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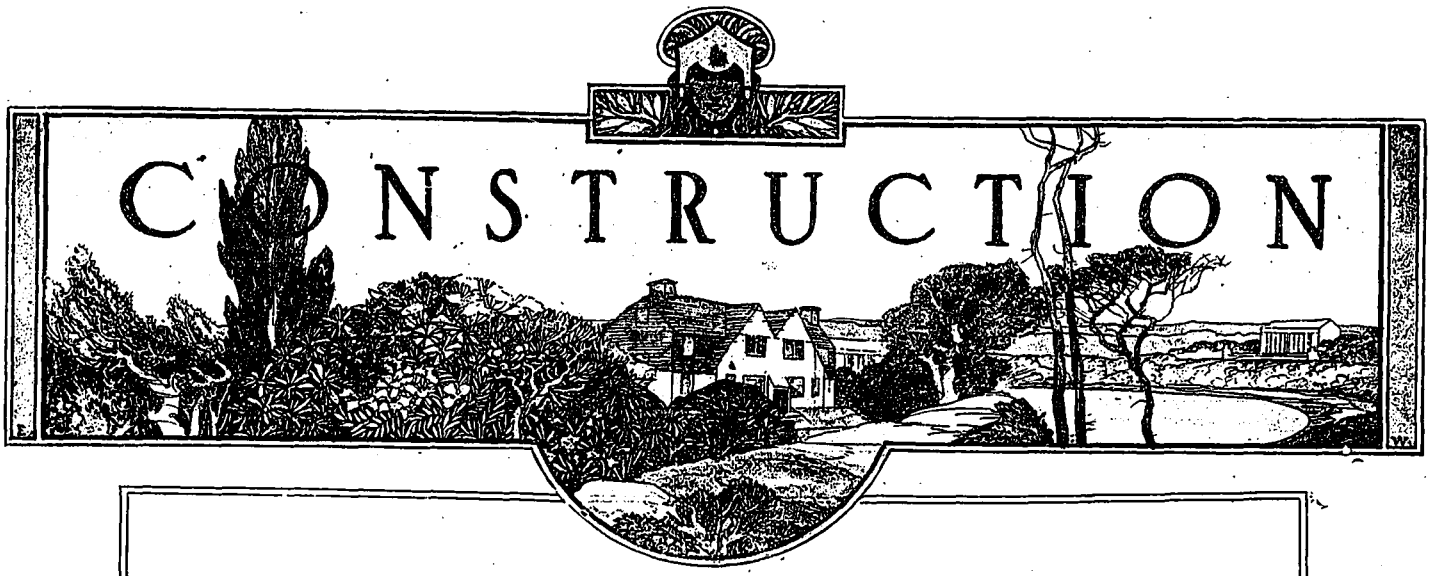

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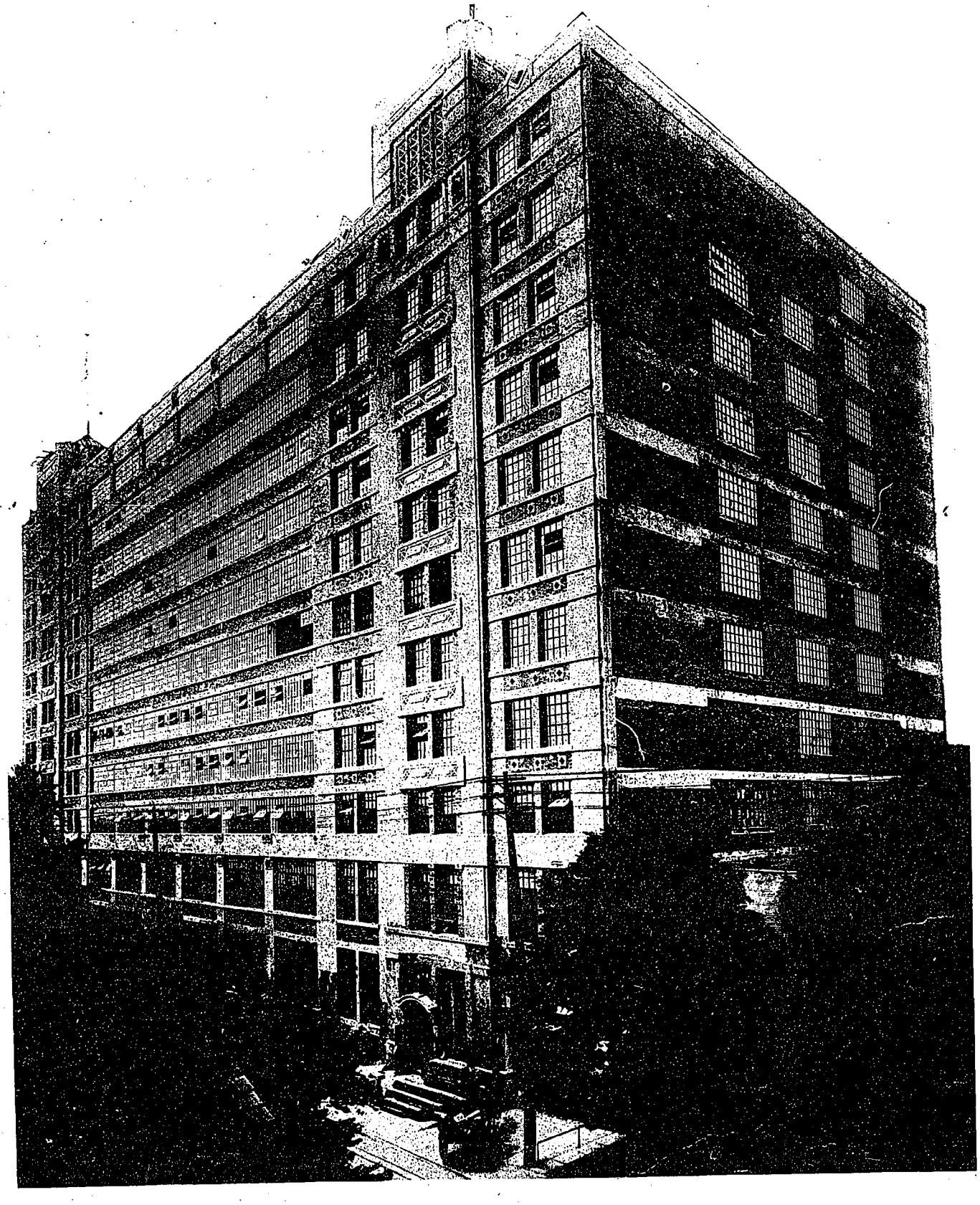


MAIL ORDER BUILDING OF THE ROBERT SIMPSON COMPANY, TORONTO.

VIEW ALONG THE MUTUAL STREET FRONT.

N. MAX DUNNING, ARCHITECT, BURKE, HORWOOD & WHITE, ASSOCIATES.

Robt. Simpson Company's Mail Order Building

By THOMAS D. MYLREA

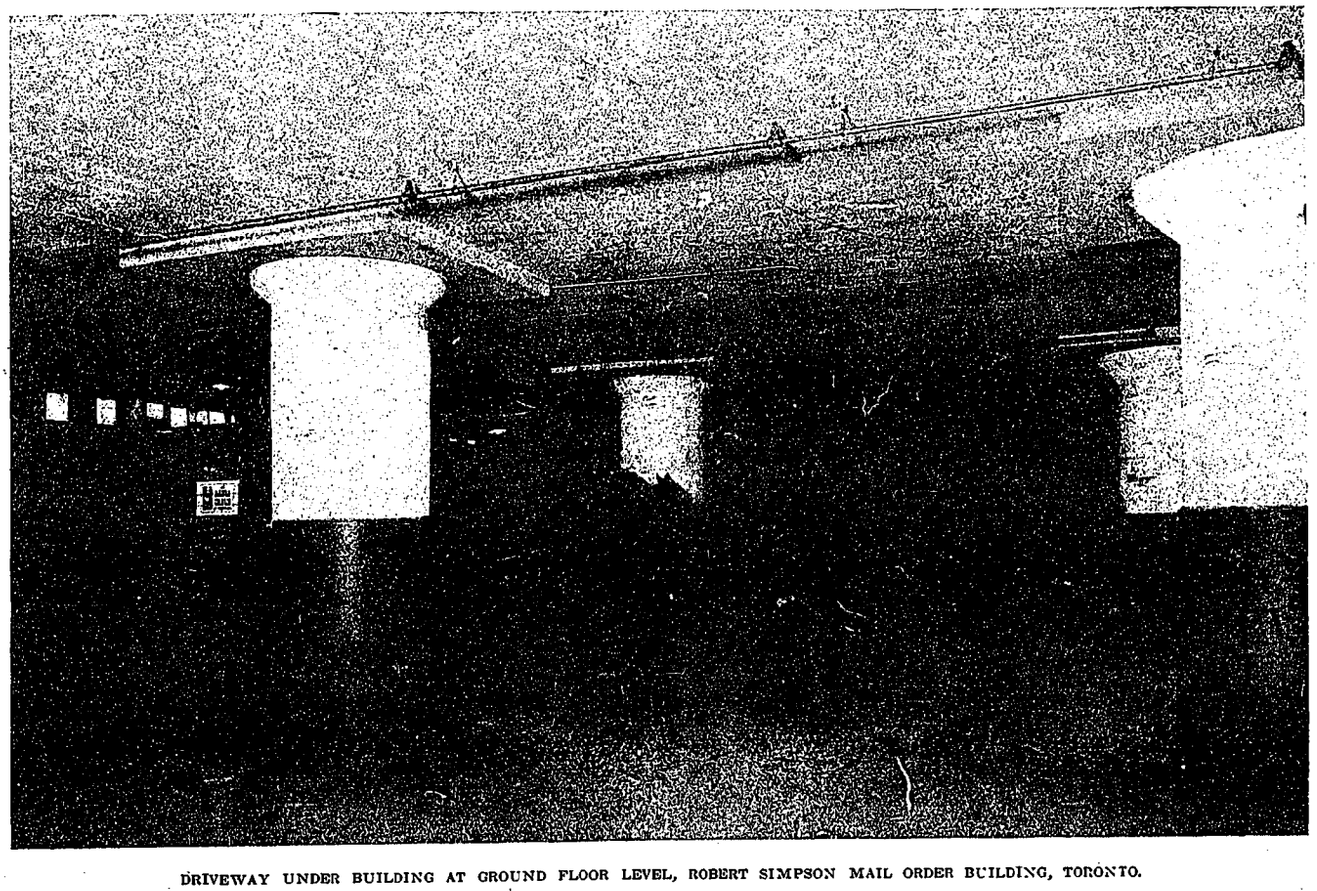
NOTABLE among the buildings constructed in Toronto during 1916, is the Robert Simpson mail order building on Mutual street, near Wilton avenue. Eleven stories and basement in height, it has a frontage of two hundred and seventy-nine feet, and a depth of one hundred and fifteen feet. With the exception of the spandrel walls, which are of brick, and the staircases, which are of steel, the entire structure is reinforced concrete. The architect in his design has made no attempt to disguise the mode of construction, but has developed a motive in concrete which presents a pleasing appearance, at the same time being distinctively concrete. The measure of his success may be appreciated from a consideration of the front elevation, and from the view taken from the southwest, in which both the new building and a previously existing structure may be seen.

The facade over each main entrance on Mutual street, together with the panel on each side of it; the frontage of the lower two floors and the parapet wall on this street, as well as the lane to the south, are treated entirely in concrete. During the construction, recesses were left in the panels beneath the window sills, and ornamental blocks of pre-cast colored concrete were secured in place.

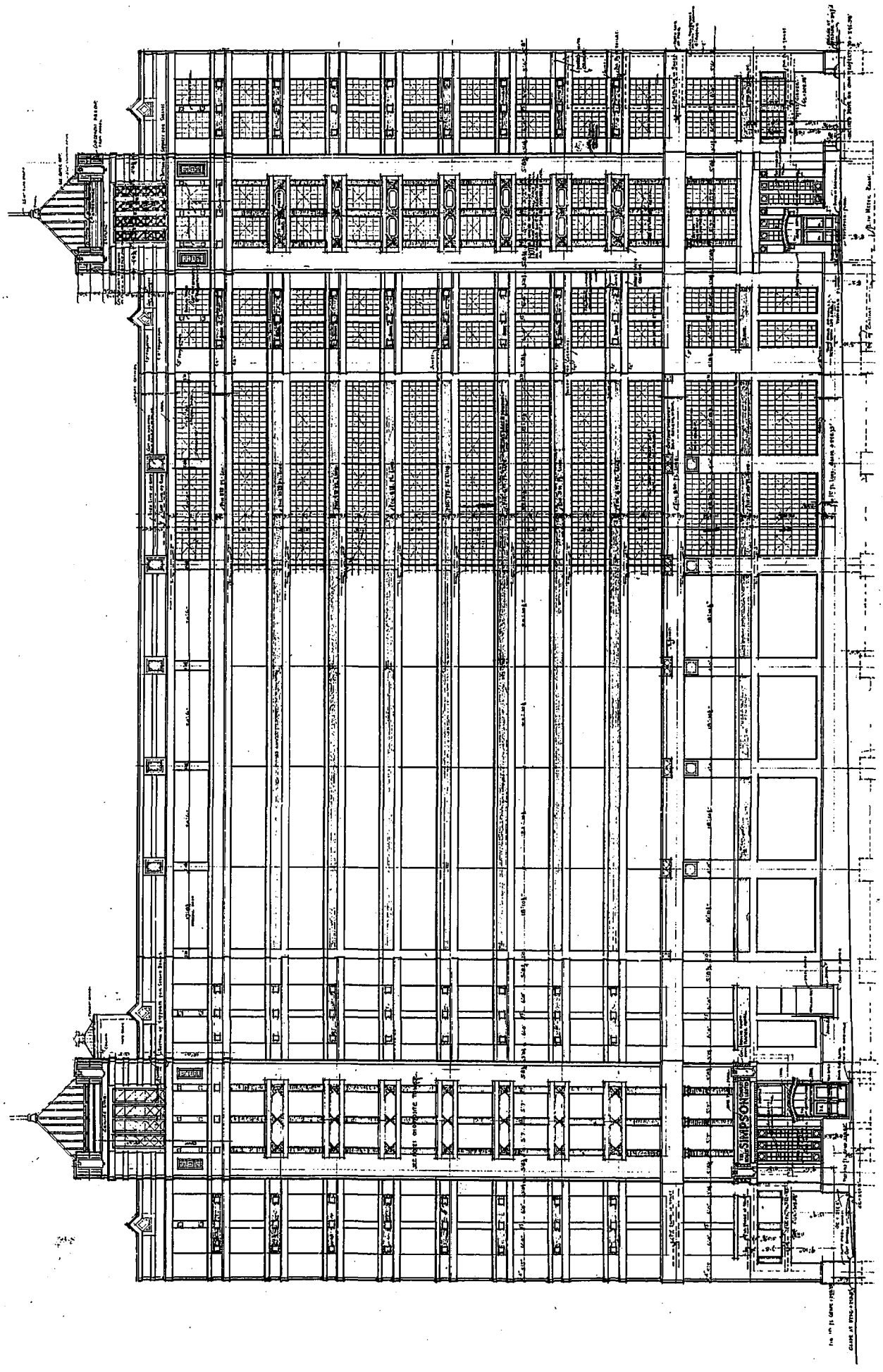
The method of interior illumination adopted is rather unusual, all wall columns being kept back from the outer surface and the window sash run continuously past them. By this means the amount of light obstructed by the wall columns is reduced to a minimum. In addition the panes in the upper half of all windows are made of prismatic glass, which refracts the light striking them horizontally to the innermost parts of the building.

After extensive tests as to the nature of the soil and its bearing strength, the engineers decided that it would be more economical and would give a more substantial structure if the column loads were carried by means of caissons down to rock—a very firm shale being found at about fifty feet below grade line. Details of these caissons are given in an accompanying schedule.

As speed of construction was an exceedingly important element, the contractors resorted to a scheme whereby excavation might proceed in a maximum number of caissons simultaneously. Over each hole a tripod was erected in which was framed a windlass operated by a cable-driven sheave. At one end of the building a hoisting engine was installed, driving the cable, which passed from tripod to tripod, making a

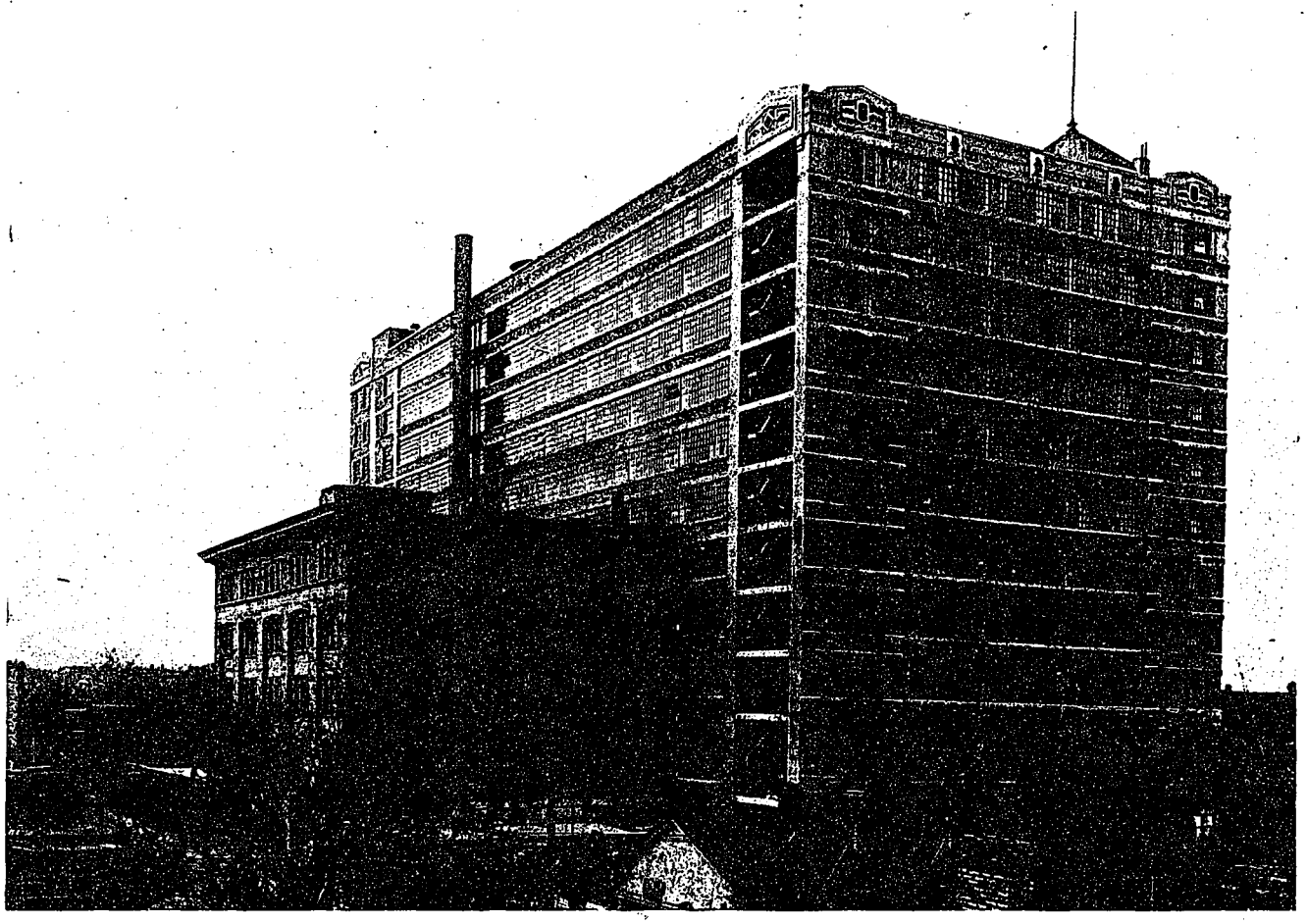


DRIVEWAY UNDER BUILDING AT GROUND FLOOR LEVEL, ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.



MUTUAL STREET ELEVATION,
THE ROBERT SIMPSON MAIL ORDER BUILDING,
TORONTO, CANADA.

N. MAX DUNNING, ARCHITECT,
BURKE, HORWOOD & WHITE,
ASSOCIATES.



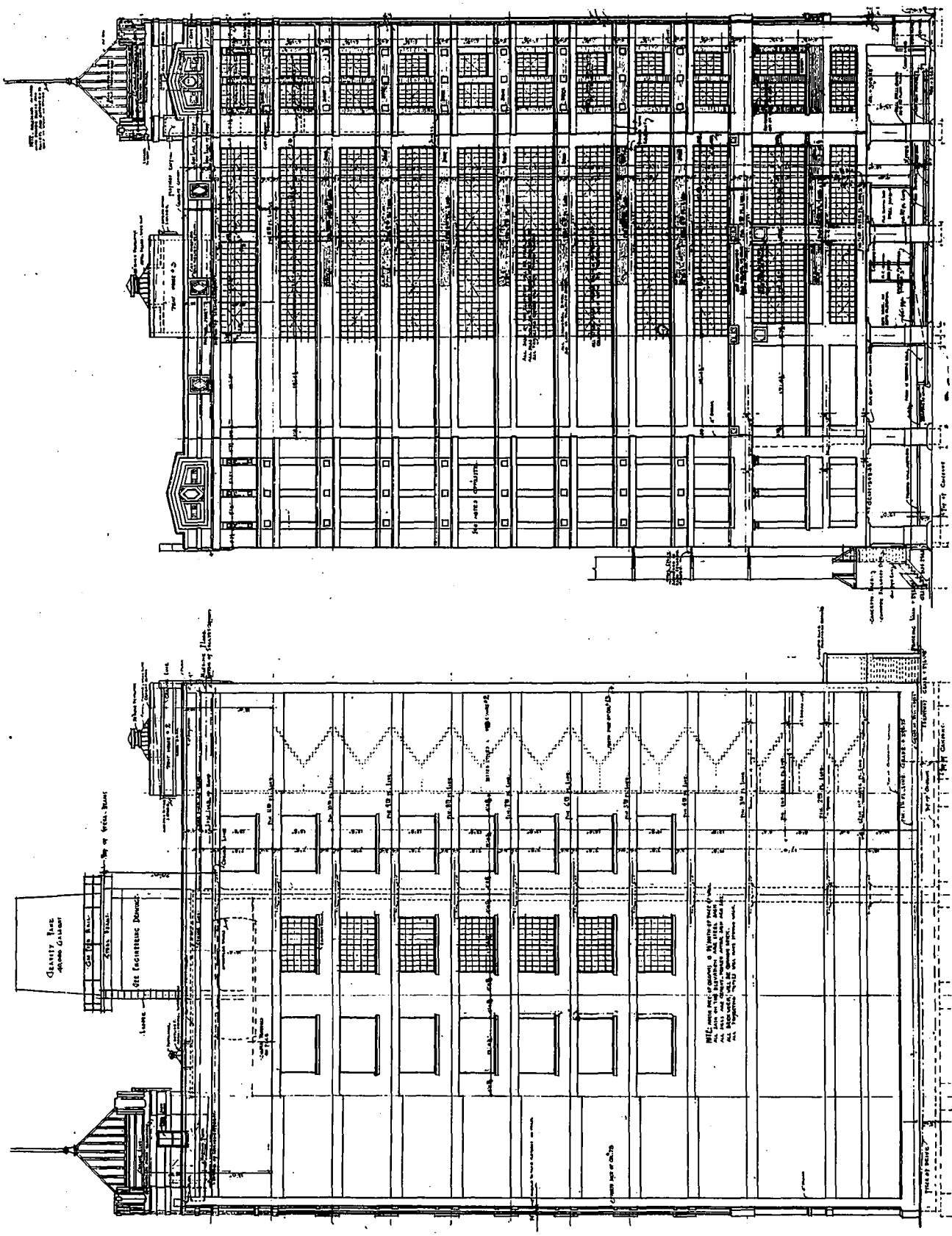
SOUTH-WEST VIEW, THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.

loop about each sheave in turn, so that all windlasses were continuously revolving. A crew of two men worked at each caisson, one down in the hole, and one at the top. The workman at the bottom filled a bucket with the material he excavated, and at a signal the workman at the top passed a loop of the hoisting rope around the revolving windlass head and brought the loaded bucket to the surface, whereupon it was emptied and lowered again into the excavation. As work could thus be carried on in a great number of caissons at the same time, and as the soil was easy to excavate, and no water encountered, the sinking of the caissons and their filling with concrete occupied but a very short period of time.

Above the caissons the structure was a typical four-way flat slab type, supported on reinforced concrete columns, these columns being carefully doweled into the upper portion of the caisson. As few changes as possible were made from story to story in the column diameters in order to reduce to a minimum the number of forms required, the additional bearing area on the lower sections of the columns of a given diameter being secured by increasing the amount of longitudinal reinforcement. Circular columns were adopted, both for the sake of appearance, and for their adaptability to being reinforced with spiral hooping without loss of area. Adjustable metal forms were used, which could be struck as soon as the column was sufficiently hard, and re-used in other parts of the structure. In casting the column the form was filled to a point where the upper part of the column began to flare out, and after this portion had secured its initial set, with consequent change in volume, the flared-out head and floor slab were cast. Owing to the fact that the concrete in the column had not completely set, an effective bond was thus formed, which was not ruptured by the change in length of the hardening column.

Work was carried on from both ends of the building at the same time, a one-yard mixer and concrete hoist being installed at each end of the Mutual street front, each in charge of a separate foreman. While under the general supervision of one carpenter foreman, the form work was built by two distinct gangs of carpenters, each in charge of a sub-foreman. In this manner a spirit of friendly competition was secured which greatly hastened the ultimate completion of the building. At this time supplies were fairly easy to secure, and, aided by an almost unbroken spell of fine weather, the construction from the top of the caissons to the last concrete in the roof slab occupied but fifty-five working days.

On the Mutual street front there are two main staircases. Each stair hall communicates with the several floors through a stair vestibule, as may be seen on the typical floor plan. This does away with direct communication, and affords an



SOUTH ELEVATION.

NORTH ELEVATION.

THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.

N. MAX DUNNING, ARCHITECT; BURKE, HORWOOD & WHITE, ASSOCIATES.

additional safeguard in case of fire. At the northwest corner of the building is a similar staircase, opening on to each floor through a vestibule as before, and at the southwest corner of the building is an open-air staircase fire escape. The view of the building taken from the southwest shows this fire escape clearly. Alongside of each stair hall is a freight elevator, and at the south main entrance are two passenger elevators communicating with the office on the top floor.

A unique means of collecting parcels from the various departments has been installed. An endless belt close to the ceiling in each story from the third to the ninth inclusive, travels from end to end of the buildings in the centre aisle, and directly above it in each bay a hole is provided in the floor slab through which parcels may be deposited upon the moving belt. These conveyors carry the packages to a spiral chute at the end of the building, through which they descend by gravity to the shipping department on the lower floors.

Owing to the fact that the old building adjoining the new one on the west already contained a boiler room, it was thought to be more economical to enlarge this plant than to instal a new boiler room in the new building, and, as shown in one of the illustrations, four one hundred and fifty horse power boilers, heated by a fuel oil system, furnishes steam for both buildings.

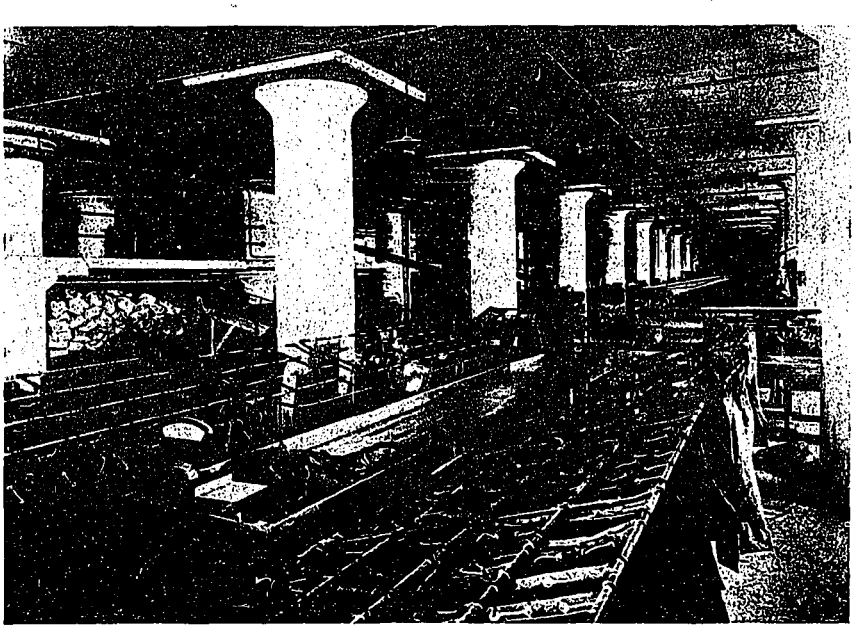
At the close of construction operations the City Architect's Department required a test of the floor slab, and four panels were loaded to double the nominal capacity of the floor. The test load in place is shown in one of the accompanying views, and it may be stated that the tests proved highly satisfactory.

WORKING SYSTEM.

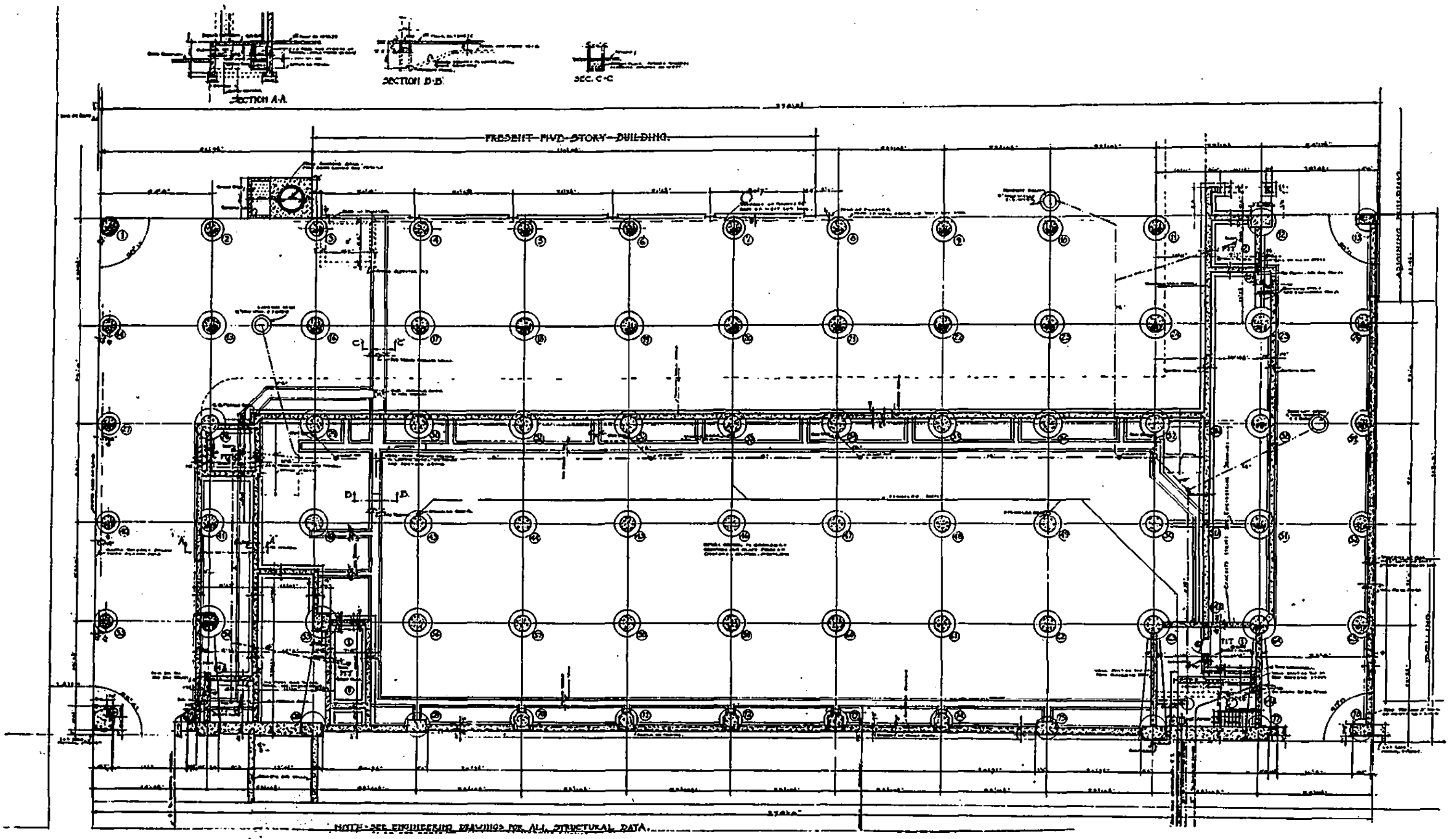
As its purpose would indicate, the building was especially designed to handle the many thousand mail orders which are received daily from out-of-town customers. The eleventh floor, or

MEZZANINE VIEW SHOWING CONVEYOR AND PARCEL CHUTE.

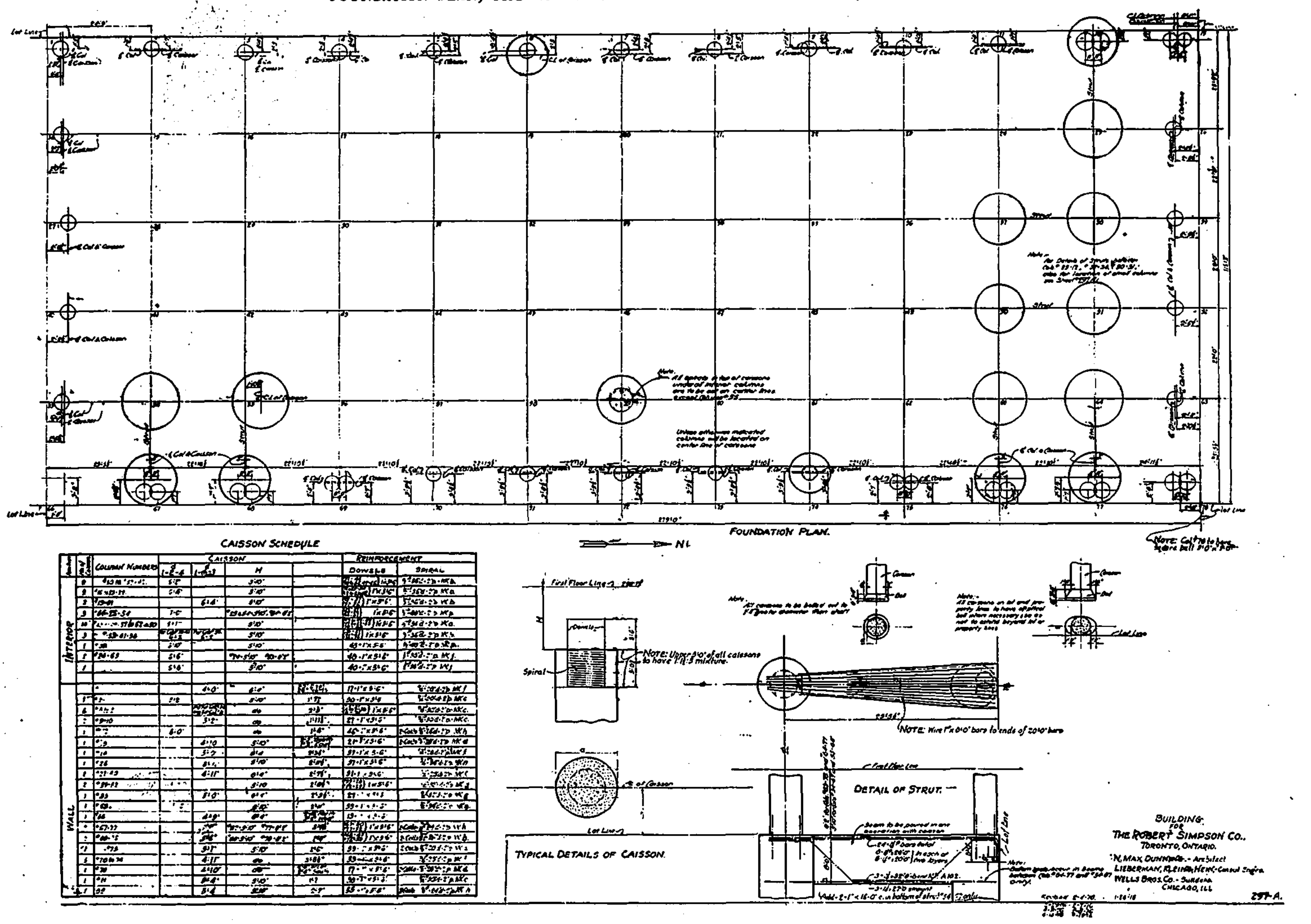
CONVEYOR BELT AND PARCELLING BINS, MAIN FLOOR.



MAILING DEPARTMENT, THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.



FOUNDATION PLAN, THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.



CAISSON PLAN, THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.

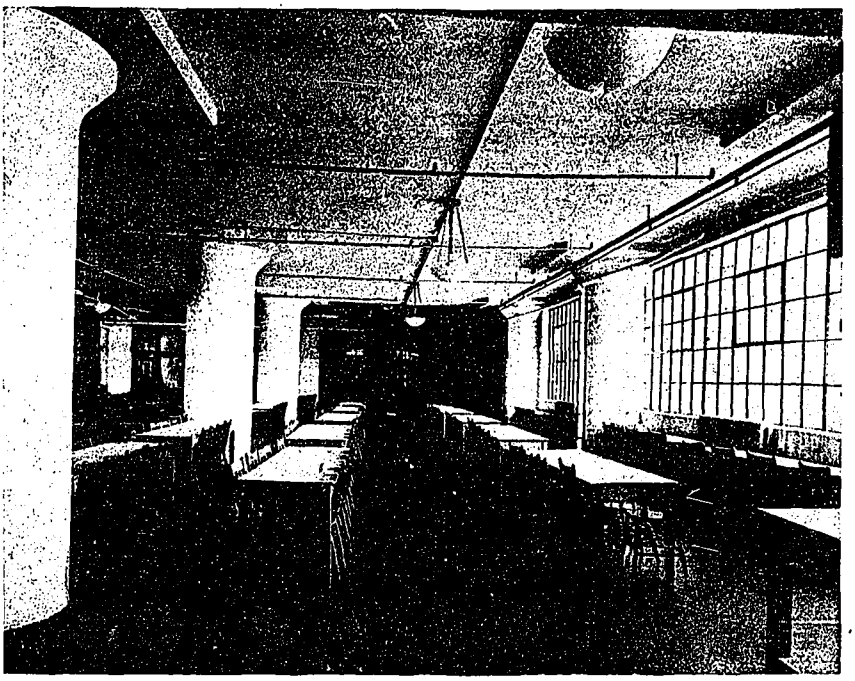
thirty-two thousand square feet of floor space, is taken up by offices which handle each order in its proper sequence.

The lower floors are given over to the housing of the enormous stocks of merchandise which are carried so that all orders may be shipped promptly. These stock floors are divided longitudinally, the west half of each floor being occupied by tiers of lattice work shelves, or reserve bunks, on which are stocked by catalogue number the vast bulk of goods carried. On the east half of each floor are the forward or active stock bunks, numbered so as to correspond with the reserve bunks, and designed to carry the smallest working minimum of stock. All orders are filled from the forward or active bunks, and replenished from the reserve shelves as needed. This effects a well organized working arrangement, and saves unnecessary steps and time on the part of the clerk filling the order.

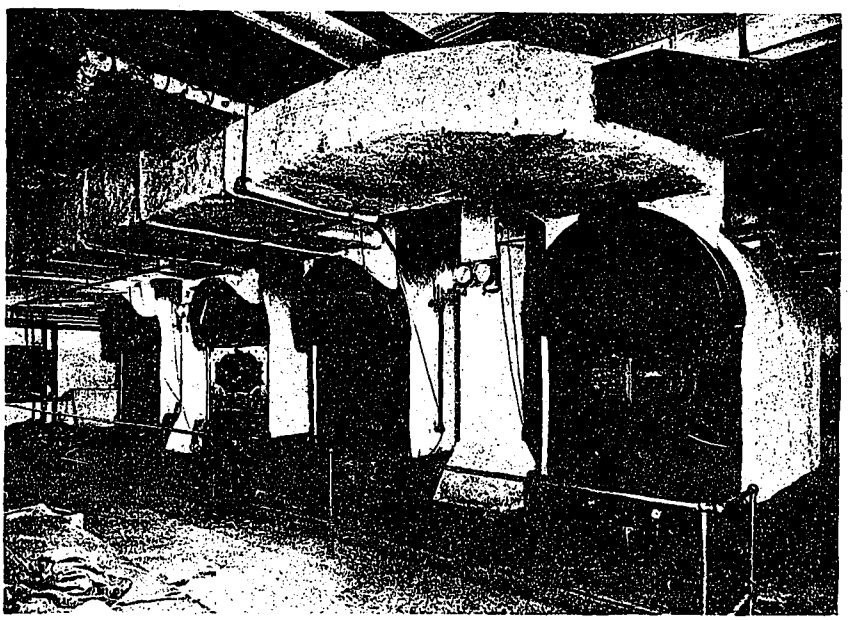
All of this necessarily involves a general plan, arrangement and equipment which successfully co-ordinates all departments and branches of the work.

Each department has its bundling desk, where all out-going merchandise is wrapped to keep it clean in handling. Back of these desks are the chutes through each floor which deposit on the belt conveyors previously described, and which discharge into the spiral chute, and from thence on to a lower belt conveyor which brings the merchandise to its destination on the shipping floor.

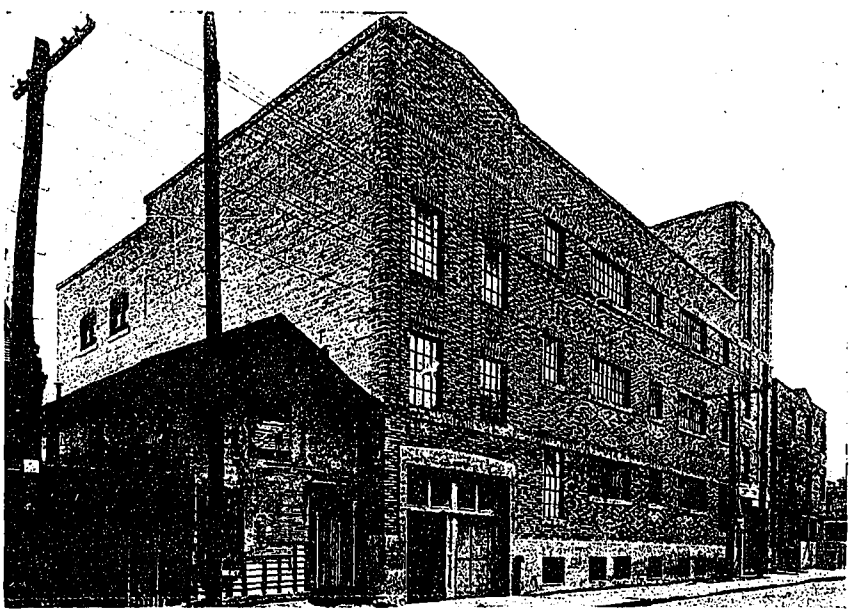
All orders received in the eight o'clock mail are opened by eight-thirty, read, totalled and audited, and the amount received credited on the purchaser's letter. In the meantime a shipping bill with a registered number printed on it is attached to the customer's order and passed to the recording section, where a record of all orders received is kept by province and town, and the customers' names listed alphabetically. By nine-thirty, or within an hour's time, the order has been sent to the



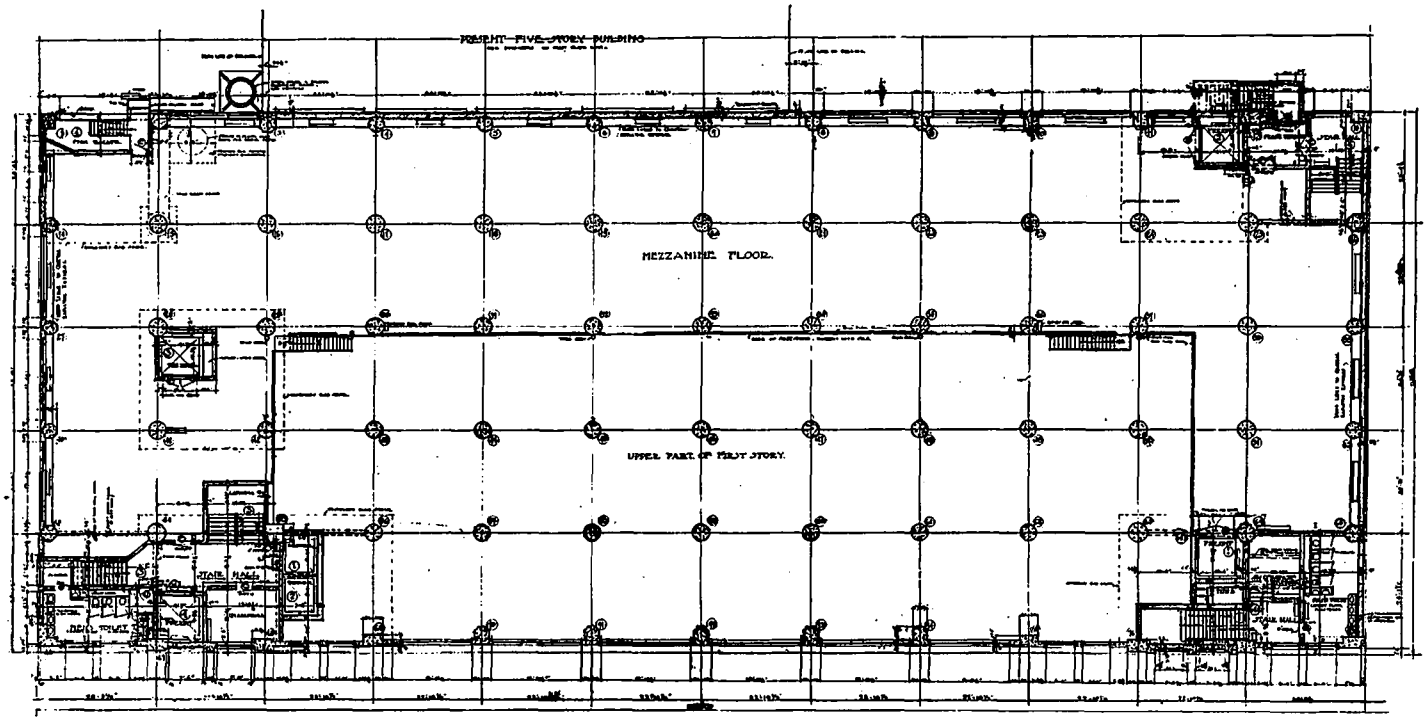
EMPLOYEES' DINING HALL.



BOILER ROOM.



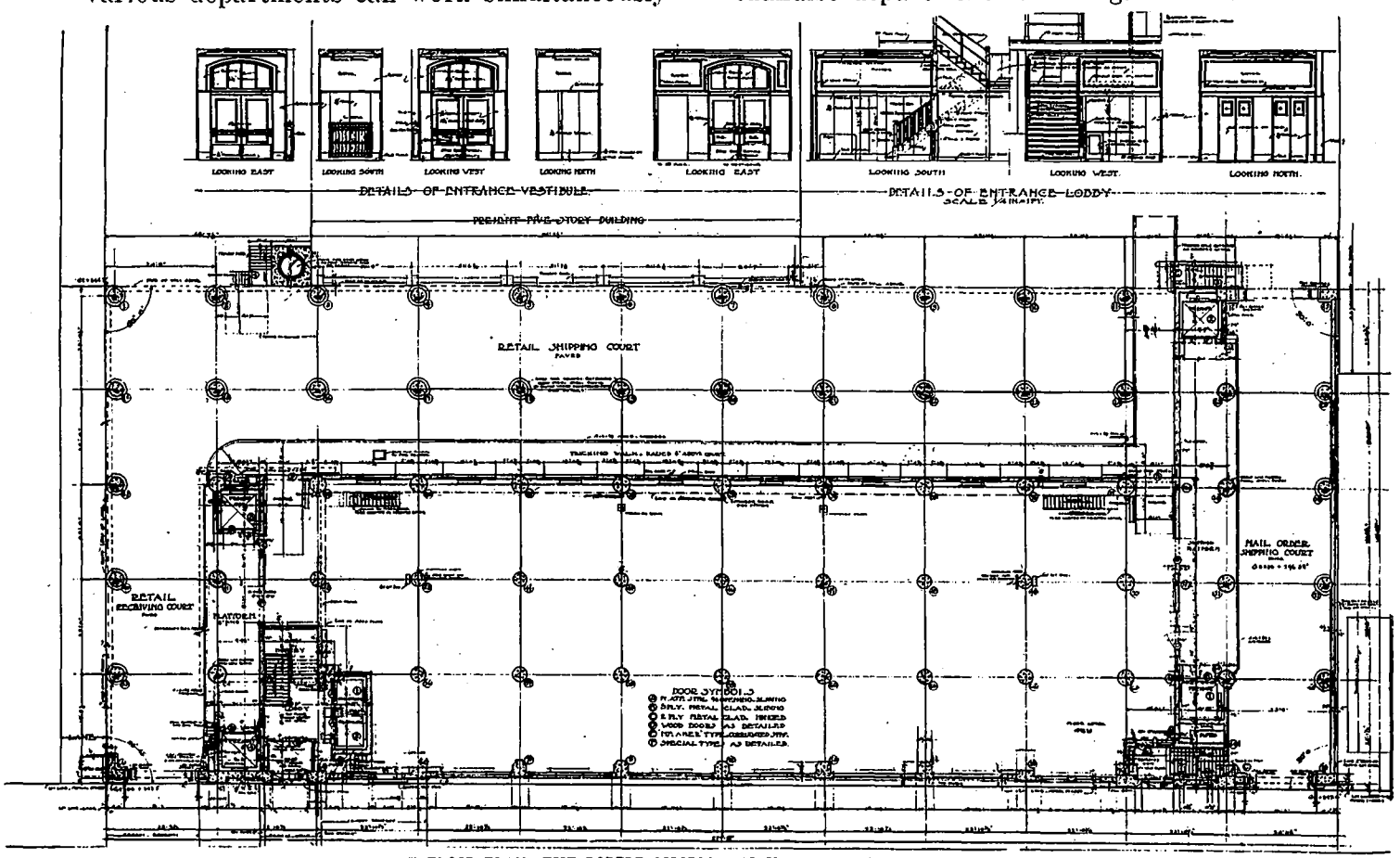
STABLES, THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.



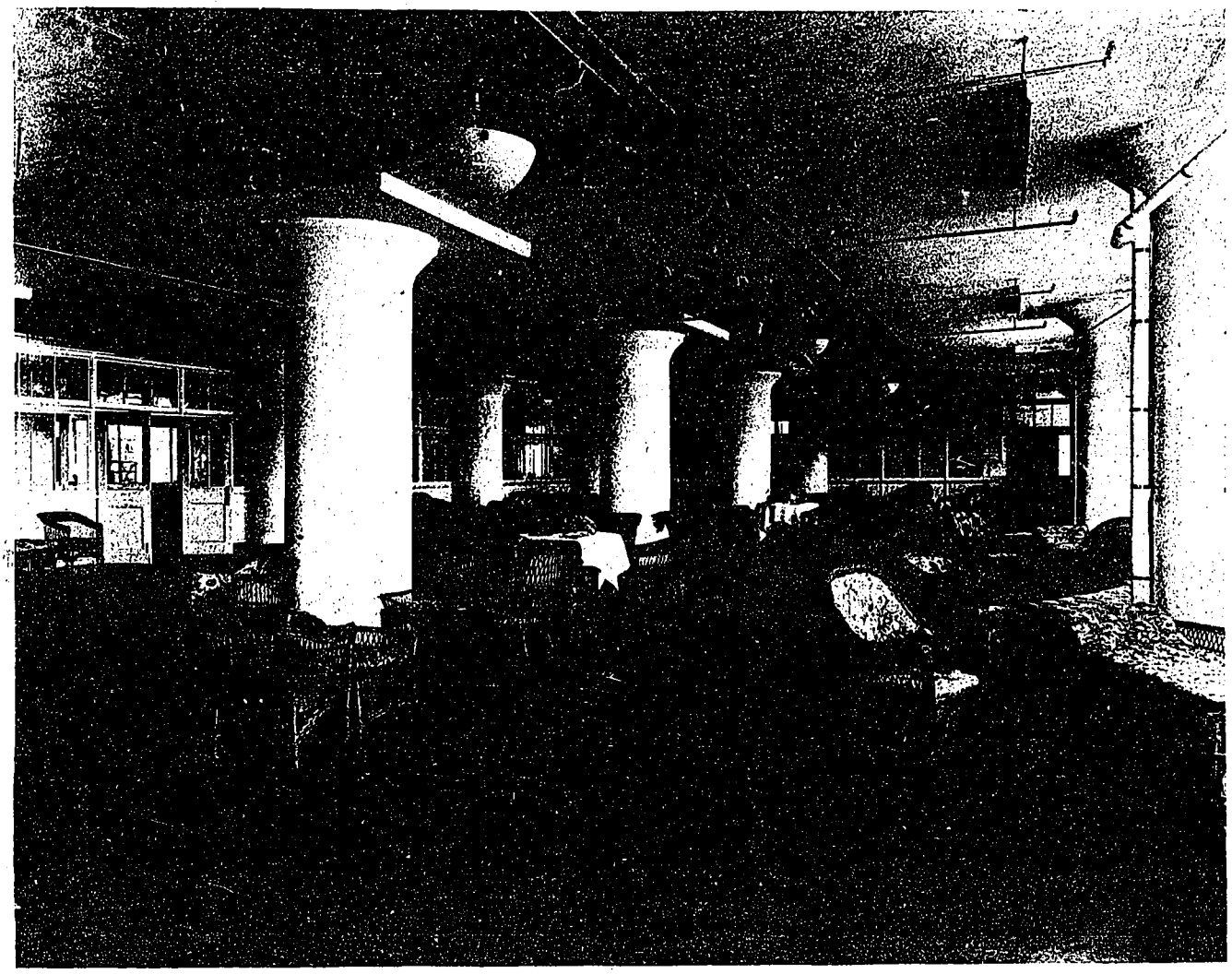
MEZZANINE OVER FIRST FLOOR, THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.

buying or copying section. If it is found that the goods are wanted from three different departments located on three different floors, the items are copied on the three order sheets, and the number of same marked on the back of shipping bill, all of which is put through the schedule machine, which stamps the assembly time on all orders received. This is done so that the various departments can work simultaneously in filling the complete order. The stamp shows the date, the assembly time, the assembly section numbers, and the numbers on the basket in the section into which all three items eventually find their way on the shipping room floor.

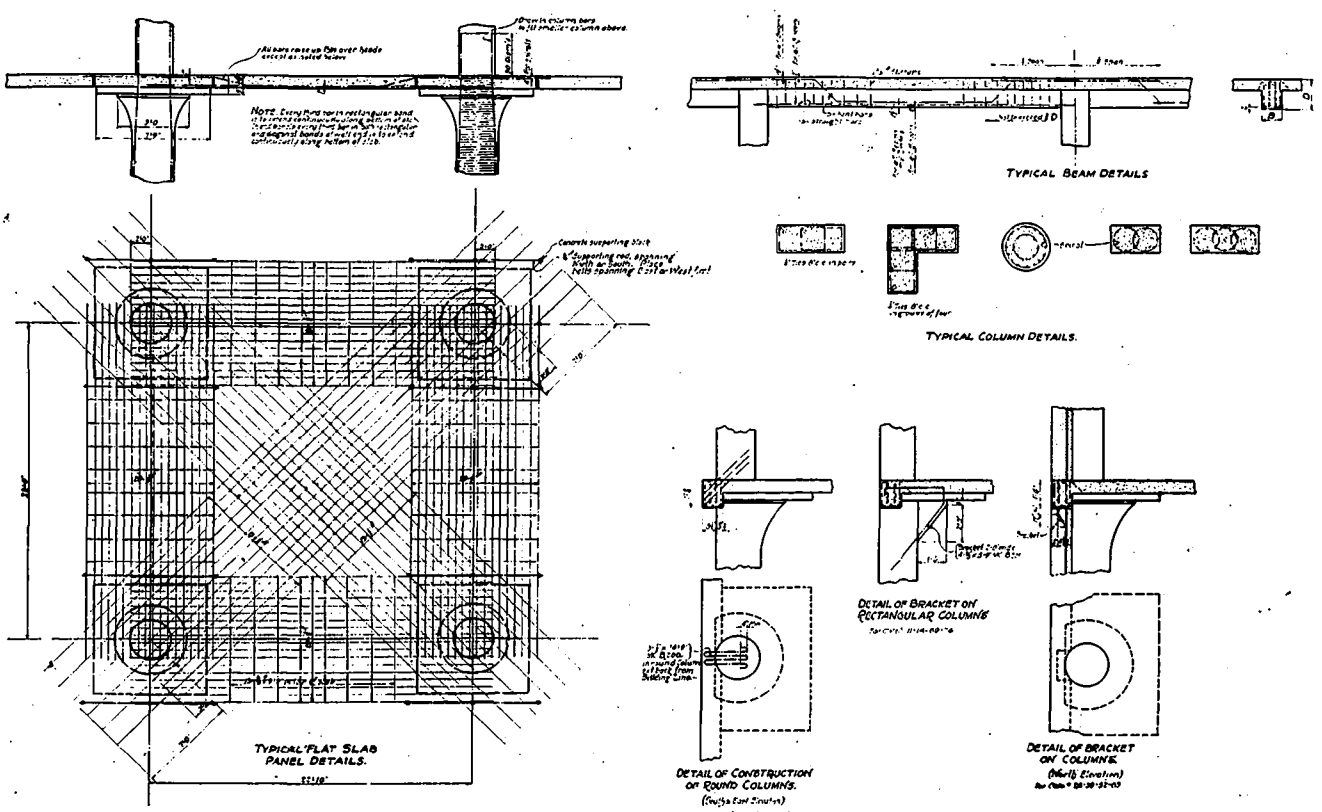
The "house purchase" transaction is completely in hand by eleven o'clock, and timed for two-thirty, two hours being allowed to the merchandise department for filling. As the items



FIRST FLOOR PLAN, THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.

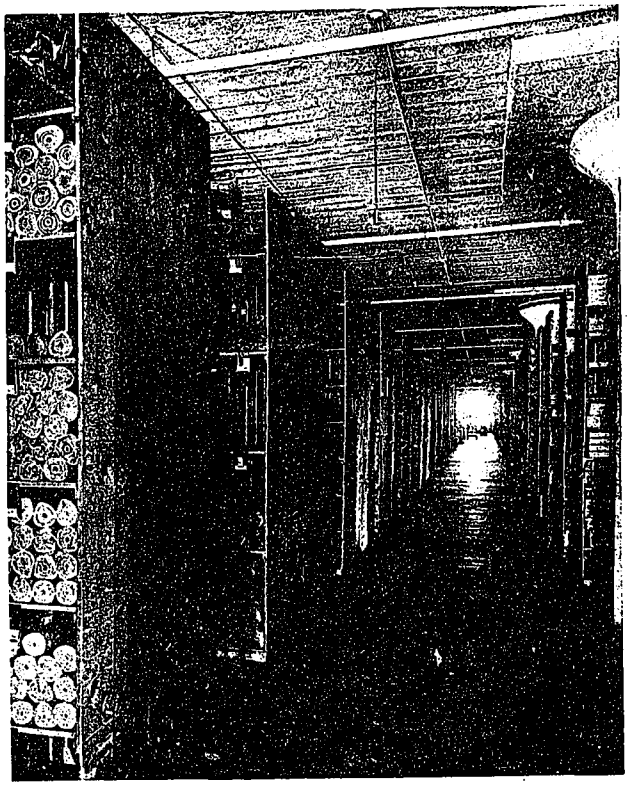


WOMEN EMPLOYEES' REST ROOM, THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.



DETAILS OF FLOOR SLAB REINFORCEMENT AND COLUMN CONSTRUCTION.

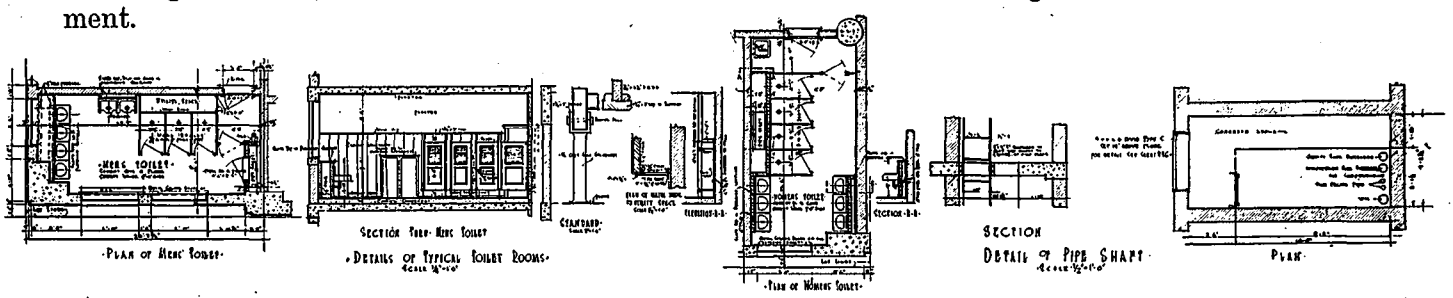
UPPER FLOOR OFFICE CORRIDOR.

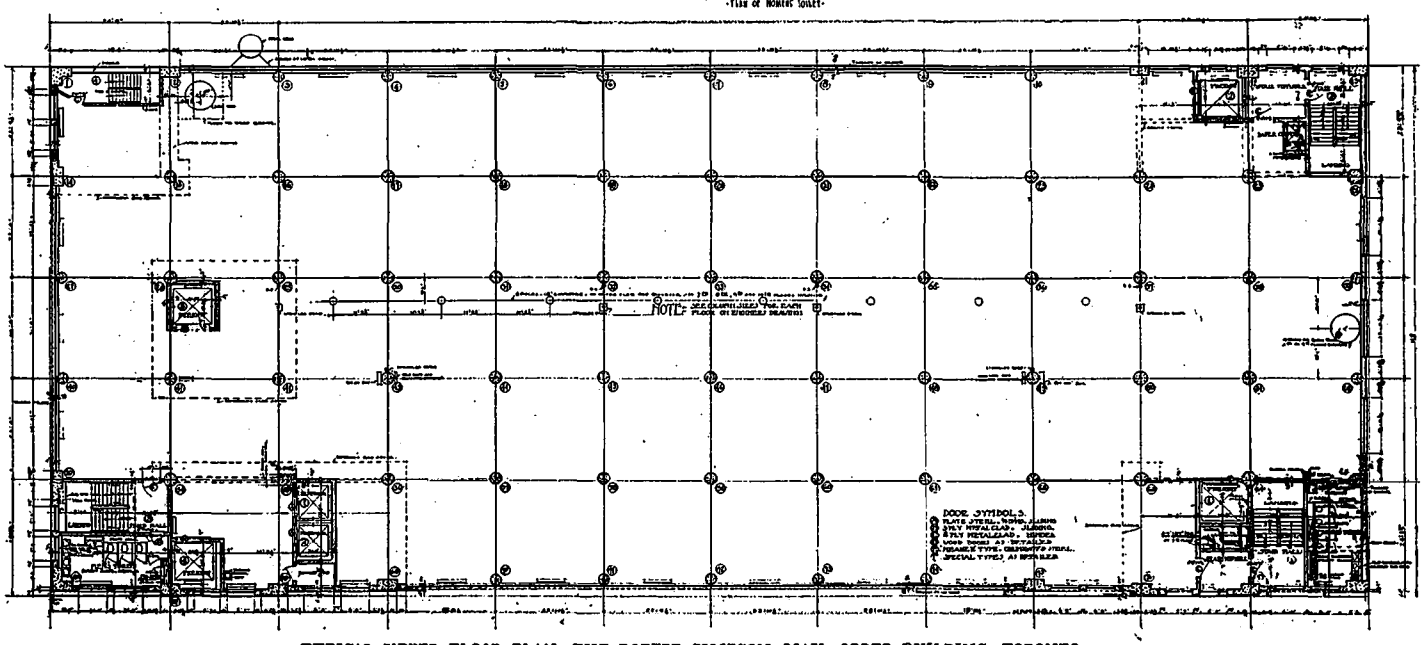


AISLE THROUGH TYPICAL STOCK ROOM.

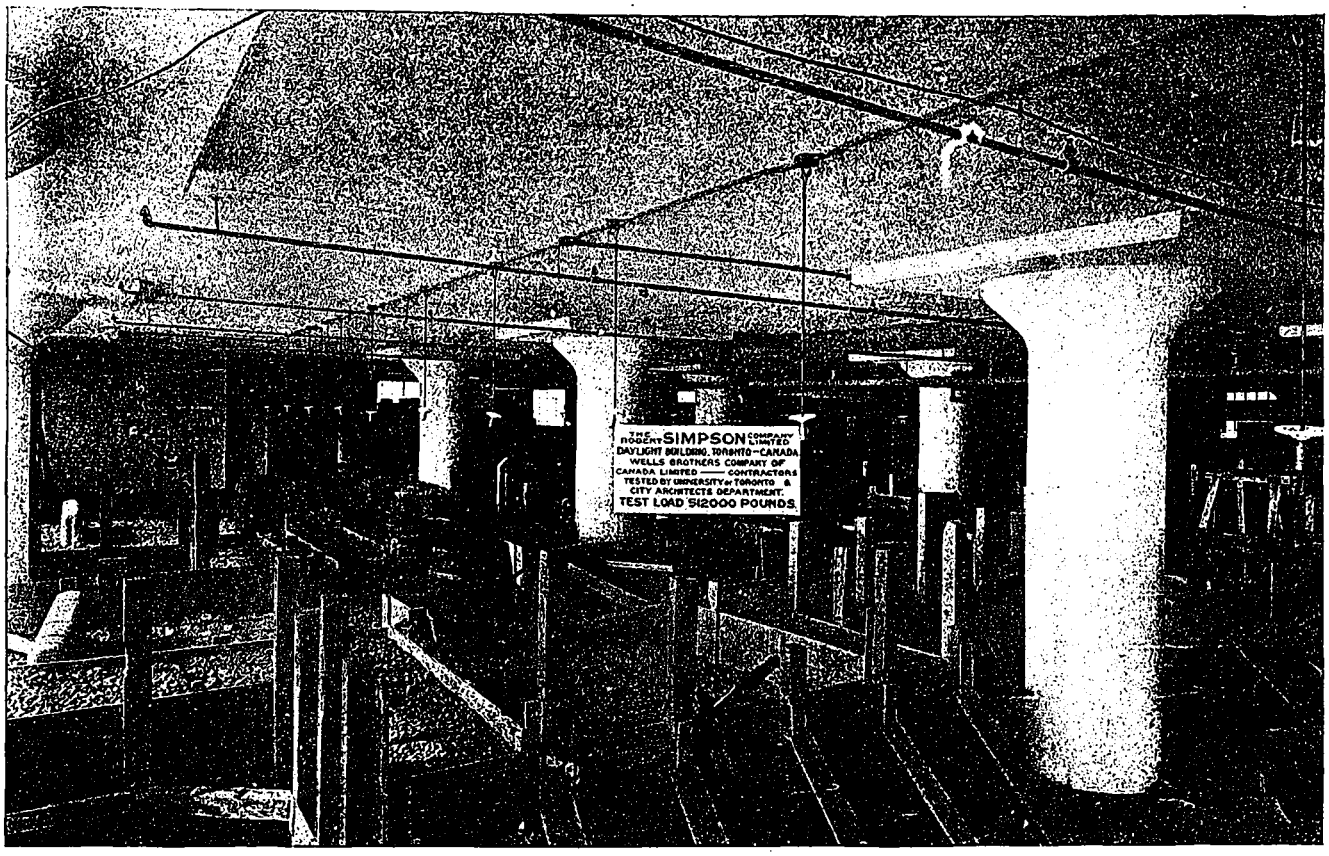
are filled and parcelled they are sent via belt conveyor and spiral chute to the shipping room floor, where, at the time designated, the various items are assembled in their assigned section and basket, and rechecked against the customer's original letter, and finally packed for shipment.

The completed package is then sent on to the end of the conveyor belt, where it is weighed, and the necessary postage applied. From here the package is turned over to the Canadian Postal Service, which maintains a branch post office in the building to facilitate the handling



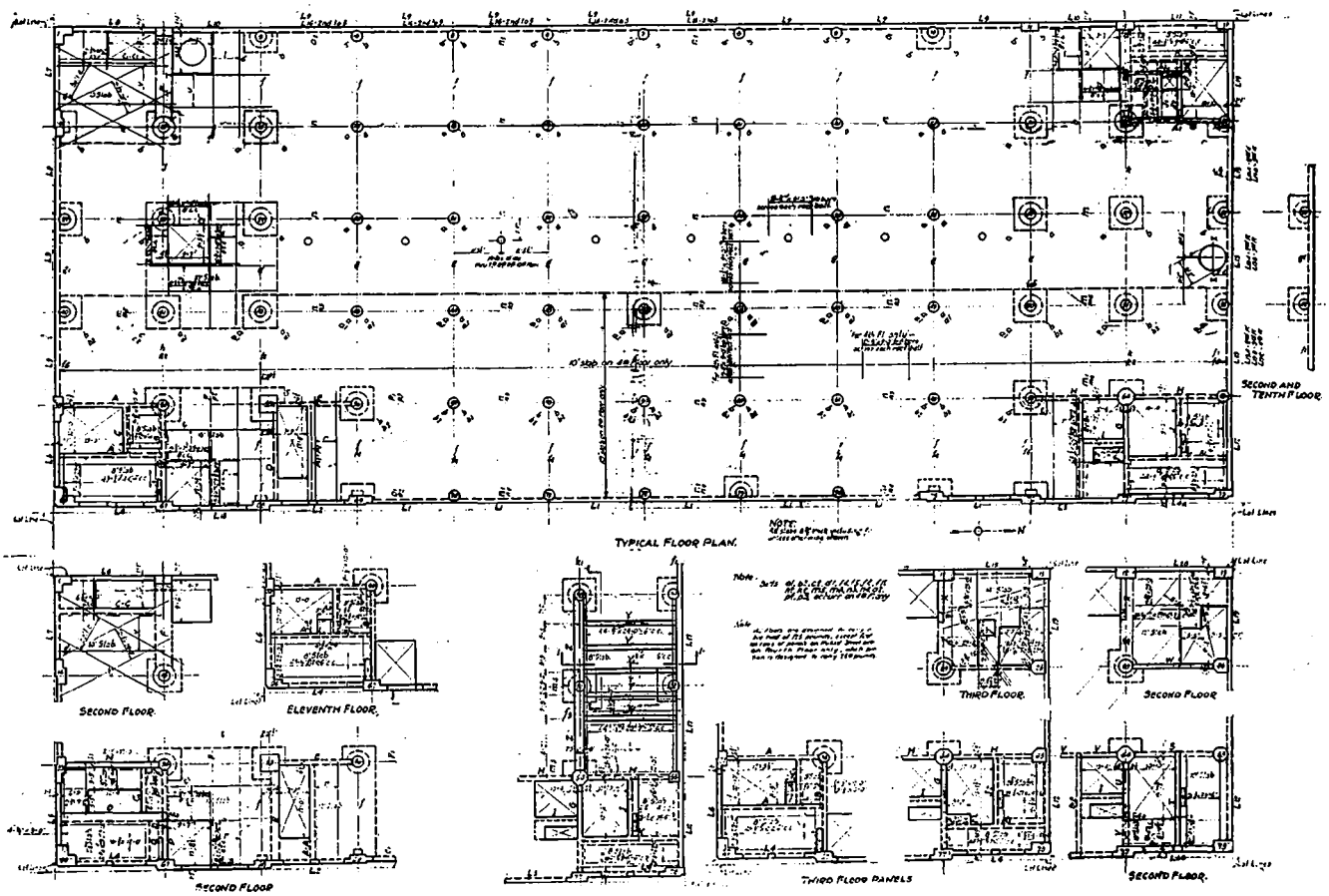


TYPICAL UPPER FLOOR PLAN, THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.

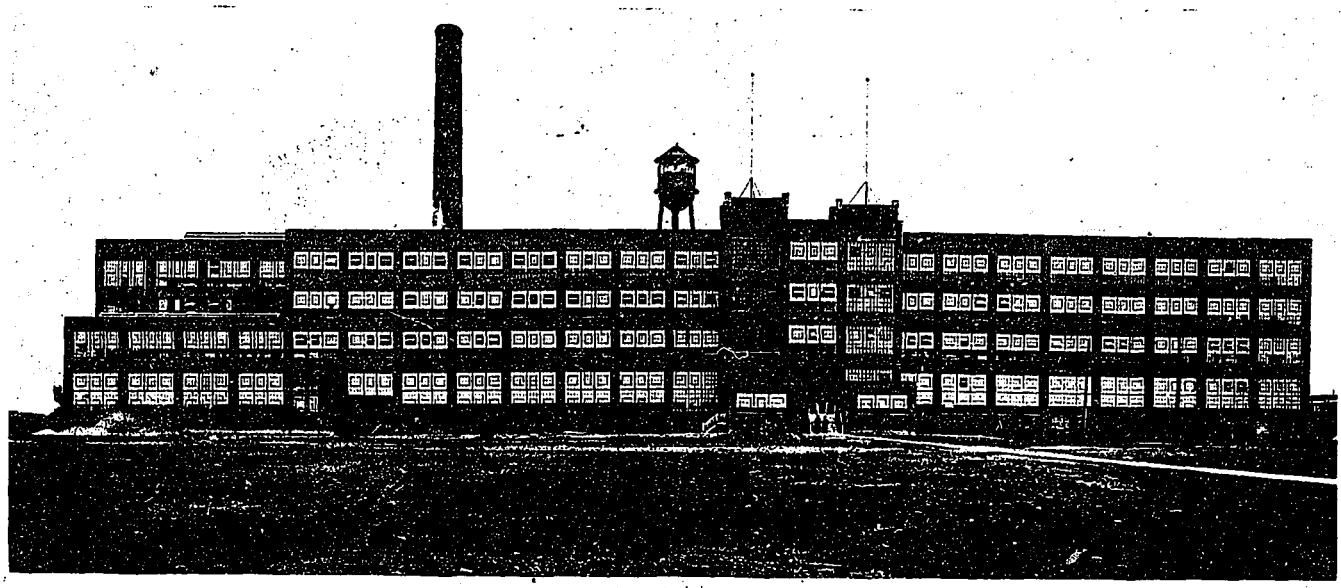


TEST OF FLOOR SLAB LOADED TO DOUBLE THE NOMINAL CAPACITY, THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.

of the vast volume of orders which are shipped daily. In this department the orders are sorted according to the various train runs, bagged and sealed and sent by auto trucks to out-going trains. This saves lost time to the Toronto post office service, which under other circumstances would be bound to occur in the busy season.



TYPICAL FLOOR PLAN, THE ROBERT SIMPSON MAIL ORDER BUILDING, TORONTO.



NEW FACTORY OF THE GOODYEAR TIRE AND RUBBER COMPANY, NEW TORONTO.

New Factory of Goodyear Tire & Rubber Co.

THE new factory of the Goodyear Tire & Rubber Company is located in New Toronto, immediately north of the Toronto & Hamilton Highway, and is the first unit of what will eventually be a group of several buildings devoted exclusively to the manufacture of this concern's products. In order to provide for future extensions, a site nearly square, of approximately twenty-six acres, has been acquired, with direct track facilities on both the G.T.R. and C.P.R. railways. The main factory is located near the east end of the property, and about five hundred feet north of the highway mentioned. This allows for the erection of two more buildings the size of the present one, together with a large office building, as conditions warrant; while the entire layout as just described can be duplicated on the west half of the property as a final development of the contemplated general scheme. Further immediate improvements will consist of the laying out of a large athletic field and the treatment of the site to make the grounds generally attractive; the necessary grading operations and the planting of trees, shrubs, etc., to start in the spring as early as weather conditions will permit.

In addition to the main factory, the present plant comprises a power house, two cement buildings, and a storage water reservoir, all of which are situated just north of the main building. All of these buildings have ideal track facilities, being served from a siding on Ninth street, which forms the eastern boundary of the property, and from which a track runs in north of the power house for the convenient handling of coal. Two other tracks are laid between the main factory building and the power house and cement buildings, and will be used for receiving and shipping materials to and from the factory, as well as for handling future machinery for the power house. Another track is also planned to run parallel to Ninth street, along the east end of the factory, but this will not be installed at present, because of the fact that the building will not be entirely completed until another one hundred feet has been added to the east end of the present structure.

The main building consists of four floors and basement, and is at present four hundred and sixty feet long by one hundred feet wide. The basement is twelve feet high, the first floor twenty-two feet, the second and third fifteen feet each, and the fourth floor twelve feet to the lower chord of roof truss. The roof trusses are approximately five feet high. A double pitch monitor twenty feet wide at the base and ten feet high extends the entire length of the building. Each pitch of the monitor carries three rows of sash, two of which are equipped with operators for raising and lowering same. The construction of the building is of brick and steel, with the columns spaced twenty foot centres each way. The wall columns are bricked in, and all interior columns are encased in concrete.

Modern steel sash is used in the structure throughout, the bays on each floor, including the basement, containing a frame approximately seventeen feet wide by from eight to fifteen feet high. Each sash is equipped with swinging ventilators to the extent of about thirty per cent. of the sash area, these ventilators being operated independently by cords from the floor. The sash area for this building alone totals approximately forty-five thousand square feet.

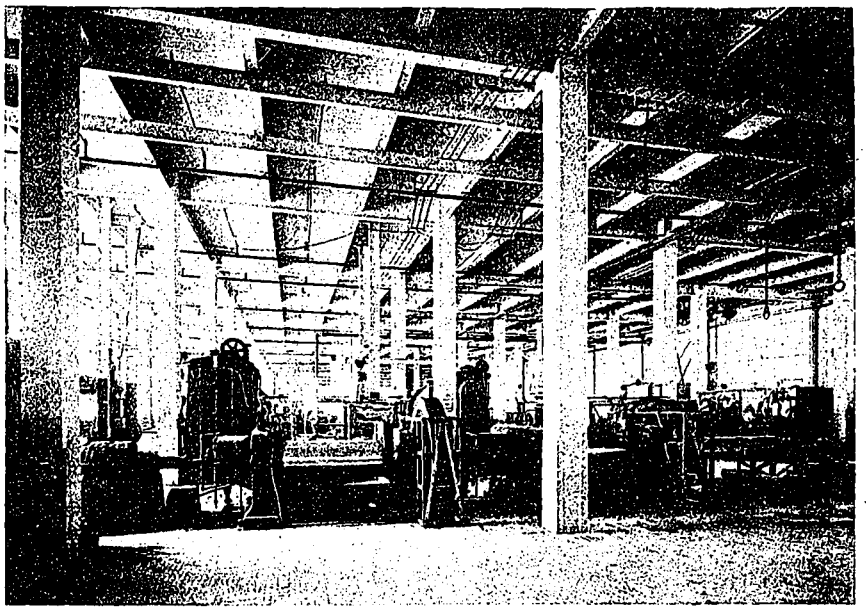
The basement extends under the entire building with the exception of about one hundred feet at the west end, and the floor here consists

of an eight-inch concrete slab laid on the shale, with two-ply waterproofing and one and one-half inches of mastic asphalt over the concrete. A complete network of drainage tile under the floor, together with floor drains spaced every forty feet, insures a perfectly dry basement. A noticeable feature is the entire absence of such obstructions as foundation piers; all the heavy machinery on the floor above being carried on large steel girders, which are in turn supported by the main building columns. All other floors are constructed of two by four-inch boards, laminated with a maple finish, excepting the section of one hundred feet in length on each floor at the west end of the building. The floors in this section are either of cement, wood block or mastic, depending on the amount of heat or water in different departments.

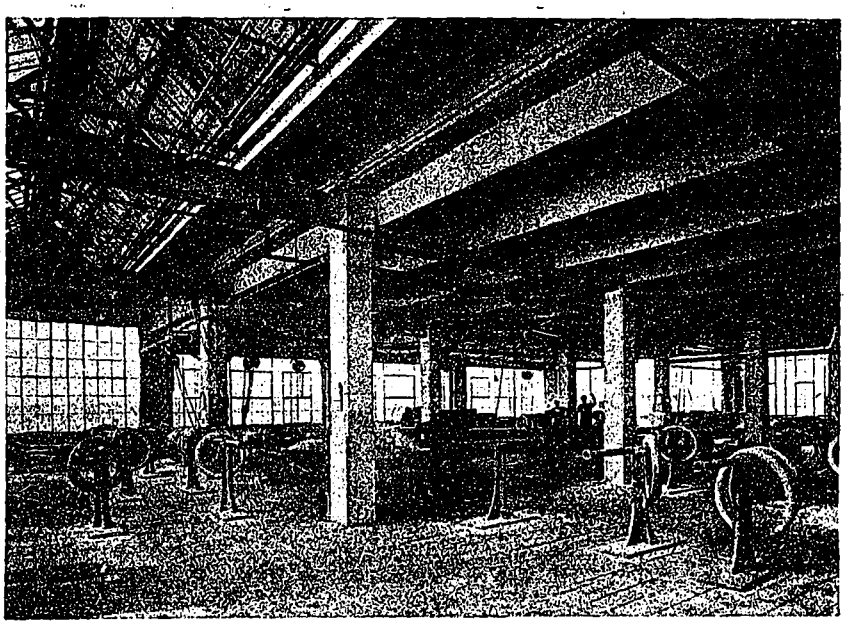
The roof is of two by six-inch boards, dressed and spiked to nailing strips on the channel purlins, and has a cover of felt and pitch. The felt is protected by about one inch of slag brushed into the pitch as it was poured, making a much more homogeneous mass than is possible in cases where the pitch is applied with a mop. The parapet wall extends around the entire building, and the roof is drained by conductors spaced forty feet apart on each side. These conductors are carried down inside the building through the basement and to the sewers which run the entire length of the factory in the centre of the building and under the basement floor.

The height of the main floor, which, as previously stated, has a twenty-two-foot ceiling, permits of a mezzanine floor being installed when required, and at the same time gives plenty of height for ventilation in the departments on this floor requiring this feature.

At the west end the building is narrowed in for a distance of eighty feet above the second floor ceiling to a width of sixty feet; twenty feet being taken off at either side. A monitor similar in

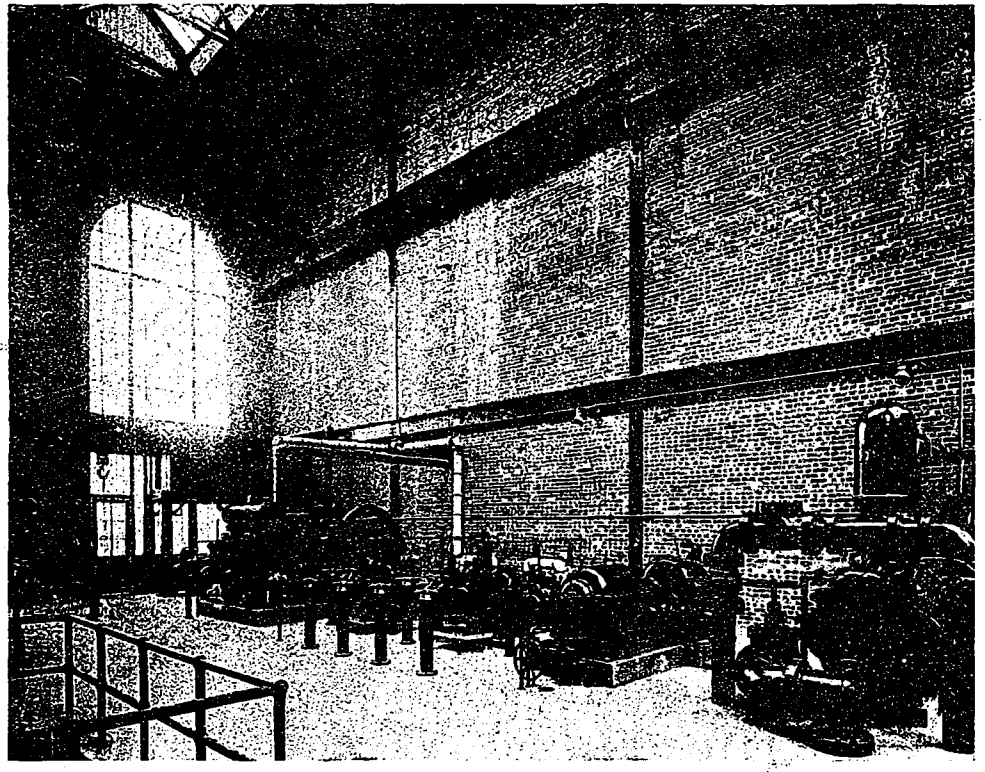


MILL ROOM, GOODYEAR TIRE AND RUBBER COMPANY'S NEW FACTORY.

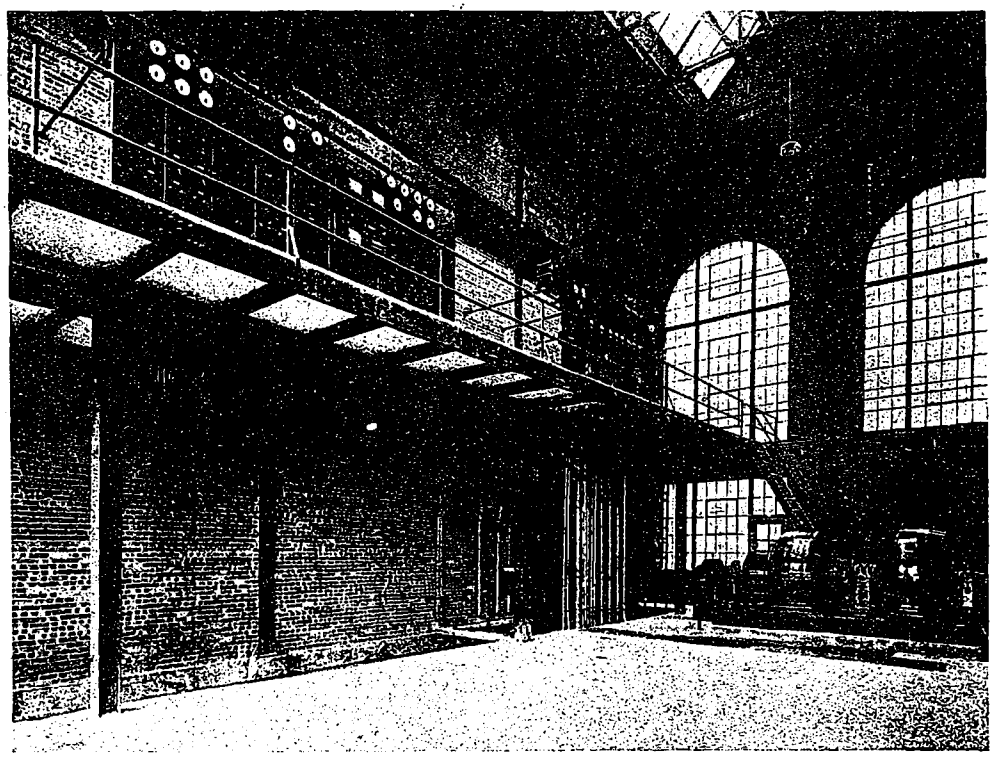


CURING ROOM, GOODYEAR TIRE AND RUBBER COMPANY'S NEW FACTORY.

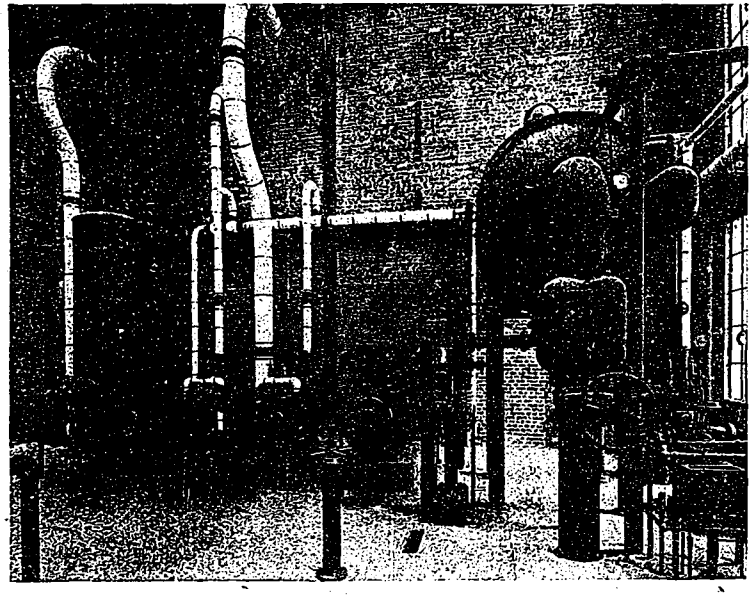
BUILDING AND FINISHING ROOM, GOODYEAR TIRE AND RUBBER COMPANY'S NEW FACTORY.



PUMP ROOM.



SWITCH BOARD.



HOT WELL.

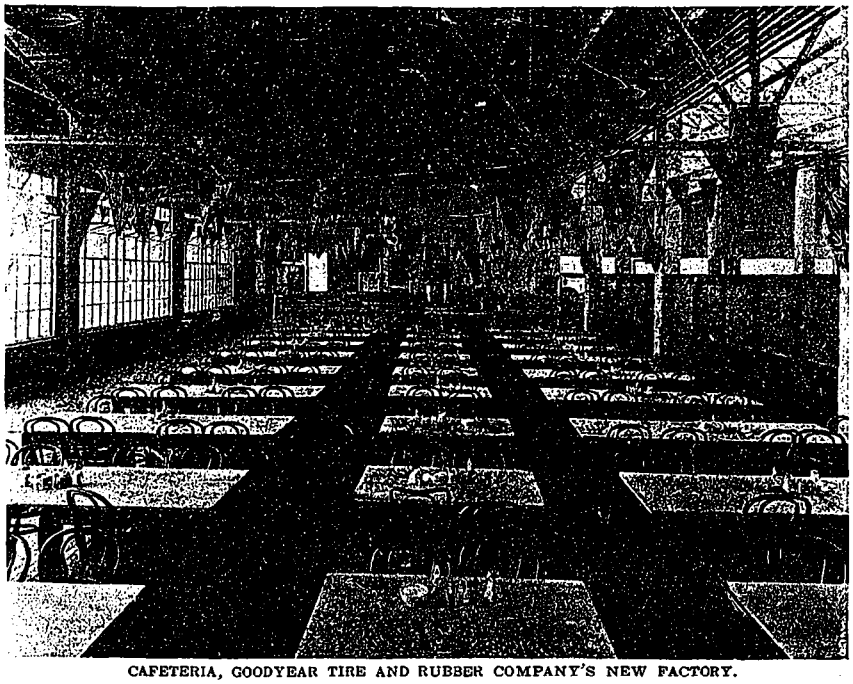
GOODYEAR TIRE AND
RUBBER COMPANY'S
FACTORY,
NEW TORONTO.

TRANSFORMERS.

design to the main monitor, but somewhat smaller, is built the entire length of the lower projecting twenty by eighty-foot strips. These monitors serve as ventilators for this part of the second floor, and are designed to relieve the departments located here of excessive heat and steam from vulcanizers which are installed in this section.

The plant is at present equipped with three elevators, and provisions have been made for the installation of two others in the wells at the centre and east end of the building. Each elevator has a platform of approximately eight by eleven feet, and a capacity of six thousand pounds. These elevators are installed in towers which are built outside the main walls, and are placed to conveniently serve all parts of the factory; one being situated on the north side one hundred feet from the west end of the building, another on the same side at a position of what will eventually be one hundred feet from the east end wall; while the third is installed at the south side in the centre. These towers form twenty-foot projections on the north side, each forty feet across; and one on the south elevation of the same depth extending sixty feet across. A section twenty feet square in each of these towers is devoted to stairways and lavatories, thus affording three fireproof stairways, as well as three lavatories on each floor. The south tower being sixty feet in length, will also allow for a twenty-foot passage way to the next building when same is erected. The lavatories are supplied with hot and cold water, with liquid soap to each bowl from a small overhead tank; and two very complete shower bathrooms are also provided for the working staff.

In addition to the factory working space, a well-equipped machine shop, wood shop, pipe shop, and tin shop, occupy the west end of the first floor; while the west end of the basement is devoted to a complete electrical shop and store room. An interesting



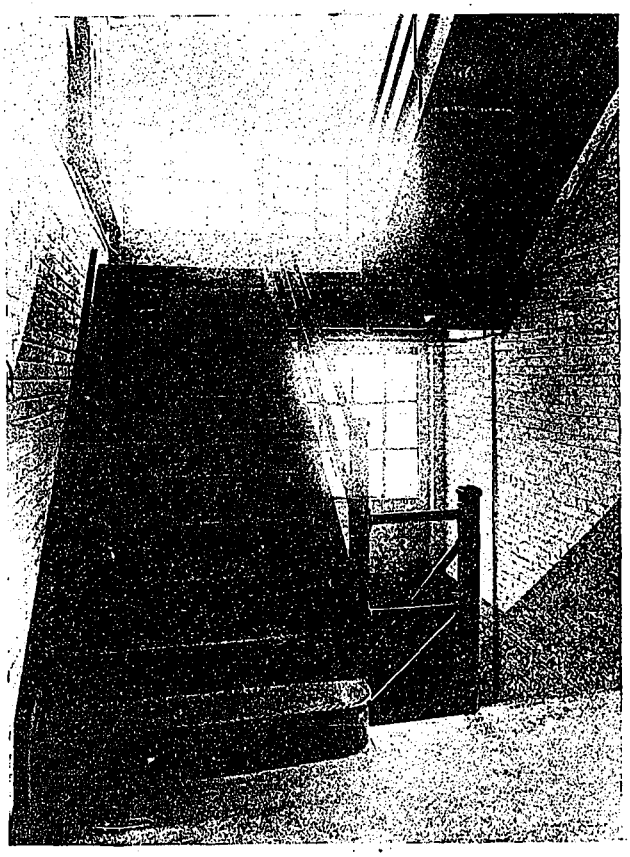
CAFETERIA, GOODYEAR TIRE AND RUBBER COMPANY'S NEW FACTORY.

BOILER ROOM, GOODYEAR TIRE AND RUBBER COMPANY'S NEW FACTORY.

EMPLOYEES' ENTRANCE, GOODYEAR TIRE AND RUBBER COMPANY'S NEW FACTORY.

feature of the building is the cafeteria, which is seemingly becoming a more important factor in industrial structures. Here it is possible to seat several hundred employees at one time, while a first-class *a la carte* service at modern prices is maintained for the benefit of both day and night staffs. The kitchen is equipped with large modern steel ranges, provided with approved ventilating hoods, and has all up-to-date utensils and labor-saving devices; while adjoining are the refrigerating facilities with complete cold storage installation.

The building is heated by a vacuum return system. The distributing mains are installed just below the third floor, and the floors above are fed by risers from this main. The lower



ENCLOSED STAIRCASE.

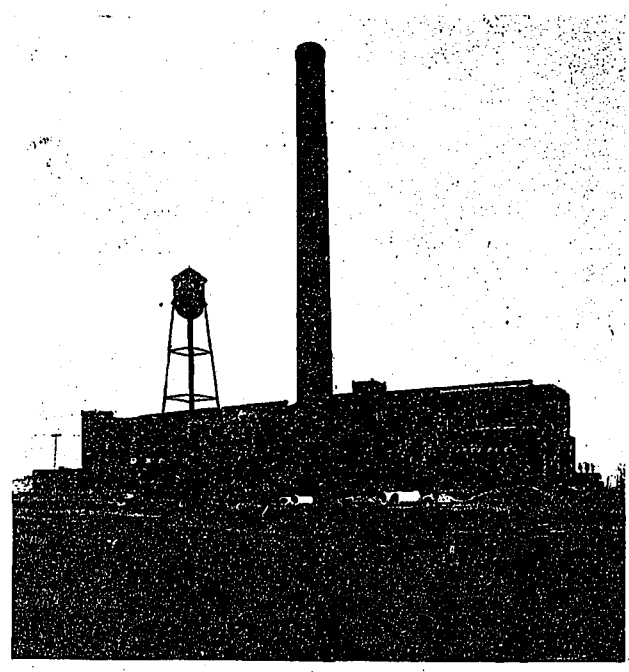
floors, including the basement, are supplied by drop-risers. Approximately one hundred feet of radiation is installed under each window on all floors, with the exception of the basement, where the radiators are extended from the ceiling. Heating coils are also installed at the foot of the monitor to prevent condensation, and returns from all radiators are carried back to hot wells in the power house.

Protection from fire is provided by a sprinkler system consisting of four separate risers connected to the main yard piping and carried from the basement to the top floor. Each riser is controlled by its own post indicator valve, and branch lines are run from these risers to all parts of each floors, including the stairways, lavatories and elevators. Six sprinkler heads are provided to each twenty-foot square bay throughout the building.

The entire interior of the building is painted white, with a five-foot dado blue border on all walls and columns. All of the piping is painted, a different color being used, so that the water lines, air lines and steam lines of the different pressures can be recognized instantly in any part of the building. The entire sprinkler system is painted a deep red for the same purpose.

POWER HOUSE.

The power house, which is approximately forty feet high, is also of brick and steel construction, and is divided into four rooms, namely: the boiler room, fifty-eight by eighty-eight feet; pump room, forty by sixty-six feet; motor generator room, thirty-six by sixty-six feet, and transformer room, twenty-two by sixty-six feet. There is also a sixteen-foot basement under the boiler room and a twelve-foot basement under



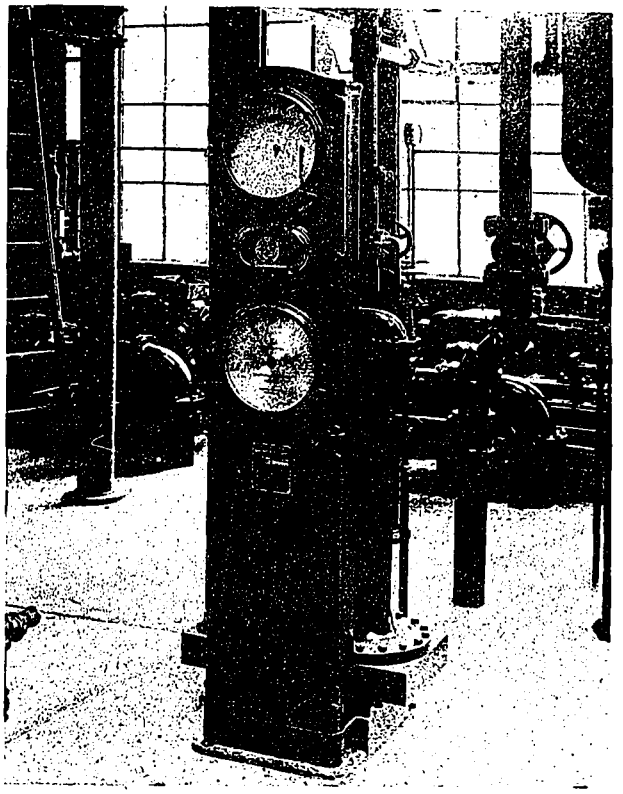
GOODYEAR TIRE AND RUBBER COMPANY'S NEW FACTORY.

POWER HOUSE.

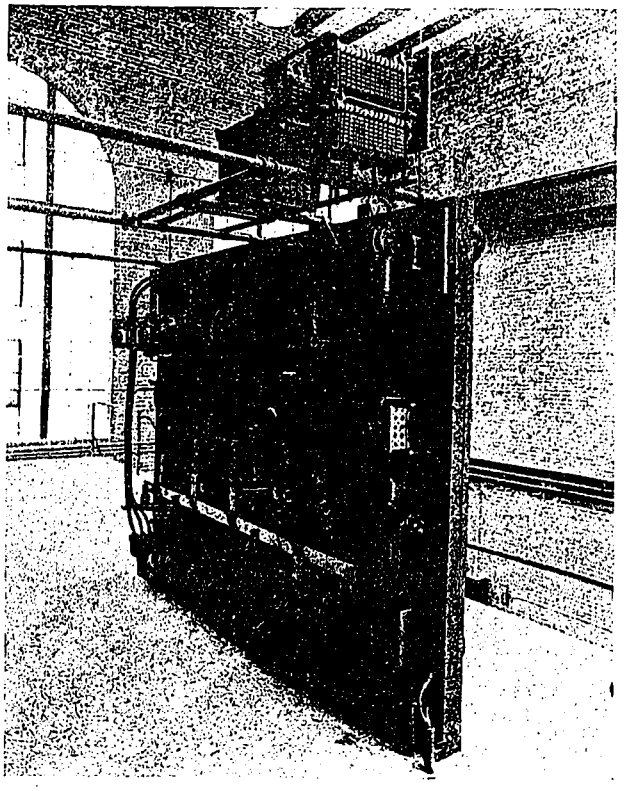
the pump room section. All these rooms are much larger than is required at present, allowing for considerable expansion before additions to the building will be necessary, and the plan is so arranged that future extensions can be made without interfering in any way with the operation of the present plant.

All structural features in this building have been very carefully considered. Modern steel sash is used throughout, circular heads being used where practical; while the arches are trimmed with cut stone keys and jammed blocks; cut stone also being employed to cap the pilasters, which are of generous size.

The roof is constructed of two-inch reinforced concrete, with ferro-inclave, which is plastered



VENTURI METER.



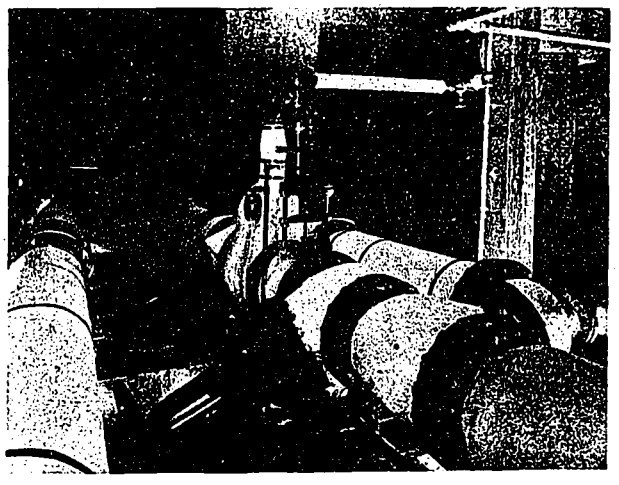
SWITCH BOARD.

GOODYEAR TIRE AND RUBBER COMPANY'S NEW FACTORY.

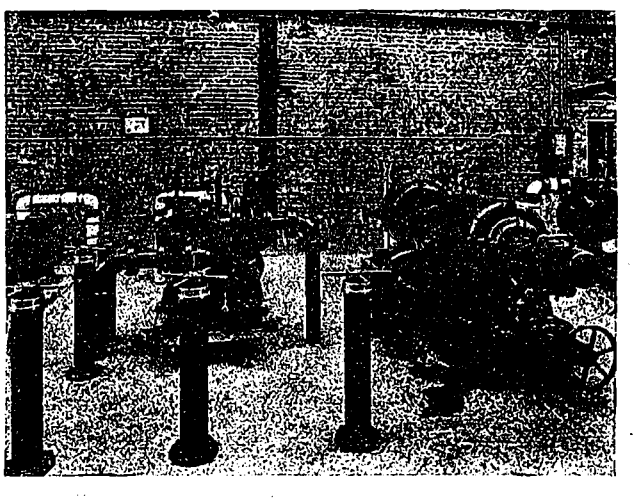
on the inside. On this concrete is laid wood roofing two inches thick, and over this four ply of felt, the latter being protected with slag. This concrete covering makes the power house entirely fireproof, while the wood roof above keeps the concrete from sweating.

There is a monitor in the roof similar to that in the main building. The steel columns in the boiler room are made of ample size to allow for the construction of a large coal storage bin for the boilers at a future date. There are installed at the present time two boilers of the three-drum, four-pass type, rated at six hundred horse power, with a capacity of twelve hundred horse power constant load. Provision has been made for an additional boiler of like capacity in the present room. A notable feature of these boilers is the distance from the grate to the first row of tubes, which is twelve feet. This distance allows for complete combustion of the gases before striking the tubes, and adds materially to the efficiency of the boiler. Each boiler is equipped with seven retort stokers, and has a force draft supplied by a fan in the basement. The boilers are designed for one hundred and seventy-five pounds working steam pressure, and one hundred degrees of super-heat. No super-heater, however, is installed at the present. The blower is directly connected to two engines, either of which is of sufficient capacity to drive the blower, and in addition the stokers. This leaves one engine constantly in reserve. The engines are automatically controlled by the steam pressure by means of a regulator controlled inlet valve.

The boiler foundations are of concrete, built



STEAM PIPES.



MAIN VALVE STEMS.

GOODYEAR TIRE AND RUBBER COMPANY'S NEW FACTORY.

up from the basement floor. The burned gases from the boiler enter a large duct in the concrete foundation, and are carried directly to the stack. A large ash pit is also built in the foundation directly under the grates. It can easily be understood that the heat from these ashes and from the gases passing to the stack would tend to cause considerable expansion in the concrete foundations. These were, therefore, designed with expansion joints, exactly the same as are used in laying the brick for the boiler settings, and, of course, had to be made absolutely airtight where opening up into the smoke duct. The ashes are removed by a steam jet ash conveyor system, whereby the ashes are raked from the ash pit to small hoppers opening up into a duct, and are carried by steam to a storage in the yard.

The stack is constructed of radial brick, and is two hundred and fifty feet high and fifteen feet inside diameter. It is located adjacent to No. 1 boiler of the present installation, assuring the most direct route for the burned gases from the boiler. Two smoke duct openings are built into the stack, one for the two boilers in use at present, and for the third when same is installed; and the other for a battery of four boilers at a future date on the opposite side of the stack. A division wall thirty-five feet high is built up in the stack between these two openings.

Provisions for extensions of this room, both in width and in length, have been made. The basement walls on these two sides, while acting as retaining walls, are built of brick, so as to be easily removed at the time of extension.

PUMP ROOM.

All of the pumps for the various requirements throughout the plant are installed in the pump room, and are laid out so as to provide a wide aisle-way through the centre of the room. This tends toward easy operation, and also makes each unit easily accessible in case of overhauling or repairing. On one side of the room are installed two hydraulic pumps, working in connection with an accumulator, one motor-driven boiler feed pump, one boiler feed water heater, and two heater feed pumps. On the opposite side of the room are two vacuum pumps, one air compressor, two low pressure hydraulic pumps, a booster pump and a fire pump, in addition to a steel settling tank for settling sand and sediment in the water when same appear in objectionable quantities. The main valves are equipped with extended stems, and are operated from stands on the pump room floor. A ten-ton hand-operated crane is also installed in this room.

All of the piping for these pumps is carried underneath the floor or under the ceiling of the basement below. As stated above, the basement is twelve feet high, which gives ample head room under all piping, and makes same easily accessible. Two hot wells, built of reinforced concrete, are provided in one end at the basement level, and take all hot returns from the factory; these wells being cross connected and so piped up as to allow for either to be taken out of service at any time for cleaning or repairs.

All water for the plant is pumped from the lake, and is delivered to the power house in a twelve-inch main. Two centrifugal pumps, driven by twenty-two hundred voltage motors, have been installed in the pumping station at the lake for this purpose, and connections are taken off the twelve-inch main to supply the fire protection piping in case of necessity, and also for filling the storage reservoir just outside of the power house.

The two feed water heater pumps in the pump room previously referred to are of the horizontal duplex type, and take their water from either the hot wells or from the supply main direct discharging into the heater, which is of four thousand horse power capacity. An exhaust steam main carries all exhaust steam to the heater, and thence to the atmosphere. There is also provided a by-pass for cutting the heater out of service.

The boiler feed pump is a three-inch, four-stage centrifugal pump, directly connected to a twenty-two hundred voltage meter. The heater from which this pump takes its water is installed at such an elevation as to give a head of approximately six feet on the pump suction. This pump is also connected so as to take water from the hot well direct or from the main supply line, or even from the storage reservoir in the yard. A Venturi meter is installed in connection with the discharge line to the boiler, and the discharge is also so arranged that this pump may be used for low pressure hydraulic service in the factory.

The two hydraulic pumps are horizontal, duplex, outside packed. They supply water to the presses in the plant and operate in conjunction with an accumulator. The suctions of the pumps are so installed that water can be taken from either the main supply line, the storage reservoir, the settling tank, or from the discharge from the low-pressure hydraulic pumps. It is also possible to take water from either of the above sources with one pump, and at the same time from any of the other sources with the other pump.

The fire pump is a horizontal duplex pump operating at one hundred pounds pressure, and is connected so as to take water from the main service line, or from the storage reservoir, and discharge into an elevated tank for fire service, or to the fire lines direct.

The booster pump is a centrifugal pump di-

rectly connected to a steam turbine. It is installed primarily to boost the service pressure to the factory if for any reason the main supply line pressure should be low. In addition to this, however, it is so connected as to take the place of the fire pump in case the latter is out of service when needed.

The two low pressure hydraulic pumps are horizontal duplex, and are used for raising the presses throughout the plant. Water can be taken by either or both of these pumps from the main supply line, the storage reservoir, the settling tank, or either of the hot wells, and can be discharged to the presses or to the boilers. A balance tank is installed in the discharge line to the presses.

The air compressor is cross compound steam driven, and takes air from the motor generator room adjoining, which air is supplied to all parts of the factory. An air reservoir is installed on the line, and air is also connected to the balance tank working in connection with the low pressure hydraulic pumps. The two vacuum pumps are used on the heating system, one pump being a spare.

A motor-driven vertical centrifugal bilge pump is installed in the basement, and is used for raising all drains about the power house from a sump in the basement to the outside sewer, the basement being below the sewer level. It is automatically operated, the electric control for same being installed on the main floor above. There is also a pump for raising the hot water returns from the hot sump to the hot wells, in case difficulty is experienced at any time in carrying these returns direct to the wells. This pump is also automatically operated.

While super-heated steam is not being used at present, the steam piping has been designed for its use at some future time. For all pressures above one hundred pounds, steel pipe with special joints is used. Steam leaves the boilers at one hundred and seventy-five pounds pressure. The three drums in each boiler are connected by means of a one-piece header made up of long sweep bends and oxy-acetylene welded, and a long sweep bend carries the steam from this header to the main steam header. At the highest point in the line from each boiler to the main header are a gate valve and an automatic non-return stop valve. The leads from the main header rise from the top of same and are carried by long bends into the pump room and down the wall to the basement, and thence to the pumps or to the factory. The steam fed to the pumps is one hundred and seventy-five pounds pressure, while the steam to the factory is reduced to one hundred pounds pressure. It is then carried through a tunnel, through which all piping to the main building is carried, and at the factory end the pressure is reduced to thirty pounds, and then again to two pounds. This makes the three pressures easily available for the several operations in the plant. Each regulator is equipped with by-pass, and a large relief valve is installed at each point when the pressure is changed.

It will be seen from the foregoing that the piping system is very flexible. As an example of this flexibility, it has been shown that the boiler can be fed from any one of these pumps, and that any of these pumps can be used for low pressure hydraulic service; also that each of these pumps can take water from any one of seven sources. Another instance is that all of the requirements of the fire pump can be readily taken care of by the booster pump. This flexibility has been gained without undue complexity in the piping system.

All steam lines throughout the plant are covered, eighty-five per cent. magnesia being used on lines of one hundred pounds pressure, and asbestos air cell on low pressure lines.

ELECTRICAL INSTALLATION.

The plant receives a three-phase, twenty-five cycle current at twenty-two hundred volts from the Hydro sub-station, located adjacent to the property, the lines entering the power house at the east end in the transformer room. The main disconnecting switches are installed immediately under the point of entrance of the lines to the building, and are operated from a gallery about twenty-five feet above the main floor. A set of electrolytic lightning arresters for protecting the system are installed on this gallery floor.

The lines are carried from this point to the twenty-two hundred volt switch structure at the opposite side of the room, this structure being supported on a pipe framework. All oil circuit breakers for twenty-two hundred volt feeders to the factory, and also the primaries to the transformer bank, are fed from a copper bus supported on this framework, each breaker being furnished with separate disconnecting switches. The twenty-two hundred volt bus is fed through a main oil breaker equipped with no voltage release. All oil breakers are D. C. remote electrically controlled, control switches being installed on switch-board on gallery of motor generator room. All the feeders are equipped with a set of series transformers, and all switching equipment is protected by a set of electrolytic lightning arrestors installed at the end of the switch structure.

On the opposite side of this room a bank of four one hundred and fifty K. V. A. O. I. S. C. transformers is installed. These are connected in delta, leaving a spare in case of trouble developing at any time. The primary side of

these transformers is twenty-two hundred volts, the secondary being five hundred and fifty volts, which feeds various circuits throughout the factory. The primary and secondary leads of these transformers are tapped off the high and low tension busses through a set of disconnecting switches.

GENERATOR ROOM.

In this room the equipment consists of a syn motor generator set, a turbo-generator set, and alternating current and direct current switchboards. The motor generator set is used for transforming the alternating current to direct current, which is used extensively throughout the factory on direct current apparatus. The turbo-generator set is used for control and emergency lighting in case of power interruption. The alternating current switchboard consists of nine panels for controlling the various feeders and on which are mounted the different meters for power calculations. The direct current switchboard consists of six panels for controlling the direct current feeders, and is likewise equipped with meters for power calculations.

FACTORY EQUIPMENT.

All the cables from the power house feeding the factory pass through an underground duct system to a brick cable vault in the basement of the main building. From here the various circuits are distributed in conduit throughout the factory. The factory machinery is all motor-driven. The alternating current motors range from one-eighth horse power to four hundred horse power, and the direct current from one-eighth horse power to one hundred horse power. All alternating current motors are equipped with starters of various types, and the direct current motors with Cutler hammer controls mounted in panels.

The lighting of the factory is controlled by its own sub-station. This station consists of a bank of transformers and a switch-board. The transformers are twenty-two hundred to two hundred and twenty-one hundred and ten volts.

The switchboard controls all the various lighting circuits in the factory. The lighting of the power house is controlled from the main switch-board, a separate bank of transformers being installed to take care of same.

The storage reservoir previously mentioned is located immediately east of the power house, and has a capacity of approximately two hundred thousand gallons. It is covered level with grade with a reinforced concrete slab capable of carrying five hundred pounds per square foot, which allows of this space being used for storage of castings, etc. Above this reservoir is built a seventy-five thousand gallon sprinkler tank for fire purposes, an overflow line from this tank dropping directly to reservoir below.

The cement building consists of two brick houses, one thirty by thirty-three feet, and the other thirty by fifty-nine feet. Each building is of one story, the distance from floor to roof trusses being fourteen feet.

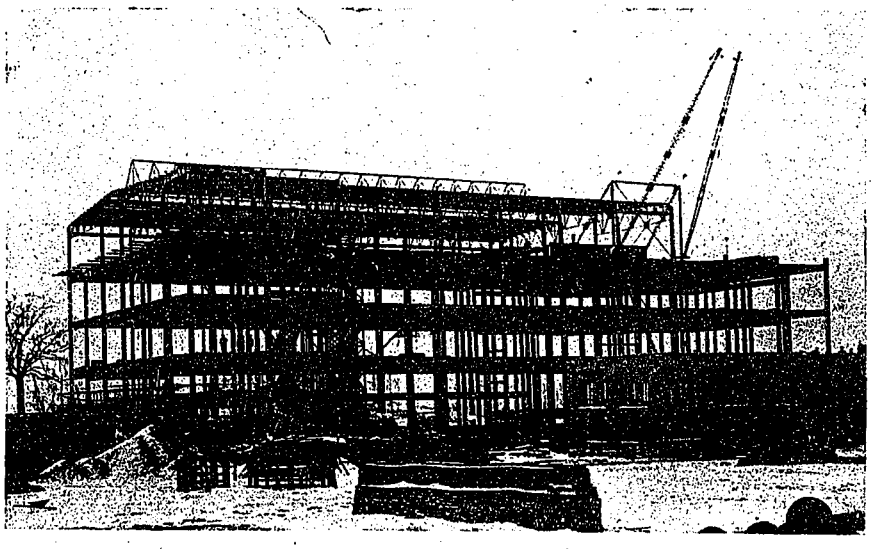
These houses are connected to the main building basement by means of a tunnel, a hydraulic elevator being installed at the cement house end.

ERECTION OF STEEL FRAMEWORK.

The structural steelwork for the main building was erected by using two five-ton derricks, with seventy-five-foot booms mounted on a traveller on which was also placed all the hoisting equipment. The traveller ran on the fourth floor steel frame, and erected all the steel up to and including the fourth floor ahead of it. When the traveller was moved forward, then the rear derrick placed the roof columns, the three lines of roof trusses and the purlins.

The derricks were so placed on the building that either one could lift the steel from the cars on the siding at the north side of the building. This method of erection proved very efficient, and enabled the steel contractors to erect all the framework in record time.

It is estimated that fire losses in Canada and the United States during 1917 will reach a total of from $240,000,000 to $250,000,000. This is considerably higher than the total for each of the two preceding years. It must be expected that Nero will fiddle just as long as material of the nature of fuel are being used in buildings.



STEEL WORK OF GOODYEAR RUBBER AND TIRE COMPANY'S MAIN FACTORY BUILDING AT TIME OF ERECTION.

Contracting Side of Structural Steel Business

By CHARLES H. MARRS, C. E. *

IT is not the purpose of this article to advertise fabricated structural steel by enlarging upon its uses and giving its advantages over other building materials, but it is the intention to merely mention some facts and make a few suggestions in connection with the contracting end of this business which may be of interest to those who have occasion to deal with it; for the development of this industry has been one of the remarkable achievements of the age, and almost every modern structure has some steel in its make-up.

There are many stubborn facts and changeable conditions in connection with any fabricating business, and especially is this true of structural steel, which is used in such varied form in building construction.

It is used in railway bridges, highway bridges, mill buildings, high office buildings, factories, power plants, steel mills, towers, and miscellaneous buildings of every description, and from the character of these structures it is evident that heavy loads and stresses are necessarily involved, and it is imperative in the interests of public safety that no element of chance or uncertainty should be permitted to enter into their construction.

In the case of railway bridges each railroad has its own specifications and standards to govern, and has also a staff of engineers to see that these are complied with, and the result is, that after the general outline of a bridge is settled, any bridge company is able to make complete designs which only require minor changes, if any, before being approved, and in this way these bridges are always built in accordance with the best practices known.

In the case of highway bridges there is likewise little variation in the design of the most important bridges which are usually under government control. In the lighter bridges, however, such as township spans where the purchasing is in the hands of inexperienced persons, who may be farmers by occupation, there is a possibility that some unreliable company might supply a structure considerably lighter than desirable.

In the design of large building structures there is usually little uncertainty, as competent architects and engineers are engaged to prepare plans, either alone or working in conjunction with some structural steel company, and the records show that the failures of steel structures built under competent supervision have been remarkably few.

The cases where failures are more likely to occur are in connection with more simple building structures, where plans are prepared by incompetent persons, or where no plans are made at all. It is common practice for a carpenter or builder to use his judgment, gained by experience, in deciding the size of wood beams which he will use for various conditions, and it is when this same practice is followed in connection with longer spans under heavy loads requiring steel beams, that the element of chance is certain to be present, because a designer with years of experience would not attempt to use this rough method of guessing at the required sections; yet it frequently happens that customers order steel beams, of a fixed depth, on the recommendation of their carpenter, when one double the size may be required, or perhaps one half as strong might answer the purpose. Sometimes, too, customers write to structural steel companies and ask for a price on steel beams, and merely state that they are to be a certain length and to carry a brick wall, and they omit to describe the walls or mention any floor or roof loads which may have to be supported by these beams.

The above rough methods usually exist in towns where there is little or no building inspection, and while structural companies employ experienced designers whose duty it is to try and get complete information before recommending the sections to be used, there often exists the uncertainty as to whether all particulars have been fully described by the customer.

In a great many cases small architectural firms are engaged to prepare plans for buildings in which structural steel is required, and there is no reason why good results should not be obtained if the architect is competent, even though he may not be a structural engineer. The architect is best able to decide the general arrangement, and the type of construction which, at a limited cost, will give a satisfactory layout, and usually is able to calculate imposed loads, and by the use of handbooks decide on sections suited to the load, but in some cases he is not qualified to make a design of the general structural steel in the building.

The most competent structural designers are only developed after years of training along that special line, and it is not expected that all men who practice architecture have these qualifications or find it profitable to engage an assistant who has.

It is always possible for an architect to get advice from the designing engineers employed by structural steel companies without any extra cost to himself or his client, and this should always be an advantage, as these men are constantly in close touch with the trade. The con-

* Assistant Chief Engineer, Hamilton Bridge Works Co., Ltd.

ditions in the steel market are continually changing, and new shapes are often being introduced, and shop practices and erection methods are always being improved, and these changes are all accompanied by improvements in designs of structures.

For the last few years, under war conditions, old customs have been particularly upset and the conditions at the mills have been such that some sections could not be procured at all and others have had to be on order for a year or more before deliveries could be made, and it has been necessary for structural steel companies to rely on their own stock, and designs have had to be made in accordance with same where quick delivery was wanted.

Since the outbreak of the war most of the structural steel business has been confined to munition buildings and steel plants, all of which have been wanted in a rush and some remarkably quick deliveries have been made, but it has been necessary to make the designs to suit the stock of the fabricating company.

Anyone connected with the contracting business is aware that there are frequently disasterous financial losses, and one of the most important phases of the structural steel business is that there should be a thorough understanding of the limits, and the details of contracts undertaken.

There is more money lost by an imperfect knowledge of the obligations of contracts than in any other way, and this more usually happens when there is obscurity in the specifications and plans which are furnished steel companies when they are asked to tender on work, and on which specifications and plans the contract is later based.

In connection with all tenders the principle of honor and the spirit of frankness should always maintain between contractor and customer. This is not always the case, and often specifications for structural work to-day are faulty, and very important clauses are not only put in obscure places, but are deliberately written in uncertain terms. Sometimes specifications are so drawn up that it is evident that the man who wrote them deliberately used terms which made them obscure, so that if he desired, the extreme of the contract could be demanded, whereas if he did not care to do so he could be satisfied with something a great deal less.

Another important feature is where tenders have to be made from drawings which are made to cover all trades in connection with the building, and where it is sometimes very difficult, if not impossible, to be sure of all steel required, and where a considerable amount of steel may be covered by a little obscure note which is easily missed, but which material is intended to be supplied later under the contract. These drawings, too, are often made to a small scale without dimensions being noted and it may easily follow that beams which should have sixteen inches bearing on the walls, may only get half that amount.

Still another custom that is open to criticism is that consulting engineers often prepare complete designs and specifications on complicated structures which may even have operating machinery in connection with them, and after tieing the contracting company down rigidly in all details, they insert a clause in the specifications making the contractors guarantee the structure for a period of years, and these companies have often to take such chances to secure the work.

Again a further confusing habit is that some standard form of specification is often submitted with requests for tenders and these specifications may not be suitable to the particular job; and the result is that the contractor has to take a lot of things for granted and uncertainty necessarily exists as to what is required.

While the above questionable methods are sometimes used by customers, there are on the other hand companies with unscrupulous salesmen, who in their anxiety to obtain work will often obligate themselves as regards contracts, the conditions of which they are morally certain they cannot fulfil, and take a chance of crawling from under afterwards.

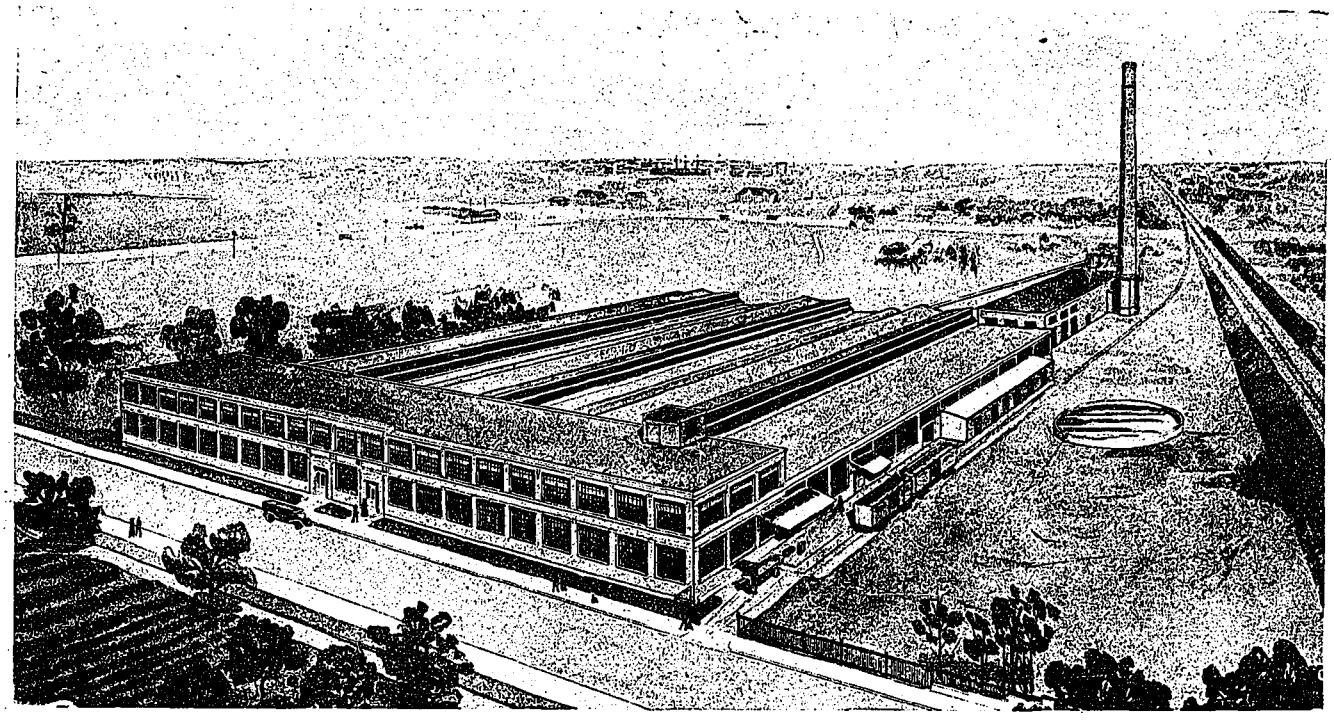
Therefore it is important that the contractor and customer make sure in the first place what is expected under the contract and be satisfied that there is a reasonable chance that it can be fulfilled, and if all information is clear, then speed and proper sequence in the work usually follows.

After a contract is under way changes are sometimes necessary through the uncertainty of customers, and in these cases, all instructions should come through the same hands as the original contract so that extras in cost may be adjusted beforehand and various officials may have full knowledge of the final conditions of contract.

Changes should of course be avoided where possible, because there is always deep disgust pervading the shop when they have to work on contracts with a large number of changed drawings, and considerable delay always results and mistakes are more likely to be made.

An interesting feature of the structural steel business is that in the old days material was fabricated, shipped and possibly erected before being examined at all, but to-day nearly all important work is over seen by competent inspectors and the fabricating shops that deliberately set out to do poor work at less cost, only fool themselves and injure their reputation.

While it is recognized that most of the points noted in this article are the comparatively simple features which have been noticed before by those intimate with the structural steel business it has been the intention to convey information to those less familiar who may have occasion to deal in this product.



PERSPECTIVE VIEW OF CANADA CYCLE AND MOTOR COMPANY'S PLANT, WESTON, ONT. PRACK & PERINE, ARCHITECTS.

New Cycle and Motor Works, Weston, Ontario

THE plan and arrangement of the new plant of the Canada Cycle & Motor Company at Weston, Ontario, was determined mainly by the extent of the site which allowed sufficient ground area to permit of the erection of an almost entirely one-story building. As a result, the various working departments are organized so that the factory operations are conducted altogether on the ground floor level. The only part of the building rising above this height is a two-story section across the front, in which the general offices and storeroom are located. This part of the building is two hundred and eighty feet long by fifty feet deep, while the factory portion occupies the remaining space of two hundred and eight feet by one hundred and fifty-eight feet.

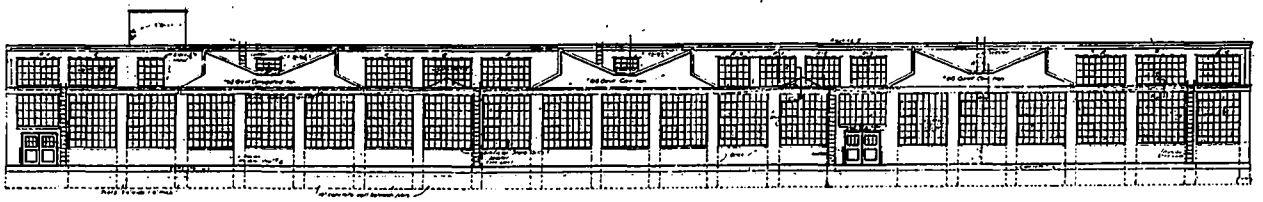
The continuous unbroken area thus available obtains both efficiency and economy in the process of manufacture; all operations, from the receiving of the raw material to the finishing stage, being carried out in a systematically arranged order, and without the necessity of raising or lowering any part of the work from one floor to another.

The general office section is built of fire resisting materials, with concrete foundation piers and reinforced concrete columns for the first floor. These columns are fourteen inches square, and placed at sixteen-foot intervals. Concrete is also employed in the girders, fourteen by thirty inches, which support the ten-inch hollow tile and concrete joist floor of the second story. The enclosing walls are of brick and the roof is flat, consisting of wood sheeting on steel wall-bearing girders, and covered with prepared roofing. The floors are finished with cement or linoleum.

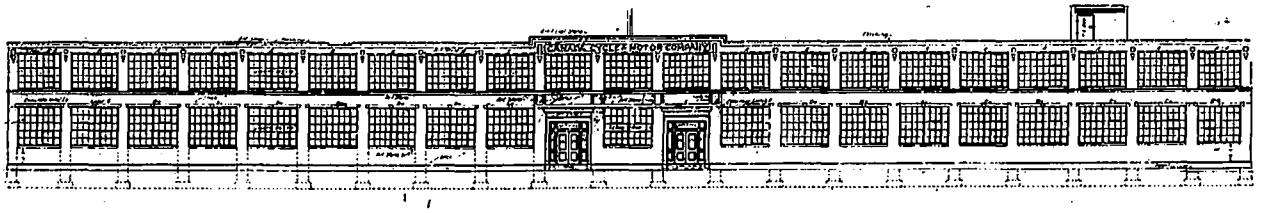
Two entrances at the front give access to the building, one being used by the male help of the factory and the other by the office staff and female employees. The general offices and storeroom are on the second floor, while modern locker rooms, an emergency hospital, and lunch and rest-rooms for the women staff are provided on the ground floor level.

One interesting feature of the entire building is the fenestration, whereby almost the entire wall area is taken up by a system of outside windows. As a result an abundance of light is obtained from all sides, and this is further supplemented by specially designed roof monitors which admit of an additional inflow of direct natural light immediately over the factory proper.

The factory section of the building is of steel frame construction, supported by concrete piers with spread footings carried down to a minimum depth of three feet six inches, and with the bearing strength varied to suit the loading requirements. The outside columns are supported on continuous foundation walls of concrete with spread footings, on which the outside brick walls are built up. The columns are placed at sixteen-foot intervals in one direction and forty-foot intervals in the other, with steel roof trusses spanning the long bays. The brick exterior walls are nine inches thick between the columns and thirteen inches at the columns, the



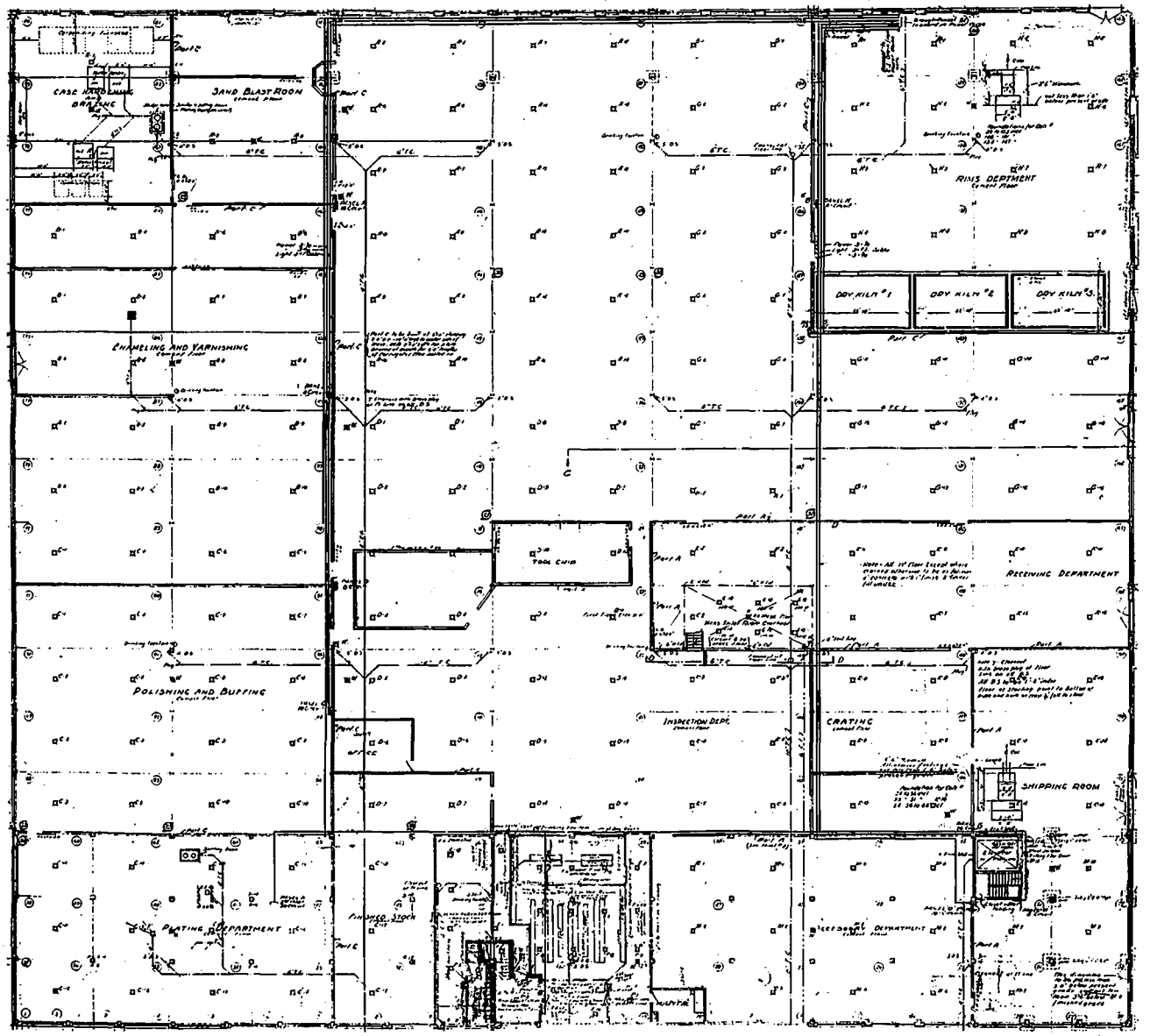
REAR ELEVATION, CANADA CYCLE AND MOTOR COMPANY'S PLANT, WESTON, ONT.



FRONT ELEVATION, CANADA CYCLE AND MOTOR COMPANY'S PLANT, WESTON, ONT.

metal sash of the windows extending from the sills to the eaves. The roof is of two and three-quarter-inch tongue and groove sheeting on six by ten-inch rafters, being supported by the steel trusses previously mentioned. Drainage is carried through interior down-pipes and outside eaves. The floor of the factory is of four-inch concrete on a two-inch cinder base, with a one-inch cement coat finish.

The power house forms a separate unit, and is approximately thirty by sixty-two feet in dimensions, with a stack one hundred and twenty-five feet high and five feet six inches in diameter at top. The walls are of brick, and the roof is carried on wall-bearing steel sections. Two return tubular boilers of three hundred horse power capacity are at present installed, and provision is made for the addition of two simi-



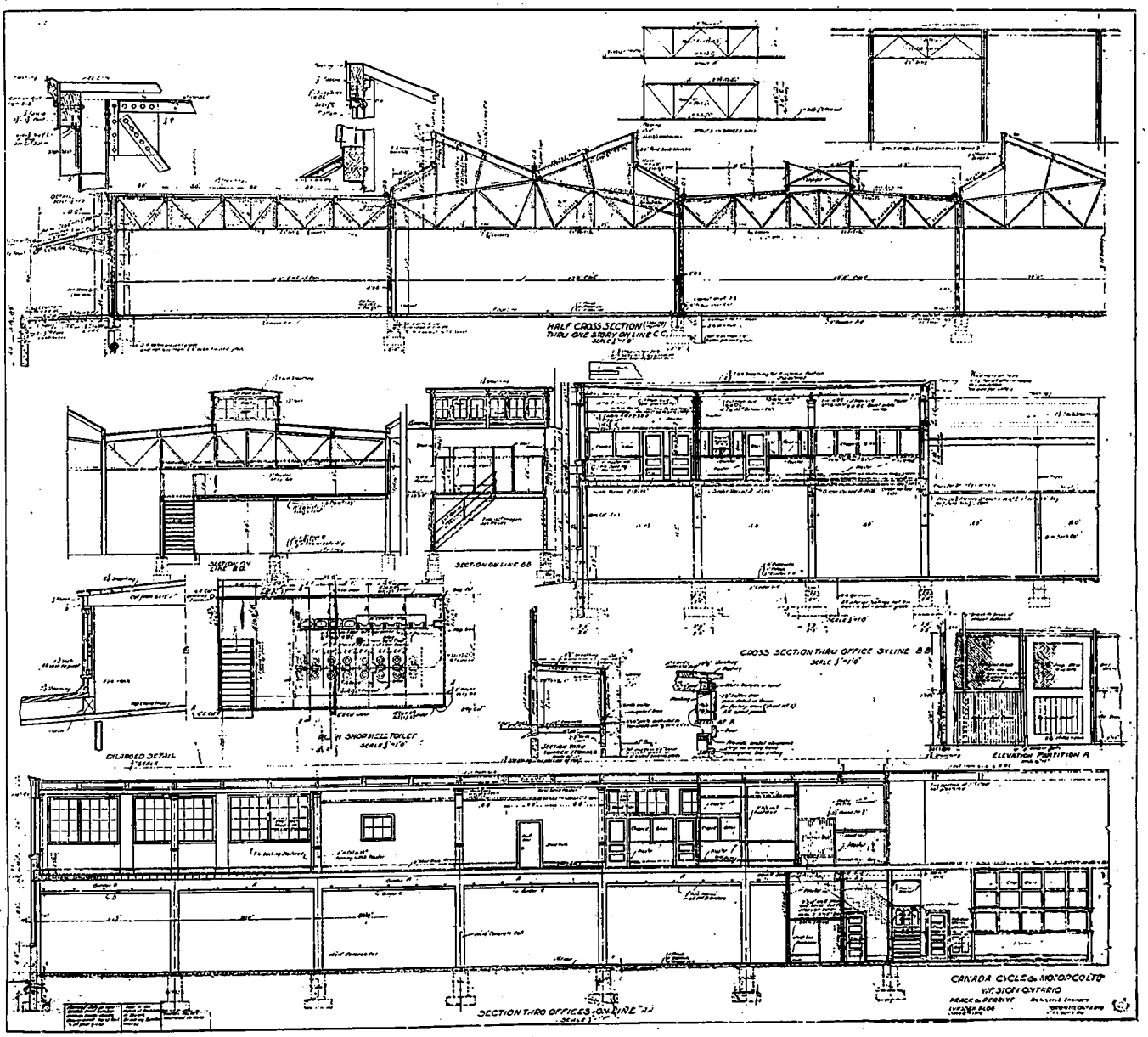
GROUND FLOOR PLAN, CANADA CYCLE AND MOTOR COMPANY'S PLANT, WESTON, ONT.

lar units at a future time. A steam-driven air compressor furnishes compressed air for brazing, sand-blast, and other shop processes. Additional equipment consists of a fire pump, which connects with a one hundred thousand gallon underground tank of reinforced concrete, fifty-two feet in diameter, which can be utilized in case of fire in the case of a breakdown in the local waterworks system.

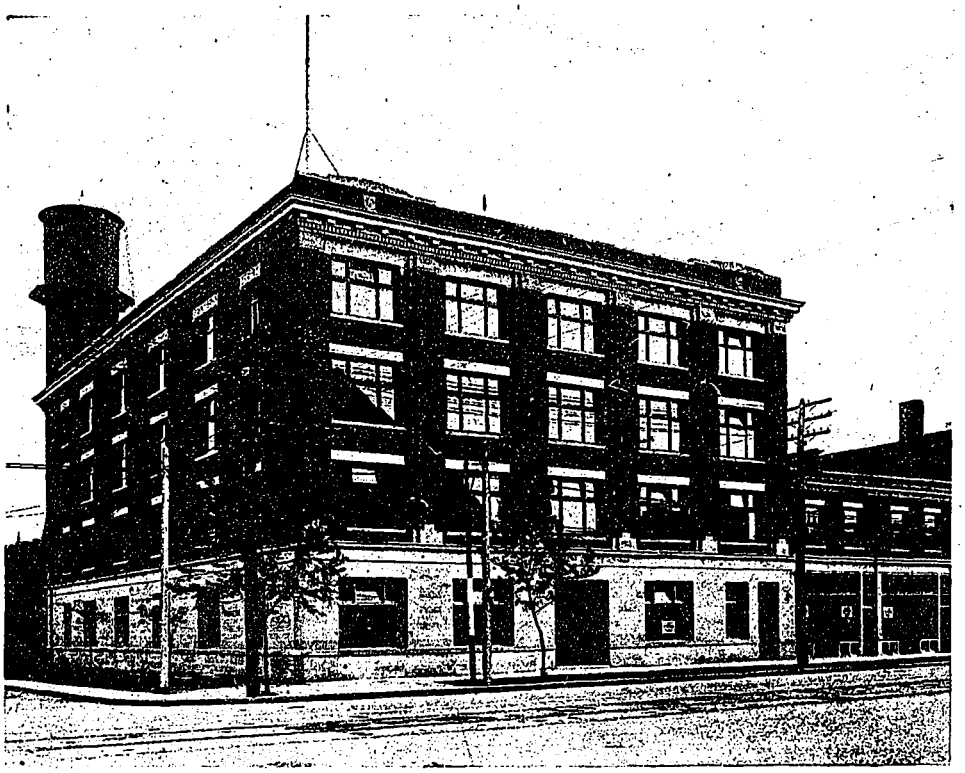
The plant is equipped throughout with a sprinkler system, and an indirect heating system with a series of three operated fans and ducts supplies warm air to all parts of the workrooms.

The office section is heated by direct radiation, the exhaust steam being used for this purpose. Steam is also used for heating the dry kilns and enamelling ovens; while the various machines throughout are driven by electric motors.

Mr. Joseph Hobson, one of Canada's most noted civil engineers passed away recently in Hamilton, Ontario, in his 84th year. Two great engineering achievements stand to his credit, both parts of the Grand Trunk main line: the railway tunnel under the St. Clair River, near Sarnia, and the rebuilt Victoria bridge from the Montreal side of the St. Lawrence to the southern shore of that river. Mr. Hobson was born near Guelph, Ontario, in 1833, and was educated professionally in Toronto. Whilst still a young man, he joined the firm of contractors that built the section of the main line of the Grand Trunk Railway from Toronto to Guelph. In 1870 he was appointed bridge engineer of the southern division, formerly the Great Western Railway, and in that capacity he had charge of the construction of the international bridge from Buffalo to Fort Erie, and of the replacement of the old Suspension Bridge below the Falls of Niagara. For ten years he held the position of Chief Engineer of the Grand Trunk Railway System, from 1896 to 1907; since which latter date he had been consulting engineer.



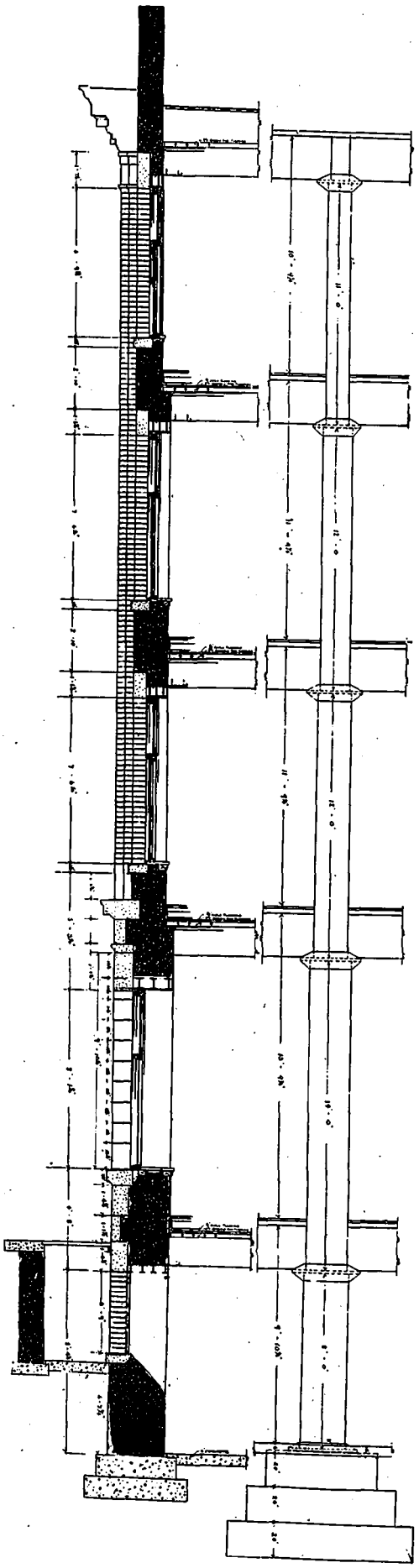
CANADA CYCLE AND MOTOR COMPANY'S PLANT, WESTON, ONT.



GENERAL VIEW.

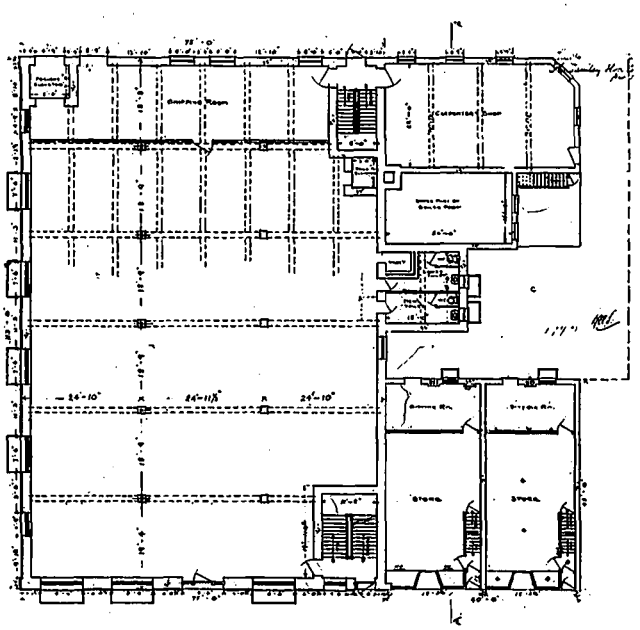
CROMPTON CORSET COMPANY'S BUILDING, TORONTO.

MAIN ELEVATION.

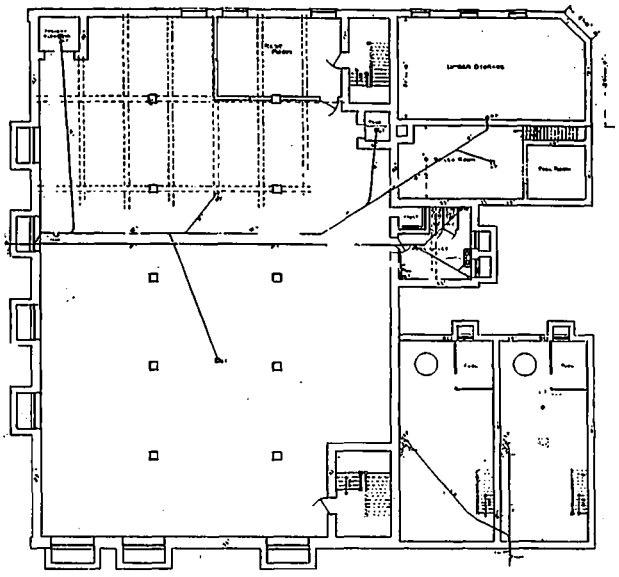


SECTION THROUGH NORTH WALL.

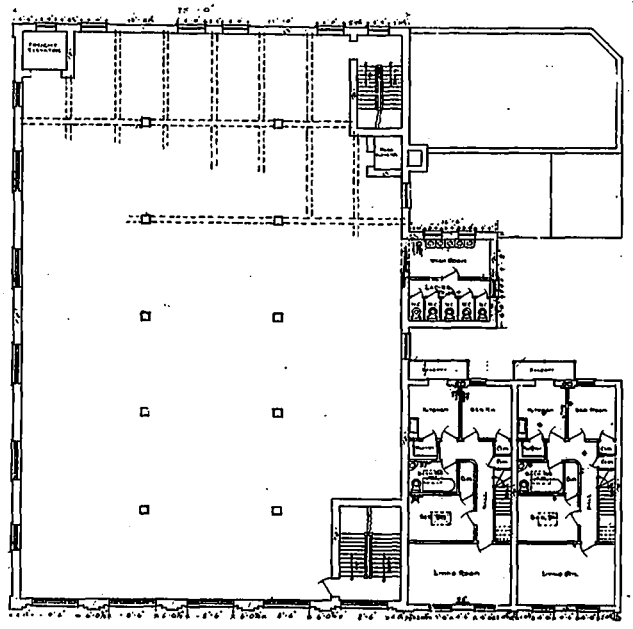
A. R. DENISON & STEPHENSON. ARCHITECTS.



GROUND FLOOR PLAN.



SECOND FLOOR PLAN.



BASEMENT PLAN.

CROMPTON CORSET COMPANY'S WAREHOUSE, TORONTO

Mill or slow burning construction offers certain advantages in initial cost and insurance which influences its adoption in a large number of commercial buildings; and especially when equipped with modern sprinkler system, metal sash and other like features, it makes a most substantial structure compatible with the outlay from the standpoint of investment.

The warehouse of the Crompton Corset Company, at the southwest corner of College Street and Palmerston Avenue, is of this character and it represents to a large extent the type of commercial buildings erected during recent developments in the west College Street district.

The building is four stories high exclusive of basement, and occupies frontages of 113 feet on Palmerstone Avenue and 75 feet on College Street, with an additional 40 foot extension for stores. Light is obtained on all four sides of the structure, the large windows on the street elevations being of the wooden casement type, while the remaining windows throughout have steel sash. The walls are of dark purple stock brick set in colored mortar with the entire ground floor faced with blue Ohio cut stone; the latter material also being used for the window heads, sills, etc. above moulded cornice band. The upper cornice is of galvanized iron painted and sanded to match the stone work. The interior is of heavy mill construction, the floors consisting of 2¾ inch Georgia Pine planks covered with ⅞ inch maple flooring, and are designed to carry a safe live load of 150 lbs. per square foot. The beams and posts are of British Columbia fir with caps and bases of heavy cast iron.

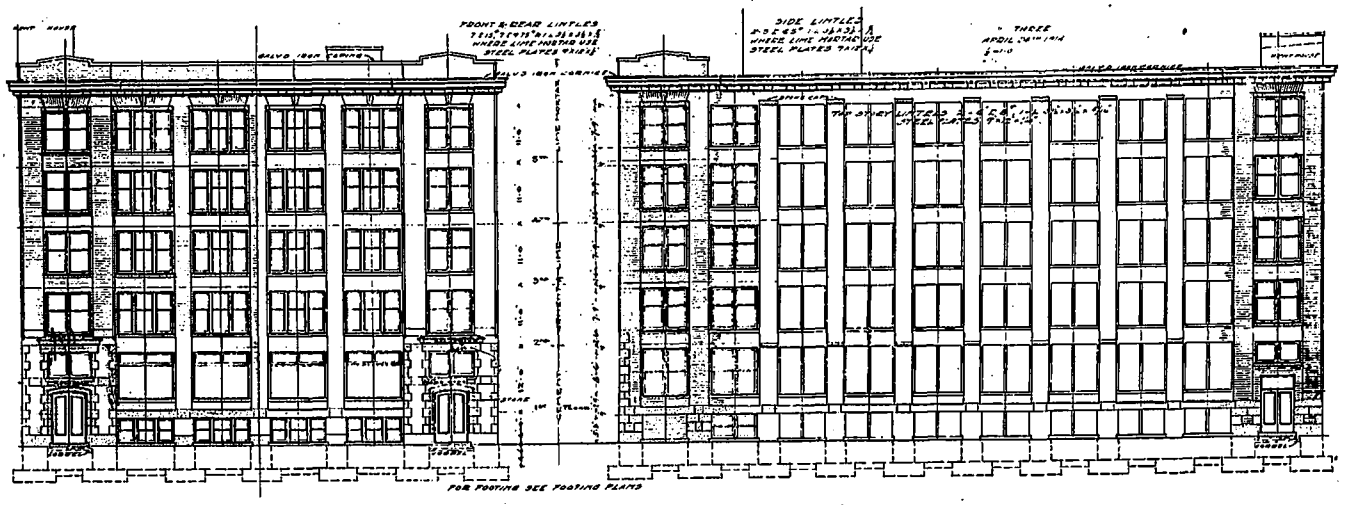
The front portion of the main floor is laid out in offices, and the balance of building devoted entirely to wareroom and working space. There are two wide stair-cases enclosed with brick walls, connecting the various floors; while both the passenger and freight elevators are likewise protected with similar brick enclosures.

A lane extending around the building at the rear gives excellent facilities for receiving and shipping and is served by the freight elevator direct.

Instead of the living apartments above the stores on the College Street extension, the space here is devoted to a large modern rest room and lunch room decorated and furnished to attractively fulfil its purpose. This change in the plan was decided upon during the time the building was in the course of erection and an opening was consequently cut through the wall to connect this part directly with the main portion of the structure; thus making it a convenient feature of the company's policy in regard to the comfort and welfare of its employees.

LADIES' WEAR LIMITED, TORONTO

The site of this building is at the south west corner of College Street and Manning Avenue and was selected to afford the greatest amount of air and light for the employees. A 15 foot lane was left to the east and this together with a 25 foot lane to the south gives light to all four sides of the building. The windows on the east and south are metal with ventilators in each sash. The exterior walls are finished with red pressed brick with artificial stone cornice and trimmings. Mill construction is used throughout, the posts, beams and heavy 4 inch floors being of Douglas fir, with ⅞ inch maple finish floor, except over the boiler room where the

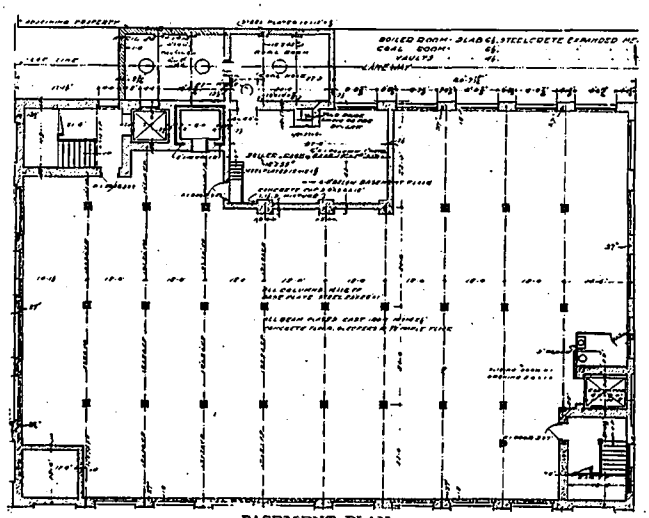


FRONT AND SIDE ELEVATIONS, PREMISES OF LADIES' WEAR, LTD., TORONTO.

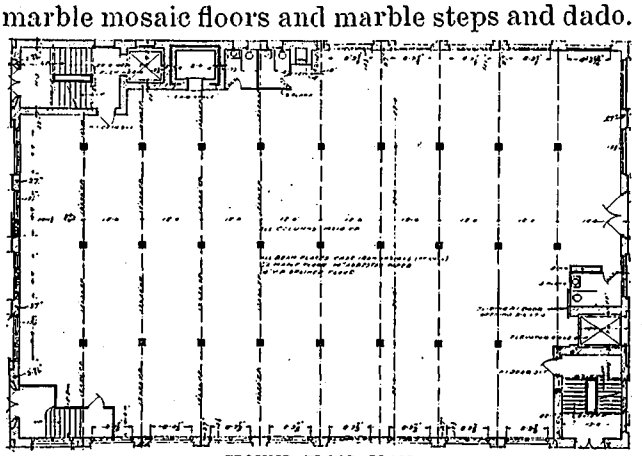
flooring is of maple over reinforced concrete. The basement floor consists of a layer of pitch and felt on concrete, over which is laid a 7/8-inch pine floor on cedar sleepers, and finished on top with a 7/8-inch maple floor. A battery of three boilers is used to heat the building, and the coal bin is situated under the lane east of basement, and has a carload storage capacity.

The stairs are enclosed with brick walls and kalameined doors, and are arranged to afford easy exit. In addition to the usual passenger and freight elevators, a spiral gravity parcel conveyor running from the fourth to the ground floor relieves traffic on the freight elevator and permits of the handling of goods with convenience. Tank of sprinkler system is connected with water curtains on the outside of east and south walls; this, with a signal system, permits of exceptionally low insurance. The main entrance is finished in marble, with marble mosaic floors and marble steps and dado.

PREMISES OF LADIES' WEAR, LTD., TORONTO. J. L. HAVILL, ARCHITECT.



BASEMENT PLAN.



GROUND FLOOR PLAN.

New Birks Building at Vancouver

LOCATED on one of the many business corners in Vancouver, B.C., the new Birks Building was erected from plans drawn by Somervell & Putnam of that city. The building is one hundred by one hundred and twenty feet with ten storeys and basement, and the upper eight floors having thirty-one offices.

The building has an attractive appearance on Granville and Georgia facades, being of light cream color terra cotta with bases of British Columbia granite.

The main entrance is finished with panelled marble wainscotting and highly ornamental plaster ceiling of caen stone finish.

The corridors are floored with terra cotta, and stair treads and base boards throughout the building are of marble. There are tiled lavatories for each sex on every floor. The woodwork throughout the building is of oak and the office floors of British Columbia fir.

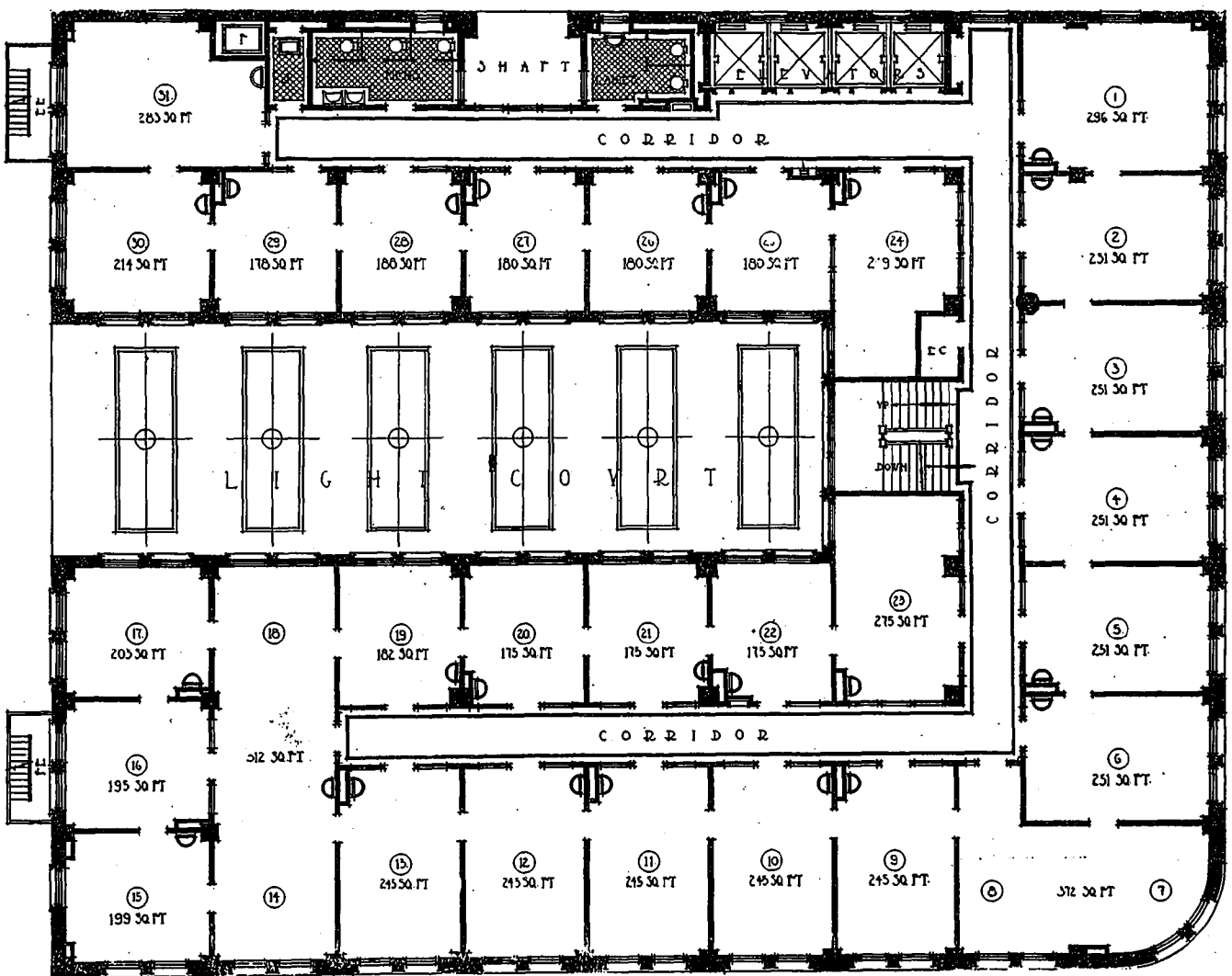
The structure is fireproof, being of reinforced concrete with terra cotta partition walls. Each floor is equipped with fire hose and two fire escapes, and metal windows throughout, which will close automatically in event of fire.

The first five floors are specially laid out for doctors and dentists with necessary water, gas and electrical connections installed in the base boards. The Webster method of circulation steam heating is used with duplicate boilers. The vacuum cleaning system and mail chute and modern elevators are also installed.

The first floor, ground floor and basement of the building are used by the owners as a jewelry store. The interior finishing of the ground and mezzanine floors being of marble, mahogany and bronze.

A large elevator is installed to enable the motor delivery trucks to be lowered to the basement, which is used for storage and shipping. The heating equipment is located in the sub-basement.

In pouring the concrete the gravity system was used. The cement and sand were mixed on the ground and conveyed by an elevator to a height of about twenty feet, where it was to be used. It then flowed by gravity through tubes into the moulds.



TYPICAL FLOOR PLAN, BIRKS BUILDING, VANCOUVER, B.C.

SOMERVELL & PURNAM, ARCHITECTS, VANCOUVER, B.C.

BIRKS BUILDING, VANCOUVER, B.C.

SOMERVELL & PURNAM, ARCHITECTS, VANCOUVER, B.C.

CONSTRUCTION

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

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FRED. T. HOLLIDAY, Advertising Representative

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The Building Outlook

While building operations are not to be compared with the heavy volume of work carried out in the pre-wartime period, the year just closed has, nevertheless, seen a fair demand for certain lines of materials. At least it can be said that since the slump occasioned by the outbreak of hostilities in 1914, the situation has recovered to a point at which it has remained more or less constant as regards the total annual investment. This has been due in a large measure to the increase in military hospital units, aviation buildings, and additions which have been made necessary to meet the requirements of manufacturing plants; and it is altogether likely that considerable additional work of this character will be undertaken in the period immediately ahead. There has also been a fair amount of activity in the erection of theatres and schools, as well as low-cost residential structures, while the establishing of shipyards and like industries has also been a contributing factor. The complete figures are not as yet available for the twelve months of 1917, but even when these are compiled, the indications are that if any decrease is noted it will not amount to more than a small percentage at the outside. Activities have perhaps shifted around to an extent in some certain districts, and consequently some sections have suffered, while others are ahead, but on the whole the total expenditure for the country held fairly steady to the previous year's mark.

As to the outlook it is difficult to prophesy, other than to say no adverse change is expected. True, word comes from Ottawa that Mr. Carvell, the new Minister of Public Works, has ordered a curtailment of work coming under his authority, and will confine expenditures altogether to necessary repairs and maintenance. But this, it is understood, is not to include work on the new Parliament Buildings, and is more in regard to harbor improvements, docks, etc., which, as far as expenditures are concerned, only involves certain basic materials. In fact, aside from the new Parliament Buildings, the government's programme in the past year has provided for very little in the way of new buildings or improvements to existing structures, so that the announcement is not as unfavorable as it perhaps might appear. On the other hand, there is considerable talk of starting a number of deferred projects of a private character, and a likelihood that considerable more will be done in the better class of residential work. There is nothing to indicate any appreciable drop in prices for some time to come, and many owners who are reconciled to this fact will likely be influenced to proceed with contemplated work without further delay. In addition, there is a pressing need in a large number of communities for school buildings, and houses to accommodate the working class, and this, together with a continuance of industrial and military work mentioned, should offer a fair amount of business prospects.

The Late R. Mackay Fripp, F. S. A.

The sudden passing away of Mr. R. Mackay Fripp, F.S.A., at Vancouver, B.C., on December 15, has deprived the architectural profession of one of its most highly respected members, as well as a practitioner of prominent standing in the Pacific coast district. Mr. Fripp was a designer of marked ability, and possessed a personality which won for him the admiration of both his confreres and a wide circle of personal acquaintances. At the time of his death he was President of the Architectural Institute of British Columbia, and his counsel and active interest in its affairs will be greatly missed at the regular meetings. The resolution adopted by that organization indicates the lofty esteem in which he was held by his fellow members, and is expressive to a large extent of the sentiment of all who knew him. The resolution reads as follows:

Resolved—That we, the members of the Architectural Institute of British Columbia, do herewith instruct and authorize our Honorary Secretary to insert in the minutes of the transactions of the Institute, an expression of our deep regret at the death of our President, Mr. R. Mackay Fripp. We feel that his wholehearted support of any movement which in the past was calculated to raise the dignity of our profession in the eyes of the public, his keen and active interest in educational matters, and in the highest ethics of the profession as a whole, and the example of his own disinterested and blameless life, are all assets to the profession which we can ill afford to lose, and that the memory of his activities amongst us will always be gratefully cherished.

Canadian Building and Construction News

BUSINESS BUILDINGS.

Galt, Ont.—Schultz Bros. Company, of Brantford, have the general contract for the erection of a new building to cost $50,000, at Main and Water streets, for the Merchants Bank of Canada. It will be a two-story structure, 45 x 53 ft., with Ohio sandstone exterior, and modern equipment throughout.

Guelph, Ont.—Tenders were recently closed for remodelling the heating system in the Ontario Savings Society Building on Wyndham street. The existing system will be remodelled on the first floor, and new equipment will be installed on the second and third floors. W. A. Mahoney, Quebec street, is the architect.

Kinmount, Ont.—The old hotel property on Main street has been acquired by Doherty Bros., who will remodel same into a modern store building this coming spring. Information is desired on heating system, vaults, freight elevators, sprinkler system, plate glass and refrigerators.

Ottawa, Ont.—Architect W. E. Noffke, 45 Rideau street, has closed tenders for a new store front and general alterations to store building on Bank street, for Foley & Gleason, Central Chambers.

Quebec, Que.—Architect Pierre Levesque, 115 St. John street, has completed plans for alterations to the Banque Nationale. The work will include a new mezzanine, plastic relief, marble work, structural steel, ornamental iron, metallic lath, fireproofing and reinforced concrete. Tenders will be called almost immediately, and close about February 15. Cost $10,000.

Sarnia, Ont.—John Elnor has the contract for new show and warerooms to be erected on Quebec street for the Auto Sales, Limited. The building will cost $10,000.

Toronto, Ont.—Yolles & Rottenburg, 302 Confederation Life Building, are the owners and general contractors for a new building to be erected at the corner of Danforth and Logan avenues, at a cost of $15,000. The structure will be of brick, and modernly equipped, and contain stores on the ground floor, with a hall above.

Toronto, Ont.—The Dickie Construction Company, Ryrie Building, have the general contract for altering premises at 279-83 Yonge street into restaurant and offices for the Childs Company, Toronto and New York City. The work will cost $60,000 and will involve the entire renovation of the building, including considerable tile and marble work, iron stairs, steam heating, and up-to-date equipment. J. C. Westervelt, 36 West 34th street, New York City, is the architect.

CHURCHES AND SCHOOLS.

Barrie, Ont.—Plans prepared by Architects Ellis & Ellis, Manning Chambers, Toronto, have been approved by the ratepayers for a new school to cost $100,000. The Ball Planing Mill Company, a local concern, has the general contract, and is now ordering material, etc., with a view to starting the work immediately.

Fingal, Ont.—The Board of School Trustees are contemplating the erection of a new $20,000 building to replace structure recently destroyed by fire. Dr. Smith can be addressed.

Kingston, Ont.—Steps are being organized towards the erection of a "Union Building" in connection with Queen's University, as a memorial to the students of that institution who have given their lives in the service of the Empire. Work will not be started until after the war.

Port Hope, Ont.—It has been decided to raise funds for the erection of a junior school in connection with Trinity College, as a memorial to graduates who have fallen in the present war.

CLUBS AND HOSPITALS.

Chatham, Ont.—Robert Grey has purchased the Algonquin Hotel, which he intends to remodel for Y.M.C.A. purposes. Work will include the installation of a swimming tank, gymnasium and bowling alley equipment, and general renovations to the building. It is reported that operations will start shortly.

Clarkson, Ont.—The Lake Shore Country Club, with offices in the Lumsden Building, Toronto, has purchased a site with the intention, it is understood, to erect new buildings.

London, Ont.—Work is started on a one-story frame addition for military hospitals purposes. Cost $3,000.

Ottawa, Ont.—The upper floor of the east wing of the General Hospital has been damaged by fire to the extent of $50,000.

Toronto, Ont.—It is reported that the premises of F. B. Robins, Ltd., Victoria and Richmond streets, will be taken over by the Y.M.C.A. and equipped as an annex to increase the accommodation for soldiers in connection with the Triangle Club.

FACTORIES AND WAREHOUSES.

Chatham, Ont.—Work is to start at once towards the rebuilding of the plant of the Canadian Des Moines Steel Company at this place, which was recently destroyed by fire. Cost $15,000.

Hamilton, Ont.—The Canada Steel Goods Company have started work on a frame storage building to cost $3,000, on Arthur street.

Hamilton, Ont.—The Hamilton Bridge Company is erecting a structural steel frame extension to their girder factory on Depew street; the company doing the work with their own staff and supplying all necessary materials. Cost $20,000.

Ingersoll, Ont.—The plant of the Ingersoll Gas Company has been almost entirely destroyed as a result of explosion and fire.

Kapukasing, Ont.—The tender of Mundy & Stewart, 84 King street east, Toronto, has been accepted by the Ontario Government for the Kapukasing timber limits. It is obligatory on the part of the purchaser to establish a pulp and paper mill, to cost $1,000,000.

Lindsay, Ont.—The general contract for the proposed Allenbury factory has been awarded to Irwin Simpson, 326 Seaton street, Toronto, Ont. The company is an English concern which manufactures infants' food products, and is represented in Canada by Lloyd Wood, wholesale druggist, Church and Gerrard streets, Toronto. The building will be three stories, 60 by 100 feet, of brick construction, and cost $50,000.

Niagara Falls, Ont.—Operations on the proposed $30,000 factory for Lundy-Scott Company, Limited, have been postponed until spring. The building will be two stories and basement 60 x 100, of brick construction. G. H. Gardner, 10 Merrick street, Welland, Ont., is the general contractor.

Owen Sound, Ont.—The ratepayers have voted in favor of a by-law guaranteeing the bonds of the King Shoe Company, 130 Wellington street west, Toronto. Work is already started on the remodelling of an existing structure which the company will use for manufacturing its products. Power and process machinery will be installed.

Porcupine, Ont.—It is the intention of the Davidson Gold Mines, Limited, to proceed at once with the erection of a new ore mill.

Sault Ste. Marie, Ont.—The Algoma Steel Corporation has let a contract for installing twenty-five by-product coke ovens, together with by-product equipment.

Toronto, Ont.—The T. Eaton Company, 190 Yonge street, is contemplating the erection of a mail order building, 200 x 200, at Bayside Park. Estimated cost, $1,000,000.

Toronto, Ont.—Tenders will be received until January 30, for the erection of a two-story addition, 75 x 30 feet, to the factory of the Cecilian Company, Limited, Defoe and Stafford streets. Oborn & Ellis, 22 College street, are the architects.

FIRE LOSSES.

Baden, Ont.—The woolen mills owned by Elias A. Brubacher, at this place, have been destroyed by fire. Loss $7,000, partly insured.

Cornwall, Ont.—The Tardiff block, on Montreal road, has been destroyed by fire; loss not stated.

Gananoque, Ont.—The axle department of the Ontario Steel Company's factory has been damaged by fire to the extent of several thousand dollars.

Hamilton, Ont.—Fire recently destroyed the cooperage building of the Steel Company of Canada on North Wellington street. Cost $10,000.

Norwich, Ont.—The plant of the Wood Flour Mills at this place have been totally destroyed. Loss not stated. Partly insured.

Ottawa, Ont.—The premises containing stores and warerooms owned by S. & H. Borbridge & Company, Rideau and Mosgrove streets, have been heavily damaged by fire. Loss on building and contents between $75,000 and $100,000.

Peterboro, Ont.—The factory of the Peterboro Canoe Company has been destroyed by fire. Loss on building and machinery, $30,000.

Peterboro, Ont.—The building occupied by the Boston Cafe has been entirely destroyed, and Elliotts' Departmental Store heavily damaged, as a result of a fire which caused an estimated loss of $50,000.

Sault Ste. Marie, Ont.—The building and machinery of the Pearl Laundry Company have been destroyed by fire. Loss $50,000.

Simcoe, Ont.—The store house of the Simcoe Wool Stock Company (Harry Brooks, proprietor) has been destroyed by fire. Loss, including contents, $25,000; partly insured.

Toronto, Ont.—The dock and buildings of the Toronto Ferry Company at the foot of Bay street, have been damaged by fire to the extent of $55,000. Insured.

Windsor, Ont.—The three-story building of the Studebaker Automobile Company on Chatham street, as well as the two-story structure owned by W. C. Kenney and C. S. King, and occupied by the Hydro-Electric Commission, have been heavily damaged by fire. Total loss estimated at $75,000.

MISCELLANEOUS.

Clarendon, Ont.—The station and agent's residence of the C.P.R., which was recently destroyed by fire, is shortly to be rebuilt.

Hamilton, Ont.—Tenders will be received by the Board of Control until January 21, for supplying asphalt cement and refined asphalt for the year ending 1919.

Niagara Falls, Ont.—The Ontario Hydro-Electric Commission has awarded the contract for the construction of a thirteen and one-half foot flume in connection with the development of an additional 50,000 horse power at the Ontario Power Company's plant. Turbines and generators will be installed.

Shelburne, Ont.—The Shelburne Agricultural Society is contemplating the erection of an exhibit building 50 x 32 feet. The town and municipality will be asked to bear part of the necessary expense.

Toronto, Ont.—The Loew Syndicate, head office, New York City, is contemplating the erection of a theatre on Bloor street near Yonge, to cost $200,000. Building operations will likely be started during the present year.

Toronto, Ont.—The Trustees of the Board of Education are again discussing the need of additional school accommodation. Nothing has been decided on, but it is likely that this subject will receive further consideration in the near future.

RESIDENCES.

Hamilton, Ont.—The following contracts have been awarded for the erection of a two-story brick building on Main street

cast for Miss Gage, 1045 Wellington street east: General contractor, Mitchell & Riddell, 45 Head street; carpenter, L. J. Beatty, 175 Emerald street north. Cost $12,000. G. J. Hutton, Bank of Hamilton Bldg., is the architect.

London, Ont.—G. A. Wardell, 5 Rector street, is erecting a two-story frame residence on Delaware avenue. To cost $3,000.

Niagara Falls, Ont.—Work has started on a $10,000 residence to be erected at the corner of McRae and Victoria avenues for Arthur Buckley, Welland avenue: General contractor, G. A. Dingwall, 133 Wilmot street; painting and glazing, Wm. Mullen, 322 Victoria avenue; heating, Payne & Nesbit, 122 Main street. C. M. Borter, Main street, is the architect.

Niagara Falls, Ont.—Work has started on the erection of a brick and frame residence for Geo. Jackson, Third avenue: General contractor, G. A. Dingwall, 133 Wilmot street; painting and glazing, Wm. Mullen, Victoria avenue; electric wiring, Carter Electric Company, Geary avenue; heating and plumbing, W. J. Crawford, Buckley avenue. Cost $10,000.

Niagara Falls, Ont.—The following contracts have been awarded in connection with the erection of a brick residence to cost $12,000, at the corner of Victoria avenue and Stanford street, for Daniel O'Donnell, McRae street: General contractor, Wm. Harry, Second avenue; carpenter, G. A. Dingwall, 133 Wilmot street; painting and glazing, Wm. Mullen, Victoria avenue; electric wiring, Carter Electric Company, Geary avenue.

Ottawa, Ont.—M. C. Neate, Rockcliffe, Ottawa, will erect a row of six houses of brick veneer and stucco construction on Joy avenue. Total cost $4,800.

Renfrew, Ont.—Wilfred Bolam will erect two brick veneer houses on Jennette street. Cost $5,000.

Renfrew, Ont.—Felex Lidtky will erect a two-story bungalow, 24 x 26, of brick construction, on Parry Sound street. Cost $3,000.

Renfrew, Ont.—Work is in progress on a three-story brick residence for Wm. Howard, in the Plaunt Park subdivision. Brick veneer, frame construction, hot air heating. Cost $2,000.

Toronto, Ont.—Plans have been completed for a two-story brick residence to be erected by S. B. Green, 40 Woodside avenue. Owner is the general contractor. Cost $3,500.

Toronto, Ont.—Tenders have been received by Architects Gordon & Helliwell, Confederation Life Building, for a two-story brick residence on Mount Clair avenue. Cost $4,000.

Toronto, Ont.—Plans have been completed for two brick houses to be built on Gothic avenue, near Quebec avenue, for Lowery & McIlroy, 105 Clendennan avenue. Hot water heating will be installed. Cost $6,000.

Toronto, Ont.—H. A. Johnston, 84 Normandy Boulevard, has the general contract for the erection of a two-story brick residence on Kingswood road, for Wm. Barber, 106 Roncesvalles avenue. Cost $3,500.

Toronto, Ont.—Plans have been completed for a two-story brick residence to be built on Gillard avenue, near Danforth avenue, for C. S. Lucas, 2 Lipton avenue. Owner is general contractor. Cost $3,000.

Toronto, Ont.—Excavating tenders have been received in connection with three houses to be built by Wm. Gordon, 36 North Shaw street. The structures will be brick, and modernly equipped. Cost $3,000 each.

"TILE CRAFT."

Some very interesting suggestions as to the use of tile construction are contained in the December bulletin issued by the Associated Tile Manufacturers, Beaver Falls, Pa. The bulletin contains a series of short contributions by men who represent firms specializing in the production of tile, and are presented so as to make each subject of interest to the reader. There is also a cash prize offer by the company for photographs of tile work; as well as a list of the various firms producing faience, porcelain and tile who are members of the Associated Tile Manufacturers' organization.

"DIFFUSELITE" BLINDS.

The J. G. Wilson Corporation, 8 West Fortieth street, New York City, claim that their "Diffuselite" blinds mark an advance in mechanism and construction over the formerly used Venetian blind. In a series of bulletins issued by this company the statement is made that "Diffuselite" blinds are readily installed, do not easily get out of order, do not block air and light, and are comparatively inexpensive.

The attempt to find a method of painting blinds which would partially absorb and diffuse the rays of light resulted in the manufacture also by this corporation of their own special makes of white and green colors. Their claims would seem to deserve investigation.

"STEAM CONDENSATION."

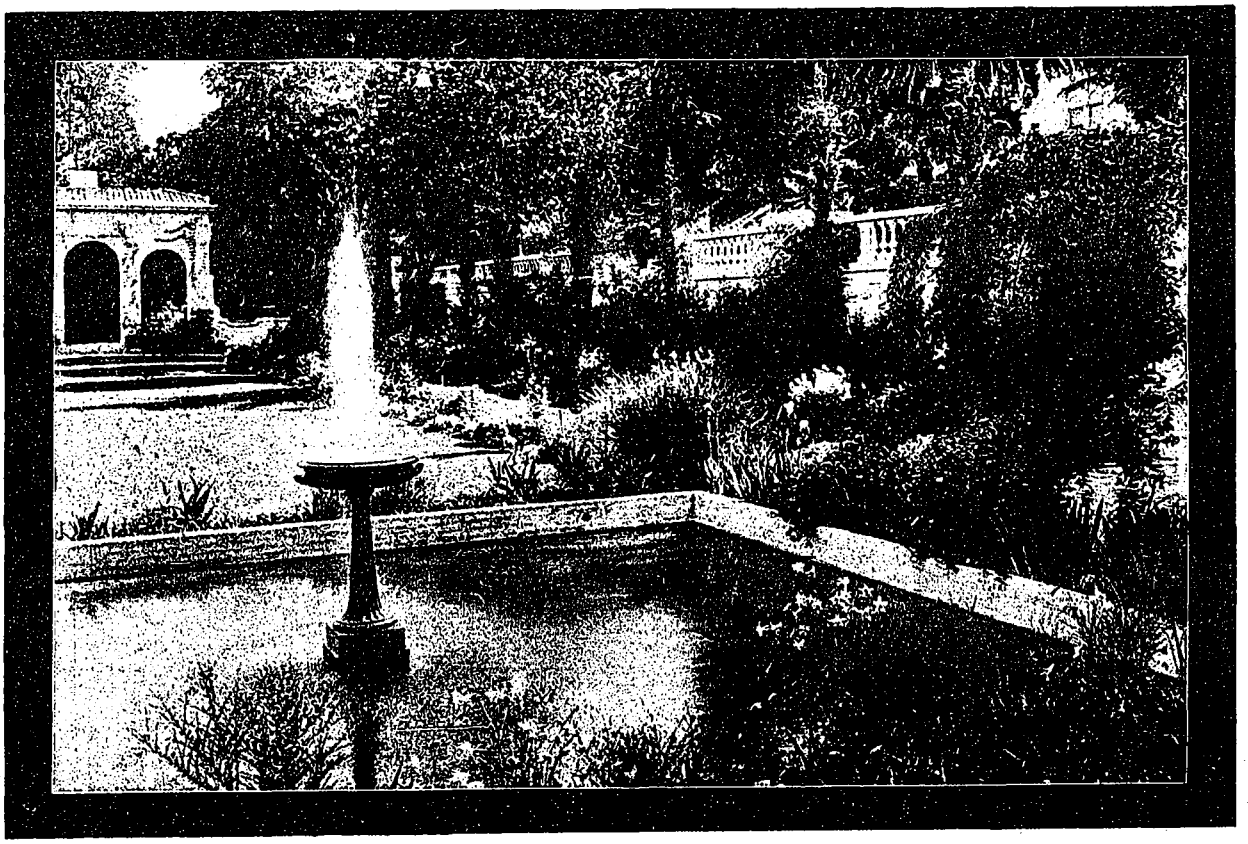
The above is the title of a fifty-page booklet written by Wm. H. Rose, Consulting Engineer, and issued by Geo. W. Cole, Ltd, 838 Dundas st., Toronto, and is replete with valuable information in reference to this subject. The text explains what steam condensation is, and the correct methods of handling and utilizing same—showing that to allow the natural law to have full sway, the difficulties met with may be easily remedied. The booklet is in the nature of a treatise reaching too high a plane to be confounded with anything in the way of a trade catalogue. It is issued by the above concern in an endeavor to answer the question: "Does the Steam Cost Too Much," and is written in a manner which avoids unnecessary use of technical terms, so that anyone can understand from reading the book whether fuel losses are due to ignorance or carelessness, and how these losses may be located and recovered. The booklet is of interest to architects, engineers, and steam plant owners, and a copy will be sent to anyone desiring same on application to the above firm.

CEMENT COATINGS.

In an attempt to overcome certain difficulties attending cement construction, the firm of Wadsworth, Howland & Company, Inc., Boston, Mass., have brought forward a new product.

The use of concrete they claim has been subject to two serious drawbacks—a tendency to absorb moisture, and an unattractive, monotonous color. Experiments have convinced this firm that the only solution of the problem is through the use of a waterproof coating which not only does away with the difficulties, but aslo serves to prevent the cement from disintegrating. Sixteen years' use of the "Bay State Brick and Cement Coating" has attested its merits, its manufacturers claim. In a booklet issued by this company detailed information is given in regard to their product, and also a list of buildings where it has been used with apparent satisfaction.

Wadsworth, Howland & Company manufacture also a cement floor coating and two grades of enamel finishes.



IN A PASEDENA GARDEN, CALIFORNIA.

CATALOGUES and BOOKLETS

Sanitary Metal Specialties.—Messrs. Drummond-Reeves, Ltd., Mail Building, Toronto, successors to the Black Building Supply Company, are handling the complete line of sanitary metal specialties manufactured by the Knapp Bros. Manufacturing Co., of Chicago, Ill. These include sanitary metal cove base and attachments, base grounds, picture moulds, feather edge and bull-nose corner beads, metal cove grounds for internal plaster corners, Thomas flush door casing, stiffened steel studs, metal chair rails, etc. A catalogue illustrating and describing the above lines will be sent upon request to architects and interested parties.

Specifications of Paint and Paint Materials.—Complete information on the specification of paint and paint materials for manufacturing plants, storage buildings and power houses, is contained in a booklet issued by the Detroit Graphite Company, Detroit, Mich. The data covers maintenance of concrete and wooden floors and walls, ceilings, roofs, and exterior walls, structural steel, iron work, piping covered and uncovered, galvanized surfaces, steel or wood tanks, boilers and machinery and radiators. Photographic illustrations and color charts are distributed throughout the text. A convenient feature of the publication is the alternate blank pages left for the making of notes on the various questions treated in the reading matter.

Largest Dye Plant in America.—A large bird's-eye view of the works of the National Aniline & Chemical Company, at Buffalo, N.Y., is illustrated in an attractive folder which is being sent out by the Barrett Manufacturing Company. This plant, which is the largest dye works in America, comprises a group of buildings giving twenty acres of floor space, all of which are covered with Barrett Specification roofs and protected by the company's twenty-year guarantee. There are 201,300 square feet of this particular roofing used on this one job alone, and it represents one of the many important recent contracts carried out according to the Barrett Specification. The folder itself is a splendid artistic achievement, being printed in blue, black and white on a grey tinted background, and with convincing text; and full credit is certainly due to whoever is responsible for the layout and copy.

Window Hardware.—A thirty-two page catalogue issued by the Russell & Irwin Mfg. Co., of New Britain, Conn., describes a most complete line of elevating sash fixtures, which are claimed to be the most effective devices made for vertically hung sash, opening in or out. These fixtures were formerly the product of the Taber Sash Fixture Company, Newark, N.J., but are now being manufactured exclusively by the above-named concern. They are said to have two great advantages over competitive lines in that sash equipped with these fixtures are (1) absolutely weatherproof, and (2) absolutely burglar proof, as the sash cannot be forced or jimmied from the outside. In addition to a large number of illustrations showing various attachments, there are also a number of full page details of sash construction, showing in a practical way the application of different fixtures to which the catalogue relates.

Ferro-Concrete.—Some very excellent suggestions, as well as much useful information on this subject is contained in a twelve-page booklet (magazine size) issued by Mouchell & Partners, of London and Paris, who are represented in Canada by Mr. F. G. Engholm, 304-5 Excelsior Life Bldg., Toronto. The object of the booklet is to call attention to the advantages of the Hennebique System of reinforced concrete, which has been quite universally employed throughout Great Britain and Continental Europe, and to a more limited extent in Canada, where it has only recently been introduced. It is claimed that over 35,000 structures have been designed and built according to this system in the past twenty-five years; and that during the ten years immediately preceding the war the number of undertakings thus erected averaged over 2,000 structures per annum. Recent Canadian examples in which the Hennebique System is used are the new Trust and Guarantee Building, and Masonic Temple, Toronto; several bridges on the Toronto & Hamilton Highway; a number of bridges for the City of Montreal; Birks Building, Vancouver; Vancouver Club; and a number of other structures in the Canadian West and Pacific Coast districts. A copy of this booklet is available to any interested party on application to Mr. Engholm at the above address.

CONTRACTORS and SUB-CONTRACTORS

As Supplied by The Architects of Buildings Featured in This Issue

The Robt. Simpson Company's Mail Order Building, Toronto.

Brick, Interprovincial Brick Co.
Boilers, Kewanee Boiler Co.
Carpets, Rugs and Linoleum, Robt. Simpson Co.
Casements and Window Construction, Henry Hope & Son.
Clocks, International Business Machines, Ltd.
Chimneys, Toronto Iron Works, Ltd.
Cement, Canada Cement Co.
Crane, Thomas Elevator Co.
Electric Fixtures, Robt. Simpson Co.
Electric Wiring and Apparatus, Bennett & Wright.
Elevators and Hoists, Otis-Fensom Elevator Co.
Fire Alarm System, Purdy-Mansell, Ltd.
Fire Doors, A. B. Ormsby, Ltd.
Fire Escapes, Canadian Ornamental Iron Co.
Fire Hose (fittings), Wilson-Cousins Co.
Flooring, Laidlaw Lumber Co.
General Contractors, Wells Bros. Co. of Canada, Ltd.
Glass, Imperial Glass Co.
Hardware, Vokes Hardware Co.; Aikenhead Hardware Co.
Heat Regulators, Webster Thermostatic Valves.
Hollow Tile, Don Valley Brick Works.
Interior Woodwork and Decoration, R. Laidlaw Lumber Co.
Inter-phone System, Bell Telephone Co.
Kitchen Equipment, Gurney Foundry Co.
Lockers, Durand Steel & Locker Co.
Marble, Canadian Marble & Tile, Ltd.
Oil Feed, Fess Oil Burners of Canada, Ltd.
Ornamental Iron, Canadian Ornamental Iron Co.
Painting, F. G. Roberts Co.
Plaster Work, A. D. Grant.
Plumbing, Purdy-Mansell, Ltd.
Radiators, Dominion Radiator Co.
Refrigeration, Canadian H. W. Johns-Manville Co.
Refrigeration Equipment, Canadian Ice Machine Co.
Refrigerator, John Hillock & Son.
Reinforcing Steel, Burlington Steel Co.; Trussed Concrete Steel Co.
Roofing, Canadian H. W. Johns-Manville Co.
Sand and Gravel, Rogers Supply Co.
Scales, Canadian Fairbanks-Morse Co.
Spiral Chute, Canadian Matthews Gravity Carrier Co., Ltd.
Sprinkler Equipment, Purdy-Mansell, Ltd.
Structural Iron and Steel, Reid & Brown.
Tanks, Chicago Bridge & Iron Co.
Vaults, J. & J. Taylor.
Ventilating System, Canadian Sirocco Co.
Water Tank, Toronto Iron Works Co.

Goodyear Tire & Rubber Company's Factory, New Toronto.

Air Compressors, Laidlaw Dunn Gordon Co.
Boiler Feed Pump, Epping Carpenter Pump Co.
Boilers, International Engineering Co.
Brick, Ontario Brick Co.
Cement, Rogers Supply Co.
Chimneys, Custodis Canadian Chimney Co.
Clocks, International Business Machines, Ltd.
Concrete Work, Dominion Construction Co.
Crane, Northern Crane Works.
Electric Wiring and Apparatus, Geo. J. Beattie Co.
Elevators, Otis-Fensom Elevator Co.
Fire Doors, A. B. Ormsby Co.
Fire Hose, Goodyear Tire & Rubber Co.
Fire Pump, Blake Knowles Co.
Floor Covering (mastic), Construction Supply Co.
Floor Covering (wood block), Creosoted Block Paving Co.
General Contractors, Dominion Construction Co.
Glass, Pilkington Bros.
Heat Regulating System, C. A. Dunham Co., Ltd.
Inter-phone System, Bell Telephone Co.
Metal Sash, Steel & Radiation Co.
Paints, Sherwin Williams Co.; Glidden Varnish Co.
Plumbing Contractors, Keiths, Ltd.
Plumbing Fixtures, J. L. Mott & Sons.
Motors, Canadian Westinghouse Co., Ltd.
Radiators, Dominion Radiator Co.; Steel & Radiation, Ltd.
Reinforcing Steel, Burlington Steel Co.
Scales, H. G. Vogel Co.
Stokers, American Engineering Co.
Stone, John Vokes.
Structural Iron and Steel, McGregor & McIntyre Co.
Vacuum Traps, C. A. Dunham Co., Ltd.
Water Tank, Chicago Bridge & Iron Co.
Water Heater, Hopper Heater Co.

Canada Cycle & Motor Company's Factory, Weston, Ont.

Boiler Feed Pump, Bawden Machine Co.
Boilers, John Inglis Co.
Brick, Port Credit Brick Co.
Chimneys, Canadian Custodis Chimney Co.
Contractors, Deakin Construction Co.
Dry Kilns, Clark Machinery Co.
Electric Wiring and Apparatus, Toronto Electric Light Co.
Elevators and Hoists, Turnbull Elevator Co.
Enameling Ovens, Brantford Oven & Rack Co.
Expanded Metal, Pedlar People, Ltd.
Feed Water Heater, Canadian Allis-Chalmers Co.
Fire Doors, A. B. Ormsby Co.
Fire Pumps, Canadian Allis-Chalmers.
Hollow Tile, Canadian National Fireproofing Co.
Plaster Work, General Contractors.
Plumbing, Drake & Avery.
Radiators, Dominion Radiator Co.
Roofing, Canadian H. W. Johns-Manville Co.
Shavings Exhaust System, Sheldons, Ltd.
Sprinkler Equipment, Adam Clarke.
Steel Sash, A. B. Ormsby Co.
Stone, Scott Bros.
Structural Iron and Steel, McGregor & McIntyre Co.
Vacuum Pump, C. A. Dunham Co.
Ventilating System, Canadian Blower & Forge Co.
Varnish, Glidden Varnish Co.
Vaults, J. & J. Taylor.

Crompton Corset Company's Building, Toronto.

Boilers, Spencer Heater Co. of Canada.
Brick, John Price Co.
Casements and Window Construction, Doors and Window Trim, Douglas Bros., Ltd.
Electric Fixtures, Canadian Electric Fixture & Contracting Co.
Elevators and Hoists, Turnbull Elevator Co.
Expanded Metel, Douglas Bros., Ltd.
Fire Alarm System, Dominion Messenger & Signal Co.
Flooring, J. C. Scott Co., Ltd.
Inter-phone System, Northern Electric Co.
Painting, A. E. Phillips.
Plumbing, A. Welch & Sons.
Plumbing Fixtures, Jas. Robertson Co.
Radiators, Dominion Radiator Co.
Roofing (felt and gravel), Douglas Bros, Ltd.
Sprinkler Equipment, Purdy-Mansell, Ltd.
Vaults, Goldie & McCulloch.
Water Tank, J. C. Scott Co., Ltd.

Ladies' Wear Building, Toronto.

Boilers, Spencer Heater Co.
Brick (common), Ontario National Brick Co., Ltd.
Brick (pressed), Don Valley Brick Co.
Galvanized Iron Work, Feather & Roadhouse.
Concrete Work, Walter Davidson & Co., Ltd.
Elevators and Hoists, Otis-Fensom Elevator Co.
Fire Doors, Feather & Roadhouse.
General Contractors, Walter Davidson & Co., Ltd.
Glass, Fred J. Cox.
Hardware, Canada Hardware, Ltd.
Marble, Canada Glass Mantels & Tiles, Ltd.
Metal Sash, Steel & Radiation, Ltd.
Painting and Glazing, Fred J. Cox.
Plumbing, F. R. Maxwell & Co.
Roofing (felt and gravel), Cruise Bros.
Sprinkler Equipment, General Fire Equipment Co.
Stone (artificial), Artificial Stone Co.
Structural Steel, Hepburn & Disher, Ltd.
Tile, Canada Glass Mantels & Tile Co.
Vault doors, J. & J. Taylor.