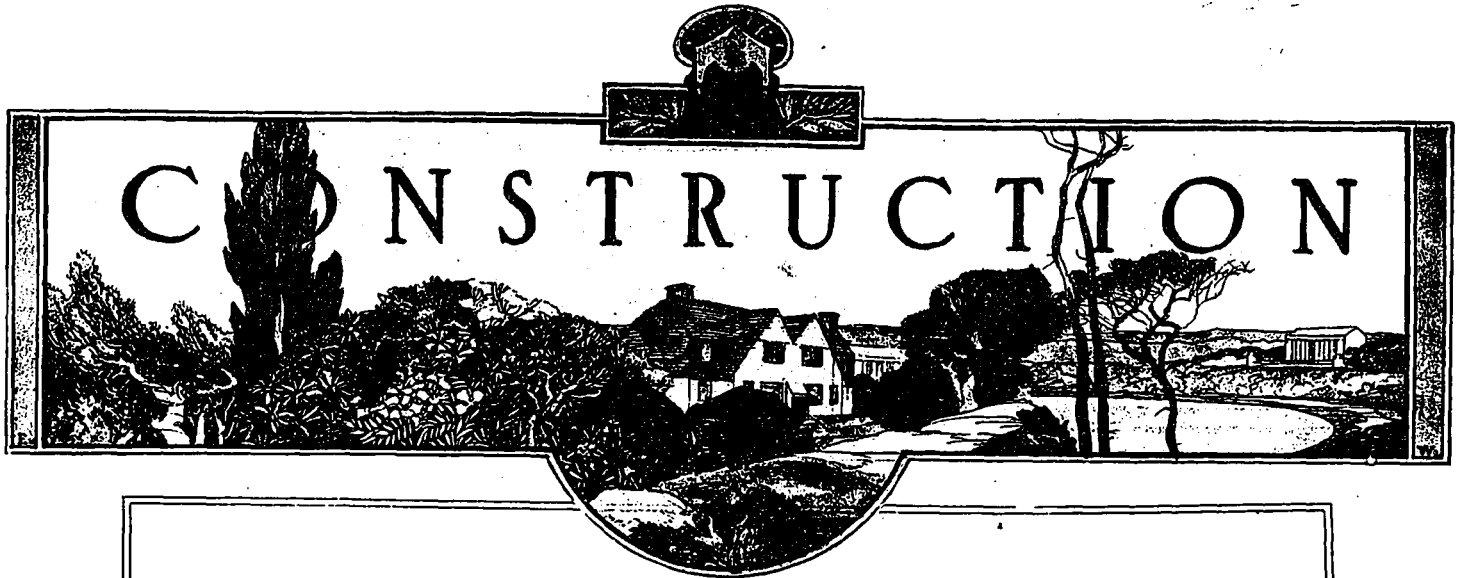


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January, 1917

Vol. 10, No. 1

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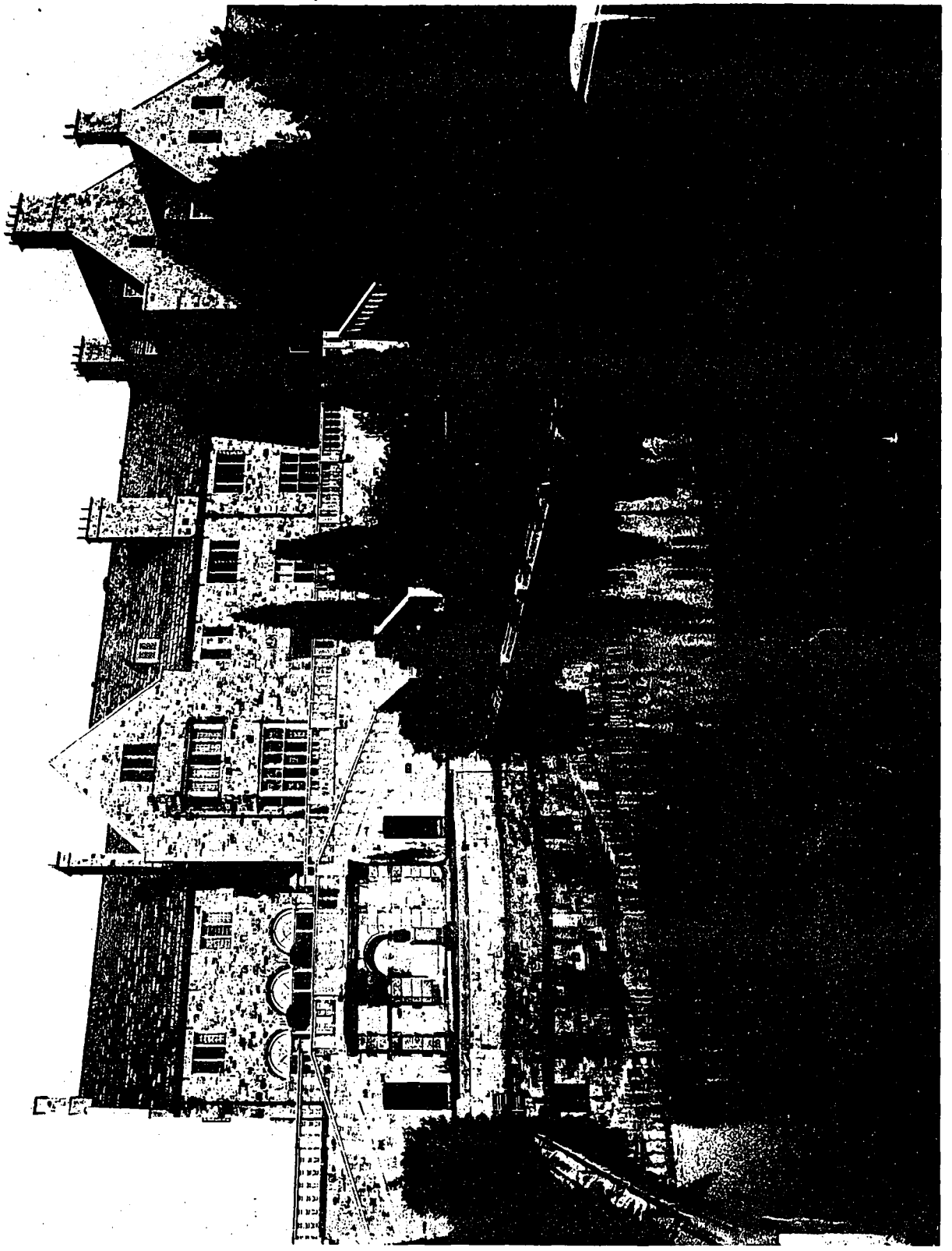
H. GAGNIER, Limited, Publishers

GRAPHIC ARTS BLDG., TORONTO, CANADA

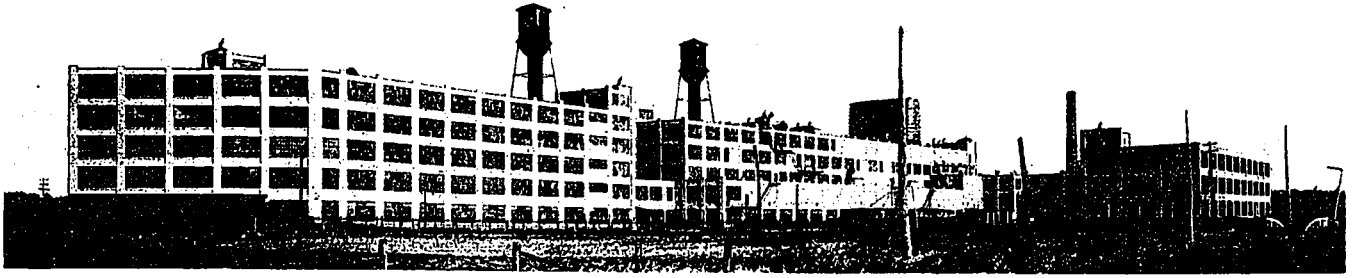
BRANCH OFFICES

MONTREAL

NEW YORK



KILLEN WORTH, GLEN GROVE, LONG ISLAND.
The house as seen across the pool in the garden of evergreens below the south terrace.



PLANT OF CANADIAN KODAK CO., LTD., KODAK HEIGHTS, TORONTO, ONT.

New Plant of Canadian Kodak Company, Ltd.

THIS splendid group of factory buildings embodies the most modern ideas in factory construction, and is one of the finest in the Dominion.

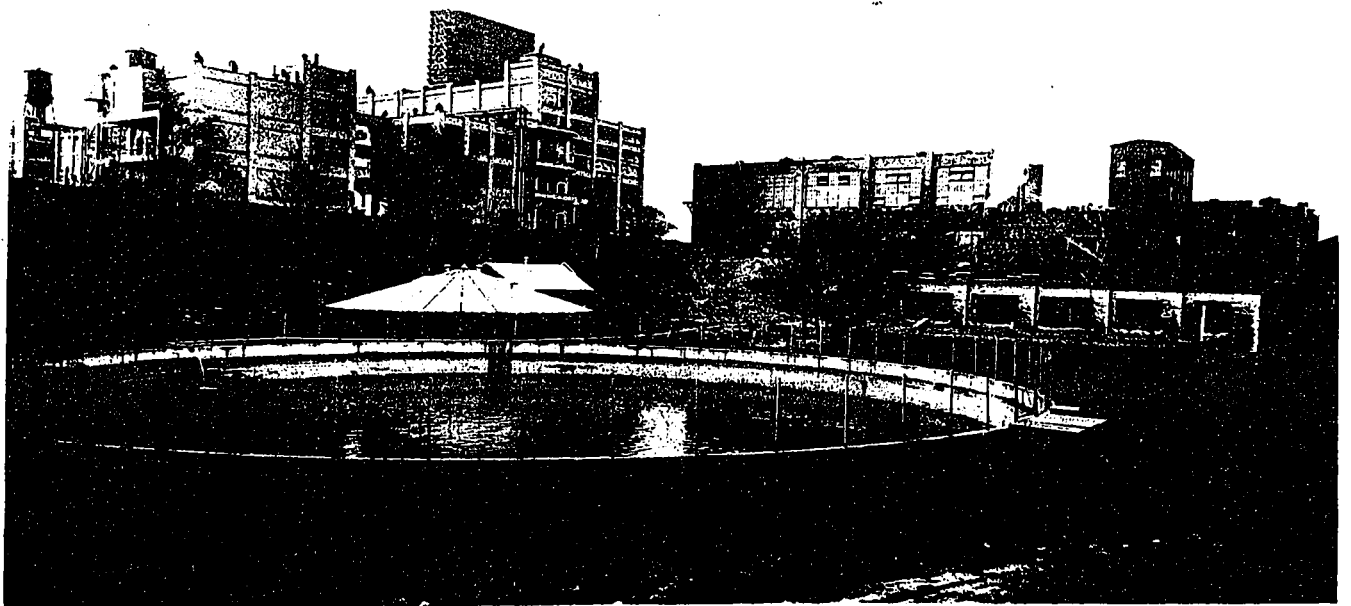
In securing a plot of twenty-five acres of ground located on the Canadian Pacific and Grand Trunk Railways, between West Toronto and Weston, and which will henceforth be known as Kodak Heights, the management of the Canadian Kodak Company, Limited, chose a location that is ideal in many ways, situated as it is within easy access of Toronto, splendid transportation facilities, abundance of water for domestic and industrial purposes, and ample grounds both for the present enormous buildings, and future extensions. When the landscape architectural plans now under way are completed, the whole will include one of the most efficient and outstandingly attractive factory groups in Canada.

LANDSCAPE ARCHITECTURE.

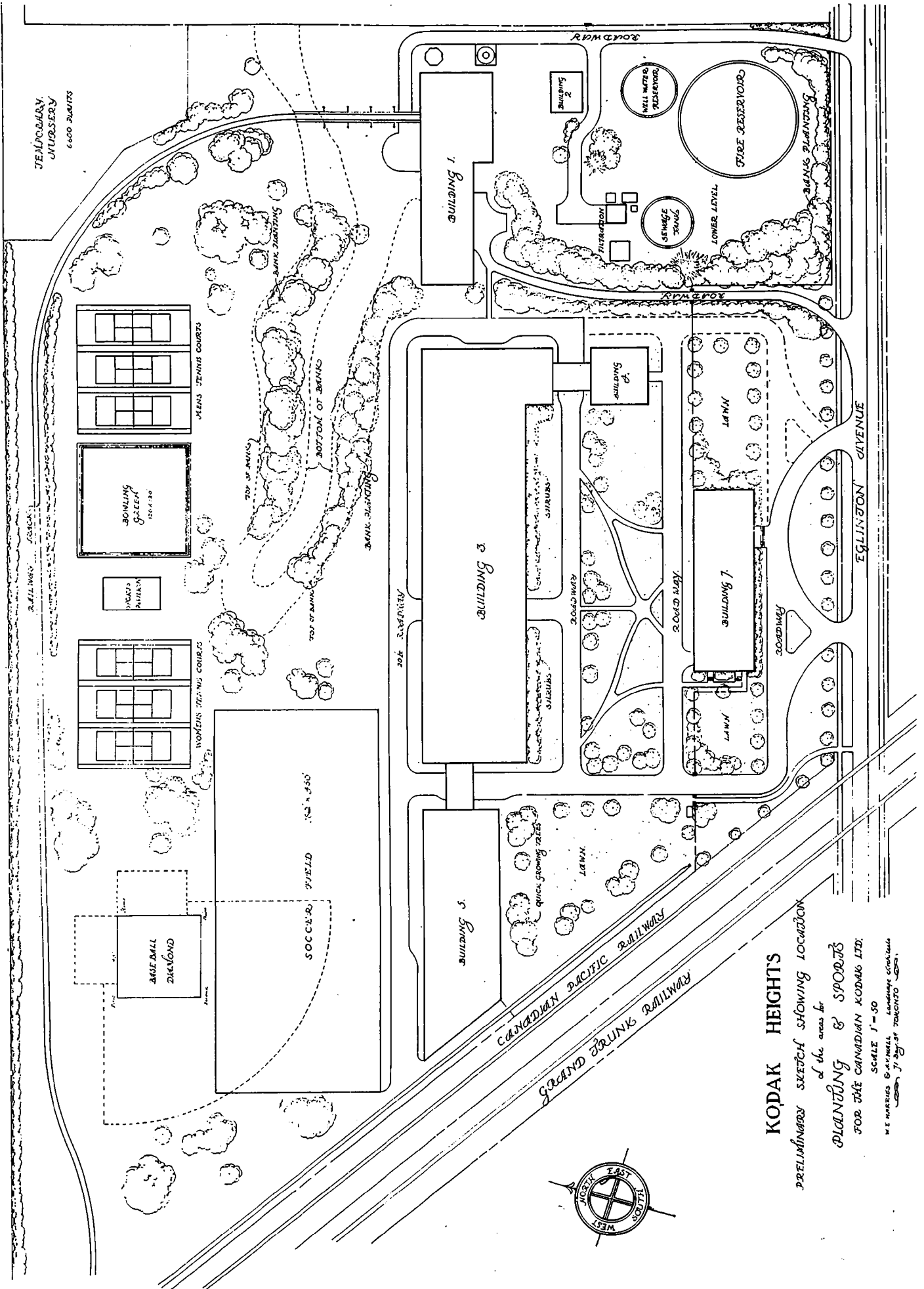
The problem to be considered in the beautifi-

cation of the grounds of the modern industrial plant are threefold: First, treatment of the areas allotted by the requirements of the industry to permanent roadways, lawns, parking, etc.; second, the temporary development of the areas set aside for the more immediate future extension of the plant; and third, the beautification of the areas, such as banks and ravines, the provision for recreation housing, etc., on whatever ground seems unlikely to be used for factory buildings for some time to come.

In the treatment of the permanent areas, the object is not only to make the grounds themselves attractive, but to soften the long and severe lines of the buildings, and to lessen the appearance of height. The use of vines on the buildings, the judicious grouping of trees on the lawns, and the establishment of shrubbery along the foundations, do a great deal to accomplish this purpose. The permanent trees, such as the elm, maple, sycamore, etc., are the types for these permanent tree plantations, while the



GENERAL VIEW FROM SOUTH-EAST, OCTOBER 30TH, 1916, PLANT OF CANADIAN KODAK CO., LTD.



KODAK HEIGHTS

PRELIMINARY SKETCH SHOWING LOCATION
of the area for
PLAYGROUND & SPORTS
FOR THE CANADIAN KODAK LTD.

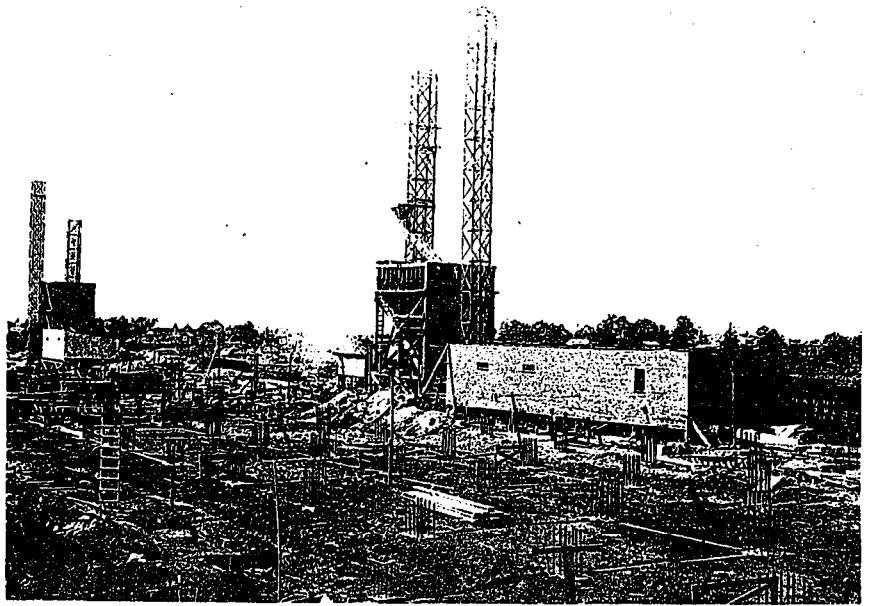
SCALE 1" = 50'
BY HARRIS & HAYMILL
LANDSCAPE ARCHITECTS
31 BAY ST. TORONTO

shrubs are selected so that their future growth will in no way affect the entrance of light and air to the buildings, and will incidentally add the color of their flower and foliage to the lawns.

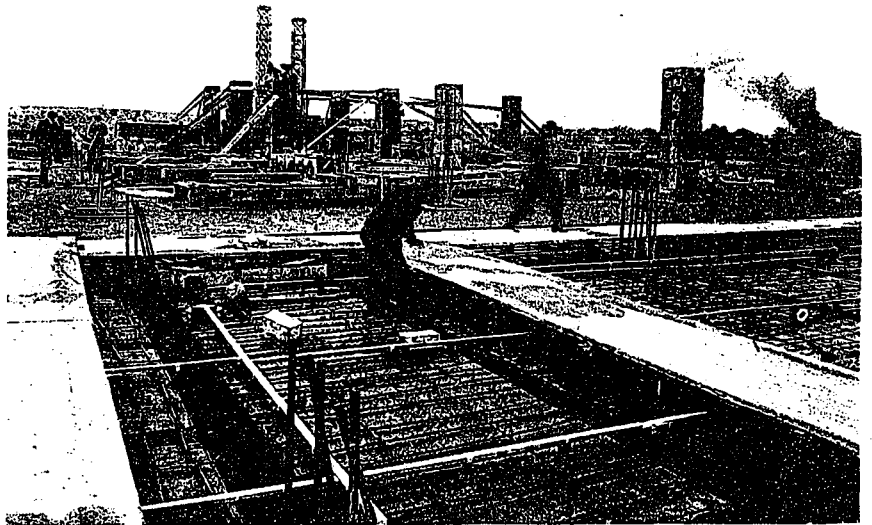
The areas set aside for the first probable extension usually suggest merely a lawn treatment, but in order to overcome the marked difference resulting by leaving these areas in lawn only, and those of the adjoining permanent areas, which have been developed, the short-lived trees have been grouped on these lawns. Their growth is very rapid, and they can either be easily moved or cut down, depending upon their size at the time that the extension actually takes place. This type of tree includes the poplars, lindens, mountain ash, catalpa, etc. Shrub plantations can be established at walk intersections, and in beds along the boundaries of these temporary lawns. These also can be moved whenever it is necessary.

In the case of the Canadian Kodak Company, the treatment of the remaining areas required caring for several steep road slopes; the banks of ravine, which could only be partially filled at present; a high boundary fence surrounding the property; and a coal switch along the north side.

In the general scheme of the future development of the factory, this area of ten acres may not be used for buildings for several years to come. In accordance with the idea of the company, that their employees be given opportunity for exercise and recreation on the grounds, this area was planned to accommodate a baseball diamond, a football field, a bowling green, and tennis courts for both men and women. The boundary fence has been made less conspicuous by a plantation of the Lombardy poplar, which will also serve as a windbreak. The coal switch is screened by a shrub plantation. Shrubs and trees which have especially vigorous root systems, and thrive in light soil, such as the sumach, locust, willows, and acacia, are selected for the plan-



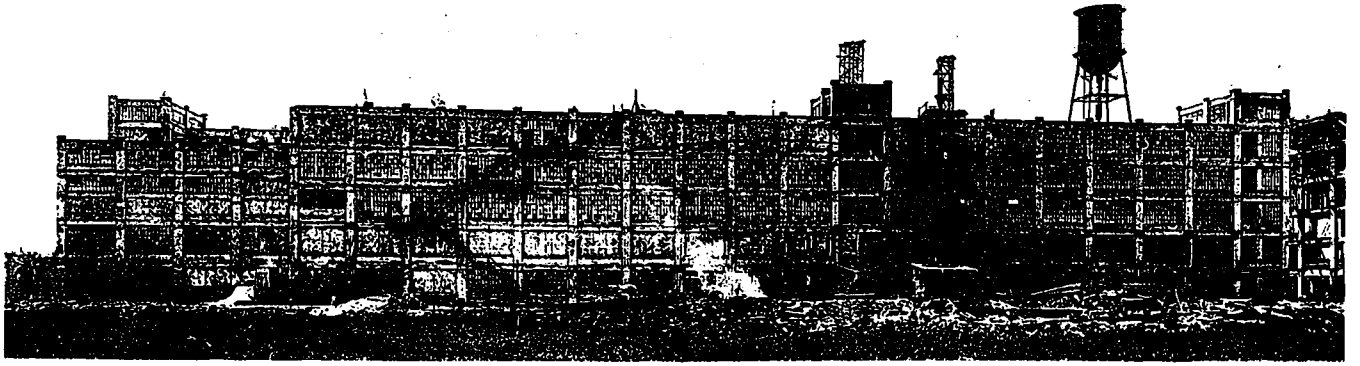
VIEW FROM WATER TANK, OCTOBER 17TH, 1914.



THIRD FLOOR, WEST END, BUILDING NO. 3, OCTOBER 13TH, 1914.



LOOKING NORTH-EAST, BUILDING NO. 3, NOVEMBER 4TH, 1914.



NORTH ELEVATION, BUILDING NO. 3, AUGUST 9TH, 1915, PLANT CANADIAN KODAK CO., LTD.

tations on the roadway slopes, and the banks of the ravines. This will very effectively hold these banks in place and will add greatly to the appearance of the grounds as seen from the factory. It is a well established fact that the foliage of the trees and shrubs does a great deal to filter the dust and smoke from the air, and this fact has been kept in mind in planning the tree and shrub groups.

A plan for the finish of the grounds was carefully considered by the company at the beginning of construction in 1914. A complete planting plan was made as soon as the engineers had arranged the buildings to meet their requirements. Provision was made for saving all top soil suitable for fin-



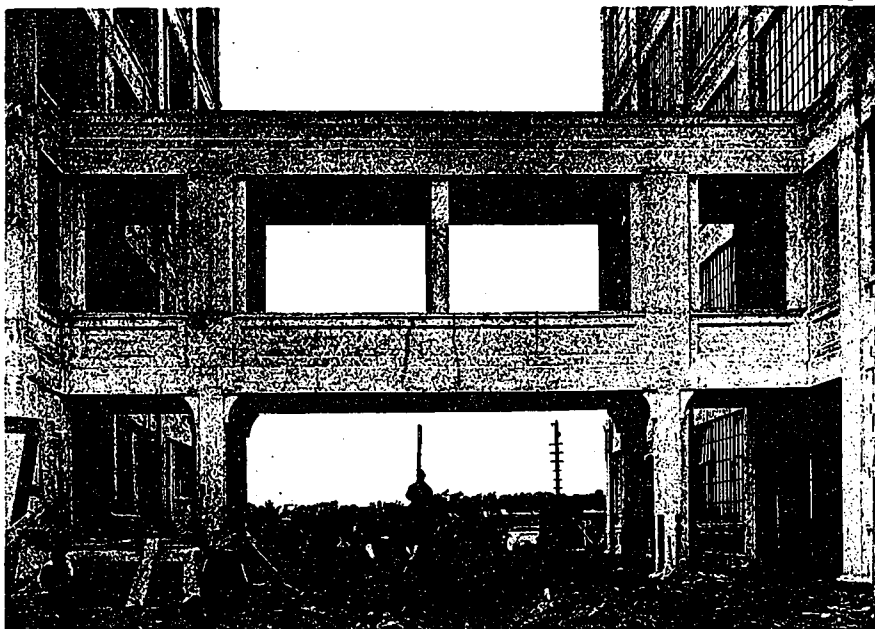
LOOKING NORTH-EAST, BUILDING NO. 3, MAY 5TH, 1915.

ished grading, and the trees and shrubs required were ordered in small sizes to be lined out in a temporary nursery prepared for them. The nursery has made a saving of about fifty per cent. in cost of the shrubs, and there are in the present plantations many varieties which are much larger in size than any that can be secured from the average nursery list.

BUILDINGS AND CONSTRUCTION.

All the buildings, with the exception of the power house, which is a steel frame with brick walls, are constructed of reinforced concrete. The concrete work on these buildings is of a superior nature.

Before commencing construction, bearing tests were made of the soil, and a safe bearing pres-

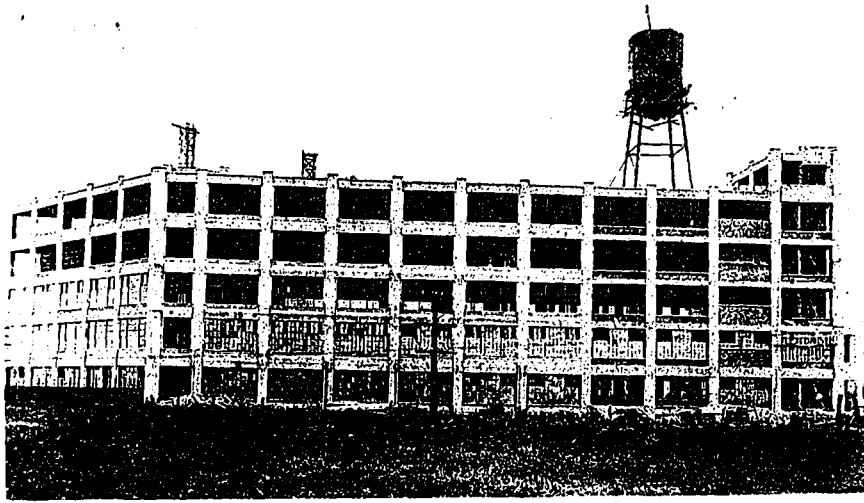


BRIDGE CONNECTING BUILDINGS, NOS. 3 AND 5, OCTOBER 15TH, 1915.

sure of one and one-half tons per square foot established. Concrete spread footings were used for the factory buildings, except the power house, the foundations of which were placed on concrete piles of the mushroom type. Beam girder construction was

used throughout. All the interior partitions are of hollow tile, the fire walls being of brick.

Square twisted reinforcing steel was used in all walls and floor systems, and round bars with spiral hooking supplied the reinforcing for the columns. The typical base bearing is twenty by twenty-one feet for live floor loads of one hundred and fifty to two hundred pounds. All concrete was of graded crushed stone and cement, the floors and walls being a one to six mix, and the columns a one to four mix. Beam stresses were taken at six hundred and fifty pounds per square inch compression for the concrete, and sixteen hundred pounds per square inch tension on the steel. Every car of cement was tested at the mills by an independent testing company, and each car of reinforcing steel inspected and tested by another company, which tests conformed for the most part to the standard of the American Society for Testing Materials. Test cylinders were taken of the concrete at the mixer at regular intervals. Test cylinders were required to develop a crushing strength of two thousand



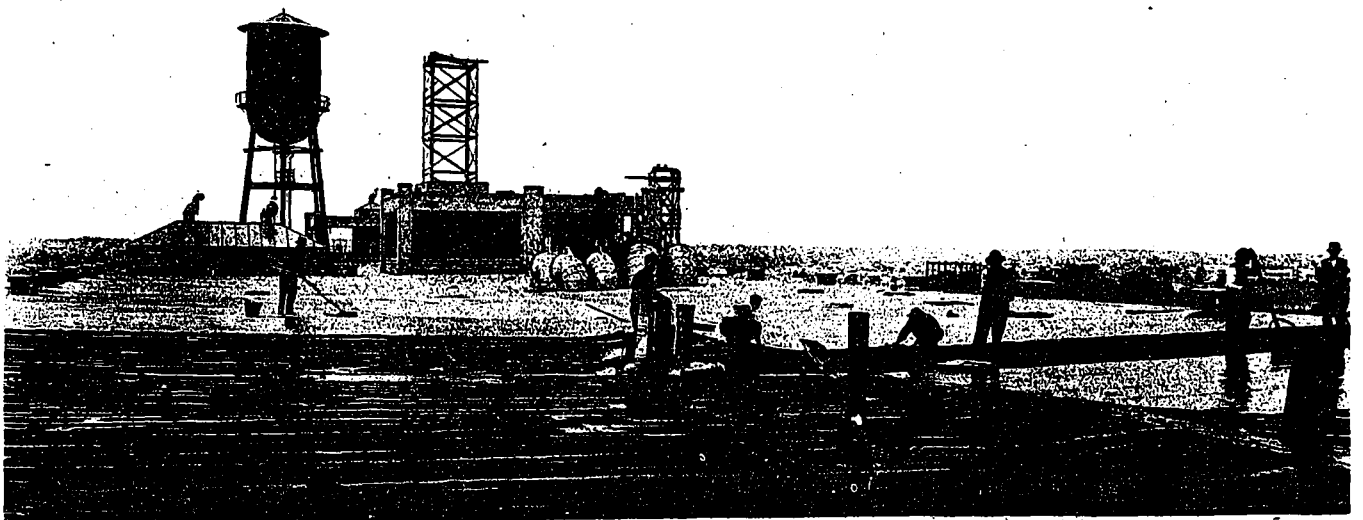
LOOKING NORTH-EAST, BUILDING NO. 2, OCTOBER 15TH, 1915.

pounds per square inch in twenty-eight days. These tests were made in the testing department of the University of Toronto.

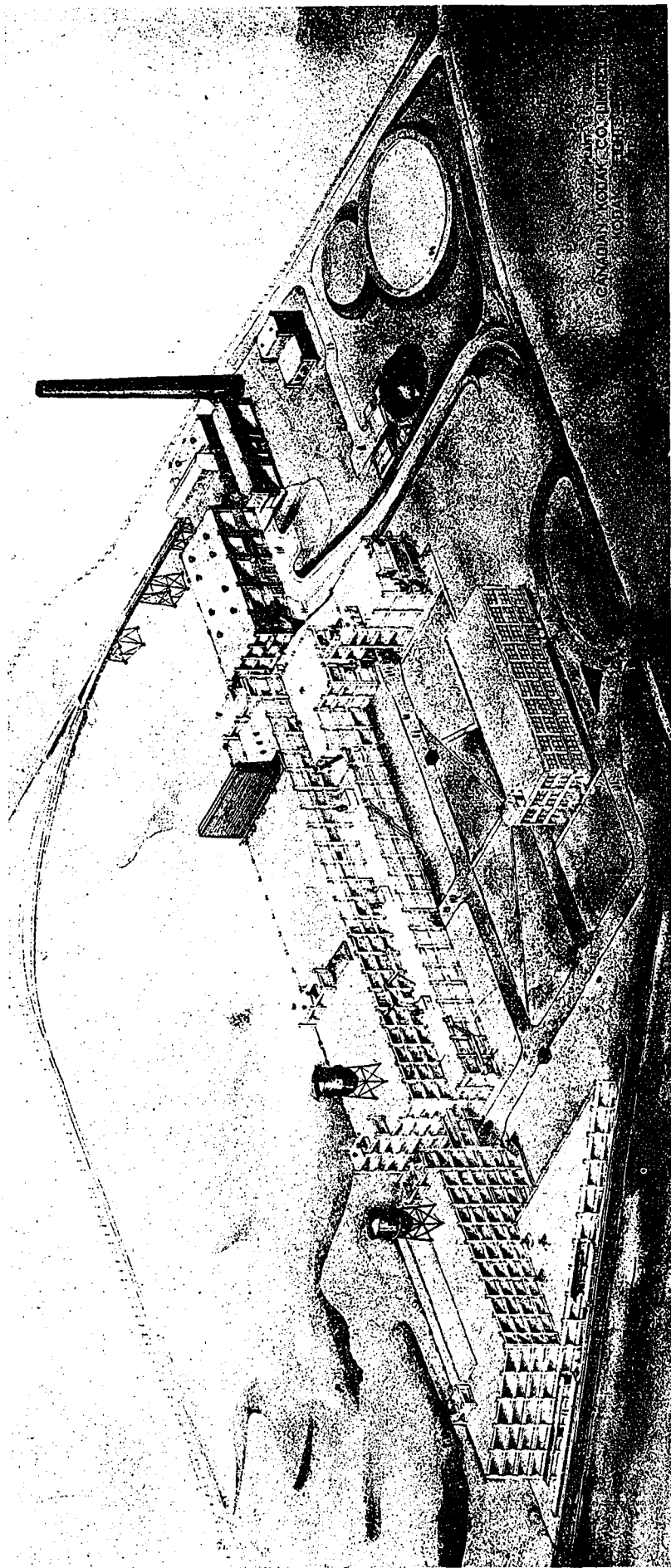
All the concrete was required to be machine mixed, and no spouting over twenty feet allowed. As some of the work was carried on in cold

weather, special precautions were taken so that when the temperature fell below twenty-three degrees Fahrenheit, artificial heat was required. The casement sills were placed as a monolith with the ground floor slab. The slabs of the upper floors were wire brushed while the concrete was green. This was found later to be a waste of labor, as all slabs had to be picked for cement or mastic finish. Railroad tracks were run parallel with the various buildings. Bottom dump cars were used for the stone and bottom dump waggons for the sand. All this material was dropped into a hopper, picked up by a bricked hoist, and deposited in an over-head hopper capable of holding four car loads. The material was drawn into measuring hoppers by gravity, and then discharged into a mixer. The mixed concrete was hoisted in half-yard batches and discharged into six feet concrete buggies.

In addition to fire escapes, all buildings have stairways of the stair tower type; in other words, to reach a stairway one has to pass across an open balcony and into a stairway separated by heavy fire walls from the remainder of



MAIN ROOF, BUILDING NO. 3, JULY 20TH, 1915. PLANT OF CANADIAN KODAK CO., LTD.

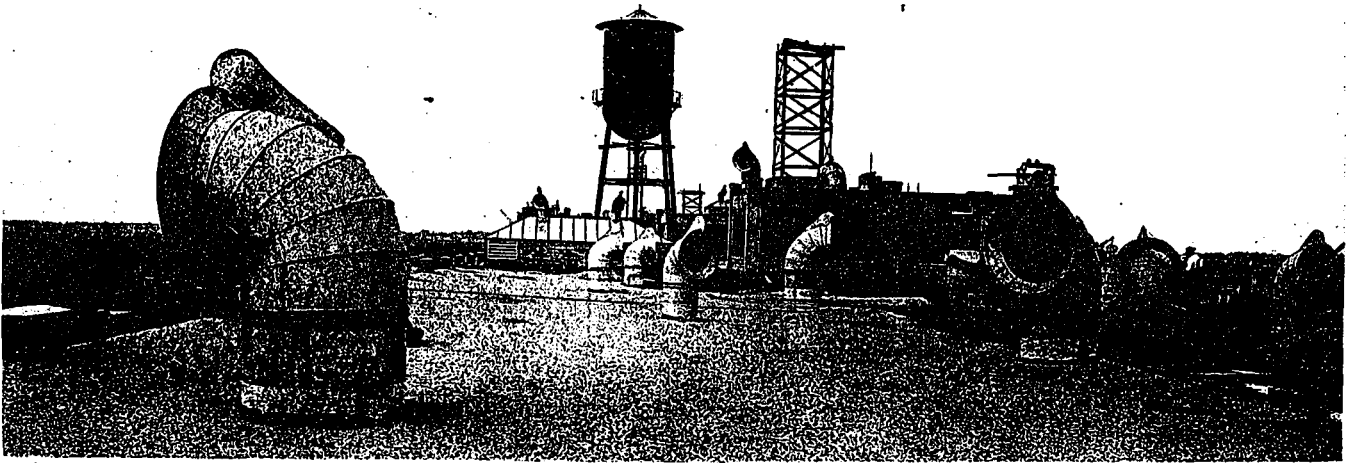


BIRD'S-EYE VIEW OF PLANT
OF CANADIAN KODAK CO.,
LTD., KODAK HEIGHTS,
TORONTO, ONT.

C. K. FLINT, CONSULTING ENGINEER..



VIEW FROM LOWER ELEVATION AT EASTERN SIDE OF PLANT DURING CONSTRUCTION.



MAIN ROOF, BUILDING NO. 3, AUGUST 9TH, 1915, PLANT CANADIAN KODAK CO., LTD.

the building. It is found that this open balcony is not satisfactory for this climate, and they were finally closed in with a sash with clear glass, and especially large ventilators, which give a large opening by touching a lever, allow the smoke to escape.

Window cleaning bolts were placed in all cornices over which scaffolds could be suspended for window cleaning purposes.

The roofing consisted of four inches of cinders covered with cement finish and five-ply tar and slag roofing. Three-eighth inch pitch per foot was used, the main pitches being placed in a concrete slab. A copper counter flashing was placed in the forms before concrete was poured, being held in place by wooden strips which remained in the concrete. This was found to be a very satisfactory method.

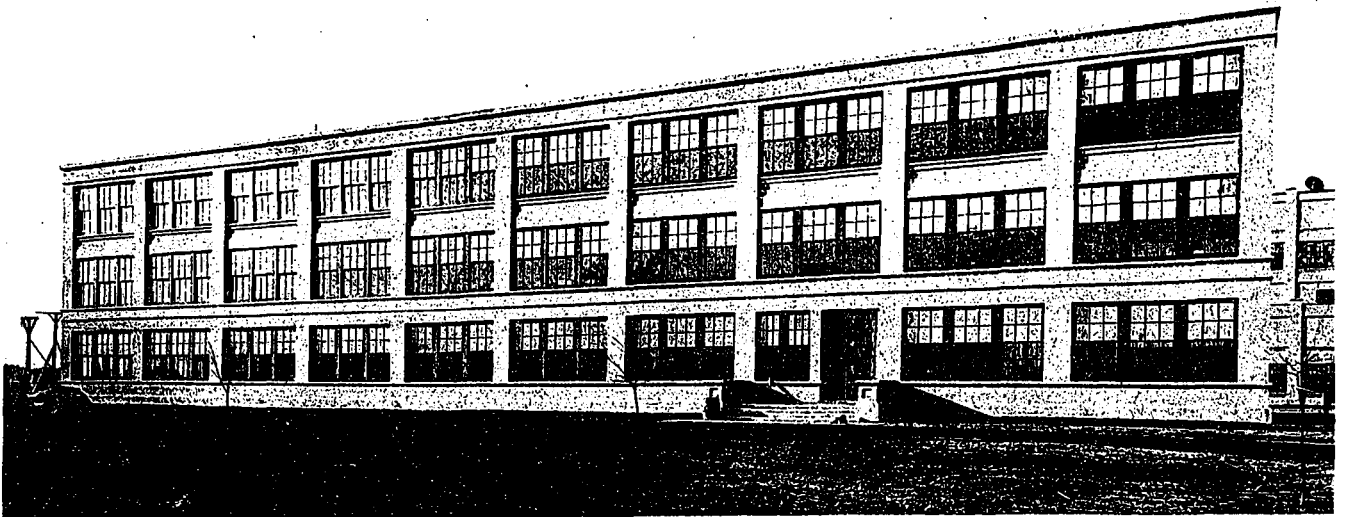
One interesting feature in the concrete construction was the concrete bridges between buildings. Dowel rods were left in the buildings, and the bridges poured at a later date. Subsequent shrinkage in temperature changes caused the bridges to contract in opposite direction to the buildings. This resulted in the tearing of the concrete from the dowel rods and

quarter-inch cracks opening up at bridges and building connections. Cracks already occurred in the bridge and the building near the bridges.

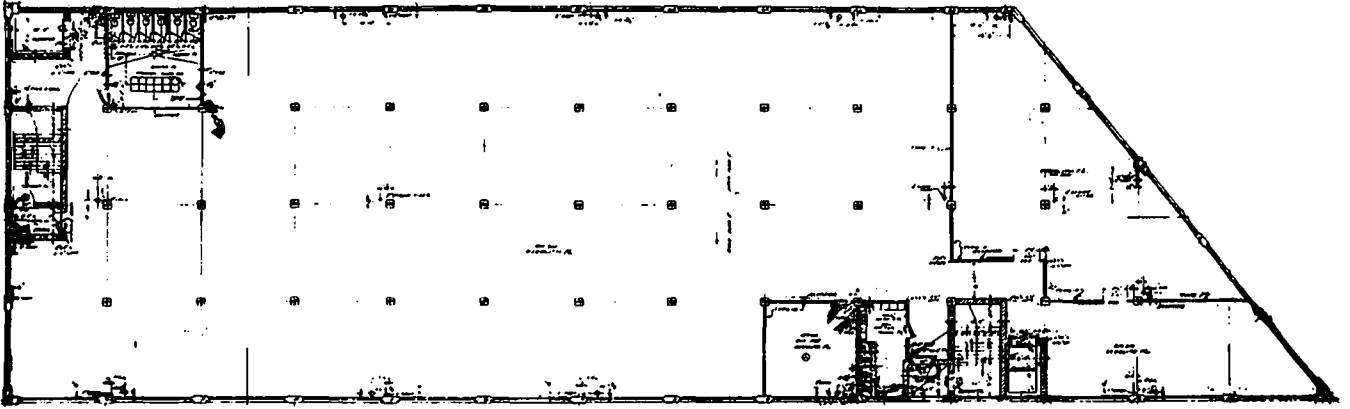
During the process of construction, quite a large fire occurred which, in addition to burning out form lumber under green concrete, allowing same to drop, burnt out the form work in one roof section which was two weeks old, and then in the process of being stripped. This concrete was quite badly damaged, but remained standing. Holes one foot square occurred in the slabs and a considerable amount of slab column steel was exposed. This was cleared and plastered with cement mortar, and subsequently subjected to an exhaustive test. One-eighth inch deflection was the maximum obtained with twice the specified live loading.

The entire fenestration of the group, comprising seventy-five thousand square feet, is of steel sash.

Over the cement floors, except in the power plant, was laid mastic flooring by experts, especially trained for this work. Owing to the different requirements of the various departments, and the varying degrees of temperature in the separate departments, it was found neces-



MAIN OFFICE BUILDING, PLANT CANADIAN KODAK CO., LTD., KODAK HEIGHTS, TORONTO, ONT.



FLOOR PLAN, BUILDING NO. 3, CANADIAN KODAK CO., LTD.

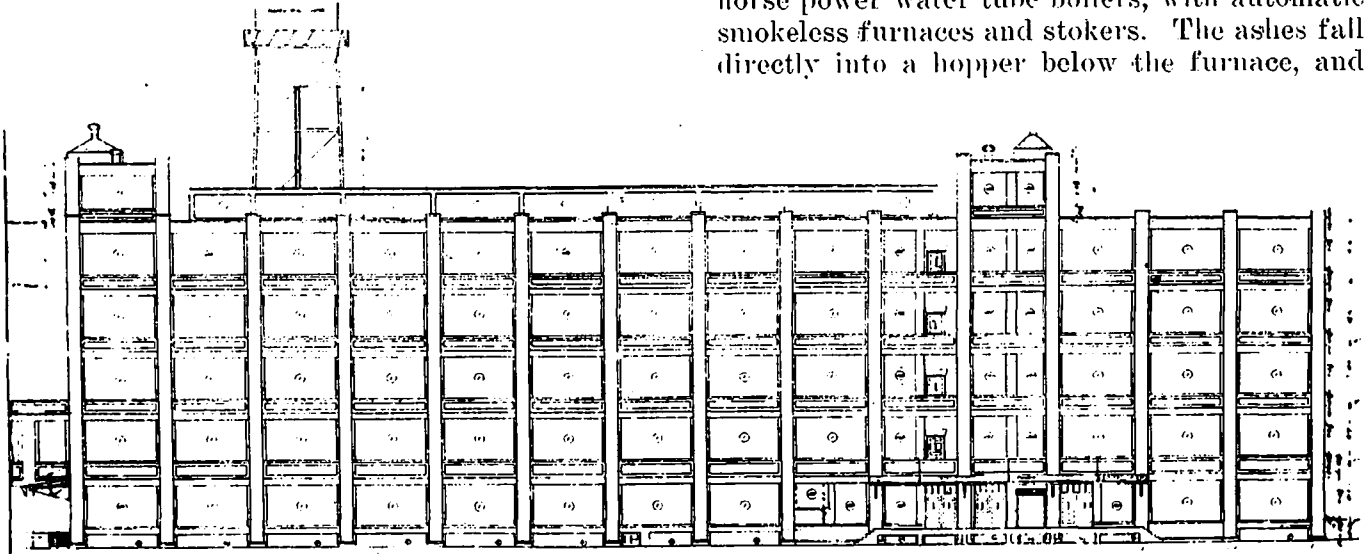
sary to have different mixtures to withstand the different temperatures. This makes a permanent flooring, and requires no upkeep cost.

All wood used, being required for water cooler, tanks, fencing, etc., was treated with carbolic carbolinum.

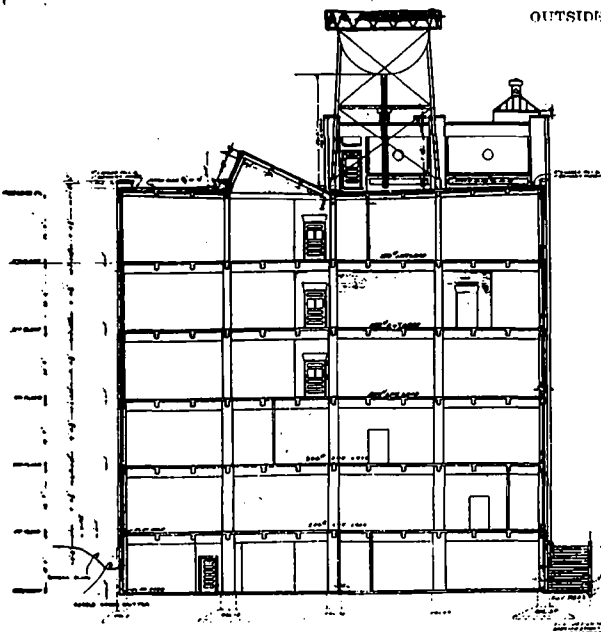
POWER, LIGHTING, HEATING, VENTILATION.

The power plant was laid out for a future of fifty per cent. increase in equipment. The build-

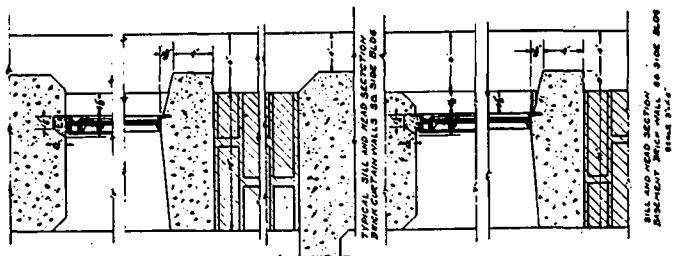
ing is two hundred and thirty-five by sixty feet in plan, and located in the valley at the rear of the main building with the boiler room floor thirty-five feet below the general first floor level factory buildings. This allows coal to be brought in railway cars over a steel trestle. The coal is then dumped from the cars into a six hundred ton concrete coal bunker located directly over a battery of four thousand three hundred horse power water tube boilers, with automatic smokeless furnaces and stokers. The ashes fall directly into a hopper below the furnace, and



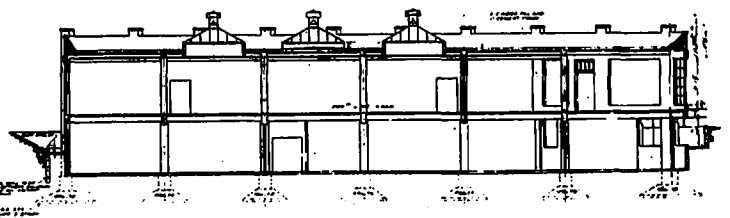
OUTSIDE ELEVATION BUILDING NO. 3, PLANT CANADIAN KODAK CO., LTD.



SECTION AA



TYPICAL SECTION ELEVATION OF NO. 3 BUILDING
 ALL UNFINISHED SECTIONS
 SHOWN IN THIS ELEVATION
 BEING PLAIN



SECTION B-B
 FUTURE ADDITION

TYPICAL SECTION ELEVATION OF NO. 3 BUILDING, PLANT CANADIAN KODAK CO., LTD.

are drawn off into small hand cars in the ash tunnel below the furnaces. These hand cars are picked up by a one-ton sprig hoist and deposited in an overhead concrete bin.

Straight pipe fuel economizers are used, and the smoke is taken away by a two hundred foot radial brick chimney.

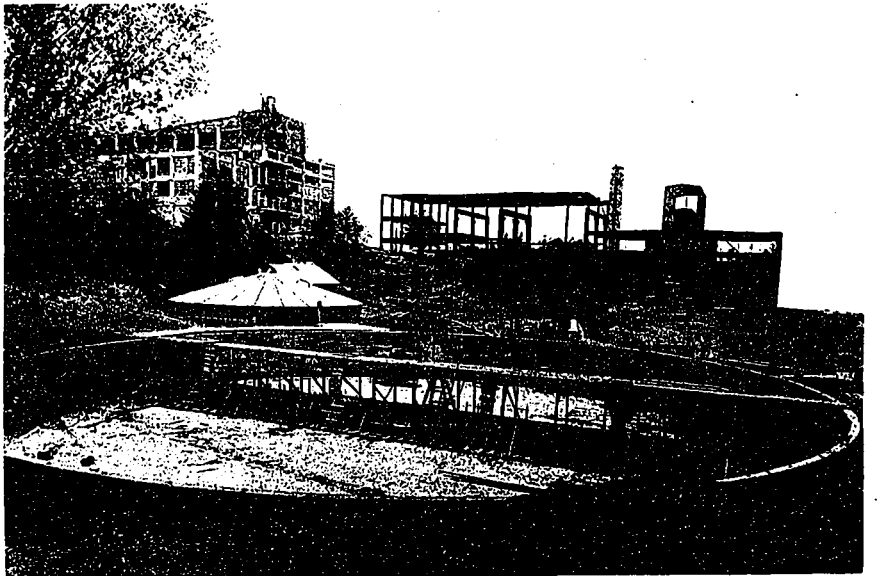
The boiler water is obtained through an outside reservoir which is fed by three artesian wells and rain water from the roofs. This water is passed through a water softener which has a capacity of six thousand U.S. gallons per hour. An exhaust, fifteen hundred horse power feed water heater and receiver is used. This makes use of exhaust steam from the engines at three pounds pressure. The boiler feed water then passes through a water weigher into feed water pumps. One hundred and twenty-five pound boiler pressure is carried for the engines and pumps. This is reduced in the power house for factory purposes. Three pound exhaust steam is delivered to all the buildings for heating purposes. Steam traps were used in connection with the various low pressure steam lines. A system capable of caring for a twenty-four thousand horse power capacity is used in connection with all the high pressure steam piping in the power house. Two vacuum pumps capable of taking care of eighty thousand square feet of radiation on one-quarter pound per square foot are used for the steam returns.

The generator room is capable of developing five hundred kilowatts. D.C. current at two hundred and twenty volt is used. There are three generating units. One new unit of a three hundred K.W. capacity is also being installed.

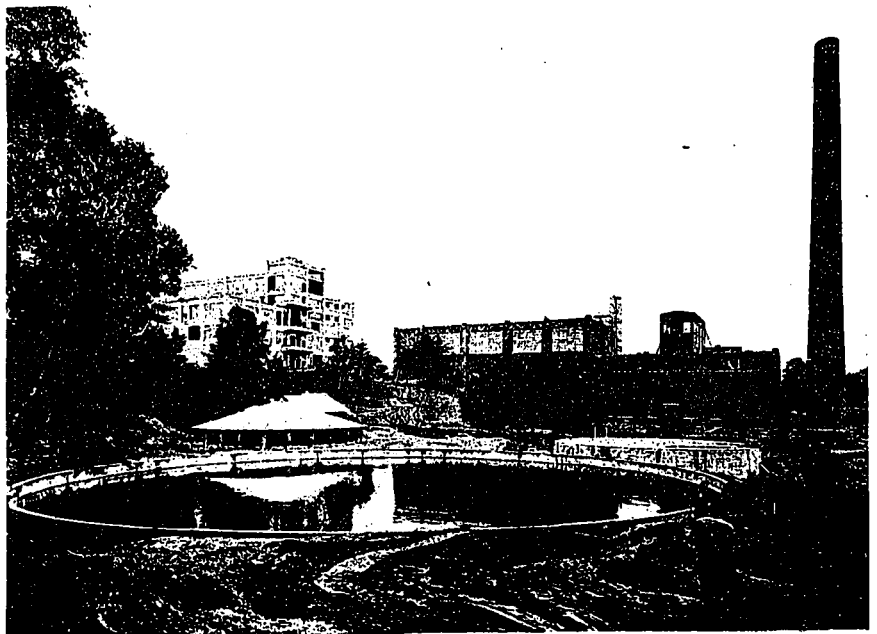
The engine for this new generator is an Inglis horizontal cross compound heavy duty Corliss, direct connected to a three hundred K.W. direct current generator, and runs at one hundred and fifty revolutions per minute with steam at one hundred and fifty pounds and five pounds back



SEWAGE DISPOSAL, OCTOBER 26TH, 1914, PLANT CANADIAN KODAK CO., LTD.

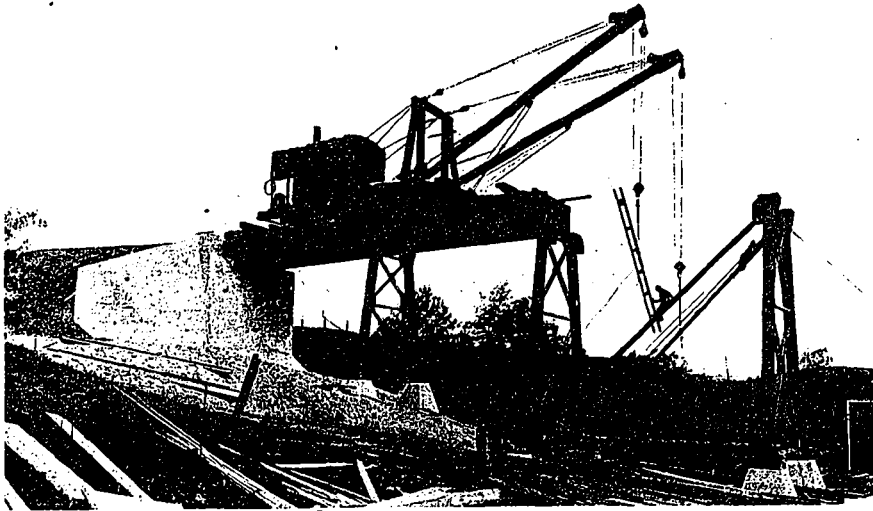


VIEW OF RESERVOIR, MAY 18TH, 1915, PLANT CANADIAN KODAK CO., LTD.



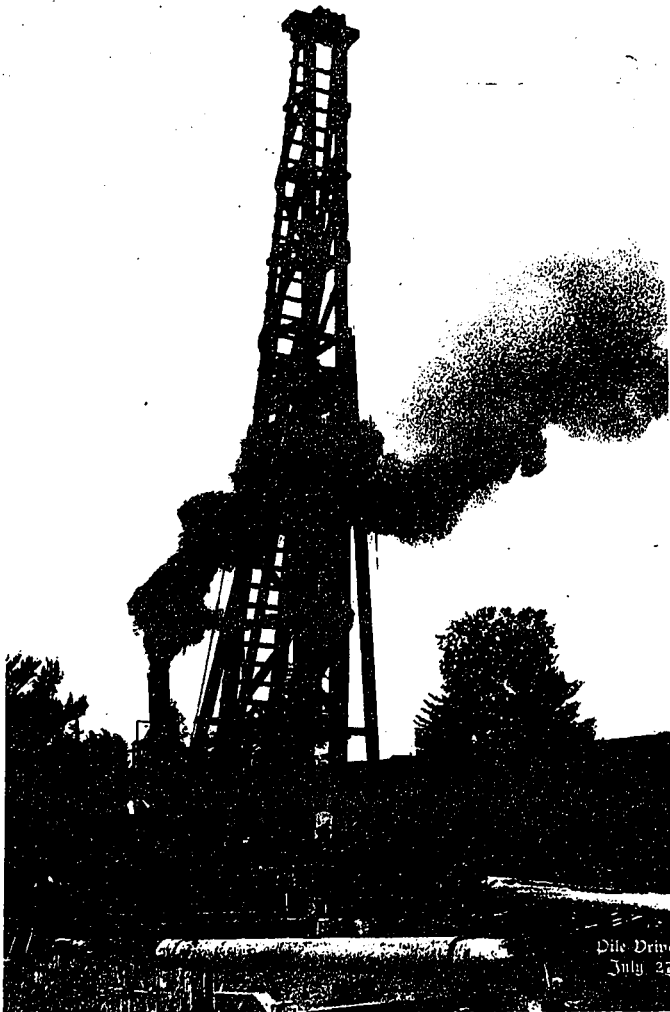
RESERVOIR, JULY 26TH, 1915, PLANT CANADIAN KODAK CO., LTD.

pressure. The valve gear is operated by double wrist plates set for long range cut off. The governor controls both high and low pressure cylinders. The cylinders are double ported, and valves are fitted with releasing gear, hooks of which latch outward. The fly-wheel is eleven feet in diameter, and weighs twenty-two thousand pounds. Eccentrics, cranks, etc., are enclosed in planished steel oil guards. Cast iron drip pans also form sole plates for the cylinder stools. The whole unit is mounted on a foundation built as a large concrete slab supported on concrete piers to allow easy access to piping, wiring, etc., which are below the engine room floor. Counterbalanced cranks are used to

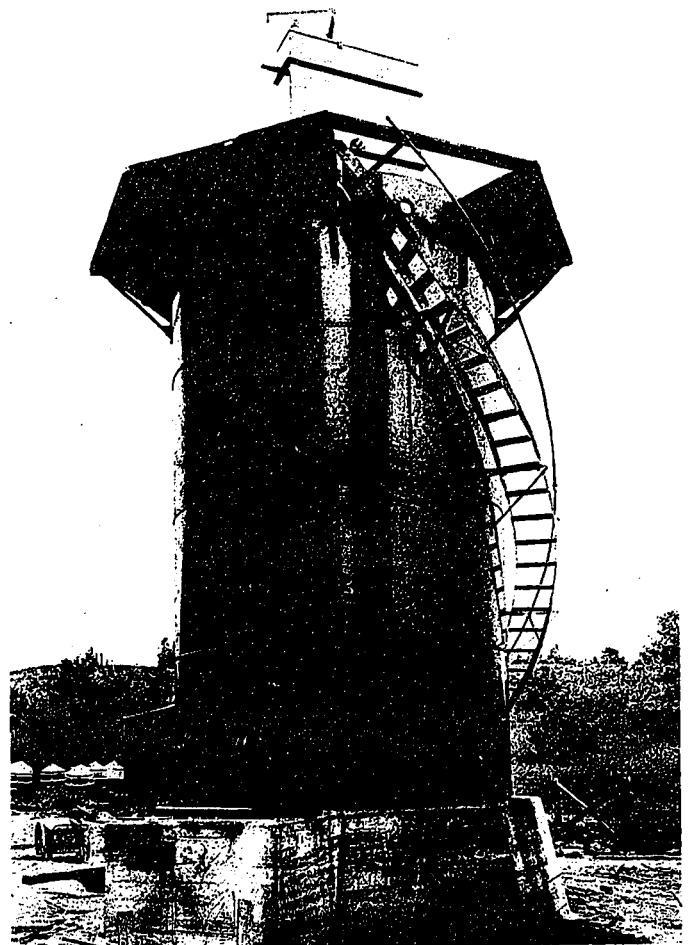


COAL TRESTLE, OCTOBER 13TH, 1914, PLANT CANADIAN KODAK CO., LTD.

eliminate vibration. REFRIGERATION. The main unit of the three hundred and ninety ton refrigeration plant is the York two hundred ton machine, the largest vertical ammonia compressor in Canada. This machine has two vertical, single acting compressors, each twenty-one inches bore by thirty-two inches stroke. They are of the stand construction, equipped with safety heads. The discharge end of the compressor is water jacketed, and the suction end insulated with nonpareil cork. Each compressor is equipped with indicator connections, and pressure relief valves in heads; the stuffing box nuts are operated by hands wheels geared from same, so that they can



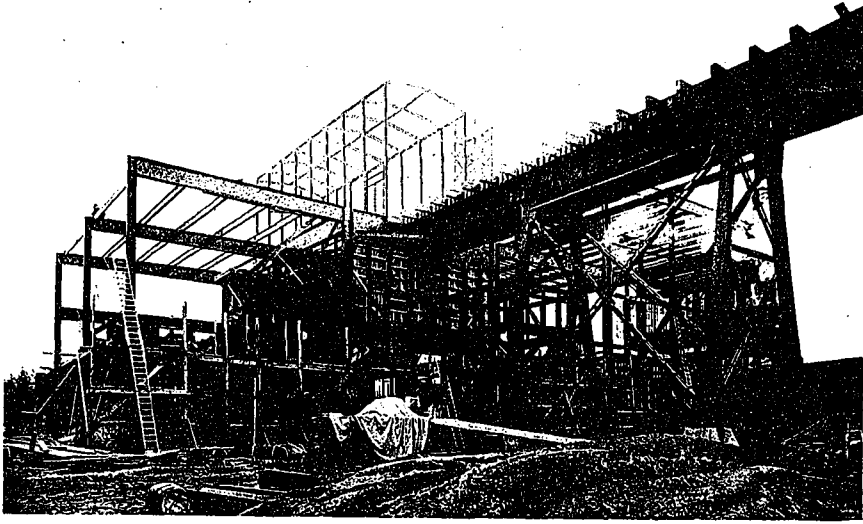
PILE DRIVER, BUILDING NO. 1, JULY 27TH, 1914.



WATER SOFTENER, JUNE 21ST, 1915.

be adjusted by the engineer standing on the floor without going up to the first gallery of the machine. The compressors are direct connected to a horizontal cross compound Corliss engine. The high pressure cylinder is twenty inches by thirty-two inches, and the low pressure, thirty-two inches by thirty-two inches. Each steam cylinder is equipped with force feed lubricator, hand oil pump, indicator connections, and two relief valves. The piston rods are of nickel steel. The pistons have metal wearing rings in addition to the packing rings, and the machine is packed throughout with metallic packing. The machine is fully equipped with every accessory, even to nickel-plated revolution counter, with ten-inch dial and central oiling system. The compressors have a capacity of two hundred tons ice melting in twenty-four hours when operating at one hundred and eighty-five pounds condensing pressure, twenty pound suction pressure, and sixty-five r.p.m.

The compression side consists of eight of the latest type double pipe, flooded ammonia condensers, made of two-inch and three-inch pipe eighteen feet long. These condensers are equipped with a purge drum for collecting the foreign gases,

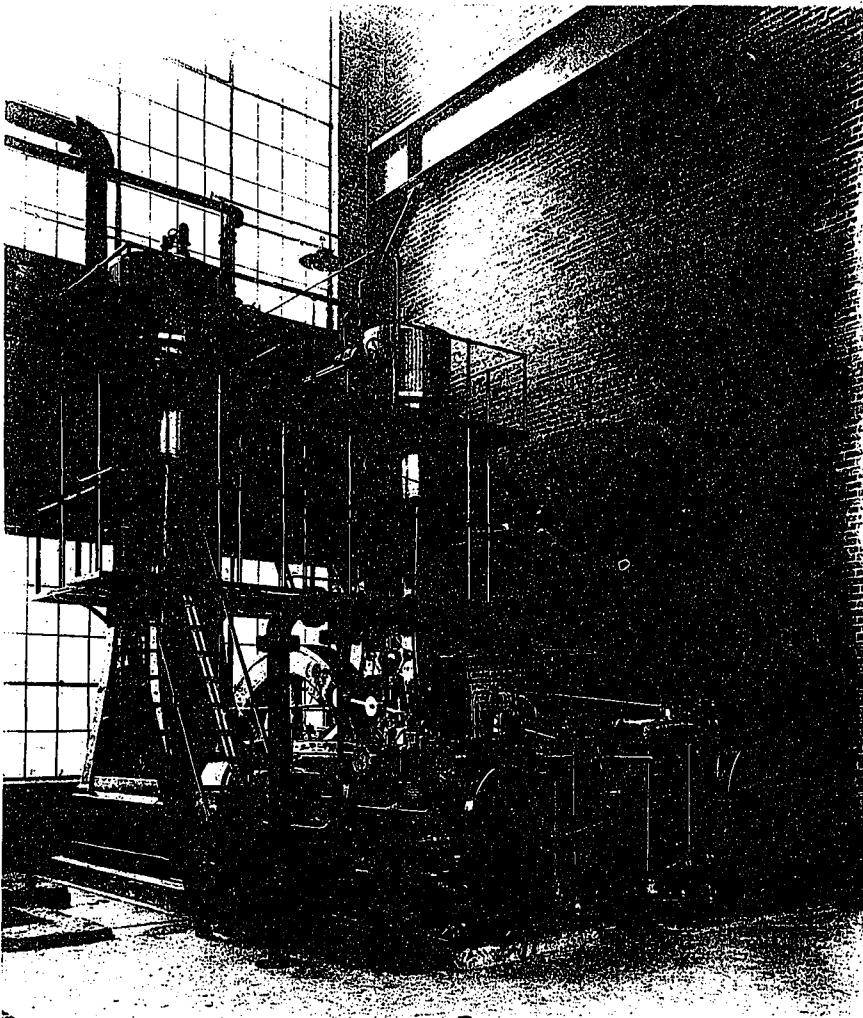


LOOKING SOUTH-WEST, BUILDING NO 1, MAY 5TH, 1915, PLANT CANADIAN KODAK CO., LTD.

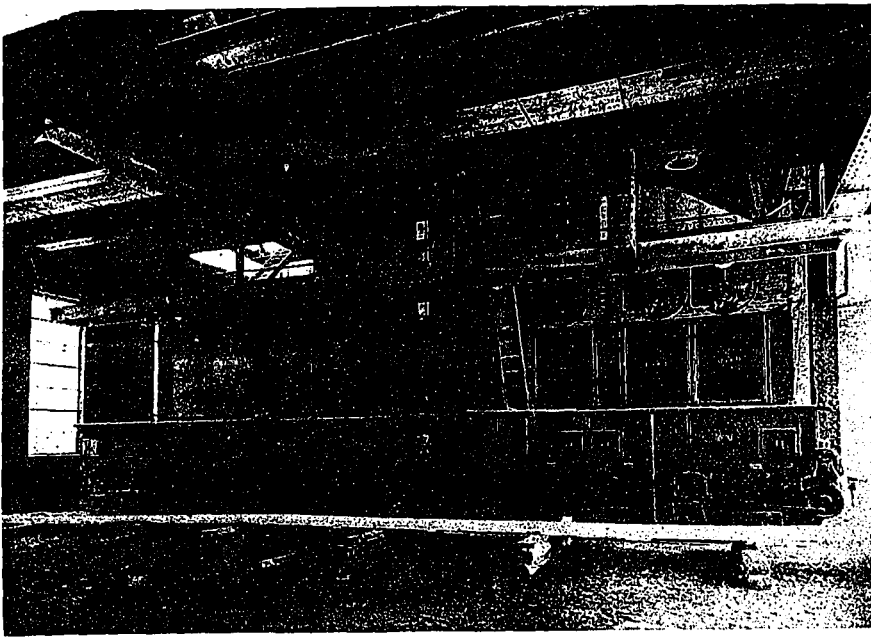
and have wash-out connections for the water tubes in addition to the regular water and ammonia valves and connections. The ammonia receiver is three feet six inches in diameter and sixteen feet long, and the high pressure oil separator is two feet in diameter and eight feet long. Both are wrought iron welded shells of standard construction. There is a check valve in the five-inch discharge line between the compressor and the condenser.

The evaporation side of the plant consists of water coolers and brine coolers, located in the room adjacent to the engine room, from which the water and brine is pumped to the different points in the factory where the refrigeration is

Water cooling is accomplished by means of twelve stacks of water cooling coils, arranged in two batteries of six stacks each. Each stack is made of two-inch galvanized genuine ammonia pipe, twelve pipes high and twenty feet long, equipped with water distributing trough and galvanized iron splash strips between each pipe. Each battery of water coolers is equipped with oil drains and collecting tank, and the suction gas passes through a trap or accumulator, which separ-



VIEW OF COMPRESSOR IN POWER HOUSE, PLANT CANADIAN KODAK CO., LTD.



FRONT VIEW OF BOILERS, OCTOBER 4TH, 1915, PLANT CANADIAN KODAK CO., LTD.

ates any liquid ammonia before it passes on and through the main thirty-inch by ten-foot scale trap in the suction ammonia line near the machine. By means of these various traps the gas is bound to reach the ammonia compressors in a slightly super-heated condition, which insures the machine operating at the very highest efficiency, at the same time enabling the cooling coils to be flooded with ammonia, so as to work at their maximum efficiency.

The brine cooling is accomplished by means of two York shell and tube type horizontal brine coolers, one fifty-one inches in diameter by sixteen feet long, the other thirty-nine inches by twelve feet long, with provision for future cooler, located on the floor above the water cooling room.

The brine storage tank has a capacity of thirty thousand gallons, and is located on the floor above the brine coolers. Two five hundred gallon per minute brine circulating pumps are located in the basement three floors below the brine tank, and one floor below the machine room. Eight-inch brine mains connect them to storage tank, brine cooler and cooling system.

The water cooler room, brine cooler, brine tank, brine mains, and all exposed cold ammonia mains are insulated with non-pareil cork. The cold water circulating pumps and brine pumps are of the triplex type, each pump direct connected to its own motor.

The water for ammonia condensing purposes is cooled by means of an atmospheric type water cooling tower on the roof of the main building. The water

is circulated over this tower through the condensers by means of two centrifugal pumps direct connected to their own motors, each of a capacity of five hundred gallons per minute.

In addition to the new equipment described, there is a York fourteen by twenty-one inch vertical, single acting compressor, direct connected to a fourteen by twenty-six by twenty-one inch cross compound Corliss engine, and a vertical De La Vergne machine equipped with York eighteen by twenty-eight inch ammonia compressors of one hundred and twenty-five tons capacity. This machine is direct connected to a horizontal simple Corliss engine.

The compression side for these latter two machines consists of eight stacks of standard counter current double pipe ammonia condensers, and five stacks of flooded double pipe ammonia condensers, with all necessary high pressure traps, receivers, etc., which are cross connected to the new unit and are arranged so that any one machine can be used on any or all of the condensers, either together or separately.

The refrigerating plant, as a whole, is one of the largest in Canada, and the new unit as described is the largest single acting ammonia compressor installed in this country to date.

Two fifteen-ton hand-power cranes are used, one in the generator and one in the ice machinery room. All the steam brine and chill water lines are carried through the power house to the various buildings through underground concrete tunnels. One hundred and



BOILERS AND FILTER FOUNDATION, PLANT CANADIAN KODAK CO., LTD.

sixty of these tunnels were required, ranging in size from nine feet by eight feet to four feet six inches, by four feet six inches in sections.

WATER SUPPLY.

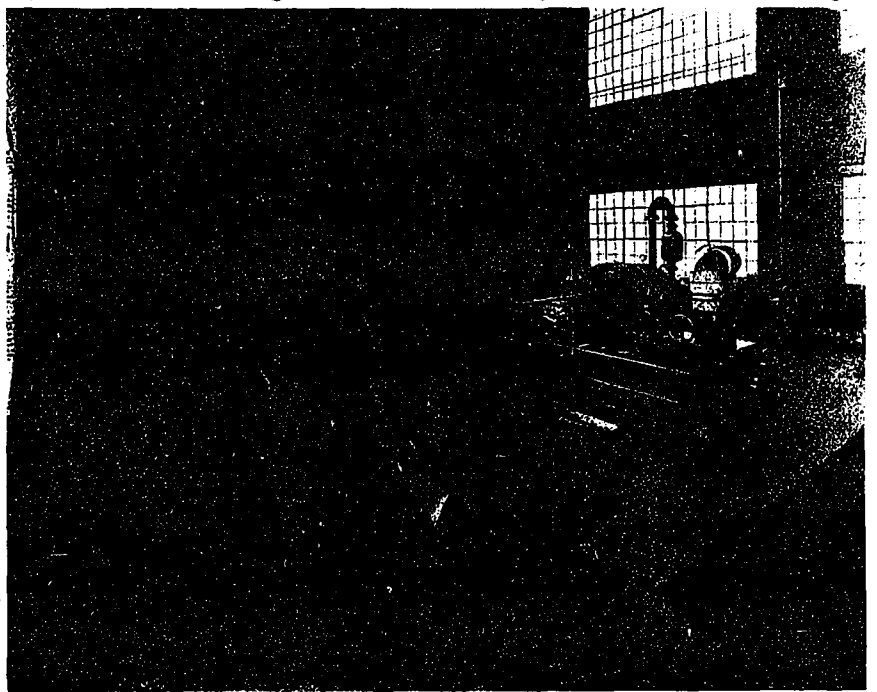
Water for drinking and factory purposes is obtained from three artesian wells ranging from one hundred and fifty to two hundred feet in depth. These wells flow into an eighty thousand gallon, well water, closed in, concrete reservoir. The overflow from this reservoir and the rain water from the roofs is collected in a seventy-five thousand gallon open concrete reservoir. This latter reservoir supplies the boilers. A twenty-five thousand sprinkler tank is used for general factory purposes where purity is not required.

The sewage disposal plant, capable of handling a population of one thousand, is installed on the company's property. This plant consists of a chlorine house, sludge in separator tanks, dissolving chamber, percolating filter and sludge beds in humus tanks.

Recent Tests by Bureau of Standards

Among the tests conducted recently by the United States Bureau of Standards as aids to the development of industrial methods were series relating to the construction of concrete columns and the production of insulating material.

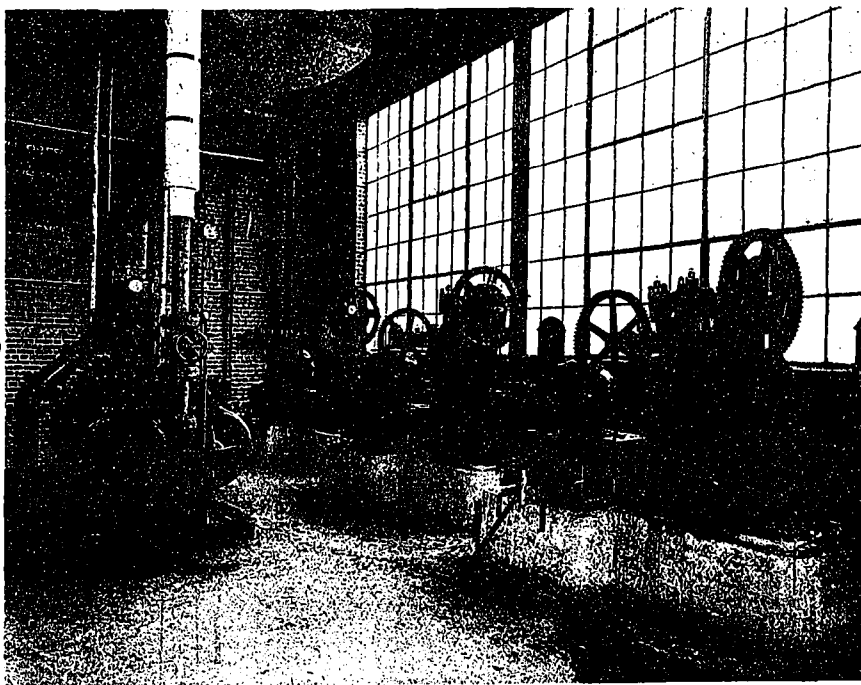
Three tests were made of a special com-



VIEW IN POWER HOUSE, PLANT CANADIAN KODAK CO., LTD.

mercial insulating material to determine its fire-resisting properties. The material submitted by the manufacturers was intended for use in a number of instances to replace wood. The test specimens were about eighteen by eighteen inches and six inches thick. They were placed in a furnace as a panel, one of the larger faces being exposed to the heat of the furnace and the other to the atmosphere. Upon being heated to nine hundred and fifty degrees in thirty minutes and held at that temperature for four hours it was found that the temperature at a distance of one and one-half inches from the heat-exposed surface was about two hundred and forty degrees C. At a depth of five and one-half inches from the heat-exposed surface sixty-six degrees was the highest temperature recorded. One of the blocks after having been subjected to this heat for the period mentioned was quenched with water. The damage to the specimen that was quenched was found to be less than to an unquenched specimen. This is explained by the fact that the blocks contained considerable organic matter which tended to be disintegrated by the heat transmitted very slowly from the heated surface, even after the flame was removed from it.

The series of tests of concrete columns was partly in the nature of an investigation and partly in the nature of routine testing. These are the first columns of their kind to be tested in this



VIEW OF PUMPS IN POWER HOUSE, PLANT CANADIAN KODAK CO., LTD.

country. The unique feature is a hollow cast-iron core. This is surrounded by concrete, reinforced with both spiral and vertical reinforcing. Such a column may be made very cheaply. Not many results have yet been obtained, but the tests are still in progress. It would appear, however, that the load which these columns can sustain is considerably in excess of that which can be borne by the ordinary reinforced concrete column of an equivalent cross section.

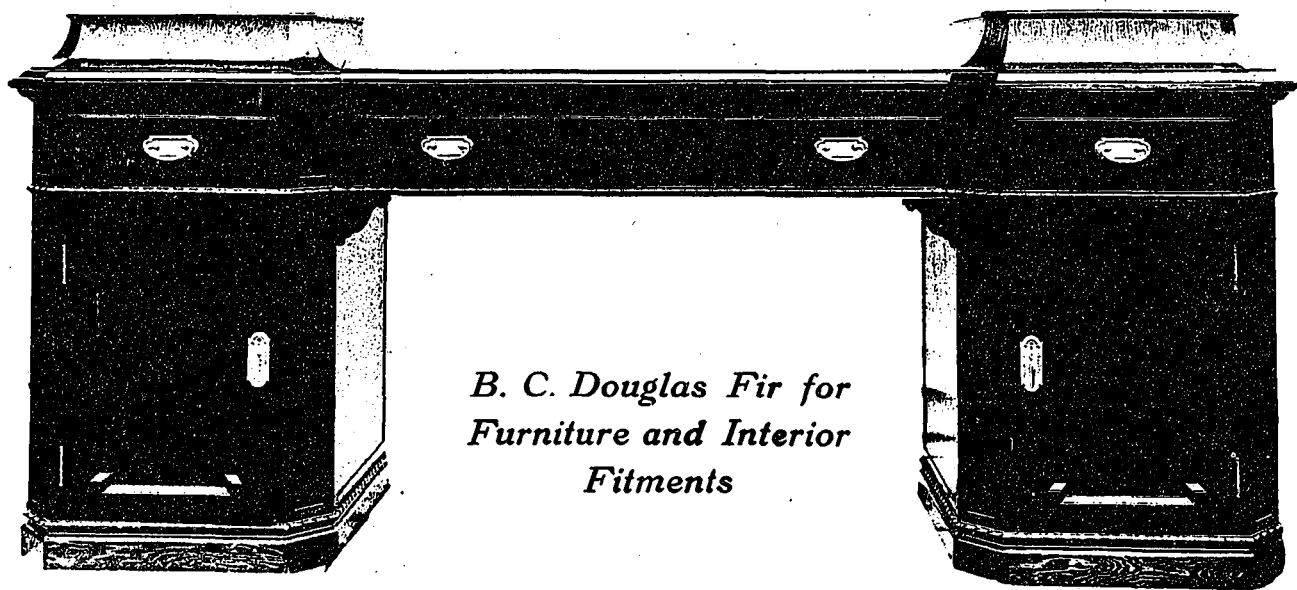
Painting of Cement

Of the many difficult surfaces requiring the application of paint, cement is, perhaps the worst. The trouble is due entirely to the alkaline character of cement. This not only attacks the oil in paint, but draws dampness, another enemy of paint, when it attacks it in the rear or back. Cement that has stood to the weather for a year or so has lost much of its alkali, and then paint does fairly well.

One of the earliest remedies used for preparing cement for painting was a seven to eight per cent. solution of muriatic acid. But where there was much lime present it was found that the acid acted upon the lime, converting it into calcium chloride. This would cause a pitting and crumbling of the surface, practically destroying it. The discovery of the zinc sulphate treatment was most opportune, and is by far

the best treatment yet found. A master painter named Nicholls claims to have introduced this treatment, and took out a patent for it. First, the cement surface is cleaned and must be perfectly dry. Then a coat of zinc sulphate solution, equal parts of each by weight. The water and zinc sulphate are intimately mixed and applied by means of a stiff brush. The zinc sulphate changes the caustic lime of the cement into calcium phosphate, or gypsum, and zinc oxide is deposited in the pores of the cement. Zinc sulphate is one of the most important of white paint pigments, and when paint is afterward applied to the coating it becomes incorporated with it, giving a very durable surface. Inasmuch as zinc sulphate has no known harmful effect on cement or concrete surfaces, the fact adds to its value in this connection. Many public and private buildings have been treated with this process, and with perfect success, it is claimed.

Auguste Rodin, the French sculptor, has executed a deed of gift to the French Government of his own and other works of art forming a collection in the Hotel Biron. The future Rodin Museum is filled with his works, some barely begun, others entirely finished. The Hotel Biron has been the nunciative, the Russian embassy, and the home of the Dames de Sacre Coeur, and has a most interesting history.



*B. C. Douglas Fir for
Furniture and Interior
Fitments*

ARCHITECTS and furniture designers will be greatly interested in the possibilities of B.C. Douglas Fir in connection with high-class interior fitments and furniture. The accompanying photograph illustrates a buffet built entirely of this wood, designed by Mr. S. MacLure, the well-known architect of Victoria, B.C.

The buffet illustrates very clearly the excellent results obtainable in Douglas Fir for this

class of work. All framing, stiles and rails are of the wood cut edge grain, while panels, door fronts and friezes are of rotary cut three-ply veneer.

Many furniture manufacturers in Eastern Canada are showing great interest in British Columbia as the source of supply for their raw material. For woods of the highest class at moderate prices, British Columbia offers a product second to none.

Christie, Brown & Co., Ltd., Factory, Toronto

Sproatt & Rolph, Architects. Jennings & Ross, Architects.

THE special features of this factory are its fireproof qualities and method of construction, whereby the largest possible amount of light is obtained.

The metal frame windows are of maximum size, and the interior is white tile. It is only by a perfect lighting system that real cleanliness can be obtained, and that absolute purity ensured that should always accompany the manufacture of foodstuffs.

The new building has two staircases, one at the west and one at the north end, the former being specially reserved for fire emergency. A feature of the stairs is the painting of the corners of the landings white, thus serving two useful purposes, making them more readily discernible and preventing the collection of dust and dirt there.

Another prominent feature is the automatic sprinkler and fire alarm system.

The eighth floor contains six ovens placed at the top of the building in accordance with the most modern baking methods. The baked products are fed down through automatic conveyors to succeeding floors for packing, etc. Each oven is independently driven by individual electric motors.

All elevator and entrance doors throughout the building are metal covered and fireproofed.

On this floor is installed a settling tank for removing sand and other impurities from the water, thus giving longer life and efficiency to all valves. The tank in the water tower supplying the sprinkler system has a capacity of twenty-five thousand gallons.

The seventh, sixth, and fifth floors are devoted to packing, each table being so designed as to automatically feed the same quantity of

biscuits to each packer.

The fourth floor holds the stock of paper and cardboard, and the second floor is used for flour storage.

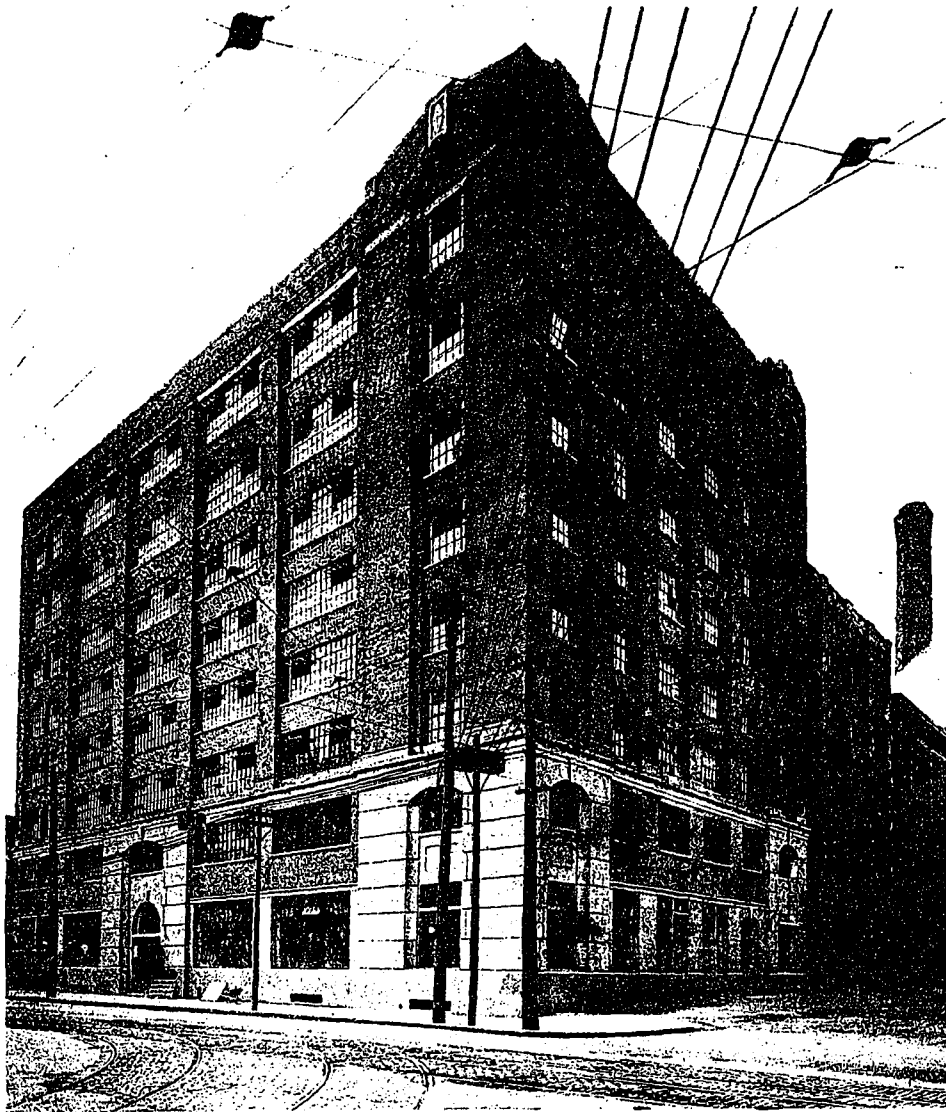
The third floor is the mixing room, and contains four large mixers of most modern design, individually driven by electric motors.

The whole of the ground floor is occupied by the general office, with the private offices at the east end.

The internal woodwork is of oak, the ceilings being white, and the walls a

pale green. Here, again, lighting has received special attention, the ceiling being sixteen feet above the floor, and the whole of the front facing south being glass. The artificial lighting is taken care of by semi-indirect glass bowls with one hundred watt nitrogen lamps.

A feature that should not escape mention might well be more generally adopted, namely, the whole extent of the front windows is filled with growing ferns and palms, giving an air of



FACTORY AND OFFICE BUILDING OF CHRISTIE, BROWN & CO., LTD., TORONTO, ONT.



CHRISTIE, BROWN & CO., LTD., BUILDING, OFFICE BEFORE SCREENS WERE INSTALLED.
(DARK LINES ON BEAMS AS BRICKS FOR SCREENS).

restful distinction both inside and out. The floor is Terrazo Mosaic. Communication from the office to all parts of the factory is by the Bell and Automatic telephones, and Lampson tubes carry order sheets to the shipping departments.

An Autocall System extends throughout the factory for calling individuals.

The basement contains store rooms, lavatories, etc. These are fitted with shower baths and all modern equipment, and rest and luncheon rooms are also provided for the office staff.

Work started on the 2nd January, 1913, and completed August, 1914.

A test hole was sunk to rock forty-two feet from the sidewalk level, and it was decided to sink all the footings to rock. The main excavation was started first, and as sub-grade was reached, the caissons were at once put down.

The material encountered was boulder clay, and great annoyance was caused by boulders in the caissons which ranged from one-quarter of a cubic yard to three-quarters of a cubic yard. The sinking of most of the caissons was comparatively simple, however, those on the north side of the new building had to be put down beneath the old building, and four columns, and also the corner of the old building had to be underpinned. There were forty-nine caissons sunk to rock. The seven caissons to the west were constructed alongside the wall of the building to the west, this wall be-

ing supported in the meantime.

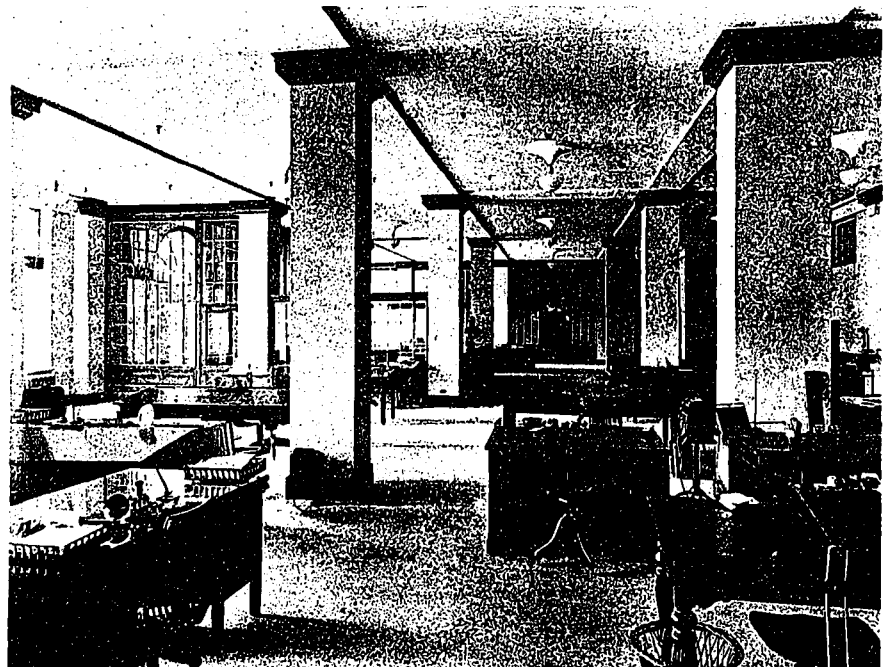
The south side of the old building was then supported from bottom to top with temporary shoring. The old columns and beams taken out and replaced by stronger material to stand the heavier floor loads of the new building. The old building showed no settlement.

The building is constructed of cut stone, brick, steel, and reinforced concrete floors and steel sash.

Wherever possible Canadian products were used.

All steel work is fireproofed, and the floors are concrete surfaced with trap-rock. The reinforced concrete is beam and slab construction, steel bars being used for the slab, and expanded metal used in the fireproofing of the beams and columns. The brick work is made of selected red brick, and the interior white enamel brick.

An immense boulder of granite that had stood since pre-historic times on the prairies, eight miles from Lawrence, Kan., has recently been quarried for monumental purposes by an enterprising granite firm in that city. The stone, which it is believed was brought to the spot by glacial action, is a rich red granite without a flaw. The granite men paid about twenty-five dollars to the owner of the land on which the boulder stood for the privilege of quarrying the stone, and their only other expenses was the labor of two men for two weeks to break it up into sizes convenient for handling.



CHRISTIE, BROWN & CO., LTD., MAIN OFFICE.

Architectural Problems Raised by The War

Addresses by Captain R. Burns Dick, Royal Garrison Artillery, President of the Northern Architectural Association of Great Britain, under the Headings of "The New Epoch" and "The Cataclysm—And After," have a Direct Bearing upon Situation Here.

The New Epoch

Gentlemen,—A year has passed since I had the privilege and pleasure of addressing you as president of the Northern Architectural Association. I find myself for a second year in that honored position, and would at the opening of a new winter session take this somewhat tardy opportunity of thanking you most sincerely for the honor you have done me.

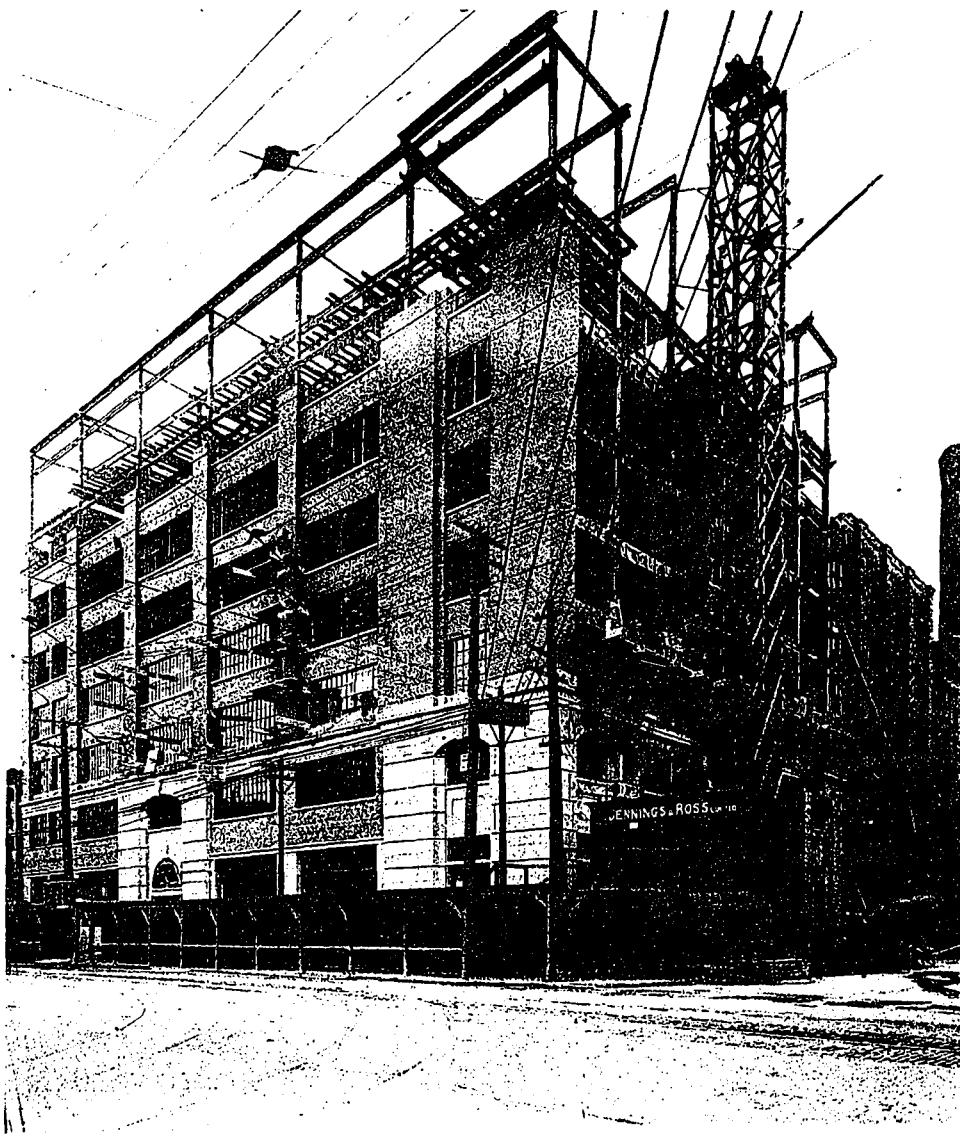
If perchance in the years to come some member, perhaps a budding president of this great, and in that future time much greater, society should take it into his head, out of an idle curiosity, or maybe for inspiration for his coming address, to glance through the presidential addresses of the past, would he be struck by anything singular about so apparently common-

place an opening as that just uttered? No doubt he would wonder how it happens that, in what he very properly would suppose was a live institution, the president does not address a meeting from one year's end till the next. But if he glances at the top of the page and notes the year 1915, the second of those fateful years seared deep, literally, with the branding irons of fire-forged steel, into the history of his country, he

will understand; and I would crave your indulgence while I have a word with this my distant successor.

"Well, son of the future, if you are merely curious, read on; but if you be my unborn president searching for professional ideas from the past, you may pass along, for here you will find little for your purpose. A president who has not only entirely ceased to pursue his work of construction, but is vowed to and frankly eager for destruction, who no longer controls the craftsmen engaged in displaying in concrete form the growing wealth and advancement of a nation, but, on the contrary, is employed with these same workers in studying how best to make use of mighty engines of war, in blasting off the face of the earth the ingenious barbarians who would dare to lay their bloody grasp

on that nation's most sacred possessions—such a president can be of little assistance to you who live in happier and more settled times. To him an architectural address at such a time is unthinkable. Like so many of his professional brethren, he is engaged in the common duty of preserving what has been entrusted to him by his fathers from the polluted touch of the despoiler, but unlike so many who are paying their debt in the forefront



CHRISTIE, BROWN & CO., LTD., BUILDING, KING AND FREDERICK STS., DURING CONSTRUCTION.

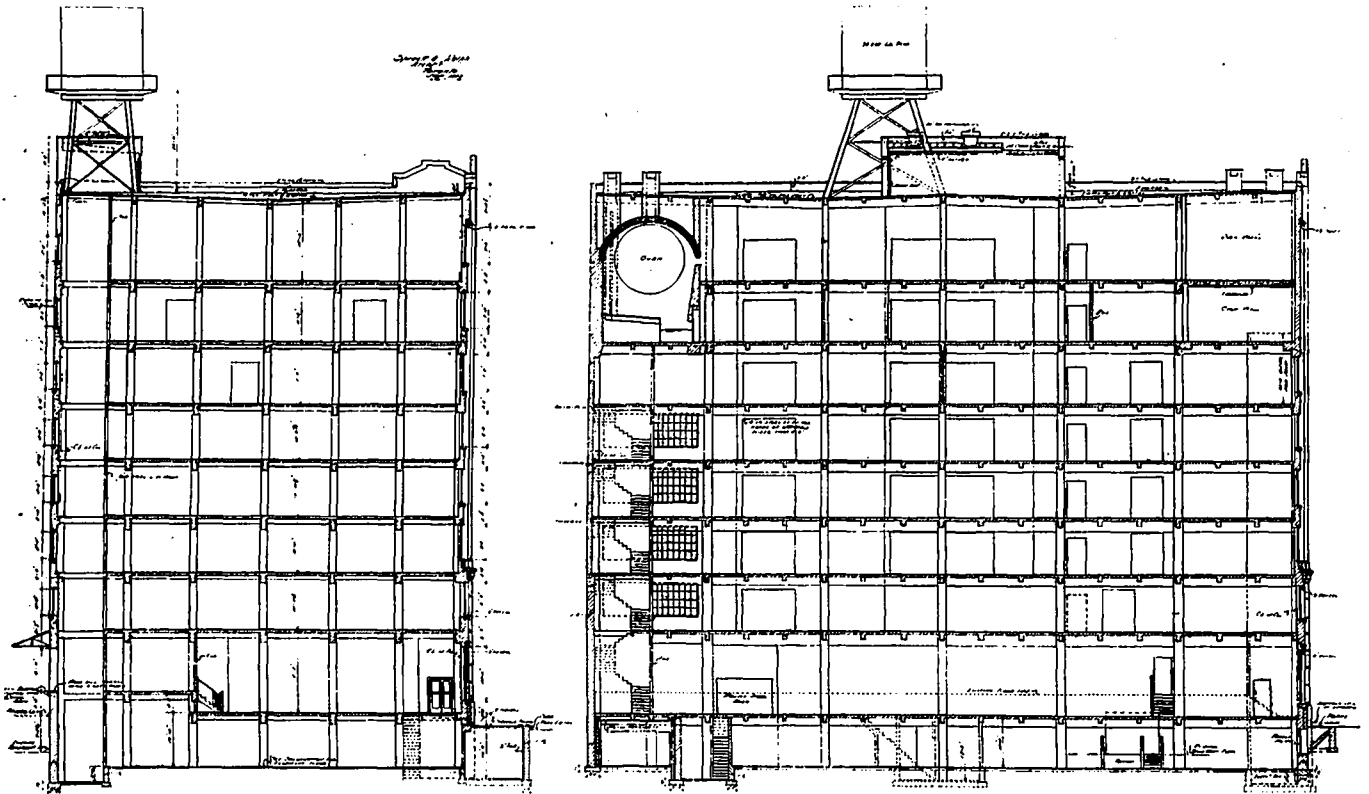
of the conflict, and those who, alas! have paid their all, his lot so far has been to watch and wait; and so he is permitted after a year to fulfil a small part of his obligations in thus addressing his fellow-members of the N.A.A.

"But stay, my scion of a noble profession; whatever your motive, I would have you read on, for I doubt not that as the recorded thoughts of the most obscure worker of the age of Pericles would be perused with avidity by us to-day, so the views of one living in a mighty age of your ancestors will prove interesting, if not curious, to you who possess a knowledge unknown to us—a knowledge for whose secrets our age is delving to uncover for your enjoyment.

"Forget not that much of that which you enjoy, of that superiority of knowledge and pow-

thousands of architects and students of our art have taken up arms to preserve and foster this beauty.

"We can admire force and strength in their many manifestations. We will not withhold the admission that the visible expression of rugged and unrestrained power rouses in us a sense of admiration—that even a certain beauty of form may be associated therewith; but we do not confuse this feeling with the sentiments aroused by the beauty that is born of the graces and nobility of the human soul. We can see in the cruel and stealthy movements of the tiger, with its form so wonderfully expressive of latent power, something that arouses in us a sense of perfect fitness for the functions of its being—functions that call for craft and energy to make the spring upon its weaker prey. But



SECTIONAL ELEVATION, CHRISTIE, BROWN & CO., LTD., BUILDING.

SPROATT & ROSE, ARCHITECTS.

er, of that enlightened outlook on life, of that toleration and sympathy which seem so lacking in this age, of all that seems to place you so much above this age of selfish and senseless conflict, has been built up on the maimed and dead bodies of those who would rather give up life itself than that those ideals to which you have attained, and of which you are so justly proud, should be sacrificed to the god of ruthless force.

"No class in what we believe to be the enlightened nations has withheld its contribution to this struggle for beauty in human life, least of all the profession to which you belong. This and other societies throughout the Empire to-day mourn the death in battle of some of their most promising and talented members, whilst

though we admire this work of Nature, we hesitate not to destroy it in order that the still more beautiful form of man, with its equally perfect fitness for its functions, which include the use of its strength for the protection of the weak, may survive.

"And so, my friend, we architects, who are citizens first and custodians with all Britons of the riches bequeathed to us, are chiefly concerned at the present, like the tiger-slayer, with the destruction of an admittedly remarkable manifestation of power, which would be well worthy of preservation and use if it could be tamed. This untamable foe of ours, in his national monuments and wherever there is room for it in his architecture, breathes his spirit of arrogance and dominating force; his brutal soul exhales

through his works the fœtid odor of the jungle monarch. It is great, this animal majesty, but it is a thing to be kept apart, confined behind bars, or better still, deprived of life, and its harmless carcase preserved for the students of evolution.

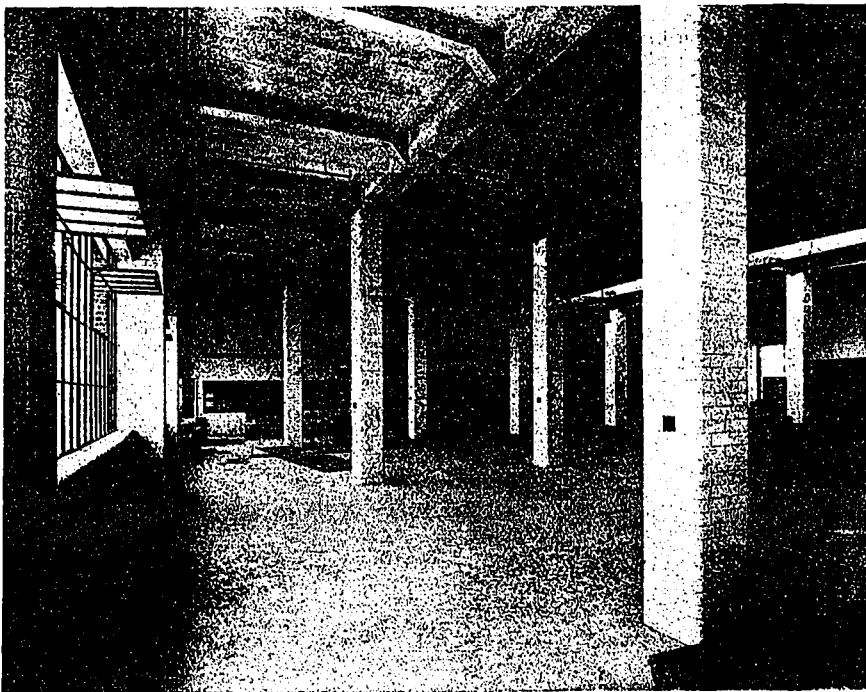
"You, no doubt, on your brief vacations, have sped over the North Sea in your air-car and visited these wonderful old specimens of the jungle age in Germany, and with a sneaking admiration have gazed upon them and pondered over the perversion of intelligence that created them. But if you are tempted to regret that something of force has disappeared from architecture by the suppression of the would-be superman, remember that the freedom which permits of the untrammelled expression of the best that is in you and which has resulted in the great advance your age can claim over that when George V. was King, is only possible by reason of the breadth of sanity of Britain and her Allies, which dissipated the poison gas of the Teuton monster. While I write, the task is still uncompleted, but when you read it will long since have taken its place in the list of accomplished facts that have opened up the wider and fuller life which you enjoy. I would I could project my vision into the life of the future, and so provide a stimulus to my fellow-workers of all creeds and trades. They, however, no matter what the sacrifices, will see that posterity is not betrayed.



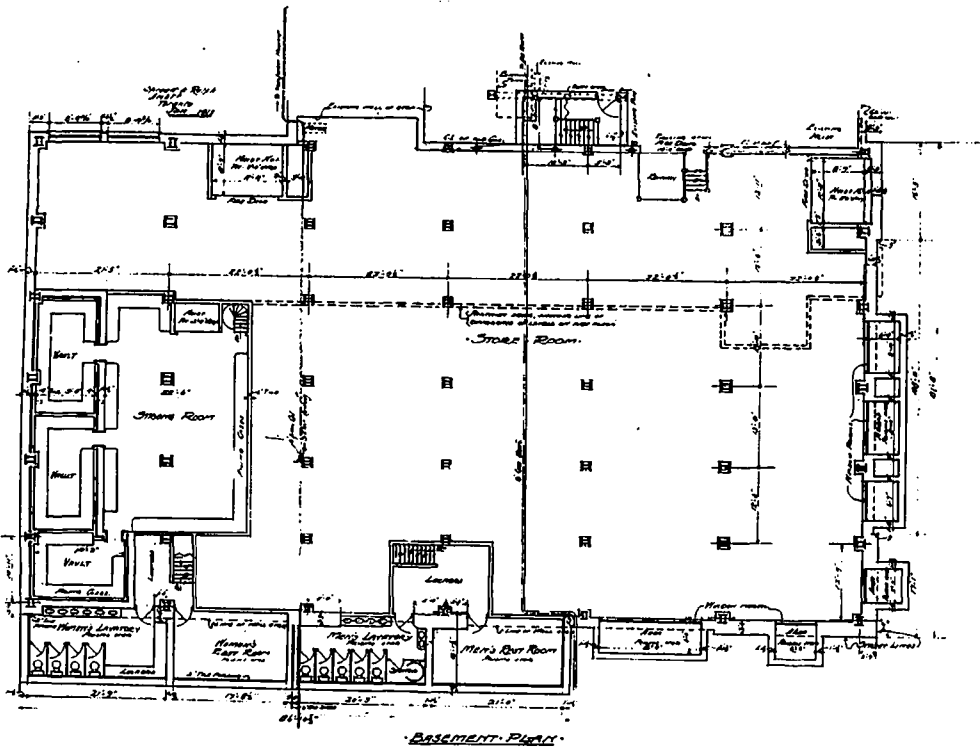
CHRISTIE, BROWN & CO., LTD., SEVENTH FLOOR, SHOWING BOTTOM OF OVENS FURRED DOWN.

"Adieu, friend! I have confidence that what you have received at the hands of your sometimes blundering ancestors will be well guarded by you; for are you not trained to war as well as architecture, and are you not ever prepared and organized to crush with force the hydra that will for long ages lie in wait for the time when the watch is relaxed and the time seems ripe to strike for world-power? Watch ever, and above all be armed! Adieu!"

Now, gentlemen, to justify such a claim as I have just made in the eyes of posterity we have strenuous work before us. This is no time to pursue the old way, with nose up against the dry bones of archaeology, trying to tear the souls out of old corpses that ceased to possess them long since when their purpose was served and their course run, like everything that is born, whether of the travail of a woman or the sweat of a man; no time even to consider the practical problems that so properly engaged our attention in normal times. We must now use every endeavor in our power to defeat the forces that are deliberately upsetting all those conditions on which we based our course of action in solving those many problems. Until the horrible disease which has seized hold on mankind has been stamped out, our work is useless. We must commence the process of inoculation that will protect against a recrudescence. We must find the serum that will destroy or make innocuous those germs of mad ambition.



CHRISTIE, BROWN & CO., LTD., EIGHTH FLOOR, SHOWING WEST BATTERY OF OVENS.



CHRISTIE, BROWN & CO., LTD., BUILDING, TORONTO.

But this disease, having once laid hold on man, will leave an indelible mark upon him, and though I believe he will emerge stronger than ever, all his future course will be marked by the measures of protection his prudence suggests.

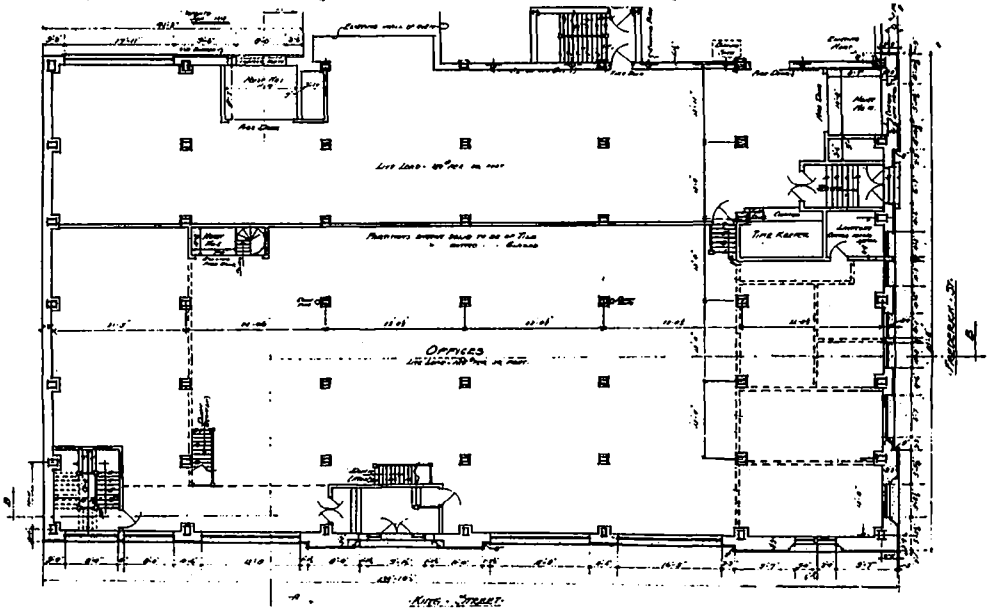
Now, as man's ingenuity and adaptability are boundless, it is impossible to forecast with any certainty the form these protective measures will take, but no time must be lost by us in setting to work to evolve them. In our particular domain the influence of this time will be very far-reaching, and one is impelled to a little speculative thought as to what lies ahead. Curiously enough, on attempting to pierce the veil of the future, my mind instantly flew back 2,000 years. The impulse was irresistible, and the explanation simple. No sooner had I formed the concept *war-architect* than my memory automatically ejected out of one of its "pigeon-holes" the same combination, labelled "Vitruvius, appointed by Cæsar Augustus architect in charge of the engines of war."

We have all read Vitruvius, that shrewd writer on architecture, and with a certain amount of amusement perused the list of attainments he considered an architect should possess: not the least of which, judging from his tenth and last book, was skill in the design and use of war engines. You

recall the, to us, humorous description of one city architect who devised a great weapon for the siege of a rival city, and the more than ingenious architect who reduced his rival's skill to nought and saved his country from defeat. Some of his advice may appear amusing, but old Vitruvius was a serious writer with a great knowledge of his craft, and was as devoid of conscious humor in his writings as a German reply to an American "Note," though distinctly shrewd and worldly-wise, as for instance when he treats of the choice of a situation for various buildings. For a temple to the "Goddess of Health and

such other divinities as possess the power of curing diseases," a site with *wholesome air and pure water* should be selected, where the sick will more readily recover and a *reliance upon the divinity be thereby increased*. In other words, "Trust in the Lord, but keep your powder dry." Well, I can see the time returning when the architect will again play an important part in the device of methods to protect his city from the assault of the foe from without; and we would do well to show the wisdom of Vitruvius as displayed in his recommendations on the choice of a site.

We must first grasp the import of this great upheaval; this is not the final war, it is the first of a new epoch. No matter how or when this conflict comes to an end, can anyone picture a peace that will be anything but the pause of ex-



CHRISTIE, BROWN & CO., LTD., BUILDING, TORONTO.

haustion? We are a peace-loving people, and I believe would be content to remain so if it were possible; but though there are people amongst us so afflicted with incurable myopia as would lead them to accept peace now, the slumbering war spirit of our ancestors now being aroused by the aggression of other peoples is likely to take a more or less permanent set, and indeed will of necessity require to do so if we are to be in a position to meet the fresh assaults on our existence as a nation which will assuredly follow in the not distant future.

One potent factor which seems always to escape the well-meaning world-pacifists is that so long as you have mankind divided up into different races, with different languages, different religions and traditions, different ideals, customs, and modes of thought, and different views of each other's importance in the scheme of things, so long will you have strife. This is no new condition, but it is one that must be ever reckoned with; it is the one from which this and all wars have sprung, and must be treated as permanent, so far as the shaping of our future action is concerned. This has been of necessity accepted by all progressive peoples and acted upon accordingly, with results varying as their relative skill and foresight.

In our case, Nature and a supreme Navy, which we have gradually come to assume as all that is needed to comply with this elemental necessity, has lulled us into individual detachment from world strife. So much so that even in the throes of a death struggle for existence we have one of the most amazing exhibitions of the workings of the human intelligence that history has to record. These means of self-preservation having failed as complete measures, the extraordinary question is under consideration as to who amongst us shall take on the burden of facing the enemy, who shall leave his private and business affairs to take up his long-neglected shield and sword in his own and his country's defence; shall every citizen as a matter of course be called upon to do what he is considered best fitted for in the crisis; or shall it be a matter of chance, left to the individual? Amazing indeed! The means hitherto considered sufficient for our self-preservation, if they have not already failed, will do so. Our magnificent Navy, as at present constituted, and the enveloping ocean will prove inadequate in themselves to our maintenance of power, by reason of the ingenuity of man in discovering new methods of exerting his offensive force and of overcoming all barriers to attack on his enemy's territory.

No matter what our scientific experts may have said about the limited possibilities of airships and aircraft generally, I think we are beginning to see that they are to be treated seriously. The whole science of aerial navigation is in its infancy, and anything is possible. Certain

it is that, as a barrier to serious offensive action on these isles, our sea power is within sight of failure—I don't say in this war, but we have already received notice and cannot afford to ignore it. If a commanded sea barrier, such as we have, fails, no country, however strong her land frontiers may be, is now immune from the attentions of the despoiler and violater from without.

The power developed by the skill and genius of the scientist and inventor in all directions, and now so evident in warfare, has brought about that great revolutionary change that puts a period to one epoch and opens up another. Do we realize what this means; that henceforth there is no distinction between civilian and soldier? Those glaring press headlines: "Barbarous attack on undefended port," "Zeppelin outrage on Tyneside; murdered citizens,"—these will gradually disappear when we awaken to their absurdity. As Monsieur Leche points out in his "Les Guerres d'Enfer," it is no longer paid professional armies that go out to do battle, whilst the citizen carries on his usual business, treating the campaign as a matter of interest in his moments of leisure. Henceforth, it is nation against nation in the literal and fullest sense. Whoever makes munitions of war: man, woman, or child; whoever clothes and feeds the fighters; the inventor, scientist, and financier, the brains directing operations, the payer of war taxes, the hewer of coal, everybody practically—all are belligerents and can no more expect to be immune from attack than the man in the trenches or on a destroyer.

Germany has shown the futility of treaties and international military laws. Make them by all means, and keep them if you can, but be prepared to meet those who don't on at least equal terms. The truth of the saying, "If you want peace, prepare for war" is being realized more and more as the days go on. The price of the most costly preparation to demonstrate our invincibility would have been as nothing to the expense we are now being put to to preserve our existence; but, above all, think of the outpouring of blood that would have been averted. See to it that the lesson is learned!

To meet the conditions of this new epoch, and as a matter of self-preservation, I unhesitatingly assert that the only way is to organize and encourage a universal military habit as part of our daily life. I can see the expression of horror on the faces of those good people who live in terror of "Militarism." I see nothing whatever to fear from the general training of the citizen to arms. It is the one sure way to kill "Militarism"; no longer would it be possible, even if it had ever shown itself in Britain, for an exclusive professional military class to dominate the nation. The nation itself would be the army, and would not lightly forsake its peaceful pursuits at the behest of the profes-

sional fighter. I see nothing but good in such a change. If it only bred in the individual a sense of the duty he owes to his country, a sense so many clearly lack, it would be well worth the loss of our so-called freedom. Militarism. A bogey! Are the French more bellicose than we? Does the average Englishman, trained to the scientific use of his fists, go blustering round to demonstrate his prowess, or is not his bearing that of a quiet confidence in his ability to defend himself or chastise any aggressor against the weak? What does England not owe to-day to the Volunteer and Territorial? I am very proud of my "T." and in all the years I have been associated with these civilians trained in military practices I have seen no shadow of the spirit of Militarism; but I have seen a marked improvement in the bearing of these men who have in times of peace voluntarily submitted to military discipline, which though limited was always real. I have learned as I could never otherwise have done to appreciate the sterling qualities of the Northumberland miner. I mention the miner because my experience has been more with him than other classes. But artisan, laborer, miner, commercial and professional men, no matter what their class or *metier*, effect a *rapprochement* and mutual understanding by this military association which no other means so effectually afford. "You want peace, take it then," said Napoleon. Take it by your power to command it.

Interwoven through the fabric of national life must be an ordered arrangement for defence, which will be the motif of its pattern. But this new order of things must no longer be left to a few Government departments to deal with. It is everybody's business, and upon that fact being thoroughly grasped depends our existence as a first-class Power.

If we architects were suddenly called upon, as we very soon will be, so to shape the plans of our new public buildings and the laying out of new town areas with special reference to the demands created by the new conditions that are looming up before us, we would be somewhat nonplussed. These new conditions have not yet definitely taken shape in the minds even of those who are most intimately mixed up with the swiftly-crowding events that are in process of crystallizing them. There are no Government departments to which to apply or from which have issued any regulations. These departments will materialize in due course, but on old methods they will prove too cumbersome, extravagant and inefficient. With a nation composed of individuals brought up to look upon personal liberty as the greatest heritage bequeathed them, free to follow any selfish inclination or ambition they choose, so long as they don't stand in the way of their neighbor doing the same—a people untrained to co-ordination of thought, without common ideals and without

understanding as to the national duty that a modern World State of necessity imposes on its subjects—a people who are only spasmodically galvanized into a noisy display of patriotism by Press and paid politicians when events threaten a wound to their pride or a loss to their pocket—with such a people no new method is possible.

It is no use blaming the bad or indifferent work of Government departments. These you form, and having appointed officials you expect them to do all your thinking for you, so far as it concerns national business. Why are we criticising the conduct of the war by the men we have loaded with the responsibility for its successful prosecution? We are responsible. If one of your clients doesn't know his needs nor his means, and won't take the trouble to find out, he cannot blame you if the alteration and extension to his house are costing more than he can afford and are not to his liking. Conscription, national service, State organization of men and material—call it what you will—we are told is contrary to the genius of our people. Then the sooner we take thought to ourselves and alter our genius the better, for I, for one, do not believe that our genius is incapable of the addition of a cubit to its stature by an effort of will.

If we continue for a time to succeed without this co-ordination of our activities in the direction that the obviously new order of world politics imposes, we will not have to congratulate ourselves on our perspicacity, but rather on the surprising fact that no other nation has seized upon the obvious means of extending its power. Be not deceived, however; you cannot stamp out in a generation or two the ambitions of a people, and the nation that has been the means of making this national unity of thought and action a necessary weapon of defence on the part of other peoples will not lightly drop it as a weapon of offence because it may have failed in its first use. It is only a matter of time, and the weapon will have been given a keener and more deadly edge. Again let me say it: Not kings, not princes, not armies, but nations are at war as they never were before. You and I and everybody are called upon to fight our present enemy, and will never again be able to entrust the work to a small section of the community called the Army and Navy, magnificent as ours have shown themselves to be. A revolution in educational methods will have to follow. The rising generation must be gradually brought to assimilate the idea of individual responsibility in national action, to develop a sense of pride of country and a willingness to self-sacrifice in defence of her honor.

We have already reached a stage when we consider it necessary in the interests of the community that everybody should be held responsible for the observation of recognized hygienic laws against disease. We are taught the value of fresh air and exercise, treatment of water

and milk, burning of organic refuse, destruction of flies and other disseminators of contagious matter: in short, how to combat the destroyer of health and life. And yet we are content to be ignorant of the first essentials in the defence not only of life, but of what is more dear than life: honor, home, country.

Official departments, without the co-operation of the community, would ill combat epidemics of disease. No better will they succeed single-handed against our more deadly foes. Familiarity with the ever-changing conditions of warfare will be an essential part of education for the youth of both sexes. The weapon of the future will be a properly directed national intelligence—it will be mind against mind. The destroying gas waves, the flying shell, the bursting shrapnel, the death-spitting missiles from Maxim and rifle, the mechanical vultures and mosquitoes of the air, the engined destroyers of the deep, the burrowing atoms of humanity, sapping their way to each other's vitals—all will be but as the flying electrons from the radium of the nation's brains. In the mountain of pitchblend that is the British Empire we have untold stores of the radium of intelligence, but it must be extracted to be of use, and that cannot be done without the proper plant. Set up the plant in every school and university, in every home and institution, in every church; preach familiarity with every weapon that may be used in our country's defence, so will you have peace and the calm to nurture those Christian virtues she holds up as her ideal.

When our foes are beaten to earth and the sword is sheathed we architects must be in the forefront of those who lay the foundations of this remodelled national structure. Let us be the first to formulate plans for its extension and alteration, such as will condemn all decayed and useless parts, preserving only the firmly based and soundly constructed core, in which are preserved the glorious traditions of a thousand years.

In this new national structure the ideal to aim at, it will be agreed, is to construct it and maintain it by the best intelligence available. It cannot be contended that this is the basis on which is reared our existing national and local government. Suppose it is contended that it is fairly representative of the average intelligence of the people. That is not enough. However equitable it may seem to give an equal vote to every man (and woman if you will), an equal right to say how we must proceed; such a method is unsound and illogical, seeing the immense gulf that separates the intelligence and character of one individual from those of another. The noblest and best must rule in the new State, not the average. A beautiful theory, but how is it to be applied? It is a difficult problem, I admit. Perhaps you will say it is impossible. Then I would remind you that, as one of our French friends says in

speaking of war operations: "Il n'y a que l'impossible qui reussisse." Who amongst us in his small way but has felt the thrill of exaltation at having achieved the apparently impossible? It may take generations to accomplish it, and it will require the application and genius of many brains to solve it, but the sooner it is commenced the sooner shall we see the fruition of our efforts. The flood tide in the affairs of this nation is approaching which, if seized, will bear us on to fortune.

Let me compress this nebulous idea into some semblance of form, feeble though of necessity it must be, lest I be accused of empty phrasing. Let me, as an example, take our local government, and suggest how the best intelligence of our city might be applied: To begin with, there would be no room in my new council for the man whose only qualifications are leisure, ambition, a ready tongue, a fat purse, or personal interest to serve.

I know that we have, and in almost any system might have, men of wide experience and intelligence and lofty motives on local councils. Indeed I think we are more fortunate in this respect than in many districts. But the system is too haphazard; there is a lack of balance in the character and experience and order of intelligence forming the combined wisdom of our rulers. The wisdom is representative of the council's members, not of the highest intelligence of the citizens.

Say there are forty members required. If you take at random forty good average citizens, you have a council equal to most elected on the present system. Each will express his own views, or at best what he conceives to be those of the class from which he is selected, not the studied views of the best thinkers of that class upon city affairs. A new way of representing what I hope will be in the future the co-ordinated intelligence of the community on the council must be found; and to clear the ground for a reconstructed system I would wipe out ward representation and the voluntary representative. What would I substitute, and how? Well, the necessary machinery for my new system, with a little development, is already in existence. Instead of making use of the ward divisions, divide the population into sections, each representative of one of the various interests which form the life of the city. These sections or "interests" are nearly all defined and more or less organized in their respective associations or unions. How many branches of activity would thus be represented would depend upon the size and character of the community concerned; for instance, the shipping interest might be very large in one place and non-existent in another. Having settled on the number of "sections" in any district, each qualified elector would by right be entitled to become a member of that which he considered most nearly repre-

sented his business or "interest." Each section or "interest" might supply a representative to the council, whose duty would be to advance not his own personal views on vital questions affecting the city's welfare, but the studied view of his "section" arrived at through its committee and council. These representatives might be paid permanent officials of their societies, presidents, or members specially selected for their peculiar fitness, acting for longer or shorter periods as the exigencies of the city work required. The size of the council could thus be reduced, for though it might be considered that one "interest" being so large compared with another should have a larger say in local affairs, this could be done by giving increased voting power to the representative of the greater.

The local authority would then be a collective organization at its best, composed of representatives of all branches of local activity: military, educational, legal, financial, commercial, labor, medical, architecture, and building, engineering, social, religious, etc., etc., all giving the result of co-ordinated effort in their respective spheres to the furtherance of communal interest and advancement. There is no individual citizen that could not be included in at least one of say fifteen to twenty such "interests."

It would be the duty of each of these societies or "interests" to form what I might call a "Foresight" Committee devoted to the study of the changing conditions affecting their special spheres of activity and their possible influence on the affairs of the community generally—to anticipate events and formulate proposals to meet them, and to confer with similar committees in other sections, finally voicing the result of their deliberations through their representative.

All this would of course involve a decided change in the attitude of the individual towards public affairs; but unless this does take place no improvement is possible. The lethargy and indifference of the average citizen is indisputable, but it is largely due to lack of any organized method whereby value can be given to his active interest, and I believe that, apart from the urgent necessity of greater interest in public work, our best men, under a system where they are assured of being able to exert their influence, would find a keen zest in using their knowledge and experience for the general weal.

These "sections" would no doubt require considerable reorganization to adapt them to the new conditions. Our society, for instance, while the purely professional work could proceed more or less as at present, would require to extend its activities and make its members realize the obligations of their citizenship. Matters of public concern generally would have to come within their purview. There is no doubt that such an extension of activity would re-act very favorably on the professional side of the asso-

ciation, quickening the interest in all directions.

What a field for the imagination of our "Foresight" Committee would open up; what opportunities for the application of this gift in the reconstruction of our cities. I can hear some city father saying: "We don't want the dreamer and the visionary on our councils; we want the practical man." My answer to that is that, in my opinion, the one man on committees (building committees, at any rate) who is a real drawback to the satisfactory prosecution of any work is the so-called "practical man." He is usually a man of very limited, if practical, knowledge; unimaginative and of very narrow outlook, fearful of losing caste amongst his confreres by admitting any inferiority of knowledge, and whose influence, if allowed play, is more often than not reflected in inferior, uneconomical and inefficient work, barely sufficient for the needs of the moment and showing no intelligent anticipation of the needs of the future. We have plenty and to spare of these men; we want the man of imagination to give some idea of what may be demanded in the future from the work of the practical man of to-day.

It might be possible to extend some such system as I have sketched so roughly to national government. Nearly all the societies and unions throughout the country are affiliated to, or together form national or central societies which might, by their respective representatives, form a much reduced and more efficient parliament.

But whatever system the genius of the people may devise for the utilization of its best brains, we must not wait till the change is accomplished. We must begin to think now, so that when the present crisis is over such action can be commenced as will add its quota in bringing it about. Pending the arrival of that more enlightened time, we, like all other already organized societies, might start by forming our "Foresight" Committee, and, in season and out, use every endeavor to enforce our right to being heard in the local councils on matters where our special training and experience must of necessity be of value to the community. We must no longer be satisfied with the laying of our communications on the table, and our views treated with suspicion as emanating from an interested source. We must learn to command respect by showing that our actions are dictated by a desire to further the general good and not to pander to selfish interests.

In the time to come, when the national life is permeated with the spirit of patriotism—the real patriotism of service to country—and a determination to put down with force if necessary any signs of aggression or despotism on the part of other nations, such problems as we are now called upon to face will look after themselves, for then they will be constantly, and as a matter of course, under consideration as an essential to the nation's position in the world. But, in the

meantime, the first and greatest problem that we must take up is how to shape our future plans to meet the danger that in a few generations will again confront any nation unprepared to defend itself against the new forces that will be employed by the enemy bent on conquest. Our "Foresight" Committee might well commence by studying the effects of the military offensive against cities that is just beginning to develop. This opens up a very large field for thought and ingenuity. Building construction must be considerably modified. The planning and general form of public buildings will undergo an appreciable change, and indeed the whole design and appearance of cities will alter, not only in the normal way due to the advance in scientific and industrial methods, but directly to the growing power and destructiveness of outside attack, chiefly from overhead.

I can see the gradual increase in the proportion of open spaces; the general introduction of underground or double-decked roadways, with their solution of traffic problems combined with safety for the population; the general adoption of covered and arcaded footways on the lines of the Ritz Hotel, Piccadilly, having easily actuated steel shutters; the general return to shuttered windows of special design, and the entire absence of inflammable material where exposed to incendiary attack; tiled and slated sloping roofs entirely abandoned in favor of very strong flat roofs specially adapted for anti-aircraft appliances, and, in the case of large or continuous blocks of buildings, without parapets and specially prepared for the landing and housing of avions. I can imagine the national treasure-houses being remodelled; picture galleries with suspended wall linings on which the pictures are fixed, and which could be swiftly dropped to their safety vaults below; museums, with their cases of treasure, their statuary, and so forth, arranged on continuous lift platforms similarly capable of being lowered to a place of safety by the pressing of a button; schools and similar public buildings so modified as not only to show the large part that national service in its wider sense plays in education, but also to make them immediately available for the accommodation of the citizen in arms at the signal of alarm; manufacturing, where the worker on mobilization orders becomes a soldier with his allotted place, so arranged as to become his quarters in war until required elsewhere; the creation of new types of buildings and athletic areas for the systematic training of the citizen soldier, and the education of the woman in her important duties in time of war. I can also imagine a network of subways linking up important centres, and the permanently constructed and well equipped trenches protecting the great industrial centres; great electric generating stations entirely underground, supplying the lighting and motive force for industrial, domestic, recreative and

war requirements; great Government laboratories for scientific and engineering research; and so on, and so on. Each thinker according to his knowledge and imaginative faculties can make a mental picture of the aspect of future centres of life—all probably very wide of the actuality, but none more widely divergent than will be the change from the present state of affairs.

A "Foresight" Committee's duty should be to be, if anything, in advance of the times, in order that our progress shall march with the ever-changing conditions and requirements of the life of the new epoch.

Now, gentlemen, I must cease flicking the surface of this vast problem and leave you to go deeper if you will. I cannot expect you all to agree with my theme; I should even be prepared to hear the opinion that I had abused my position in voicing such views before a professional society. Yet I make no apology for so doing, for at such a time as this I feel perfectly justified in attempting on any available occasion to influence others to an earnest consideration of what I feel to be a vital matter to the nation first and to us as architects afterwards. If I arouse active opposition to some of my beliefs I care not so long as I succeed in stimulating an interest that may bear fruit in action when the fast approaching time arrives. Until then let every ounce of our combined weight be hurled against our foe. In every way possible let all of us, old and young—for remember we are now all belligerents—emulate the courage and patriotism of those who are bearing the heat of the battle. Of our members and those who have been connected with us no fewer than sixty are with the forces; many have been wounded, and, alas! we have to record the supreme sacrifice to King and country of four great souls whose memory will live on and add their lustre to our annals—George E. Hunter, A. E. Lowes, R. Mundle and F. Lawson are gone from amongst us, and yet are they not to be envied—for

"How can man die better than in facing fearful odds"

"For the honor of his country and the temple of his gods?"

The Cataclysm—and After

Gentlemen,—For the third consecutive year I am privileged to take the chair at the opening meeting of the winter session of this association as its president. This unusual fact is not one on which I am permitted to congratulate myself; it is merely one of the smaller effects of the universal upheaval that has changed the whole course of events in our national life. Whither leads the new movement is more than can yet be surmised, so perforce are we compelled to mark time till the way is clear.

I am fortunate in being able to attend this—the first general meeting of the session, and I feel that much will not be expected of me in the way of a presidential address, or, rather, that you will be very indulgent to me. I shall confine myself practically to one thought, and that the influence of present events on the citizen's attitude towards the city beautiful. As to the work of the association, there is little to record during the past year. A certain amount of time and thought has of necessity been devoted to the affairs of the society, but though nominally your president, I have taken no part in the work owing to my military duties. Your vice-president, Mr. Errington, who would in the ordinary course have occupied the chair to-day, together with our capable hon. secretary, Mr. Hicks, and the council, have done all that was necessary and possible under existing conditions.

Though the war has produced the disastrous effects for our profession that were to be expected from the curtailment and uncertainty imposed on all peaceful industry, it has unfortunately been found necessary to put a stop to much of the work that was left to us, in order that the output of munitions might not be interfered with. It is something, however, to know that every case is properly investigated before permission to carry out work is withheld, and from the knowledge I have of those controlling the investigation, I am sure everything is being done to minimize the burden put upon us.

I have mournfully to record that death, the uninvited and never welcome guest, has descended upon us as never before. A past president, in the person of Mr. J. W. Taylor, has been taken from us, leaving behind him the memory of an earnest worker for the welfare of the N.A.A., whose long roll of members has been enriched by his name. Mr. J. W. Dyson has also passed away, depriving us of a valued and useful member. The society is poorer by such a loss, and those of us who knew these two gentlemen will much miss the pleasant personal associations we had with them. But they have lived long and useful careers, which in the ordinary course could not have been much further extended. It is quite otherwise with those others whose names you have heard read from the Roll of Honor, who at the call of country have willingly laid down their lives on the threshold of the careers they had envisaged, and on which they were entering with high hopes and an ardor that might well have yielded so much that was beautiful and useful. We cannot accept the loss of these, the nation's gallant sons, cut down in the flower of their youth, with the resignation that follows on the death of those whose course is well-nigh run. Our hearts go out to the parents who have given to the State a beloved offspring, and we mourn with them

the loss of long cherished hopes for a future, alas! arrested for ever. Admirable is the courage of those bereaved, who must feel some consolation in the belief that this supreme sacrifice is of more value to the future of the State than the longest career of a normal life. As Mr. Ernest Newton, P.R.I.B.A., wisely pointed out in his presidential address, the future will be determined for us by the men who have done the fighting, and whatever may be that future—and I think it will be great—it will have been made possible by the sacrifice of those who have laid down their lives at their country's call.

Gentlemen, terrible as seems the price we are paying, I have a full belief that posterity will not consider it too great for the results achieved. I believe that the changes which will be wrought by this conflict in every domain of our national life will be vaster and more far-reaching than any of us have any conception of. I will not venture to predict what will be the nature of these changes so far as they affect the sphere of work with which we as architects are concerned; all I would do is to counsel such an attitude of mind on the part of those who are compelled to stand clear of the actual conflict of arms as will respond readily to the new influences that will soon commence to operate—an attitude of mind such as will anticipate the needs of the new life and, freed from all prejudice and narrowness, will be ready to co-operate with the new desires and aspirations that will most certainly express themselves.

In my last address I advocated the establishment of what I called "Foresight Committees," and I still think much might be accomplished in the meantime by each of us so constituting himself, if only as a hobby in his spare time. I must also reiterate the views I expressed as to the tremendous effect that the new methods of warfare will undoubtedly have upon the actual form and construction of buildings and the laying out of residential and industrial areas. They will be as far-reaching as was the general adoption of new principles of construction in the past, such as the dome and the pointed arch, or as steel construction in the present. I am convinced, though none of us are likely to see the particular "set" it will assume, that this is the dawn of as distinctive an era in architecture and the arts as any of the well-defined periods in history.

The design and construction of habitations and the position and arrangement of mediæval centres of life were profoundly influenced by the prevailing methods of warfare, just as the succeeding period, the *soi-disant* Renaissance, was markedly affected by the invention of artillery, which aided in destroying those conditions that gave rise to moated strongholds, castles on craggy eminences, and the old walled cities of the Middle Ages. After four or five centuries

of freedom from direct military influence, so far as the life and growth of our towns and cities are concerned, I believe we are again returning to a period when the effects of man's fighting propensities will once more show themselves in our habitations and mode of life, and a new phase in architecture will evolve.

Now, while this means that the "Renaissance" has practically run its course, I do not mean to suggest that it will suddenly cease. It will simply be gradually crowded out, as something tangible and decided and more in conformity with the changing conditions takes hold. In other words, the usual transition which separates every period from that succeeding is now commencing. Whilst I am emphasizing the part that the developing science of warfare will play in this dawning new era, I do not wish to suggest that that is the only factor in the change that is coming, though I believe this war to be directly responsible for launching the new order of things; for I believe it will materially change the citizen's outlook in a way nothing else could have done.

One of the things to which the sordidness of the surroundings and atmosphere of industrial life may be largely attributed is the inability of the people themselves to see that there is a solid and substantial return to be obtained from expenditure on spacious, healthy and beautiful surroundings in the centres where they work and live. Its practical and remunerative value, to put it on no higher basis, has been clearly demonstrated by such far-seeing men as the founder of Port Sunlight, where there is so much to delight the senses in the beautiful homes erected under his personal aegis, and where they and the character and happiness of the workers are in such contrast to the habitations and lives of the artisans in the vast majority of our industrial centres.

There are many far-seeing people who have been laboriously working to remove this reproach on our national life, and the result is being seen in various directions in the springing up of more or less satisfactory garden suburbs, founded on practical lines, and not on an unstable philanthropic basis. But it is dishearteningly slow work, because it is being practically forced by the few enlightened on an almost indifferent community. Until the people themselves realize the possibility of the infinitely increased happiness awaiting them in this direction it will never become general. The degree of beauty of a city is an indication of the enlightenment of its people. So long as the people remain indifferent to the effects of material environment on character so long will it be impossible to them to create an entirely beautiful city.

To point the moral, I have only to take our own city as an example. We have more than once heard a city father with pardonable pride

refer to this as "no mean city." A no mean city indeed! Whilst that remark points to the many-sidedness of the city's life, its distinguished citizens, its position as a centre of culture and learning, and its great industrial position, it also visualizes the imposing thoroughfares and buildings of which the city may justly boast. Now, take away the work of that far-seeing citizen, Grainger—work that owes its nobility of form to Dobson, his equally great architect—and what remains of our boasted city? How much is there left of the modern city of which one would boast? Yet eighty years have elapsed since Grainger's fine work came into being.

Ross, in his "Views in Newcastle," published in 1841, thus refers to Grainger's improvements: "Our canny toon 'the Coal-hole of the North,' now stands, through his exertions, as proudly pre-eminent for architectural beauty as it has successively done for military glory, for monastic learning and piety, and for mercantile enterprise and respectability. May that enterprise continue to reap and secure the advantages justly its due, while the Tyne shall roll its floods, laden with the products of art and of commerce, to the ocean!" and quotes Milton:

Anon out of the earth a fabric huge
Rose like an exhalation,
Built like a temple, where pilasters round
Were set, and Doric pillars overlaid
With golden architrave; nor did there want
Cornice or frieze, with bossy sculptures graven

The hasty multitude
Admiring entered; and the work some praise,
And some the Architect.

Well have the "enterprise" justified the pious hopes of Ross. The curious thing is that while praise is always forthcoming from those who are responsible for the development of the city, Grainger's brilliant example seems to be without influence in their "enterprises."

Since then city improvements, some on a large scale, have had to be undertaken to meet the growing traffic and business demands; great opportunities have offered themselves to continue the work of Grainger; and a people prosperous enough to bear the burden has not been wanting. With what results? With all our boasting of our fine streets, there has not been, since his (Grainger's) time, one single instance of the many thoroughfare improvements and extensions undertaken having in any way approached in spaciousness and dignity those constructed three-quarters of a century ago, when failure to foresee the enormous growth and nature of the traffic that would crowd our streets might have been considered excusable. Our most recent and most important improvement, offering splendid possibilities for perpetuating the wisdom and foresight of that bygone city-builder of whom we are so proud—and for

showing that the future necessities and credit of the city are safe in our hands—has resulted in a complete failure to realize the responsibilities that are placed upon us as an advanced community, and is indeed pitiable. I refer, of course, to the extension of Market street.

Now it must not be inferred that the city is deficient in the intelligence and civic pride and technical and artistic skill necessary to the worthy carrying out of such a project, for there were, and are still, men on the council who realized the possibilities and desired to see them taken advantage of, but who were not strong enough to prevail against the people whose indifference and short-sightedness were reflected by their representatives on the council. It is the people themselves who are responsible, and it is our business and the business of those who are devoting time to the study of better housing and town planning, to foster and encourage an appreciation of the moral and material benefit that will accrue from an improvement in those vital matters of civic life.

But this, as I have said, is laborious in the extreme. Nothing but a cataclysm would have the desired effect. Well, gentlemen, the cataclysm is here, and is in process of working that change in the perception and outlook of the people themselves, from which great things can confidently be looked for. Think what is taking place just now with us: something that has not occurred since the distant past, when people were fierce, migratory, and elementary in their civilization: something that history will record as very wonderful and far-reaching in its results—in fact, something that ushered in as distinctive a period in the life and arts of our nation as any that can be recorded in our history. A whole nation has shaken itself free from the peaceful pursuits and traditions of centuries; its whole manhood that counts is for the first time in its history leaving its shores to stem the threatening flood of barbarism that was descending on it and its peaceful neighbors, is penetrating new worlds, and is coming under the influence of new friends and new conditions undreamt of. Three years ago the imagination would have reeled at the suggestion of half the truth of to-day.

What is it that causes the narrow, parochial, and unimaginative outlook from which the people in their lives and habitations suffer? It is that the majority are tied and fettered to their particular circumscribed world, in ignorance of a wider and nobler existence of thought and action, fostered in the insular belief that Britain leads the way in everything. We know, at any rate so far as the arts are concerned, that to cut ourselves off from contact with other peoples would not give us a leading position. I do not believe that in any phase of life a nation can isolate itself without deterioration. Is not our greatness largely due to the roving, restless

spirit of the great pioneers of our race?

By the nature of things, that spirit has not been given play amongst our industrial millions, who are now more responsible than in the past for their own government; hence that narrowness of outlook which is reflected in our towns and cities. But can this wonderful thing that is happening leave things where they were? Can you take millions of men and women—the whole nation in fact—and such a nation, nay, a world-scattered Empire—from the narrow daily round from which few can escape under ordinary conditions, train them to a new existence, where unsuspected traits of character reveal themselves; lead them into foreign countries, which they for the most part would never have known, there to come in contact with peoples of different ways and thoughts not inferior to their own, there to see new cities and new modes of life, that cannot fail to have some message for them; there in fierce contest to defend the right to develop in the way they think best for themselves?—I say, can you do this with the people, those who will one day dictate the policy of our civic life and mould the external appearances of our towns and cities, and expect them to remain unchanged, uninfluenced by the tremendous experiences through which they have passed as never before in our history? It is unthinkable. Remember, it is the whole manhood of the nation, not one class, but every social stratum and grade of which the nation consists, a whole nation's intelligence that is under treatment. It is not even confined to the manhood of the nation; women as never before are playing an heroic part in spheres that hitherto they have not entered, and their influence cannot fail to be very marked in the work of the future. It is so tremendous and overwhelming a thing that is upon us that few have any conception of what it portends. The subject is a vast and interesting one with many phases, but one which I cannot pursue further, and I will conclude these few immature thoughts by recommending those who have the leisure—and who remaining behind in the architectural world has not the leisure?—to devote some consideration to those inevitable changes that will be demanded in the future by the more thoughtful and newly enlightened citizen in every rank of life.

Much, I am sure, will be expected of our profession in the way of interpreting their aspirations and of giving them a worthy, concrete expression; and I am convinced that the hitherto ill-fostered arts will, with a widened intelligence and outlook, take their proper place amongst the higher things that will be desired of life. A people gets no more nor no less than it deserves. Well, I believe our people will deserve better things, and that a higher standard of attainment will be demanded of architects than in the past, and only those of us who are worthy of it may hope for success in that Golden Age to come.

Wood Block Flooring

By J. L. BOYD, C. E.

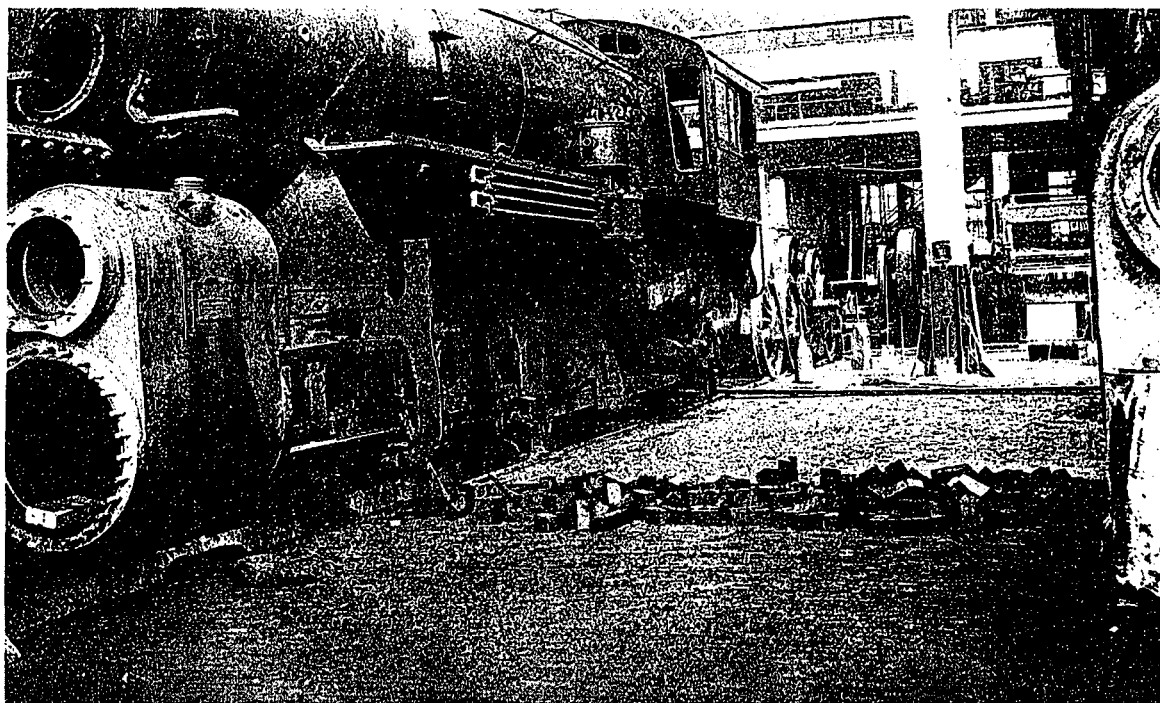
A SUBJECT of great importance to architects and engineers, in connection with factory construction, is the one of flooring—what kind of surface to put down that will stand heavy service, that will be low in upkeep, that will be easy under foot, etc.—are questions that must be solved by the prospective builder and architect. The success of creosoted block wood paving on streets has been achieved on its merits wherever it has been laid, and just recently it is reported that “The committee on streets of the Seattle Municipal League, after five months of investigation of the merits of various forms of pavements now in common use, and the manner in which these pavements have stood up under actual wear, has recommended that creosoted wood blocks be used for the improvement of the East Marginal Way, a big street improvement project.”

It is such evidence and record that has made creosoted wood block so desirable for flooring where heavy trucking, the moving of heavy machinery, or other severe service makes the maintenance of floors a serious problem. It is extensively used for flooring in warehouses, factories, foundries, machine shops (all kinds), railroad shops, roundhouses, railway stations, platforms, wharves, barns, stables, garages, cotton mills, paper mills, rubber plants, hospitals, laundries, printing houses, fire engine stations, etc., in fact, any situation where durability under service is a prime factor.

The creosoted wood block floor is not as universally known in Canada as in the United States, but amongst those who have realized its importance and have laid, or are about to lay such floors, are many of the most prominent mercantile and manufacturing companies in Canada.

The blocks are manufactured in Canada from Canadian Norway pine, which wood resembles very closely in structural qualities and appearance the Baltic pine, used so extensively in England for block purposes. The lumber from which the blocks are made is of selected stock and air seasoned. A sawmill at the treating plant cuts the lumber into blocks of the size specified, which varies in depth from two and one-half inches to four inches, the four-inch block being used for extremely heavy service. The blocks are three inches in width, and from six inches to ten inches in length.

After the blocks have been cut they are delivered by conveyors to cage cars, holding approximately thirty-six square yards of blocks



WOOD BLOCK FLOOR, GRAND TRUNK SHOPS, STRATFORD, ONT.

each. When ten of these cars are filled they are transported to the treating cylinder, one hundred and thirty-four inches long and seven feet in diameter, made of steel, and provided with an end door, through which the cars enter the cylinder. The door is then closed and securely held by means of swing bolts, making the cylinder absolutely airtight. The cylinder is then filled, from an overhead tank, with creosote oil, heated to approximately one hundred and eighty degrees F. When the oil ceases to flow into the cylinder a pressure of approximately one hundred pounds to the square inch is applied by means of pumps, and maintained a sufficient length of time to force additional oil into the blocks until they are thoroughly saturated. Pressure is then released and the

oil is pumped out of the cylinder. When the cylinder is drained a quick high vacuum is applied to withdraw the surplus oil in the block and leave in the wood the amount of oil specified, which, for interior work, will average eight pounds per cubic foot of wood; for outside paving purposes from fourteen to sixteen pounds of oil per cubic foot is left in the wood. The method described is known as the Lowry process. There are other methods, but all have the same end in view; *i.e.*, to secure a uniform penetration of the preservative oil.

The method of laying the wood block floor is somewhat similar to street paving work, the best results being obtained when a concrete base is used as a foundation, which may be as light as three inches. The thickness of the concrete base, however, will depend upon the nature of sub-soil and the floor loading. In situations where concrete is impracticable a well supported sub-floor of creosoted plank is used. In one large shop the blocks were laid upon a bed of cinders eighteen inches deep, placed in four-inch layers, and well tamped with hand pounders of varying weights, a light sand cushion being placed on top of the cinder bed, upon which the blocks were laid.

The concrete surface should be finished smoothly and in true contour to the finished floor. Upon the concrete surface is spread dry a mixture of one cement to four sand, averaging one-half inch in depth, and struck smooth and true to the finished surface, sufficient water being sprinkled over the floor surface after the blocks are laid to set the mixture (in some locations a cushion of sand may be used in place of the cement and sand mixture). The wood blocks are laid upon the cushion with the *grain vertical*.

In situations where the floor will be always dry, the block should be laid tight-jointed, but where the floor will be wet or alternately wet and dry, they should be laid with open joints of about one-sixteenth inch between the sides, and three-sixteenths inch between the ends of blocks, with expansion joints against all walls, machine foundations, etc. The joint spaces are two-

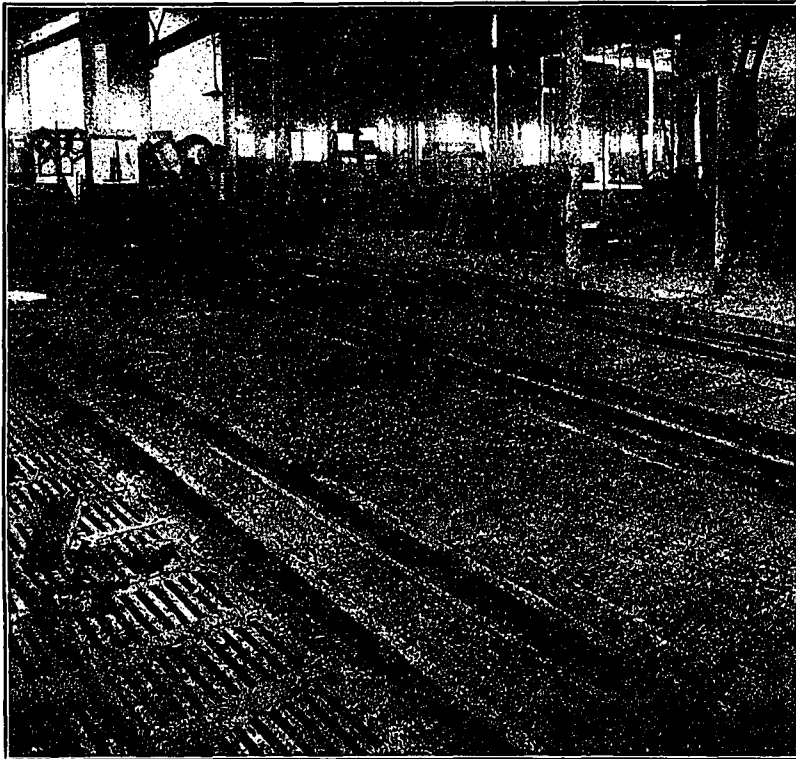
thirds filled with an asphaltic or tar filler, which forms an elastic cement around each block, thereby making the floor absolutely water-tight, and, at the same time, will allow individual blocks to expand and contract without injury to the surface. The top of the joint spaces above the filler may be filled with clean sand if necessary. A special block is manufactured for wet locations, having ribs or projections down one side and one end; the ribs may be made in any width and thickness, which, tapering to an edge, allow of equal spacing when laying, and will compress under expansion of the block.

Among the essential qualities of creosoted wood block floors might be mentioned, durability, low maintenance cost, smoothness, adaptability and comfort.

Its chief advantage is durability under service, by laying the block with the grain vertical; there is no perceptible wear after years of service, as the wood fibres compress somewhat under traffic, and form a matted, resilient surface, which does not wear off. There is no such thing as wear or splintering, as there is on a plank floor; neither is there any sealing, chipping or fracturing as on a hard, non-resilient surface. The impregnation of creosote oil will prevent the blocks from decay.

The record made with creosoted wood blocks used for street pave-

ments will apply to floors also. To cite one street in Minneapolis, where thirteen thousand five hundred square yards were laid in 1902, under heavy traffic, up to 1915 the total repairs amounted to 0.1 cent per square yard, or less than fourteen dollars for thirteen years' service. Creosoted wood block floors can readily be taken up and re-laid for repairs to pipes, etc., under the floor, or for the installation or renewal of machinery, without injury to the block. On account of the manner in which the block is laid and its uniform surface, trucking is accomplished with ease. There are no ruts or depressions to break trucks; the loads are not thrown off from jars; but a truck can be loaded and handled to its capacity with no



WOOD BLOCK FLOOR, GURNEY FOUNDRY, TORONTO.

breakages. Creosoted block floors have the advantage of being adapted to practically any shop conditions, whether wet or dry, heavy or light service. There is no dust to injure delicate machinery, and the floor is practically noiseless. Articles in the process of manufacture accidentally dropped are not injured—any intelligent laborer can lay the block. If anyone were asked what floor he would prefer to walk over or work upon for any length of time, wood block would be the selection. It is sanitary, easy under foot, warm in winter, and gives sure footing. Plant efficiency can be maintained only where the workman's comfort is considered, and cannot be had when men are compelled to work on cold, hard, uneven floors.

What Are Acoustics ?

If closely questioned upon this point, many architects, if equally frank, might with the same truth make a reply similar to that credited to the eminent Richard M. Hunt of New York, one of the greatest architects America has produced, in the following incident:

It was the custom of Mr. Hunt to make charcoal studies of interior details, full size, and for this purpose had prepared in a room of the New York State Capitol, where he was engaged, a long wall space with a running board from which to work. On this particular morning Mr. Hunt, clad in a long linen duster to protect his clothes from the charcoal, was busily employed upon some details, when by some means entrance was obtained to his room without his knowledge, and the following dialogue ensued:

A Voice—"Is this Mr. Hunt?"

Mr. Hunt, continuing his work without looking around—"Yes, I am Mr. Hunt; what can I do for you?"

The Voice—"Well, Mr. Hunt, what do you know about acoustics?"

Mr. Hunt, still absorbed in his work—"I guess I know as much as anyone, and that's d—d little."

The Voice—"Well, Mr. Hunt, I think you are the man I am looking for. I wish to build a large church, and I am looking for an architect who will acknowledge he knows nothing about acoustics. My name is Henry Ward Beecher."

However, the increasing use of reinforced concrete and similar non-absorbent materials in construction during recent years has resulted in so many auditoriums with defective hearing conditions that the subject of acoustics is at present of vital interest to everyone concerned in the erection of public buildings intended to provide accommodations for the gathering of audiences of any size or nature.

Particularly timely, therefore, is the issue of an "Essay on Architectural Acoustics," prepared by Mr. J. R. Crowley, president and acoustical engineer of the United States Acous-

tical Correction Co., 6 Beacon Street, Boston, Mass., and published by that corporation.

Quoting briefly from this "Essay":

"The acoustics of an auditorium are its conditions for hearing speech and music. When we say a room has faulty acoustics, we mean the conditions for hearing speech and music are bad.

"In the design of buildings it is a natural tendency of architects and the desire of their clients to pay greatest attention to beauty of design and stability of construction, which under the most approved ideas in the past often result in the failure of acoustic properties. Where the room is necessarily large, it is practically impossible to secure satisfaction without special construction.

"Bad acoustics are chiefly due to excess reverberations and echoes, caused by sound waves continuing in the room for several seconds after the source of sound has ceased. Briefly, this is due to the fact that sound travels from the source such as a speaker spreading out spherically in all directions, the angle of incident being equal to the angle of decadence, and is reflected to and fro from one wall to another and gradually soaring and constantly diminishing in intensity—according to the greater or less absorbing power of the exposed surfaces—until the energy is entirely expended.

"In a room or auditorium having faulty acoustics, we must absorb these sound waves as they strike the different barriers and prevent excessive reverberation being reflected upon the audience.

"By scientific experiments it has been determined that every known material used in the construction of the inside of an auditorium or room has a certain co-efficient of sound energy absorption.

"From these co-efficients it is very easy to determine the total units of absorption of the material within the room. After the total units of absorption are found and the volume of the room in cubic meters, one can determine accurately the duration of the residual sound, that is the length of time the atmospheric vibrations continue in a room after the source of sound has ceased.

"Now it has been determined that in order to have proper acoustic properties within a room we must have a limit to the duration of the residual sound. In a room used for speaking it should not be more than 1.5 seconds. In a room for music, not over 2 seconds. Therefore, if a room has a duration of residual sound exceeding this time, the room has faulty acoustics, and it is very certain that the excess reverberations must cause confusion in some part or parts of such room.

"The problem to solve is how to kill this excess reverberation (muffle or absorb the excess residual sound).

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FRASER S. KEITH - - - EDITOR AND MANAGER

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An Industrial Year

The year 1917 has every indication of being the greatest in the industrial history of the Dominion. Evidences are not lacking which prove this to be the case. At the present moment practically every factory in this country is working to capacity whether it be devoted to manufacture of war products or those of peaceful industry. Many firms have contracts at hand which will keep their entire staffs employed throughout the year. There has been promised, if the people of Canada do their share towards helping to finance such, an additional volume of war contracts aggregating five hundred millions. A feeling of optimism prevails that goes beyond the filling of mere war orders, into days of peace that it is believed will prevail a year hence. The part that Canada has played in the world's war, and the readiness with which her manufacturers arose to the situation in supplying the Empire with needed materials, have given her industries a place in world affairs that under ordinary conditions would not have been accomplished in half a century. There is a strong feeling at present in the United States that when war orders cease, the industries of that country will experience a relapse unknown in the whole of their history. There is, further, a feeling almost of envy on the part of American manufacturers regarding the industrial out-

look of Canada. This feeling is stronger to-day than it ever has been in the past. Its outcome will be that a greater number of industrial concerns in the United States will establish factories in Canada in the near future than at any time previously.

Up to 1914 United States investments in branch plants in Canada represented an outlay of one hundred and fifty million dollars, and was the largest single item at that time in the list of their investments here, which totalled nine hundred and seventy-eight million dollars. Since the war commenced, investments in Canadian securities have brought this item to a greater aggregate than the amount invested in industries. During the past two years fifty United States companies have erected factories and commenced operations in this country, making a total of about five hundred. A large number of these are controlled in Canada with Canadian directors, but for the most part they are under the direction of the parent companies.

As an indication of the impetus that industry has experienced in Canada during 1916, the situation in Hamilton is of interest. A total of seventy-two new factories or additions were erected there last year. While a good many of these new pieces of construction were the outcome of war industry, a large number were due to expansion in business, the result of domestic trade. In Toronto, the total number is not available, but factory construction represented a fairly large share of the total building permits. There were completed, or under construction, during 1916 factory buildings representing an investment of several million dollars. In Guelph, which has always been considered a conservative city, seven new industries commenced operations. Windsor, Lindsay, Trenton, Welland, Port Colborne, Sarnia, Brantford, and many others, particularly the newer towns in Northern Ontario, have all shared in increased factory construction. Canada's position as a manufacturing country is established. The forward movement is under way.

Eliminating Dishonest Practice

When one man or a few men so conduct their affairs that an odium is cast upon an entire profession, then the members of their profession owe it to themselves to eliminate from their association, and without ceremony, such party or parties. Quite recently a manufacturer remarked to the writer that he thought architects were a crooked lot, which led to an indignant protest against such a statement, and a request for proof that would substantiate it. In the ensuing conversation it transpired that he based his remark on *one single experience* he had had with an architect from Western Ontario, who came with a client, selected some equipment for a building in course of erection, and asked for an

extra discount from the prices quoted. "Perhaps," we suggested, "he was working solely in the interests of his client and had no personal motive whatever." To which he replied that he was sure he had. Questioned further, our friend the manufacturer could not remember another single instance in his relations with Canadian architects upon which he could base the charge he originally made, although he said he could recall many in his dealings with United States architects, thereby admitting that he was condemning a whole profession in this country by the impression he received from one man, which was not only illogical, but grossly unfair.

Every profession has its unprofessionals. Such has been the case throughout history, and will be as long as there are men whose sordid selfishness and greed are more impelling than, and outweigh, their obligation to their chosen calling. When a doctor, a lawyer or a minister is accused of unprofessional conduct his case is taken up by the men of his own profession, and if found guilty he is debarred from practising it. If an architect or engineer is known to resort to questionable practices, apart from an occasional disparaging word against him, no action is taken in his case, the reason being that there is no authority to do so.

The canons of the American Institute of Architects contain the following definition as to what constitutes unprofessional conduct. "It is unprofessional for an architect to accept any commission or substantial service from a contractor, or from any interested party other than the owner."

"It is unprofessional for an architect to injure falsely or maliciously, directly or indirectly, the professional reputation, prospects or business of a fellow-architect," and

"To attempt to supplant a fellow-architect after definite steps have been taken towards his employment, *e.g.*, by submitting sketches for a project for which another architect has been authorized to submit sketches."

These are more tersely put in the canons of professional ethics adopted by the Illinois Society of Architects:

"To accept any commission or any substantial service or favor from a contractor, or anyone connected with the building trades.

"To injure intentionally the fair reputation, prospects or business of another architect.

"To attempt to supplant a fellow-architect after definite steps have been taken toward his employment."

This practically constitutes what is considered a professional crime on the part of any architect throughout the world. It must be admitted that there are men practising architecture who are constantly resorting to such tactics. Are the members of the architectural profession in Canada going to sit quietly by and allow a few men to besmirch the entire pro-

fession? This raises the point as to how such men may be eliminated; and the answer is, never, as long as the architects of Canada are content to submit to present conditions in respect to their limited powers concerning their own affairs.

That there is an absolute need of a licensing or registration law in Canada is the opinion of a great majority of architects and engineers in this country. A few years ago the Canadian Society of Civil Engineers applied for legislation at Ottawa, but failed because they were trying to make it too drastic, giving the Society greater power than was deemed expedient. In the name of all that is reasonable, and in the interests of ordinary justice, both the engineers and the architects should have it in their own hands to regulate the affairs of their professions to a greater extent than at present. Take the case, for instance, of eliminating the undesirable. No reasonable legislature will refuse to grant authority to do this when it is coupled with a properly designed scheme of licensing and registration. Now, when the Canadian Society of Civil Engineers has approached the Government with a view to giving Canadian engineers the recognition they deserve at the hands of the Government, and in view of the feeling of protest on the part of our architects being discriminated against in favor of outsiders, there is a splendid opportunity for hand-in-hand co-operation, which, if followed through in the proper spirit, will undoubtedly lead to a more desirable state of affairs.

Civil Engineers' Meeting

The annual meeting of the Canadian Society of Civil Engineers, which will be held in Montreal on the 23rd, 24th, and 25th of January, promises to be one of unusual interest and one of the most important in the history of the Society's affairs. During the past year, the council of the Society formed a committee on Society affairs composed of members from the seven districts, with Mr. H. E. Haultain as chairman, and Mr. E. W. Oliver, secretary. This committee, which has carried on its work systematically during the year, and in which it has endeavored to secure the co-operation of the entire membership, has brought forward a number of recommendations, some of which will have an important bearing upon the future of the Society. They are as follows:

1st.—The inclusion in the List of Members of a geographical distribution by Districts.

2nd.—The creation of a new classification in membership to be known as "Retired Members," in which the annual fee will be nominal, for those members over sixty-five years of age who have been Corporate Members of the Society for over twenty years, and who desire to be so classified.

3rd.—The publication of a journal or periodical at least once a month, devoted largely or entirely to the interests of the Society and its members.

4th.—The elimination of interest charges on annual dues for the first six months of the current year, a fixed charge of 50 cents being made for each period of six months thereafter during which the fees remain unpaid.

5th.—Systematic publicity in the public press.

6th.—A systematic effort to have recognized university engineering professors identified with the Society and to secure the co-operation of such universities.

7th.—The engagement as soon as practicable of a Secretary who will devote his whole time to the Society.

8th.—The election of the Nominating Committee and of the Councillors by the Districts.

9th.—The encouragement of the general use of the Society's Standard Specifications by the membership and by municipalities.

10th.—The change of name from Canadian Society of Civil Engineers to "The Canadian Institution of Civil Engineers."

11th.—The re-drafting of the entire by-laws.

12th.—The systematic collection and filing in the library of important engineering reports in Canada, Great Britain, France and the United States.

13th.—The appointment of a Committee to be known as, say, "The Public Service Committee" whose duty it shall be to take cognizance of and report upon any or all public questions or legislation which may appear to be contrary to sound engineering practice or to the interests of our membership.

14th.—The obtaining of annual grants from the Dominion and Provincial Governments.

Another question that might be discussed to advantage with a view to action being taken thereon, is that of closer co-operation between the engineer and architect. In an article published in these pages in May, 1916, by Mr. G. R. G. Conway, an able discussion was given pointing out the important relationship existing between architects and engineers and indicating points of contact where co-operation was advantageous to both professions. The annual meeting should provide an opportunity of an open discussion on this subject.

There has been great interest on the part of the members taken in the affairs of the Society during the past year, which will no doubt result in a record attendance at the annual meeting in Montreal.

The following circular has been issued by the secretary to the members of the Society referring to a situation which attracted the attention of every member of the Society. This circular is self-explanatory and follows:

To the Corporate Members
of the Canadian Society of Civil Engineers.

I am instructed to inform you that the circular issued on September 7th, 1916, by the Council, regarding the principle of the employment of non-Canadian engineers by the Government, has received considerable attention at the hands of the membership, and that as a consequence much information has been forwarded for the use of the Council. Sir Henry Drayton also took note of the circular and addressed a communication to the Premier in regard thereto.

The Council at many regular and special meetings, as well as through specially appointed committees, has given most careful consideration to all the representations that have been made by the members, and to the communication by Sir Henry Drayton above referred to. The consensus of opinion in the Council is that much benefit will result to the profession and to the Society from the steps that have already been taken, and that it does not seem necessary to take any further official action at the present time. The whole subject is still before the Council which will continue its interest therein, and a discussion has been opened up with other representative bodies.

The Council has instructed me to say, however, that in its opinion it is necessary and desirable that the members should continue to interest themselves in upholding the principle of the employment of Canadian engineers by the Canadian Government.

C. H. McLEOD,
Secretary.

Preparing For The Future

Great Britain is setting us a splendid example towards preparation for conditions that will arise from the great war. The steps already taken by her leaders to secure the greatest national efficiency, stand out in bold relief as a beacon light beckoning us to follow. While every thinking man in Canada is convinced that we must strain every effort to hold the position we have gained, with the exception of a trade conference being outlined, but not yet accomplished, we are doing practically nothing in the way of preparation.

A new department of scientific research has been established in England under royal charter having a permanent secretary. This new Government scheme embodies: A large grant, estimated to cover the next five years; exemption from taxation of money set apart by firms for research; special grants to local authorities to provide improved training of technical teachers and technical scholarships to the universities; an annual grant for helping approved individual research workers, professional societies, and research work generally of a non-profitable nature for the time being; a series of researches under the coal conservation committee to introduce economy in the use of fuel.

This is only one direction in which thought is being taken for the morrow in Great Britain, and should be an incentive to the Dominions to awake to the fact that immediate action is necessary along the same line.

Manufacturers' Catalogues

There are many catalogues and booklets issued by manufacturers which, from their attractiveness, the amount of technical knowledge displayed, and the real information contained, deserve more than a passing glance on the part of architects and engineers. They are often the result of a life-time's study on the part of one man or a group of men, generally contain explanatory illustrations, and while necessarily written from the manufacturers' viewpoint, are nevertheless sources of valuable information.

A few years ago there was so much trade literature arriving in the mails of the architectural and engineering professions that it was impossible to give them proper attention. The tendency at present seems to be to embody a fund of real information, and as such a study of the pages of the catalogues now being issued by many manufacturers is time well spent.

The National Complete Building Exposition

This exposition is to be held in the Grand Central Palace, New York, March 5-11, this year. It will be a furtherance of the movement for better building, which was initiated in the first American complete building show, held in Cleveland, O., last February. The effect of the Cleveland show has been felt. Expanding beyond a mere exhibition of all kinds of building materials and equipment, the exposition will provide instructive demonstrations of architecture, construction methods, engineering, landscaping and garden furnishment. Special divisions will be devoted to factory, commercial and general building; there will be separate displays of theatre, church and school building equipment; and the home building interest will be maintained with equal strength.

Architectural Digest

Articles of More Than Passing Interest From Our Contemporaries

THE RELATIONS BETWEEN THE ARCHITECT AND THE MASTER STEAM FITTER.

By D. Knickerbacker Boyd.

In the matter of direct letting of contracts, I have read all the literature on the subject, including your own "Report on the Evils of Sub-contracting." I can subscribe to the principal objections which you raise because I know that these evils have existed, but you must not condemn all general contractors. And, after all, what you are aiming to change, it seems to me, is not so much the sub-contracting evil as the sub-estimating principle.

I personally feel that too much stress has been laid on the sub-contracting evil without due regard to any perfectly feasible plan of controlling the estimating. Perhaps you have found this method the means of most quickly checking an abuse rather than the slower process of education.

All branches of the building trades have suffered alike from the "farming" and "huckstering" of sub-estimates and dicker-ing with sub-contractors which is practised by some, but by no means all, general contractors. Sub-contractors who allow themselves to take part in this are equally at fault.

When work is awarded under one general contract, architects can help all the trades and very largely control the whole situation by requiring that a complete list of all sub-contractors be submitted with the estimate, the same to be subject to the approval of the architect and not to be changed without consent after the contract is awarded.

In my own practice we invariably do this, to protect all interests and insure a selection of capable men. But in the case of heating we practically always take the estimates direct, and, whenever possible, do the same with plumbing. We turn over the lowest of these to the general contractors, who estimate with the understanding that they must accept them as sub-contractors' bids if they want the contract.

This gives us the opportunity to carefully select the bidders—a most important consideration. Only the men we deem best qualified to do work of the kind and size in hand are asked, and the number limited to from three to five. This is quite sufficient. Others should not impertune for the privilege and so lessen their prestige. Architects should be resolute and not allow any one to estimate who does not do the high grade of work as those selected. This will save disappointments and insure to all an equal chance on the basis of good work. Under these favorable conditions the lowest figure should prevail in the award. Under general and open competitive bidding the low estimate is often to be regarded with suspicion.

In selecting those to whom they will entrust the work, architects ought to inquire and know whether they have the respect and confidence of their associates, as well as whether they are members of their respective associations. In this way architects can help to control the situation and you can co-operate with them in many ways.

In some of the States where the separate contract law obtains, annoyance is often caused because the heating, plumbing and electrical work cannot when desired be incorporated in the general contract for State and municipal buildings. If all the contracts were separately let, and there were no general contractor, the situation would be quite different. So would it be if, after securing separate estimates on the mechanical equipment, in the manner I have indicated, the contractors for these branches of the work, upon approval as to their fitness, could become sub-contractors to the general contractor. While this would cost the owner more, it would insure a unified responsibility for the completion and term maintenance of the building, and would simplify the course of procedure throughout the work. Under the existing conditions contractors are often working at variance and the way is open for constant dispute and discussion as to interference, delay, responsibility for damage and defects.

How to Obviate Losses Due to Estimating as Sub-Contractors.

The contention made by your committee that estimating as sub-contractors to all general contractors involves a loss to the trade is well founded, and worthy of every consideration. The difficulty would, however, be obviated if architects were required to take separate estimates just as at present, under the law referred to, but could have the option of incorporating these into the general contract under proper conditions. Your interest would be fully protected in work of this nature if the general contractor were required to furnish a bond protecting sub-contractors, as, for instance, is required on all municipal work in the city of Philadelphia, and owners and architects would be saved much annoyance and duplication of duties, clerical and supervisory.

The Situation with Reference to the "Standard Documents."

The matter of improving the relations between architects and those entrusted with the execution of their work by no means ceased to engage the attention of architects with the discontinuance of the institute's conference committee. Work was still under way by another and larger committee of the Institute of Architects to bring about better conditions in all estimating and contractual relations in which architects, owners, contractors and others are vitally concerned.

I refer to the committee on contracts and specifications, which finally concluded its most arduous labors little more than a year ago, when, after serious and countless conferences with representatives of the National Association of Builders, exchanges and many other interested bodies, the second edition of the "Standard Documents of the Institute" was issued.

These embrace four papers: "Form of Agreement and General Conditions of the Contract," "Bond of Suretyship," "Form of Sub-Contract," "Letter of Acceptance of Sub-Contractor's Proposal." They cover as fully as is possible the points formerly raised as to the relations of the architect to all parties in interest and the relations of these parties one to the other, including all contractors, sub-contractors and the owner.

Desiring to fortify my position on this occasion with the

views of other architects, I wrote several of my friends in different cities, asking for suggestions.

Among the replies received was one from W. Stanley Parker, of Boston, whose great service in connection with the work of the committee to which I have just referred, to the profession of architecture, and all interests allied with it, has everywhere been recognized.

Attitude of New York Contractors Toward "Standard Documents."

The letter has such an important bearing on our relations that I am going to read it to you, and I earnestly hope that it may result in furthering your co-operation. He said:

"Roughly, the situation is this: The men in New York who are members of the National Association are also members of the Building Trades Employers' Association in New York. The committee of the Employers' Association has not approved the documents, and some of the steam fitters in New York seem to agree with objections that the New York Employers' Association have made. The National Association of Master Steam Fitters, however, prior to this action in New York, did approve the documents. An effort has been made to get the National Association to withdraw its approval, but this action has not been taken. The National Association, however, did fail to approve the revised subcontract form on account of the general situation. I have been all over the situation with one of the men in New York who, though not on the committee there, has voiced, as I understand it, the general points of opposition that they find.

"The principle objection seems to be that the documents are too long. They seem to fail to appreciate that the value of a standard document is not in its brevity, but its inclusiveness in regard to all of the most general conditions existing in a contract. They seem to feel it is a detriment to have some conditions included which rarely, if ever, occur in their particular work. The fact that the meaning of the standard clauses can be made clear by expert advice, and that they can readily learn what clauses apply to them and what do not, does not seem to appeal to them as being vastly superior to varying general conditions in which they must study, each time, the particular clauses and in regard to which they really should have expert advice of a lawyer each time.

"They also object to the liability insurance arrangement, but apparently because it costs the owner more. All we want and all we were trying to get was complete protection for the owner at the least expense. If we have not succeeded in doing this, subsequent editions will doubtless change the wording. But additional expense to the owner is no justification for refusal to approve the documents.

"They also seem to think that the documents are available for application only to general contracts. They fail to see the intended and actual adaptability of the documents to any contract, and a heating contract practically always has sub-contracts involved in it, and so is in effect a general contract itself; the form, therefore, applies to their work as direct contractors, if their work is so executed. Doubtless in connection with a heating contract, or electric contract, or a plumbing contract, additional clauses would be needed, as in the case of nearly every building contract, and conceivably some clauses might be entirely crossed out. The fundamental provisions, however, apply. This they do not seem to appreciate.

"They object to what they conceive to be some statements that limit the architects in being the agent of the owner, and feel, apparently, that all provisions of the contract in which the architect is assumed definitely or by inference not to be the agent of the owner are objectionable. They fail to appreciate that for the purpose of carrying on the contract as agreed upon, the architect is definitely accredited the agent of the owner for certain specific purposes, but that for purposes of changing the contract his agency is properly limited, as every owner would naturally insist.

"There also seems to be objection to the fact that it is possible to make changes in the Standard Form, and that changes are even anticipated. They seem to feel that if a Standard Form can be changed it loses its value as a Standard Form. This, of course, appears on the face of it, to us, to be unreasonable, since no standard form will ever be developed that will not be subject to changes to fit individual conditions. Having, however, a complete and full Standard Form, it assists the contractor to observe readily points in which changes are made, the balance of the document being familiar to him without study in each particular case."

Contractors Should Not Pay for Blue-Prints in Estimating.

I feel that it is quite right and only proper that, except in the case perhaps of advertised work, contractors should not be required to pay for blue-prints for estimating purposes. Heating contractors should also retain one set for their files and records. They are doing their full share in bearing the cost of estimating, which under our present system is but a contribution to our enormous national waste and a factor in the high cost of building. It has been computed that there is spent in this country each year for the privilege of estimating the sum of over \$85,000,000, more than one-half of which, on a conservative basis, could be saved if efficient methods along the lines of the so-called "quantity survey system" were generally adopted.

Instead of hopefully waiting for proper methods of estimating to be evolved, let us do our share now in improving them in every way possible. Architects can help greatly in conserving waste of money and human energy in the heating field alone if they will do some very simple things, which I suggest that you can call upon them to do. Some of these are now being done by those architects whose first thought is real service to their employers—the clients. One of these is the preparation of clear and complete drawings and precise specifications which lessen the time and risks contractors take in estimating and which convey to them the assurance that they will not, if they secure the contract, be expected to make up for shortcomings of the architect.

I have seen some architects' drawings without figures outside or inside of the plans, and have read some specifications almost as brief as this: "Heat all portions of the building to 70 degrees in zero weather and guarantee these results." Here we have steam-fitters, say twenty to thirty, if under the sub-contractor evil, spending their time scaling off every office or room or enclosed area, when all this time could be saved if one draftsman in an architect's office had taken the time necessary to do this work once—and properly.

In that large number of every-day cases where no consulting engineer is employed, and where you are expected to do your own calculating and engineering, and assume all responsibility for results—only to be beaten out, if you have figured even conservatively, by some one not so scrupulous, intelligent or careful—why not refuse to estimate until you are furnished with a reasonable amount of data upon which to base your estimate?

I would urge you, individually and collectively, assuming that you are willing to estimate under these conditions, to insist upon certain basic requirements as a precedent to estimating. Architects can help you greatly if they will become accustomed to putting on every plan both dimensions of each enclosed space—perhaps even to computing either the area or the cubical contents of each enclosure—moreover the addition of figures to indicate the area of window and outside door openings would in many cases save much time and handling of prints to refer back and forth from plans to elevations and sections. Can you not take this up and perhaps consider symbols for drawings?

And in the matter of incomplete and indefinite specifications or of those equally as bad, imposing conditions or guarantees impossible to provide—even if they have been prepared merely in accordance with the routine of an antiquated custom—why not return them to the architect or the engineer responsible for them and frankly state your reasons for not estimating? Be courageous and do this for the good of the cause!

Obviously the architect who makes every heating contractor perform gratuitous calculating and engineering saves himself time, labor and cost, and transfers those not to one but to a large number of heating contractors—and, eventually, to the owners.

And yet one of the singular factors in this condition of affairs is that the trouble often begins with the owners, who too often do not select their architects on the basis of competency and integrity. After allowing for the young and inexperienced men who are selected on the basis of friendship or otherwise and should be given every practical assistance possible by associations of their fellows and of others in the crafts the facts are that many architects who render full and proper services are the ones who charge a greater fee than those who do not, or rather, I should say, those who do not render or do not expect to render the nicer and fairer and, in the end, the more economical service, do not charge the owner as much as those architects who do. Unfortunately some owners give too much consideration to the question of fee in selecting their architects and do not always discriminate between the kinds of service, where the recollection of the quality will remain long after the fee is forgotten. You heating men have the same thing to contend with, so you know all about it, but the owners do not discover their mistake until it is too late.

Of course, for all work of any size, for power plants, and mechanical equipment and for work of a specialized nature, it is to be presumed that the services of a competent engineer have been engaged and the drawings and specifications prepared with accuracy and precision. Presumably such a man will be a member of The American Society of Heating and Ventilating Engineers. If not, he ought to be.

Value of High-grade Membership for Reference Purposes.

In passing I wish to lay stress on this matter of membership, for it applies to your own association as well. All the good men in your calling should invariably be included in your membership. Only such should be properly qualified to enjoy the privilege of your association. Then it will be pertinent on the part of architects and owners considering the awarding of a contract to inquire if the contractor about to be chosen is a member of the association, and if not, why not? Not being a member should be attributed either to a lack of eligibility or to a lack of sensitiveness to his responsibilities, for all good men should delight in assisting organizations of their fellow craftsmen, not for what good the association may do them, but for what good they may do the association.

Your association through its members and committees has already done much to simplify heating practice. This ought greatly to be appreciated by the trade in general, especially by the younger men, who have thus benefited by the results of your experience. You have in this way, also, rendered an assistance to architects and performed services to the owners and occupants of buildings perhaps unknown to them.

In addition to what you have done in perfecting certain practices in piping, and in standardizing flanges, couplings, and threads, etc., can you not further co-operate with The American Society of Heating and Ventilating Engineers and with The American Society of Mechanical Engineers and manufacturers of apparatus, in developing a standard or uniform basis of rating for boilers and domestic water heating apparatus, etc.? I know you have been working on this, or I have read of it in your 1914 proceedings, but can we not look for a definite pronouncement and the publishing of the results?

Uniform Radiation Formula Recommended.

Can you not in co-operation with the same society work on developing a basic formula or officially approving one of those in existence for computing the amount of radiation recommended in proportion to cubical contents, to outside wall area (for different kinds of walls) and different exposures, to window and door openings, etc., and make this available to all architects for instant reference?

Such a formula, if not actually used, as it should be, by those architects who do not employ an engineer for some of their everyday problems, could at least be referred to in their specifications. Then, instead of calling for the building to be heated according to the varying individual judgment of each contractor estimating, these architects could refer to such a formula, as providing the minimum installation allowed. This would undoubtedly be a great improvement over the indefinite methods now obtaining and would provide equitable conditions of estimating so far as capacity of apparatus and amount of radiation is concerned. If any estimate received appeared either too low in cost or deficient in quantities, such a formula

would afford any architect an opportunity to check up for comparison with other estimates.

Of course, preferably, it should be used as the basis of his own calculations to be definitely stated before estimates are asked, and, if so used, I cannot see how it would interfere with the occupation of heating engineers, which is one of the arguments that might be advanced against it. Presumably it would only be used by those architects who would not in any case have employed an engineer for that particular work.

This is a suggestion which I wish you seriously to consider, for I believe it would greatly facilitate common practice in steam fitting, just as the piping of buildings for gas will be facilitated by the basic piping schedule recently adopted by the National Commercial Gas Association.

Of course this basic formula would not alone be sufficient to insure absolute equality of conditions in estimating. There are other matters to be considered, such as a general description or outline specifications or requirements for the ordinary run of work, which, it seems to me, could well be drawn up by your association. This would, of course, not apply to sizes of pipes, which in your case I appreciate are variable, but should be in the form of suggestions to architects as a basis for their specifications to provide truly competitive conditions of estimating, as to whether pipes are to be exposed or to be encased in walls or partitions, as to chasing and covering of same, as to valving and draining raisers in hot water installations, the height of radiators, whether under sills, or seats or not, and so forth, in simple work and on up into air lines, returns and other important principles in larger work.

And there is the matter of sectional covering and banding on lateral runs, plastic covering on flanges, couplings and fittings, and on the heating apparatus itself—surely some standards of practice could be developed which would greatly aid in establishing a uniform basis of estimating.

Use of Names and Brands in Specifications Favored.

While we are speaking on the subject of clarity, why not let us co-operate to get rid of words in specifications which say, but do not mean, "very best quality" and the "or equal," in favor of calling for the brands, thickness and weight of pipes and for the various other products by the several names which will be acceptable?

More and more frequently a distinction is being made as to quality in materials of building construction, and stronger encouragement is being given to those producers who, in spite of rigid competition, adhere to their standards of manufacture and make names for themselves under established brands.

(From an address before the National Association of Master Steam and Hot Water Fitters.)

PROMINENT MANUFACTURER DEAD.

The death occurred on January 8th of Mr. Hugh McCulloch, President of the Goldie & McCulloch Co., Limited, of Galt, Ont., and Vice-President of the Galt Malleable Iron Co., Limited, and of the Galt Art Metal Co., Limited, and a director of the Gore Mutual Fire Insurance Co. The late Mr. McCulloch was in his sixty-first year, a native of Galt, and closely identified with the industrial progress of the city. He was educated at Whitby Grammar School and Upper Canada College. He was a Conservative and a Presbyterian. He is survived by one brother, R. O., of Galt, and one sister, Mrs. Charles A. Shearson, Toronto.

PLAN BIG ENGINEERING FEAT.

The Ontario Hydro-Electric Commission will undertake a huge engineering feat in the construction of the proposed Hydro power canal between Chippewa Creek and Queenston. The project is estimated to cost about \$9,000,000, and when completed will provide an additional 200,000 horse-power for the use of the manufacturers and citizens of Ontario. The Commission will undertake this work itself and will spend approximately \$1,000,000 in the purchase of materials and equipment. As far as possible electrical machinery will be purchased, as the Commission does not want to depend on power generated through the medium of coal.

This greatest of all Hydro-Electric enterprises has been undertaken after two years of exhaustive investigation by the Commission's engineers, and after contractors on the Welland Canal had refused to tender unless they were allowed compensation for the probable advance of coal, and a commission of 25 per cent of the actual cost.

The Commission and its engineers are to be commended for their decision in deciding to tackle this huge engineering enterprise, which we hope will work out successfully and prove to be a good precedent for the construction of all public works throughout Canada. The new canal, when completed, will be twelve miles in length.

ELECTRIC LIGHT ON THE FARM.

The Hydro-Electric Power Commission of Ontario, in its seventh annual report, gives some interesting data on the advantages and cost of installation of electric lighting in farm homes and outbuildings. The report says: "The farmers in the districts that are being served greatly appreciate the improved condition on their places by reason of having electric light in the house, barn, drive shed and yard. With previous forms of lighting the dull appearance of the place from the road and from the yard had a depressing effect. The attractive contrast that is the result of installing electric light will probably be beneficial in keeping the young people on the farm. The decrease of fire risk on the premises due to the absence of coal oil lanterns and lamps is another feature that is usually considered by the farmer in arriving at a conclusion regarding the installation of electric service on his premises.

"Installations in barns are now being made in conduit, as this method is found necessary for the protection of the wires and fittings. The cost of installation varies according to conditions in the different districts. The open wiring varies from \$1.25 to \$1.75 per outlet and the concealed wiring from \$1.50 to \$2.25 per outlet. Conduit installations in the open, that is, in barns and farm buildings, vary from \$3.25 to \$4.50 per outlet. The outlet in each case is the opening for either fixture or switch; it does not include (except where drop cord is used) the fixture, but does include the switches."

CONSTRUCTION NEWS

Information of Special Interest to Architects, Contractors, and Manufacturers.
Construction Building Reports will Give You Up-to-date Information Every
Day on all New Buildings About to be Erected or in Course of Erection.

BUSINESS BUILDINGS.

Ottawa, Ont.—The Trussed Concrete Steel Company of Canada, Limited, 23 Jordan St., Toronto, have been awarded the reinforced steel contract on an office building for the Dominion Loose Leaf Company, Wellington St., to cost \$30,000; The Atlantic Terra Cotta, New York City, have been awarded the terra cotta contract; Hooper Brothers, Elgin and Isabella Sts., have been awarded the cut stone contract; The Italian Mosaic and Marble Company, Toronto, have been awarded the terrazzo contract; Duford, Limited, Ottawa, have been awarded the painting and glazing contracts; McCullum Electric Company, Ottawa, have been awarded the electrical wiring contract; McFarlane & Douglas, Ottawa, have been awarded the roofing contract; A. Gauthier & Company, Ottawa, have been awarded the plumbing contract; Doran & Devlin, 104 Sparks St., are the general contractors; Richards & Abra, Booth Building, Sparks St., are the architects.

Port Arthur, Ont.—The General Realty Corporation Company contemplates the erection of a business block, to cost \$60,000.

Renfrew, Ont.—Architect B. Evan Parry, Renfrew, has prepared plans for a business block for the Jamieson Meat Co., Ltd., to cost \$15,000.

Windsor, Ont.—Architects Watt & Blackwell, Bank of Toronto Chambers, London, have prepared plans for an office building for the Huron & Erie Mortgage Company, London, to cost \$50,000.

CIVIL ENGINEERING.

Hamilton, Ont.—The City of Hamilton contemplates the erection of a concrete subway, to cost \$3,000; E. R. Gray, City Hall, architect.

CLUBS, HOSPITALS, THEATRES AND HOTELS.

Byron, Ont.—Hyatt Brothers, 289 Egerton St., London, has been awarded the general contract for the erection of a hospital for the London Health Association, to cost \$75,000; Watt & Blackwell, London, are the architects.

Hamilton, Ont.—The City of Hamilton contemplates the erection of an addition to the nurses' home Mountain Park Ave., to cost \$11,000; T. H. Pratt, 20 James St. North, is chairman for the hospital board. The Board of Control has postponed this project until a later date. Tenders for heating, plumbing and wiring are being called for by Charlton & Co., Clyde Block Building, for the sanitarium building for the Hamilton Health Association, to cost \$50,000.

Kingston, Ont.—The Arts Building of Queen's University and upper storey of Court House will be altered and converted to accommodate 1,000 beds for the soldiers; Captain W. S. Symons, 22 Victoria St., Ottawa, is the architect.

Montreal, Que.—The Military Hospital Commission, Drummond Building, will erect a hospital on Drummond St., St. George Ward, to cost \$10,000. Jacobs & Bell, St. Catherine St. West, will erect a theatre on Grey and Bulmer Sts., to cost \$59,000.

Toronto, Ont.—The Salvation Army will make alterations to their Training College on Sherbourne St. for hospital purposes, to cost \$7,000. The Women's College Hospital and Dispensary, 125 Rusholme Road, contemplates the erection of a hospital on Rusholme Road, to cost \$60,000; Gordon & Hellwell, Confederation Life Building, are the architects. Architect Geo. B. Post, New York City, is preparing plans for a hotel for the Anglo-American Hotel Company, to cost \$2,000,000; W. S. Dinnick, 84 King St. East, Toronto, is the secretary.

Windsor, Ont.—The work on a club house for the Knights of Columbus has been postponed; G. Jacques & Company, architects.

FIRE LOSSES.

Barrie, Ont.—The Board of Education school at Barrie was destroyed by fire; loss \$100,000.

Campbellford, Ont.—Dickson Bridge Company's factory was destroyed by fire; loss \$60,000.

Cayuga, Ont.—John Ranston's grist mill was destroyed by fire; loss \$10,000.

Charlottetown, P.E.I.—The town of Summerside was damaged by fire; loss \$325,000.

Emsdale, Ont.—J. W. MacDonald's store was destroyed by fire; loss \$5,000.

Fonthill, Ont.—A. McGlashan's residence was destroyed by fire; loss \$6,000.

Halifax, N.S.—Pickford & Black's wharf at Halifax was destroyed by fire.

Hamilton, Ont.—The National Machinery and Supply Co.'s, 76 Wellington street north, factory was destroyed by fire; loss \$20,000.

Manneheim, Ont.—Eph. Devitt's barn and drive sheds were destroyed by fire; loss \$3,000.

Ottawa, Ont.—The Rolla L. Crain Co., Ltd., Spruce street printing plant was destroyed by fire; loss \$150,000.

Peterboro, Ont.—The Quaker Oats Company's Peterboro factory was destroyed by fire; loss \$500,000.

Port Stanley, Ont.—Stevens Hartlip's residence was destroyed by fire; loss \$2,000.

Prince Albert, Sask.—Windsor Hotel was destroyed by fire; loss \$50,000.

Prince Albert, Sask.—MacLeod Co., Ltd., department store was destroyed by fire; loss \$20,000 on the building, and on the stock \$175,000.

Rockland, Ont.—The Roman Catholic congregation church at Rockland was destroyed by fire; loss \$100,000.

Simcoe, Ont.—The Delhi Mitt Factory was destroyed by fire; loss \$20,000.

Springfield, Ont.—Mr. Reichheld's hotel was destroyed by fire; loss \$10,000.

Stouffville, Ont.—Todd & Cook's warehouse was destroyed by fire; loss \$10,000.

Toronto, Ont.—The car barns of the Toronto Railway Company, King street east, were destroyed by fire; loss \$100,000.

Tullamore, Ont.—The rectory of the Anglican Church was destroyed by fire; loss \$2,500.

MISCELLANEOUS.

Cochrane, Ont.—The Frederick House and Abitibi Pulp Wood Co., Cochrane, contemplates the erection of a pulp mill, to cost \$150,000.

Fort William, Ont.—The Terminal Elevator Co., Fort William, contemplates the erection of a grain elevator, to cost \$130,000.

Hamilton, Ont.—W. H. Yates, Jr., 244 Leeming St., has been awarded the contract for the erection of an ice-house for the Abso Pure Ice Co., Barton St. East, to cost \$8,000.

Hamilton, Ont.—The Salvation Army, Rebecca and Humphrey Sts., contemplates the erection of a rescue house, to cost \$25,000. T. Ramsden, Lister Building, has been awarded the carpenter contract in a garage for Thos. Ramsey, 15 Market Square, to cost \$15,000; R. Isbister, 65 Hughson St., has been awarded the mason contract, and are also the general contractors; E. B. Patterson, 143 Wentworth St. North, is the architect. The City of Hamilton contemplates the erection of bath houses, to cost \$7,000.

Kingston, Ont.—The Dominion Government, Ottawa, contemplates the erection of a limestone mill at Kingston.

London, Ont.—Architect J. H. Tramanhouser Co., Ltd., Temple Building, Toronto, have prepared plans for flour mills for Hunt Brothers, Ltd., Talbot St. South, to cost \$40,000.

Montreal, Que.—The Grand Trunk Railway Company are constructing a plant at Montreal for repairing freight and passenger cars; it is estimated to cost \$700,000.

Niagara Falls, Ont.—C. M. Barter, Main St., Niagara Falls, is the architect for a fire hall to be built on Walnut and Kitchener Sts. by the City of Niagara Falls, to cost \$20,000.

Ottawa, Ont.—Arrangements have been completed for the construction of a large floating drydock at Vancouver.

Ottawa, Ont.—The City of Ottawa will erect swimming baths to cost \$75,000. The City of Ottawa will erect a garbage destruction plant, to cost \$50,000. Work has started on a shop for Mrs. J. de St. Denis Lemoine, 505 Wilbrod St., to cost \$6,000.

Ottawa, Ont.—The Trussed Concrete Steel Company of Canada, Limited, Walkerville, have been awarded the reinforcing steel contract in a garage for the Ottawa Car Co., Slater St., to cost \$60,000; Sutherland & Son, 216 Cooper St., are the general contractors; W. E. Noffke, Plaza Building, is the architect.

Port Arthur, Ont.—The Hydro Electric Commission, University Ave., Toronto, contemplates the erection of a power plant. J. J. Carrick, Port Arthur, Ontario, contemplates the erection of a pulp mill, to cost \$1,000,000.

Port Stanley, Ont.—M. J. Hogan, Port Burwell, Ontario, has been awarded the contract for the completion of a breakwater for the Dominion Government, to cost \$130,000.

Stratford, Ont.—McIntosh Granite Co., 1623 Yonge St., Toronto, have been awarded the general contract for the erection of a mausoleum for Dr. W. H. Hamilton, Fort William, to cost \$7,000; J. S. Russell, Gordon Block, Stratford, is the architect.

Toronto, Ont.—Architect G. W. Gouinlock, Temple Building, is preparing plans for lavatories for the National Exhibition Board, 38 King St. East, to cost \$25,000. R. A. L. Gray & Co., 85 York St., has been awarded the wiring and fixture contracts in the municipal incinerator on Don roadway for the City of Toronto. Architects Darling & Pearson, 2 Leader Lane, are preparing plans for a mausoleum for the Toronto General Burying Ground Trustees, Confederation Life Building, Toronto, at Mount Pleasant Cemetery, to cost \$200,000.

Welland, Ont.—The town of Welland contemplates the erection of a fire hall. Wm. Mitchell, Welland, Ontario, has been awarded the general contract for the erection of a barracks for the Salvation Army, to cost \$4,000.

PLANTS, FACTORIES AND WAREHOUSES.

Acton, Ont.—J. B. Mackenzie, Georgetown, Ont., has commenced work on a factory for the Reliance Shoe Company, Toronto, to cost \$15,000.

Belleville, Ont.—The Maple Leaf Tire Company, Belleville, contemplates the erection of an addition to their factory.

Brantford, Ont.—The city of Brantford contemplates the erection of a filtering and chlorinating plant; T. Harvey Jones, City Engineer.

Cornwall, Ont.—Anglin's, Limited, 65 Victoria street, Montreal, have been awarded the general contract for the erection of an addition to the factory of the Canadian Cotton Co., 28 Victoria street, Montreal, to cost \$30,000.

Grimsby, Ont.—The Metal Craft Company, Grimsby, contemplates the erection of a factory, to cost \$12,000.

Guelph, Ont.—Rundle & Son, Clark street, have been awarded the mason contract in the factory of the Dalyte Lamp Co., Ltd., Guelph, to cost \$15,000; Geo. Walker, 32 Tiffany street, has been awarded the carpenter contract; Frank & Shuett, 92 Macdonell street, have been awarded the sheet metal and iron work contracts; W. A. Mahoney, 73 Quebec street west, is the architect.

Hamilton, Ont.—The Desmond-Stephen Co., 44 Market street, contemplates the erection of a factory on Market street.

Hamilton, Ont.—Architects Prack & Perrine, Lumsden Building, Toronto, are preparing plans for a factory for the Canadian Westinghouse Company, to cost \$50,000. The work on the addition to the factory of the American Car Company will not proceed until after the war; the addition will cost \$25,000. H. C. Gummo, 15 Tuckett St., has been awarded the general contract for the erection of a warehouse for C. Miles, 95 King St. East, to cost \$5,000.

Hamilton, Ont.—W. H. Cooper, Clyde Block, has been awarded the mason contract in the factory of the Tailman Brass and Metal Co., to cost \$50,000; J. C. Boswell, 140 Wellington street, has been awarded the painting and glazing contracts; J. E. Riddell, 14 Ferguson avenue north, has been awarded the roofing contract; E. Goodall, 96 Alkman avenue, is the general contractor; Stewart & Witton, 7 Hughson street, are the architects. W. H. Yates, Jr., 24 Leeming street, has been awarded the general contract for the erection of an ice storage plant for the Abso-Pure Ice Co., Barton street east, to cost \$3,000.

Hickson, Ont.—Jencks Machine Co., St. Catharines, Ont., have been awarded the contract for the installation of the boilers and stack in the factory of the Canadian Milk Products Ltd., Mail Building, Toronto, to cost \$15,000; McKinney, Woodstock, Ont., has been awarded the general contract.

Kincardine, Ont.—J. B. Watson, Princess street, contemplates the erection of a factory, to cost \$50,000.

Kitchener, Ont.—The Woelfe Shoe Company contemplates the erection of a factory, to cost \$10,000; Chas. Cowan, Victoria St., is the architect.

Lindsay, Ont.—Rhys Williams, Lindsay, Ont., have been awarded the concrete and brick work contracts in a cold storage plant for Flavell, Limited, Kent street, to cost \$60,000; G. M. Miller & Co., 93 Yonge street, Toronto, are the architects.

London, Ont.—Kentshersed & Rolls, Kansas City, have purchased a site for the erection of a broom factory at London, to cost \$75,000.

New Toronto, Ont.—Fiddes & Hogarth, 122 King street east, have been awarded the heating contract in the factory for the Dominion Abrasive Wheel Company, to cost \$65,000; Toms Construction Co., Kent Building, Toronto, are the general contractors.

New Toronto, Ont.—Purdy-Mansell, Limited, 63 Albert street, Toronto, have been awarded the plumbing contract in the factory for the Goodyear Tire and Rubber Company, Limited, 152 Simcoe street, to cost \$750,000; Dominion Construction Company, 152 Simcoe street, are the general contractors; W. D. Spengler, 152 Simcoe street, is the engineer.

Ottawa, Ont.—Cuthbertson & Clark, 143 Hawthorne street, have commenced work on a factory on Hinton avenue, for the Capital Wire Cloth Mfg. Co., Ottawa, to cost \$9,500; Richards & Abra, 126 Sparks street, are the architects.

Owen Sound, Ont.—The Keenen Woodenware Co., Owen Sound, will erect an addition to their factory, to cost \$15,000.

Owen Sound, Ont.—The Northern Bolt, Screw and Wire Co., Ltd., Owen Sound, Ont., contemplates the erection of a keg mill and factory addition; J. M. Kilbourn, president.

Quartsino, Ont.—The Colonial Pulp and Paper Mills, Ltd., Quartsino, Ont., contemplates the erection of a sulphite plant.

Smith's Falls, Ont.—The Canadian Cooperage Co., Smith's Falls, contemplates the erection of a factory, to cost \$20,000; F. F. Kessel, manager.

St. Catharines, Ont.—Architects Denison & Stephenson, 18 King street west, Toronto, have prepared plans for an addition to the factory of Kinleth Paper Co., St. Catharines, to cost \$6,000.

Toronto, Ont.—Work has started on alterations to freight offices for the Grand Trunk Railway, to cost \$6,500. Jackson & Lewis, contractors, Bell Telephone Building, have received tenders for the erection of a warehouse for Cassidy's, Ltd., 51 St. Paul St. West, Montreal, to cost \$30,000; MacVicar & Heriot, 104 Union Ave., Montreal, are the architects.

Toronto, Ont.—T. Pringle & Sons, Excelsior Life Building, have received tenders for the erection of a warehouse and garage for Clarkson-Jones Estate, Sun Life Building, to cost \$18,000. The Toronto Furnace and Crematory Co., 111½ King street east, have been awarded the heating contract in the addition to the factory of the National Electric and Heating Company, 544 Queen street west, to cost \$5,000; L. E. Dowling, 167 Yonge street, is the general contractor. Jas. Hicks, 144 Montrose avenue, has been awarded the mason contract in the factory of the Dominion Machinery Co., 110 Church street, to cost \$7,000; A. B. Ormsby, 48 Abell street, have been awarded the skylight and metal sash contracts. Geo. R. Baker, 37 Lappin avenue, has been awarded the plumbing and heating contracts in the store and warehouse for H. H. Williams, 38 King street east, Toronto, to cost \$30,000; W. R. McGiffon Co., Ltd., 54 Roncesvalles avenue, have been awarded the carpenter contract; G. W. Wood, 613 Manning avenue, has been awarded the mason contract; C. J. Gibson, 51 Yonge street, is the architect.

Welland, Ont.—Ryan & Gardiner, Main street, have been awarded the general contract for the erection of an addition to the plant of the Canadian Steel Foundries, Limited.

Whitby, Ont.—The Canadian Tractor Company contemplates the erection of a factory, to cost \$60,000.

PUBLIC BUILDINGS AND STATIONS.

Galt, Ont.—The Hydro-Electric Commission are preparing plans for an addition to their station on Dickson street. Robert Elliott, superintendent.

Ottawa, Ont.—R. C. Desrochers, Secretary of Public Works,

has received tenders for completion of the public building at Three Rivers, P.Q.

Preston, Ont.—John Hayman & Sons, 482 Wellington street, London, have commenced work on an addition to the Hydro station for the Hydro-Electric Commission, Toronto, to cost \$10,000.

Tillsonburg, Ont.—The Hydro-Electric Commission contemplates the erection of a power station at Tillsonburg, to cost \$15,000.

Welland, Ont.—The Hydro-Electric Commission have received tenders for the erection of a transformer station at Welland, to cost \$50,000.

RESIDENCES, STORES AND FLATS.

Hamilton, Ont.—Architect E. B. Patterson, Wentworth St. North, has prepared plans to convert a store into an apartment house, to cost \$5,000; Ed. Mathews, 221 John St. North, is the owner.

Oakville, Ont.—The Canadian Engineering and Contracting Company are excavating for a residence for W. F. Eaton, on Ravenscliffe Ave., to cost \$40,000; Munro & Mead, 34 Hughson St., are the architects.

Renfrew, Ont.—Wm. Hastings, Renfrew, has been awarded the plumbing and heating contract in the stores and apartments for John Mitchell, to cost \$20,000; G. T. Moore, Renfrew, has been awarded the general contract; B. Evan Parry, is the architect.

Thornhill, Ont.—The Board of Control of Toronto has sent a project on to the City Council for approval that fireproof cottages for boys should be built at the Men's Industrial Farm; they will cost \$75,000.

Toronto, Ont.—Work has commenced on a pair of residences for W. A. Scott, 125 Mutual St., on Victoria Ave., to cost \$7,000; P. H. Finney, 79 Adelaide St. E., is the architect. L. E. Dowling, 167 Yonge St., has been awarded the general contract for the erection of a store on Yonge St. for Mr. Powell, 380 Yonge St., to cost \$6,000. The Board of Control has sent a project on to the City Council for approval that fireproof cottages for girls should be built at the Women's Industrial Farm; they will cost \$75,000.

Toronto, Ont.—R. M. Lesme, 1027 Gerrard St. East, has been awarded the hot water heating contract in the residence of Chas. Bully, 119 Dinnick Crescent, on Pembroke St., to cost \$5,000; Mr. McConnell, Cosgrave Building, is the architect. W. H. Addison, 301 Carlaw Ave., has been awarded the plastering contract in a residence for A. A. Thompson, 88 Warren Road; Thos. Lunn, Toronto, has been awarded the painting contract; Edwards & Edwards, 18 Toronto St., are the architects. Kerr & Martin, 25 Howland Ave., have been awarded the general contract in the residence of J. A. Trebilcock, 153½ Queen St. West, to cost \$6,000; W. Bredin Galbraith, Traders Bank Building, is the architect.

Walkerville, Ont.—The Border City Supply Company, 5 Pitt St. West, Windsor, Ontario, have received tenders for the erection of a residence for H. F. Metcalfe, Kingston Business College, Kingston, Ontario, to cost \$5,000.

Windsor, Ont.—Work has commenced on a residence for Winter, Williamson & Little, Pitt St. West, Windsor, to cost \$5,000.

SCHOOLS, COLLEGES AND CHURCHES.

Creemore, Ont.—The by-law authorizing bonds for the erection of a school to cost \$16,000 at Creemore was upheld by the court.

Creemore, Ont.—H. M. Coshett, secretary of the Public School Board, will call for tenders shortly for the erection of a school at Creemore, to cost \$18,000.

Hamilton, Ont.—John Milburn, 22 William street, has been awarded the general contract for the erection of a church for the Roumanian Greek Orthodox Church, to cost \$3,000. Architect Gordon Hutton, Bank of Hamilton Building, will call for tenders about February 1st for the erection of an addition to the Adelaide Hoodless School, Maple avenue, to cost \$40,000.

McGregor, Ont.—The School Boards No. 8 Anderson and No. 11 Colchester have abandoned the project of the erection of a school to cost \$10,000; G. Jacques & Co., 5 Sandwich street west, Windsor, are the architects.

McGregor, Ont.—Architects G. Jacques & Co., Pensular Security Building, Chatham street west, Windsor, are preparing new plans for a school, to cost \$7,000; A. J. Barnars, McGregor, is the secretary for the School Board.

Preston, Ont.—The Methodist congregation contemplates the erection of an addition to their Sunday school, to cost \$15,000; Rev. D. A. Walker, pastor.

St. John, N.B.—Architect H. Claire Mott, St. John, N.B., has received tenders for the erection of a new school building at Glen Falls, Coldbrook, N.B.

Swansea, Ont.—The Dickie Construction Co., Ryrie Building, Toronto, have been awarded the general contract for the erection of a church for the Morningside Presbyterian Church, to cost \$30,000; J. M. Jeffrey, care of Sharp & Brown, 18 Wellington street east, Toronto, is the architect.

Tweed, Ont.—McKelvey & Birch, 69 Brock street, Kingston, have been awarded the plumbing and heating contract in a school for the Board of Education, to cost \$20,000; A. MacPherson, Toronto, has been awarded the electric wiring contract; Houston Company, Limited, Tweed, are the general contractors; Ellis & Ellis, Manning Chambers, Toronto, are the architects.

Toronto, Ont.—The Board of Education, 263 College street, has purchased a site at the corner of Glenholme and Earncliffe avenue, for the erection of a school, to cost \$100,000; W. C. Wilkinson, secretary.

Toronto, Ont.—The Board of Education contemplates the erection of an addition to Perth Avenue School, to cost \$60,000. R. Chalkley & Sons, Ltd., 34 Victoria street, have been awarded the mason contract on the addition to Orde Street School, to cost \$70,000; Concrete Construction Company have been awarded the reinforced concrete contract; Frank Armstrong, rear 89 Oak street, has been awarded the carpenter contract; Beaver & Co., 62 Winchester street, have been awarded the plastering

contract; D. M. Rowe & Co., 30 Atkins avenue, have been awarded the sheet metal and roofing contracts; Canada Ornamental Iron Co., 88 River street, have been awarded the ornamental iron contract; J. Phinmore, rear 367 Dupont street, has been awarded the painting and glazing contracts; Fred Armstrong Co., Limited, 273 Queen street west, have been awarded the plumbing, electric wiring, heating and ventilation contracts; Johnson Temperature Regulating Company, 118 Adelaide street west, have been awarded the heat regulator system contract; Canada Glass, Mantel and Tile Company, 45 Richmond street, have been awarded the terrazzo floors contract.

THE MODERN INDUSTRIAL BUILDING.

By Edward H. Putnam.

The general improvement in American architecture is easily apparent in the construction of the modern industrial building. Careful study of proportion and decorative treatment is the rule rather than the exception, and the bleak, barren waste of the cheapest material obtainable belongs to the past. The factory building of to-day, while strictly utilitarian, is built on the principle that economy is not of necessity limited to a saving in initial cost. The aesthetic appeal is considered, and even in instances of Spartan simplicity the crude and unsightly are carefully avoided.

There is some excuse for the old-time ramshackle structures; building materials were not on a par with those in vogue to-day and selection was limited. Steel construction was in its infancy, reinforced concrete was unknown and architectural terra cotta had not reached its present development as a practical as well as an ornamental structural material. Hollow tile and stucco were not even dreams. Even brick had not its present flexible versatility.

That the spirit was willing is attested by the occasional presence of a microscopic garden or ivy covered office tucked away in the middle of a waste of coal trestles, boiler houses and long, low, dingy buildings covered with soot and dust. The attractive approach, while not totally lacking, was unusual.

Undoubtedly steel construction has had a great deal to do with the changed conditions. Large, heavy piers that shut out sunlight and air have no part in recent construction, and the factory building is frequently a mere skeleton enclosed in steel sashed windows.

The modern policy of publicity is largely accountable for the improvement. Situated by railroads, as most factories naturally are, there is an excellent chance of prepossessing the thousands that pass daily in favor of an article that is manufactured in a clean, well-lighted, sunny building. Clothes do not make the man, but we are certainly more favorably impressed by a clean shirt than by a dirty one with frayed cuffs, and the same principle applies to buildings.

There are other reasons more practical, perhaps, but equally intangible; reasons that have to do with the hackneyed and over-used words, "psychology" and "efficiency." There can be no doubt that a clean, attractive, well-lighted and ventilated building keeps the workman more alert mentally, more satisfied, and less inclined to listen to the malcontent and the agitator. He is healthier, happier, and his efficiency increases automatically.

The large number of food product buildings condemned as unsanitary some years ago has forced a marked improvement in buildings of this character. The best-known firms have made cleanliness a visible asset. An interesting example, and one in which many materials are used in a supplementary way, is the Sheffield Farms dairy. The three-story elevation of the main building is a reinforced concrete frame covered with a veneer of lustrous glazed white architectural terra cotta, a combination which is practically indestructible. The terra cotta protects the concrete from fire and weather, offers little foothold for soot or dirt, and is very easily cleaned down with soap and water. In this instance advantage is also taken of the decorative possibilities of architectural terra cotta; the name panels are raised in white against backgrounds of green, the keystones of the window arches show a conventional milk bottle in white against green, and the large cartouches under the cornice are in the shape of a cow's head executed in the natural colors of the Jersey cow. Surely an appropriate form of decoration! Instead of the usual pressed metal the panels between the window courses are of light green glazed terra cotta. The superstructure is of common brick covered with thin cement stucco artificially jointed to reproduce the effect of the lower stories. The walls of the large bottling room, four stories high, are also of lustrous glazed white terra cotta, and, if necessary, can be cleaned down with a hose. Bottling is done by the gravity system. The milk is hoisted to the top and comes out in sealed bottles at the delivery level.

One of the most usual forms of the industrial building is the unadorned frame of reinforced concrete. Properly constructed, its durability and efficiency are beyond question, and its strong, simple lines and uniform gray color give an impression of solid worth and not infrequently an impression of what might be called rugged dignity or grim beauty. As a matter of fact the impression of mass is misleading, for the piers are usually very slender to permit maximum window space, and a multitude of large windows more than anything else is the unfailing sign of a thoroughly up-to-the-minute factory. One very real advantage of reinforced concrete is that it is a rapid form of construction.

Brick always has and always will hold its own as one of the most popular building materials for industrial buildings, and brick to-day is a far more adaptable material than it ever was before. A monotonous even red used to be the one aim, and off-color brick were sold as "seconds." Almost a complete about-face in this particular is an indication of the improved public taste. Brick of uneven shade have become so popular that manufacturers are specializing along this line. Pattern work in brick-laying has come into vogue, and instead of the smooth-faced brick of other years many rugged textures have been introduced and have met with immediate favor. A brick factory to-day may express the highest type of architecture and at the same time be practical and thoroughly economical.

Just as the war has affected every other line of endeavor this year, it has had a peculiar effect upon the erection of factories. The most apparent effect is one of stimulation; many factories of many kinds are cropping up all over the country, as a direct result of the war, but dependent upon the continuance of the war to dispose of them a little more than temporary, and erected as an investment with the greatest haste and in the cheapest possible way in order that the returns upon the investment may be immediate and generous. This necessity and the probability of

closing down at the end of the war have caused a mushroom growth of flimsy shacks with one seemingly durable feature, the high fence that surrounds them.

On the other hand, the money that these makeshift factories have brought in has undoubtedly enabled many firms to erect modern plants for the production of materials that are staple in normal times.

And there is another direct result of the war. We are beginning to manufacture a number of products that formerly were imported, and the great majority of these adopted industries will become permanent naturalized residents. Each one must be housed, and there is little doubt that our present knowledge of what constitutes good industrial construction will be applied with excellent results.—"American Architect."

CONTRACTORS and SUB-CONTRACTORS

As Supplied by The Architects of Buildings
Featured in This Issue

Building, Canadian Kodak Co., Ltd., Factory, Kodak Heights, Toronto, Ont.

Contractors, Deakin Construction Co., Ltd., Montreal, Que.
Brick, Medina Shale Brick Co., Streetsville, Ont.; Don Valley Brick Works, Toronto, Ont.

Boilers, Babcock & Wilcox, Toronto.

Boiler Feed, Pump, Blake Knowles, Toronto.

Cabinet and Woodwork, H. W. Switzer, Toronto.

Cement, Canada Cement Co., Ltd., Toronto.

Concrete Work, Deakin Construction Co., Ltd., Montreal, Que.

Cranes, Northern Crane Works, Ltd., Walkerville.

Chimneys, Custodis Co., Toronto.

Concrete Piles, McArthur Concrete Pile Co., New York.

Conveyors, Lamson Co., Toronto.

Air Washers, Canadian Buffalo Forge Co., Ltd., Kitchener.

Coal Scale, Richardson Scale Co., Bridgeburg.

Elevators, Otis-Fenson Co., Ltd., Toronto.

Fire Alarm System, Purdy Mansell Co., Ltd., Toronto.

Fire Doors, H. B. Ormsby & Co., Ltd., Toronto.

Fire Hose, Dunlop Rubber Co., Ltd., Toronto.

Fire Pump, A. R. Williams Machinery Co., Ltd., Toronto.

Floor Covering, H. H. Symmes & Brother, Montreal, Que.

Fittings and Valves, Jenkins Bros., Ltd., Toronto.

Gaskets, Howe & Bassett, Rochester, N.Y.

Glass, Pilkington Bros. Glass Co., Ltd., Toronto, Ont.

Hardware, Yale & Towne Co., St. Catharines.

Hollow Tile, National Hollow Tile Co., Toronto.

Insulation, Armstrong Cork and Insulation Co., Toronto.

Inter-Phone System, Stromberg-Carlson Electric Co., Toronto.

Ice Machinery, Canadian Ice Machinery Co., Ltd., Toronto.

Kitchen Utensils and Equipment, Wrought Iron Range Co., Ltd., Toronto.

Metal Cornice, Douglas Bros., Ltd., Toronto.

Marble, Canada Glass Mantles and Tile Co., Ltd., Toronto.

Plumbing, Purdy, Mansell & Co., Ltd., Toronto.

Plaster Work, Deakin Construction Co., Ltd., Montreal, Que.

Preservative Wood, Dominion Paving and Contracting Co., Toronto.

Paints, Interior, Sherwin-Williams & Co., Ltd., Toronto; Exterior, Trussed Concrete Co., Stone-Tex., Toronto; Cold Water, A. Ramsay & Son, Montreal, Que.

Packing, Garlock Packing Co., Toronto.

Power Machinery, Prime Movers, John Inglis Co., Ltd., Toronto.

Motors, Canadian Westinghouse Co., Ltd., Toronto; Pumps, Fairbanks Morse Canadian Co., Ltd., Toronto.

Refrigeration Machinery, Canadian Ice Machinery Co., Ltd., Toronto.

Refrigerator Doors, John Hillock & Co., Ltd., Toronto.

Radiators, Taylor-Forbes, Ltd., Toronto.

Refrigeration Equipment, Canadian Ice Machinery Co., Ltd., Toronto.

Reinforcements, Steel Co. of Canada, Ltd., Hamilton, Ont.

Roofing, Tar and Gravel, Douglas Bros., Ltd., Toronto.

Steel Reinforcing, Steel Co. of Canada, Ltd., Hamilton.

Steel Testing, R. W. Hunt & Co., Ltd., Montreal, Que.

Structural Iron and Steel, Standard Steel Construction Co., Ltd., Welland.

Smoke Flue and Breech, Toronto Iron Works, Ltd., Toronto.

Sprinkler Equipment, Purdy, Mansell & Co., Ltd., Toronto.

Tanks, Polson Iron Works, Ltd., Toronto.

Testing, Canadian Inspection and Testing Laboratories Co., Ltd., Toronto.

Wood Treating, Dominion Paving and Contracting Co., Toronto.

Water Heater, Sims Water Heater Co., Toronto.

Water Softener, Kennicott Water Softener Co., New York.

Landscape Architects, Harries & Hall, Bay street, Toronto.

* * *

Building, Christie, Brown & Co., Ltd., Factory and Office Building, Toronto, Ont.

Architects, Sproutt & Rolph, Toronto, Ont.

Engineers, Jennings & Ross, Toronto.

Brick, Plain, John Price, Toronto; Fancy, Don Valley Brick Works, Ltd., Toronto; Enameled, Scott, Hammond & Pratt, Toronto.

Casements and Window Construction, Henry Hope & Sons, Ltd., Toronto.

Concrete Work, Jennings & Ross, Toronto.

Electric Fixtures, E. F. W. Salisbury, Toronto.

Electric Wiring and Apparatus, E. F. W. Salisbury, Toronto.

Expanded Metal, Clarence W. Noble, Toronto.

Fire Alarm System, E. F. W. Salisbury, Toronto.

Fire Doors, A. B. Ormsby & Co., Ltd., Toronto.

Fire Escapes, McGregor & McIntyre, Ltd., Toronto.

Glass, Consolidated Plate Glass Co., Ltd., Toronto.

Ornamental Iron, McGregor & McIntyre, Ltd., Toronto.

Plaster Work, Jennings & Ross, Toronto.

Roofing, H. Williams & Co., Toronto.

Screens, Higgins Mfg. Co., Toronto.

Sprinkler Equipment, W. J. McGuire, Ltd., Toronto.

Stone, Geo. Oakley & Sons.

Structural Iron and Steel, McGregor & McIntyre, Ltd., Toronto.

The, National Fireproofing Co., Toronto.

Vaults, J. & J. Taylor, Ltd., Toronto.

Water Tank, Des Moines Bridge and Iron Co., Pittsburg, Pa.

Weather Strip, Higgin Mfg. Co., Toronto.

Contractors (general), Jennings & Ross, Toronto.

CATALOGUES and BOOKLETS

Eureka Water Pumps and Systems.—The Bishop-Babcock Becker Company, Cleveland, Ohio, have issued Catalogue B33. It describes in detail the various systems they manufacture. The Eureka systems are complete, covering pumps and systems which are operated by electric motors, gasoline or kerosene engines, city water pressure, or by hand, enabling water to be pumped from any source and delivered wherever desired. Capacity details and other tabular information is given. Copies can be had on application.

Pedlar's Saino Fire Door.—This book describes a product that is claimed to be radically different from any fire door heretofore known. The National Fire Protection Association demand that fire doors meet certain requirements, and apparently these have been amply accomplished by the manufacturers of these doors. A description covering the six types made, cuts and illustrations, hardware required, and blue prints, are included in this book. It is, in fact, as complete an edition of its kind as we have had the pleasure of reviewing for some time. By addressing the Pedlar People, Ltd., at any of their numerous branches this book may be obtained.

British Columbia Red Cedar Shingles is the title of an interesting booklet issued by the British Columbia Government. It is well known throughout the continent that British Columbia shingles are the highest grade shingles manufactured, owing to the fact that cedar reaches its best development in British Columbia. The best methods of laying, the right nails to use, how to use them, the reliability and economy of them, are all dealt with in this booklet, and the many advantages to be gained by promoting their use adds force to the argument that interprovincial commerce and trade should be encouraged to the best of our ability. By addressing the British Columbia Lumber Commissioner, Excelsior Life Building, Toronto, Ont., this and other valuable information may be procured.

The Webster Vacuum System of Steam Heating is the title of a profusely illustrated and attractively bound ninety-six page catalogue just issued by Darling Bros., Ltd., Montreal. It describes the progress of the firm during the past twenty-eight years in relation to the development of heating systems and the effect of a close study and the application of engineering principles towards bringing to its present state of efficiency the vacuum system of steam heating and the various accessory apparatus which they produce. It further contains many pages of valuable information illustrated with drawings on the installation of the Webster System, besides describing this system and giving typical installations. Views are given throughout the catalogue of various Canadian buildings in which the Webster System is installed, which include some of the largest office buildings, hotels, public institutions, factories, apartment houses, and private residences in Canada. Other Webster Systems are described, including the Webster Pres-co Vacuum System, the Webster Hydro Pneumatic System, the Webster Hydro Vacuum Control System, and the Webster Modulation System. Feed Water Heaters are illustrated and described, as well as other special apparatus relating to control and efficiency. This catalogue should be in the hands of every architect and engineer of Canada, and a card mentioning "Construction" will result in a copy being sent.

Planning and Specifying Interior Lighting.—Illumination from Concealed Sources is the most comprehensive publication on lighting that has yet come to hand. Dealing, as it does, with this important subject, no facts or points of interest have been overlooked. With this data at his command the architect or illuminating engineer can design his own fixtures to harmonize with the specific interior, and be assured that the illumination will be ample in quantity, perfect in quality, and the combined artistic and lighting effect entirely in accord with the general period or scheme of decoration.

Scientifically designed X-ray eye comfort reflectors and accessories have been developed to meet the requirements for indirect illumination from ceiling fixtures of many types, floor pedestals, urns, portable floor and table art lamps, wall and pillar brackets, pillar capitals, corbels and cornices. This equipment has been standardized, and complete data, dimensional drawings, and other requisite information on the various types of reflector equipment are given.

It is stated that with this equipment, which has been adopted by the world's largest manufacturers, the efficiency of workmen is increased, and, since he is working under hygienic conditions, his services and good will are retained.

Twenty-four detail plates are enclosed with this portfolio, and they cover the field up to the present stage of development excellently.

It is the endeavor of this company to render valuable aid to the architect, and they emphasize that their staff of illuminating engineers is ready and willing at all times to co-operate as fully as desired in solving lighting problems in the most effective manner.

This portfolio of catalogue and plates will be forwarded upon request to the National X-Ray Reflector Co., 235 West Jackson Blvd., or to George J. Beattie, Canadian representative, 72 Victoria Street, Toronto, Ont.

MANY GARAGES BUILT.

The number of garages built in Toronto during 1916 is an indication of the importance attained by this branch of construction. There were built last year 325 garages, representing a value of \$300,000. This item does not include the permanent equipment, which would add from twenty-five to fifty per cent. to the above amount.

JUBILEE ANNOUNCEMENT.

The firm of A. C. Leslie Company, Ltd., of Montreal, have just issued an announcement on the completion of fifty years of the company's history. Established a year before Confederation, this firm is considered as one of the pioneer business organizations in relation to the metal industry in Canada. They have always enjoyed a high place in the esteem of those with whom they have done business.

BUILDING PERMITS.

Total value of permits issued at St. Catharines for the month ending November, 1916, was \$57,470.00.

Total value of permits issued at Vancouver, B.C., for twelve months ending 1916, was \$2,412,889.00; for twelve months ending 1915, was \$1,593,229.00.

Total value of permits issued at Port Arthur, Ontario, for the year ending 1916, was one and a half million dollars.

Total value of permits issued at Galt, Ontario, for the year ending 1916, was over a quarter million dollars.

WILL BUILD NEW FACTORY.

The Turnbull Elevator Company of Toronto have purchased a large factory site at the corner of Bloor and Lansdowne, consisting of about 4½ acres, and comprising the larger portion of the old Dunlop property. The frontages include 425 feet on Bloor street, beginning about 367 feet west of Lansdowne avenue; 110 feet 10 inches on Lansdowne avenue, 360 feet on Janet avenue, 175 feet along the G.T.R. tracks, and 540 feet on Wade avenue. The average depth is around 120 feet. The price paid for the property is \$106,000. A modern factory will be erected.

TORONTO BRANCH CIVIL ENGINEERS.

The annual meeting of the Toronto branch of the Canadian Society of Civil Engineers was held at the rooms of the Society at the Engineers' Club, 30 King Street West, on Thursday, January 11th. The main business of the evening was the election of officers for the ensuing year. Reports from the various committees were received and disposed of. A suggestion which met with hearty approval, and towards which the executive will work, is that of making the members better acquainted with each other. The following officers were elected: Chairman, E. W. Oliver; secretary-treasurer, L. M. Arkley; executive committee, A. H. Harkness, T. T. Black, H. G. Acers, and E. A. Hewson.

TECHNICAL SOCIETIES.

ALBERTA ASSOCIATION OF ARCHITECTS.—President, Jas. A. Henderson, F.R.I.B.A., Edmonton; Hon. Secretary, W. D. Cromarty, Edmonton.

ARCHITECTURAL INSTITUTE OF BRITISH COLUMBIA.—President, R. Mackay Frigg; Secretary, Fred L. Townley, 325 Homer St., Vancouver, B.C.

CANADIAN CEMENT AND CONCRETE ASSOCIATION.—President, Peter Gillespie, Toronto, Ont.; Secretary-Treasurer, Wm. Snaith, The Thor Iron Works, Toronto, Ont.

CANADIAN CLAY PRODUCTS' MANUFACTURERS' ASSOCIATION.—President, J. E. Frid, Hamilton; Secretary-Treasurer, G. C. Keith, Toronto.

CANADIAN ELECTRICAL ASSOCIATION.—President, Col. D. R. Street, Ottawa; Secretary, Alan Sullivan, Confederation Life Building, Toronto.

CANADIAN FORESTRY ASSOCIATION.—President, William Power, M.P.; Secretary, James Lawler, Journal Building, Ottawa.

CANADIAN GAS ASSOCIATION.—President, J. P. King, Stratford, Ont.; Secretary-Treasurer, Geo. W. Allen, 19 Toronto St., Toronto, Ont.

CANADIAN INDEPENDENT TELEPHONE ASSOCIATION.—President, W. Doan, M.D., Harrietsville, Ont.; Secretary-Treasurer, Francis Dagher, 21 Richmond St. West, Toronto.

CANADIAN INSTITUTE.—198 College St., Toronto. President, J. E. Lyren; Secretary, Mr. J. Patterson.

CANADIAN NATIONAL ASSOCIATION OF BUILDERS' EXCHANGES.—Western Section—President, C. R. Frost, 609 Second St., Edmonton, Alta.; Secretary-Treasurer, A. M. Frith, 224 McDougall Ave., Winnipeg. Eastern Section—President, Geo. Gander, Toronto; Secretary-Treasurer, P. L. Fraser, Builders' Exchange, Toronto.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—President, G. H. Duggan, Montreal; Secretary, Prof. C. H. McLeod, Montreal.

LONDON BUILDERS' EXCHANGE.—President, A. C. Nobbs; Secretary-Treasurer, F. S. Barclay.

ONTARIO ASSOCIATION BUILDERS' EXCHANGE.—President, T. R. Wright, London, Ont.; 1st Vice-Pres., C. T. Pearce, Hamilton; 2nd Vice-Pres., A. Tomlinson, Chatham; Treasurer, Geo. Oakley, Jr., Toronto; Secretary, A. E. Flower, Toronto.

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PROVINCE OF QUEBEC ASSOCIATION OF ARCHITECTS.—President, E. B. Staveley, Quebec; Treasurer, N. MacVicar, Montreal; Secretary, J. Emile Vanier, 5 Beaver Hall Square, Montreal.

QUEBEC BUILDERS' EXCHANGE.—President, J. A. Marlier; Secretary-Treasurer, Alf. Cote.

ROYAL ARCHITECTURAL INSTITUTE OF CANADA.—President, Jos. P. Ouellet, Quebec; Vice-president, A. Frank Wickett, Toronto; Hon. Treasurer, J. W. Watts, Ottawa; Hon. Secretary, Alcide Chausse, Montreal.

SASKATCHEWAN ASSOCIATION OF ARCHITECTS.—President, A. Graham Creighton, Prince Albert; Vice-Presidents, R. G. Bunyard, Moose Jaw; J. C. Fortin, Regina; Secretary-Treasurer, Francis B. Reilly, Westman Chambers, Regina. Council—W. G. Van Egmond, Regina; Prof. Greig, Saskatoon; H. Cooper, Saskatoon.

SOCIETY OF CHEMICAL INDUSTRY.—Wallace P. Cohoe, Chairman; Alfred Burton, Toronto, Secretary.

TECHNICAL SOCIETY OF PETERBOROUGH.—Bank of Commerce Building, Peterborough. President, M. C. Mills, P.O. Box 995, Peterborough, Ont.

TORONTO BUILDERS' EXCHANGE.—President, S. R. Hughes; Secretary, A. E. Flower.

UNION OF CANADIAN MUNICIPALITIES.—President, T. L. Church, Mayor of Toronto, Ont.; Hon. Secretary-Treasurer, W. D. Lighthall, K.C., ex-Mayor of Westmount; Asst. Secretary, G. S. Wilson, Coristine Building, Montreal.