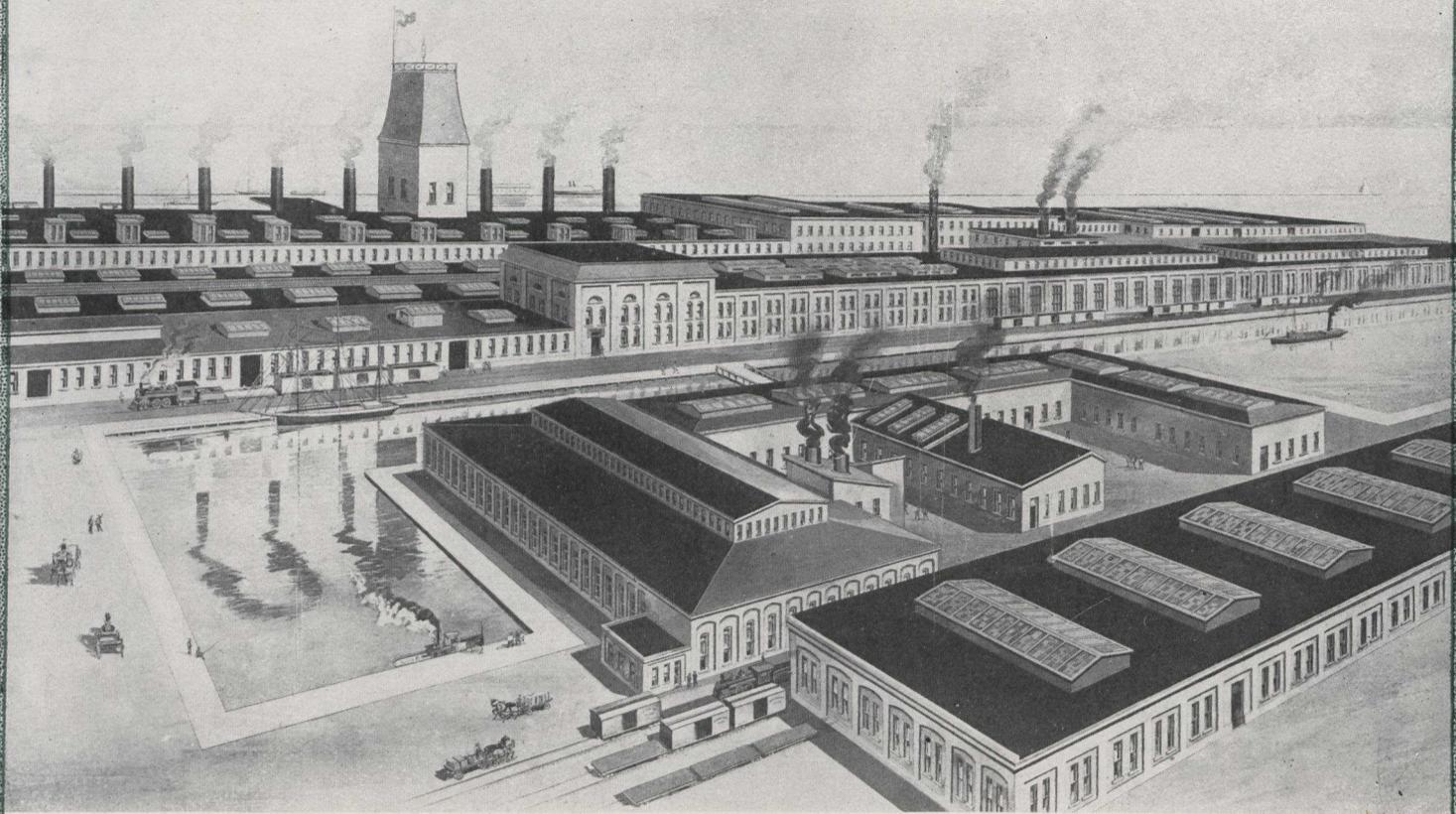


"ALEXANDRA" WARE—PLATE F. 032.—FIRST GRADE ENAMELLED OUTSIDE AND INSIDE *SITZ BATH* ON LEGS. NICKLE-PLATED BELL SUPPLY AND WASTE FITTING WITH CHINA INDEXES. *DIMENSIONS*—LENGTH OUTSIDE, 29 INCHES; WIDTH OF ROLL RIM, 21-2 INCHES; WIDTH OUTSIDE, 26 INCHES; DEPTH INSIDE, 10 1-2 INCHES.



"ALEXANDRA" WARE—PLATE F. 035.—FIRST GRADE ENAMELLED OUTSIDE AND INSIDE *FOOT BATH* ON BASE. NICKLE-PLATED FULLER BELL SUPPLY AND WASTE FITTING, CHINA HANDLES AND CHINA WASTE KNOB. *DIMENSIONS*—LENGTH OVER ALL, 22 INCHES; WIDTH OVER ALL, 19 INCHES; WIDTH OF ROLL RIM, 2 1-4 INCHES; DEPTH INSIDE, 11 INCHES.

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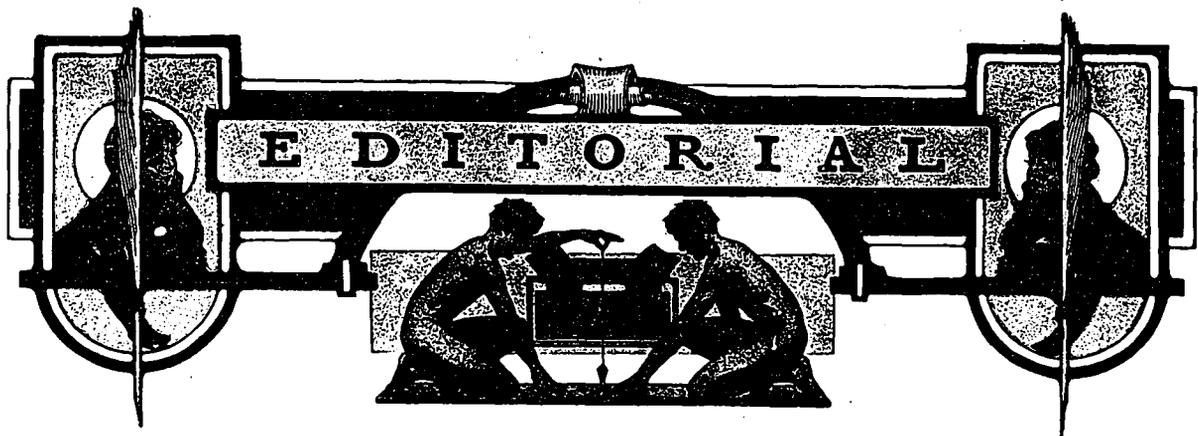
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Smuggling

IN TIME OF WAR a man who betrays the interests of his country; who places into the hands of the enemy papers, plans, secrets, information; who, being in possession of knowledge or position, undertakes to defeat the laws designed for the protection of the country to which he ostensibly owes his allegiance, if caught is courtmartialled and shot as a traitor.

The ignominy and shame associated with such a crime does not end with the extreme penalty. The name of the traitor lives for generations and is forever associated with all that is despicable, contemptible, sordid and base. He accepted of the protection of the institutions of his country while he attempted to lay bare its vitals to the fire of the enemy.

A man who, through unscrupulous methods, betrays his employer to his competitor and thereby renders ineffective the business advantages possessed by the institution which is giving him his livelihood, is dishonest, deceitful, treacherous and unsafe. A man who deliberately transgresses a rule or law of the institution with which he is employed, designed to protect the business of that institution against the unfair advantage of its competitors, is unworthy of his trust and not to be depended upon by any employer.

If such a traitor in the course of the betrayal of the institution, with which he is associated, commits an act punishable under the statutes he is sent to jail. But his punishment does not end here. Society has yet to deal with him. He is despised and distrusted and for his duplicity is marked for the remainder of his days.

Just as our government has found it expedient to enact laws for the protection of the secrets of the country; for the protection of the community against murder, theft and arson; just as the business world has deemed it efficacious to establish unwritten laws for the protection of business interests against unfair advantage of competitors, so has our government deemed it expedient to enact laws providing for import customs duties for the protection of Canadian industries and the development of Canadian enterprise, against the dumping of foreign products, made under political, social and commercial conditions, over which we, in Canada, have no control.

Individuals or corporations that conspire to defeat the objects of such laws not only lay themselves liable to punishment as provided in the statutes, but are guilty of operating against the commercial welfare of the country and for private gain render a protection, which they themselves enjoy, useless and inoperative.

In most cases where the product has a specific and tangible value, the customs authorities are successful in thwarting the efforts of professional and amateur smugglers and through a very elaborate and expensive method of customs inspection the traffic of smuggling is brought to a minimum, but in the matter of imported *Architects' or Engineers' plans*, where there is an opportunity for *misrepre-*

sented values, co-operative duplicity, tangled complications, and secretive smuggling, either through the lack of efficient and intelligent inspection, the cunning secretiveness and disloyalty of our citizens, or a combination of both, the fact remains that our customs laws, in this particular, have by no means been adequately or evenly effectively enforced.

The man who makes a profession of smuggling openly declares war with the customs authorities. He is interested in no country; the success of his business (if it may be called such) does not depend upon the protection provided by such laws, other than it renders profitable the breaking of them. He plies his precarious trade with the expectation of being punished, when caught. He is a self-declared law breaker.

But the Canadian manufacturer, the corporation, or the individual who, through misrepresentations, false valuations and secretive methods, smuggles into Canada, building or engineering plans, not only undertakes to transgress the laws of the country and defraud the government of its rightful revenue, but attempts to render ineffective those measures which have been enacted for the protection of Canadian institutions against the incursion of foreign interests; the protection granted by the people, which every institution and corporation in Canada has profited by; the protection necessary to the very existence of industrial prosperity in Canada. For private gain he has surreptitiously and dishonestly laid bare the very industrial vitals of the country to the batteries of our commercial enemies.

The manufacturer, the incorporation, the municipality, the individual that attempts to smuggle plans into Canada, is not only a law breaker, but is a traitor to Canadian institutions, just as the soldier is a traitor, who, by transgressing military law, deliberately renders ineffective the protective plans of his regiment and opens it to the direct fire of the enemy.

The architect or the engineer who, by fathering foreign building plans, conspires with the owner or the foreign architect to import plans without the payment of the rightful duties, is a traitor to his profession and to the building interests in general in Canada, just as much as the man who conspires with his employer's competitor to render ineffective, business methods adopted for the protection of the institution which gives him his livelihood.

The contractor who aids or abets the importation of foreign plans "sells his birthright for a mess of pottage."

Building and Engineering Plans

THE PRACTICE OF SMUGGLING building and engineering plans into Canada has become a common one. Buildings have been erected in almost every large city in Canada after foreign plans, upon which the rightful duties have never been paid.

The Ontario Association of Architects have repeatedly discussed the evil, and, at their last convention in Toronto, Past President Gordon dealt at some length with the question. The Ottawa Chapter of the O. A. A. has been especially active in their efforts to have this pernicious practice stopped. They have been successful in a limited degree in bringing some few owners to task in Ottawa. The attention of the Canadian Government has been repeatedly called to the rapidly growing contempt with which owners regard this portion of the Tariff laws. But of no avail. *The government is either unable or unwilling to put a stop to this contemptible, unpatriotic custom.*

The evils, growing out of the smuggling into Canada of foreign plans, are obvious. In the first place it is only right and proper that the professional man should be protected as well as the manufacturer, the corporation, or the individual who employs him. Our doctors, our lawyers, our dentists, are protected by close corporations, which practically require that a man must be a resident of the country before he can practice here.

The only protection given the architect or engineer is a duty of 25 per cent. of the architects' or engineers' commission, levied upon foreign plans and blue prints.

Why should not this part of our customs laws be as rigidly enforced as the portions that protect the manufacturer? From the standpoint of the general public, it is as important that the professions of architecture and engineering should be protected as it is that the manufacturer should be protected. If we desire to develop architects competent to do our work in Canada, we must protect the profession against unfair and ruinous foreign competition...

Experience has taught us that foreign architects employ foreign contractors, and specify foreign made materials and appliances. Canadian architects make it a practice to employ Canadian contractors and specify Canadian made materials and appliances wherever possible. It, therefore, would appear that it is very much to the country's interest to encourage the employment of Canadian architects. The United States bars our architects from practice in that country, and it may be added that there is no portion of the United States Tariff laws that is more rigidly enforced than that, dealing with imported plans.

A Toronto architect prepared plans for a house for his brother in Buffalo not long ago, but the United States' Customs authorities made such exorbitant demands that the Toronto architect was obliged to withdraw and a Buffalo architect was employed.

Recently, a United States firm of engineering contractors, who had operated in Canada from a Toronto office, and had erected several buildings for prominent Canadian manufacturers, after plans prepared at their head office in the United States, closed their Canadian office and made an attempt to take the blue prints of these several jobs back to their head office, but they were held up at the Suspension bridge, where it was necessary to provide satisfactory evidence that the plans were prepared at their United States office, before the customs authorities would pass them.

Think of it; plans prepared in the United States for Canadian structures, brought into Canada without duty, the structures erected after them here, and held up on their return by the authorities of the country from whence they came! Owners and even contractors make no secret of the fact that they have very little difficulty in smuggling plans into Canada. They have even become so bold as to put up an argument why they should not pay duty, after they have been caught.

Even the City of Toronto, when "caught with the goods," was very much annoyed to think that the government had the audacity to demand duty on the plans for the new \$800,000 filtration plant, and the absurdity of the many statements made by the city fathers showed that they were actually sincere in their protestations.

It is not to be wondered at that our Yankee friends have such a poor opinion of our ability to do things in Canada, when they read such interesting, intelligent and highly amusing matter as was provided by the city officials of Canada's second largest city, over the filtration plant controversy.

If the United States can prevent this smuggling of plans so successfully, so can Canada. Every piece of work has its architect or its engineer. If that architect or engineer is not a resident of Canada, where does he come from, and where were his plans prepared, and what is his commission? Some Canadian architect or engineer is in possession of such knowledge on every job, and it is only by conveying such information to the proper authorities that this evil will be stopped. "CONSTRUCTION" is of the opinion that any such information with regard to any individual piece of work in Canada, should be placed in the hands of the proper authorities. The source of such information will be treated confidentially. Remember that the owner is liable for duty on imported plans, even after the structure has been completed.

In the interests of Canadian enterprise, Canadian institutions, Canadian architects and engineers and Canadian contractors, we propose to find some method or means whereby this despicable practice of the smuggling and under-valuation of building plans is stopped.

*INCONSISTENT AND EGOTISTICAL CON-
TENTION OF UNITED STATES ARCHI-
TECTURAL JOURNAL.—BELIEVES CAN-
ADA SHOULD WELCOME WORK OF
FOREIGN ARCHITECT.*

COMMENTING upon Past President H. B. Gordon's address before the Ontario Association of Architects, at the recent annual convention of that Association, the *WESTERN ARCHITECT*, Minneapolis, says:

"A strong protest was made against the attitude of the government toward the foreign architect whose plans and competition was not taxed, to the detriment of the Canadian Architect, who is. We believe in this connection, that if foreigners were admitted it would elevate the standard of Canadian design, as the foreigner can often introduce a class of structure that the local architect would not have been allowed to, and thus set a pace which the business man has to follow, to the future advantage of the local architect, while by some means the "PLAN FACTORY ARTIST" should be prohibited."

It is amusing to Canadians to read the kindly advice so willingly given us, as to how we should do things, by our patronizing friends in the neighboring Republic. They are altogether too ready to prescribe a remedy for our evils, which they, themselves, refuse to experiment with. James Hill tells us how we can develop our West by letting in his railroad, tearing down our already too low tariff walls, and permitting him to carry into Canada American manufactured products and carry back over his American railroad system, our raw products to American ports, from whence they may be shipped to our own British market. Think how absurd it would sound if we should make such a proposition to the Western States. Our Yankee friends would declare us insane.

Our esteemed contemporary would have us encourage foreign architects to come into Canada, for the purpose of establishing standards in building construction, from which our own architects would eventually profit. Suppose we turn the tables and suggest that the United States should take down its barrier, against the importation of foreign plans, and allow Canadian and European architects to come into the United States and establish standards in architecture, for the reason that a foreign architect could accomplish with his client, that which would be impossible for the local architect. Suppose that this were proposed, upon the strength of the argument that the United States architect would be eventually benefited by the new standards established by the foreign architect. We ask would our esteemed contemporary undertake to advance such a policy for the United States, and expect it to meet with any degree of favor.

The United States often reminds us of a spoiled child that has had all the play things its heart desired and is not satisfied with keeping all it has, but wants everything it sees another youngster with, and even believes it within its inherent right to have it. "All that's mine is mine, and all that's yours is mine, too."

Through the laxity of our Customs Department, in collecting duty on foreign plans, we have had in Canada some experience with foreign architects, who did that with their clients which local architects could not. But the result was not as outlined by our American contemporary. We have had no new standard of excellence created through the incursion of foreigners. In fact, we have a few structures, designed by American architects, which come far from being creditable to either the architect or the owner.

Foreign architects have, however, been highly successful in inducing Canadian owners to consent to have American building materials and appliances specified in their structures; materials and appliances that could have been supplied by Canadian-made products at an even lower cost. But the United States architect does not know Canadian contractors, Canadian materials or appliances, and, as the wise man on the job, the foreign architect prevails upon the owner, to build of the materials

which he (the architect) knows and has been accustomed to specify.

There is a duty on foreign plans coming into Canada, for the same reason that there is a like duty in the United States. Duty is levied upon foreign plans for the development and protection of the profession, to encourage competent designers to come to Canada, study conditions in this country and establish a purely Canadian practice; to develop architects in this country who know our contractors, our materials, and our Canadian-made appliances, and to protect the profession in Canada against the incursion of architects out of a job, when times are dull in a country of eighty million people. What Canadian architects object to, is that the Customs law is enforced in the United States, where it is not in Canada.

The *WESTERN ARCHITECT* suggests a registration act as a means of barring the "plan factory architect," while admitting the competent designer.

An efficient registration or licensing act would do more than that. It would provide that all plans should bear the seal of their author as a guarantee that they were either planned by him or in his office by his employees, under his direct supervision. This seal would bear the business address of the architect at the time his license was issued or last renewed. It would further provide that any architect found guilty of unlawfully using his seal on plans not prepared by himself or his direct employees, under his supervision at his stated place of business, would have his license to practice, revoked. This would force the foreign architect to secure a license upon which would be stated his place of business, before he could proceed to erect a building in the province, in which such a law was in force. By this means, the Customs Department could be apprised of the fact that a certain building was to be erected after plans of a foreign architect, which would greatly assist officials in collecting the rightful duties on such plans.

On the other hand, such a law would prevent resident architects in Canada from fathering foreign plans and thereby avoiding the payment of duty. If the resident architect used his seal on plans not prepared by himself, or his direct employees in his own office, he would stand to lose his license to practice.

We have to thank the *WESTERN ARCHITECT* for so unwittingly suggesting such an effective remedy of an evil so rightfully deprecated by Canadian architects.

A CONDEMNED SCHOOL—A CONSCIENTIOUS COMMUNITY—SHORT-SIGHTED TAXPAYERS—AND THE POSSIBLE CONSEQUENCES.—A REPRESENTATIVE CONDITION.

WITHIN THE MEMORY of some of the grandfathers in a quiet, thrifty town in Western Ontario, a red brick school house was built. At the time this modest little town was duly proud of this, its seat of learning. In those early days, when Canada's men, brave and true, were cutting the paths through our rich forests, for the generation to come, the erection of a four-room brick school house was by no means a small undertaking. But realizing the importance of "book learning" this little band of pioneers accepted the responsibilities thrust upon them, and deprived themselves that they might do their duty in providing adequate educational facilities for their children.

It was a proud moment for the youngsters in that early day, when those of the higher classes were moved out of the little frame school with its long desks and benches into the "new brick school" with the modern, double, varnished desks with the covered inkwells. Time rolled on and year after year thirty or forty young men and women passed the highest examination conducted in the "big red brick school," some to later return to teach the lower forms, some to go back on the farm, some to

take up some occupation in the town, some to seek higher education, some to go to the United States, some to go West and some to get married.

Year after year it was the supreme ambition of the beginner in the little frame school to "pass" into the "big brick." When into the big brick, the next hope was to get down stairs into the third book, then upstairs into the fourth book and the entrance class, and then down stairs again into the principal's room. Year after year did this good old building thus house the children of this little town, while they were being given the first lessons in life's vexatious problems.

The town grew and the young to be accommodated multiplied and the "big brick" was no longer able to accommodate all the classes, so it was deemed expedient to move a class to a large room fitted up for the purpose, in the Town Hall on the other side of the river. In the meantime the masonry in the old school proved to be defective and great large cracks developed in the brick walls, and it became necessary to reinforce it with steel rods. This was some twenty years ago, and the lack of accommodation in addition to the very evident, unsafe condition of the "big brick" actually started a whisper intimating that it might be advisable to think about a new school.

Later the building was condemned as being inadequate and unsafe. Then there was more talk about a new school, but other local matters of apparent greater import, engaged the minds of the citizens. Still later the matter came up more forcibly and it looked almost as though the old "big brick" were doomed. But not yet. A dispute arose as to which side of the river the new school should be located, and the citizens from each side of the town became so fervent in their respective claims for the new building, that they forgot about the condition of the "big brick."

Again, a school board was elected that had strong ideas about the necessity for better school accommodations and undertook to have a United States architect from Port Huron, Mich., prepare preliminary sketches and plans. These plans were morally approved by the school board, and the citizens were asked to vote upon the issuing of \$20,000 bonds for the new school. It seemed, now that the old red brick was doomed beyond all question. But not yet.

The citizens voted against the expenditure. The architect sued the town for \$700 fees, claiming that he had been authorized to prepare plans by the Public School Board. The town claimed that the board was not authorized to order such plans. Judge McMahon rendered a decision in favor of the town. The case was appealed by Mr. Erb to the Divisional Court at Toronto, which gave a decision reversing the ruling of Judge McMahon, and thus giving Mr. Erb, the United States architect, \$125.00.

But where is the new school? The light-hearted, playful youngsters who day after day attend this, the building, which the community by its vote has declared to be the only one they will provide, little realize, when they step over the threshold of the school, that ere they come out the old building may have effected its own destruction. Parents cannot fully realize the hazardous condition of this old worn-out structure when they kiss their beloved offspring good-bye, as they hustle off in the morning "in time for school." A small fire that would reduce the least bit, the factor of safety, would bring down the roof, the floors and the walls, before the building could be partially emptied. The breaking of a supporting rod, the subjecting, by any trivial condition, of any part of the structure to an abnormal stress would bring the already condemned building down upon the

heads of the pupils, with awful, horrifying and appalling consequences.

Inspector of Public Schools W. H. G. Colles, in a recent communication to the school board of this town, made the following statement, which should at least arouse the citizens to the realization of their plain duty.

"In no one sense or particular are your school accommodations such as are required by law, by the needs of the pupils, or by any sense of the duty resting upon us.

"Better accommodations are absolutely required and it is imperative upon the trustees to provide them. I need not particularize as to the inferiority and unfitness of your accommodations. You have not anything under this head that could be made up-to-date even by expending considerable money in repairs and alterations, and the time has now come when it is your duty as trustees, and as good citizens, to build a new school house, and I must now discharge the duty that rests upon me to tell your Board that the present conditions cannot any longer be tolerated."

It appears extraordinary that a community of the present day should be so parsimonious as to risk the lives of their children in a dilapidated fire trap, rather than consent to be taxed for an adequate structure, so obviously needed. The early pioneers of this town did well to provide the structure they did. It answered the purpose well at the time of its erection, but it now must be replaced. Will the community accept its responsibilities of to-day, or will it continue to lean upon the dilapidated structure provided and paid for by their forefathers?

Again, why should a United States architect be employed? Have we not Canadians who can plan and erect a structure equal to the requirements of this town? Surely so. Would the young men reared in this community, who have gone to the United States, where they speak with boastful pride of Canada and Canadian institutions, be pleased to learn that the school to be erected in their old Canadian home was to be built in accordance with the plans and specifications of an architect from the United States? Canadians should have sufficient public spirit and national pride to see that such important institutions as our school buildings, should be designed, planned and built by Canadians. Western Ontario has several architects fully capable of designing a \$20,000 school house. Any insistent demand for a foreign architect could only come from some financially interested source.

This case we speak of is only one of the many, in smaller towns throughout the province of Ontario. Many of these towns become filled with retired farmers whose children have all grown up and who have no direct interest in the public school. Many of these old pioneers attended school in a log house and it is hard for them to understand why increased educational facilities are required to-day, and they religiously vote against every and any expenditure that will add to their taxes. Thousands of dollars will be spent in places of worship, but not a dollar for schools. It is a peculiar religion, it seems to us, that would prompt a man to spend money in a place, to worship once a week, when he refuses to contribute his share toward an adequate building in which the coming generation may safely and comfortably learn their first lessons.

The town we speak of is "Dresden," and the editor attended school in the "big brick."

We sincerely hope that ere the citizens of Dresden are awakened to the fullness of their responsibilities, the old maple and walnut trees that surround the "big brick" will not be called upon to perform the awful duty of hiding a great pile of debris in which were crushed out the lives of the little victims of unheeded danger.

MR. J. C. B. HORWOOD HAS MORE TO SAY ON PROPOSED "LICENSING ACT."—MORE PROBLEMATICAL DEDUCTIONS.

WE PUBLISH herewith a letter from Mr. J. C. B. Horwood, in which he replies to Mr. A. H. Gregg's letter, published in January CONSTRUCTION. This question, of the licensing of architects, is, without question, a live one with the profession, in the province of Ontario, and the two factions, for and against such a law, have evidently lined up for a battle royal.

Mr. Horwood has something to say also relative to the conclusion of an editorial in the same issue. Mr. Horwood's letter is as follows:

Editor, "CONSTRUCTION."

Dear Sir: Mr. Gregg, in his letter in your January number, thinks it "curious" that I should oppose a license law for architects after having made the statement in a former letter that under a license law "The licensing of architects rightly remains with the government." But Mr. Gregg has evidently not noticed that at that time I was discussing as to where the power to license architects should be placed—as to whether handed over to the members of a society of architects or placed in the hands of a government official appointed by and directly responsible to the government. If he will look up a still earlier published letter of mine he will see I thought it as unwise to place the licensing of architects in the hands of a society of architects, as it would be to place power to enforce laws relating to morals in the hands of a law and order society, or to place power to enforce prohibitory liquor laws in the hands of a prohibition society.

All of these three kinds of society have their proper function and realm of activity but their proper function and realm of activity is not the enforcing of government law that "rightly remains with the government."

I oppose a license law for architects not because, if enacted, one of its features would be satisfactory; but because the existence of the law would be detrimental to the cause of architectural education.

The curious thing about Mr. Gregg's letter is that though he professes to be an advocate of architectural education and says "All will agree that the architect should be a thoroughly trained man"....."All will surely agree that there is need of the educational facilities of schools of architecture with proper staff and equipment," he nevertheless takes the ground that without a close corporation or a license law for architects the government would not be warranted in providing proper educational facilities. He fails to see that the need of the facilities by the community is in itself sufficient warrant for providing them. If Mr. Gregg is strongly in favor of proper architectural education, he should keep emphasizing the need of the necessary facilities. To say they are not warranted is a function which rightly belongs to the government.

As to your editorials in the same issue: It seems necessary to point out to your writer that he has failed, as yet, to see the view point of "some few architects" who actively oppose registration or license law for architects.

They oppose not for the reason that "it is unwise to teach a boy arithmetic because it will interfere with his history." But they do oppose, for the reason that a law ought to be opposed, which would give a boy a certificate that he was an historian merely because he passed an examination in arithmetic.

They oppose not for the reason that "It is ill advised for an intending law student to take an arts course for fear it will interfere with his law studies." But they do oppose for the reason that a law ought to be opposed which would give a student a certificate that he was a lawyer merely because he passed an examination in the arts course.

In like manner they oppose, not for the reason that "it is injudicious for an arts student to study French because it may interfere with his English." But they do oppose, for the reason that a law ought to be opposed which would give a student a certificate that he was a French scholar merely because he passed in English.

As to the statement that a license law would not be detrimental to the cause of architectural education: Let us suppose that the study and practice of medicine in the province were in a similar condition as the study and practice of architecture is to-day, and the University had a proper course for medical students for the degree of M.D., and then the government should propose to enact a law which said in effect that every one passing an examination in "First aid" would be officially recognized as an M.D. I can well imagine the very men, who are advocating a similar law for architects, would clearly see it would be detrimental to the course of medical study and would most strenuously oppose a law which provided for only one sided and completely inadequate study of a subject in which the public are most vitally interested.

Yours very truly,

J. C. B. HORWOOD.

We heartily agree with Mr. Horwood in his position with regard to close corporations, but would say that the same argument in favor of a licensing law as compared with a Provincial Act, granting a charter making a close corporation of the Ontario Association of Architects, would forbid Mr. Horwood's drawing a comparison between the degree of protection given the public, through the existence of the Ontario Law Association, and that

which an Architects' Licensing Act would provide. In one instance, we have all laws governing the actions of the lawyer, placed in the hands of an association of lawyers for enforcement and in the other we would have the laws, governing the conduct and action of architects, enforced by a board responsible to the Government.

With regard to Mr. Horwood's contention that architects oppose a licensing law for the reason "that a law ought to be opposed, which would give a boy a certificate that he was a historian merely because he passed an examination in arithmetic, etc.," we would say that it is not the object of such a law to grant a certificate in any individual branch of architecture, but in public interest, to raise the standard of architecture, by demanding that the man who calls himself an architect, shall have sufficient knowledge of the basic principles of the profession to enable him to safely and sanely design and superintend the construction of buildings and, in the interest of the profession, by thus protecting the title "Architect."

It is not contended that a certificate as to a man's ability to design, should be granted him simply because he may have excelled in his knowledge of construction, any more than a certificate should be granted a man for his knowledge of construction, simply because he excelled as a designer, but that every man should be forced to qualify, before an impartial board of examiners, in all subjects that are essential in the practice of architecture, before he is entitled to use the title "Architect."

It is to the individual advantage of the architect, to improve his knowledge of design, for the size and character of his practice, will greatly depend upon his ability as a designer. But the community has a right to demand that the architect should have the knowledge and ability to safely and economically convert his design into the actual building.

It is true that Government qualification would not examine a student as to his knowledge of design and rendering, as thoroughly as it would his knowledge of building construction, strength of materials, laws of sanitation, and merit of investment, but if he were in possession of the latter knowledge, he would find it necessary, or at least beneficial, to develop his knowledge of design, if he desired to procure a large lucrative practice. His knowledge of the science of building construction would render him at all times a sane designer.

The owner can judge and criticise an architect's design, if he desired to procure a large, lucrative practice. knowledge of building construction.

It is very well to say that after several failures and bad jobs, the incompetent will be found out, and experience will demonstrate who is the best architect to employ, but few men ever build more than once in a lifetime, and the community has a right to protect the public as well as the owner against these failures, necessary to demonstrate to the public whether a man is an architect or not.

A GENERAL SPECIAL MEETING OF the members of the Architectural Institute of Canada will be held in the rooms of the Ontario Association of Architects, 94 King street west, Toronto, on April 6th, at 10.30 a.m. The business of the meeting will consist of the election of a vice-president, the opening of a letter ballot for the admission of Associates and the transfer of Associates to the Fellow class, and the transaction of other matters which may arise. At 9 a.m., previous to the general meeting, the council of the Institute will confer with representatives of the various Canadian architectural bodies regarding the proposed federation of all architectural societies of the Dominion. The lectures will be delivered by Messrs. H. B. Gordon and J. P. Hynes, both fellows of the Institute, and the members of the Council will be the guests of the Toronto Chapter of the Ontario Association at their fortnightly luncheon.

THE KITCHEN-TO-THE-FRONT HOUSE.---An Arrangement in Domestic Architecture Which Marks a Departure from the Conventional Plan.---All Rooms Admirably Grouped.---Recessed Ingle Nooks a Feature.

TO PLACE THE KITCHEN to the front of the house, and the drawing-room at the rear, is an arrangement in residential planning which, to the average person, might suggest an order of things wholly revolutionary.

This is because the average person has been accustomed to find in most homes a somewhat conventional from-the-front-to-back layout of rooms, to which the kitchen-to-the-front variety is the direct reverse.

While not an unknown quantity, this reversed type of residence is nevertheless quite uncommon, and, as a rule, the fact of its existence is more or less obscured by exterior lines, which suggest nothing radically different from the usual order of things within.

A very attractive domicile of the character is to be seen in the accompanying illustrations. It is the home of Mr. John Martin on Lowther avenue, near Walmer road, Toronto, and was originally designed by Architects Eden Smith & Son as a residence for Mr. A. E. Plummer. It is a pleasing conception of domestic architecture done in brick and stone, with arched entrance, niched balcony and low broad eaves, to the right of which the wall rises in gabled effect.

A usually characteristic feature of a building of this sort is the side or rear verandah. In this particular case, it is at the rear affording more privacy and comfort than it would if in its much wanted place at the front of the house.

Over the verandah, between the bays of the second storey, is a balcony, sheltered from above by an overhanging dormered roof. This portion of the house overlooks a well kept terrace and lawn, and is equally as pleasing in appearance as is the front.

On the interior a most excellent arrangement has been worked out. From the porch one passes through the vestibule and enters a large hall around which are grouped various rooms on the ground floor.

The plan, while compact and permitting of direct communication between the various rooms, yet virtually separates the living rooms from the service department.

The kitchen, notwithstanding its location next to the entrance at the front, is well removed from the other portion of the house. It can be reached either through the rear of the main hall or from an entrance at the side, which leads into the service passage, and also affords access to the basement. The service passage is equipped with a built-in china closet and shelves, and provides direct connection between the kitchen and the dining-room at the rear.

On the other side of the hall from the kitchen, at the front of the house, and equally as well sequestered, is the library, while immediately behind it, opening off the reception-room and adjoining the dining-room, is the drawing-room. The space between the library and drawing-room has been advantageously utilized to provide each of them with an inviting inglenook.

This feature has been carried out in a very novel manner. In each of these rooms, the fireplace is located in a recessed portion, having a low ceiling and permanent settees on either side. The design and treatment varies according to the character of the room in which they are located, and built-in mantel shelves and plate rails add to the

snugness and coziness of the two, the effect in the drawing-room, with small leaded glass corner cupboards, being particularly good.

Both the drawing-room and dining-room open directly on to the verandah, from which a doorway leads into the conservatory, which is situated at its right. Access to the conservatory can also be obtained from the drawing-room, off of which it really opens.

All of the rooms on this floor are finished with hardwood and adamant plaster, the walls in the dining-room



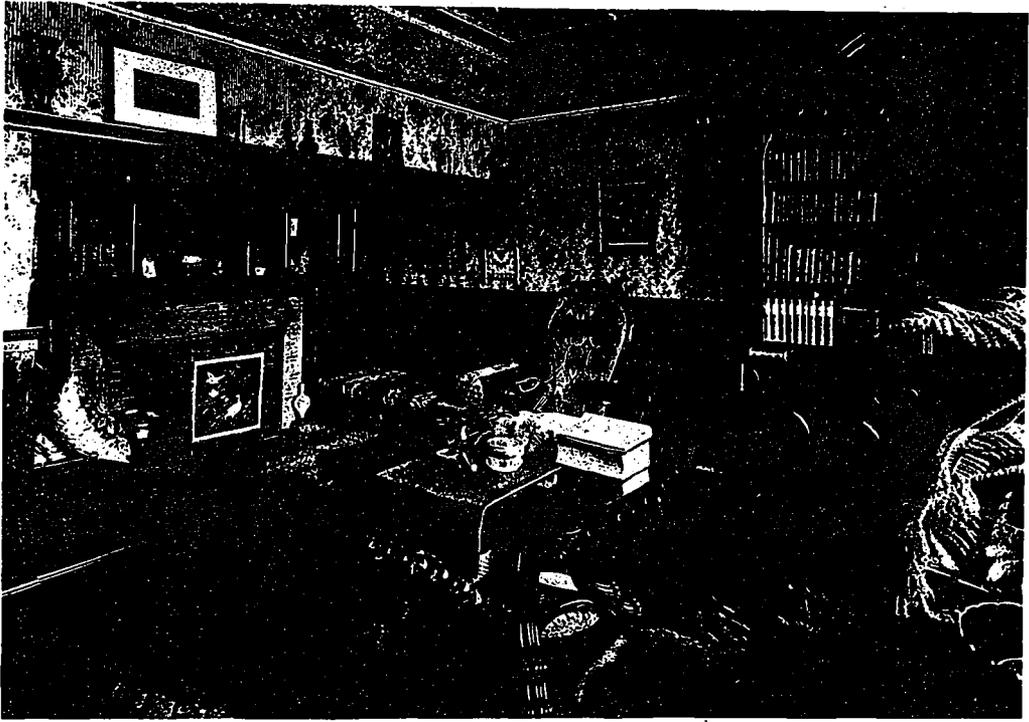
FRONT VIEW, RESIDENCE OF MR. JOHN MARTIN, TORONTO. THE KITCHEN IS LOCATED AT THE FRONT IN THE VINE COVERED PORTION TO THE LEFT OF THE DOORWAY ON ENTERING. MESSRS. EDEN SMITH & SON, ARCHITECTS.



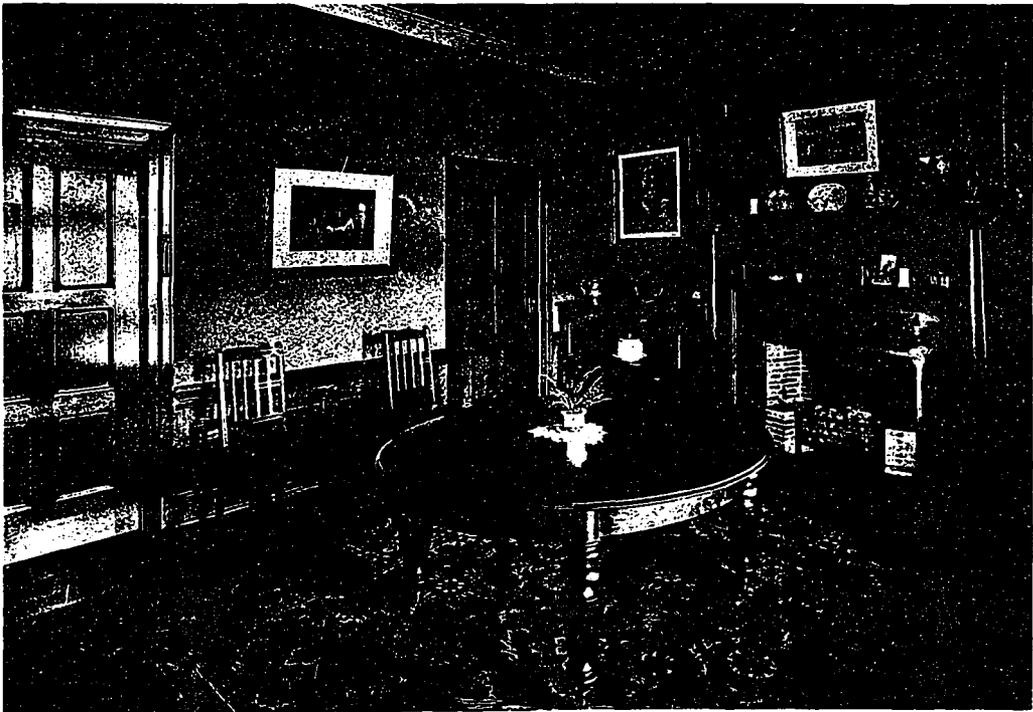
REAR VIEW, RESIDENCE OF MR. JOHN MARTIN, TORONTO, SHOWING THE VERANDAH AND CONSERVATORY WITH BALCONY ABOVE, ALL OF WHICH OVERLOOKS A WELL KEPT TERRACE AND LAWN. MESSRS. EDEN SMITH & SON, ARCHITECTS.



DRAWING ROOM LOOKING TOWARD MAIN HALLWAY, RESIDENCE OF MR. JOHN MARTIN, TORONTO. THE FIREPLACE WITH ITS BUILT-IN SETTEES AND SMALL OVERHEAD CORNER CUPBOARDS, IS A PARTICULARLY PLEASING FEATURE. MESSRS. EDEN SMITH & SON, ARCHITECTS.



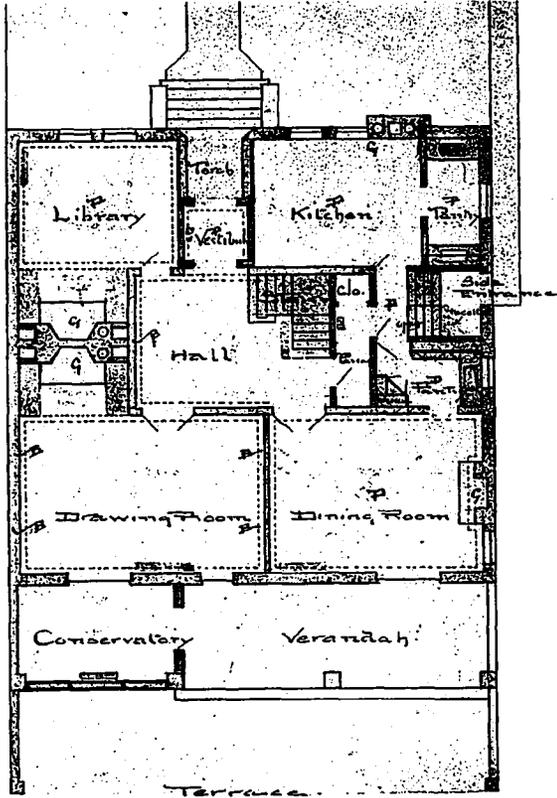
LIBRARY, RESIDENCE OF MR. JOHN MARTIN, TORONTO, SHOWING COZY FIREPLACE WITH MANTEL SHELF AND LOW PROJECTING HOOD. THE FURNITURE AND WALL HANGINGS ARE OUT OF HARMONY WITH THE ORIGINAL SCHEME OF DECORATION AS DESIGNED BY THE ARCHITECTS. MESSRS. EDEN SMITH & SON, ARCHITECTS.



DINING ROOM, RESIDENCE OF MR. JOHN MARTIN, TORONTO, SHOWING THE LOW PANNELLED WAINSCOTTING AND TILE FIREPLACE. MESSRS. EDEN SMITH & SON, ARCHITECTS.

and library having a low pannelled wainscotting.

The plan is unique in many respects, and an idea as to the character of the various rooms can be seen from the accompanying illustrations. The greatest criticism which can be offered is in the case of the library, where the wallpaper and furniture are entirely out of keeping with the architectural lines of the room, and the original decorative scheme as designed by the architects. The somewhat quaint lines of the furniture, to which evidently there is a strong personal attachment on the part of the owner, have their value and their atmosphere, but not



FIRST FLOOR PLAN LOOKING FROM THE REAR, RESIDENCE OF MR. JOHN MARTIN, TORONTO. NOTE THE LOCATION OF KITCHEN AT THE FRONT AND THE ARRANGEMENT OF HALLWAY, TOGETHER WITH FIREPLACES IN LIBRARY AND DRAWING ROOM. MESSRS. EDEN SMITH & SON, ARCHITECTS.

here where the simply straight lines should predominate in the general scheme.

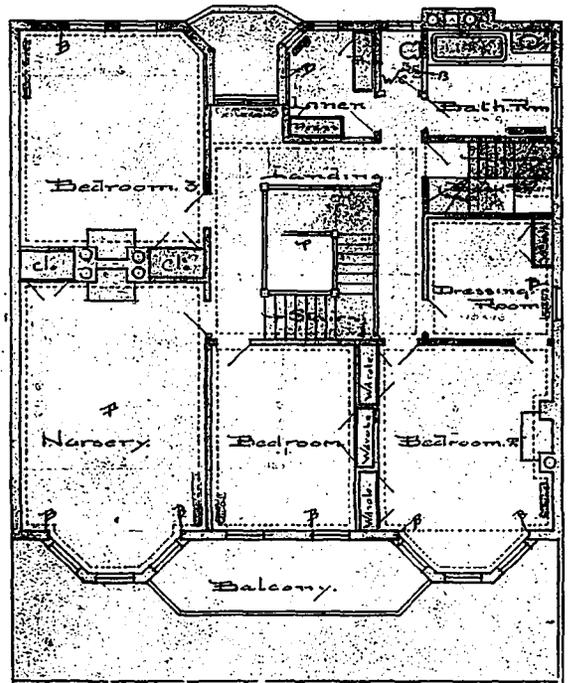
One feature, in passing, which is worthy of attention, is the main stairway connecting the first and second floor. The manner in which it has been disposed of could not be improved upon. On the first floor it stands in a most convenient spot and admirably screens off the service passage at the side, while on the second floor it is so located as to produce a most desirable grouping of the various rooms.

On this floor there are three bedrooms, a nursery, a dressing room, linen room, and bathroom. All of them have outside exposures, and the principal rooms are provided with built-in wardrobes and closets.

THE OFFICE OF SCHOOL ARCHITECT has been created by the Vancouver Board of Education. Mr. A. C. Hope is the appointee, being selected out of a list of twenty-five applicants for the position. The salary consideration is \$2,500 a year, and the architect will be privileged to devote his spare time to his private interests.

17th CENTURY DECORATIVE ART.— Some Interesting Examples Discovered in Renovation of Celebrated Old Aberdeen Building.

It appears that the renovation of a celebrated old building in Aberdeen has brought to light some interesting examples of decorative art of the end of the seventeenth century. The building referred to stands in the Guestrow—one of the slum districts of the city—and was erected about 1676, although a portion of it dates back to 1580. During the Jacobite rebellion of 1745 the house was lent by its then owner—Mr. Thomson, an advocate—to the Duke of Cumberland, who occupied it as his residence during his six weeks' stay in the city, and not only made very free with all it contained, but on his departure carried off all the valuables he could possess himself of. Since that date, says an English exchange, the house has changed hands many times, and latterly had been used as a common lodging house. It was in a small paneled apartment—probably an antechamber—that the discovery referred to was made. Ordinarily one would have expected that the panels themselves would have been the portions decorated with subjects; but it is not so in this case. The panels have been painted very boldly with an effective imitation of marble, and the stiles and rails enclosing the panels have been carefully and minutely treated with painted decoration on a black ground. The decorations include groups of figures, landscapes with trees and with towers, spires, castles and ruins. The work has



SECOND FLOOR PLAN LOOKING FROM REAR, RESIDENCE OF MR. JOHN MARTIN, TORONTO. SHOWING THE MANNER IN WHICH THE VARIOUS ROOMS ARE GROUPED. MESSRS. EDEN SMITH & SON, ARCHITECTS.

been done with great skill, and is evidently by a thorough craftsman. To all appearance, the painting is contemporaneous with the date of the erection of the house, so it is probably about 230 years old. The ceiling of a small apartment in the older part of the house is painted in the Flemish manner. One of the panels, although much faded, evidently portrays the Ascension, and another the Crown of Thorns and the Five Wounds. This apartment was probably used as a private chapel.

REINFORCED CONCRETE CONSTRUCTION.---Architectural and Constructive Development of New Permanent and Fireproof Building Methods.---Different Types of Reinforced Concrete Buildings.---Accuracy in Plan Important.---Need for Uniform Specifications and By-Laws.

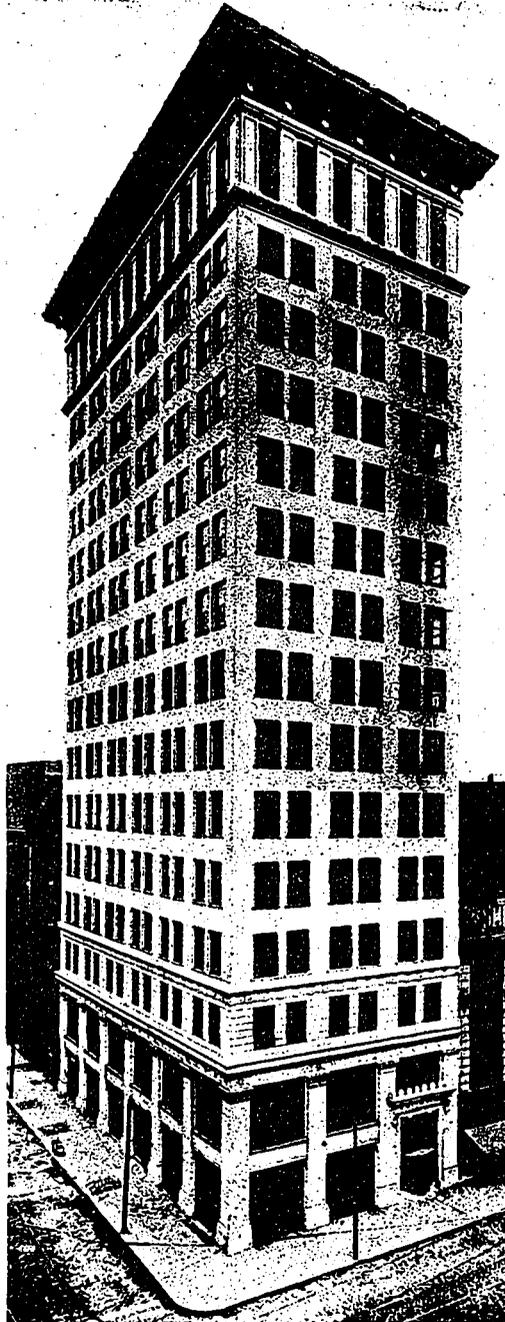
By WALTER J. FRANCIS, C.E.*

THE MARVELOUS DEVELOPMENTS of the past forty years in all branches of art and science have been the subject of numberless volumes, and the nineteenth century in its last quarter will in this respect be without a parallel in the pages of history. It is possible that in discussing these developments one might first think of the advance in the field of electricity, affecting as it does so many of the larger of the world's affairs to-day, or of the advances in surgery, but of equal importance to mankind are the applications of those new methods of permanent and fireproof construction which are perhaps the most noted advance that the ancient and noble art of architecture has made since the days of Ancient Greece and Rome.

To the introduction of calculus, mathematics and applied science owe their most important advancement. The germ theory gave to medicine its greatest impetus, and is responsible for the new system of preventive medicine. In the same manner a new and important system of architectural construction was evolved and the construction of permanent and fireproof buildings advanced with great rapidity, when in place of the comparatively large pieces of wood, brick and stone, the builders employed the atoms of cement combined with the particles of sand, the crushed stone and the small sections of steel.

The invention of steel, the earliest practical application of which to engineering and architectural construction is still fresh in the memory of many in the profession, rendered possible the erection of the modern tall buildings. Without steel the present-day reinforced concrete systems would be impracticable.

Reinforced concrete as a general builder's term refers to a Portland cement concrete combined with steel rods. Usually the steel is so disposed in the compound mass that it will care for tensile and shearing stresses that may be set up from any cause, the concrete itself furnishing the compressive strength. To this



INGALLS BUILDING, CINCINNATI, OHIO, DESIGNED BY ELZNER AND ANDERSON. A SIXTEEN STOREY OFFICE BUILDING OF REINFORCED CONCRETE SKELETON CONSTRUCTION, WHICH SHOWS HOW THIS MATERIAL IS BEGINNING TO COMPETE WITH STRUCTURAL STEEL IN THE SKYSCRAPER FIELD.

general rule there is an exception, however, inasmuch as in some types of columns the steel is introduced solely for compression purposes.

The combination of these two construction materials—concrete and steel—which formerly had been and are still being extensively used separately as simple materials for well defined purposes, is from both theoretical and practical considerations a very desirable one. The coefficient of expansion by heat is almost identical for the two materials, so that variations of temperature will have no effect on the composite structure. Probably the most important feature, however, in this connection is that while the concrete is comparatively low in tensile strength its durability and permanency are of the highest order. Steel, on the other hand, although possessing the highest tensile strength of all the common construction materials is one of the least enduring. A bright steel surface is visibly affected by ordinary atmospheric conditions in ten minutes, and unless protected its life is very short. The most efficient and practical protection yet known for steel is Portland cement. Our present knowledge of the subject leads to the conclusion that steel properly embedded in Portland cement concrete is absolutely protected for all time irrespective of moisture conditions. Further, the adhesion of cement to steel is very considerable and has been carefully studied and measured.

Tests have shown that the composite body is perfectly elastic within working limits. While it cannot be claimed that present knowledge of reinforced concrete is anything like complete and all the best formulæ have been deduced for the design of reinforced concrete, still the assumptions are safe on which the approved formulæ are based. In the case of the older materials the formulæ accepted do not apply beyond the elastic limit.

*Full text of illustrated paper delivered before the recent annual convention of the Ontario Association of Architects.

When the architects erected the Pantheon at Rome shortly before the Christian era they knew how to use hydraulic cement so well that the 142-ft. concrete dome of that interesting structure has withstood the elements through nearly two thousand years and it is in perfect condition to-day. Time will not permit of more than a passing reference to the fact that the art of making

carefully for use in culverts and short span bridges. After the successful completion of the first examples the progress although gradual was uninterrupted. To-day we see this system responsible for the investment of millions of dollars. In the last few years buildings have been erected for every kind of duty throughout the world. Its use is not confined to the construction of the least pretentious, architecturally, of all buildings—the factory. Many elaborate hotels have been erected of reinforced concrete, to say nothing of countless warehouses and office buildings. Even the field of the skyscraper, so long closed to all but structural steel, has been invaded, and we find a sixteen-storey office building in Cincinnati that has a skeleton of reinforced concrete from basement to roof.

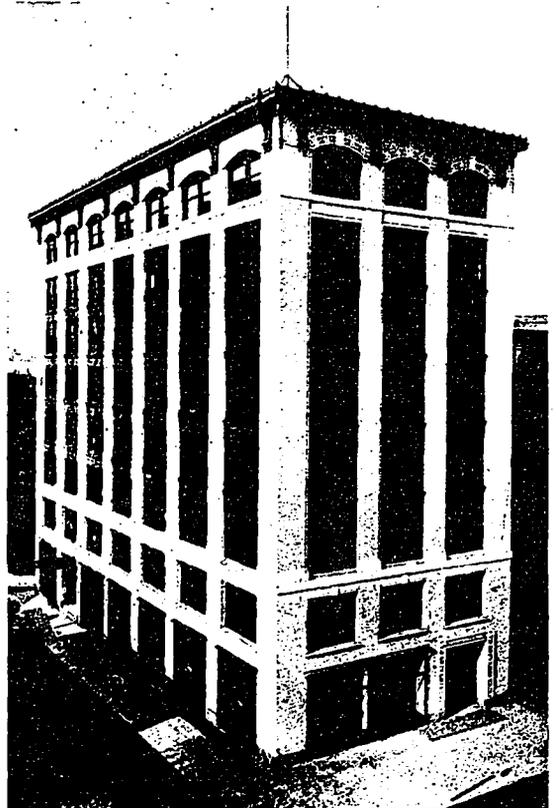
The applications of the system are very wide. The engineer to-day is using reinforced concrete successfully for purposes not dreamed of ten years ago. Incidentally he is learning what is not adapted to—knowledge of great value and inseparable from the development of every important system. One writer on the subject says something like this: "Formerly concrete was good for nothing. Then it was applied to everything. Now we are learning that the system is here to take its place amongst the highest types of construction." Its application to architectural requirements will now be discussed, dwelling more particularly on those features which are not particularly referred to by the standard authors, and which concern the architect in his relations to the



EMPIRE BUILDING, SEATTLE. A. WARREN GOULD, ARCHITECT. ANOTHER EXAMPLE OF HIGH OFFICE BUILDING CONSTRUCTION OF WHICH THE ENTIRE FRAMEWORK IS OF REINFORCED CONCRETE CONSTRUCTION.

hydraulic cement appears to have been lost until Smeaton built the Eddystone lighthouse in 1756. Portland cement was first produced in 1824, and for twenty-five years England led in its manufacture. Germany then gained supremacy in cement making until a few years ago when the United States surpassed all other countries as a maker of Portland cement.

The first recorded instance of the use of reinforced concrete was in 1855 when M. Lambot of Paris exhibited a small row boat made of wire netting and cement mortar 1 1/2 in. thick, which is said to be still in use. In 1866 M. Monier was granted patents on reinforced concrete but he confined it to the construction of troughs, water-pipes, tubs and reservoirs. The Germans however are largely responsible for the successful development of the system of reinforced concrete, which they really began about 1880. In France M. Hennebique was the first engineer to design floor beams and slabs and to develop formulæ for proportioning them. The study by American engineers appears to be contemporary with that of the Germans and in 1875, W. E. Ward erected a complete building at Port Chester, N.Y. He built rods into the lower sides of his beams and joists much as they are built to-day, relying on his judgment, in the absence of formulæ, to guide him in proportions. The need of fire-proof floor construction is in a measure responsible for the development of the system which was also studied



KAHN BUILDING, DETROIT, BUILT BY THE TRUSSED CONCRETE STEEL COMPANY, IN ACCORDANCE TO THE SYSTEM WHICH NAME IT BEARS. IT IS AN ALL-CONCRETE STRUCTURE WITH THE EXCEPTION OF THE EXTERIOR WALLS. MR. JULIUS KAHN, ARCHITECT.

owner and to the contractors. Time will not permit of a discussion of detail, design and calculation, which is fully taken up in the standard works of reference.

TYPES OF REINFORCED CONCRETE BUILDINGS.

Reinforced concrete buildings may be divided gener-

ally into two classes—entirely of reinforced concrete, and reinforced concrete interior only. Of the latter class there are divisions since we may have an entirely self-

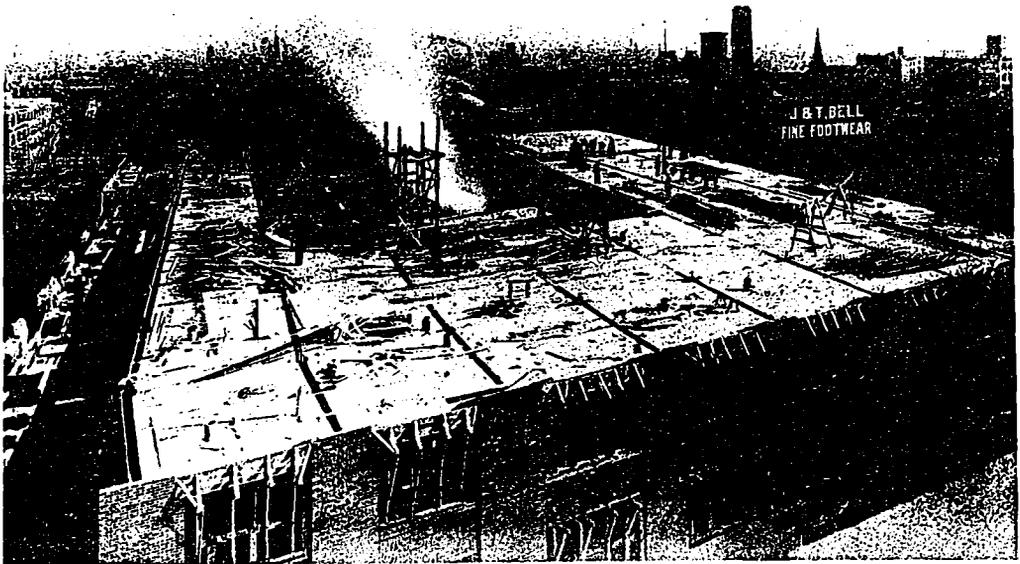
at Quebec City and the Lyman and the Southam Building in Montreal may be used as good examples. As an instance of floor sustaining exterior walls the Ames-



AMES-HOLDEN BUILDING, MONTREAL. ROSS & MACFARLANE, ARCHITECTS. AN INTERESTING INSTANCE OF FLOOR SUSTAINING EXTERIOR WALLS IN REINFORCED CONCRETE CONSTRUCTION.

supporting skeleton or one in which the exterior walls sustain a proportion of the floor systems. Of the first

Holden building in Montreal may be taken. These are all Canadian buildings of the highest type for their



AMES-HOLDEN BUILDING, MONTREAL, SHOWING REINFORCED CONCRETE FLOOR WORK IN PROCESS OF CONSTRUCTION. IT WILL BE NOTED THAT THE FLOOR SUSTAINING EXTERIOR WALLS ARE CONSTRUCTED SIMULTANEOUSLY WITH THE CONCRETE FRAMEWORK OF THE BUILDING. ROSS & MACFARLANE, ARCHITECTS.

general type we may take as an interesting example the Imperial Tobacco buildings of Montreal. For the second type with self sustaining skeletons the Chateau Frontenac

respective uses, representing heavy manufacturing and warehousing purposes, office use, hotel use, and light manufacturing. As a matter of general interest two

views are shown, one of the 16-storey Ingalls skyscraper, and one of the immense Empire Building in Seattle. Very large buildings such as may be found in all the large cities of Europe and the United States are not yet numerous in Canada. This is not the result of climatic conditions but rather the age and wealth of the other countries.

DESIGN.

As in every other branch of heavy buildings the design of the constructional part of reinforced concrete structures is best carried out by specialists who are, ordinarily, trained architects or engineers who have had actual experience with field construction and who can appreciate fully not only the possibilities but the limitations of the material. That a good mathematical knowledge and considerable constructive ability is necessary need not be emphasised. Reinforced concrete, like many other new systems of construction, has suffered in the past from overzealousness on the part of its friends. Its design should never be attempted by rule-of-thumb methods.

It frequently happens that a building has been laid out for some other type of construction and at a later date the design becomes merely a translation by having reinforced concrete substituted for the material originally intended. Such methods cannot of course produce the best or even passably satisfactory results. For the proper and economical use of reinforced concrete the layout must be studied from that point of view.

The writer does not for a moment think that reinforced concrete should be used throughout every part of a building. Other things being equal there are many instances of the material having been adopted where some other material would have been much better. Within reasonable limits the material best suited for the purpose should be used. For example, because reinforced concrete has been decided on for an interior, that is no reason why structural steel should not be employed for roof trusses for certain designs, or that terra cotta should not be used for ordinary partitions. Stairways, balustrades, and similar details are usually much cheaper and quite as satisfactory in metal.

The selection of the form of reinforcing steel in the present state of the art will depend to some extent on the individual taste of the designer. Some pin their faith to plain bars, many want them twisted, while others

rely entirely in their designs on deformed bars of various shapes and types. Good work has been and is being done by all. The writer uses, ordinarily, plain round rods and sees no reason to indulge in anything more expensive. They can be procured practically anywhere in the open market and can be fabricated and put in place for from \$37.50 to \$47.50 per ton. His next choice is twisted squares, not so much on account of the possible mechanical bond given by the spiral as the fact that the elastic limit of the steel is raised in the twisting and none but high quality will stand the process. Speaking broadly we then come to the "deformed" bars of which there are numerous varieties. The general idea sought by their advocates is to obtain a "mechanical bond" to help out the adhesion between the cement and the plain steel. Many of the best authorities and those who have been instrumental in bringing reinforced concrete to its present state of perfection hold to the opinion that mechanical

bond should be adopted in all cases. With this view the writer does not agree. The simple adhesion is sufficient to develop the strength of the steel. If the adhesion does not exist then the mechanical bond will not save the structure. To make satisfactory work the concrete must be made properly wet, in which case it will adhere to the steel. Anything that prevents proper adhesion is detrimental and cannot be counteracted by any amount of mechanical bond.

In detail too much stress cannot be laid on the importance of liberal fillets where abrupt changes of shape occur, as they obviate shrinkage cracks in the setting just as they do in cast iron and steel in cooling. Corbels should be introduced where the main beams join columns to

add to the general rigidity of the building. In steel skeletons this duty is performed by knee braces and wind bracing.

Those who have followed the subject closely will have observed the immense amount of discussion that has taken place during the past few years on the general design of column reinforcing. The column has received a great deal of attention through jealousy of the floor space it occupies. The writer will admit that New York and London rentals will demand the maximum available floor space, but he believes that in a general way the space occupied by columns is really not so important as many owners imagine. In any event the desire to decrease column dimensions appeared serious and important and



TELEPHONE BUILDING, SHANGHAI, CHINA. AN ELABORATELY DETAILED CONCRETE STRUCTURE, WHICH IS ESSENTIALLY A CARVED MONOLITH IN THAT THE EXTERIOR WAS ENTIRELY CUT BY HAND. MATHIEN & JARDIN, ARCHITECTS.

so it was given special attention. The earliest columns had vertical reinforcement. At a later date, M. Considere of France and Mr. Jameson of Montreal, during the same time and unknown to each other, developed the hooped column, the idea being that the concrete if restrained from side flow would stand a very much greater pressure than otherwise, which proved to be true. As an exaggerated example of this action—if loose sand be put into a tube and not permitted to escape, the amount of load it will sustain will depend entirely on the bursting strength of the tube. The "hooped" or "spirally reinforced" column has proven very satisfactory in large tests. Other designers pin their faith to vertical rods placed near the circumference of the column with hoops about the verticals spaced at least as close together as the distance apart of the outer rods. Still other designers would make practically a structural steel column, the concrete encasing it being really for fireproofing only. In the writer's judgment many of the building codes require too low a unit stress, many of the owners have an undue prejudice against putting an extra inch or so on

and stone is one worthy of the most careful consideration. On general principles it is well not to have too many formulæ on any one job, because it is confusing to the workman and apt to lead to serious errors, and, again, the different rates of setting for different mixes is very likely to cause shrinkage cracks at the junction of the two. In a general way 1:1 1-2:4 or 1:2:4 makes a very good mix for columns and 1:2 1-2:5 for beams and slabs.

Concerning the advantage of rich mixtures, Prof. Talbot in one of his most recent pamphlets says: "The effect of the amount of cement used in the concrete is very marked and cement is shown to be an economical reinforcing material for compression members. A 1:1 1-2:3 concrete at 60 days gives an average ultimate strength of 2,300 lbs. per sq. in., while a 1:2:4 gave 1,740; 1:3:6, 1,030; and 1:4:8, 575; under the same conditions."

If rich mixes are decided upon they should be used with regard to uniformity not jumping from say 1:1:2 for columns to 1:2 1-2:5 for beams.



INTERIOR OF TELEPHONE BUILDING, SHANGHAI, CHINA, SHOWING ARCHED TRUSSES OF THE REINFORCED CONCRETE ROOF.

the dimensions of columns, and that there has possibly not been sufficient consideration given to the fact that cement itself is one of the strongest, cheapest and best reinforcements. This phase of the subject will be dealt with at length under the head of by-laws and specifications.

In locating the steel members great care should be exercised to obtain at least 2 inches of concrete outside of all metal in order to protect the steel from the action of fire. A further precaution is necessary to see that the steel members do not come too close together, for two reasons, first in order to provide a sufficient body of concrete to properly transmit the stresses in the composite mass, and secondly to prevent the reinforcing members from acting as a screen to separate the component parts of the concrete in the pouring and thus form voids. Generally speaking there should be at least 2 inches between rods.

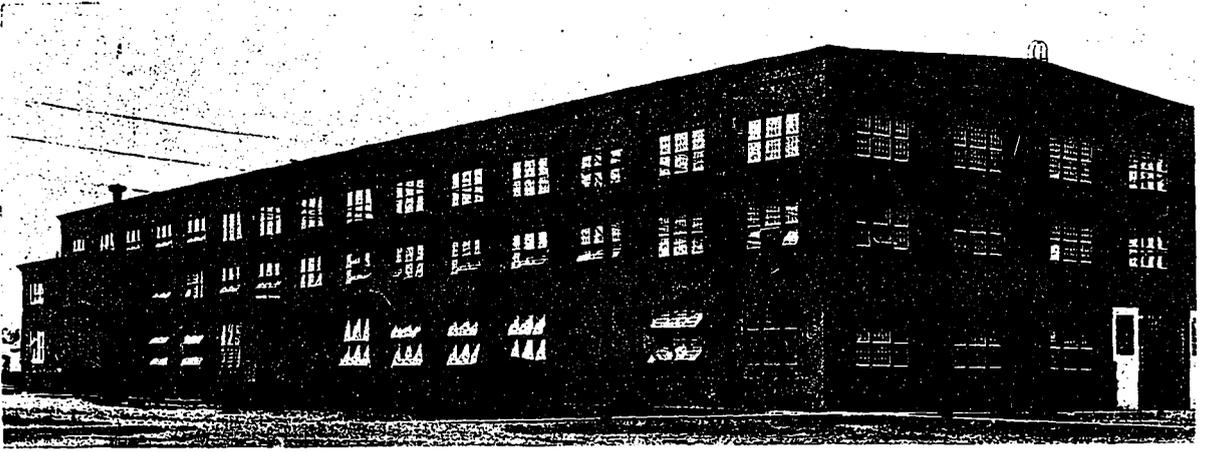
The subject of the proper proportions of cement, sand

For dwellings cinder concrete is amply strong enough for floors and is much lighter than that made with sand and stone. The best authorities appear to agree that no detrimental effect is to be feared by the possible presence of sulphur in the cinders acting on the steel.

For floor work all of the standard floor reinforcements are good and in the writer's judgment this point resolves itself into one of price. In heavy floors 3-8 in. or 1-2 in. rounds are very satisfactory. The wire reinforcements are also good, the wire being of high tensile strength and convenient to handle.

Regarding rust on the steel, the best authorities agree that a slight amount of rust is not harmful and indeed some consider it beneficial. The writer in his practice prefers the steel to be practically free from rust.

A most important feature of the design is the accuracy of the plans. It must be remembered that the reinforced concrete type of building is unique, inasmuch as every element of the structure goes on the ground in its



CANADIAN GENERAL ELECTRIC COMPANY'S TRANSFORMER HOUSE, PETERBORO. A STEEL FRAME STRUCTURE, WITH CONCRETE WALLS AND FLOORS.

raw state bearing absolutely no resemblance to its finished form. The superintendent and inspector must be supplied with absolutely correct information or later on the wall will be heard that it is very difficult to make alterations in reinforced concrete.

CONSTRUCTION.

The correct plans can only be executed by a competent and skillful superintendent co-operating with a qualified building inspector. (Kindly note the word co-operation.) The claim so commonly heard by the advocates and friends of reinforced concrete that it is cheap because unskilled labour can be employed, must be properly interpreted. Unskilled labour may be used and should be used in the proper place, but that place is not the position of responsibility in reinforced concrete structures. The superintendent and the inspector must be able men and the chief foremen engaged in the work should

be first-class men or unnecessary cost will be the result.

The particular duties of the inspector are to see that the plans are faithfully adhered to and that the materials are properly received and stored. The cement, sand and stone require special attention. The alignment and cleanness of the formwork and the accurate fabrication and placing of the steel, he should check up while there is yet time to rectify any errors.

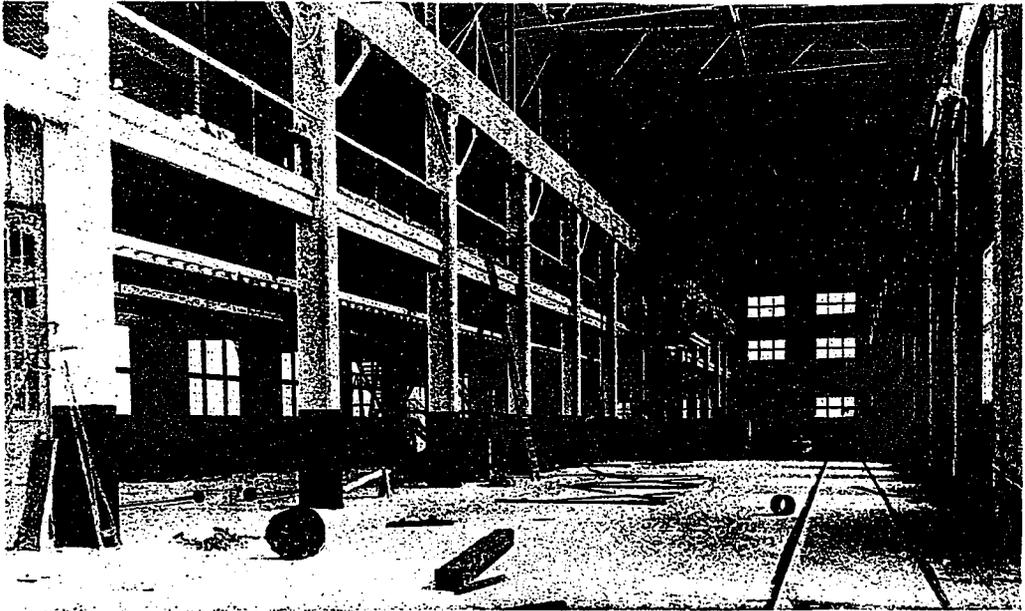
The testing and care of the cement is of great importance. Only well-known standard brands of cement should be used. The store-house must be perfectly dry in every particular and the cement must be so piled that no error may result through the use of untested cement. Tension briquettes should be made on all cements, their chief use being the gain in strength through time. On most buildings this of course is quite useless since ordinary requirements demand the use of the cement before the tests are complete. Consequently all but the short



CONCRETE FACTORY, BUDAPEST, SHOWING THE OUTSIDE COVERED STAIRWAY, THE REGULATION EMERGENCY EXIT PLACED ON ALL HUNGARIAN FACTORIES, WHICH EMPLOYEES ARE REQUIRED TO USE DAILY.

period tests are practically eliminated. The "boiling" or "constancy of volume" test is in the opinion of the writer of the greatest importance to detect the presence of free

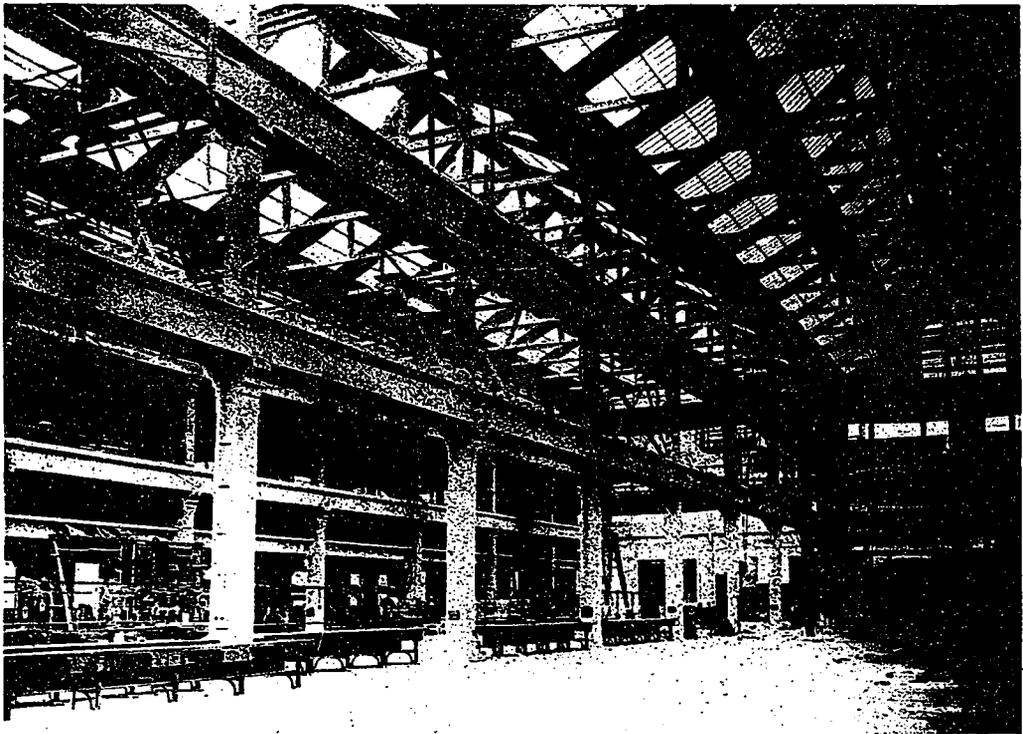
lime. The writer has been forced at times to deal with thousands of barrels of cement in this way—cement which



INTERIOR VIEW OF CANADIAN GENERAL ELECTRIC COMPANY'S TRANSFORMER HOUSE, PETERBORO, SHOWING THE STEEL BEAMS AND GIRDERS AND TRUSS WORK OF THE ROOF.

lime. It must be made every time. All the standard brands will always pass the tensile and fineness tests,

The writer has been forced at times to deal with thousands of barrels of cement in this way—cement which



INTERIOR VIEW OF CONCRETE FACTORY, BUDAPEST. AN EXAMPLE OF THE EXTREMES TO WHICH THIS MATERIAL IS EMPLOYED, THE SUPPORTING FRAME WORK AND ROOF TRUSS BEING ENTIRELY OF CONCRETE.

but the writer has known many of them to fail at times in the boiling test. Failure to pass the boiling test may mean that it is only necessary, if nothing better can be

had passed all the other tests quite satisfactorily. Where possible such cement should be removed and replaced by satisfactory material. The writer does not for a moment

wish to belittle the standard tests; he only wishes to point out the advantage of one of the speediest and easiest of the tests on cement, and at the same time for construction purposes one of the most important. The boiling test as described in the latest government specification is as follows: To test the soundness of the cement, at least two pats of neat cement mixed for five minutes with 20 per cent. of water by weight shall be made on glass, each pat about three inches in diameter and one-half thick at the centre, tapering thence to a thin edge. To be well trowelled to work out air bubbles and surplus moisture. The pats are to be kept under a wet cloth until finally set, when one is to be kept in fresh water for twenty-eight (28) days. The second pat will be placed on the rack in "Faija hot bath tank" over the vapor of water heated to 170 Fahr. and allowed to remain there from three to four hours, after which it will be placed in the hot water, temperature 170 Fahr., where it will remain for the balance of the twenty-four hours, and then be allowed to cool. In some cases it will be found desirable to raise the temperature of the water to the boiling point 212 Fahr. Neither sample should show distortion or cracks. If possible all the standard tests should be systematically conducted on important jobs.

The sand used plays a more important part than is generally supposed. There are sands which look all right, but which will not make strong mortar. The sand should be siliceous, not necessarily sharp, but well graded as to size of the particles, and comparatively clean. As an instance of the extreme case of absolutely "sharp" sand with evenly sized grains we have the "standard sand" of the laboratory which is a finely crushed and

screened quartz, and it will not make a mortar approaching in strength or density that made by pit sand.

The stone where fireproofing is a consideration should be trap, if it can be obtained. The grading of the particles is also of great importance. For example the resultant concrete will be much stronger and denser if made with a stone varying from 1-8 in. to 1 in. than if made with pieces uniformly 3-4 in.

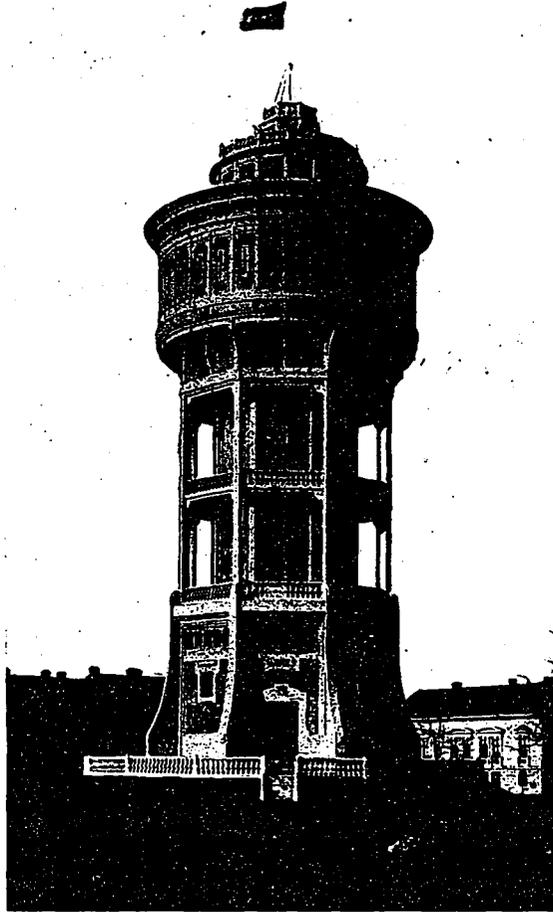
Speaking generally, the strongest, cheapest and densest concretes result from a mixture graded as to size all the way from the cement particles to the coarsest bits of the broken stone. On every job this should be determined by actually making and breaking specimens of concrete and by any of the standard methods of ascertaining the voids in the sand and stone.

Gravel may in some cases be used advantageously to replace stone. The resulting concrete is entirely satisfactory and some pits exist where little or no correction is required to allow the use of pit run. The voids, however must be carefully determined and checked from time to time.

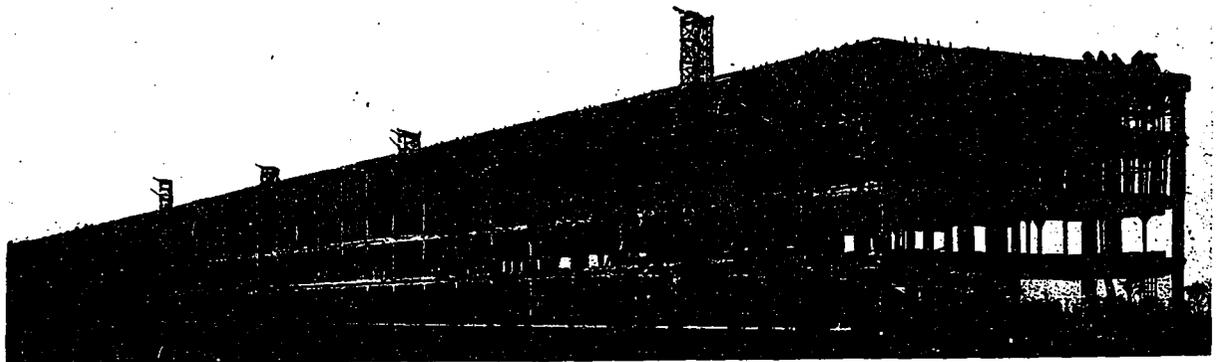
The steel must be kept clean and absolutely free from oil or grease of every kind.

All the moulds should be kept clean, carefully aligned and braced. They should be thoroughly cleaned of all chips, rubbish and dirt before the steel is placed. In columns a small hand hole for cleaning purposes ought to be made in the moulds just above each floor level.

The steel itself should be fabricated in units before being placed into the moulds and be so supported by rigid means that it will not be displaced during the pouring and manipulation of the concrete. If the steel



A CONCRETE WATER TOWER IN BUDAPEST, SHOWING THE ARTISTIC POSSIBILITIES OF THIS MATERIAL, WHEN IN THE HANDS OF CAPABLE DESIGNERS. M. ZELINSKI, ARCHITECT.



VIEW SHOWING CONSTRUCTION WORK ON A SECTION OF THE FORD MOTOR CAR COMPANY'S FACTORY AT HIGHLAND PARK, MICHIGAN, THE LONGEST CONCRETE BUILDING IN THE WORLD.

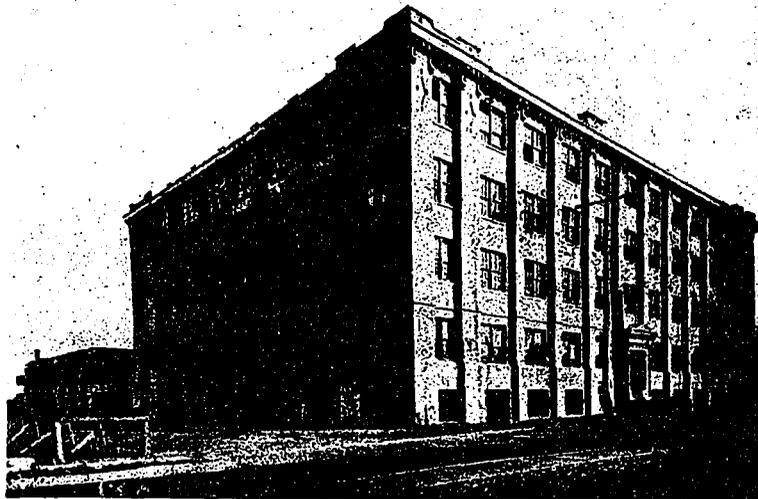
of any individual member be not rigidly fastened together by wires then the rods themselves should be held in place by small rounds or flats bent to the required shape to hang the members from the moulds. The effect of misplacement is readily seen when it is remembered that if the rods get too low in a beam, say, they are not protected from fire and will probably not be sufficiently encased in concrete to take their proper stresses, while if they are too high they are not so well able to care for the bending moment and will consequently be stressed to a higher limit than the designer intended.

It is quite unnecessary to remark that such glaring errors as the substitution of reinforcement must be carefully guarded against—an error which has occurred through carelessness or in substituting something “just as good” where the intended pieces have been lost.

The mixing or actual making of the concrete is important. It is a well-known fact that a rich mixture may result in a poor concrete through insufficient turning. On the other hand a leaner mix may make an excellent concrete if turned sufficiently. For this reason the writer in every case uses a batch mixer, and of the batch mixers he prefers a type from which a small quantity at a time may be conveniently drawn if desired. This brings up the question of the necessity of thoroughly stirring up a batch that may be standing for a few minutes in a hopper or barrow before drawing off a quantity or depositing it. Unless this is done where the broken stone is very heavy, it will be found to have settled to the bottom and the first part of the effluent will be coarse and stoney, leaving the mortar to follow by itself.

Sufficient water should be used to make a wet mixture. Dry concrete cannot be successfully used because it will not adhere to the steel without a great amount of

insures the adhesion required, but it is not advisable to make the concrete too wet. There is a certain state of wetness which gives the best results and the best descriptive terms the writer can think of are “stickiness” and



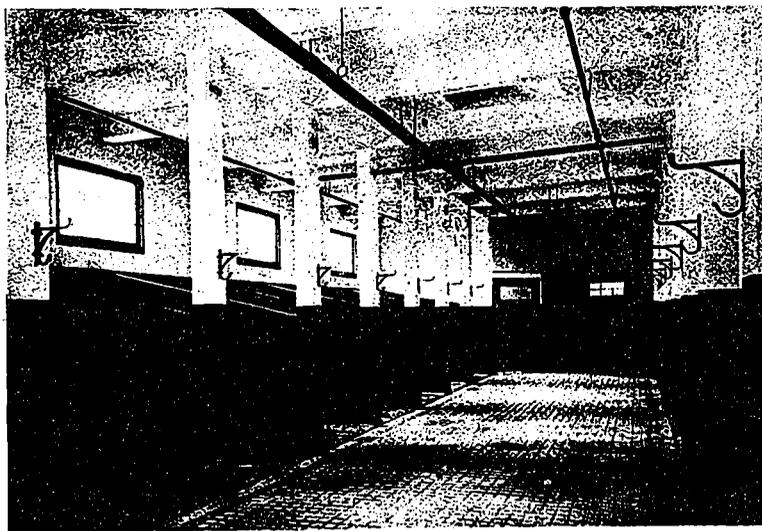
IMPERIAL TOBACCO COMPANY'S BUILDING, MONTREAL. A TYPICAL EXAMPLE OF AN ALL CONCRETE STRUCTURE. NOTE HOW SATISFACTORILY THE CONCRETE HAS ASSIMILATED THE ARCHITECTURAL LINES. MR. ROBERT FINDLAY, ARCHITECT.

“toughness,” attributes of mortar that cement finishers are very careful to watch and which can be only obtained by experience. It is better to have the mix too wet than too dry. Immediately on depositing, the concrete should be thoroughly manipulated or puddled. For columns this can be readily done with rods or gas pipes. In beams and plain walls a set of prongs formed out of thin steel plate, much like a potato fork with wide prongs, can be used to work back the stone from the wall faces and release the bubbles of air and water which otherwise would form pitted surfaces.

Where very wet mixtures are used with some cements a coating of slimy, inert material called “laitance” may be found on the top of the concrete a few hours after it has been in place. This should be carefully scraped off the surface before renewing operations.

In pouring floors care should be exercised to see that the slab work is done continuously with the beams to ensure monolithic action. After concrete has set it is difficult to make a perfect bond. This, however, is entirely obviated if the first concrete has not set up and the formulæ of the mix of the two is not very dissimilar. In stopping overnight, it is now generally agreed that the proper place to make the joint is by a bulkhead at the point of no shear, which is generally the centre of the floor beams and slabs. This line is best jogged somewhat and on resuming, if the surface be broken down a little and swabbed with a I.I mortar a better joint will result.

In order to permit the concrete to attain its maximum strength it must be given all the water necessary to complete the chemical action of the cement in crystallization.

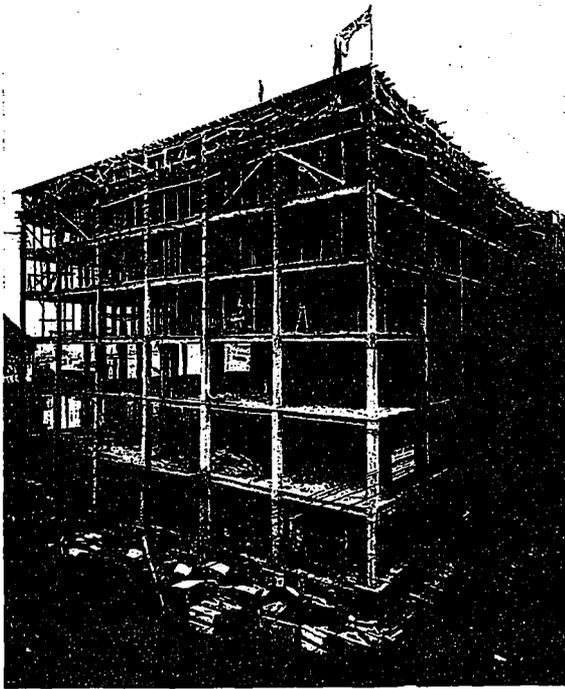


IMPERIAL TOBACCO COMPANY'S STABLE, MONTREAL. VIEW SHOWING THE ARRANGEMENT OF STALLS AND THE WELL LIGHTED AND SANITARY CHARACTER OF THE CONCRETE INTERIOR. MR. ROBERT FINDLAY, ARCHITECT.

ramming, and ramming is in most cases absolutely impossible. Water makes one of the best pounders and it

For this reason, for two or three weeks it is well to sprinkle the work at intervals with the hose, to assist the concrete to mature. In very hot weather the work should be covered with canvas, kept damp.

On no account should reinforced concrete work be



LYMAN SONS & COMPANY'S NEW BUILDING, MONTREAL. THIS BUILDING DEMONSTRATES THE POSSIBILITIES OF QUICK CONSTRUCTION IN REINFORCED CONCRETE, THE FRAME WORK, INCLUDING ALL FLOORS AND THE ROOF, WAS COMPLETE TWO AND A HALF MONTHS AFTER EXCAVATION. MITCHELL & CREIGHTON, ARCHITECTS.

attempted at temperatures below the freezing point unless it is absolutely necessary. The risk involved is great and the necessary expense renders the operation commercially impracticable. The writer was on one occasion compelled to do some building work with the thermometer at 4 below zero. The work was satisfactory, but for the sake of your pocket, your bodily comfort and your peace of mind, don't try it. Incidentally he has done very complicated reinforced concrete work with the thermometer 104 in the shade and 140 in the sun. Again he says "don't try it," and the reasons are the same. At all normal temperatures between 40 and 90 the work can be successfully and economically conducted without unusual precautions. The ideal weather for the work is cloudy at a temperature from 45 to 65.

The question of the removal of formwork requires to be handled with judgment. More time is required to enable the concrete to set up at low temperatures. Ordinarily the forms should remain on the sides of beams and walls ten days, and on the bottom of beams and slabs a week longer. Shores should be left under beams as long as practicable extending from floor to floor and storey to storey. The removal of forms prematurely is responsible for all the accidents to reinforced concrete buildings that have come to the writer's notice.

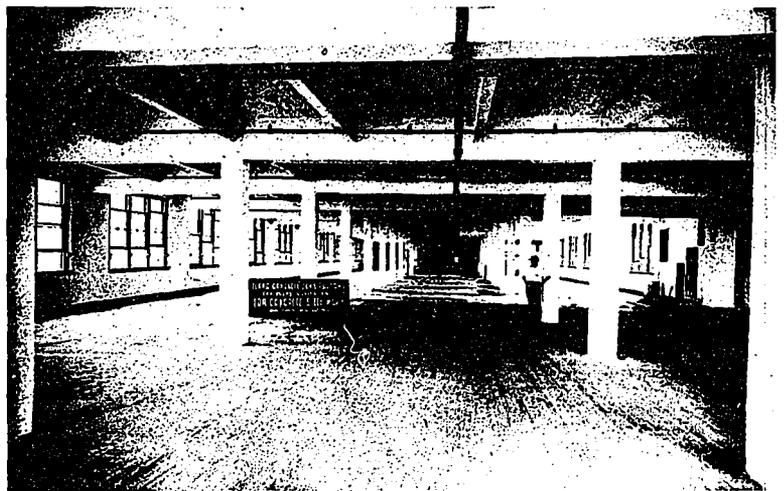
Throughout the discussion under the head of construction it would appear that the word "careful" has been used too many times. If the writer were considering a revision he would only add the words "Be careful." After all, this is the course pursued in every other high grade construction. Care and experience are exercised right along. In a steel superstructure the designs are by a skillful designing architect or engineer. The details are by experienced draughtsmen. The drawings are made with great accuracy, and are checked by a high priced checker. The material passes through the shop in the hands of experienced men, under the eye of the inspector of the bridge company and also of the architect's inspector. Every operation of riveting, facing, cleaning and painting are watched. In the field, the erectors are really experienced mechanics and the field inspector follows the work to completion. Reinforced concrete requires only a corresponding amount of care and good judgment.

BY-LAWS AND SPECIFICATIONS.

The extremely wide variations in the limits set by the municipal authorities are very unsatisfactory from a constructor's viewpoint. The art has so far advanced that a common basis of permissible stresses should be adhered to. To obtain this, in Canada, the writer would suggest that your Association immediately take in hand the appointment of a representative committee composed of, say, five persons conversant with the practice and limits of reinforced concrete construction for architectural purposes. A very desirable committee would appear to be two architects, one member of the Canadian Society of Civil Engineers and two representing the specialists in the art.

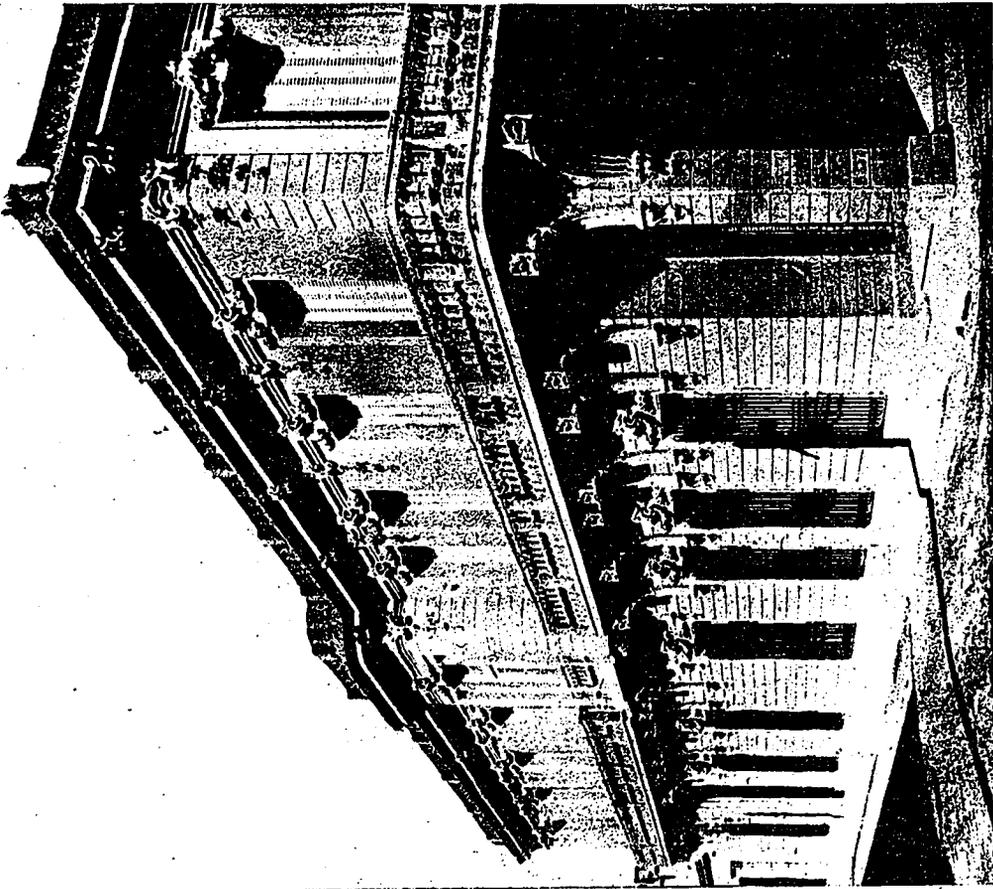
As an instance of the need of some common and rational basis for concrete in compression, the building laws of New York permit 750 lbs. per sq. in. Toronto permits less than half this amount, namely 350. The writer is aware of specifications demanding as low as 300. The French Government Commission recommended 2-7 to 3-5 of the ultimate strength as determined by tests on 90 day concrete, thus permitting about 900 pounds per sq. in.

This question is a large one and should be settled on a reasonable basis at once. Until it is officially dealt with recommendations are useless. The actual strength of various sized masses of concrete in compression must be considered, because four square inches loaded in an

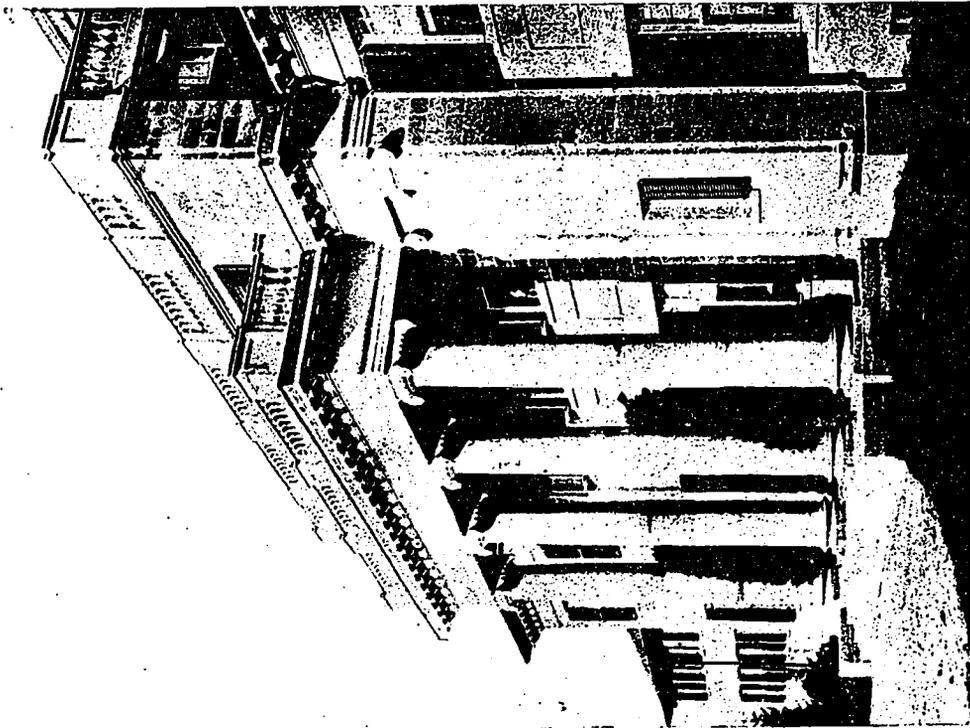


INTERIOR VIEW OF LYMAN SONS & CO.'S NEW BUILDING, MONTREAL. MITCHELL & CREIGHTON, ARCHITECTS.

area of four square inches is an entirely different thing from one hundred inches loaded all over to the same unit



CONCRETE MANSION AT HAVANA, CUBA. MR. CLEMENT P. BRUN, ARCHITECT. NOTE THE EASE AND GRACE WITH WHICH THE PLASTIC CHARACTER OF THE CONCRETE HAS YIELDED TO THE HAND OF THE DESIGNER. BOTH THE TREATMENT AND FINISH ARE HIGHLY COM-
MENDABLE.



CONCRETE MANSION AT PORT CHESTER, N.Y. A RESIDENTIAL STRUCTURE WHICH COST ABOUT \$200,000. THE EXTERIOR WALLS IS A STRIKING EXAMPLE OF THE USE OF CONCRETE BLOCKS IN THE HIGHER TYPE OF RESIDENTIAL DESIGN. CARRERE & HASTINGS, ARCHITECTS.

of load. Again the various mixtures must be taken into account and the strength of the concrete at various ages. At the same time the age at which the building is to be loaded and the possible extent of the maximum live load must also be considered. The results of the most reliable tests must be collected and properly weighed. The records of existing buildings in the detail design of their members and the duties they have performed must also be used. Many of the large American cities as well as the European cities and countries have studied the question and adopted regulations which appear to be generally satisfactory.

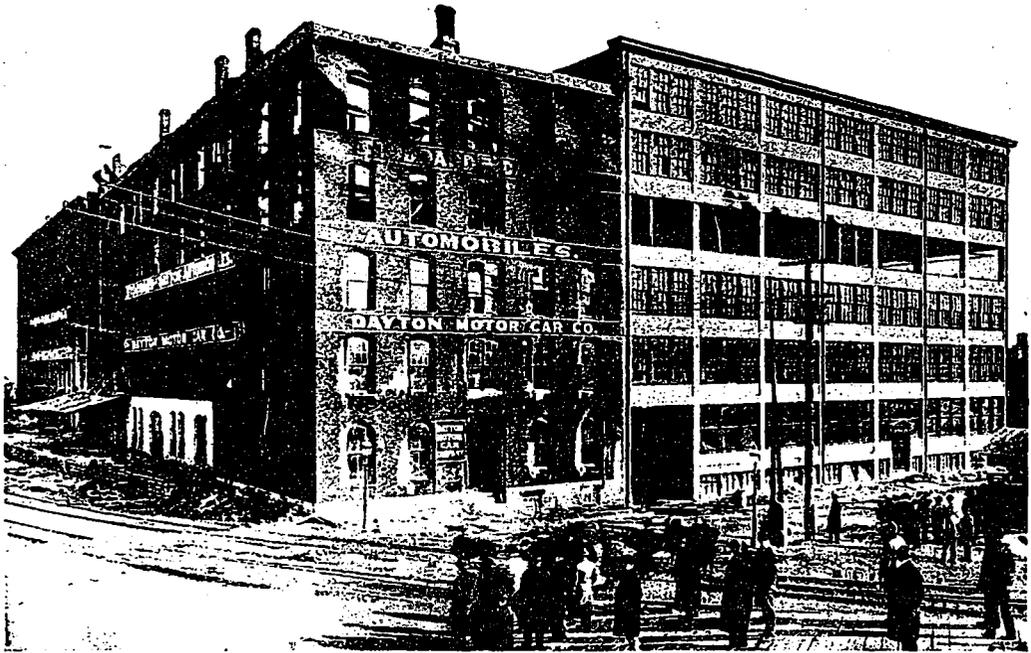
EXTERIORS AND EXTERIOR FINISH.

In the present state of the art, and for our climatic conditions, concrete is not recommended for exteriors. With this view most of the exponents of reinforced concrete will agree. This is partly due to the fact that the lines of our present day buildings are the result of the development of building design in wood, brick and stone. It is incumbent upon the architects themselves to develop a general design to suit the new material. That satisfactory exteriors have been produced in concrete all must

stone by making marks to imitate joints is inexcusable. Good, honest concrete need not stand as an imitation.

In a general way we think of concrete as a material good enough in appearance to be put into underground culverts or into bald, engineer-designed retaining walls. What a relief then when we find walls performing these utilitarian functions broken up by the introduction of a base course, a coping and possibly a pilaster or two, and yet professing to be nothing more than they are—good, honest concrete.

It is the ordinary custom after removing the forms from concrete exteriors to daub the outside wall surfaces over, with cement grout on a whitewash brush. A more unworkmanlike, pasty-looking, characterless surface cannot be imagined. Certainly, satisfactory surfaces are difficult to obtain, but it must be a very poor surface that a wash will improve. Plastering, also, in any form is to be condemned both on account of its lack of permanency and absence of character. The only way to obtain a reasonably uniform coloring is to have the whole supply of cement necessary for the exterior, as well as the whole supply of sand, mixed thoroughly, separately, and



DAMAGED WAREHOUSE OF THE DAYTON MOTOR CAR COMPANY, DAYTON, OHIO, WHICH IS DEMONSTRATIVE OF THE FIRE-RESISTING PROPERTIES OF CONCRETE. THE FIRE STARTED ON THE FOURTH FLOOR OF THE CONCRETE STRUCTURE ON THE RIGHT, WHERE IT BURNED ITSELF OUT. THE ADJOINING BUILDING TO WHICH THE FIRE WAS COMMUNICATED WAS COMPLETELY GUTTED.

admit, but these are altogether too expensive when compared with other types. The telephone building in Shanghai, China, was actually cut by hand over the whole exterior and is essentially a carved monolith. What would happen to such a suggestion at American stone-cutters' wages? Architects have always risen to the occasion no matter what the available building material and it is only a question of time when this problem will be solved.

If, for certain reasons, concrete must be used for exteriors, then do not make it an imitation of something else. It has enough virtues to render no apologies necessary for its appearance. On general principles of course imitations should be avoided. Originally, the idea in stone structures was to hide the weakest parts—the joints. Appreciating the difficulty of this, designers later adopted them as a feature. Attempts to make concrete look like

stored in bins to be drawn from as required. This of course is a difficult thing to do.

The possibilities of the material are great, but for exteriors, practical systems and designs yet remain to be developed. The custom of using a fairly dry mortar for face work deposited simultaneously with what is called a dry body concrete or even a wet concrete, should be discouraged. In such a structure there are two widely different substances; one, mortar exposed to all changes of temperature, the other, concrete, more protected. The result is in the best of work that the hard mortar surface will crack into squares of about 8 ft. each way, the cracks extending to the heavy concrete backing. The writer knows of many such cases in concrete as good as to be beautifully crystalline in structure. A very rich face-work mortar may set so much faster than the body concrete that a distinct cleavage crack will result. Ordinary

wet concrete will give as good a surface without a facing mixture, will not crack the same way and is much cheaper. Cracking or map cracks result from the improper float-

The wearing surface of floors may be of cement or other material. If of cement the best results are obtained, if time permits, by finishing the floor immediately after making the slab and then protecting it against damage from continuing the building operations. For many purposes hardwood floors are excellent. They are best secured by embedding 2 in. x 2 in. screeds in a layer of cinder concrete, deposited at a convenient time on top of the concrete slab and after the cinder concrete has dried out swab it with roofing tar, nail an under floor diagonally on the screeds and the hardwood to the under flooring.

In floor systems where shallowness of slab is not a consideration several types of construction have been devised. One of these, quite inexpensive and satisfactory, is of combination tile and reinforced concrete, in which between each roll of tiles the reinforced concrete plays the part of a joist.

For lighter floor work, as for residences, slabs are now being cast in factories in lengths up to 21 ft. and widths of 4 ft. ready to span from wall to wall without beams of any kind. Metal lath fastened on the ceiling provides a sure bond for the plaster which hides the joints.

ADVANTAGES OF REINFORCED CONCRETE SYSTEMS.

In a general way some qualities of reinforced concrete buildings obtrude themselves very forcibly. The principal of these are fire-resistance, absence of vibration, increasing strength with age, rigidity and economy.

Instances of the fire-resisting qualities of reinforced



GRAIN WAREHOUSES IN TUNIS, AFRICA. A REMARKABLE PICTURE SHOWING TWO LARGE CONCRETE STRUCTURES THROWN 25 DEGREES OUT OF PLUMB, OWING TO ESCAPE OF QUICK SAND ON WHICH THEY WERE BUILT. BOTH WERE BROUGHT BACK TO A VERTICAL POSITION WITHOUT DEVELOPING A CRACK IN EITHER STRUCTURE. THIS WAS DONE BY LOADING SAND ON THEIR HIGH SIDE AND EXCAVATING UNDERNEATH.

ing of too much pure cement to the surface, combined with lack of opportunity to properly mature.

INTERIORS AND INTERIOR FINISH.

For the interior of factories there is not the slightest difficulty in producing a surface right off the forms and good enough for anything. In many instances too great care is demanded in the finish of surfaces because it is thought "form boards can be easily planed." Too much planing and carpentry adds materially to the cost and serves to accentuate the slight warping of the boards inevitable as soon as they are called on to retain the wet concrete. Such demands do not appear to be reasonable when the same proprietors would be perfectly satisfied with the very rough surface of an interior brick wall and the irregularities of structural steel connections and surfaces. The alignment of the forms, however, should be good.

Interiors for factories may be finished in cold water paint applied directly to the concrete and if desired on the lower parts of the walls a dado may be painted in oil. Take care, however, that the concrete is dried out, for the result of the combination of the paint, oil and the alkalis out of the cement may give something that looks suspiciously like soft soap and it may be found next morning that the most of the dado has slipped down into the hospital cove. On dry concrete there is no trouble with oil paint.

In cases where a good finish is desired the writer does not believe in trying to get it in concrete. Make a regular plaster finish. Use rough lumber for the forms, thereby cheapening the formwork and getting a better surface to plaster on. To plaster on smooth concrete walls is difficult even with Keen's cement.



INTERIOR VIEW OF WAREHOUSE, TUNIS, AFRICA, SHOWING WORKMEN EXCAVATING UNDER HIGH SIDE SO AS TO PERMIT THE BUILDING TO SETTLE TO A VERTICAL POSITION.

concrete buildings are numerous. The great conflagrations as well as individual fires bear testimony to this virtue. A consideration of the nature of the members

shows clearly why this is so. A natural stone, if heated to say 1,500 or 1,700 degrees F. is apt to crack from end to end or to continue spawling off until the bulk of it is removed. Steel if heated to such temperatures reddens and is unable to bear any load. Good concrete only dries out and continues by non-conduction to preserve the interior steel from heat injury.

The writer is frequently asked about the safety of reinforced concrete buildings when heavy vibrating machinery is placed on upper floors. There is practically no vibration. He knows of one building in which batteries of trip hammers are at work about the fifth floor and no difficulty is experienced. In another building high speed, heavy chopping machines are at work and in the floors above and below the occupants know nothing about it from noise, vibration or in any other way. In the Kitterlinus buildings in Philadelphia there is an interesting comparison of two buildings used for printing machinery and the like. One is of steel, the other of reinforced concrete. In the former the vibration is considerable while in the latter it is scarcely perceptible. The sound proofness is also remarkable.

It cannot be said that any type of building other than reinforced concrete improves with age. Some types remain as strong as when new but none except concrete increase in strength. For this reason the contractor himself runs probably more risk with his building than anyone else. He has the structure in its tenderest stages and it is not recorded as far as the writer is aware that difficulty in the matter of strength has ever occurred after the building left the contractor's hands. True, many accidents have happened, but we believe these have in almost every case resulted from the premature or improper removal of forms.

That reinforced concrete buildings possess a remarkable amount of rigidity or power to act as a unit is well known. Explosions have occurred in them without serious damage to the structure. One of the columns supporting a loaded coal pocket in France was accidentally knocked out by a derailed locomotive—but the loaded coal pocket with its thousands of tons of coal did not come down. Two grain warehouses in Tunis, having settled about 25 degrees out of plumb through the escape of quicksand on which they were built were loaded down with sand on their high side and thus with the assistance of excavating beneath the high side were brought back to the vertical without developing a crack in the structures.

As to the cost it is impossible to give general figures other than to say that the actual cost depends altogether on local conditions and requirements. Everything being equally favourable for, say, steel and reinforced concrete, the cost may not be materially different, although the writer is aware of heavy reinforced concrete buildings that have been completed for 10 per cent. less than the tendered price for the same in steel. As to formwork itself the cost of it may be made to run from 25 per cent. to 75 per cent. of the total cost of the concrete work.

CONCLUSION.

In the present state of the art, the highest type of a reinforced concrete building is that with a brick or stone exterior. What may be evolved in the next few years no one can say. At the present, we cannot fully understand and appreciate some of the unusually excellent results obtained in tests, but it is only a matter of time, with the co-operation of the architect, the engineer, the laboratory expert and the concrete exponent, when we shall know all about them and how these results are to be obtained in daily practice. The system has developed fast and is still developing. Development means modification and who can say what the final result may be? Enthusiasts are spending their lives in trying to perfect new cements. Capital is being added to the general industry daily. Already hundred of millions of dollars worth of buildings have been built of this new type in a few years. One

firm of specialists alone has erected over twenty-five thousand reinforced concrete buildings. The subject is receiving the attention of all the leading scientific bodies in the engineering world. That it is sound engineering to make haste slowly along well tried lines, however, no one will deny.

The subject is a large one and constantly growing. Possibly an appropriate closing remark of this brief discussion is a definition of reinforced concrete, namely Portland cement, sand, stone, water, steel and—brains.

GROWTH OF INTERIOR WOODWORK.— Beamed Ceiling and Panelled Walls Gaining Favor. ---Dull or Natural Finish Popular.

WHAT IS KNOWN as the mill work business, the manufacture and putting up of interior woodwork, in dwellings especially, has developed wonderfully the last few years, not so much in point of quantity as in quality. There has been a continual seeking for something better, for something different, and at present the builders of good homes want a wood that furnishes naturally something near the color scheme they have in mind, and this they want finished natural or with a slight stain. They don't want the old paint coloring, but they want a wood that shows a grain and has distinct characteristics of its own and generally they want it dull finished; not highly polished or covered over with a cheap, flary varnish, but well rubbed and neatly finished.

All this is pretty well known to the woodworking trade, but now there comes a new idea that is startling at first, but eventually carries us back to old times, says a writer in a recent issue of the *WOODWORKER*. There is quite a tendency to decorate rooms all over; that is, finish the interior walls with woodwork of one kind and another instead of plastering, calcimining or papering, especially where the builder can afford it. It is rather expensive to do this in conformity with modern ideas because of the artistically laid panels and the use of practically clear stock that can be finished natural. But in spite of its expensiveness it is gaining in favor with those who can afford it and it is adding materially to the volume of the woodwork of the planing mill.

This recalls old times inasmuch as in the earlier days, in what might be termed the pioneer days of modern home building in this country, most of the houses were ceiled with lumber, both on the walls and overhead, and either finished natural or painted in whatever colors were desired. Lots of excellent lumber has been put up and had the figure spoiled by painting. Some of the old-time houses, instead of ceiling overhead, had dressed and beaded beams or heavy joists which were painted, and the bottoms of the floor on top of it were painted, too, and this made the ceiling of the room. There is now quite a tendency to turn to this old beam effect also, but, of course, in a different manner, just as they would return to interior wood decorating in a different manner.

In the earlier days the idea was to get an interior lining for the house at a comparatively small expense, and very little was thought of the artistic features of the wood itself. Generally where some one wanted to put on style, as it was called in those days, they painted the ceiling. Then came the plastering, which began in the cities distant from the source of supply, where wood was scarce, following next into the prairie sections of the country, where lumber was also valuable, but finally coming into such general use that plastering lath and plaster practically crowded out wooden ceiling in nearly all house building. So now to have plastering begin to give way to interior wood decorations for the walls naturally recalls old times, but it is not carried out in the old-time way. Artistic effects are studied and designs are varied wonderfully and different kinds of woods are used, making it expensive rather than economical, but the people want it, and it looks like there is going to be quite a lot of this kind of interior woodwork in the next few years.



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ADVERTISEMENTS.—Changes of, or new, advertisements must reach the Head Office not later than the first of each month to ensure insertion. Advertising rates on application.

CORRESPONDENCE.—The Editor will be pleased to receive communications upon subjects of interest to the readers of this journal.

Vol. 2 March, 1909 No. 5

Current Topics

VANCOUVER HAS THE ONLY FIRE HALL in America that is exclusively equipped with motor car machines. This certainly speaks volumes for Western Canada enterprise.

* * *

FIVE HUNDRED AND FIFTY FEET above the water is to be the height of the bridge which is shortly to be built across the Snake River Canyon at Shonshone Falls, Utah. This will be the greatest altitude at which a bridge has ever been placed. The span of the structure from cliff to cliff will be 1,140 feet.

* * *

IN GENERAL DIMENSIONS the concrete piers of the Clover Bar bridge on the Grand Trunk Pacific Railway at Lethbridge will, it is said, outrank anything of their kind in Canada, and perhaps in the world. There are four of them, two of which are 140 feet high and the others seven feet less in height. The bridge from abutment to abutment is 1,660 feet in length. The piers extend forty feet below the surface of the water.

* * *

WOOD IS TO BE EXCLUDED almost entirely in the construction of the new Government building to be erected by the United States at San Juan, Porto Rico, for use as a post office, court house, and customs house. One reason why this material is being avoided is because there is an omnivorous small ant indigenous to the island, which eats its way up through wooden doors, casings, chairs and desks and makes them spongy on the inside. The structure is to be built of reinforced concrete. All interior doors will be rattan and the only place about the building where wood will be employed, will be in the window sashes on one side of the edifice.

WHAT IS DECLARED will be the first town of exclusive concrete construction in the world is to be established at Metaline, Washington, in the heart of the lead-mining district of the same name 105 miles north of Spokane. The cement which is to be used in the construction of the buildings will be supplied by a large Eastern company who owns large deposits near by. The company will erect a 2000 barrel plant at a cost of \$1,500,000.

* * *

MR. MARK L. BUFFY, a well-known architect of London, Ont., recently passed away at his home, 905 Dame street in that city. Mr. Buffy was born in Aylmer, and at the time of his death was 63 years old. He came to London nineteen years ago, where he built up an extensive practice. Besides his wife he is survived by three sons, Messrs. R. Buffy, A. C. Buffy and W. A. Buffy, of London, and one daughter, Mrs. A. G. Bayles, of Toronto.

* * *

EIGHTY THOUSAND CUBIC YARDS OF ROCK was recently removed in one blast from the big bluff which obstructed the right of way of the Grand Trunk Pacific into Prince Rupert. This is declared to be the largest and most successful blast in railway construction work on that line west of Montreal. Two months were consumed by the contractors in tunnelling and cross-cutting beneath the bluff on grade level and facing the harbor. These huge pockets were loaded with 75,000 pounds of explosives and connected by wires with a powerful galvanic battery several hundred yards distant. When the shot was fired, the whole mass was lifted with almost volcanic force several hundred feet in the air and dropped into the sea. It is estimated that nearly \$15,000 worth of dynamite was used in the blast.

* * *

A TECHNICAL CLAY-WORKING SCHOOL will be established in Western Ontario if the petition to be presented to the Provincial Government, asking that \$10,000 be appropriated for that purpose is favorably acted upon. A resolution authorizing that the Legislature be asked for this amount was passed by the Western Ontario Brick-makers' Association at their fifth annual convention recently held at Blenheim. The need of a school of this character is said to be very urgent and it is suggested that the Government immediately establish an institution to be conducted along similar lines to the several clay-working schools in the United States. Officers of the association elected for the ensuing years are: Honorary president, Adolph Whelan, Rodney; president, John Milner, Kingville; 1st vice-president, A. W. Hill, Essex; 2nd vice-president, John Wadell, Blenheim; secretary-treasurer, A. Whelan, Cairo.

* * *

EDMONTON'S NEW BUILDING BY-LAW has been approved of by the city council, and will be formally passed at its next meeting. The measure is modelled somewhat after the Winnipeg code, and is said to cover the ground very thoroughly. It is understood that the by-law will bring about a number of reforms in the construction of buildings which will be of great benefit to the city. No structure under two stories in height will be permitted to be erected within the first class fire limits, and the practice of appealing from the decision of the building inspector to the city council for special permits to build in violation of the restrictions, is to be done away with. The alleged action of the council in the past in conniving at breaches in the building law, and the increasing rate of insurance, some time ago brought forth a strong protest from the Edmonton Board of Trade, with the request that a new set of regulations be drafted and rigidly enforced.

CEMENT MAKERS IN THE UNITED STATES have recently perfected a combine which is said to practically include all the big mills in that country. The organization is known as the Association of Licensed Cement Manufacturers, and it is capitalized at \$200,000,000. The president of the Association is John B. Lober, head of the Vulcanite Portland Cement Company, and the concerns interested in the merger are said to have a collective annual output of 36,610,000 barrels. Recent advices state that the selling price of cement will be fixed at \$1.50 per barrel at the mills.

* * *

STEAM ENGINES AND BOILERS and other forms of motive power are fast outstripping manual labor as means of operation in the industrial life of Japan. In a recent report to Department of Trade and Commerce, Trade Commissioner W. T. R. Preston, of Yokohama, states the importation of machinery of this class, which was little more than \$100,000 in the year preceding the war with China, has now grown to a total annual valuation of approximately \$1,500,000. Of the motive power used, steam stands first, with the electric and kerosene or gas engine in second and third place respectively. Practically all engines and boilers of over 50 h.p., as well as a certain class of special small engines, are imported, the trade at the present time being proportionately divided among Great Britain, United States, France and Germany in order named.

* * *

THE THIRD ANNUAL CONVENTION of the Canadian National Builders' Association, held in Ottawa, the early part of this month, went on record as being decidedly in favor of extending the Industrial Disputes Act so as to include the building trades disputes. The question was taken up by a deputation appointed for this purpose, with Hon. Rudolphe Lemieux, who pointed out that the Federal Government had no jurisdiction over questions of civil and property rights, and that the matter rested with the provincial authorities. It was also suggested by the deputation that the Federal Government enact a general employer's liability law, basing the amount of compensation on the earning capacity of the victim. The convention was a most representative one in every respect, delegates from all parts of the Dominion being present. The officers elected for the ensuing year were: President, J. A. Crain, Ottawa; vice-president, William Tytler, London; secretary-treasurer, J. H. Lauer, Montreal; vice-president for Ontario, John Whittaker, London; director for London, Geo. S. Gould.

* * *

FRESHLY PLASTERED ROOMS are said to be perfectly dried in three days' time by an apparatus in which considerable interest has been taken by the builders of Sheffield, England, where it was recently demonstrated. It is claimed that by this system all excessive moisture can be completely removed from the walls without any deteriorating effect. The apparatus consists of a stove with a fire box, suitable for coke fuel, surrounded by a number of small diameter tubes, similar to gas pipes. By means of the apparatus fresh, dry outside air enters constantly into the air-supply tubes, and is highly heated in the tubes surrounding the fireplace. It ascends in a dry-heated state in the room, passes along the ceiling and walls, and absorbs the dampness, sinking down after being saturated with the same and reentering the apparatus. It then mixes with the coke gases in the outlet tube for the smoke, and eventually escapes into the chimney. This constantly renewed fresh outside air furnishes an abundance of carbonic acid to the mortar, thus hardening it, and producing in a short time the same effect as if the mortar had dried naturally. It is claimed by this system that no moisture can possibly show later on.

NEW AUTOMATIC EXIT DOORS which have recently been placed on three Toronto theatres, have proved so efficient and reliable in operation that the City Architect and the Chief of the Fire Department will insist on all playhouses in the city being equipped with them. This type of door, which is not barred or bolted in any manner, necessitates only a slight pressure of a person's body against large plate in the centre to cause it to spring open. The door cannot be opened from the outside but any crush or jam on the inside will immediately release the catch and make it fly outward. The door, it is said, is a most excellent device, and one that will facilitate egress in event of an emergency.

* * *

ESNACH BARRAGE, the final unit of the great system of works by which the Nile floods are to be controlled, has been completed. This interesting piece of engineering had its beginning in the construction of the Assouan dam which is capable of retaining 2,300,000,000 tons of water, to be delivered to the lower reaches of the river when required. To control the distribution weirs or barrages were built at intervals along the river, one at Zifta, and one at the arm of the Delta; one at Assiout 230 miles from Assouan, and the Esnach which has just been opened. The dam at Assouan has gates which lift at the touch of an electric button. Every morning a message from Cairo tells just how much water is needed. The new barrage is situated at a distance by the river of 162 kilometers north of the Assouan barrage, and stretches across the Nile at a height of 9.2 meters above low water mark. It is 900 meters long, and is pierced by 120 doors with locks.

* * *

NINE HUNDRED MILLION GALLONS is to be the capacity of the mammoth water tank which is to be erected at Calcutta, India, for municipal purposes. This huge receptacle, the contract for which was recently awarded to Messrs. Clayton, Sons and Company, Leeds, England, in a world wide competition, is to be the largest water tank in the world and over 7,000 tons of steel will be required in its construction. The reservoir itself will be 321 feet square and 16 feet deep, and it will be divided by cross frames into four equal sections. In order to insure a pressure that will adequately supply all parts of the city, the bottom of the tank will be placed at a height of over 90 feet above the ground level. It will be supported upon 81 steel trestles, each composed of four heavy rolled-steel beams, braced together at intervals by smaller beams, and each trestle will carry cross beams at the top to support a 40-foot section of the tank floor. The weight of the contents of the tank, it is estimated, will be equal to 40,000 tons.

* * *

AN INGENIOUS RAILWAY GATE, which automatically lowers and raises with the approach and departure of trains at grade crossings, has been perfected in a working model just completed by Mark Ridout, a Glace Bay, N.S., inventor, who has been at work on the problem for several months. The gates used are of the ordinary drop pattern type with back balance, and they are operated by a suitable gearing attached to a small steel rope which passes over a pulley and extends along the track to a shoe placed beside one of the rails. The shoe projects slightly above the rail and upon the approach of a train, the weight of the engine on it causes the gates to immediately descend. They remain down until the last car passes over a releasing shoe on the other side of the crossing, when a catch is freed and the gates swung up out of the way by the balance weight attached to them. Both an operating and a releasing shoe are provided on either side of the crossing so that mechanism will work upon a train coming from one side or the other.

PROSPECTIVE CONSTRUCTION

The following information is obtained from our correspondents, from architects, and from local papers. These items appear in our Daily Advance Reports and are herein compiled for the use of subscribers to the monthly issue of "CONSTRUCTION." Should any of our readers desire this information oftener than once a month, upon receipt of request we will be pleased to submit prices for our Daily Service.

Mills and Factories

Toronto.—The Nasmith Company has taken out a permit for a two-storey bakery to be erected on Sterling Road at a cost of \$40,000. J. F. Brown, Board of Trade Building, is the architect.

Toronto.—The factory of the Jones Bros. Company, at the corner of Richmond and Sheppard streets, has been damaged by fire to the extent of approximately \$3,500.

Toronto.—A permit has been issued for a five-storey brick factory and two-storey brick boiler house to be erected on Richmond street, near Jarvis street, for Robertson Bros., 103-113 Queen street east, at a cost of \$40,000. M. Hall, 180 Crescent road, is the architect.

Woodstock, Ont.—The Oxford Knitting Company has awarded the contract for its new factory to be erected on Ingersoll avenue to W. J. Taylor. The building, which is to cost \$18,930, will be 200 by 57 feet, two storeys and basement in height, with boiler and dye house separate.

Welland, Ont.—Plans have been prepared for a factory to be erected for the Welland Stove Works, Limited, which has just been organized. The directors are: E. A. Playfair, Buffalo; W. S. Davis, Ann Arbor, Michigan; B. J. McCormick, Capt. Hugh A. Rose and W. J. Telford, Welland.

Niagara Falls, Ont.—The McGlashan-Clark Silver Works have been badly damaged by fire. Loss not stated.

Demeretsville, Ont.—The grist mill owned by the Crowe Estate, and leased by Mr. McKibbin, of Cherry Valley, have been destroyed by fire.

Hamilton, Ont.—Messrs. Stewart & Witton have purchased the old Central Church property, on which they will erect a four-storey building to be used for light manufacturing purposes.

Hamilton, Ont.—Messrs. Stewart & Witton have taken out a permit for a 5,000 brick addition to the Canada Steel Goods Company's factory on Arthur street.

Berlin, Ont.—Mr. D. Knipfel, Berlin, will erect a new block to be occupied by the Pearl Laundry.

St. Catharines, Ont.—Architect A. E. Nicholson, 15 Queen street, has prepared plans for a forge shop to be erected for the Whitman & Barnes Mfg. Co., Ltd. The building will be of stone, with steel trusses, corrugated iron roof, electric lighting.

Preston, Ont.—The Preston Car & Coach Company's building, in course of construction, has been destroyed by a wind storm.

London, Ont.—The McClary Co. are contemplating the installation of sprinkler system in its plant at the corner of Adelaide and Trafalgar streets. Their plant comprises a power house, finishing shops and storage warehouse.

London, Ont.—The Murray Shoe Company has taken out a permit for the

erection of a factory building on Richmond street.

London, Ont.—The premises of the Roberts Engraving Company have been badly damaged by fire. Loss not stated.

London, Ont.—The Globe Casket Company has made arrangements for the rebuilding of its plant, which was recently destroyed by fire.

Sault Ste. Marie, Ont.—Manager Franz of the Lake Superior Corporation, which has recently been taken over by English capitalists, states that the company will immediately commence extensive additions to the open hearth furnaces at the Algoma steel plant in the Canadian Soo. It is reported that the company will erect new blast furnaces and a structural steel plant.

St. Thomas, Ont.—The coal hoist plant and buildings of the Pere-Marquette railroad at this place have been destroyed by fire. Loss on plant and buildings estimated at \$10,000, partly covered by insurance.

Bruce Mines, Ont.—The boiler house, air compressor building, electric light plant and hoist house, together with all the machinery, with the exception of two dynamos, at Bruce Mines, Ont., have been destroyed by fire.

Montreal.—Architect Joseph Perrault, 17 Place d'Armes Hill, has awarded the following contracts for the erection of the Campbell Mfg. Co.'s new factory in Ville St. Louis: Stone work, Chas. Charbonneau; mill work, Paul Demers; cast-iron, Canada Iron Corporation; architectural iron, Montreal Architectural Iron Works.

St. John's, P.Q.—The St. John's Straw Works have been destroyed by fire. Loss not stated.

Norton, N.B.—Harner's flour and corn meal mill has been totally destroyed by fire. Loss estimated at approximately \$15,000, with \$11,000 insurance.

Sydney, N.S.—It is stated that the directors of the Dominion Iron and Steel plant, at this place, are contemplating the erection of a large extension to their plant, for the manufacture of rolled steel.

Montreal.—Architects MacVicar & Herriot, 104 Union avenue, have awarded to Messrs. D. G. Loomis & Son, 261 St. James street, the general contract for the erection of the Eveleigh factory in St. Henri.

Calgary, Alta.—The Calgary Windmill & Pump Company, Limited, a new incorporation, with capital of \$50,000, will erect in the near future a large factory for the manufacture of pumps, windmills, saws, etc. The officers of the company are: Thomas Armstrong, President; John McGowan, Vice-President; D. D. McGillivray, Secretary and General Manager; R. A. Brocklebank, Director.

Gas Plants, Elevators and Warehouses

Toronto.—The Copp-Clark Publishing Company has applied for a permit to erect a two-storey warehouse and factory, to cost \$40,000, on Wellington street west, near Portland street.

Sarnia, Ont.—Plans have been prepared for terminal facilities for the Northern Navigation Company, at Sarnia, including the construction of docks 750 feet in length, extending from Cromwell street, on which will be built warehouses for freight, and waiting rooms. An umbrella awning of steel will be erected to protect the passengers from inclement weather. It is intended to have the changes and improvements completed by June 1st.

Orangeville, Ont.—Messrs. Clarke & Hannah's grain elevator has been com-

pletely destroyed by fire. Loss not stated. Partly insured.

Victoria Harbor, Ont.—The Canadian Pacific Railway has awarded to the John S. Metcalf Company, of Chicago, the contract for the erection of a 2,000,000 bushel grain elevator at Victoria Harbor, Georgian Bay. Contract price, \$200,000, this sum including the building of wharves and other necessary equipment.

Montreal, P.Q.—Mr. J. T. Molson, 906 Notre Dame street east, has taken out a permit for alterations to warehouse. Cost of improvement, \$19,500.

Montreal.—Architect H. C. Stone, 84 St. Francois Xavier street, has awarded the general contract for the erection of a warehouse in Dolorimier for E. M. Heney Co., Ltd., to D. G. Loomis & Son, 261 St. James street.

Winnipeg, Man.—Mr. E. F. Hutchings, of the Great West Saddlery Company, will erect a large wholesale house on James street.

Prince Rupert, B.C.—The Grand Trunk Pacific Railway will in the immediate future construct a warehouse, 300 feet long, on the wharf at this place.

New Westminster, B.C.—It is understood that the Board of Trade will take active steps toward the establishing of an elevator in this city.

Vancouver, B.C.—Mr. K. Burnett, of Nanton, Alta., has secured a site here near the foot of Heatley avenue, on which he will erect a large grain elevator and warehouse.

Vancouver, B.C.—Plans have been completed for a warehouse to be erected on Powell street, near Campbell avenue, for Mr. R. Bowman. It will be of concrete and brick construction, and will cost approximately \$30,000.

Vancouver, B.C.—Messrs. H. Moores & Company, Kingston, Ont., will erect a large elevator on the Vancouver waterfront. The company are negotiating with the C.P.R. for a suitable site. Messrs. Webber & McConnell, Flack Block, are local representatives of this firm.

Saskatoon, Sask.—Messrs. A. Carruthers & Company, of Winnipeg, have purchased a site here on 23rd street, adjoining the Wentz-Birkland Lumber Company, on which they will erect a large warehouse.

Rouleau, Sask.—Messrs. Conger & Company's elevator at this place has been destroyed by fire. Loss not stated.

MacLeod, Alta.—Mr. E. F. Hutchings, of the Great West Saddlery Company, Winnipeg, will erect a large warehouse at this place.

Edmonton, Alta.—The Exchange Mart and the warehouse of the Great West Implement Co. at this place were damaged by fire to the extent of \$10,000 and \$3,000 respectively.

Electrical Construction

Toronto.—The Hydro-Electric Power Commission has awarded contracts for the electrical equipment of twelve stations on the transmission lines between Niagara Falls and Toronto, and Niagara Falls and St. Thomas. The Canadian General Electric Company has secured a contract for about two-thirds of the total equipment, and the Canadian Westinghouse Co. for about one-third.

Toronto.—The Hydro-Electric Commission will in the near future call for tenders for the building of eleven transformer stations, at the following points: Niagara Falls, Dundas, Toronto, Guelph, Preston, Berlin, Stratford, St. Mary's, London, Woodstock and Brantford.

Niagara Falls, Ont.—A survey is being completed by W. D'Arcy Ryan, Illuminat-

ing expert, for the permanent illumination of the cataract, Niagara Falls. The principal battery will be located at the transformer house of the Ontario Power Company, on the upper river bank; another at a point opposite the middle of Goat Island, and a third at the spillway of the Ontario Power Company. It is understood that the cost of installation alone will be at least \$150,000.

Guelph, Ont.—Tenders will be received up to 4.30 p.m. March 17th for electric fixtures for the Guelph Armoury. Plans and specifications are on file at the Department of Public Works, Ottawa, and at the office of Mr. W. Mahoney, architect, Clerk of Works, Guelph. Napoleon Tessier, Secretary, Department of Public Works, Ottawa.

Montreal.—The Eastern Electrical Engineering Company, 76 Victoria Square, have been awarded the contract for the electric wiring of the low level pumping station at Point St. Charles.

Winnipeg, Man.—Tenders will be received at the office of the undersigned up to 11 a.m., April 15th, for the manufacture and delivery at Winnipeg of two testing transformers, viz.: One 30 K.W. at 80,000 volts, and one 200 K.W. at 200,000 volts, also for control equipment therefor. Specifications are on file at the Power Engineer's office, Carnegie Library Building, Winnipeg, or at the office of Smith, Kerry & Chace, Confederation Life Building, Toronto. M. Peterson, Secretary, Office of Board of Control, Winnipeg.

Toronto.—A by-law will be submitted to the local ratepayers in April for the purpose of authorizing the expenditure of \$400,000 for the completion of the seawall.

Brantford, Ont.—Plans and estimates will be prepared for the erection of a new bridge on South Market street. City Engineer Jones can be addressed.

Sault Ste. Marie, Ont.—The ratepayers have passed a by-law granting a bonus to the company of capitalists which proposes to erect a drydock and shipbuilding yards at this place. The company agrees to build a drydock valued at half a million dollars, also shipbuilding yards at cost of several millions. The principals behind the project are Mr. M. J. O'Brien, mining owner and contractor; Mr. J. J. McFadden and Mr. Anderson, of Ottawa.

Port Arthur, Ont.—The Provincial Government has decided to construct a dam at Dog Lake, near Port Arthur, to raise the level of the river, provide a large storage, and increase the water power. It is understood that on the completion of the dam, the power will be administered by the Hydro-Electric Commission.

Lindsay, Ont.—Mr. John Ritchie, Beamsville, Ont., has been awarded the contract for the erection of the new bridge, locks and dam at this place. The work will be commenced at once.

Port Hope, Ont.—Damage to the extent of approximately \$25,000 has been caused at Port Hope by the over-flowing of the Ganeraska River. The following are some of the structures destroyed, viz.: the Canton bridge, Helms' dam, the electric light plant footbridge, the Barrett's Hill bridge and the C.P.R. foot bridge. The north side of the cement bridge on Walton street has also been badly damaged.

Peterboro, Ont.—City Engineer Hay has prepared a new set of plans for the proposed Smith street bridge, which call for an expenditure of approximately \$30,000, and provides for an eighteen foot roadway, with sidewalk on each side, two piers, and two abutments.

Peterboro, Ont.—Representatives of the County of Peterboro, the Township of Harvey, and the Town of Robeygeon have taken up the matter of reconstructing and relocating a number of bridges across the new Trent Canal, and the extension of the wharf at Lakeside.

St. John, N.B.—At a meeting of the Navy Island Bridge Committee preliminary plans were submitted by Mr. F. W. Holt, C.E., for the proposed structure, which it is estimated will cost \$750,000. The bridge will be a double decked structure, providing for railway, vehicular and foot traffic, and will be fifteen hundred feet in length.

St. John, N.B.—At a meeting of the Board of Works it was decided to recommend to the City Council that rebuilding

of Wiggins wharf be made to provide for a three hundred foot ell at the end, to cost \$3,500.

Annapolis, N.S.—Tenders will be received up to 4.30 p.m., March 23rd, for the construction of three ice piers in the Annapolis River at Annapolis Royal, N.S., according to plans and specifications on file at the offices of C. E. W. Dodwell, Resident Engineer, Halifax, N.S.; E. G. Millidge, Resident Engineer, Antigonish, N.S.; the office of the Postmaster at Annapolis Royal, and at the Department of Public Works, Ottawa. Napoleon Tessier, Secretary, Department of Public Works.

Victoria, B.C.—Repairs to the collapsed section of the outer wharf will be commenced at once. Plans have been prepared for the work, which it is expected will cost approximately \$25,000.

Vancouver, B.C.—Messrs. Hermon and Burwell have presented the Civic Harbor Improvement Committee detailed plans for the proposed enlargement of the deep water harbor. The scheme embraces the construction of a breakwater two miles in length, the construction of a canal from English Bay to Coal Harbor, and the building of locks at the mouth of False Creek.

Edmonton, Alta.—The Provincial Government Engineers have completed plans and specifications for a high level traffic and street railway bridge to be built at some point between Fourth and Ninth streets. The estimated cost of the structure is \$300,000.

Waterworks, Sewers and Canals

Toronto.—The following sewers for the Deer Park district have been recommended by the City Engineer: Yonge street, from old city limits to present city limits; Farnham avenue, from Yonge street to a point 1,320 feet west; Olive avenue, from Yonge street to a point 1,330 feet west; St. Clair avenue, from Yonge street to east side of Marlborough Crescent; DeLisle avenue, from Yonge street to Marlborough Crescent; Marlborough Crescent, from St. Clair avenue to Heath street, Heath street, from Yonge street to a point 628 feet east of Oriole road; Clinton avenue, from Lawton avenue to a point 588 feet east of Oriole road; Gormley avenue, from Lawton avenue to west end; Lawton avenue, from Heath street to north of city limits; Jackes avenue, from Yonge street to east end; Rosehill avenue, from Yonge street to east end; Pleasant avenue, from Yonge street to east end; St. Clair avenue, from Yonge street to a point 110 feet east; Alvin avenue, from St. Clair avenue to north end; Ferndale avenue, from St. Clair avenue to north end; Clarence avenue, from Yonge street to a point 870 feet east; Gordon avenue, from Clarence avenue to north end; Glen avenue, from Yonge street to 570 feet.

Burlington, Ont.—Tenders will be received up to 8 p.m., March 23, for the following sections of the proposed waterworks system, viz.: (a) pipe-laying; (b) pump house; (c) water tower; (d) cast-iron pipes; (e) hydrant valves; (f) electrically operated pumping machinery; (g) pump well. Plans and specifications for "a," "c," "d" and "e" may be seen at the office of the Clerk, Burlington, or at the office of Willis Chipman, C.E., Chief Engineer, 103 Bay street, Toronto.

Edmonton, Alta.—The City Council has passed a by-law authorizing the expenditure of \$40,000 for sewer improvements.

Vancouver, B.C.—Engineer Burwell has outlined to the Civic Water Committee a proposal for the extension of the waterworks system, including the construction of the Little Mountain reservoir, and its connection with the Seymour mains. Specifications for this work have been prepared.

Weyburn, Sask.—Tenders will be received up to 8 p.m., April 7th, for the following sections of proposed waterworks system. (a) pipe laying; (c) water tower; (d) cast iron pipes; (e) fire hydrants and valves. Plans and specifications may be seen at the office of the Secretary-Treasurer, Weyburn, or at the office of Willis Chipman, C.E., Chief Engineer, 103 Bay street, Toronto.

Railway Construction

Ottawa, Ont.—It is reported that the Grand Trunk Railway will purchase the materials required in the erection of the Ottawa Terminal Station, D. G. Loomis & Son, general contractors, Montreal, having cancelled their contract.

Hamilton, Ont.—The Street Railway Company will lay new tracks on Herkimer, James and Barton streets this year, and will later reconstruct the system on York and King street west, and Locke street. The contract for cement has been awarded to the Lakefield Portland Cement Company.

Bluevale, Ont.—The Grand Trunk Railway station and freight shed at this place have been completely destroyed by fire. Loss not stated.

Montreal.—It is stated that the various railways having entrance into Montreal are considering the erection of a new union depot on a scale equal to the best railway terminals in the world, and involving an expenditure of from ten to twelve million dollars.

Calgary, Alta.—The City Commissioners have awarded to the Northwest Electric Company, a local concern, the contract for the supply of copper wire for the street railway. Contract price, \$17,339.60. Other contracts which have been awarded are: Motor generator, set and switchboard, Chalmers-Bullock Co., \$15,950; 750 h.p. engine, Pohb Engineering Co., Amherst, N.S., \$14,300; 1,100 tons of steel rails, Gorman, Clancy and Grindley, Calgary, \$70,000. The ties will be supplied by the East Kootenay Lumber Company.

Public Buildings

Toronto.—Architects' plans will be received up to April 1st for the new city registry office to be erected on Albert street, at the rear of the City Hall.

Toronto.—A deputation consisting of Ald. Hilton and Chisholm and Messrs. Money Penny and Clarke have waited on the Public Library with a request that the Board erect a branch building at the corner of Broadview avenue and Gerrard street. Mr. H. T. Kelly, K.C., has been elected chairman of the Board.

Toronto.—The contract for the new Transportation building to be erected at the Exhibition grounds has been awarded to Mr. Frank Armstrong, 296 Berkeley street, at a contract price of \$85,279, with \$2,640 additional for a top flooring of maple. The building will be one storey in height, 337 by 153 feet, and will be built of cut stone and pressed brick. Geo. W. Gouinlock, 1100 Temple Building, is the architect.

Ottawa.—The Board of Control has approved of the proposal for a new grand stand at the Exhibition grounds, combined with a fire station for the south end. This will involve calling for new tenders for the grand stand. Estimated cost, \$35,000.

Ottawa.—The Public Works estimates include the sum of \$30,000 to complete the refinery at the Royal Mint. This amount does not include the machinery or the cost of its installation.

London, Ont.—In all probability the City Architect will, in the near future, be asked to prepare plans, specifications and estimates for the erection of a new City Hall.

Lucknow, Ont.—A new library and public hall, towards which Andrew Carnegie has donated \$7,500, will be erected in the near future.

Glencoe, Ont.—Mr. Geo. A. Proctor, Sarnia, has been awarded the contract for the new Post Office and Customs Building to be erected here.

Owen Sound, Ont.—The town of Owen Sound has under consideration the re-modelling of the interior of the town hall at estimated cost of \$12,000.

Montreal.—Labelle & Lessard, 668 St. Urbain street, have been awarded the contract for the erection of the new armoury on Pine avenue for the 65th Regiment. Plans for the building were prepared by Architect R. A. Brassard, 9 St. James street.

St. John, N.B.—It is proposed to either remodel the present City Hall by the construction of an additional storey or to erect a new building. The matter is now under advisement.

Winnipeg, Man.—In all probability a large wing, to cost \$200,000, will be built to the Kennedy street Court House. It is understood that work on the structure will be commenced in the early summer.

Winnipeg, Man.—Application will be made by the Winnipeg Horse Association for the privilege of erecting a pavilion, up to the street line, on the property between Osborne and Colony street, facing Broadway. The Association proposes to erect a building to cost \$40,000.

Magrath, Alta.—Architect Jas. A. McDonald, Lethbridge, has prepared plans for a new two-storey town hall to be erected here at a cost of \$5,000. The building will be of brick construction.

Strathcona, Alta.—The City Council has decided to offer the Government a free site for the proposed Armory, for which the Government has appropriated \$10,000.

Fernie, B.C.—Messrs. Gray & Campbell have decided the contract for the erection of the new City Hall. The building will be of red pressed brick with Calgary sandstone trimmings.

Banks

Toronto.—Architects Darling and Pearson, 2 Leader Lane, have prepared plans for a fire-proof building to be erected at the corner of Queen and Yonge streets for the City of Toronto.

Montreal.—Architects Ross & McFarlane, 1 Belmont street, have prepared plans for the erection of a branch bank building for the Dominion Bank, at the corner of Prince Arthur street and St. Lawrence Boulevard.

Three Rivers, Que.—Architects Daoust & Lafont have prepared plans for the erection of a bank building for the Bank Nationale.

Kamloops, B.C.—The Bank of Hamilton will erect a new bank building at the corner of Victoria street and Third avenue, to cost \$30,000.

Business Buildings

Toronto.—The Canada Cycle & Motor Company, Limited, will erect a three-storey building on Richmond street, adjoining the Gayety Theatre. It will be 85 by 112 feet, and includes showroom, offices, garage with full equipment of oil and gasoline storage plant, elevator and repair department.

Toronto.—Architect J. H. Galloway, 77 Victoria street, has prepared plans for a two-storey store and dwelling to be erected on Roncesvalles avenue, near Howard Park avenue, for Mr. M. Grogan, 55 Hewitt avenue, at a cost of \$3,000. It will be of brick construction with stone foundation, felt and gravel roof, hardwood and pine floors, pine interior finish, open plumbing, hot air heating, combination lighting.

Toronto.—Architect E. R. Babington, 28 Toronto street, has prepared plans for three two-storey stores and dwellings to be erected on Queen street east, near Kew Beach, for Mr. Cecil Lee, at a cost of \$6,000. The buildings will be of brick construction, with felt and gravel roof, open plumbing, hot air heating, combination lighting, galvanized iron cornice and skylights.

Toronto.—Messrs. Love Bros., 1000 Gerrard street east, have been awarded the contract for a store and dwelling to be erected on Gerrard street east, near Galt avenue, for Mr. Wm. Segwick, at a cost of \$3,000. It will be two storeys in height, of brick veneer construction, with open plumbing, hot air heating, combination lighting, plate glass, leaded glass and electric bells. P. H. Finney, 43 Victoria street, is the architect.

Toronto.—Mr. Chas. A. Grant, 192 Pape avenue, will erect three attached stores and dwellings on the north side of Queen street, near Elmer avenue, at a cost of \$7,000. The buildings will be of brick construction, with stone foundation, felt and gravel roof, hardwood and pine floors and interior finish, open plumbing, hot water heating, combination lighting, metal ceilings, plate glass, three mantels and electric bells.

Toronto.—R. H. Graham, 862 College street, will erect a pair of stores and dwellings on Bloor street, near Gladstone avenue, at a cost of \$4,000. The building will be of brick construction, with felt

and gravel roofing, hardwood and pine wood interior finish, open plumbing, combination lighting, hot water heating, leaded glass and mantels.

Toronto.—Mr. T. Collins has been awarded the general contract for the erection of a two-storey store and dwelling at the corner of Gladstone avenue and Hamam street for Mr. Wm. Collins, 742 Gladstone avenue, at a cost of \$3,900. It will be of brick construction, with brick foundation, felt and gravel roof, hardwood and pine floors and interior finish, open plumbing, hot water heating, combination lighting.

Hamilton, Ont.—Messrs. Southam, Limited, have purchased the premises formerly occupied by Messrs. Morgan & Co., on King street east. The property will be remodelled, and will be occupied by The Spectator Company.

Wallaceburg, Ont.—Mr. D. Gagner has decided to erect a large departmental store on the property adjoining his hotel, work to be commenced at once.

London, Ont.—Architect Wm. G. Murray has prepared plans for alterations to the building of Wm. Pratt, Hyman street. The work includes new plumbing and hot water heating system, and will cost \$2,000.

Berlin, Ont.—Mr. R. Pinke has been awarded the contract for the erection of a two-storey addition to the premises of Messrs. Lang Bros.

Thorold, Ont.—Architect T. H. Wiley will receive tenders up to March 16th for alterations to business block, to be used for grocery and liquor store, for Mr. J. T. Petrie. Specifications include cement work, cut stone, metallic lath, reinforced concrete, ornamental iron, sheet metal work, plate glass, art glass, prismatic glass, refrigerator, oak interior finish, electric lighting and hot water heating.

Montreal.—Architect G. A. Monette, 97 St. James street, has awarded the following contracts for repairs and alterations to the Pratt Estate: Carpentry, F. Lamontagne; painting, D. Lamontagne; heating, E. Lesperance; steel work, Dominion Bridge Co.; elevator, Darling Bros.; metal ceilings, Pedlar People.

Montreal.—Messrs. Reid, MacGregor & Reid, 1552 St. Hubert street, have been awarded the contract for alterations and repairs to the London & Lancashire Building, 164 St. James street.

Montreal.—Architect Joseph Sawyer, 407 Guy street, has awarded the following contracts for the erection of stores and dwellings at corner of Dufresne and St. Catherine streets: Brick work, Marsan Bros.; carpentry, Francis Harel; plumbing, heating and roofing, P. N. Sevigny; plastering, Joseph Fabien; painting and glazing, B. Havert.

Montreal.—Architects Ross & Macfarlane, 1 Belmont street, have awarded to Messrs. D. G. Loomis & Son, Cote St. Paul, the general contract for the erection of a block of stores and offices at the corner of Guy and St. Catherine street west for Messrs. Southam, Limited.

Montreal.—Messrs. Henry Birks & Sons, Ltd., have taken out permit for alterations and repairs to building at 306 St. Catherine street west, to cost \$10,000. Hutcheson & Wood, Royal Insurance Building, architects.

Three Rivers, P.Q.—Architects Daoust & Lafont have prepared plans for the erection of a store for Mr. Badeau.

Three Rivers, P.Q.—Architects Daoust & Lafont have prepared plans for the erection of a block of stores and residences for Mr. Balcer.

Moncton, N.B.—Architect W. C. Barnes has prepared plans for a store to be erected for Mr. R. N. Wyse at a cost of \$10,000. It will be of brick construction, with stone trimmings, electric lighting, hot water heating, modern plumbing, birch and white wood interior finish, freight elevator, metal ceiling, plate and prismatic glass.

Winnipeg, Man.—Messrs. Oldfield, Kirby & Gardner have taken an option on the property between the new general post office and the Northern Bank Building, on which they propose to erect a large office block. The property has a frontage of 40 feet on Portage avenue, and depth of 110 feet.

Vancouver, B.C.—Architects Grant & Henderson have awarded to J. J. Dis-

sette the contract for the erection of a brick store and rooming house at Davie and Hornby streets. The structure will cost \$15,000.

Vancouver, B.C.—Architects Parr & Fee, have awarded to Mr. Peter Tardiff the contract for the Fillon building to be erected on Carrall street at a cost of \$20,000.

Vancouver, B.C.—Mr. J. S. Helyer has completed plans for an eight-storey structure to be known as the "Exchange Building," to be erected on Hastings street. The owners are Mr. J. S. Helyer, Mr. E. W. MacLean, Mr. J. W. Weart and others.

Vancouver, B.C.—Architects Hooper & Watkins have prepared plans for a six-storey office building to be erected for Mr. Geo. E. Bower. It will be located next to the Eastern Townships Bank, on Granville street, and will be of steel and concrete construction. The stairways will be of marble, and passenger and freight elevators will be installed.

Vancouver, B.C.—A permit has been issued covering the erection of a three-storey brick block on Pender street, between Hornby and Burrard streets, for Mr. F. Fuller. Estimated cost, \$24,000. Architects, Parr & Fee, Contractor, George S. Williamson.

Victoria, B.C.—The British American Trust Company is contemplating the erection of an office building in the central part of the city.

Victoria, B.C.—The B.C. Land and Investment Co. is considering the replacing of the present building occupied by Hiram Walker & Sons, corner of Langley street and Fort street, with a new four-storey structure.

Victoria, B.C.—Plans have been prepared for a two-storey building containing twelve stores with offices above, to be erected on Government street, near Chatham street, for Lim Bang.

Lethbridge, Alta.—Mr. Wm. Ott will extend his block on Round street back to the lane. Architect Jas. A. McDonald has prepared the plans for the addition.

Calgary, Alta.—It is reported that the T. Eaton Co., Ltd., has secured lots here on 8th avenue with a view to erecting a large departmental store. It is expected that the sum of \$500,000 will be expended on site and building.

Edmonton, Alta.—The Royal Fruit Company, represented here by Mr. H. C. Stockton, has purchased lot 215 on Third street, on which they will erect a two-storey solid brick building. Plans will be prepared at once, and construction started in the course of a month or two.

Edmonton, Alta.—Messrs. Miller, Spencer & Cunnell have taken out a permit for the erection of a \$30,000 store and office building on Jasper avenue, between Fifth and Sixth streets.

Edmonton, Alta.—Teese & Persse, large wholesalers of Winnipeg, are contemplating the erection of a large business building at this place.

Edmonton, Alta.—Mr. J. A. Powell, Fraser avenue, has taken out a permit for the erection of an office building to cost \$12,000.

Regina, Sask.—Messrs. Willoughby and Duncan will erect a large business building this coming summer. The building will be five storeys in height, and the main floor will be laid out for stores.

Regina, Sask.—The Heintzman Piano Company, of which Mr. E. E. Corbeau is local manager, will erect new premises near the Post Office. The foundations will be laid with a view to erecting a five-storey building, but in all probability not more than two or three storeys will be built this year.

Clubs and Societies

Montreal.—An extension to the Y.M.C.A. building on Dominion Square is being considered by the Directors. The following committee has been appointed to further report on the matter: J. W. McConnell, Chairman; G. W. Birks, L. Cushing, W. H. Goodwin, A. F. C. Ross, E. C. Budge and R. H. Macdonald. The proposed addition will cost \$250,000.

Asylums and Hospitals

Hamilton, Ont.—At a special meeting of the Board of Works Dr. Roberts and a deputation from the Board of Health

made application for funds with which to build a new isolation hospital. The Finance Committee appointed a sub-committee to consider the matter and report.

Goderich, Ont.—The Hospital Board is considering the erection of an addition to the present hospital building for the accommodation of both the nurses and patients. The following officers have been elected: President, Judge Holt; vice-president, Judge Doyle; treasurer, C. A. Halm; secretary, H. E. Hodgins.

Montreal.—Architects Hutchison & Wood, Royal Insurance Building, have prepared plans for a building to be erected at the Protestant Infants Home. The structure will be of brick, and cost \$50,000.

Halifax, N.S.—Mr. Walter Lownds has been awarded the contract for the erection of a building for the Children's Hospital, Halifax, N.S., as per plans prepared by Architect W. M. Brown. The building will cost \$15,057.

Winnipeg, Man.—In all probability the management of the Children's Home, River avenue, will either make an extension to the present building, or replace it with an entirely new structure of much larger dimensions.

Vancouver, B.C.—The Associated Charities propose taking immediate steps to secure funds for the building of an infirmary ward in connection with the General Hospital.

New Westminster, B.C.—Plans prepared by Architect Sait have been submitted to the Royal Columbia Hospital Managers for the central section of the proposed hospital building. The plans call for a brick and stone structure, 250 by 130 feet, to cost over \$100,000.

Toronto.—Plans have been prepared by Architect A. J. Rattray, 18 Washington avenue, for a Rescue Home, for which an option on a property on College street has been taken. The building will be known as the Burn Memorial.

Toronto.—A site for a sailors' home has been requested of the Board of Control by the Upper Canada Tract Society, of which Mr. J. K. Macdonald is President. The proposition is to erect a building to cost \$15,000.

Toronto.—The Trustees of the House of Industry have made application to the Board of Control for a grant of \$50,000 to enlarge the institution.

Toronto.—Architects Dennison & Stephenson, 20 King street west, have prepared plans for the Nurses' Home and new wing to be erected in connection with the Hospital for Incurables, Dunn avenue. The buildings will be of brick construction, with brick foundation, slate roof, hardwood floors, hardwood and pine interior finish, open plumbing, steam heating, combination lighting, metal lath, plate glass, steel beams and steel columns.

Churches

Toronto.—The congregation of Fern avenue Presbyterian Church propose erecting a new edifice to cost \$50,000, at the corner of Garden and Roncesvalles avenue.

Toronto.—Tenders will be received at the office of the undersigned up to 5 p.m. March 19th, for the plastering of St. Helen's Roman Catholic Church, Dundas street and St. Clarens avenue. J. P. Hynes, architect, 199 Yonge street, Toronto.

Port Colborne, Ont.—The Presbyterian congregation propose to expend the sum of \$3,500 for remodelling their church, which was recently damaged by fire.

Ottawa, Ont.—The congregation of St. Bartholomew's Church will erect a new church on Buena Vista Road, Rockcliffe, on a site which has been donated for that purpose.

Stratford, Ont.—It is estimated that \$15,000 will be spent in improvements to St. Joseph's Roman Catholic Church this year. It is intended to install new seats, remodel the interior, and tile the aisles.

Peterboro, Ont.—At a meeting of the congregation of Knox Church it was unanimously decided to erect a new edifice sometime during the coming summer. A large sum of money has been donated towards the new structure, and a committee has been appointed to have plans and specifications prepared.

London, Ont.—The Trustees of St. John

the Evangelist Church have purchased a lot on the corner of Adelaide and Grosvenor streets, on which they intend to erect a new church. Rev. W. T. Hill, pastor.

Montreal.—Architect Chas. Bernier, 70 St. James street, has prepared plans for the erection of a Roman Catholic Church in Ville St. Paul.

Montreal.—Architects Ross & Macfarlane, 51 Bank of Ottawa Building, have prepared plans for a new church of St. Matthias to be erected on the corner of Cote St. Antoine Road and Churchill avenue. The building will be of the Gothic style of architecture, 90 by 150 feet, and will be built of Indiana limestone. It will cost \$45,000.

Bedford, Que.—St. Damien's Roman Catholic Church at this place has been destroyed by fire, entailing a loss of \$40,000, with insurance of \$7,000.

Winnipeg, Man.—The congregation of the Dufferin avenue Presbyterian Church will erect a new church.

Vancouver, B.C.—Plans are being prepared and work will be commenced at once on the erection of a new church at West Burnaby. Rev. W. H. Barraclough will be addressed.

Regina, Sask.—The Baptist congregation has decided to erect a new church to cost \$43,000.

Lethbridge, Alta.—Mr. T. O. Johnston, of North Dakota, will erect a three-storey brick block at this place on the corner of Burdett and Dufferin street. The building will be used as lodging house and restaurant, and will be 34 by 125 feet. Architect, James A. McDonald, Lethbridge.

Saskatoon, Sask.—Architects Storey & Van Egmond, Regina, have prepared plans for a large addition to the Empire Hotel at this place. It will be of brick construction, and modernly equipped.

Residences and Flats

Toronto.—Architect E. R. Babington, 28 Toronto street, has prepared plans for a pair of semi-detached two-storey dwellings to be erected on Lee avenue for Mr. W. N. McEchern, Leuty avenue, at a cost of \$4,500. The building will be of brick construction, with felt and gravel and shingle roof, pine floors and interior finish, open plumbing, hot air heating, electric lighting, electric bells and two mantels.

Toronto.—Architect J. H. Galloway, 77 Victoria street, has prepared plans for a two-storey dwelling to be erected on College street, near Roncesvalles avenue, for Mr. E. B. Atkinson, Harvard avenue, at a cost of \$3,500. It will be of brick construction, with oak and pine floors and interior finish, open plumbing, hot water heating and combination lighting.

Toronto.—Architects Ellis & Connery, Manning Chambers, have prepared plans for two detached two-storey dwellings to be erected on Rowenwood avenue, near Scarth Road, for Mr. Samuel Young, Jr., 69 Hazleton avenue. The buildings will be of brick construction, with slate roof, hardwood and pine floors and interior finish, open plumbing, hot water heating, combination lighting, four mantels and electric bells.

Toronto.—Architects R. J. Edwards & Saunders, 20 Toronto street, have prepared plans for a two and a half storey pair of residences to be erected in South Parkdale at a cost of \$8,000. The buildings will be of brick construction, with slate roof, hardwood and pine floors and hardwood interior finish, open plumbing, hot water heating, combination lighting, electric bells and refrigerator.

Toronto.—Architects R. J. Edwards & Saunders have prepared plans for a two and a half storey residence to be erected in Avenue Road Hill district, at a cost of \$9,000. It will be of brick construction, with slate roof, hardwood and pine floors, hardwood interior finish, open plumbing, hot water heating, combination lighting, four mantels and electric bells.

Toronto.—Architects Simpson & Young, 17 Toronto street, have prepared plans for a two and a half storey residence and stable to be built at Bain and Broadview avenues for Mr. W. T. Harris at a cost of \$16,000. It will be of brick construction, with brick foundation, slate roof,

hardwood and pine floors, open plumbing, hot water heating, combination lighting, staved columns and mantels.

Toronto.—Architect E. G. Wilson, 77 Victoria street, has awarded the following contracts for a two and a half storey brick residence to be erected on Geoffrey street for Mr. W. Dinsmore: Masonry, H. Manley, 1053 College street; carpentry, Thos. Farley, 350 Wellesley street; plastering, Hanna & Nelson, 271 Rusholme Road; painting and glazing, Fletcher Co., 93 Pearson avenue; plumbing, Chas. Taylor, 1208 Yonge street; heating and galvanized ironwork, Howard Furnace Company.

Toronto.—Architect Ewart G. Wilson has prepared plans for a three-storey apartment house to be erected in the north end of the city, at a cost of \$17,000. It will be of brick construction, with felt and gravel and slate roof, hardwood floors and interior finish, open plumbing, steam heating, electric lighting, mantels and dumb waiters. Owner's name withheld.

Toronto.—Architect Ewart G. Wilson has completed plans for three attached two and a half storey dwellings to be erected on Manning avenue at a cost of \$6,000. The buildings will be of brick construction, with open plumbing, hot air heating, combination lighting, three mantels and electric bells. Owner's name withheld.

Toronto.—Architect J. Hunt Stanford, 34 Yonge street Arcade has prepared plans for a pair of two and a half storey dwellings to be built on Shannon street, near Dovercourt Road, for Mr. J. T. V. May, 22 Shannon street. The buildings will be of stucco on brick, with slate roof, hardwood and pine floors and interior finish, open plumbing, hot water heating, combination lighting, three mantels and electric bells.

Toronto.—Architect J. Hunt Stanford has prepared plans and specifications for a two-storey garage and chauffeur's suite, to be erected on Lynwood avenue, near Poplar Plains Road, for Mr. H. Hutson, 43 Victoria street. It will be of brick and half timbered construction, with open plumbing, hot water heating, electric lighting, concrete and pine floors, pine interior finish, mantel and electric bells. The building will be erected by day work, the owner supplying all materials.

Toronto.—Architect J. Hunt Stanford has prepared plans for a two and a half storey residence to be erected on Warren Road, near Clarendon avenue, for Mr. W. W. Ecclestone, Balmoral avenue, at a cost of \$9,000. It will be of brick and stone construction, with slate roof, hardwood floors and interior finish, open plumbing, hot water heating, combination lighting, ornamental columns and five mantels.

Toronto.—Architect J. Hunt Stanford has prepared plans for a pair of two and a half storey residences to be erected at 201-3 George street for Mr. W. A. Forster at a cost of \$6,000. The buildings will be of brick construction, with felt and gravel and slate roof, pine and hardwood floors and interior finish, open plumbing, hot water heating, combination lighting, metal lath, electric bells and two mantels.

Toronto.—Architect J. Hunt Stanford has prepared plans for a two and a half storey residence to be erected on Palmerston Boulevard for Mr. H. F. Squires at a cost of \$5,000. It will be of brick construction, with pine and hardwood floors and interior finish, open plumbing, hot water heating, combination lighting, metal lath, electric bells and three mantels.

Toronto.—Architect J. Hunt Stanford has completed plans for three pairs of semi-detached dwellings, to be erected on Smith street, near Broadview avenue, for Mr. Nicholson, 1117 Yonge street. The buildings will be of brick veneer construction, with rough-cast exteriors, felt, gravel and shingle roof, gas lighting, open plumbing and hot water heating. Estimated cost, \$7,500.

Toronto.—Architect J. Hunt Stanford has prepared plans for five attached two and a half storey dwellings to be erected on McGill street, near Yonge street, for Mr. W. A. Forester, Ann street, at a cost of \$11,500. The buildings will be of brick

construction, with stone foundation, slate roof, hardwood and pine interior finish, plumbing, hot water heating, combination lighting, mantels and electric bells.

Toronto.—Architect J. Hunt Stanford has completed plans and will receive tenders from March 20th to April 1st for the erection of a \$9,000 two and a half storey residence on Warren Road, near St. Clair avenue, for Mr. Z. Gallacher, Maynard avenue. It will be of brick construction, with slate roof, oak and pine interior finish, open plumbing, hot water heating, combination lighting, dumb waiters and five mantels.

Toronto.—Architect Leonard Foulds, 43 Victoria street, has prepared plans for a two and a half storey residence to be erected on Brunswick avenue, near Bloor street, for Dr. Slade, at a cost of \$4,500. It will be of brick construction, with slate roof, oak interior finish, open plumbing, hot water heating, combination lighting, ornamental columns, two mantels and electric bells.

Toronto.—Architect P. H. Finney, 43 Victoria street, has drawn plans for a two and a half storey residence to be erected on Brooklyn avenue for the Rev. Wm. Eushill, Brooklyn avenue, at a cost of \$4,000. It will be of brick construction, with slate roof, open plumbing, hot water heating, combination lighting, two mantels and electric bells.

Toronto.—Architect P. H. Finney has prepared plans for a pair of two and a half storey dwellings to be erected on Huron street, near Dupont street, for Messrs. Wilkins & Co., 70 Wellesley street, at a cost of \$6,000. The buildings will be of brick construction, with slate roof, oak interior finish, open plumbing, hot water heating, combination lighting, mantels and electric bells.

Toronto.—Architect P. H. Finney has prepared plans for a two and a half storey residence to be erected on Rose avenue for Mr. D. Campbell, Seaton street, at a cost of \$5,000. It will be of brick construction, with slate roof, oak interior finish, open plumbing, hot water heating, combination lighting, two mantels and electric bells.

Toronto.—Architect P. H. Finney has prepared plans for a pair of semi-detached dwellings to be built on Victor avenue for Mr. W. S. Appleton, Logan avenue, at a cost of \$5,000. The buildings will be of brick veneer construction, with felt and gravel roof, open plumbing, hot air heating, combination lighting, electric bells and two mantels.

Toronto.—Architect P. H. Finney has prepared plans for a pair of two-storey dwellings to be erected on Dovercourt Road for Mr. R. Burkell, 313 Crawford street, at a cost of \$5,000. The buildings will be of brick construction, with slate roof, open plumbing, hot air heating, combination lighting, two mantels and cut stone sills.

Toronto.—Architect W. G. Hunt, 255 Westmoreland avenue, has completed plans for a two and a half storey residence to be erected on Palmerston Boulevard for Mr. J. B. Shields, 529 Euclid avenue, at a cost of \$6,000. It will be of brick construction, with shingle roof, hardwood and pine interior finish, open plumbing, hot water heating, combination lighting and three mantels. The owner will let contracts for the various trades.

Toronto.—Architect W. G. Hunt has prepared plans for a pair of two and a half storey dwellings to be erected on Marmaduke street, near Roncesvalles avenue, for Messrs. Robertson & Summers, 186 Ontario street, at a cost of \$5,500. The buildings will be of brick construction, with open plumbing, hot air heating, combination lighting, two mantels and electric bells. The owner will let contracts for all trades.

Toronto.—Architect J. W. Siddall, 75 Yonge street, will receive tenders up to March 23rd for a two and a half storey residence to be erected on Roxborough street east for Mr. W. D. Tummis, at a cost of \$15,000. It will be of brick construction, with slate roof, hardwood interior finish, open plumbing, hot water heating, electric lighting, mantels and electric bells.

Toronto.—Hall and Son have the contract for a \$16,000 three-storey brick apartment building, to be erected on King street west, near Jamieson avenue,

for Thos. McIlwain, 147 Jamieson avenue. Simpson & Young, 17 Toronto street, are the architects.

Toronto.—Messrs. Elgie & Page, 21 Havelock street, have the contract for a \$10,000 two-storey solid brick residence to be built on Dunvegan Road, near St. Clair avenue, for W. M. McLaughlin, 478 Huron street. Architect Chas. J. Gibson, 75 Yonge street, prepared the plans.

Toronto.—Architect J. C. Hedges, 86 Clinton street, has prepared plans for three attached two and a half storey dwellings to be erected on Clinton street, near College street, for Mr. Wm. Greaves, 593 College street, at a cost of \$6,500. The buildings will be of brick construction, with felt and gravel and slate roof, open plumbing, hot air heating, combination lighting, electric bells and mantels.

Toronto.—Wm. H. Thompson, 29 Marlboro street, will erect a pair of two-storey stores and dwellings at 1224 Yonge street, near Walker avenue, at a cost of \$4,000. The buildings will be of brick construction, with felt and gravel roof, open plumbing, hot water heating, combination lighting, hardwood and pine floors, metal ceilings and electric bells. Architect Chas. H. Wilmott prepared the plans.

Toronto.—Architect C. J. Reed, Confederation Life Building, has awarded the following contracts for alterations to residence in Rosedale for Mr. F. E. Hutton: Masonry, carpentry and plastering, H. Manley, 1053 College street; plumbing and heating, Toronto Furnace Co., 72 King street east; electric wiring, McDonald & Wilson, 181 Yonge street. Cost of work, \$3,000.

Toronto.—The following contracts have been awarded for a two-storey and attic brick dwelling to be erected on Admiral Road for Mr. Chas. Bonnick, 65 Prince Arthur avenue; Masonry, E. Smith, Dovercourt Road; carpentry, Jas. Hogg, Adelaide street west; plastering, Hanna & Nelson, Rusholme Road; painting, McCausland & Son, Nelson street; tinsmithing, G. M. Bryan, Yonge street; electric wiring, Federal Electric Co., Bay street. Bond & Smith, 19 Wellington street, are the architects.

Toronto.—Messrs. T. Jones & Co., 600 Manning avenue, will erect a pair of two and a half storey dwellings at 151-3 Brunswick avenue at a cost of \$5,000. The buildings will be of brick, with slate roof, open plumbing, hot air heating, combination lighting, electric bells and mantels. A. B. Stroud, 157 Bay street, architect.

St. Catharines, Ont.—Architect Thomas H. Wiley has prepared plans for three dwellings to be erected for Mr. Peter Forsythe at a cost of \$5,000. The buildings will be of brick construction, with hot air heating, gas and electric lighting, enameled iron plumbing and electrical bells.

Windsor, Ont.—Mr. W. W. Cruise, real estate dealer, proposes to erect a three-storey apartment house on the old Meloche property, at the corner of Ouellette avenue, opposite the Liberal Club. It will be of brick and marble construction.

Hamilton, Ont.—Mr. W. A. Noble has taken out a permit for the erection of a \$2,600 brick dwelling on Homewood avenue, between Kent and Locke streets; also for six brick dwellings to be built at the corner of Clyde and Cline streets, at a cost of \$6,000.

Ayr, Ont.—Architect Wm. G. Murray, London, Ont., has prepared plans for a two-storey and attic residence to be erected at this place for Dr. Ward Woolner. It will cost \$4,500.

Montreal.—Architects MacVicar & Heriot, 104 Union avenue, have awarded the following contracts for the erection of the Duncan Apartment House on Mountain street: Masonry and brick, Reid, MacGregor & Reid; carpentry, Wm. Evely, 449 Bleury street; structural steel, Dominion Bridge Co.; plumbing, James Ballantyne, 159 St. Antoine street; electric work, Sayer Electric Co., 14 Beaver Hall Hill; roofing, Geo. W. Reed & Co., 337 Craig street west.

Montreal.—Architect Joseph Perreault, 17 Place d'Armes Hill, has awarded the following contracts for the erection of eight flats on Park avenue for Mr. J. M. Dorion. Roman stone, T. A. Morrison &

Co., 20 St. James street; brick work, C. Gauthier, Ville St. Louis.

Montreal.—Architect R. Montgomery Redden, 8 Beaver Hall Square, has prepared plans for the erection of three houses on Winchester avenue, Westmount, for W. H. Price. The contract has been let to T. C. Bulmer, 30 York avenue.

Montreal.—Architect J. E. Adamson, Coristine Building, has prepared plans for the erection of an apartment house on St. Mark street for Chas. Shirley.

Montreal.—Architect J. E. Adamson, Coristine Building, has prepared plans for the erection of two houses on Grosvenor avenue, Westmount, for Mr. Sharp.

Montreal.—Architect A. F. Dunlop, Lindsay Building, has awarded the following contracts for the erection of an apartment house on Lorne Crescent for Mr. Tatley: Masonry and brick, Gray & Wighton, 7 Park avenue; roofing, Richardson Simard & Co., 8 Prince Arthur west.

Montreal.—Architect Alphonse Piche, 52 Victoria Square, has completed plans for the erection of two houses on Mount Royal avenue for Mr. H. Valentine.

Montreal.—Architect Alphonse Piche, 52 Victoria Square, has finished plans for the erection of two houses on Mount Royal avenue for T. A. Gauthier.

Montreal.—Architect J. Rawson Gardner, New York Life Building, has awarded the following contracts for the erection of a residence on Aberdeen avenue, Westmount, for Mr. P. B. Sherwood: Masonry, Gray & Wighton; carpentry, J. & W. Morrison; roofing, G. W. Reed & Co.; plumbing, Ogilvie Bros.; plastering, F. Beaudoin; painting, J. K. Arcand; electric work, Scott & Rubenstein.

Montreal.—Architect Geo. T. Hyde, 157 St. James street, has prepared plans for the erection of four houses on Montrose avenue, Westmount, for Thomas Lamb.

Montreal.—Jas. Mousen has the general contract for the erection of a \$25,000 residence on Drummond street for Mr. R. B. Angus, 240 Drummond street. E. & W. S. Maxwell, 6 Beaver Hall Square, architects.

Montreal.—Mr. E. Lamoureux, 9 St. Elizabeth street, has taken out a permit for the erection of two houses, containing six dwellings, at a cost of \$8,000.

Outremont, Que.—Architect Theo. Daoust, 103 St. Francois Xavier street, Montreal, has prepared plans for a four-storey villa to be erected on St. Catherine Road, Outremont, for Mr. Joseph Gravel, St. Catherine street. It will be of pressed brick and Roman stone, with plastic brick foundation, terra cotta partitions, slate roof, hardwood floors, hot water heating, open plumbing, combination lighting. The building will cost \$40,000.

Rimouski, P.Q.—Architects Ouellet & Levesque, 115 St. John street, Quebec, P.Q., have prepared plans for a \$5,000 dwelling, to contain store and shop, to be erected at this place for Mr. A. E. Portugals, a local plumber. The building will be two storeys in height, of pressed brick construction, with stone foundation, hot water heating and galvanized iron roof.

Three Rivers, P.Q.—Architects Daoust & Lafont have prepared plans for the erection of a residence for Mr. Jutreau.

Winnipeg.—Architect Wm. Wallace Blair, 414-16 Nanton Building, has prepared plans for a six-storey and basement brick building, 50 by 120 feet, to be built on Main street south.

Vancouver, B.C.—Architect Arthur J. Bird, has prepared plans for a frame apartment house to be erected at the corner of Seventh avenue and Bridge street for Dr. W. A. Clark.

Vancouver.—Architect E. Stanley Milton, 619 Hastings street west, has prepared plans for a residence to be built on Nelson street for Wm. Trythall.

Victoria, B.C.—Dr. O. M. Jones will erect a \$10,000 stone residence near the golf grounds, Oak Bay. Plans for the structure have been completed.

Victoria, B.C.—A permit has been issued to Architect Geo. C. Mesher for the erection of an apartment house at the corner of McClure and Johnson streets. The building will be of frame construction, two storeys and basement in height, and will cost \$8,000.

Edmonton, Alta.—E. J. Taylor has taken out a permit for the erection of seven apartment houses, two storeys in height, at the corner of Ninth street and Saskatchewan avenue. The buildings will be of brick construction, and will cost approximately \$26,000.

Saskatoon, Sask.—Plans prepared by Architect W. W. Lachance, of Regina, have been accepted for an apartment house to be erected at this place on Second avenue for Messrs. Newton and Baldwin. The plans provide for a brick and stone building, three storeys in height, 140 feet by 35 feet.

Hotels

London, Ont.—Mr. B. Harrison has taken out a permit for the erection of a new stone front to his hotel on Talbot street.

Kingston, Ont.—Mr. Walter Telfer, proprietor of the British American Hotel has made an offer to the City Council to put up a five-storey building on the present site, providing the city will guarantee bonds to the extent of \$100,000.

Hamilton, Ont.—The Waldorf Hotel has been considerably damaged by fire. Loss not stated.

Three Rivers, P.Q.—Architects Daoust & Lafont have drawn plans for a hotel building to be erected for A. Dufresne. **St. John's, N.F.**—The Springdale hotel, Water street west, of which Mr. B. Walsh is proprietor, has been badly damaged by fire. Loss not stated.

Vancouver, B.C.—Architects Grant & Henderson have awarded to F. F. Perry the contract for the erection of a \$22,000 brick rooming house on Cordova street, east of the Sullivan building.

Lumsden, Sask.—The Maple Leaf Hotel has been completely destroyed by fire. Loss estimated at \$15,000, with insurance of \$8,000.

Fire Stations and Jails

Guelph, Ont.—It is reported that the city will erect a new fire hall on Trafalgar Square, opposite the Royal Opera House.

Montreal.—The general contract for the erection to be added to the new jail at Bordeaux has been awarded to J. B. Pauze Co., 70 St. James street.

Montreal.—The Civic Legislation Committee have adopted an amendment empowering the city to build a fire station and a police station on land belonging to Mount Royal Park, in the vicinity of Pine avenue and Cedar avenue.

Moose Jaw, Sask.—Negotiations are under way for the purchase of a suitable site on which to erect a new fire hall.

Opera Houses and Rinks

Toronto.—Mr. P. T. Burgess will erect a \$20,000 theatre building at the S.W. corner of Queen and Lewis streets, just east of Broadview avenue. The building will be 55 feet by 132 feet, with a seating capacity for 700 people.

Toronto.—Tenders were received up to March 9th for the new Shea's theatre to be erected at the corner of Victoria and Richmond streets. A permit for the structure, which will cost \$260,000, has been issued.

Montreal.—Architects Mitchell & Crighton have been awarded the general contract for the erection of a moving picture theatre at the corner of St. Catherine and Aylmer streets, for Cochels and Pules, to Laurier & Grandmaison. Liverpool, London and Globe Building.

Toronto.—Mr. F. Powell has purchased a lot on the north side of Queen street, immediately east of Yonge street, on which he will erect a moving picture theatre, to cost in the neighborhood of \$20,000.

Toronto.—A permit has been issued for a \$15,000 two-storey brick theatre to be built on Teruley street, near Agnes street, for Chas. Pasternack and Simon Rabinovitch, 187 University avenue. Geo. W. Gounlock, 1108 Temple Building, architect.

Schools and Colleges

Toronto.—Tenders will be received up to 5 p.m. March 22nd for all trades required in the erection of a building for the Faculty of Education, University of Toronto, at the corner of Bloor street

and Spadina avenue. Darling & Pearson, architects, 2 Leader Lane.

Toronto.—The Board of Education has awarded the following contracts for the enlarging of Fern avenue school: Carpentry work, W. H. Martin, 126 Riverdale avenue, \$7,400; masonry, J. C. Bayliss & Son, 265 Gladstone avenue, \$11,000; paintings, J. Phinnemore, 10 Gerrard street east, \$1,025; plumbing, Fred Armstrong Co., Ltd., 277 Queen street west; plastering, Beaver & Company, 62 Winchester street, \$1,460; roofing and tin-smithing, Flowers & St. Leger, 5 Denison avenue, \$1,000; heating and ventilating, Rutley Warming & Ventilating Co., 36 Toronto street, \$1,000; steel construction, Dominion Bridge Co., steel for fireproof doors, Expanded Metal Co.

Toronto.—The Board of Education has awarded the following contracts for the enlarging of the Girls' Home: Carpentry, Frank Armstrong, 69 Oak street, \$4,453; masonry, Balderston & Hutchinson, \$4,207; painting, James Phinnemore, 10 Gerrard street east, \$395; plumbing, Fred Armstrong Co., Ltd., 277 Queen street west, \$350; plastering, T. Blackburn & Son, 208 Broadview avenue; heating and ventilating, The Rutley Warming & Ventilating Co., \$840; structural steel, Reid & Brosn, 63 Esplanade east, \$287; roofing and tin-smithing, R. Rennie & Son, \$680; steel, for fireproof floors, The Expanded Metal Co., \$558; floor tiles, Alkenhead Hardware Co.

Toronto.—The Board of Control will be asked to grant \$20,000, in addition to the \$50,000 already granted, for the building of eight rooms and an assembly hall at Riverdale High School.

Toronto.—At a meeting of the Board of Education it was decided to ask for the sum of \$60,000 for the erection of a new school to replace the Elizabeth street school.

Oshawa, Ont.—The ratepayers have passed a by-law authorizing the expenditure of \$20,000 for the erection of a new high school, for which a Special Committee has been appointed to secure a suitable site.

Trenton, Ont.—Architects Ellis & Conner, Manning Chambers, Toronto, have prepared plans for a \$19,000 three-storey school building to be erected at this place. It will be of brick construction, with stone foundation, slate roof, maple floors, pine interior finish, open plumbing, steam heating, combination lighting, structural iron, stock brick, fireproofing, asbestos materials, pipe covering. Tenders will be received up to March 20th.

Dorchester, Ont.—Architect Wm. G. Murray, London, is preparing plans for a one-storey school house to be erected in Dorchester, Ont., for the Trustees of School Section No. 15. The building will be of cement block construction, with hot air heating, and will cost \$5,000.

Brantford, Ont.—The Collegiate Board have plans for a new structure to cost \$73,895, with \$5,145 for equipment, and will ask the City Council to provide the money, without again submitting the issue to the ratepayers.

Brantford, Ont.—The Trustees of School Section No. 18 of the Township of Brantford, are considering plans for the erection of a new school building this spring. **London, Ont.**—The Catholic Board of Education will erect two new schools in the near future, one to be located in the south-eastern section of the city, and the other probably on Maitland street. The buildings will cost approximately \$5,000 each.

Clarke, Ont.—Tenders will be received up to March 25th for a new school building for School Section No. 1. Plans and specifications may be seen on application to Wm. Payne, Secretary-Treasurer, Clarke, Ont.

Windsor, Ont.—The Property Committee of the Board of Education will recommend the erection of a \$12,000 addition to the Collegiate Institute, connecting the present building and gymnasium. The Committee will also recommend the erection of a new four room school building, which might later be made into an eight room building.

St. Thomas, Ont.—Tenders will be received up to March 18th for the erection of a two-room brick school for Section No. 18, Yarmouth Heights, one mile from St. Thomas. Plans for the structure

were prepared by Architect N. R. Darragh, Southern Loan Chambers, St. Thomas, Ont.

Berlin, Ont.—The Fathers of the Resurrection, who have charge of St. Jerome's College, will greatly enlarge the building.

Stratford, Ont.—It is proposed to erect a four-room addition to Shakespeare Ward School, at a cost of between \$15,000 and \$20,000. A by-law will be submitted to the ratepayers.

Strathroy, Ont.—School-house No. 9, West Adelaide, about nine miles northwest of Strathroy, has been destroyed by fire.

Halleybury, Ont.—Tenders will be received up to 6 p.m. March 30th for the erection of an eight-roomed brick school. Plans and specifications may be seen at the office of A. D. Piller, architect, Paul A. Corbold is Secretary of the Public School Board.

Berlin, Ont.—The Public School Board has decided to erect two four-room additions to the Rosland avenue and the Margaret avenue schools at a cost of about \$21,000. Architect C. Knechtel is preparing the plans for the extensions.

Montreal.—The Government of the Province of Quebec has decided to erect an addition to the Jacques Cartier Normal School, Lafontaine Park. Mr. Chauré, architect of the department, will prepare detailed plans for the new wing, which will be of granite, four storeys in height, 90 by 55 feet, and cost approximately \$60,000.

Moncton, N.B.—The School Trustees are considering the question of issuing bonds to the extent of \$15,000 for additional school accommodation.

Sydney Mines, N.S.—A citizens' meeting has been called to consider the voting of sufficient funds to erect a new eight-room school building at this place.

Victoria, B.C.—The choice of a site for the proposed University of British Columbia will be left to a Board of Eastern University experts. The local Government, it is expected, will make a large endowment towards the erection of these buildings.

New Westminster, B.C.—At a special meeting of the Building Committee of the Board of School Trustees it was decided to construct the new eight-room school at Clark Drive and Ninth avenue on the fireproof plan. This will probably entail an additional expenditure of \$2,500.

Thunder Creek, Sask.—Tenders for building of the Bird's Eye View school house, No. 2009, will be received up to 1 p.m. March 25th. Plans and specifications may be seen on application to the Secretary-Treasurer, at the S.E. 1-4 section 12-19-375, where all necessary information may be obtained. E. W. Johnson, Secretary-Treasurer, Thunder Creek, Sask.

Mutana, Sask.—The Board of Trustees are having plans prepared for the enlargement of the present school building to make it an eight-room structure, and also for the erection of an entirely new building. Mr. W. P. Pate, Secretary, Bowerman Block, Saskatoon, may be addressed.

Civic Improvements

Toronto.—Notice is given that the city will make the following local improvements: Vitrified block pavement on section of Lake street, estimated cost, \$19,846; vitrified block pavement on Shaw street, from s.s. Essex street to the north city limit, estimated cost, \$14,717; 24 foot asphalt pavement, with concrete curbing and gutters, on section of Euclid avenue, estimated cost, \$4,437; 24 foot asphalt pavement, with concrete gutters, Harbord street, from Bathurst street to Spadina avenue, estimated cost, \$11,364; 18 foot asphalt pavement on Shaw street from Queen to Arthur streets, estimated cost, \$18,903.

Toronto.—A by-law will be submitted to the rate-payers for the purpose of authorizing the expenditure of \$100,000, to carry out a plan of permanent improvements at the Island, for which Park Commissioner Wilson has prepared a plan.

Toronto.—City Engineer Rust has recommended the construction of the following asphalt pavements: Dunn avenue, from Queen street to the railway tracks, \$13,085; Dalhousie street, from Gould to Gerrard streets, \$2,853.

A WORD FROM MR. DINNIS.—President of Toronto Builders' Exchange Takes Exception to Mr. Smith's Letter.—Advocates Closer Relationship Between Architects and Builders.

Editor CONSTRUCTION:

May I ask for a short space in your excellent publication to comment on a portion of the letter by Eden Smith in your last issue. He says, "My experience of thirty years leads me to believe architects are more honest than the ordinary business man," and "The habit of exacting honesty from others, prompts honesty." Did anyone ever read a more egotistical statement. How pharisaical, almost thanking God, architects are not as other men. I believe, (also with an experience of thirty years), that the builders of Toronto with whom the architects transact most of their business, are rated by the community quite as honest as the architects.

With what kind of men can Mr. Smith have been associated, that it was necessary to exact honesty? One does not require to exact honesty from those who are honest, and who would no more to their knowledge do a dishonest act than try to fly. How can architects be more honest? There are no degrees to honesty; a man is either honest or dishonest. If he means more architects are honest in the city than a like number of men in any other business, let me lift the scales from his eyes by telling him that while, thank God, there are very many architects in this city whose honesty has never been, and never can be in question, men who are the soul of honor, there are also some architects who are not above reproach as the evidence of many builders and others can prove.

May I suggest that it would be beneficial if Toronto architects mingled more with their fellow men, that they might be better able to judge men. Last month Mr. Smith was invited to the Builders' Exchange Banquet, but failed to attend. Had he done so, he would have met over one hundred prominent Toronto builders, whom the Mayor of Toronto, members of Dominion and Provincial Parliaments, clergymen, and other representative men, evidently did not think too dishonest to associate with.

At the banquet given by the Canadian Cement and Concrete Association last week, while two eminent architects came all the way from Montreal, and the tenor of the speech made by Mr. Francis was, "Don't Knock, Boost," only one Toronto architect was present, who admitted he was "two removes" from the man who ought to have been there: he being a substitute for a substitute, and in the course of his remarks had not one good, kind or encouraging word to say of cement or concrete.

There is a Builders' Exchange in Toronto with a membership of about two hundred, composed of honest, upright men, in all branches of the building trade, who with a view to demonstrating their integrity, would be glad to have an opportunity of meeting the architects of Toronto in closer relationship than has been the custom in the past.

Yours truly,

ARTHUR DINNIS.
President Builders' Exchange.

March 15, 1909.

TORONTO BUILDERS' EXCHANGE BANQUET.—Annual Event a Most Enjoyable Affair.—Many Prominent Guests Present.

ABOUT ONE HUNDRED members and guests sat down at the eighteenth annual banquet of the Toronto Builders' Exchange recently held at McConkey's. The affair was a most enjoyable one in every respect, and the evening will long be remembered by those present as a cardinal event in the social happening of this organization. Mr. A. Dinnes, president of the Exchange, presided as chairman, and among the guests

were Dean Galbraith, of the School of Practical Science; Rev. A. L. Geggie, Rev. Wm. Hincks, Mayor Oliver, Architect G. W. Gouinlock, W. D. MacPherson, M.P.P.; Joseph Russell, M.P.; S. Harris, president of the Employer's Association; Fred Armstrong, W. E. Robertson of the Presbyterian; R. S. McIntyre, A. S. Purdy, Joseph Wright, George Evans and Jas. Thompson.

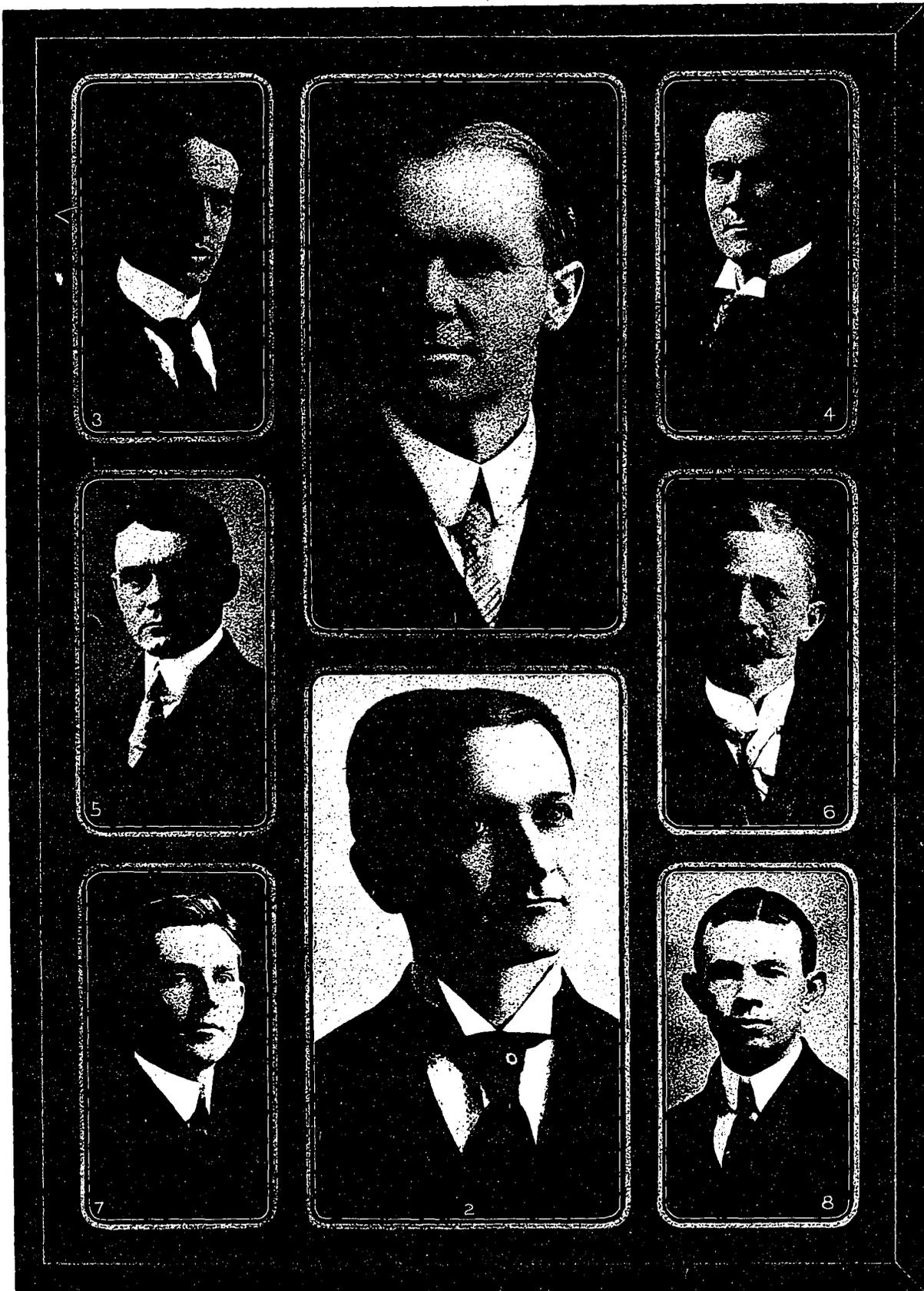
The toasts of the evening were in capable hands, and were both entertaining and practical in character. After the toast to the King was duly honored, Mr. W. J. Hill, in a few well chosen remarks, proposed a toast to the building interests of Toronto. In responding, President Dinnes dwelt upon the growth and importance of the Exchange. Of the \$12,000,000 of work carried out in Toronto last year, over three-fourths was executed by its members. The building fraternity was a big factor in the industrial life of the city, and one which was active in its material advancement. In his opinion, the credit given the builders was not commensurate with what they deserved for their work. The reason for this was that they themselves failed to properly estimate the value of their services, and the indifference of the public was a natural consequence. He believed that the builders should be allowed, the same as the architects and officials, to place their names on all important public buildings so that posterity might know who had constructed them. It would be a deserving recognition, and stimulate them to their noblest and best efforts. Regarding the present year, Mr. Dinnes took an optimistic view, and gave as his opinion that operations in the building line would be most active.

Mr. W. D. McPherson, M.P.P., in response to the toast "Canada," spoke of the greatness of the Dominion and the position it was destined to take among the nations of the world. There was enough arable land within its confines to produce sufficient wheat to supply the world and still leave a billion bushels for home consumption, while the mineral resources were practically inexhaustible. He referred to the increasing amount of outside capital that is being invested in Canada's industrial development as the best indication of the confidence that was held as to her future and stability.

The toast to the "City of Toronto" was replied to by Mayor Oliver. In the course of his remarks, His Worship pointed out the importance the city was attaining as an industrial and financial centre. He had seen the city increase in population ten-fold, and at no time was its growth more pronounced than at the present. Outside firms were continually negotiating with the Board of Control for factory sites and other accommodations, and he predicted a great future for the city. The time was at hand when a comprehensive scheme should be adopted to render Toronto more beautiful. There was a need for widening certain streets, and immediate steps should be taken to bring this about. While the work would represent a big financial outlay, it would in all probability cost much more in the years to come.

Mayor Oliver then pictured the city as it would appear when it extended from East Toronto to the west of the Humber river and north of Danforth avenue, with a driveway along the water front and up one side of the Humber and down the other. He also referred to the big improvements the city has in project at the present time. These included the trunk sewer and municipal electric plant, which would soon be under way. Plans for the proposed viaduct to be built along the water front would shortly be submitted to the city by the railways, and if these were acceptable, he hoped to see the structure completed within the next two or three years.

The toast to the Ontario Association of Architects was replied to by Mr. Geo. Gouinlock, while Dean Galbraith responded for the Canadian Society of Civil Engineers. Other speakers of the evening were: Messrs. S. Harris, Rev. A. L. Geggie, Rev. Wm. Hincks, Joseph Russell, M.P., and Fred Armstrong.



Officers of the Canadian Cement and Concrete Association

1. President, Peter Gillespie, Lecturer on Theory of Construction, Toronto University. 2. Vice-President, Gustave Kahn, Trussed Concrete Steel Company, Toronto. Councillors:—3. Kennedy Stinson, Stinson-Reeb Builders' Supply Company, Montreal; 4. C. H. Thompson, Canadian Art Stone Company, Toronto; 5. C. A. Lingham, Canadian Portland Cement Company, Toronto; 6. T. L. Dates, Sun Portland Cement Company, Owen Sound; 7. D. Raymond, Concrete Engineering & Construction Company, Toronto; 8. J. G. Murphy, Excelsior Paving Company, Toronto.

FIRST ANNUAL CONVENTION OF C.C.C.A.---Initial Event Well Attended and Representative of All Branches of the Industry. ---Daily Sessions Replete with Instructive Papers and Interesting Discussions.---Splendid Array of Exhibits at St. Lawrence Arena. . .

IT IS A WELL-KNOWN and generally conceded fact that the cement industry has been greatly aided and substantially improved through the formation of organizations, designed to serve as clearing houses, for information, knowledge and technical data relative to the manufacture and application of cement and concrete in building construction and civil engineering.

The National Association of Cement Users was formed but five years ago in the United States, since which time numerous organizations have been formed in several of the States in the American Republic. All these associations were started with but one purpose in view and that was to promote the sane, intelligent use of cement in accordance with the best known scientific practice.

In keeping with the justified enthusiasm of the exponents of this new material, the formation of each of these individual organizations was attended with almost unparalleled interest by those engaged in almost every branch of the industry.

We can however say, without the least fear of contradiction, that the first annual convention and exhibition of the Canadian Cement and Concrete Association recently held in Toronto, Mar. 1st to 6th, far outstripped the first meeting of any other cement association now in existence, in the size of attendance, intensity of interest, excellence of programme and the number and character of exhibits.

Even the initial convention of the National Association of the United States, held in Indianapolis five years ago, was in no way to be compared with the meeting, just concluded of the C.C.C.A.

In view of this fact, in addition to the highly successful condition of like organizations in the United States, formed under less favorable circumstances, the promoters of the C.C.C.A. have great reason to feel highly elated and greatly encouraged over this their first convention and exhibition.

Apart from the benefits to be derived from the successful existence of such an organization in Canada, by those materially interested in the various branches of the industry, the Canadian public, in general, has every reason to assist in the promotion of the work undertaken by the C.C.C.A. for the reason that every Canadian must necessarily be interested in the dissemination of reliable knowledge and information that will assist in producing a stable, lasting and fire-resisting type of construction. As a new country we have the very material advantage of profiting by the experience of our neighbors to the south, where it has been proven, beyond all peradventure, that to build of wood is to invite inevitable disaster.

To promote the intelligent use of cement in building construction and engineering projects is not to discourage the proper use of brick, or steel, or terra cotta, or wood, but to encourage the application of this modern material in conjunction with the use of stone, brick, steel and terra cotta in such a manner as to secure the best construction possible from both scientific and economic standpoints.

A very pleasing and much appreciated feature of the convention was the kindly and hearty co-operation of the many visitors from the United States. Engineers, architects and manufacturers from the south contributed a large number of papers and discussions on the programme and without exception expressed the most ardent hopes for the success of the new Canadian Association.

The presence of President Humphrey, of the N.A.C.U. was most appreciated and the very excellent talks he gave, before the convention, will, without question, bear much fruit. Mr. Humphrey was the father of the Association in the United States and his successful experience in his work renders him a most able counsellor on matters pertaining to cement and on questions affecting the promotion of its proper use.

The association, is most fortunate in having so able a president as Peter Gillespie. Mr. Gillespie's position as Lecturer on Theory of Construction at Toronto University renders him one of the best authorities in Canada on cement and its application. The fact that he is connected with no commercial enterprise engaged in any branch of the industry is a guarantee against his actions, rulings and views being affected by partiality, prejudice or favor.

His energetic and untiring efforts on behalf of the Association, free from self interest and personal gain will ever be remembered and appreciated by the interests which the organization aims to serve. Fifty years hence, when the Association will, undoubtedly, have reached proportions never dreamed of by its most optimistic promoters of to-day, its members may have forgotten the circumstances and conditions under which the C.C.C.A. was founded but the effective, unselfish and untiring work of Peter E. Gillespie will never be forgotten.

Opening of Exhibition

THE EXHIBITION, which proved to be one of the most important features of the Convention, was well attended every afternoon and evening during the entire week. Almost every foot of space in St. Lawrence Arena was filled with some 60 exhibits, which included cement, artificial stone, concrete blocks, concrete reinforcing, concrete block machinery, concrete mixers and in fact almost everything that could be included in the manufacture of cement products.

On Monday evening, March 1st, at 7.30 Hon. Dr. Reaume, Minister of Public Works of the Province of Ontario, officially opened the exhibition.

President Gillespie, in introducing Dr. Reaume, outlined the objects of the Association and referred, as a precedent for the Canadian Association, to the Concrete Institute of Great Britain, with the Right Honorable Earl of Plymouth at its head. This Institute had some 500 architects and engineers as members, and had been organized for the purpose of popularizing the proper uses of cement and concrete. Hon. Dr. Reaume thanked the Committee on Arrangements for having invited him to take part in the opening ceremonies of the exhibition. He was pleased to see that so many people in the Province of Ontario were taking such a deep interest in the industry as was exhibited by the large attendance. He pointed out that during the past few years the Ontario government had devoted a great amount of time, attention, observation and study to cement and concrete work. His department had recommended the use of cement to municipalities and farmers throughout the province with the result that all bridges of any importance in Ontario were to-day built with cement abutments and cement floors.

He then referred to the many concrete bridges already built, being built and contemplated by the provincial government, and explained how much more serviceable they were as compared with the old wooden type of bridge.

He was glad to learn that the country at large was not only satisfied with concrete bridges but that they were building their barn foundations and floors of concrete, and were using cement for sidewalks and pavements. In his own town cement blocks were now used, and they had proven durable, serviceable and practical, and owners were well satisfied.

At the present time he figured that cement as the most permanent and surest of all materials and the cheapest in the end, but the men in charge of this industry must unite and work hand in hand to see that good honest work was done. "Employ honest men to do your work and see that your material is well mixed." His experience had proven to him that it was not always the mixing that was responsible for bad work. Oft times the cement was not clean. It was most important that the manufacture of a first grade of cement should be

encouraged. He pointed out that 100,000 barrels of American cement was imported for the Canadian end of the big international tunnel being constructed at Windsor, and the reason given by the contractors for importing cement was that they could not secure a clean cement in Canada. While he was kindly disposed toward Americans, Dr. Reaume said that Canada after all was for Canadians.

Canadian manufacturers should make a cement that would compare favorably under actual test with any foreign product. Something was wrong if such was not the case.

In closing he wished the Association success in its first convention and exhibition. Cement was the coming building material, and it was for the cement interest to unite and foster the industry.

Amidst the blowing of the whistles of the concrete mixers, the Hon. Dr. Reaume declared the first exhibition of the Canadian Cement and Concrete Association open.

Opening of Convention

The Convention proper was opened at 2.30 p.m. in the Banquet Room of the King Edward Hotel, on Tuesday, March 2nd, by Dean Galbraith, head of the Faculty of Applied Science of Toronto University, with President Gillespie in the chair.

Mr. Galbraith stated that he was pleased to be present on the occasion of the opening of the first Convention of the C. C. C. A., and as a representative of Toronto University, wished to express the sympathy of that educational organization with the work in which the Society was interested. He did not believe that such an Exhibition as that at the St. Lawrence Arena was possible fifteen years ago in Canada, and outlined the enormous increase in the production of Portland cement in America. During the next few years, in view of the fact that the plants already in existence were not working to the full extent of their capacity, we could not look forward to the construction of new cement plants, but that instead methods and means would be found for making better use of the materials the plants already in existence were capable of producing.

At this point, Dean Galbraith grew rather reminiscent, and told of some very interesting experiences he had had in the use of cement in construction work, in the early seventies, and contrasted the vague knowledge of the proper use of this material, of those days, with the scientific investigations that are being carried on at the present time.

He referred to the two processes now in vogue in the manufacture of Portland cement, and dwelt upon the relative merits of each, showing that the wet method was, for all intents and purposes, by far the most practicable in modern construction work. Cement was especially adapted for construction work. It had strength and elasticity and denseness. For this reason, inventors will still continue to stick to cement, for the purpose of finding out new possibilities in its use. Cement concrete, being non-combustible, was fireproof in that sense.

Concrete had acted very creditably in the severe tests to which it was subjected in recent large conflagrations, in which it showed that it could hold its own. It was not only incombustible, but would hold its own better than stone, and possibly as well, or better than brick. "There is no doubt at all that when the public generally becomes convinced of the fireproof properties of concrete, there will be a greatly increased use of it," said the speaker.

He believed that in the near future a great field would be opened for cement in the construction of houses, and, to his mind, the two structural materials that were of the greatest importance to the engineer, the manufacturer, and the builder of the present day were steel and cement.

He believed that the use of cement in construction work would greatly aid in the attempts now being made along the lines of forest conservation, that even in this one particular, cement would have served a great purpose in that it would aid in maintaining sufficient forest lands at the heads of the streams, and thus preserve the nature's irrigation methods.

President's Address

IT IS DOUBTFUL indeed, if any industry of magnitude can show a record of growth and expansion comparable at all with that exhibited by the manufacture and use of Portland cement, on this continent. It began in 1875, when D. O. Saylor, the father of the industry in the United States, erected his first plant in the Lehigh Valley. The domestic output totalled a million barrels in 1895; 3,432,000 barrels in 1900; upwards of thirty-five million barrels in 1905, and nearly fifty million barrels in 1907.

With this phenomenal record, a comparison of the growth of the iron industry in the Republic is interesting. As early as 1812, long before Joseph Aspdin in England had conceived the idea of making Portland cement, the output of pig iron in the United States was fifty thousand tons per annum. By 1840, this had grown to 287,000 tons; by 1864, to one million tons, and by 1875, when Saylor erected his first kiln at Coplay, Pa., the production of this material was in the neighborhood of two million tons per annum. Since that time, this industry, which is generally conceded to be a kind of industrial thermometer, has grown with rapid strides, reaching an aggregate output in 1905 of 23,360,000 tons. Between the years 1880 and 1886, the growth in the iron industry was 48 per cent., while between the latter year and 1904, it was 311 per cent. The statistics of the United States Government show during the same periods, increases in the cement industry of 256 per cent. and 23,400 per cent., respectively. In Canada, the growth has been scarcely less marked. The output in this

country for 1892, the first year for which statistics are available, was 29,000 barrels. By 1900, this had grown to 283,000 barrels, and for 1907, to 2,368,000 barrels. In short, the home production has doubled itself every second year since 1901. It is interesting to note that whereas the per capita consumption of Portland cement in the United States for 1905 was 161 pounds, that of Canada for the same year was substantially half that quantity.

In consequence of this marvellous growth, a situation inevitable though unfortunate has been created. The advocates of cement construction through misguided enthusiasm, inexperience or commercial knavery, have made declarations concerning the cheapness, strength and excellence of their product, which never have been and doubtless never will be true. The American people have come to recognize the merits of the new material long before they were truly appreciative of its limitations. Its easy manipulation, its relative cheapness, its immunity from decaying influences and its fireproof qualities were recognized before its behavior under stress and its elastic properties were known sufficiently to permit of intelligent and economic construction. The inexperienced designer, without data, without precedent and without standard, has made mistakes, some of which, be it regretted, have proved fatal. Incompetent supervision and careless inspection have been unfortunately too common. There is no doubt, that most of the failures in concrete and reinforced concrete structures, during the past decade, are traceable to some or all of these various causes, and, as may be expected, the public at large has attributed the failure to the material rather than to the method of its manipulation.

Fortunately, of late years, much investigation and experiment, both inside and outside of the laboratory, have been carried on. As a result, our knowledge concerning the properties of concrete has become more exact, our methods of manipulation have been improved and our practice in design has approached something like standardization. Such organizations as The American Society for Testing Materials, The American Railway Engineering and Maintenance of Way Association, The American Society of Civil Engineers, The Canadian Society of Civil Engineers, The National Association of Cement Users, and others have had committees working on the various problems in the manufacture and use of Portland cement. Much valuable information has been collected, and much important work has been done. The publications of these bodies are generally regarded as authoritative, and represent the focused opinion and experience of the best men available. That their work is not yet concluded, is evidenced by the fact that recommendations looking toward changes, sometimes, indeed, quite radical, are frequent. As experience and investigation reveal additional information, the necessity for such changes becomes imperative. Manifestly then, the control of the methods of employing this material is largely in the hands of such organizations, and if the industry is to be saved from discredit through ignorance, incompetency or dishonesty, it must be through their good offices. How can the Canadian Cement and Concrete Association assist in this work? I think, in several ways, viz.:

First, by becoming an outlet for valuable contributions on the manufacture, testing and use of Portland cement.

Second, by adopting as an organization, either in toto or with modifications, specifications which other reliable organizations have evolved, or by creating others which seem better suited to the conditions under which they will have to operate.

Third, by similarly assisting in the standardization of methods of testing cement and cement products.

Fourth, by becoming a "clearing house" for the ideas and experiences of manufacturers, users, engineers, architects and chemists. In the last analysis, what is best for an industry as a whole will be best for the individuals who are identified with it in any capacity.

There are many problems before the cement man to-day, which must be honestly met, and the ultimate status of this organization will depend pretty much on its integrity and independence in facing them. To publish authentic information is one of its prime functions, and it will be judged solely on whether it properly discharges that function. The usefulness of concrete in sewer construction has recently been a live topic in Toronto and other places, and there are no doubt many persons who are honestly seeking information on this very important subject. The fire-resisting qualities of concrete and its efficiency in this regard relative to that of clay products, has been much debated of late. The effect of steel on the elastic properties of concrete adjacent to it, the ability of such imbedded metal to resist corrosion, the failure of cement sidewalks, the care of expansion and contraction in the large masses of concrete, the effect on concrete of chemical re-agents and products of organic decay and putrefaction, are some of the things concerning which many sincere but inexperienced people, and perhaps too, some experienced users of cement are not absolutely clear. There are in the employ of the cement plants in Canada, chemists whose opportunities for studying these problems of manufacture and use have supplied them with data of undoubted value, and there are contractors, engineers and architects whose constructional experience has been extensive. For all such who, through experiment or experience, successful or otherwise, have learned something which will likely prove of value to their fellow-members, the publication of a method, process or discovery is a duty to their Association. Reciprocity in ideas ought to be the watchword of this organization.

A specification that is too severe defeats its own object; one that is not severe enough is a menace to both parties to the contract. Most of our Canadian cities have incorporated into their building codes, rules for the regulation of concrete construction. These rules are generally conservative, sometimes unduly discriminating as to the use of concrete and reinforced concrete, and err in that they are not sufficiently

elastic and fail to recognize that different requirements should be demanded for different kinds of construction. This Association should throw the weight of its influence toward the procuring of specifications that avoid these objectionable features and that will properly safeguard the public by insuring for them reliable and workmanlike products. Such specifications, representing in compact form, what a large number of intelligent, honest, and experienced men have found to produce the best results, will do much to win the confidence of the architect, the builder and the residence owner, and will prove in the long run a protection to both producer and consumer.

To obtain, prior to acceptance, information concerning the fitness of any material or method to perform the work expected of it, is the purpose of a test. Concerning this purpose and the efficacy of a test to serve that purpose, Dr. Charles Dudley has this to say:—

"The knowledge of the properties of materials of construction has increased, methods of testing and testing appliances have grown up in delightful profusion and it is to-day entirely possible, we feel safe in saying, for an engineer to be reasonably sure that defective material does not go into his structures. In view of present knowledge and present means and appliances for testing, are engineers or their principals any longer entitled to offer as an excuse for defective materials, that they were brought from the best makers? Can they equitably do so? Can they legally do so? Is not the time near at hand when engineers and their principals will be compelled, if not legally, then by force of public opinion, to acquire, by the establishment of laboratories and means of testing, by the making and enforcement of specifications, such knowledge in regard to the materials they are putting into structures, as will give the public greater security than is now had against disaster?"

Granted then, the wisdom of the practice of testing, what about the method employed. One of the chief difficulties in making comparisons between results obtained in different places at different times and by different operators, is that the methods of conducting tests are often widely different. The drafting of specifications designed to obviate that difficulty has been one of the commendable acts of the technical societies, and I feel that to this worthy object, our Association should contribute something.

In the fourth place, this Association exists for the purpose of interchanging experiences among its members. Here is the opportunity for those whose experiences have been similar, to rub shoulders,—to compare notes. It is in such ways that progress will be made, that the repetition of failures will be prevented, that the successful method will be perpetuated and the organization made an educational factor. The meetings belong to the members—and the public—and it is hoped that they will take advantage of every opportunity afforded to give and receive useful information.

As many of you are aware, the Canadian Society of Civil Engineers at its recent meeting in January, discussed at considerable length the question of Government research laboratories along lines similar to those conducted by the United States Geological Survey at St. Louis, Mo. These laboratories, which are the outgrowth of the model testing laboratory of the Association of American Portland Cement Manufacturers at the St. Louis Exposition, 1904, are now maintained by the Federal Government at an annual cost of \$100,000 for "the investigation of structural materials belonging to or for the United States, such as stones, clay, cement, and so forth."

It is to be regretted that in Canada, no provision for such investigations on anything but a small scale, at present exists. How important to the industries of Canada would be the creation of such a laboratory? It would not exist for the purpose of commercial testing, but rather as an institution where, under capable and unbiased direction, the facts concerning the materials of construction could be investigated according to a comprehensive plan not now possible. If a beginning were made, I feel confident that its usefulness would soon justify its creation. It has been estimated that the tests reported to date from the St. Louis Structural Materials Laboratories indicate the possibility of reducing the amount of material used in public buildings and structures made wholly or in part of reinforced concrete, so that the cost will be lowered ten per cent.

The efficient conduct of a technical society necessitates the appointment of a Permanent Secretary. This is essential in order that there be continuity of method. Since he must act frequently without the advice of the Council, he must be a man of some administrative capacity. Further, the status and influence of the Association, its numerical strength and its resources are pretty much measured by his energy. He must oversee details, take the initiative, and, in brief, perform all the functions of a general manager. In order to do this, he must be a person who is prepared to devote a large portion of his time to the work of the Society, and for this, it is only reasonable that he be paid. It will be very much to the interest of the Association if its financial condition will permit the appointment of such an official.

Finally, let it not be forgotten that the Canadian Cement and Concrete Association is a national organization. Its membership must include representatives from both parties to the transaction—the buyer and the seller; the maker and the user. On its committees, should be found the manufacturer and the builder, the engineer and the architect, the investigator and the scientific writer. That the best interests of this wide constituency may be properly conserved, it is imperative that no one section shall dominate the work of the Organization. Only by resting on this broad democratic basis, and by recognizing that in a multitude of councillors there is safety, can the Association do its part in furthering the interests of all who are

concerned in the building up of what is destined to be one of the great national industries of Canada.

Need of Testing Laboratory

Dean Galbraith made some remarks with regard to that portion of the President's paper in which he dealt with the discussion by the Canadian Society of Civil Engineers, with reference to approaching the Government for the establishment of an Investigation Laboratory. Mr. Galbraith pointed out that what was required was a testing laboratory along the lines of the one conducted by the United States Government, at St. Louis, for examining and investigating all materials of engineering interest.

It was not intended that this laboratory should be simply a testing plant for the purpose of determining whether materials came up to certain clauses in specifications, but a laboratory which would investigate the properties of all materials, with a view to aiding in the proper scientific use of each in its proper place. He did not believe that Canada should depend upon the investigations conducted by the St. Louis laboratory, but that the different climatic conditions in Canada necessitated possibly a somewhat different line of investigation, and that it was altogether possible that a Canadian testing plant would have a line of investigation altogether different to that of the United States. Although he was not authorized to speak for the Canadian Society of Civil Engineers, he felt that their council would welcome any help that would come through such an association as the C. C. C. A.

Why Sidewalks Fail

Mr. Kinney, at this juncture, read a paper, illustrated with lantern slides, on "Why Sidewalks Fail."

Mr. Kinney's paper opened up considerable discussion, and it was very evident that a large number of sidewalk men were present, from the nature of the questions asked. Mr. Kinney did not believe that a rigid standard of specifications for all localities would be practicable, in so far as there were local conditions that greatly affected the construction of sidewalks and the aggregates employed.

Dean Galbraith opened up the question as to why granolithic sidewalks, during the wet and cold season, were so slippery. He wanted to know what caused this, and how it could be avoided. Mr. Kinney explained that this was almost entirely due to too much trowelling, and could be avoided by not bringing so much of the cement to the surface. He was also opposed to the method of sprinkling the top of the sidewalk with cement, and trowelling it down.

The question came up as to what was the best protector against frost, in the laying of sidewalks, and if there were any injurious effects in manure or sawdust. Mr. Kinney pointed out that manure would keep the sidewalk warm, without question, but it would be apt to stain the concrete. He however believed that about two or three per cent. of salt would lower the freezing point sufficient to give the concrete time to set. The question of the use of Calcium Carbide was brought up, but Mr. Kinney did not believe that it was practicable, because of the fact that it took up too much dampness from the air, and was too hard to keep.

The President then opened up the question of the use of slag concrete and cinder concrete in the construction of sidewalks. Mr. Kinney stated that the Universal Portland Cement Company, which was connected with the Carnegie Steel Company, were at the present time making a series of tests, and although he did not have data with him to show the effects or the results arrived at thus far, he could state that their investigation, as far as it had gone, had favored concrete made of a slag of the proper quality, when mixed and used intelligently. He expected that in the course of two or three years this firm would have completed a series of tests that would, beyond all question, settle the advisability of the use of this aggregate.

The meeting was then adjourned until 8.30 p.m.

Evening Session, March 2nd

The Evening Session was opened with an address by Mr. J. E. Moore of the Robert Hunt Company, on the subject of "Tests and Inspection of Cement." Mr. Moore went very thoroughly into the history, importance and methods of testing cement, and pointed out that, while some few years ago the cement manufacturer was not wholly in favor of having individual, private tests made of his product before it was used on the job, that later experience had proven that such tests served as a favorable check on their product, and had a tendency to establish a much more thorough method of testing at the plant, with a view to producing a very much more uniform material.

Mr. Moore further brought out the necessity of having the setting time of cement adapted to the season of the year in which it is to be used. He pointed out that in cold weather the manufacturer has a demand for quick setting cement, and in the summer a demand for the very opposite. The setting time of cement is determined as a sort of a gauge to find out whether it is safe. If cement could be mixed with mortar and got in the work previous to the time at which it would take on its initial state, any disturbance of it is attended with a subsequent loss of strength. He further pointed out that the setting time of cement made in the laboratory is also influenced a great deal by differences in temperature of the water and of the room.

Mr. Moore then brought out the necessity for uniform quality of sand in making laboratory tests. The sand generally adopted was a pure white silica, which was sifted through a twenty mesh sieve and remained on a thirty mesh sieve.

Mr. Moore went very thoroughly into all of the various methods employed by testing laboratories, in the various types and characters of test made, and his address gave the hearer: present a very thorough and comprehensive insight into what the testing of cement really means to both manufacturer and user.

Mr. Barber, York County Engineer, gave a paper on "Concrete Bridges," which went very thoroughly into the subject. Mr. Barber's position rendered his experiences as related in his talk very instructive. Through lack of space, we are unable to treat Mr. Barber's paper in this issue.

Mr. J. Augustine Smith, of the Ideal Concrete Machinery of South Bend, Indiana, read a carefully prepared paper on "The Present and Future of the Concrete Block—Their Manufacture, Availability and Cost." His was one of the most noteworthy papers delivered at the Convention, first because it was the only treatise given on the manufacture of concrete blocks, and secondly because it dealt with every phase of the concrete block industry in a most elaborate and scholarly manner, showing much careful investigation and study of the problems at hand.

It would be an injustice to Mr. Smith's paper to publish it without accompanying it with reproductions of some of the excellent slides given with the paper. For this reason, we when it will be given in full with a number of illustrations. Have deferred the publication of same until a later date.

Representative of O.A.A.

Mr. Gordon, of Toronto, addressed the Convention on behalf of the Ontario Association of Architects. He referred to his visit to the St. Lawrence Arena, where he had had the pleasure of seeing the exhibition. He had listened to the fund of information in the papers presented, and came to the conclusion that the gentlemen who got up this Exhibition and Convention were a concrete sample of progress. He recalled the time when he had started practicing as an architect. Manufacturers of cement blocks had induced him to specify them in his buildings; afterwards he had occasion to regret his moment of weakness. He was now glad to see that the industry had passed through the experimental stages, and that experiments were being continued upon a very high and scientific plane, that was almost beyond the comprehension of the ordinary architect.

He was willing to accept the statements of concrete enthusiasts, that there was something very wonderful in this material, that in ages to come people would be standing looking at these monuments erected of cement, and wondering at the wonderful skill of the men who planned such material, and what awful bad taste the architects had that designed such buildings.

There was an advantage about perishable material, for, after the architect had passed away, things that were not particularly nice would have passed away also, but he believed that his new material would require a very much greater care on the part of the architect, for he understood that one remarkable character of this material was that the longer it lived the stronger it got. He believed that while cement manufacturers, manufacturers of machinery and cement engineers were endeavoring to solve the problems of constancy in mixture, and practicability of construction that the architects were confronted with the tremendous problem of suitability of design for concrete buildings.

He did not know whether it was policy for them to follow too closely Ruskin and other men, who were so dreadfully opposed to imitation, but he did not believe that the architects should follow the designs of stone, in concrete. He wished to compliment the man who had made artificial stone, but after all it was necessary for the architect to create new designs suitable for concrete, something that would give the idea of stability, the idea of conscious strength, and the idea of enduring power, something that would give strength and vigor and power to the design. The cement men were solving their end of it, and he was going to tell his fellows that they must get their thinking-caps on.

Afternoon Session, March 3rd

The first paper to be presented at this Session was that of Mr. A. G. Larsson, of Owen Sound, on Portland Cement Mortars. Mr. Larsson went very thoroughly into the various mixtures adopted in concrete construction, showing the advantages of each combination of aggregate, as well as the results to be obtained from each. He first brought out the necessity of having the aggregates properly graded so that all the voids would be filled. He stated that the strongest possible construction was obtained when every available space was taken up at the time the hardening process was finished; more than this does not improve the concrete, but after a time would act injuriously, in so far as the edging of the aggregates in between themselves would cause internal stresses, and thus reduce the strength of the concrete, the soundness of cement, the detrimental effect of free lime, the portions of gypsum and magnesia to be allowed in the cement.

A point brought out by Mr. Larsson was the setting time. He contended that a quick hardener should only be used for work where a rapid set was essential, as for instance, stopping leakage, mortar or concrete work in cold weather, and for decorative purposes.

He gave a number of valuable tables, relative to tests, showing the efficiency of various cements in mortars, under different conditions. Mr. Larsson's paper generally was one that gave an exceptional amount of information upon the subject which it dealt with, and showed conclusively that he had given his subject great care, study and consideration.

Mr. Larsson's data with regard to the advisability of the use of clay in sand, as used as a concrete aggregate, brought

forth some discussion. Mr. Larsson maintained that ten per cent. of clay in sand increased the strength of mortar from 312.06 to 316.04.

In answer to the question as to whether he believed it good practice in case a wash material was used to add ten per cent. clay, Mr. Larsson stated that such matters had to be tested in each individual case. He believed, however, providing it was desirous to waterproof the material, it would be well to add from five to seven per cent. of clay, and get good results. He had experienced creditable results from five, seven and up to ten per cent.

Designing and Testing of Reinforced Concrete Beams

The next paper on the programme was that of Prof. Brown, of McGill University, Montreal, on the subject of designing and testing of reinforced concrete beams.

Prof. Brown's paper will be published in full with illustrations and diagrams in a later issue of CONSTRUCTION.

The President wished to know if in Prof. Brown's experiments he had obtained results that would lead him to consider it advisable to recommend a somewhat smaller percentage of metal than would be called for by the assumption that the entire stress is carried by the steel, and if he would recommend the use of high carbon steel for reinforcing. Mr. Brown did not believe it desirable to reduce the strength of steel. The tensile strength of mortar and neat cement was known. But there was no basis upon which the tensile strength of concrete could be determined. He believed that engineers would be sailing too near the wind in making any attempt, in practice, to rely upon the tension strength of concrete. He believed that the proper method was to assume that all tension should be carried by the steel.

The President asked the question if concrete in the presence of steel could be subjected to extraordinary strains and not rupture, and whether there were microscopic fractures that were not visible, or whether the material was so radically changed in the presence of steel that its elastic properties were quite different. Mr. Brown dealt with this question at some length, and stated that he was of the opinion that while the tensile strength of concrete in the early stages of setting could not be measured, he had conducted experiments that led him to believe that through the setting and hardening process of concrete in ordinary construction, the strength of the material itself would be sufficient to stand the stresses far beyond those which it was originally figured to stand—he had beams that were two years old that he had tested recently and the results were so extraordinary that he believed that the maturity of the concrete would add so enormously to it in the intervening time, that it would be safe to figure on the bolts and columns to carry the load, and that the natural maturing of the concrete would provide some margin for the subsequently increasing loads.

Mr. Kahn brought up the question of what should be a satisfactory percentage of steel in a concrete beam. Mr. Brown admitted that this was a very broad question, and he did not think that any precise statement of this percentage could be formulated. Mr. Kahn stated that his reason for asking this question was that building laws are adopted in different sections of the country, which specify a certain percentage of steel as being capable of developing, under ordinary conditions, a uniform load. Mr. Brown replied that there was no use putting more steel in a beam than would carry the weight that was required. Data was, however, required as to the particular concrete to be used. He did not see why it would not be possible to prepare tables for different mixtures of concrete, allowing a reasonable amount for variations which are inherent in the different conditions of mixing. It would be a very excellent thing if some uniform specifications or standardization could be arrived at, based upon the results of practice in the particular direction in which these specifications were to be applied, together with the results of these experiments. He did not believe, however, that it would be practicable to formulate any statement as to what percentage of steel should be used.

Representative of Paving Association

Mr. James Pearson then addressed the Association on behalf of the Paving Association of the city of Toronto. After having complimented the Association upon bringing the Convention to Toronto, and upon their fine Exhibition, he went into the question of concrete sidewalks and pavements. He called attention to the fact that no good city pavement to-day could be constructed without a concrete foundation, and that this fact was recognized by not only municipalities, but by the manufacturers and engineers who are engaged in street paving. He had something to say about sand, and contended that the only sand that should be permitted to be used as an aggregate in concrete, was a clean, sharp material, one that did not have the corners worn off. He referred to an address by Mr. A. L. Barber, the father of asphalt pavement, to a body of paving men in Washington, D.C., in which he had recommended macadam roads for districts located at distant points from thickly populated centres.

There was, however, a problem with which the paving contractor was confronted, and that was the providing of permanent and economical pavement for roadways in close proximity to cities. For this he recommended a concrete foundation, with macadam surface. He wished to ask the question why it was that pavements in the city of Toronto, upon concrete foundations, would remain in good shape the first year after they were laid, but that in the second year great cracks would appear in them, at distances of about fifty feet apart. The President stated that the cause of such

cracks were pretty well known, though he did not state what the scientific cause was.

Twenty Years' Experience in Cement Walk Building

Mr. C. W. Cadwell, of Windsor, Ont., read a paper on the subject of "Twenty Years' Experience in Cement Walk Building." Mr. Cadwell gave a very interesting talk upon his early experience in the cement sidewalk business. He related how twenty years ago he left his business as a travelling dry goods salesman, and was led to investigate the cement industry. At this time, however, little was being done with cement for walks. Lumber was cheap and plentiful, and good cement was scarce and high priced, and the majority of cement walks erected at this time had proven a failure, and most of the people whom he had solicited for business gave him a very flat and abrupt refusal.

At this time, with cement at \$4.00 a barrel and hard to get, the few contractors that exploited the business with secret and patent formulae, of very questionable character, managed to more or less monopolize the business.

He described the early methods of constructing concrete sidewalks, and compared them with the generally accepted modern methods of to-day. At that time from 5,000 to 10,000 feet was considered a big job, and caused a great deal of talk, but now a contract for many times that size would cause little or no comment.

The cement walks, to insure success, must be made good as it is only a thin sheet spread over a long space of ground, and every inch of it is subjected to severe tests, and none but the best cement and materials will in time show up to advantage. In many cases failure is due to carelessness of the men employed.

The greatest care must be taken in watching the workmen, and see that they do their work honestly. At other times failure comes from bad materials, for, in different localities where sand and gravel is more or less scarce, much faulty material is used, and contractors take chances, as material is hard to get, and highly expensive. Such practice, however, is bad, and very detrimental to the trade. Every contractor should have positive proof that the materials with which his works are of the very best, and he must treat those materials in accordance with their properties. Cement should not be used that sets too quickly, in warm season, and yet a quick setting cement is required in a colder season.

In speaking of foundation for cement walks, he stated that years ago, the one great object was a good foundation, which meant an excavation of from ten to twenty inches, filled with sand and gravel, or cinders well tamped, and in some cases even more, with a layer of cobblestone on the bottom. In his experience he had proven that this was unnecessary, and would rather guarantee a walk laid on heavy soil with one inch of fill than with ten.

He pointed to the great and rapid growth of the cement industry, and stated that none can guess what its future would be. He believed that all in the cement business would take courage in looking at the great accomplishments in this industry, and strive for higher attainments, knowing if cement was given its just due, it would not fall in its severest trial.

Mr. James Pearson in commenting upon Mr. Cadwell's paper, spoke of some failures in sidewalk construction that had taken place in the city of Toronto. Sidewalks had gone to pieces by the frost blowing them up, and he contended that it was the depth of the cinders in these walks that caused the trouble. These failures took place in clay soil, always where there was a concrete curb between the sidewalk and the ordinary street pavement. The filling of cinders in the spring-time, absorbed the water, and when the frost came the water blew the sidewalk up. He did not believe that if clay had been used for the foundation, these failures would have been possible.

The President wished to know if there were any engineers present who had had any experience with the use of tile in sidewalks. To this Mr. Cadwell replied by stating that he had built a sidewalk in front of his house some seventeen years ago, with a twelve inch foundation. The walk had a fall of eighty-three feet in a slope of two hundred feet. A four-inch tile was placed under it, directly connected with the sewer. The results were not satisfactory. A year after, he built a walk on the opposite side of the street, with a foundation of two or three inches of cinders, and there was much less heaving. He believed in a one-inch foundation, which was practicable for the reason that if the walk was level on one side and had a slope on the other, the cinders would soak away the water. Apart from this, he would do away with cinders altogether.

Modern Methods of Waterproofing Concrete

Mr. Lucius E. Allen, of the Ontario Limestone and Clay Company, read a paper on "Modern Methods of Waterproofing Concrete," in which he took up the subject in a most comprehensive and interesting manner. He especially pointed out the use of a waterproofing compound in the concrete building blocks. To demonstrate the necessity for such precaution, he described several cases in which concrete block wall of dwellings had proved to anything but moisture proof. His paper opened up a very wide discussion in a general way of the necessity or advisability of the use of a waterproofing compound. Mr. Allen's paper will be treated in full in a subsequent issue of CONSTRUCTION.

The President called upon Mr. Hassen to open the discussion on Mr. Allen's paper. Mr. Hassen wished to know if Mr. Allen had made any tests as to the porosity of either monolithic structure, or concrete structure, in any shape or form, also as to the solubility of concrete in water. He did not believe it was essential to waterproof concrete, and in power-house construction, he had never found it necessary to waterproof any cement or concrete.

Mr. Allen replied that he had made tests of concrete blocks and had found that they were not damp proof; that houses built of this material, he had found, absorbed moisture, and he believed that the sooner concrete workers adopted some waterproofing method, the better for the industry. If, however, concrete was properly mixed and blocks were faced with one-to-two or one-to-three mixtures, that was sufficient, but the trouble was that there were so many blocks that were not properly mixed.

Mr. Cadwell wished to know if blocks could be made dense through the use of ordinary aggregates, properly mixed and properly tamped, without the use of some water resisting substance on the exterior of the block.

Mr. Smith of the Ideal Concrete Machinery Company remarked in connection with this discussion, that concrete building blocks, if properly made, of the proper aggregates, properly tamped, with a rich mixture on the face, were waterproof, and that no waterproofing was necessary. He had found, however, that it is necessary to deal with all sorts and conditions of men in these days, and for this reason his firm had recommended the use of waterproof compound, only to make assurance doubly sure. The harder the blocks were rammed, the better and more condensed the concrete.

Mr. Cadwell related an experience he had had eighteen or twenty years ago, in building a concrete block house, the only objection being to the material was that the walls were not waterproof, and he believed that if there was any compound that would serve as a surface for the blocks and throw off the water, it should be adopted, as a further means of prevention of absorption.

Mr. Lewis agreed with Mr. Smith, stating that he had made blocks absolutely waterproof without any compound of any kind. The mixture on the face was what counted. He referred to a little cottage that he was building at the present time, and stated that the sleet and ice were so dense that the east face of the building was absolutely covered with ice, but the block on the interior was as dry as possible.

Mr. Smith did not believe that it was good policy to plaster directly on the blocks, but lath at all times should be used. Block manufacturers had made great mistakes in recommending that the products of their machines, when erected in walls, should be directly plastered upon. Irrespective of the non-porosity of blocks, his firm had strongly recommended the use of lath in all cases.

In reply to a question from Mr. Smithson, Mr. Allen stated that the concrete block house he referred to in his paper was lathed and plastered, and was built about five years ago. The President remarked that this discussion confirmed the findings of Mr. Humphrey, of St. Louis, that a great deal can be done in the matter of waterproofing, by a judicious selection of materials.

The next paper on the programme was presented by Mr. A. W. Birge, of the Trussed Concrete Steel Company, on the subject of Reinforced Concrete Design from the Standpoint of Practicable Engineering.

Evening Session, March 3rd

The first number on the programme for this Session was a paper by Walter J. Francis, M.S.C.E., of Montreal, on Field Made Concrete. Mr. Francis' paper went very thoroughly into the subject and was illustrated by a large number of lantern slides, which proved both interesting and instructive. Owing to lack of space, same will be published, with illustrations, in an early issue of CONSTRUCTION.

The next number on the programme was an address by Mr. Campbell, Deputy Minister of Public Works for the Province of Ontario, on the subject of the Use of Concrete in Municipal Work. Mr. Campbell outlined very thoroughly the work that had been done throughout the Province of Ontario, by the Provincial Government, in educating municipalities in the proper use of concrete in roadway construction, etc. He also gave a very interesting account of what the Government had done in concrete construction in Provincial work, and spoke of the wooden bridges and structures erected by the pioneers in the Province of Ontario, and referred to the fact that even the wooden bridges erected in the earlier days which were primitive and crude, had been greatly improved upon in the wooden structures of more recent date.

It was a conceded fact that one of the greatest expenditures in connection with roadmaking was the rebuilding of bridges, culverts and sluices, and it was most important that materials should be adopted that were durable. Experience had proved that the cheapest, most durable, and most economical material to be used for this purpose was cement concrete. He called attention to the vast amount of carelessness that prevailed in designing such structures, in the selection of cement and aggregates, and in the proper mixing and use of same. He referred to the proportions that were usually recommended for sidewalks, street foundations, culverts, etc., and wished to know what they meant. He stated that specifications called for so much cement, so much sand, so much crushed stone or gravel. The problem that arose was the securing of a cement of the proper character, clean sand and sharp gravel. It was one thing to make a specification, and quite another thing to see that it was properly carried out. The foundation, he believed, was of the first importance, and that in small sluices it was proper to use cement concrete pipes, up to a certain size, reinforced to a safe limit. This same precaution should be exercised with bridges where they were built of cement reinforced with steel for the substructure, and cement for the superstructure. In his mind there was nothing more pleasing to see than splendidly designed steel bridges resting on well constructed cement or stone piers.

His department had been working upon street improvement for twenty-five years, and the transformation in the cities and towns throughout Ontario was marvellous. He referred to

the fact that pavements made of cement concrete were being used in some Ontario municipalities at the present time, and that he believed that in the near future experiments would prove that cement concrete would be very largely adopted for street paving, especially where the road is level; the grades could be treated with some other material.

With careful drainage, careful selection of materials, careful manipulation, proper ramming and watering, and care in laying, he believed that cement would rapidly grow in public favor, and that the future popularity of cement concrete pavements would add another very strong demand for the cement now being produced in the Province of Ontario.

The President then introduced Mr. Emile G. Perrott, of Philadelphia, who read a paper on Reinforced Concrete in Building Construction. Mr. Perrott's paper was a very valuable one. It entered into almost every phase of reinforced concrete as a structural material, and was illustrated with a very large number of slides, showing concrete structures from the cottage to the tall skyscraper. Owing to our limited space, we are unable to treat Mr. Perrott's paper in such a manner as it deserves, and will deal with same in a future issue of CONSTRUCTION.

The President at this juncture introduced Mr. Fred A. Norris, Consulting Engineer, Boston, Mass., who read a most interesting paper on ornamental concrete stone. His address was illustrated with a number of views, which showed beyond all question the architectural possibilities of this plastic material. Mr. Norris' paper will be given consideration in a later issue of CONSTRUCTION.

Business Session

On Wednesday morning the Association held its annual business meeting, at which the reports of the various committees were received, and officers for the ensuing year elected. Mr. Peter Gillespie was elected by acclamation for President; Mr. Gustave Kahn was chosen Vice-President. The following are the members of the Executive Council for 1909:—C. A. Longham, Canadian Portland Cement Co., Toronto; T. L. Dates, Sun Portland Cement Co., Owen Sound; C. Caniff, expanded Metal & Fireproofing Co., Toronto; J. G. Murphy, The Excelsior Constructing & Paving Co., Toronto; D. Raymond, Concrete Engineering & Construction Co., Toronto; C. M. Thompson, Canadian Art Stone Co., Toronto; Kennedy Stinson, Stinson-Reeb Builders' Supply Co., Montreal.

A resolution was adopted by the Convention, extending a vote of thanks to Mr. Uren, the Secretary for last year, and instructing the Executive to present him with an honorarium for the excellent services rendered to the Association during 1908. A resolution was adopted instructing the Executive Board to appoint a permanent publicity committee, and also to take steps towards the employment of a permanent secretary, who should be paid a salary, commensurate with the services which he should be obliged to render. A resolution was adopted instructing the Executive Board to undertake to promote the formation of local organizations in various centres throughout the Dominion of Canada.

Another business meeting was called Friday morning, for unfinished business. A motion was adopted instructing the Secretary to address a communication to the King Edward Hotel, expressing the appreciation of the Association of the very excellent service rendered, and the kindly co-operation of the officials and employees of Toronto's famous hostelry.

Afternoon Session, March 4th

The first paper on the programme for this Session was that of Mr. C. R. Young, lecturer on Applied Mechanics, of the University of Toronto, entitled "Artistic Concrete Bridges." Mr. Young's paper went very thoroughly into the principles of design and construction in concrete bridges. His remarks were very appropriate, in view of the talk by Mr. Campbell, Deputy Minister of Public Works for the Province of Ontario, on the previous evening. Mr. Young's talk was illustrated with a number of lantern slides.

The Vice-President, Mr. Gustave Kahn, introduced Mr. Edmund Burke, representative of the Architectural Institute of Canada. Mr. Burke called attention to the fact that he was representative of the youngest architectural organization in Canada, and he was very much interested in Mr. Young's paper on artistic bridges. He believed that it had struck the right note in many instances.

With regard to reinforced concrete, architects had some complaints to make. They found that as a rule a great deal more careful supervision was required on reinforced concrete work, than in other types of construction, for the reason that many irresponsible contractors did not give the care that was required in seeing that the reinforcement was properly placed in the work, that the materials were properly mixed and rammed.

He referred to some of the columns shown in structures that had been illustrated on the evening before, and stated that in Toronto it would be impossible to erect such structures in accordance with the city's building by-laws, which demanded heavier structural members than were really required, unnecessarily increasing the cost of construction.

The Vice-President, Mr. Gustave Kahn, wished to express the appreciation of the Association for the words from Mr. Burke, as representative of the Architectural Institute. Reinforced concrete he believed had been carried on very successfully in many portions of the country, but was somewhat handicapped in Toronto. In time, however, he hoped that they would be able to wear away the prejudices of the local authorities.

Mr. Charles D. Watson, Consulting Engineer, of Cleveland, gave a paper on Factory Made Concrete Building Products. Mr. Watson opened by stating that it afforded him much pleasure to address the Association, as a pioneer in concrete construction in Canada. He knew something of the trials and tribulations that had to be contended with, but that a great amount of prejudice had been overcome.

Mr. Merrill Watson, of the Associated Expanded Metal Companies, New York City, then addressed the Convention. Mr. Watson's remarks were more or less of a humorous nature. He had been in the concrete business so long that he had become really old, and, inasmuch as he was scheduled for a number at the banquet that evening, he wished to be excused. He expressed congratulations from the United States, and particularly from the National Association of Cement Users, organized some four years previous, and of which he had had the honor of being an officer during the greater time of its existence. They had been doing just what the Canadian Association had been organized to do—educate the public to concrete; first educating the architects to think and design in concrete, then educating the public to live in concrete, and how to build and use it. It was only a question of education, but that would come on gradually and profitably.

Banquet

The annual banquet of the Association was held on Thursday evening, at the King Edward Hotel, and was attended by nearly 100 guests, including prominent architects, engineers, contractors, as well as men representative of the various branches of the Cement Industry.

A most entertaining toast list was provided, and the speeches were brief, witty, and highly interesting. Music was supplied by the King Edward Hotel orchestra, and very excellent vocal selections were rendered by Mr. Marley Sheriff, of Toronto, and Mr. Quigley, of Hamilton.

President Gillespie, who occupied the chair, proposed the toast "Canada," which was responded to by A. W. Horn, of Toronto. Dean Galbraith, of the School of Applied Science, Toronto, proposed the toast to "The Industry," responded to by Messrs. Augustine Smith, South Bend, Ind.; Merrill Watson, of New York, and Thos. Dates, of Owen Sound. Messrs. W. J. Francis and M. Morssen, of Montreal, and J. G. Langton, of Toronto, responded to the toast, "The Men Who Specify," proposed by Ivan S. Macdonald. Mr. J. G. Murphy toasted the "Guests," with which he coupled the names of Messrs. Sanford E. Thompson, of Newton Highlands, Mass., and J. E. Moore, of Chicago. "Municipal Interests" was proposed by Mr. James Pearson, of Toronto, and Messrs. Chamberlin, of Belleville; Griffin, of Buffalo, and Blanchard, of Toronto, responded. Mr. Pearson proposed a toast to the President, which was received with hearty applause.

One of the appropriate features of the evening was the manner in which the newly elected President of the United States, Taft, was heartily toasted, in honor of the guests from the neighboring republic.

Morning Session, March 5th

A special session was called for Friday morning, by Vice-President Kahn, on account of the unexpected arrival of Mr. R. L. Humphrey, President of the National Association of Cement Users of the United States.

In introducing Mr. Humphrey, Mr. Kahn said that more than any other man in America, Mr. Humphrey had advanced the interests of the cement industry, not only as President of the National Association of Cement Users, but as superintendent of the U.S. Government Testing Laboratory at St. Louis.

Mr. Humphrey was received with applause, and he congratulated the Canadian Association on the showing made at their initial convention, not only with regard to the Exhibition, but the Convention itself. He outlined the conditions that had brought about the organization of the National Association of Cement Users in the United States, and told how difficult it was to keep commercialism out of the organization. The work of such an organization should be purely an educational one. The National Association was doing valuable work in disseminating information as to the proper uses of cement, and he believed that the Canadian Association had a very worthy work in that particular.

The National Association had been the father of several State Associations, which had sprung up in several States of the Union, to take care of local conditions, and these Associations were doing excellent work in conjunction with the National organization. He was greatly surprised at the lack of information on the elementary principles connected with the use of cement, at the early Conventions, but this ignorance had gradually disappeared, until to-day it was possible in this U.S. organization, to discuss the subject on broad lines.

He referred to the awful fire losses in the United States, by stating that this country was burning up yearly as much as it built. Cement was not fireproof, but it offered one of the best materials for fireproofing. Houses could be built so that they were sanitary, durable, and fire resisting. The use of cement in the construction of dwellings he believed to be one of the most important to the industry, especially since the lumber supply was becoming exhausted.

It was all right for the engineer and architect to know how to use these materials, but it was infinitely more necessary for the man who is working under the instructions of the architect and engineer to have an intelligent knowledge of the material and how it could be used to the best advantage. It was along

these lines that the Association should look for its greatest success.

The Canadian Association should not be discouraged by the small number of members. The National Association of the United States after the first year, notwithstanding the fact that over 650 men registered, only had 189 members who had paid their dues. This did not discourage them however. Year after year the membership had grown until to-day they have nearly 1,000.

He believed in experience meetings. It was, of course, well to have learned men give long papers on technical subjects, but in his experience as President of the N. A. C. U., the meetings that were most profitable to the greatest number of members were those in which everybody was free to give his experience and views on the minor details connected with concrete work. One of the difficulties to be overcome was the successful work of procuring better knowledge of the use of cement and concrete, or in getting in touch with the man who really did the work. This man, as a rule, did not care much for the usual proceedings of the Convention, and Mr. Humphrey believed that the forming of local organizations was really the solution of the problem.

He believed that the cement industry to-day was just beginning. The experimental stage was passed, and that it was more and more realized that standards were required of various kinds. One of the first things the Canadian Association should undertake was the formation of standard specifications covering the various uses of cement. Those who represented the architectural and artistic side of the Canadian Association should give their attention to developing methods that apply to this plastic material, so as to make the material speak for what it is and not resort to base imitations.

There was a great deal that was not known about concrete at the present time, and the joint committee of the N. A. C. U., composed of some thirty men, had been engaged in the work of trying to formulate rules governing the use of concrete, but they had found that data was not sufficient to enable them to reach positive conclusions.

For this reason the experiments at St. Louis were undertaken under the auspices of the United States Government. Unfortunately the terms of the appropriation for the conducting of the United States Laboratory at St. Louis were such that tests were required for different departments, and demands had been made upon this laboratory for investigations and tests of materials that entered into the various Federal buildings. This had made it impossible to set aside any very large amount of money for the investigation of concrete itself. He had noted with a great deal of interest and satisfaction that the Dominion Government was to be asked for a similar appropriation for a Canadian Laboratory. Not until the properties of concrete were more thoroughly established could the great economy be attained, which was possible with cement, and, strange as it seemed, the most of the demand for economically built concrete structures comes, not from the architect or the engineer, but the owner.

The committee on the insurance of the N. A. C. U. had received letters from various owners, stating that they had cancelled their insurance entirely on concrete buildings, because they believed it unnecessary. In Minneapolis, recently, the contents of a building was entirely destroyed, but the damage to the building was so slight that the owners decided to cancel their insurance.

He wished to impress upon this new Association the importance of the great work they had undertaken, and he hoped that they would always keep the educational features foremost, and permit nothing that would tend to promote commercialism. Those who are interested in commercial lines, of course, should affiliate in every possible way, but everything should be subsidiary to the best interests of the Association, which, first, last and always must be the promotion of the best knowledge of the proper use of cement.

He was glad to welcome the Canadian Association into the field in its efforts in the campaign of education, and wished it every possible success. It could always rest assured that the National Association would ever be ready to lend its hand in co-operation.

In reply to the question as to whether the United States Government had made any investigations with regard to cement tile, Mr. Humphrey stated that this had been one of the most active of their recent investigations. He had been asked by the United States Department of Agriculture to prepare a bulletin on cement drain tile. It first looked like an easy problem, but after investigation he had deferred the matter until after he had made further investigation.

The action of alkali on cement tile seemed to be the most difficult of problems to solve. In his investigations and experience, while he had tile in his possession that was thirty or forty years old, that showed little or no effects from its age and use, he was of the opinion that there was only one way to make a really good, durable cement tile, and that was with a wet mixture. It had been argued by clay manufacturers that as a result of various tests, such as boiling test, a test where hardened concrete had been subjected to a solution of hydrochloric acid, that the solubility of cement rendered it impracticable as a material with which tile should be constructed; still, it might be, also, said that clay tile when boiled in water would contain a certain amount of soluble salts. He had recently found occasion to make tests of bricks to determine their fireproof qualities, and, when they had been subjected to extreme weather in the winter season, had found that they had returned to common clay, but this fact did not prove that clay brick was a poor construction material. It only demonstrated that there were good and bad products in all materials. It was, therefore, unfair to say that all concrete was bad. It was true that cement tile made from a dry mixture, through being very porous, would yield somewhat to the effect of alkali, but cement tile could be manufactured from the proper aggregates, properly treated, with sufficient water, that would have a metallic ring, just as a cast iron pipe.

Five years ago he had recommended at the North-West Cement Products Association, in Minneapolis, the use of a wet mixture, and was there declared an enemy of the industry. At the last Convention he found that every manufacturer was looking for information as to how he might be able to make his mixture wetter.

Mr. Humphrey then spoke of the importance of having absolutely clean sand, as an aggregate, and also of putting sufficient cement in the mixture. Sands had been submitted to him for testing purposes that were coated with clay, while they appeared to the eye to be a perfectly clean aggregate. He further pointed out the importance of proper mixing. There were concrete mixers on the market in which the materials that passed through the machine never got an opportunity of becoming acquainted. The resultant mixture was, therefore, very defective. It was absolutely essential that all materials that go into mortar and concrete should keep in an intimate relation, for a period of at least one minute. This was easy to understand, because to get a dense mortar it was necessary that all the air be eliminated from the mixture. Tamping would not drive out the air. It simply compressed the air, and it was still there. The only way that air could be gotten out of a mixture was by working the materials together into intimate relation, so that the sand coated every particle.

Mr. Beaumont Jarvis opened up the question of standardization of concrete. He wanted to know if there was not some means whereby some standard specifications could be arrived at that would eliminate the necessity of making columns and beams about four times as strong as necessary, simply to satisfy the whims of a City Architect. Mr. Humphrey replied that he believed that standardization was one of the essentials of the Association. Methods of testing should be simplified in such a manner as would provide simple rules that could be used in the field. Such standards were of utmost importance to the success of cement products. There was no question but that concrete beams and columns and other parts of concrete structures were designed perhaps to the best of present knowledge, but without an adequate idea of just how strong they are. A great many of our concrete structures of to-day were made so strong that we shall never find out how strong they really were. They were unnecessarily strong. The question of standards was a very hard one to determine. Mr. Humphrey did not believe that one-tenth of the time the cement was at fault. The sand and the mixture were as a rule at fault. Steel structures were not erected to-day without making tests at the mill, and there was no reason why concrete work should be fabricated in the field without the use of the same methods used in structural steel construction. One of the greatest curses to the business were the men who worked upon the principle that "all you have to do is to have something mixed up in any old way, and it would stand through eternity." This was where failures could be traced to. To obtain success in concrete construction all that was necessary was to use the same care in construction as it was customary to use in any other material. A standard or something of the nature was essential to work to. It might be low at first, but as the industry grows it could be brought to the standard to which it was destined.

Vice-President Gustave Kahn called attention to the fact that the standardizing of concrete was one of the main objects of the Association. He stated that President Humphrey's remarks were not only gratifying but encouraging to the promoters of the Canadian Association. The great success of the National Association, from a small beginning, would encourage the C. C. C. A. in its humble beginning. He hoped, with the encouragement that they might get from the Association in the United States, and also the encouragement and co-operation from the allied industries in Canada, that the results that have been accomplished elsewhere would be possible in Canada. He wished to state for Mr. Humphrey's information, that the first thing decided upon in the early organization of the C. C. C. A. was the leaving out of all commercialism, and he was pleased to say that up to that time there had been no remarks of any sort made before the Convention which could in any way be construed as commercial remarks.

Afternoon Session, March 5th

Mr. Morsson, Consulting Engineer, Montreal, presented a paper on Factory Made Cement or Concrete. Mr. Morsson referred to the real excellence of concrete, as had been shown at the Exhibition, and described in the papers read at the Convention. Concrete had been exploited by large numbers of practical men, and by a goodly number of enthusiasts, but enthusiasm would not produce good concrete. Everything could be done in concrete, but to do it well was the question.

A fair idea had been given before the Convention as to how concrete might be used in field work. It was Mr. Morsson's endeavor to tell how it was being used in the factory. One of the essentials in concrete was density. This was only possible through a careful study of the materials used, proper grading of them, and intelligent mixing. The machine itself could not do the work. In Europe, where the production of concrete materials had been carried on to a very great extent, special machines for crushing and kneading together the materials were used. The careful study of the properties of cement and aggregates was each day bringing better results, with fewer failures. The concrete product was not finished when it was formed. It must be treated. A certain amount of water is required for setting, and care must be taken that it was not unduly subjected to the sun or wind.

Concrete blocks should be kept in a cool place, sometimes in water; they should be sprinkled. In other words, it was necessary to make a careful study of the materials that were being used, and to constantly be observant of the result acquired. In Europe, sidewalk blocks were produced, eight or ten inches by one and a half to two inches thick. These blocks



BANQUET OF CANADIAN CEMENT AND CONCRETE ASSOCIATION HELD ON THE EVENING OF MARCH 4TH AT THE KING EDWARD HOTEL.

are made on special machines, under great pressure, with surface corrugated, smooth, sometimes colored. These blocks have made very artistic sidewalks in cities in Germany, France and Belgium.

In Germany concrete pipes for sewers and water conduits consumed about one-fifth of the output of cement. Concrete sewer pipes have been a success, for the reason that the contents did not seep through them. He referred to artificial cement stone, and stated that although architects were not willing to accept an imitation, it must be remembered that the fact that both the architect and public had been accustomed to certain materials for many years, and it would take several years before cement could really find its place.

While reinforced concrete was to-day being used to a great extent in factory buildings, it was, nevertheless, a fact that whole structures could be put together by unit system, using concrete elements cast on the plates and put together in the structure. Concrete tiles had been used to a great extent in both Europe and the United States. In the United States many buildings were now constructed of concrete units, and large savings have been possible through this system of construction.

Mr. Morssen's talk was illustrated with a number of lantern slides. The question came up as to the efflorescence and waterproofing of these blocks. Mr. Morssen stated that a dense product could be procured by the proper grading of the materials and that to give a still further assurance of waterproof properties, there were several waterproof fluids to be procured that would mix with the concrete and effect a crystallization that would close up all the voids.

The President introduced Mr. Sanford E. Thompson, who addressed the Convention on the selection of concrete materials. Mr. Thompson was sorry to bring the Convention down from the finished structures to the hard, cold, dry facts of sand and stone. Still, in order to produce these houses and factories, and concrete tiles, the ingredients had to be carefully selected and put together. In so far as his paper would doubtless be in print, he wished to omit certain portions and substitute some experiences.

Mr. Thompson spoke of the difference between rounded and sharp sand. Sand that appeared poor because of being apparently round, was dead sand, not because it was round, but because the grains were coated with dirt. One of the best ways to determine whether sand was adapted for concrete work was to take it between the hands and rub it together. If the sand was dirty, a coating of slime or fine dirt, which

was largely vegetable matter, would be found between the fingers.

The engineer sometimes had to act, as it were, as coroner and hold a post mortem on concrete, and oftentimes some very interesting facts were brought out. There had never been a failure in concrete that could not be attributed to either poor design, poor workmanship, or poor material. He related an instance where some abutments for a small bridge, built under water, did not harden. The cement used had passed the standard test. When the concrete was analysed, it was found to have proportions of 1-5-9, whereas the contract called for 1-1½-5. The reason for this was that the cement had been washed away by the water passing through a bad floor in the coffer dam.

He spoke of a covered reservoir that had fallen down. It was a groined arch roof, and a large portion of the roof was laid in the early winter, in the cold weather, and the forms were taken down in April. Examination revealed, of course, that the form work was taken down too soon. There was also a truss of the arch which contributed to the danger, and on close examination it was found that the gravel was dirty, and the proportions, which were supposed to be 1-3-5, were really 1-1-4. When the failure first occurred, he had taken a piece of the concrete away with him, which was so soft it could be crumbled with the fingers, but when it had been exposed to the air for a month, it became very hard. Slow hardening was affected partly by the materials, and partly by the cold weather.

Mr. Thompson then went into several failures and tests that had come under his notice, and in each and every case the difficulties had arisen, as he had stated at the commencement of his talk, from either bad design, poor materials, or poor mixture. It was most important that the proper proportions be used in concrete, that absolutely clean materials be employed, and that great care should be taken in the workmanship. All the trouble he had ever known of with sand or aggregates occurred in the placing of concrete, resultant from slow hardening. When the concrete once set, it was pretty certain that it was all right.

Some discussion arose over Mr. Thompson's paper, as to the tests that he had referred to, showing 15,000 per square inch in compression strength in one instance, 200 lbs. per square inch tension in another instance, and 25 lbs. per square inch tension in another instance. The question arose as to what had caused this great disparity in the extremely low test of 25 lbs. Mr. Thompson stated that it was organic

matter in the sand, which amounted to two-tenths of one per cent.

Concrete Sewers

President Gillespie then introduced Mr. R. L. Humphrey, who addressed the Convention on "Concrete Sewers." It was Mr. Humphrey's good fortune to be associated with the construction of sewers in the early days, and last year he was enabled to inspect sewers in various large cities, that had been in existence for a good many years. There had been only one case, to his knowledge, where a concrete sewer had proven inefficient, and under the same conditions a brick sewer had also failed. This was in Great Falls, Montana, where alkali had caused disintegration and softening. In all of the cities the concrete sewers were in an excellent state of preservation. He had examined sewers that had been in existence as long as thirty or forty years, and there was no reason why concrete did not form one of the most admirable materials for the construction of sewers.

He had seen concrete sewers in which the discharging waters of manufacturing plants had flowed through them, containing a great quantity of acid, which in no way affected the sewer, for the reason that there seemed to be an oily substance that acted as a kind of a lining on the surface of the sewer. He referred to the excellent grade of concrete sewers in Philadelphia, in Brooklyn, and in New York. There was one condition, however, in which concrete could not be used without some protection; that was sewers where there were high grades, and where the scouring of the sewerage is likely to have a tendency to rub or wear down the green concrete. Under such conditions it was advisable in brick, as well as concrete sewers, to use Belgium block or a very dense vitrified brick, as a lining.

A short time ago he had inspected an egg-shaped sewer in Minneapolis, that had been down for over thirty years, and the condition of this pipe was so good that after having been taken up, to be replaced by a larger sewer, it was to be re-used this spring in laying another sewer.

Reinforced concrete pipe could be used with great saving, as compared with brick. In Cleveland they were laying concrete trunk line sewers with diameters as great as from 18 to 20 feet.

In laying a concrete sewer, the essentials were that the concrete should be well proportioned, so as to secure the maximum density. Concrete should be put in wet. The sewerage water should not be turned into it too sudden, so as to give the concrete a chance to attain a fair degree of hardness.

Mr. C. H. Thompson asked the question, if it was a general practice to make one continuous section, or to make it in small sections put together with joints filled in. Mr. Humphrey replied that this depended largely upon the size of and conditions under which the sewer was laid. Pipes had been very successfully made in sections and the joints filled in with a neat cement mortar, so that an almost perfect continuous pipe was possible.

He spoke of tile for drainage purposes, and stated that there had been a somewhat mistaken idea that they should be porous, so as to allow the water to seep through into the pipe. This was entirely wrong, and the idea undoubtedly came from the tile manufacturers, who could not make a tile on their machines that was not porous; hence the argument. The tile should be as dense and non-porous as it was possible to make it.

Mr. Keating, formerly City Engineer of the city of Toronto, now in the employ of the Toronto Street Railway Company, related some very successful experiences with concrete sewers while he was engineer for the city of Halifax. They had had endless difficulty with their brick sewers, and finally decided to build sewers of concrete. These sewers were made in blocks, and the condition of same after twenty-four years' service was most excellent. The sewer blocks were made from 20 inches to 4 and 5 feet in diameter, and in reply to an inquiry, the present City Engineer of Halifax told him that they were still following the same principle in making these sewers. The proportion used was 1-3-5.

Mr. Essery wanted to know what the ingredients of concrete were in the United States, and Mr. Humphrey replied that they differed in different portions of the country. In Philadelphia they used crushed stone as well as gravel. Throughout the West, limestone was used. He did not believe, however, that it made any difference as to the character of the ingredients, if they were used in proper proportion.

Mr. Essery wanted to know the effect of acid on concrete sewers. Mr. Humphrey did not believe that it should be considered at all, in so far as the entire surface of a sewer is coated with a greasy scum which practically makes the surface of concrete immune against acid action.

Mr. Essery stated that his father had taken a trip through the United States recently, and inspected a large number of concrete sewers. In every place he brought up the question of acid and he did not find a single place in the United States where they thought acid should be considered. At this point there was some discussion as to the effect of acid on sewers of various characters, with the result that it was the general opinion that the question of acids should not be considered, only in cases where there was a concentrated discharge from a manufacturing plant. Even then, disintegration would be only on the surface, and the action would be very slow. Mr. Humphrey said that he, under no circumstances, would hesitate to use a concrete sewer where there was water coming from plants which to a large extent were diluted and still further diluted from the sewer by sewage of ordinary character. He believed that concrete was one of the best materials that could be used for such sewers.

Mr. A. C. Blanchard asked Mr. Humphrey's views with regard to comparisons in the retardation of flow, between brick and concrete sewers. Mr. Humphrey replied that he would be greatly in favor of the concrete sewer. It was impossible to lay a brick sewer with a decidedly smooth intake. Mr. Humphrey had recently gone through one of the main trunk line sewers in Brooklyn, with a diameter of 22 feet. Metallic forms had been used, and the surface of the sewer, after the forms were pulled, was almost like granolithic finish. Several instances were spoken of by several present of cases in which the cement mortar had out-worn the stone blocks or brick in sewers, leaving the cement joints protruding up upon the surface of the sewer.

The next number on the programme was a paper by Mr. Blanchard on "The Evolution of Concrete in Municipal Engineering." Through our inability, before going to press, to get a copy of this MSS., we will be obliged to deal with it in a later number of CONSTRUCTION.

Closing of Convention

In closing the Convention, President Gillespie stated that as an initial Exhibition and Convention he believed that the Association had reason to be gratified at what had been accomplished.

The Association had conducted a Convention at which upwards of twenty papers had been contributed. The gentlemen who contributed these papers had received no reward, and their only motive had been their devotion to good engineering construction. In view of that fact, the Association should be considered as a purely educational organization, and was entitled to the co-operation and support of engineers, architects, contractors and cement manufacturers. If the Association was ever going to attain, and maintain the position of authority, which was essential, it should receive the support of these professions, as well as the industry. Mr. C. H. Thompson moved that a tender of the hearty thanks of the Association be extended to those who had contributed to the success of the Convention. This was seconded by Mr. Essery, and was carried amid applause.

NOTE

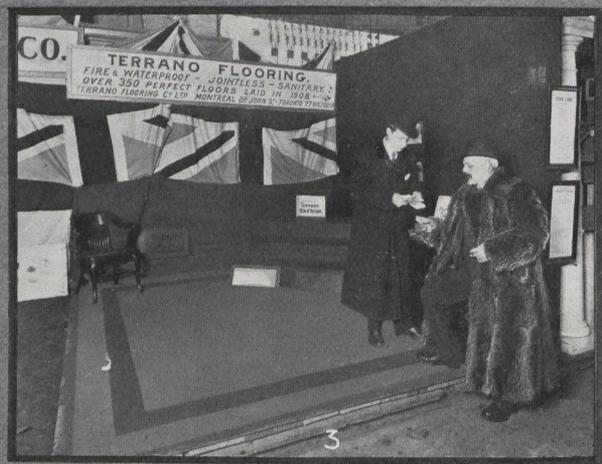
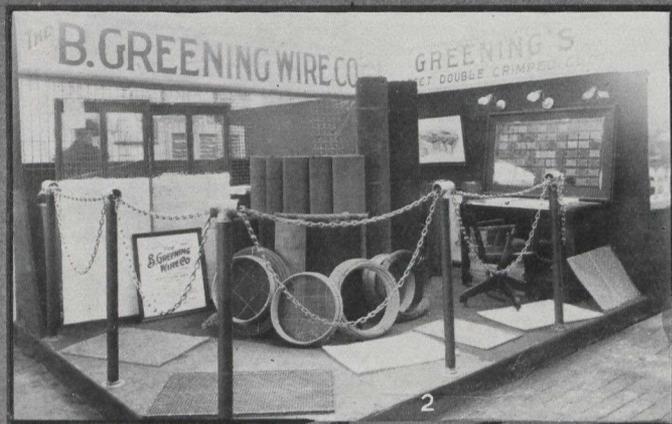
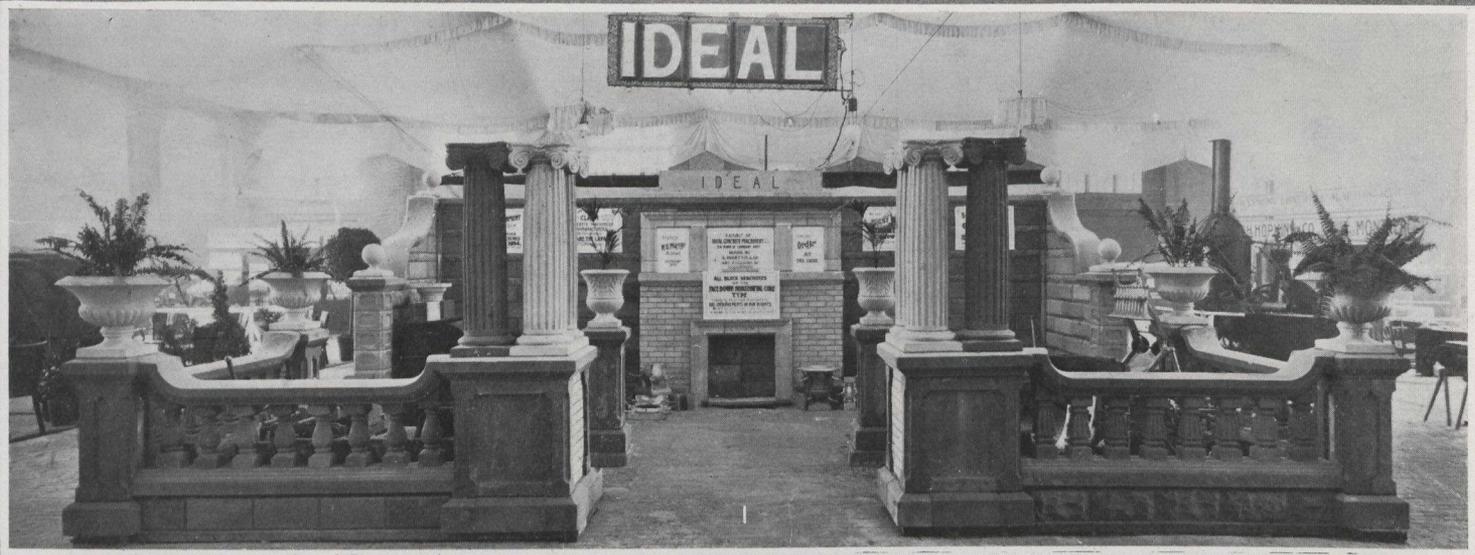
It had been the intention of the publishers to give, in condensed form, the complete proceedings of the entire convention, including all papers, but the large number of lengthy papers and the great amount of discussion made such an undertaking impossible, in one issue. We therefore have given in condensed form an outline of the proceedings and will treat in the near future the papers crowded out of this report.—*Editor.*

A DEVICE WHICH OBVIATES SOLDERING in the suspension of trolley lines has been patented by the manager of the Haslingden Corporation Tramway. As described in a report from Trade Commissioner J. B. Jackson, of Leeds, England, the invention consists of a special tool which grooves and flanges the wire at the required point, and a correspondingly grooved and flanged metal holder which clips the wire and makes the necessary connection. The holder is in two parts and is securely fastened by countersunk screws. The invention does away with the risk of weakening a line by soldering, with resultant risks of fusing. It also eliminates the danger of wires falling from the insecure soldering. Although it has just been patented, it is said, that the device has already been highly approved of by a large number of engineers and experts.

All are architects of fate,
Working in these walls of time,
Some with massive deeds and great,
Some with ornaments of rhyme.

For the structure that we raise
Time is with materials filled:
Our to-days and yesterdays
Are the blocks with which we build.

—Longfellow.



Some of the Exhibits Seen at the Cement Show

1. Ideal Concrete Machinery Company, London, Ont. 2. B. Greening Wire Company, Hamilton, Ont. 3. Eadie-Douglas Company, Montreal and Toronto. 4. Trussed Concrete Steel Company, Toronto. 5. Pilkington Bros., Montreal, Toronto, etc. 6. London Concrete Machinery Company, London, Ont. 7. Cement Products Company, Toronto.



Some of the Exhibits Seen at the Cement Show

8. A. B. Ormsby, Ltd., Toronto. 9. Canadian Portland Cement Company. 10. Roman Stone Company, Toronto. 11. Lehigh Portland Cement Company. 12. Expanded Metal & Fireproofing Company, Toronto. 13. Mussen's, Limited, Montreal. 14. Canadian Art Stone Company, Toronto.

CANADA'S FIRST CEMENT SHOW.---Vast Array of Materials, Products, Machinery and Appliances Shown at St. Lawrence Arena. ---All Available Space Occupied.---Many Elaborate and Artistic Exhibits.

THE EXHIBITION which was held at St. Lawrence Arena, not only reflected great credit upon the Canadian Cement and Concrete Association, but also upon the many enterprising firms who took part in it. Every branch of the industry was represented and in the sixty some odd booths, some of which were very elaborate in character, was to be found everything from the raw material up to the finished product. Concrete mixers, concrete block machines, brick machines, and cement working tools and appliances were much in evidence, and there was also some very practical demonstrations in the way of reinforced concrete construction.

It was impossible to lose sight of the vast improvement that has been made in the manufacture of artificial stone and cement blocks, and the numerous splendid exhibits of this kind to be seen had an educative influence which augurs well for these materials in the future.

All in all, the Exhibition was comprehensive, interesting and instructive in character, and in general scope, number of exhibits and effectiveness, it was said by the many United States visitors, to take rank with the cement shows which are held by the more advanced organizations on the other side.

IDEAL CONCRETE MACHINERY CO.

THE REPUTATION of the Ideal Concrete Machinery Company for making fine exhibits was fully sustained in their artistic display which was pronounced by many of the American visitors present to have eclipsed anything that has ever been attempted at various cement shows which have been held on the other side. The company occupied a large double space, the front portion of which was enclosed by an ornamental concrete fence having a base course of concrete blocks, concrete base rail, square and round spindles and curved top rail. The entrance was effectively set off with concrete columns and caps while at the corners were pannelled pedestals surmounted by appropriately designed lawn vases. These corners introduce an entirely new idea in concrete pedestals or piers' construction which can be worked out so as to meet almost any size or width required.

The great diversity of facings which it is possible to produce with the Ideal block machine, was strikingly demonstrated in wall of 24 inch blocks which formed the background of the exhibit. The lower panel on the right was composed of bush hammered blocks, while that on the left was built of one-quarter inch bevel, one-quarter inch panel blocks. These were carried up six courses, above which were four-inch rock-faced blocks laid in alternating courses with vertical and horizontal tooled blocks on each respective side. In the centre of the wall was a fire-place of white-faced brick with a pleasing mantel-piece worked out in white-faced egg and dart design. The wing walls on either side of the exhibit completed the enclosure and were in perfect keeping with the general scheme.

All the work shown in the exhibit was manufactured on the Ideal Machines and molds, and it must be said that the company has done much to advance this type of construction. Demonstrations of these machines were given during each day and evening and a large number of sales were made during the week. The booth was in charge of C. F. Pulfer, the Canadian manager, J. Au-

gustine Smith, United States sales agent, and F. M. Leach, representative for the State of Michigan.

THE B. GREENING WIRE CO

THE B. GREENING Wire Company, Hamilton, displayed a large number of their lines at an attractive booth near the main entrance. One feature of their exhibit which created a large amount of attention was a practical demonstration of the Greening trussed hard steel wire lathing, a new product which the company placed on the market. This lathing offers a taut, rigid surface to which plaster takes hold in a ready manner, and it is fast gaining favor with the architects and builders. Wire cloth for cement screening, also shown in a variety of mesh and widths, as was also the company's crimped wire, which, owing to its continuous bond make an excellent reinforcement for floors or roof construction. Other products of the Greening make displayed wire rope for hoisting and derrick work and a full line of perforated sheet steel, copper and brass.

TERRANO FLOORING.

THE MERITS of Terrano flooring were explained at the booth of the Eadie-Douglas Company, where a practical application of this material proved to be of unusual interest to the daily visitors. This material is now being extensively employed for surfacing concrete floors. It is applied in a plastic state and usually laid about three-quarters of an inch thick. When set which requires only a short time, it produces a hard, smooth, jointless surface. In addition to being jointless, Terrano flooring also possesses fireproof, waterproof and sanitary qualities that greatly recommend its use. While Terrano has only been before the Canadian building public for a short time, it is rapidly growing in popularity, and up to the present time, the Eadie-Douglas Company has laid over 350 floors.

One of the important recent contracts executed by this firm was in the new addition to the Chateau Frontenac, Quebec, where all the bath room floors are of Terrano instead of terrazzo, as was erroneously stated in the previous issue of CONSTRUCTION.

The exhibit was in charge of Mr. Macdonald of the Toronto office, and included a large number of samples showing various colors and designs in which Terrano can be executed.

TRUSSED CONCRETE STEEL CO.

A LARGE ELECTRIC SIGN emblazoned with the words "Kahn System" indicated the location of the Trussed Concrete Steel Company's exhibit where a concrete beam loaded down with pig lead, proved to be an irresistible attraction of an interesting and instructive nature. The beam was eight inches in width by twelve in depth, with a span between the supports of twelve feet from centre to centre, and a cantilever at each end 3 feet 6 inches long. The beam was reinforced with Kahn bars, the location of which was indicated by black lines painted on the exterior. These consisted of two $\frac{3}{4}$ inch by 2 inch bars which extended through the entire length of the beam at the top and two $\frac{3}{4}$ inch by 2 inch bars placed near the bottom of the span to take the centre load of four tons. The cantilever load carried at each end was two tons. The company also exhibited their Hy-Rib lath and a number of other interesting pro-

ducts used in concrete construction, in addition to showing a number of photographs of buildings which had been erected according to the "Kahn" system.

ROGERS SUPPLY CO.

SOMETHING NEW to the Canadian field in the way of a concrete mixer was shown at the exhibit of the Rogers Supply Company, where a Hadsel non-tilting concrete mixer proved to be a mighty magnet. It is doubtful if there was any place in the exhibition hall where greater interest centered than around this interesting machine, and it was the consensus of opinion of the large crowds who gathered about it, that the merits of the mixer fully speak for themselves. Among the many visitors who called at the Rogers Supply Company's exhibit were representatives of the C.P.R., G.T.R., and T.H.B. railway companies; members of various boards of public works, municipal engineers from many places in the province, and a large number of prominent concrete engineers and contractors; and from



EXHIBIT OF ROGERS SUPPLY COMPANY

the warm endorsement expressed, it seems quite evident that the Hadsel mixer is destined to play an important part in future construction work to be carried out by these various departments and interests. In construction, the Hadsel is a simple, strong, compact built machine, with an octagonal mixing drum, built of cast iron segments thoroughly rivetted together. On the inside of the drum are pressed steel buckets attached to each segment and steel deflectors which give the materials an additional turn, as they are carried by the buckets to a point near the top, from which they are dumped in the course of every revolution.

PILKINGTON BROTHERS

FIREPROOF GLASS, and glass of all descriptions, was displayed to advantage at the artistic exhibit of Pilkington Brothers, Limited. This firm are the proprietors of the St. Helen's Glass Company, St. Helens, England, and their Canadian trade has grown to such proportions that they now maintain offices and ware rooms in Montreal, Toronto, Winnipeg and Vancouver. A pyramid containing 245 lbs. of Pilkington's patent wire rolled glass, in a wide array of sizes, formed the central feature of the booth. The fireproof and other excellent qualities of this glass has been universally recognized and to-day the Pilkington products are being specified by architects and engineers the world over. There was also displayed a complete line of the Company's patent prismatic glass which is made in three different angles, together with a number of specimens of beautifully wrought art and fancy color cathedral glass which fully demonstrated the firm's capabilities in this respect.

LONDON CONCRETE MACHINERY CO.

BY FAR THE LARGEST individual display of cement machinery and appliances was shown by the London Concrete Machinery Company, who always had an interested group about their large double space. Included in this exhibit were concrete block machines, concrete brick machines, tile and sewer pipe moulds, moulds for sill, steps and window caps, continuous mixers, hand mixers, etc., all of which were of the company's own manufacture. These machines were operated throughout the week, turning out the particular class of work for which each was designed. The continuous mixer and other machines, which were operated by power, were driven by gasoline engines, also of the company's make. An attractive feature of their exhibit was a curb for the construction of concrete silos which are becoming so popular in the rural districts. This curb is adjustable and will build any size silo from five feet up with walls varying from twelve feet at the bottom to six feet at the top.

Mr. Henry Pocock, president and manager of the company, and Mr. J. C. Doidge, its secretary and treasurer, were personally in charge of the display, and they were both enthusiastic over the success of the show in general. At the present time the company has in contemplation a large addition to their plant in London in order to better take care of their growing trade.

THE CEMENT PRODUCTS CO.

THE CEMENT PRODUCTS COMPANY, 19 Wellington st. west, Toronto, showed in a most practical manner the excellent quality of its blocks and kindred materials at a well arranged booth. This company makes a specialty of manufacturing a cement stone which bears a striking resemblance to broken Ashlar. The wall and pier construction, which formed a part of the exhibit showed effectively the application of this material. So well was the monotony and ugliness of the ordinary cement block overcome that the work was hardly distinguishable from the real stone. The corners, posts and piers were surmounted by vases which were also the products of the company, while along the sides its handiwork was revealed in the turned spindles and railing of the concrete fence.

Although the company is new in itself its products show the result of years of experience on the part of those who are identified with it. They have succeeded in overcoming the many objectionable features in work of this kind, and to-day are manufacturing a cement stone which is free from hair cracking, of great strength, practically non-absorbing, and attractive in appearance.

The Cement Products Company can furnish this stone with smooth, tooled or rock face, in any color or shape, and is prepared to fill large or small orders promptly in any part of the Province.

A. B. ORMSBY, LIMITED

MUCH INTEREST CENTERED during the week at the exhibit of A. B. Ormsby, Limited, where many visitors availed themselves of the opportunity to inspect the fireproof building appliances which this company makes. These consisted of fireproof windows, Kalameined and Terne Clad fireproof doors, rolling steel doors, fire door hangers, etc., all of which have become important factors in present day building construction. It was an education to a large number present to note the great improvements that have been made in work of this kind within the last few years. The artistic appearance of the Kalameined and Terne Clad door, and the fireproof windows were especially admired and it was the common expression that the company's work in general, represents the very best in the sheet metal-workers art. The popularity of the A. B. Ormsby's goods is rapidly growing, and the company, in addition

to its factories at Toronto and Winnipeg, now maintains branches in London, Eng., Montreal and all the principal cities in Western Canada.

CANADIAN PORTLAND CEMENT CO.

A VERY ACTIVE WEEK was spent by the Canadian Portland Cement Company, which found among the visitors many customers of the well-known Star Brand. They had a neatly decorated booth on the outside of the entrance where they displayed samples of their cement in various stages from the raw material to the finished product. About the booth were several large views showing the extent of the company's works, and also one of the standing piers of the collapsed Quebec bridge, in which the Star brand was used.

The Canadian Portland Cement Company have two plants in operation, with a total daily output of 3,000 barrels. These are located at Marlbank and Port Colborne, Ontario. The company has direct shipping facilities on both Grand Trunk and Canadian Pacific railways, and they are enabled to ship by boat from their own dock at Port Colborne to Port Arthur, Fort William and ports on the Great Lakes.

ROMAN STONE CO.

A REPLICA of a modern bank building, executed in a classic design, which formed the chief feature of the Roman Stone Company's exhibit, won for the company many a deserved encomium. The idea was certainly a clever one and it gave the company a splendid opportunity to show the adaptability of its stone to high class design. The exceptionally fine texture and color of this manufactured stone excited much favorable comment, and one authority on structural materials, who was present, said that there was a pronounced similarity between it and Indiana limestone.

Other specimens of the company's work was to be seen in two vigorously modelled lions placed on each side of the entrance, and in the coat of arms for the Bank of Montreal, which has been supplied for five branches of that institution. Two pilaster caps in process of being hand carved were also shown and created no little interest. These fully demonstrated the suitability of Roman stone where sculptured work is required.

LEHIGH PORTLAND CEMENT CO.

ONE OF THE MOST progressive concerns identified with the industry in Canada, to take part in the exhibition was the Lehigh Portland Cement Company, for which the Thorn Cement, 601 Continental Life Building, Toronto, are the sole selling agents. At their appropriately arranged booth, was a particularly interesting exhibit showing the component part of Lehigh cement at various stages during the process of manufacture. Of equal interest was the product of the company in finished work which was shown in the form of a window sill of great density and having a rich white color. Lehigh cement is especially well adapted to sidewalk construction and high grade engineering work. The company's plant at Belleville, Ont., which is one of the modernly equipped on the continent, has an annual output of 1,000,000 barrels.

EXPANDED METAL & FIREPROOFING CO.

FENESTRA STEEL SASH was a conspicuous feature at the exhibit of the Expanded Metal & Fireproofing Company, Toronto, which displayed their concrete reinforcement, steel lath and other fireproof accessories. The booth which was in charge of Mr. Black, was splendidly arranged and showed off the various line to an excellent advantage. Expanded metal was shown in various sizes of web, and there was also to be seen the splendid type of expanded metal locker for schools, offices, commercial and industrial institutions, which the company is marketing with great success. A "Fenestra" steel basement sash set in a concrete wall stood at the front of the exhibit, while at the rear, forming the background, was a

"Fenestra" sash of the type which is now coming to be specified for manufacturing and other buildings. A large suspended wash-drawing gave the many callers at the booth an opportunity to gain an idea of the company's new concrete plant on Fraser Avenue, Toronto, in the construction of which the various kinds of materials displayed were used.

MUSSENS LIMITED

POSSIBLY THE DISTINCTION of being the first concrete mixer in operation at a Canadian cement show belongs to the 1909 Model Smith Machine displayed at the exhibit of Mussens, Limited. In a manner quite characteristic of the aggressive and business-like policy of this firm, the big machine driven by an electric motor, got under way simultaneously with the first blast of the whistle announcing the formal opening of the exhibition on the first night.

The Mussens, Limited, exhibit was a most extensive one, and it proved to be a strong attraction throughout the entire week to the many visitors who were in attendance. In addition to the mixing machine, several of the many lines of contractors' supplies and equipment which the company carries, were also shown and resulted in a number of important sales. The Smith mixer exhibited was equipped with an improved side loading device which elicited an unusually large amount of interest. The features of this device are essentially economical and practical ones, in that the attachment does away with the feeding platform, increases the output, and reduces the cost of mixing. By its use all materials are assembled in the skip or car on the ground level and hoisted to the charging device. It does away with the cost and time required in erecting a platform every time the mixer is moved, and because of its portability, large output and low feed it is a particularly attractive outfit for street work.

The 1909 Smith mixer, while of the same style as before, is built more heavily and stronger so as to better withstand the hard usage to which a mixer is generally subjected. An important improvement is the reinforcement which is now employed in the construction of the drum on all sizes of this machine. This reinforcement greatly adds to the rigidity and strength of the drum, and it can be readily replaced when worn out, thus rendering the mixer serviceable for a much longer period.

Another machine which was also demonstrated with much success at the Mussens' exhibit was the Chicago mixer, a new machine in the Canadian field, which is especially well adapted to meet the requirements of small work. This mixer is being introduced by this firm to take care of the trade where a less expensive machine than the Smith is desired. It is very serviceable in character, being strong and substantial, and a most splendid and reliable worker. One of its several salient features is the turbine loader which permits of the material being fed to the machine from a wheelbarrow almost on the ground level.

CANADIAN ART STONE CO.

THE EXHIBIT of the Canadian Art Stone Company, proved to be one of the strong attractions of the show. It would be difficult to imagine anything more artistically conceived or better carried out than their display which demonstrated beyond peradventure, that the term "art stone" is no misnomer. The company's exhibit included a great variety of design in decorative landscape and lawn pieces, consisting of garden tables, seats, vases and similar ornamental features. The possibilities of artificial stone for decorative architectural relief work was also to be seen in several splendidly executed pieces which are to be used in the construction of the World Publishing Company's new building now in process of construction on Richmond street, Toronto. Other products of the company were two strongly modelled statuettes, and a number of grotesque heads which were used effectively to overcome the monotony of the background, and which greatly added to the attractiveness of the general scheme.

SUCCESSFUL TEST OF CONCRETE SLAB.
 ---Report of Test Conducted by W. G. Swan,
 B.A. Sc., of Toronto University, at Cement Show.---
 Slab Reinforced with Triangular Mesh.

AMONG THE MANY interesting features of the exhibition held the first week of this month in the St. Lawrence Arena by the Canadian Cement and Concrete Association was the testing of a reinforced concrete floor slab, manufactured by James Claxton & Son, contractors of this city, for the United States Steel Products Export Company of Buffalo and Montreal.

The accompanying sketch gives the dimensions of the floor slab and indicates the method of abutment support, a steel framework of I-beams and channels being used for the purpose. The style of reinforcement employed and its position in the slab is also indicated. The following additional information in connection with the slab is worthy of note:

MIXTURE.

The concrete was a 1 : 2 : 4 mixture of National brand cement coarse and fairly clean pit sand, and one inch limestone aggregate. The mixing was done by hand much care being taken to make it thorough. Age of concrete 35 days.

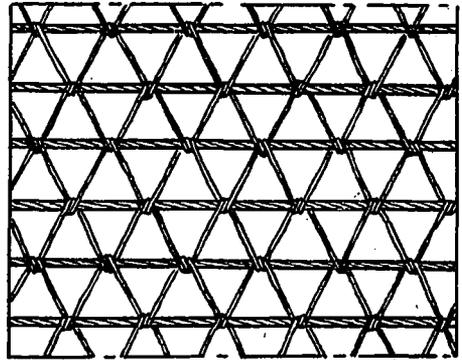
REINFORCEMENT.

The reinforcing material known as the "Triangular Mist" was cold drawn O. H. steel with a guaranteed ultimate strength of 60,000 pounds per square inch.

The percentage reinforcement is very low being only 1-4 of one per cent. It will be seen from the accompanying sketch the diagonal wiring system carries the inter-

mediate stresses to the heavier longitudinals whence they are transferred to the abutments.

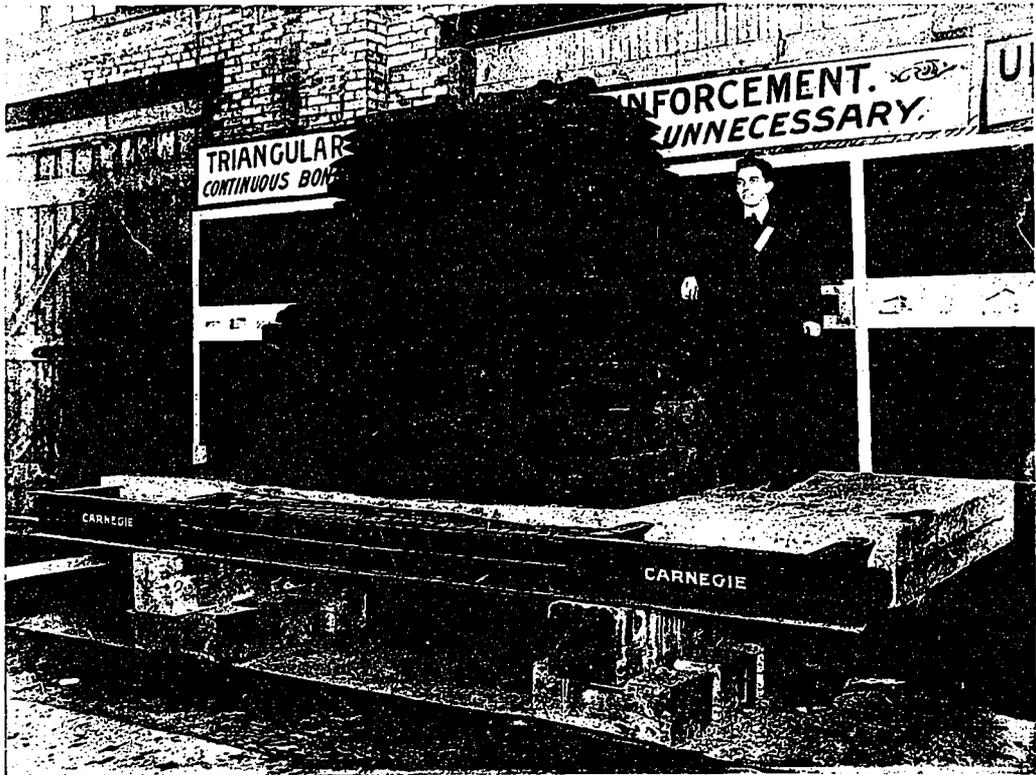
The loading of the floor slab was accomplished by the use of pig iron, each piece being weighed before being



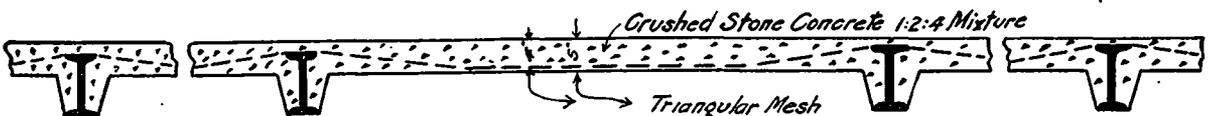
DETAIL OF REINFORCEMENT.

put in place. The pig was loose piled in an effort to overcome the arching effect of the load. The following load-deflection table and graph give a good idea of the behavior of the floor slab under stress.

Total load (Pounds)	Total load (Pounds per sq. in.)	Total Deflection (inches)
0	0	0
12,170	254	.07
21,830	455	.16
34,300	715	.35
40,300	840	.48
52,900	1100	.87



CONCRETE SLAB TEST MADE AT RECENT CEMENT SHOW, TORONTO, SHOWING THE PANEL AS IT APPEARED WHEN SUBJECTED TO 52,900 LBS.



DETAIL OF CONSTRUCTION OF SPAN SHOWING LOCATION OF THE TRIANGULAR MESH REINFORCEMENT.

The first cracks appeared in the slab at a load of 34,300 pounds. Failure occurred at the ultimate load.

In summing up the test the results may be said to be very satisfactory especially since the floor slab was designed to carry a uniformly distributed load at 30 days' time of only 110 pounds per square foot with a safety factor of four. As we may note the values obtained are

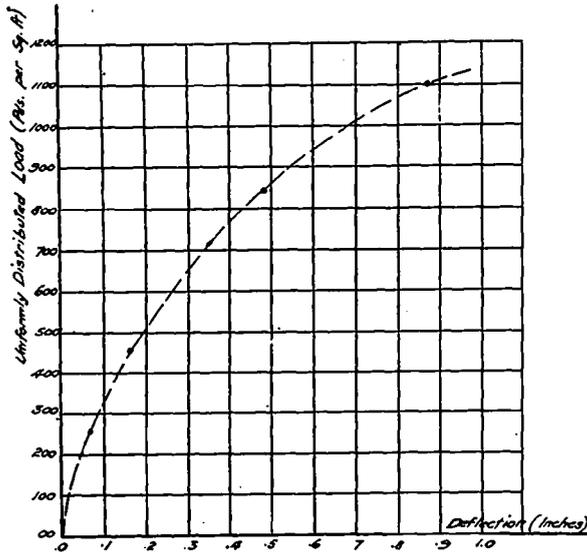


DIAGRAM SHOWING DEFLECTION OF SLAB REINFORCED WITH TRIANGULAR MESH.

more than double the guaranteed capacity of the floor slab and although the deflections above the 34,000 pounds total load mark are high this is accounted for to some extent by a slight turning over of one of the abutments I beams due to loose bolting. It is the writer's opinion that the triangular mesh is especially suited to floor reinforcement, on account of its natural tendency to distribute the load and the comparatively small amount of steel required.

W. G. SWAN, B.A. Sc.,
U. of T.

BUILDING STATISTICS FOR FEBRUARY.

Returns Show Universal Activity Throughout the Dominion.—Very Bright Outlook for Future Work.

WHILE THE BUILDING STATISTICS for the month of January were indicative of a record breaking year, those for the month of February are positively assertive of it. It is extremely doubtful if ever before in the building annals of the Dominion there has been recorded at this season of the year, anything quite like it for universal activity.

Returns for the months, as submitted to CONSTRUCTION from representative cities in every province of the Dominion show, conclusively, that building operations from coast to coast, have not only been fully revived, but that gains of such huge proportions are being made as was little anticipated even by the most optimistic at the beginning of the year.

Of the sixteen cities reporting for the month, twelve submit comparative figures, and of these only one shows a falling off from the corresponding month of 1908. This decrease is noted in the case of Edmonton, which after a series of successful months, experiences a slump of 91.22 per cent. However, it must be taken into consideration that last year's amount for February included the parliament building to cost \$1,250,000, and apart from this, Edmonton is really far ahead on the total value of permits for the past month.

In fact the West in general shows every evidence of a flourishing condition and the immediate prospects are that the present pace in the building line will be maintained throughout the entire season.

Winnipeg follows strongly on the lead gained in January, by another tremendous advance of 1.425 per cent.; while Calgary eloquently attests to her prodigious growth by again coming to the front with a gain of 230.90 per cent. for the month. A material increase is also to be noted in the case of Regina, which turns up with 169.90 per cent. in her favor, and again in the amounts of Vancouver and Victoria, both of which overlap last year's figures for the month by 11.61 per cent. and 68.15 per cent. in order named. It is interesting to note the strong re-action on the part of Fort William, Toronto and Halifax the only three places which registered a decline for January.

Fort William has not only regained a large portion of what she lost, but tops the list for the month with the striking gain of over 2,925 per cent. the largest increase to be recorded during the month. Toronto has more than redeemed herself by an increase of 68.19 per cent. and is so far away ahead in the year's work; while the gain in Halifax of 40.79 per cent. more than offset any loss in January and gives the city a total valuation of permits for the first two months slightly in excess of that for the corresponding period of last year.

There is also a strong forward movement in Montreal, where a splendid increase of 104.86 per cent. added to the gain made in January, gives the metropolis a very substantial margin in her favor which promises to be materially extended as the season advances.

Quebec city also shows a most healthful condition and has a gain for the month of 109.30 per cent.

Peterboro registers a gain of 22.30 per cent. while Windsor, Kingston and Berlin show much activity for so early in the season.

Reports as to the future are of a most sanguine nature. Edmonton sends in word that the "outlook is bright"; while others report as follows: Brandon, "fairly good"; Calgary, "looks bright"; Fort William, "very bright"; Kingston, "very good"; London, "splendid"; Regina, "many buildings in contemplation"; Winnipeg, "bright"; Berlin, Ont., "good".

	Permits issued for Feb. 1909.	Permits issued for Feb. 1908.	Increase per cent.	Decrease per cent.
Berlin.....	\$ 9,000	.....	.....	.....
Calgary, Alta.....	78 000	\$ 23,690	\$ 230.86	.....
Edmonton, Alta.....	112 400	1,281,416	.....	91.22
Fort William, Ont.....	311,625	10,300	2,925.48	.....
Halifax, N. S.....	22,070	16,676	40.79	.....
Kingston, Ont.....	18,400	.....	.....	.....
London, Ont.....	.....	4,200	.....	.....
Montreal, Que.....	235,330	114,380	104.86	.....
Peterboro, Ont.....	1,165	60	2,230 00	.....
Quebec P. Q.....	9,000	4,300	109.30	.....
Regina, Sask.....	5,965	2,210	169.90	.....
Toronto, Ont.....	1,233 060	783,091	68.19	.....
Vancouver, B. C.....	407 655	865,225	11.61	.....
Victoria, B. C.....	121,620	72,325	68.15	.....
Windsor, Ont.....	17,000	.....	.....	.....
Winnipeg, Man.....	157,900	10,350	1,425.60	.....

"THE BUILDING INSPECTION DEPARTMENTS of many cities have a great deal of difficulty in inducing owners and contractors to recognize the necessity of applying for building permits in advance of starting the work," says the IMPROVEMENT BULLETIN, Minneapolis, "The real object of building inspection is overlooked, if permits are granted without an inspection and an approval of plans ahead of starting the work. Inspectors at different cities from time to time, threaten and even take steps against dilatory and negligent owners, but the matter continues to recur at frequent intervals." The difficulty seems to exist in almost every large city in America. Both the Montreal and Toronto building departments are handicapped in their inspection by this unlawful, deplorable practice. Measures should be taken to make examples of a few dilatory builders.

THE INCOMPARABLE "DAISY" HOT WATER BOILER

THE "DAISY" is in every way a perfect boiler—a boiler in which the quality is *high grade*, the workmanship *honest and skilful*. Manufactured under the direction of *competent engineers* at a plant possessing the most *ideal* manufacturing facilities of any factory ever devoted to the production of a high grade water boiler. Every part is inspected before being assembled, and *tested* by experts before leaving the shop—a *perfect boiler* at a low figure.

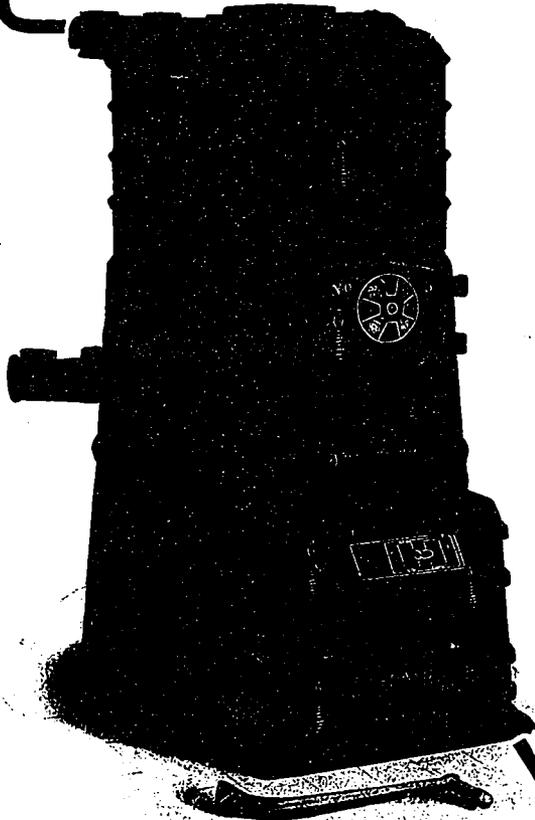
The "DAISY" is the boiler to specify. The boiler to install. One upon which you can stake your reputation. A boiler that appeals to everyone who understands its merits. It possesses many improvements exclusively its own.

The "DAISY" excels for efficiency and economy. It has been *tested* under all conditions and proven "*Unequaled*" by the most prominent *heating engineers and architects*, and thousands of property owners.

The "DAISY" is the *unapproachable pioneer* of hot water boilers, 30,000 of which are in active service. Its name stands as a guarantee of *perfection* in hot water heating apparatus.

The "DAISY" has a reputation *unequaled*. It is *Canada's best production* in hot water boilers. It stands in a class by itself, often imitated, but never rivalled.

Architects should send us their plans. We will figure your heating. The services of our Engineering Department are at your disposal.



CLUFF BROTHERS

LOMBARD ST. - - TORONTO

Selling Agents for

WARDEN, KING LIMITED

GOVERNMENT PLACES BIG ORDER FOR CEMENT.

AN EXCELLENT IDEA as to the extent to which cement is coming to be used in construction work in Canada, can be gleaned from the number of large contracts which have recently been placed by the Dominion Government for this material. By far the largest contract which has so far been awarded, has just been given by the Department of Railways and Canals to the Lakefield Portland Cement Company. It calls for 107,500 barrels and is the largest individual order which has ever been placed in Canada.

Under this contract the company will supply all the cement that will be required during the year for new construction work and repair work for the Rideau, Cornwall, Welland and Trent Canals. The greater part of the material will be used in the construction of the new Trent canal, in fact, the contract calls for 95,000 barrels for this work.

The company has also been awarded a contract by the City of Hamilton, to their cement for various improvements to be carried out by the Board of Work.

MUNICIPAL SUPPLIES.

THE LARGEST and most comprehensive catalogue of municipal machinery equipment, ever issued by any firm in Canada, is now ready for distribution by Mussels, Limited, of Montreal. This book, which contains 55 pages, 7 by 10½ in., is printed on an excellent quality of coated book paper, and is profusely illustrated with an exceptionally large number of first-class half-tones.

The arrangement of the catalogue is everything that could be desired. Each machine is illustrated and described on the same page thus rendering the book invaluable for quick reference. Every piece of machinery required in municipal work, from the road scraper and sprinkler, to rock crushers, plows, dump wagons and hoisting machinery, is to be found in this catalogue.

It is altogether possible that no firm ever got together such an excellent combination of high class municipal machinery and supplies, as Mussels, Limited, show in this catalogue. This book should be of very excellent value to municipal officials, especially in this day when municipalities are doing such a large portion of their own road-making and maintenance.

The object, as expressed by this firm, in issuing this catalogue, was to get together in book form, general information relative to the various machines, tools, and supplies used in municipal engineering. Individual catalogues covering each of the various types of machines, and giving more detailed information, may also be had upon request. Architects, engineers and municipal officials will do well to send for a copy of this almost indispensable publication.

LONDON CONCRETE MACHINERY CO.'S NEW CATALOGUE

OUTSIDE of a visit to their plant, possibly the best idea as to the extent of the London Concrete Machinery Company and the vast line of machinery and appliances which they manufacture, is to

be obtained from the splendid new catalogue which the company is now mailing to the trade.

This catalogue is very comprehensive in its character and it is designed to enable prospective customers to make their selection quietly and intelligently. It embodies 125 pages and from cover to cover is profusely illustrated with high-grade half-tones of the many lines which the company makes. These include block machines, brick machines, face plates, concrete mixers, sill lintel and step moulds, silo curbs, sewer pipe moulds, etc.

There is also shown, portable rock crushers, bearing cars, wheelbarrows and every character of cement working tools. A feature of the book are a series of plates showing a number of handsome structures which have been constructed with cement blocks and bricks manu-



HENRY POCOCC,
PRES. AND MGR.



JOHN C. DOIDGE,
SEC.-TREAS.

factured on the company's machines. The excellent results to be obtained by the company's machines in the manufacture of ornamental caps and columns, is also to be seen in several handsomely illustrated pages.

In addition to this, the catalogue also contains standard specifications for the manufacture of concrete blocks, instructions as to color, rules for making tiles and other information which will be found of great value to those who are engaged in this class of work.

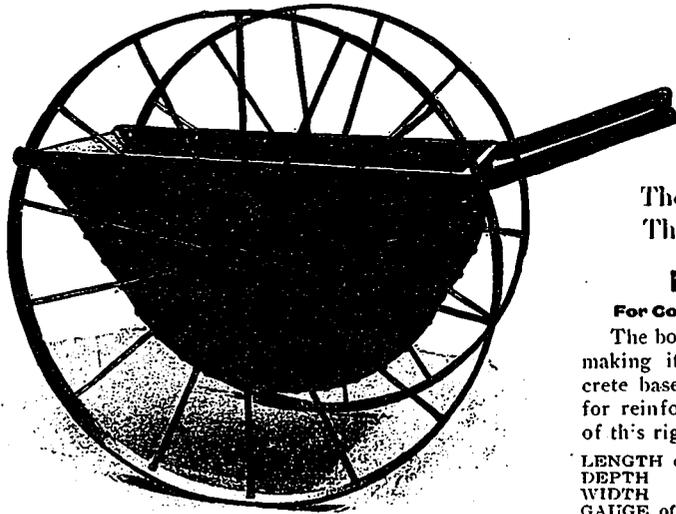
A copy of this very excellent publication will be forwarded to any address by the London Concrete Machinery Company, Ltd., London, Ont., upon request.

LANDS ANOTHER BIG ORDER.

ANOTHER LARGE CONTRACT for cement has been let to the Wm. G. Hartranft Cement Company by the Department of Railways and Canals. It calls for 46,000 barrels of the "Vulcan" brand to be used on construction work on the Quebec and Lachine canals. This is the third big order received from the Government by this firm since last fall when the Vulcan plant commenced operations, and it certainly speaks well of the company's aggressiveness and the excellent quality of its product.

It will be of interest to the trade to learn that this firm has just issued a very handsomely illustrated book entitled "Portland Cement Sidewalk Construction," which deals with its subject in a most thorough and comprehensive manner. This book will be found of much use and benefit to architects, engineers, and contractors, and it can be procured without cost by addressing the Wm. G.

The Best Your Money Can Buy



Consider } **The Quality
The Workmanship
The Price**

These cuts show a few specials.
They cannot be improved on.

No. 1 Concrete Cart

For Contractors, Cement and Concrete Workers

The bowl is so hung that it can be turned bottom up, making it especially convenient for laying the concrete base for sidewalks, reservoir bottoms and floors for reinforced concrete buildings. A brief description of this rig is as follows:

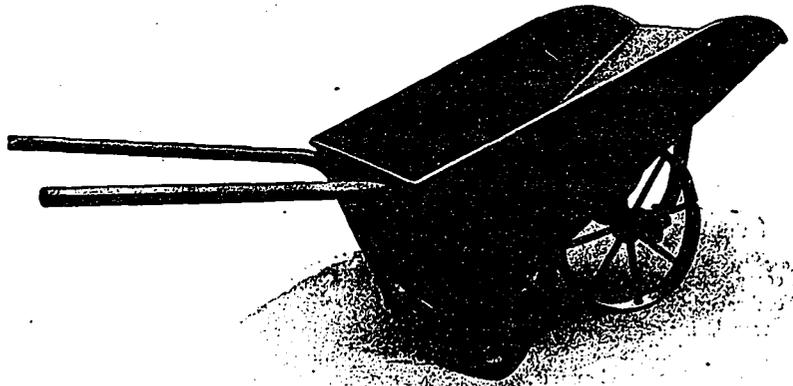
LENGTH of Body.....	39½ inch	HANDLE.....	1 inch gas pipe
DEPTH " ".....	20 inch	WHEELS.....	42 inch dia.
WIDTH " ".....	21 inch	" ".....	2 in. tread
GAUGE of Steel.....	No. 12	AXLE.....	1½ inch cold rolled
LENGTH over all.....	58 inch	WEIGHT.....	225 pounds
WIDTH over all.....	32 inch	CAPACITY.....	6 cubic feet

H--22, LANSING TUBULAR

especially adapted for Cement and Concrete. It has stability and carries its large load easily and without strain on the arms for the reason that the bulk of the load is below wheel bearings and handles. On a large variety of work this barrow will be found a time and money saver.

A brief description follows:

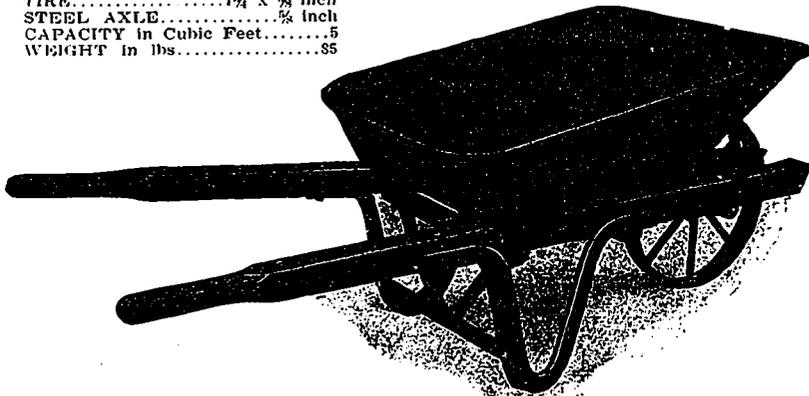
LENGTH over all.....	64½ inch
WIDTH " ".....	25 inch
HEIGHT " ".....	28 inch
TRAY LENGTH.....	33½ inch
" WIDTH.....	25 inch
" DEPTH.....	15½ inch
HEIGHT at Nose.....	26 inch
GAUGE of Steel.....	No. 16
WHEEL Diameter.....	16 inch
TIRE.....	1¾ x ¾ inch
STEEL AXLE.....	¾ inch
CAPACITY in Cubic Feet.....	.5
WEIGHT in lbs.....	.85



F--2, LANSING STEEL TRAY

with angle steel legs and braces is similar to the No. H-20 as to size of tray and capacity, and like it, is an excellent barrow for mortar and wet concrete.

Tray measures 34 x 26 in. and is made of No. 16 specially prepared steel reinforced at corners and strengthened at top by a 5-16 in. steel rod. Heavy steel wheel 16 in. in diameter, 1 3-4 x 5-16 in. tire and runs on a steel axle firmly held to underside of handles by heavy lugs. Capacity 4 cubic feet, weight per dozen, 76 lbs.



F. HYDE & CO., 31 Wellington St., Montreal

Hartranft Cement Company (sole selling agents of the Vulcan Portland Cement Company), Bank of Ottawa Building, Montreal.

SOMERVILLE LTD. MAKES EXTENSION TO PLANT.

SOMERVILLE LIMITED, Toronto, who have recently completed one of the finest and most perfectly equipped brass plants on the continent, are already finding it too small to meet the requirements of their rapidly growing business, and have taken out a building permit for a large extension to their foundry. They are also extending and refitting their show rooms and offices on Richmond street, where the company will greatly add to their already extensive display of plumbing fixtures and appliances.

TORONTO IRON WORKS.

THE TORONTO IRON WORKS, while one of the most recent manufacturing concerns identified with industrial life of Toronto, has, nevertheless, successfully carried out several large contracts since its inception. Probably the most important of these is the large standpipe installed by the company, in connection with the new waterworks system at Guelph, Ont., which is said to be the largest reservoir of its kind in Canada, the capacity being 500,000 gallons and the dimensions 30 feet in diameter and 100 feet high. The workmanship and erection were carefully executed and have proved entirely satisfactory to the city and their engineers, Messrs. Davis & Johnston, of Berlin.

Prior to its incorporation, the principals in the company had built the plant of the British American Oil Company and had become satisfied with the future prospects of the steel business in Canada. The charter for the Toronto Iron Works was obtained in 1907 and the plant completed early in 1908. The operations of the concern embrace all details of the industry in which they are engaged, including tanks, water-towers, standpipes, blast furnaces, boilers, stacks and plate work in all its varieties; steel beams, channels, angles, building members such as columns, girders and trusses. The present equipment is amply sufficient, and additional machinery will shortly be installed to make possible the handling of the heaviest grades of work.

It is the intention to carry a complete stock of structural metal, beams, channels, angles and column sections, besides plates of certain dimensions. Ample yard room has been secured, and the improvements which the Toronto City Council have in hand will give good railway facilities in a short time.

Among other contracts that the Toronto Iron Works have on hand, is one for a 50,000 gallon water tower for the Village of Markdale, to be built according to the plans and specifications of C. H. Mitchell, consulting engineer.

The personnel of the company includes several influential business men, while those most closely connected with the management are men of extensive practical engineering experience and technical knowledge.

MESSRS. C. EDWARD WHITE and J. A. L. Foulds, architectural and structural designers and engineers, of Sherbrooke, Que., have formed a partnership and opened a suite of offices at the cor. Montcalm and Magog streets, in that city, at which address they will be pleased to receive manufacturers catalogues and samples.

HARVARD UNIVERSITY TO HOLD COMPETITION.--Will Award Three Scholarships to Students of the Architectural League of America and Associate Societies.

HARVARD UNIVERSITY offers to members of the associate societies and to the individual members of the Architectural League of America, three scholarships in architecture for special students. The scholarships will be forwarded to those who stand highest in a competition in architectural design to be held in May.

The competition will be conducted in the various cities by the League through the organizations affiliated with it; on a program prepared by the Architectural Department of the Harvard University, and will be judged by the Professor of Architecture in the University and a Boston architect selected by the League.

These scholarships entitle their holders to free tuition in Harvard University for one year. The cost of such tuition otherwise being \$150 per year.

If the number of candidates and the quality of the work done in the competition should warrant such action, the Department of Architecture of Harvard University will recommend to authorities the award of similar scholarships to the two competitors standing next highest on the list to the successful ones.

Candidates should notify Emil Lorch, chairman of the Committee on University Fellowships, Architectural League of America, Ann Arbor, Michigan; by April 10, of their intentions to take part.

The program will be given out at 9 a.m., May 1st, at a place in each city, designated by the officers of the local organization or by the chairman of the above committee on University Fellowship in the case of Individual members of the League.

Eight consecutive hours will be allowed for making a preliminary sketch, a tracing of which should be retained by the competitor, the original being handed to those supervising the preliminary competition.

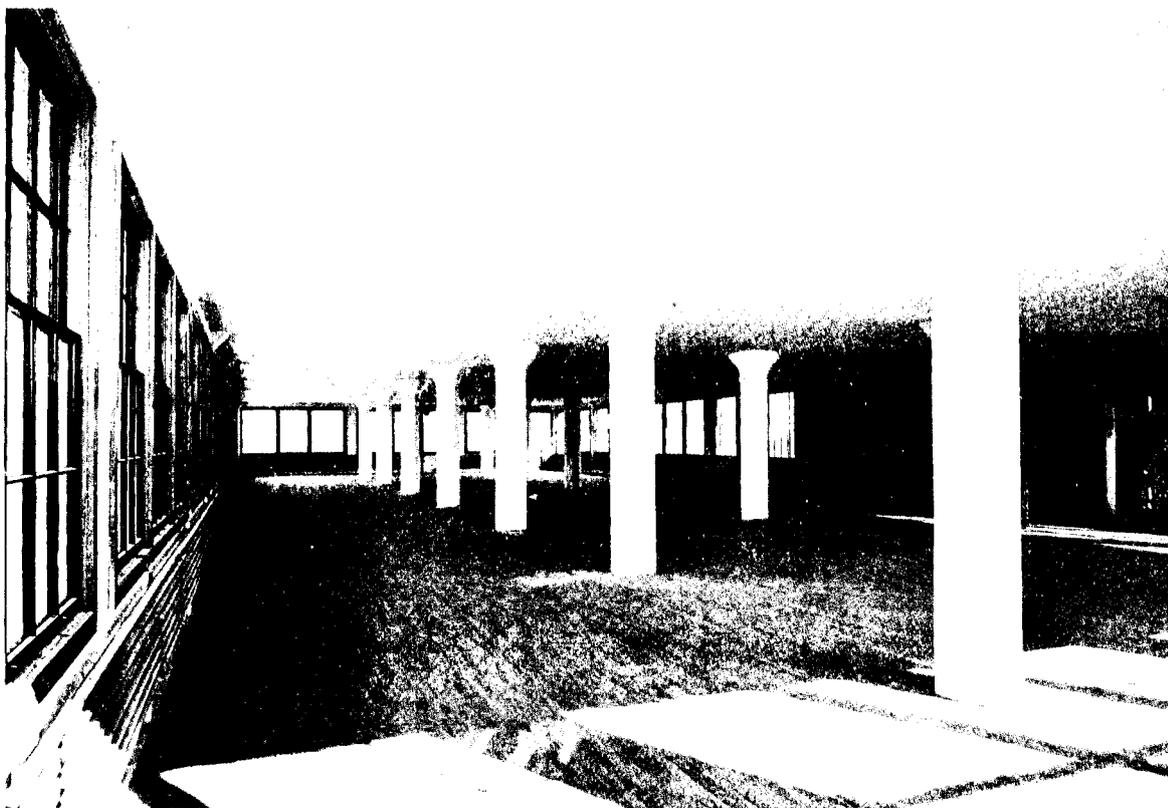
Supervisor of examinations will endorse the original sketches and send them at once to the chairman of the Department of Architecture of Harvard University.

The essential features of this sketch are to be adhered to in preparing the final drawings.

The competitors will have until Monday May 10th, to complete the drawings called for by the program. The drawings are to be sent in a mailing tube, and must bear the post mark or express stamp of that date. They should be addressed to the chairman of the Department of Architecture, Harvard University, Cambridge, Mass. The drawings of the unsuccessful competitors will be returned.

The name of the designer should not appear on any of the drawings. The sketch and the final drawings should bear some device, a copy of which with the author's name and address should be sealed in an envelope and enclosed with the drawings. The competitor must not have any assistance whatever in preparing his drawings, and that they are by him alone should be stated on the identification sheet.

"HIGH BUILDINGS, sir?" remarked an American, contemptuously. "Why, in England you don't know what height is! Last time I was in New York it was a blazing hot day, and I saw a man coming out of a lift wrapped from top to toe in bearskin, and I said to him: 'Why are you muffled up on a broiling day like this?' 'Waal,' he said, 'you see, I live at the top of the build-in' and it's so high that it's covered with snow all the year round!'"—Tit-Bits.



Second Storey of Barthelmes Building, Carlaw Ave., Toronto. Tested to 450 lbs. per sq. ft.

TURNER "MUSHROOM" SYSTEM

Reinforced Concrete

Distinctive Features

Absence of Beams
Flat Ceiling

Advantages

Increased Head Room
Maximum Light
Economy of Construction

Application

Suitable for Panels up to 30 feet square.
Particularly adapted for heavy loading.

Designs submitted and contracts taken for all classes of
Reinforced Concrete Construction

CLARKE & MONDS

ENGINEERS AND CONTRACTORS

36 Toronto Street

TORONTO

THE KENT COMPANY, Limited, of Montreal, has recently been formed to carry on business in Canada to supply and install

Ice Making and Refrigerating Machinery
for all purposes

This company will also take over the business in Canada of the

Armstrong Cork Company

dealing in their well known

Cork Board Insulation

which is acknowledged to be the very best for cold storage insulation.

The management of the company will be in charge of MR. W. G. KENT, who has had a wide experience in the Refrigerating business in Canada.

Any interested in *Ice making and Refrigerating Machinery, Supplies or Cold Storage Insulation* are requested to communicate with us, and we will gladly furnish them with catalogues and further particulars.

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MONTREAL

The Following Article Appeared in the Chatham Daily News:

Actual Results—Guarantees More Than Fulfilled at Chatham, Ont.

Suction Gas Engines Installed by Colonial Engineering Co., of Montreal, Reduce Chatham's Street Lighting From \$65 per Year to \$30 per Year per Lamp.

The following report of test made on gas engines installed by the Colonial Engineering Co., Ltd., for street lighting in Chatham, Ont., was made by K. L. Aitken, E.E., of Toronto, and makes good the claim that the Hornsby-Stockport Gas Engine can produce power at 50 to 70 per cent. less cost than Steam or Hydro-Electric equipments.

Report on Producer Gas Plant to the City of Chatham.

(By K. L. Aitken, E.E., 1003 Traders Bank Bldg., Toronto.)

In pursuance of instructions received from your city clerk and James N. Massey, I beg to advise you that I have carefully gone over the contract between the City of Chatham and the Colonial Engineering Company, of Montreal, and have made tests of the gas engines and gas producers supplied under this contract.

The engines show every evidence of proper design, good material and good workmanship. The hit-and-miss system of governing which is used, is standard English and Continental practice, and will be found quite satisfactory for your work.

Tests.

The output of each engine was measured by means of a friction brake, which apparatus is an entirely reliable device for making power measurements.

In making a maximum capacity test on engine No. 25938 with natural gas (guaranteed to develop 96 B. H. P. on Suction gas and 105 B. H. P. on Natural gas), I obtained 125 horse-power, and the engine then was running in such a manner as to be capable of delivering

somewhere between 5 and 10 per cent. more than this amount.

A similar maximum capacity test was made with producer gas, and 100 brake horse-power was obtained with 3 or 4 per cent. more capacity left in the engine.

Engine No. 25939 showed a maximum capacity on producer gas of 98 brake horse-power.

The efficiency question is as follows: Will the two small units deliver full power with the same economy as guaranteed for the one large unit? (The original contract called for one engine of 190 B. H. P., but the Colonial Engineering Company decided afterwards to install two engines of 96 H. P. each at the same price.) This guarantee for the large engine is that it shall not consume, at from three-quarters to full load, more than one pound of good anthracite pea coal per brake horse-power hour, and the quality of this coal, as stated under the specification for the producer, is 14,806 British Thermal Units per pound. The coal which I found in the power house and used for this test, I have had analyzed, and find that it has a considerable lower energy value than the above, and correction has therefore been made to compensate for this. On the combined test of the two engines I found that a horse-power hour was developed with .92 (92-100) pound of coal, and therefore the two smaller engines have shown an efficiency 8 per cent. better than that guaranteed for the large unit.

The contract states that the one engine, when used on natural gas, must be capable of delivering a maximum of 210 brake horse-power. Please note that engine No. 25939, as above stated, showed 125 horse-power on natural gas and had something to spare. The two engines are identical (note that on the maximum

test on producer gas one showed 100 brake horse-power and the other 98 brake horse-power), and I would therefore say that the combined maximum power of the two engines on natural gas will be approximately 250 horse-power, or 19 per cent. better than the guaranteed maximum.

On producer gas, the contract calls for the one engine to have a capacity of 190 brake horse-power. From figures given above, you will note that the combined maximum capacity of the two engines on producer gas was 198 brake horse-power, or something over 4 per cent. better than the guarantee.

The figures in the contract covering annual operating cost are mostly a matter of bookkeeping, the only variable which enters into them being the coal consumer per brake horse-power hour. The consumption of less than one pound of coal per brake horse-power having been demonstrated, the figures as presented to you can be taken as approximately correct.

Summary.

I believe and will most unhesitatingly say, that a better and more suitable equipment has been furnished you than contemplated in the agreement. The guarantees have all been exceeded, and the furnishing of two units without additional cost to you will do away with any question of installing an auxiliary plant.

In conclusion, I would state that the tests herein referred to were very carefully made, and the results as herein given are correct to the best of my knowledge and belief.

Respectfully submitted,

(Signed) K. L. AITKEN.

Sept. 29, 1908.

The Hornsby-Stockport suction gas engines and suction gas plants installed for the City of Chatham, Ont., and tested by Mr. Aitken, not only more than fulfilled every guarantee made, but were accepted by the City of Chatham by unanimous vote of the council. The City of Chatham having had a great deal of trouble with its dynamos (being lighted on the continuous current series arc basis) is now considering the installation of modern type dynamos and arc lamps, which, when equipped, will, together with the splendid showing made by their gas engines, bring their entire lighting equipment up to a standard of economy and efficiency unequalled by any municipality in the Dominion of Canada and probably not excelled by any lighting plant in the world.

The Colonial Engineering Company have installed municipal lighting equipments also for the towns of Megantic, Que. (street and domestic lighting); and Vegreville, Alberta (street and domestic lighting), and has also installed Hornsby-Stockport suction gas engine equipments for Ames-Holden Limited, Montreal (lighting and power); Empire Manufacturing Co., London, Ont. (lighting and power); Queen City Printing Ink Co., 105 Davenport road, Toronto, Ont. (lighting and power); Dominion Brewery, Queen street east, Toronto, Ont. (power); Frame & Hay Fence Co., Stratford, Ont. (light and power); Essex Roller Mills, Essex, Ont. (light and power).

A municipal lighting plant for the town of Glencoe, Ont., is now in process of installation.

As against the best steam engine equipment it is perfectly safe to say that the Hornsby-Stockport suction gas engine can produce power, including all operating costs and fixed charges, at \$20.00 per annum per H.P., operating on a basis of 10 hours per day for 300 days in the year.

As against hydro-electric power it is safe to say that the Hornsby-Stockport suction gas engine can produce current at the switchboard for less than 1c. per K.W. hour—for lighting and power.

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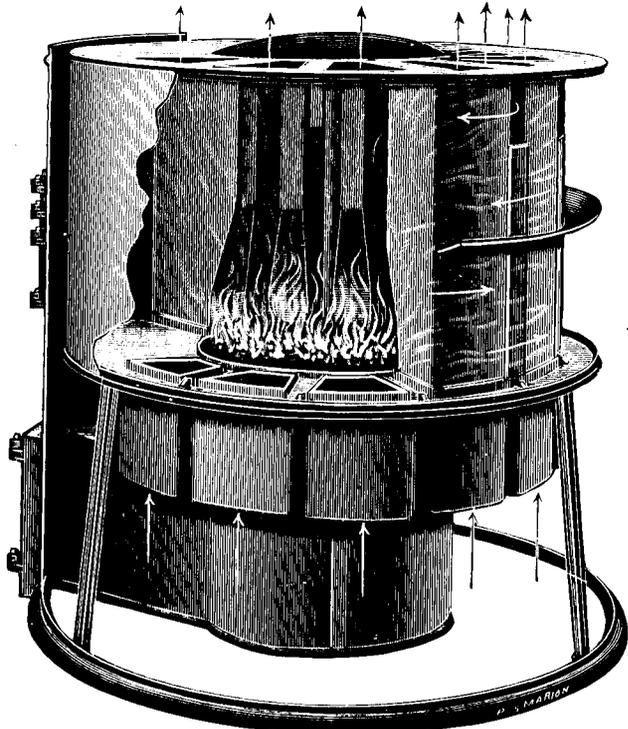
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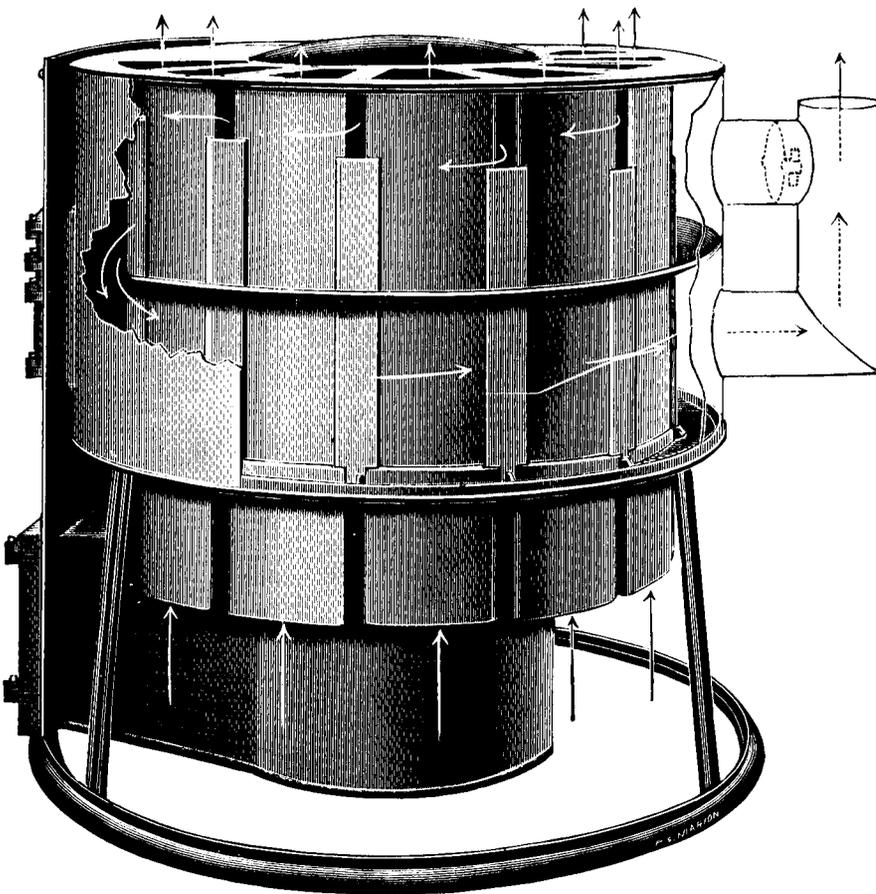
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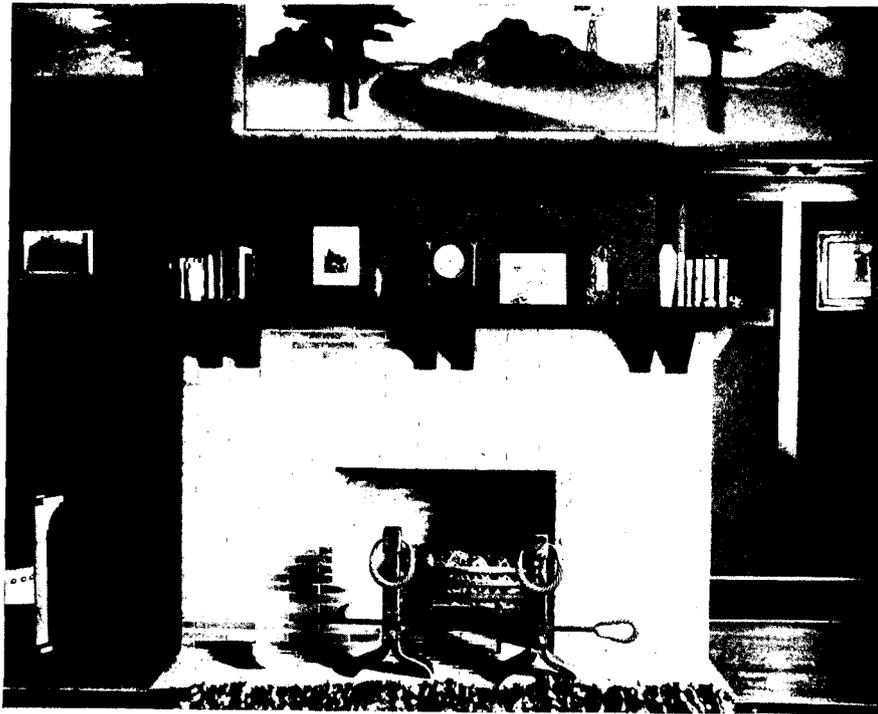
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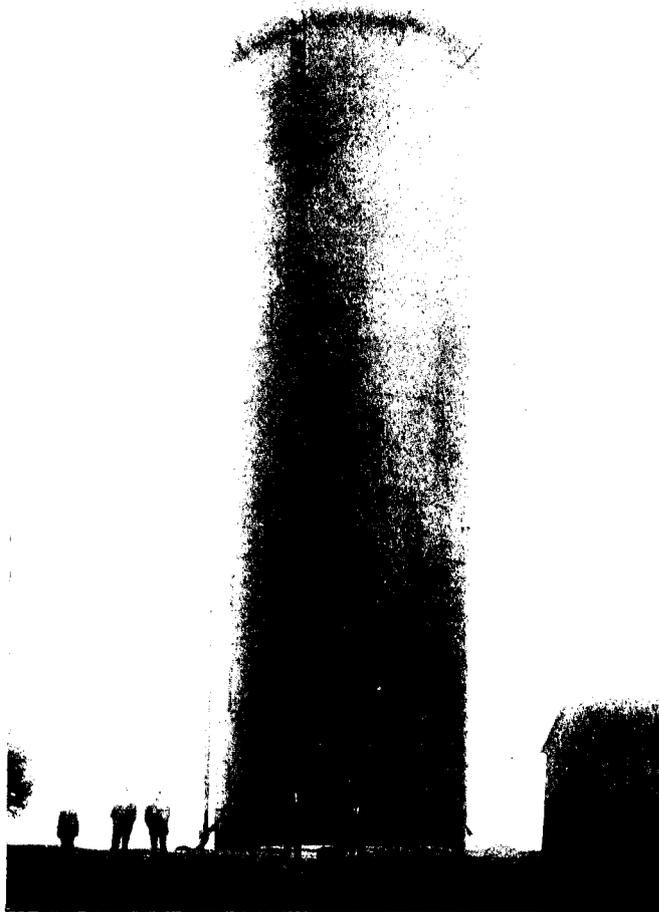
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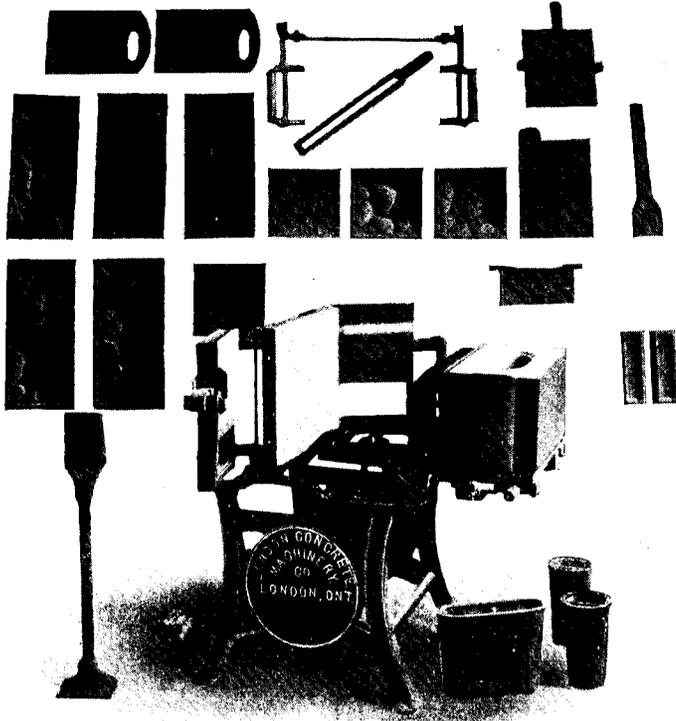
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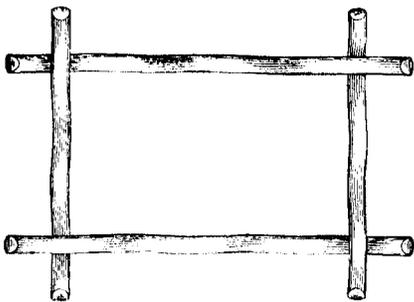
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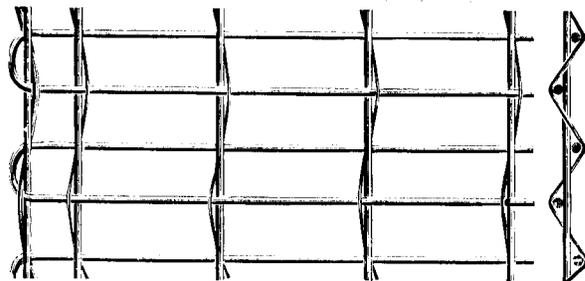
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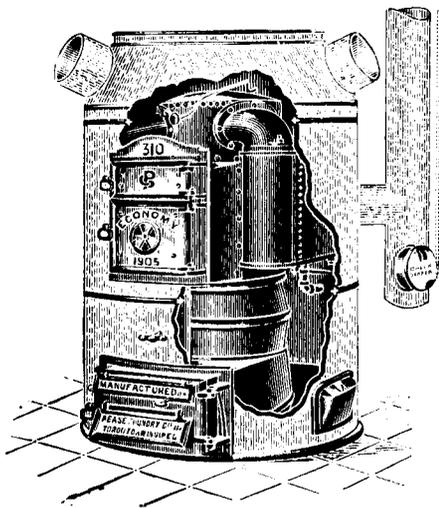
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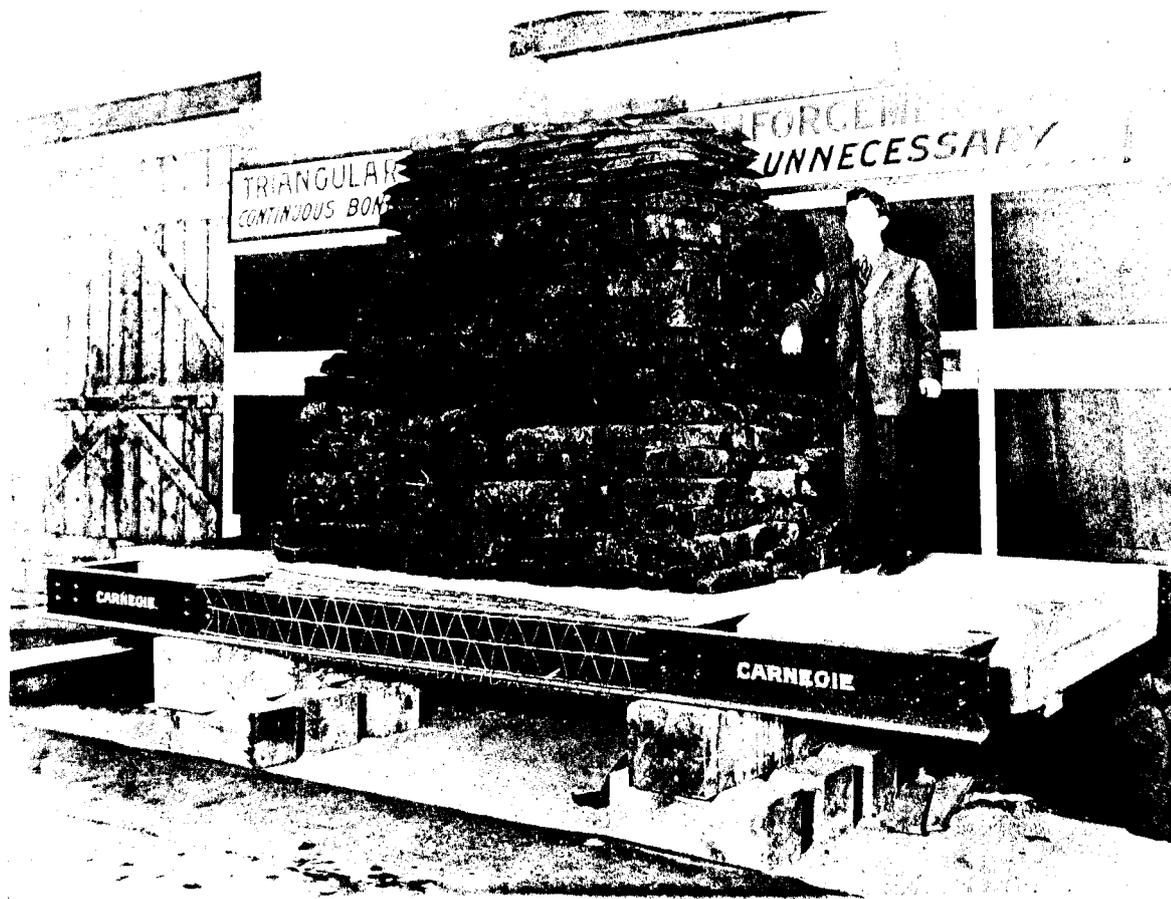
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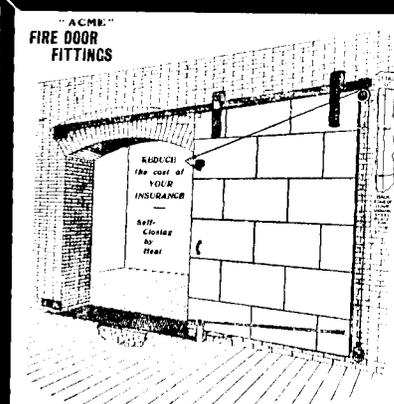
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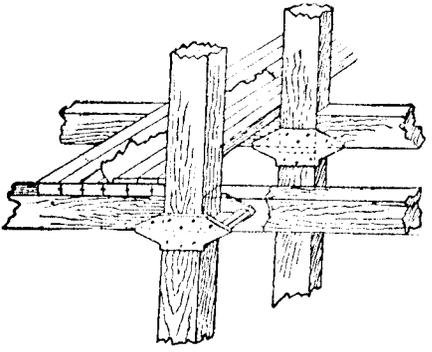
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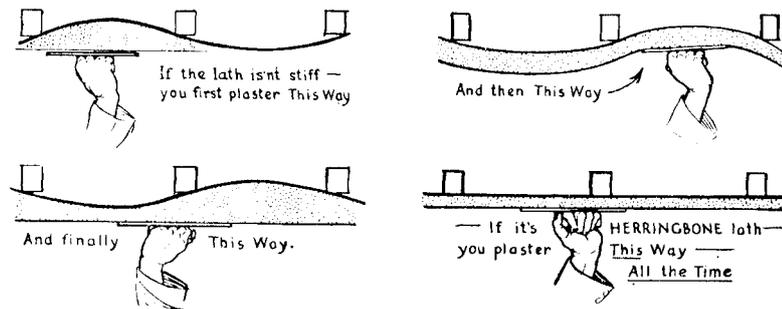
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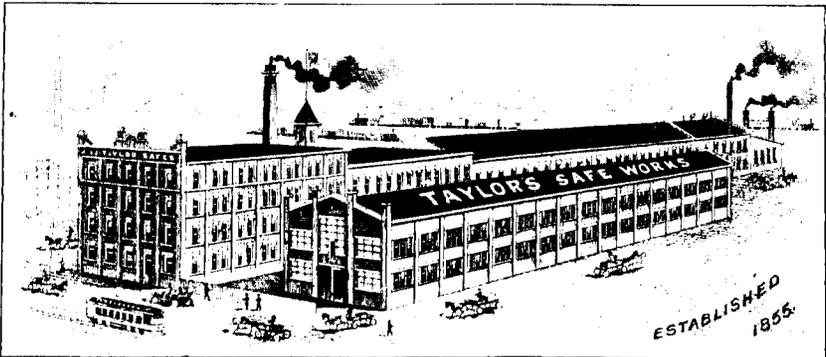
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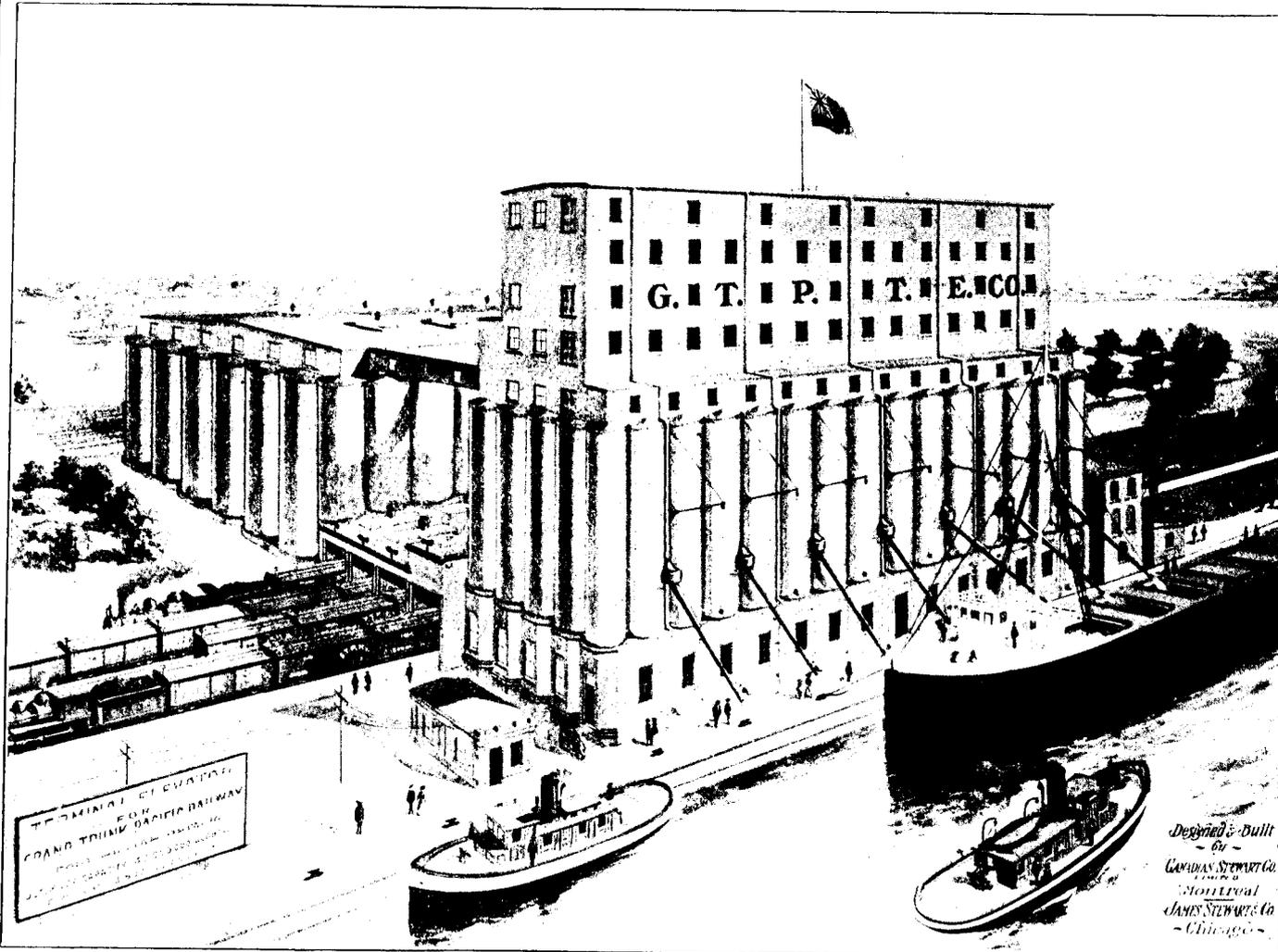
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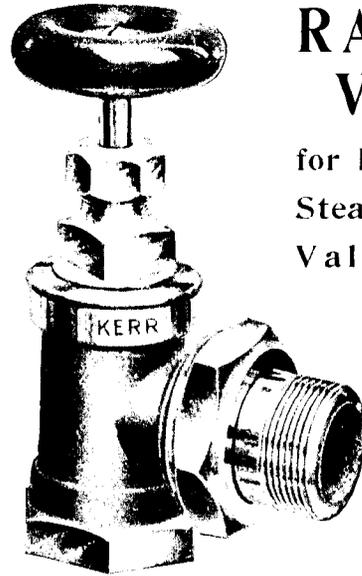
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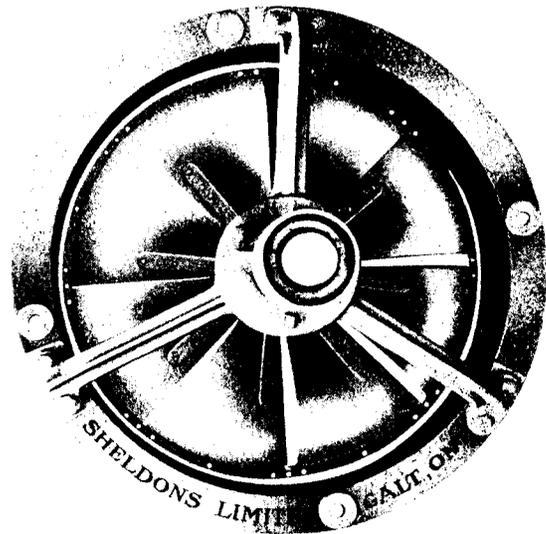
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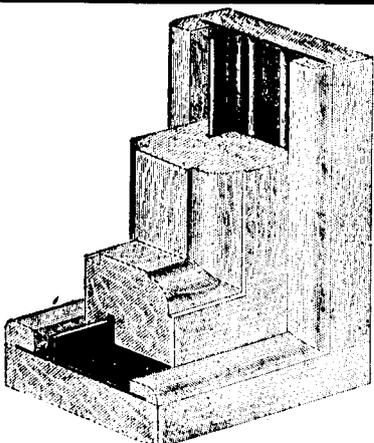
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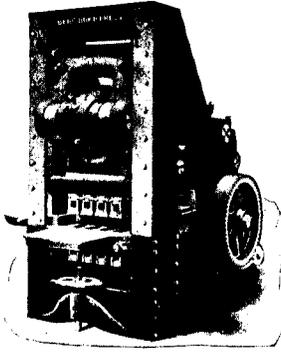
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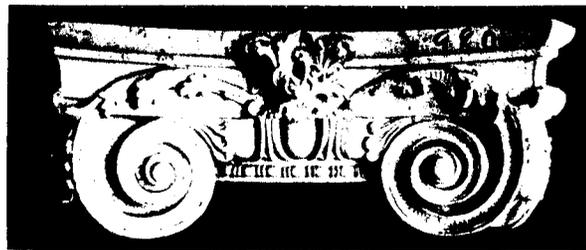
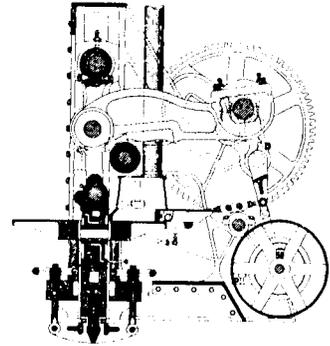
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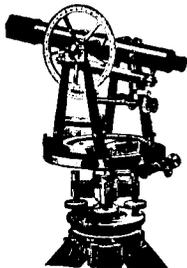
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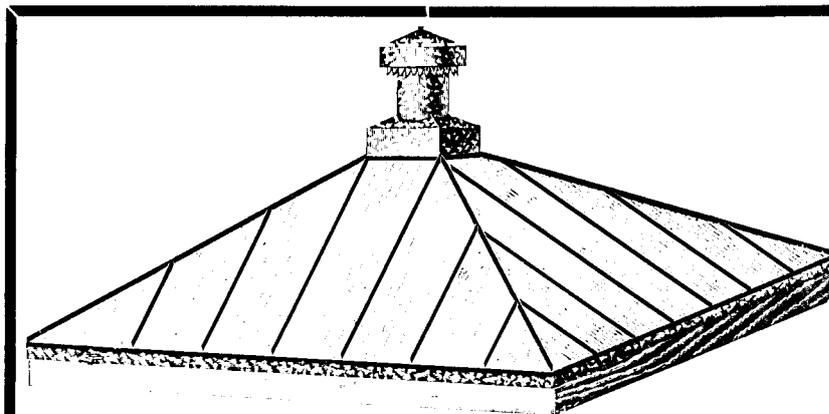
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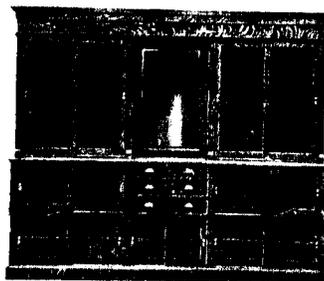
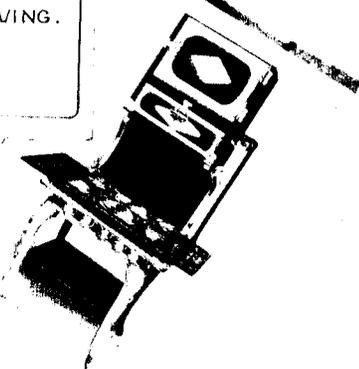
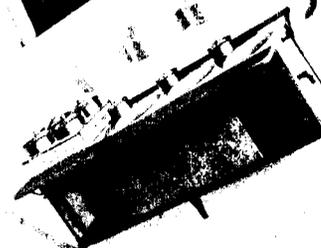
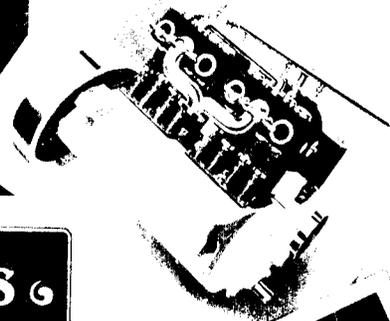
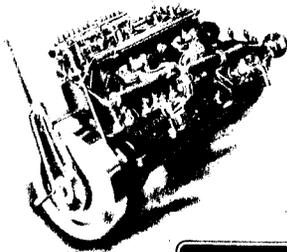
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