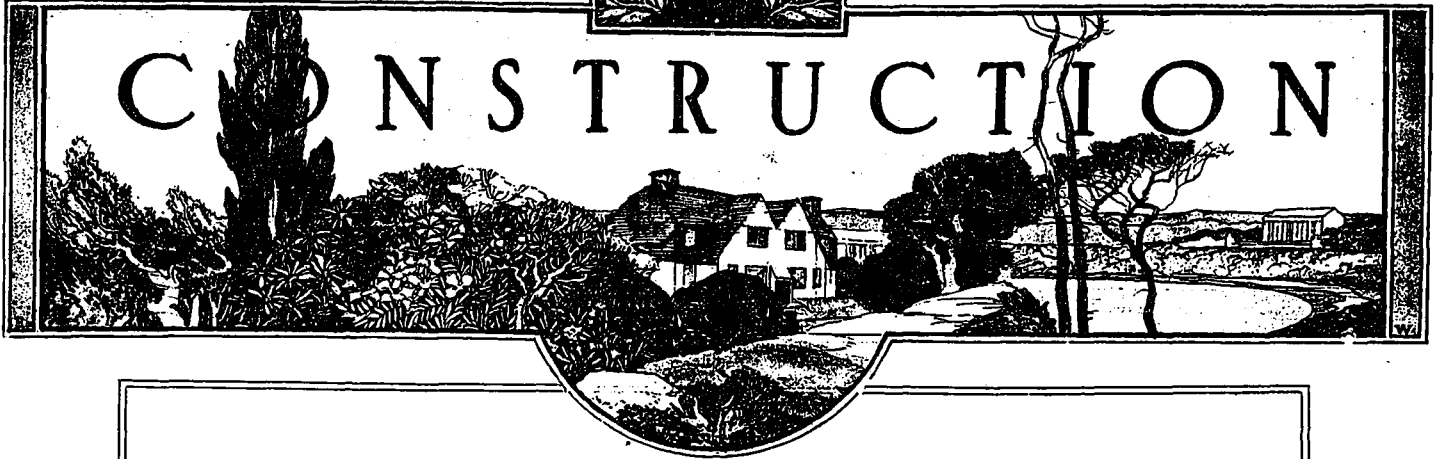


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# CONSTRUCTION



October, 1916

Vol. 9, No. 10

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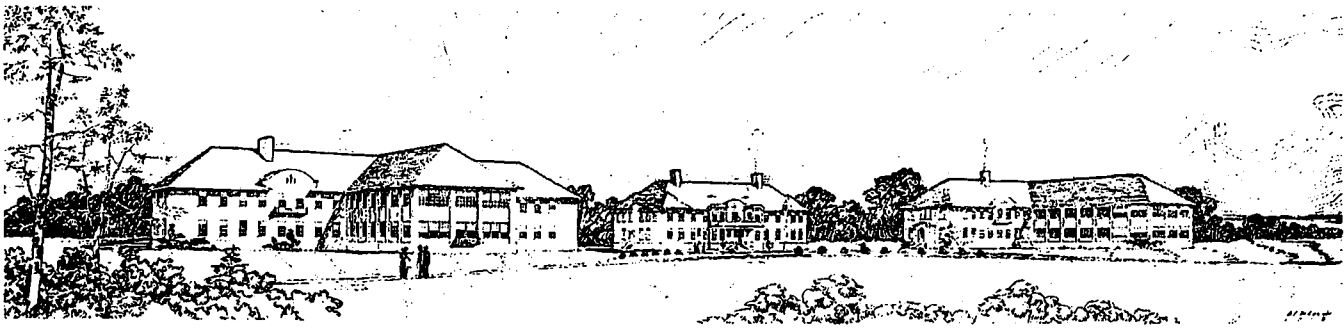
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NEW YORK



LINCOLN HOUSE PORTICO, MANCHESTER-BY-THE-SEA, MASS. THE ORIGINAL HOUSE WAS BUILT IN 1700. THE PORTICO, ADDED DURING THE LAST CENTURY, IS A REPLICA OF A FAMOUS SALEM DOORWAY.



THE MALE AND FEMALE RECEPTION HOSPITALS, WITH THE ADMINISTRATION BUILDING IN THE CENTRE, HOSPITAL FOR INSANE, WHITBY, ONT. JAMES GOVAN, ARCHITECT.

# Hospital for Insane, Whitby, Ontario

*A Notable Achievement in Hospital Construction and Equipment.*

THE opening of part of the new Hospital for Insane at Whitby marks a very decided change in the type of hospital devoted to the care of the mentally sick in this country. The modern hospital for the mentally afflicted differs from the asylum of a decade ago quite as much as the present day reformatory contrasts with the penitentiary of a few years back. The public generally is not so well aware of this fact as it should be. The same advanced thought which resulted in the creation at the Provincial Reformatory, Guelph, of an institution which marks the Province of Ontario as standing at the head in penological reform, is in evidence in the design and construction of this new hospital.

The Hon. W. J. Hanna, Provincial Secretary, under whose regime both of these large undertakings have been evolved, is to-day being congratulated by all those who have had an opportunity of visiting the Whitby institution, and who are qualified to express an opinion, upon having duplicated the success of his Guelph achievement.

In its handling of this great question of treatment of those who have hitherto been looked upon as Pariahs, but who are now more and more beginning to be thought of as mentally sick—to differentiate from the bodily sick—the Province of Ontario is gradually developing the hospitalization of its institutions in a way which does not seem to be bettered, either on this continent or in Europe, at the present time.

A review of the work of this kind done in Europe reveals the fact that in the planning of their so-called asylums, the architects have been influenced very largely by the adoption of the village system in Germany,

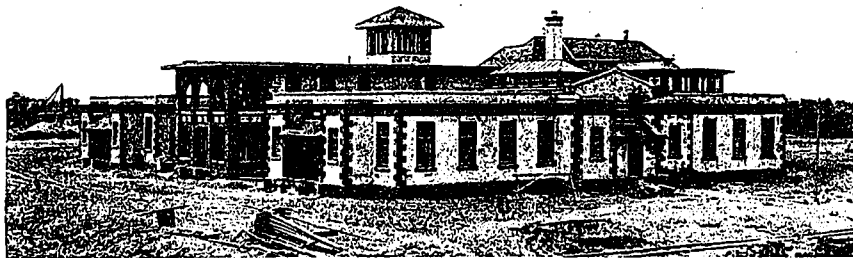
which had its beginning at Alt-Scherbitz, in Saxony. The idea of the village type of mental hospital has also spread to the United States, and to some extent it has affected the work done at some of our Canadian institutions. Although the declaration of war was yet more than two years off when the first studies of the Whitby Hospital were made, the prevalent worship of German ideas and methods did not blind those responsible for the scheme to the very glaring defects which were evidently being ignored by those who were so slavishly following German practice.

Several of the physicians engaged in this work at the Ontario institutions who had visited the best German hospitals, were disappointed to find conditions there not as ideal in some respects as they had hoped to see.

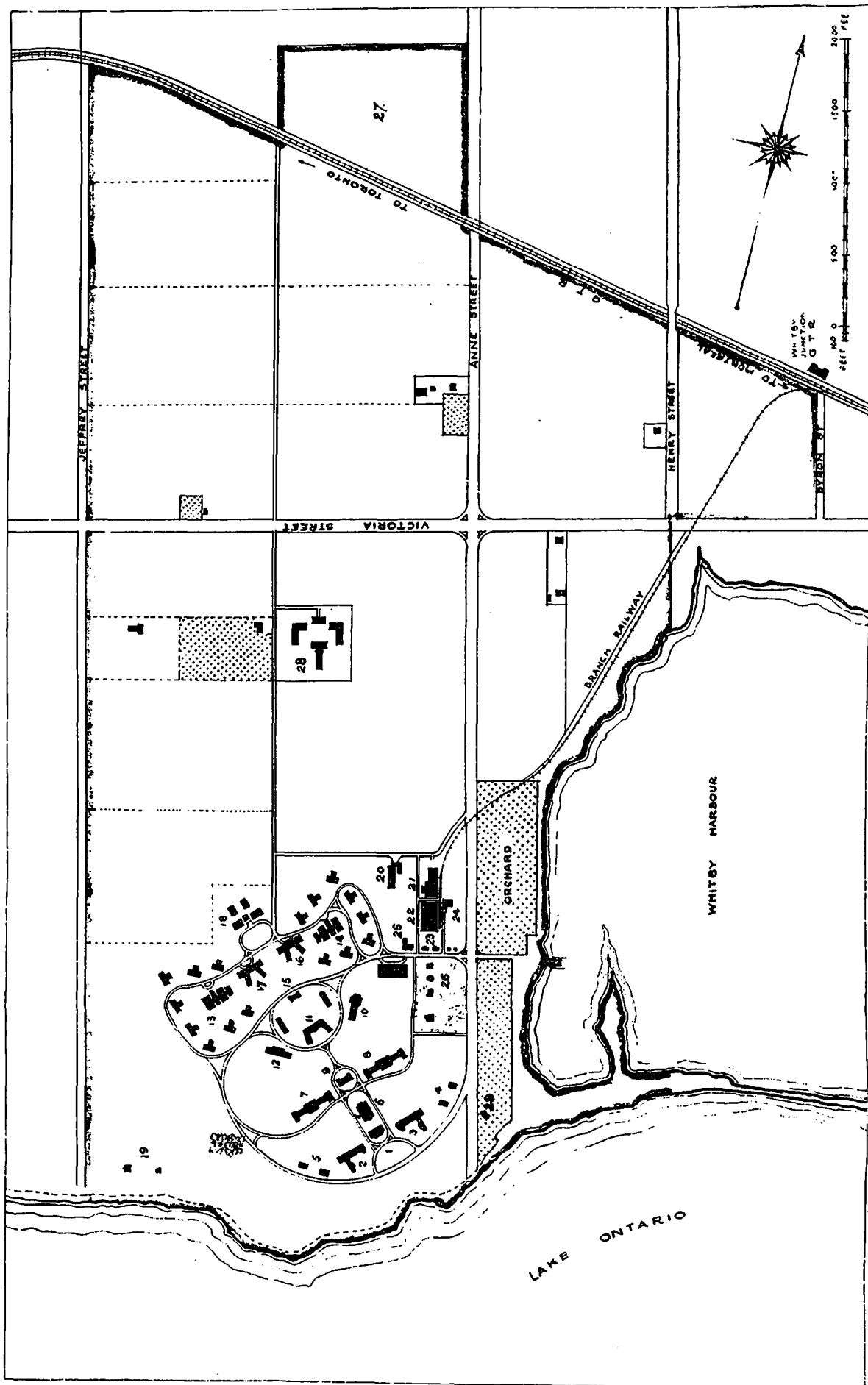
While laboratory work occupied a very high place, the consensus of opinion was that the welfare of the patients seemed to be secondary to the opportunities for study and research afforded the doctors in charge. While it was true that much admirable scientific work was being done for the patients who were looked upon as being special hospital cases, many of the patients were neglected and relegated to separate buildings for so-called chronics, where there was an entire absence of the nursing and care which distinguish all branches of the work as now carried out in this Province.

A careful study of the plans of nearly all the German asylums reveals further that the tremendously important problem of planning for

sunlight in all buildings housing patients has been neglected there, and by those who have been following German examples, in a way that is almost unbelievable.



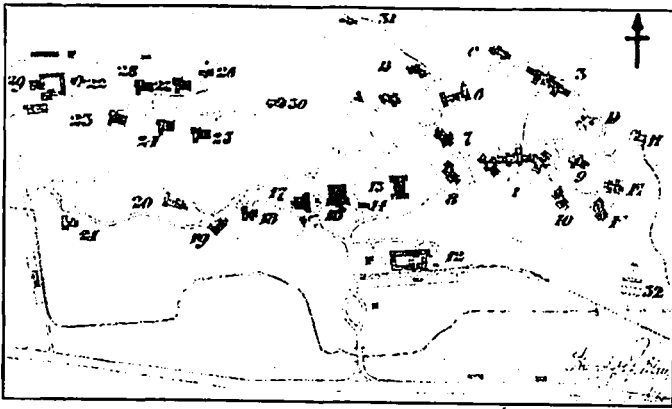
KITCHEN AND DINING ROOMS FOR THE WOMEN'S COTTAGE CENTRE.



SITE PLAN, SHOWING BUILDINGS AND FARM, HOSPITAL FOR INSANE, WHITEBY, ONT.

JAMES GOVAN, ARCHITECT.

INDEX TO SITE PLAN: 1, Administration Building; 2, Reception Hospital, men; 3, Reception Hospital, women; 4, Convalescent Cottages, women; 5, Convalescent Cottages, men; 6, Kitchen and dining rooms, Hospital group; 7, Hospital, men; 8, Hospital, women; 9, Surgical and Pathological Building; 10, Church and Hall; 11, Nurses' Home and annexes; 12, Recreation Building; 13, Cottage Centre No. 2, for men, with kitchen and dining rooms in centre; 14, Cottage Centre No. 1 for women, with kitchen and dining rooms in centre; 15, Double Residence for Doctors; 16, Infirmary No. 1 for women; 17, Infirmary No. 2 for men; 18, Tubercular and Isolation Hospitals; 19, Sewage Purification Plant; 20, Greenhouses; 21, Power House; 22, General stores, workshops, etc.; 23, Cottages for employees; 24, Cold Storage Plant; 25, Male Attendants' Home; 26, Residences for Officials; 27, Garden and Nursery; 28, Farm Buildings; 29, Sewage Pumping House; 30, Laundry (south of Building 25).



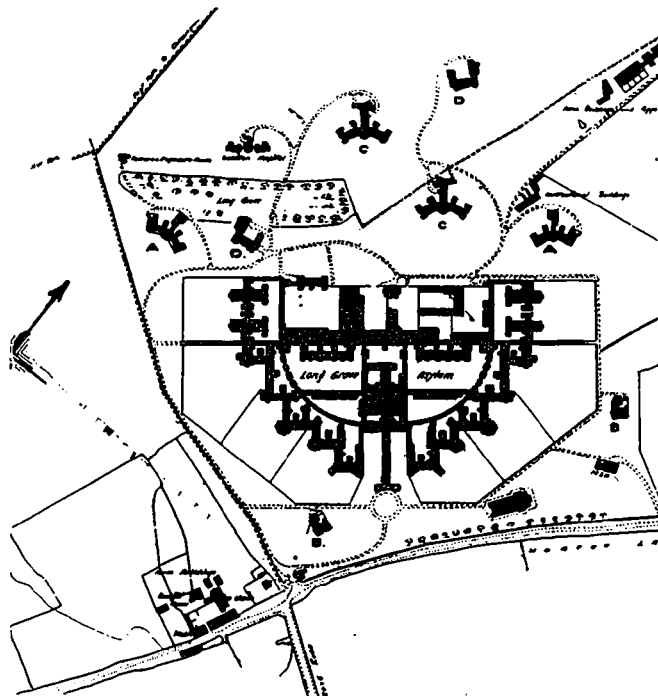
BANGOUR VILLAGE ASYLUM, NEAR EDINBURGH, SCOTLAND.

The ideas on which the scheme at Whitby is based are the result more of a close study of Ontario's own problem as revealed in the institutions already in existence, rather than the slavish following of work done in other countries.

The development of the use of trained female nurses for male as well as female cases, with the consequent change from the asylum to the hospital idea, which has been a feature of some of the Scottish institutions for many years, has won the approval of the Ontario psychiatrists, and has had a strong influence on the progress made along these lines in this Province.

Two main ideas influenced the development of the scheme as a whole, and the further working out of its component parts; first, the classification of patients into two different groups, hospital and industrial; and second, planning for sunlight in all wards and rooms occupied by patients at all seasons of the year, and particularly during the winter months.

Whitby differs from other institutions in that the hospital idea of nursing and treatment is being carried into all its buildings, and that while the cottages for patients who are physically well enough to be occupied daily have none of the all too common institution appearance and atmosphere, but are rather of a domestic type of architecture, they still preserve internally a hospital character in the arrangement of wards, single rooms and treatment rooms, which will call for the highest degree of nursing skill.

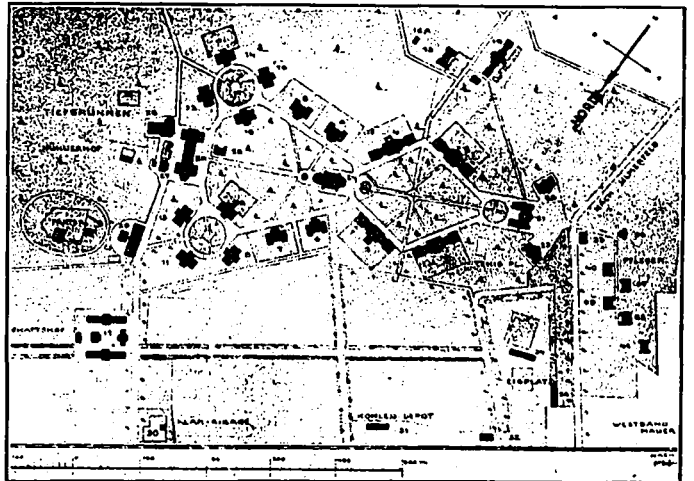


LONG GROVE ASYLUM, LONDON COUNTY COUNCIL, ENGLAND.

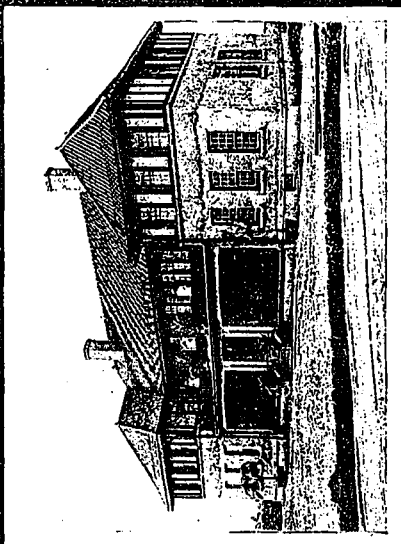
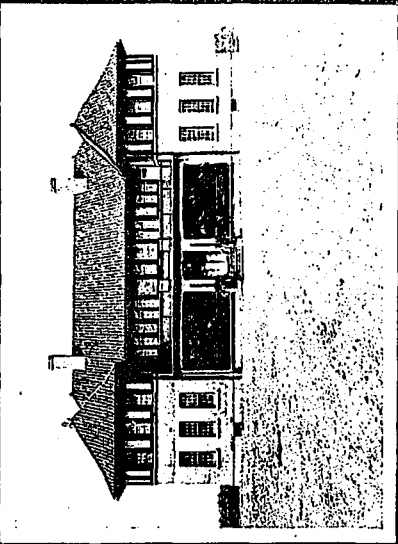
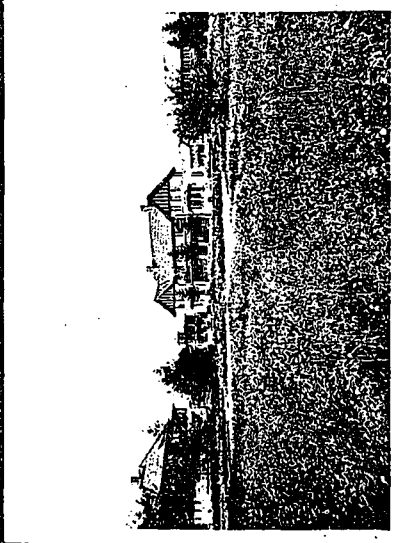
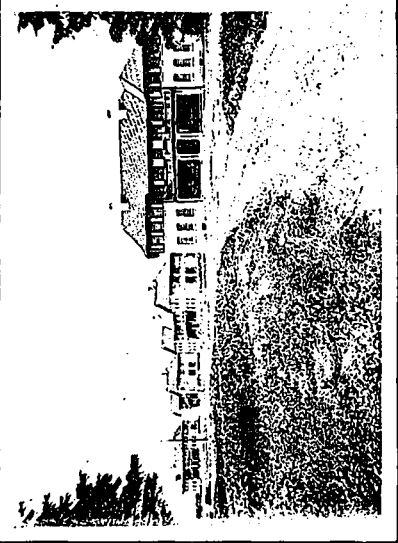
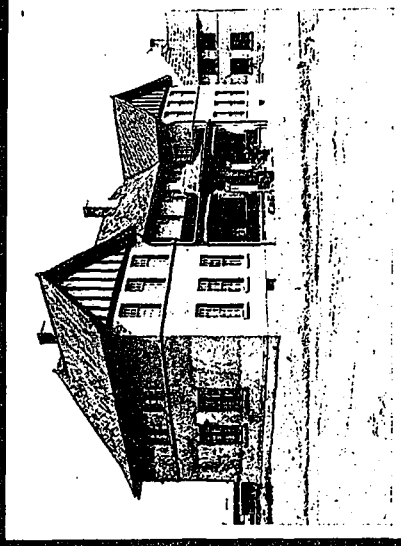
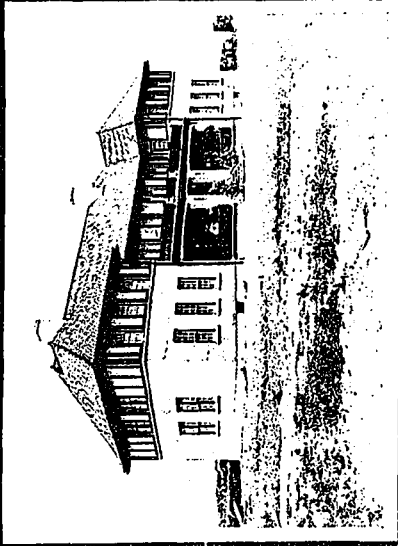
The result of this arrangement will be that the hospital training of all the nurses will be continued, no matter in which building they may be employed. This will contribute in no small degree to the successful training of the nurses, and will give them further opportunities to add to the reputation of the graduate nurses of the Ontario public institutions, a reputation which has been declared to be second to none by those who have had an opportunity of judging the work done by nurses who have gone from these institutions to serve in the wards of the overseas military hospitals.

The determination to place the buildings so that all wards and rooms occupied by patients shall receive direct sunlight at some period of the shortest day, implies some criticism of schemes which have in other respects received much favorable notice, such as, for instance, "Long Grove," in England; "Mauer Ohling," in Austria-Hungary; "Bangour," in Scotland—illustrations of which are given for purposes of comparison—and also other institutions in the United States, where evidently this problem has not been given any more consideration than in the examples illustrated.

That the orientation of hospital buildings in Canada is of the very greatest importance is evident when we remember that in winter it is absolutely essential to admit the direct rays of the sun into our buildings, because the low



MENTAL HOSPITAL, "MAUER OHLING," AUSTRIA-HUNGARY.



JAMES GOVAN, ARCHITECT.

outside temperatures do not permit us to keep windows open, and thus admit the entry of sun-purified air.

#### DESCRIPTION OF HOSPITAL.

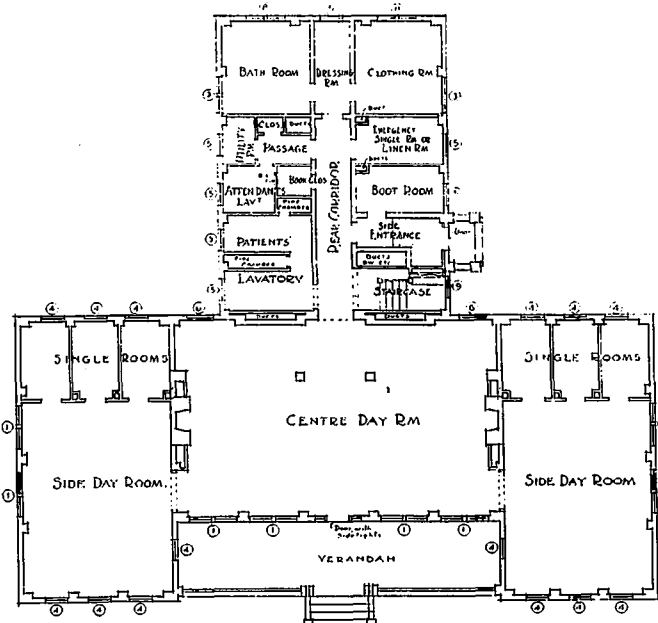
The main group of buildings is placed on a wide, gentle slope, having the advantage of a southeastern exposure. From this site extensive views may be had across Lake Ontario to the south, and Whitby harbor to the east. The town of Whitby lies to the north, and to the west is a prosperous farming country. Great natural beauty, existing trees, orchards and roads, convenient railway and water facilities, all emphasize the suitability of the property for hospital purposes.

A reference to the site plan shows an arrangement of buildings which may best be described as a hospital village. The institution is divided into three centres: First, nearest the lake front, the principal hospital centre, and the second and third, the two groups of cottages for men and women, separated from the hospital centre by the recreation and athletic grounds. The buildings when completed will accommodate fifteen hundred patients.

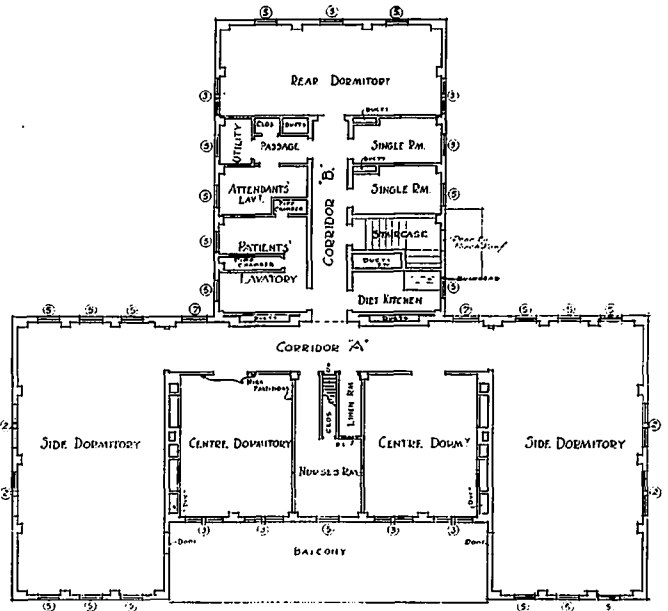
#### HOSPITAL CENTRE.

The hospital centre consists of four hospital buildings, with a central kitchen and dining-rooms. Two of these buildings accommodate sixty-three patients each, and will

Views of Cottages in Women's Centre, Hospital for Insane, Whitby, Ont.



GROUND FLOOR PLAN  
COTTAGES # 1-2-43.



FIRST FLOOR PLAN  
COTTAGES # 1-2-43.

be used as reception or observation hospitals, and for incipient cases. With these should be included two convalescent cottages, accommodating thirty-five patients each. The other two buildings at this centre accommodate one hundred and four patients each, and will be used for recurrent acute cases.

The reception or observation hospitals form a separate unit distinct from the rest of the institution, but in close touch with it. Here patients will be received, cared for and treated; then, if satisfactory progress is made, given a period of probation in the adjacent convalescent cottages, without coming in contact with cases of longer duration in the institution.

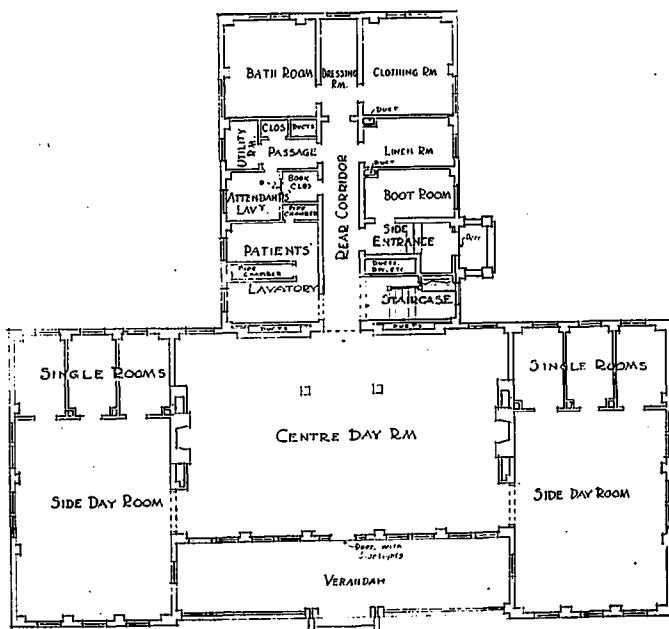
The arrangement of the roads and grounds is

such that traffic to and from the other parts of the institution need not pass near the reception hospitals.

Should a patient not make the desired progress in the time allowed in the reception hospital, he or she will be transferred to another part of the institution, first either to one of the cottages in the industrial group, should bodily health be such as to make this transfer desirable, or secondly, to an infirmary or other hospital building as the necessity of the case may demand.

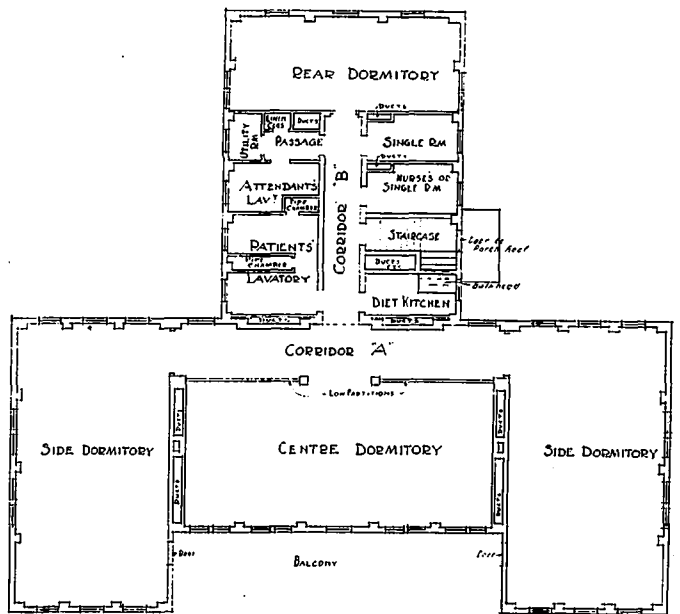
COTTAGE CENTRES.

The cottage centres consist of two groups of eight cottages each, accommodating from



GROUND FLOOR PLAN  
COTTAGES # 4-5-6-7-8.

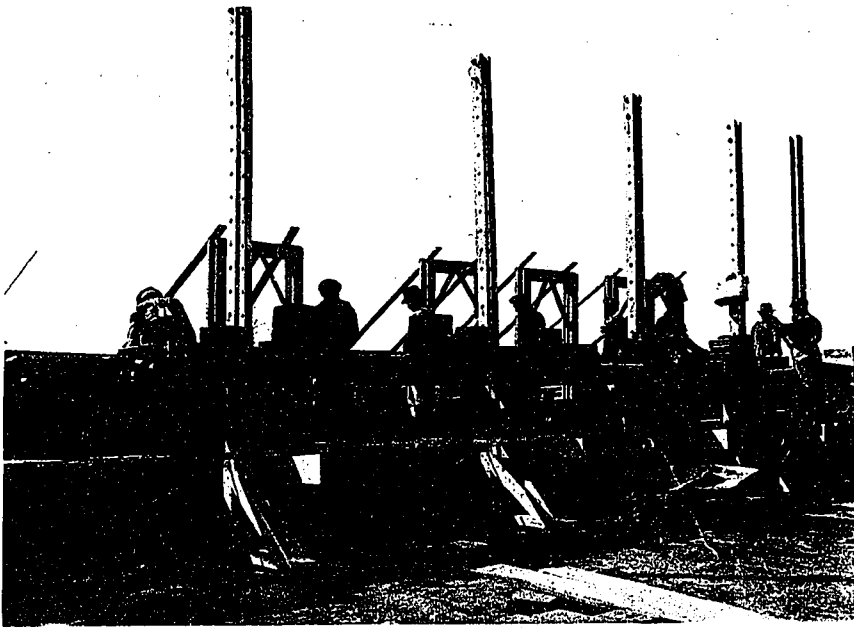
NOTE.  
FOR WINDOW # SEE PLAN OF COTTAGES # 1-2-43



FIRST FLOOR PLAN  
COTTAGES # 4-5-6-7-8

NOTE.  
FOR WINDOW # SEE PLAN OF COTTAGES # 1-2-43



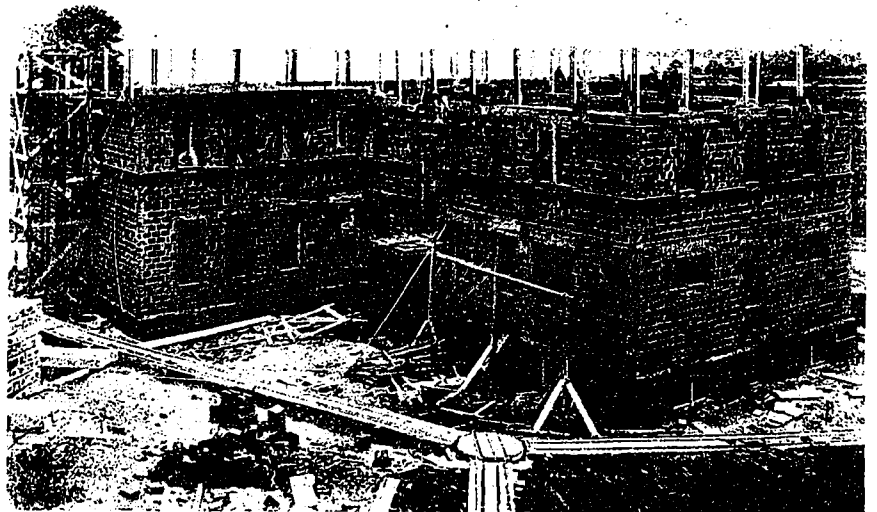


LAYING UP TILE WALLS FROM GILBRETH SCAFFOLD.

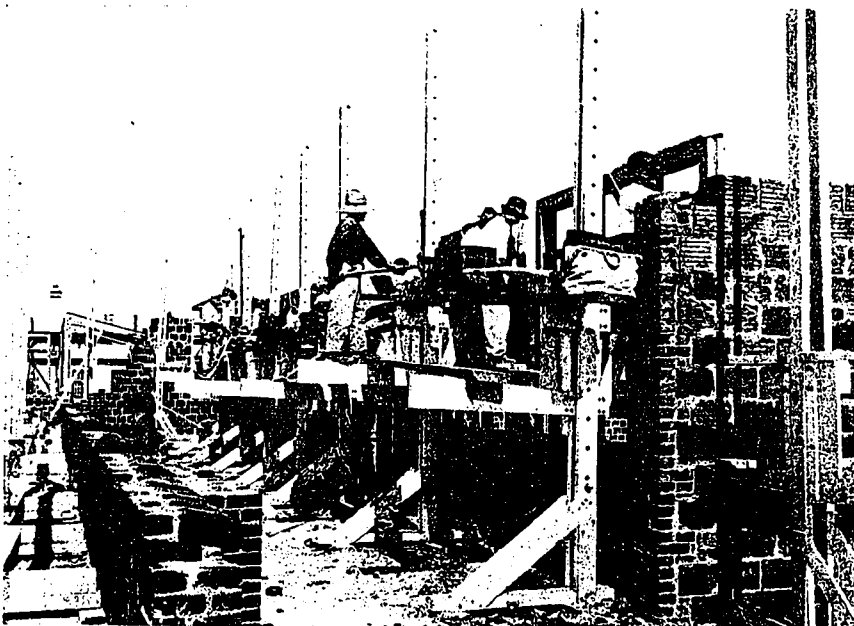
fifty-seven to sixty-two patients in each cottage. For each group an infirmary is provided, which will take care of all patients assigned to cottage centres who require special nursing on account of general feebleness or physical illness. The cottage centres will accommodate all patients who do not require, or who have ceased to require for a time at least, special medical treatment, the more easily managed patients, the working patients, and all who would be benefited by the suggestion of normal home life.

#### ISOLATION HOSPITALS.

Isolation hospitals will permit



A COTTAGE UNDER CONSTRUCTION. NOTE USE OF LIGHT RAILWAY AND HOIST FOR DISTRIBUTING MATERIALS AND GILBRETH SCAFFOLD FOR UPPER STOREY.



GILBRETH SCAFFOLD BEING RAISED WHILE BRICKLAYERS CONTINUE THEIR OPERATIONS.

of the proper segregation of all cases of tuberculosis and other diseases requiring to be isolated from the general medical hospital.

#### TREATMENT ROOMS.

Provision for carrying out the best ideas of psychiatry in the treatment of patients has had careful attention, and the plans embody special arrangements for continuous baths and other hydro-therapeutic measures, electro-therapy, mechano-therapy, hot air baths, massage, special rest rooms and hygienic diet; also surgery, dentistry, ophthalmology, etc.

It should be noted that much of the equipment for this work has

been manufactured in Canada for the first time from special details prepared by the department. The goods produced are quite equal to those which have been imported hitherto; indeed, in some details, such as insulation and construction, they are superior.

#### SUN ROOMS.

In all the hospitals and infirmaries very liberal provision has been made for treating patients in sun rooms.

#### RESEARCH WORK.

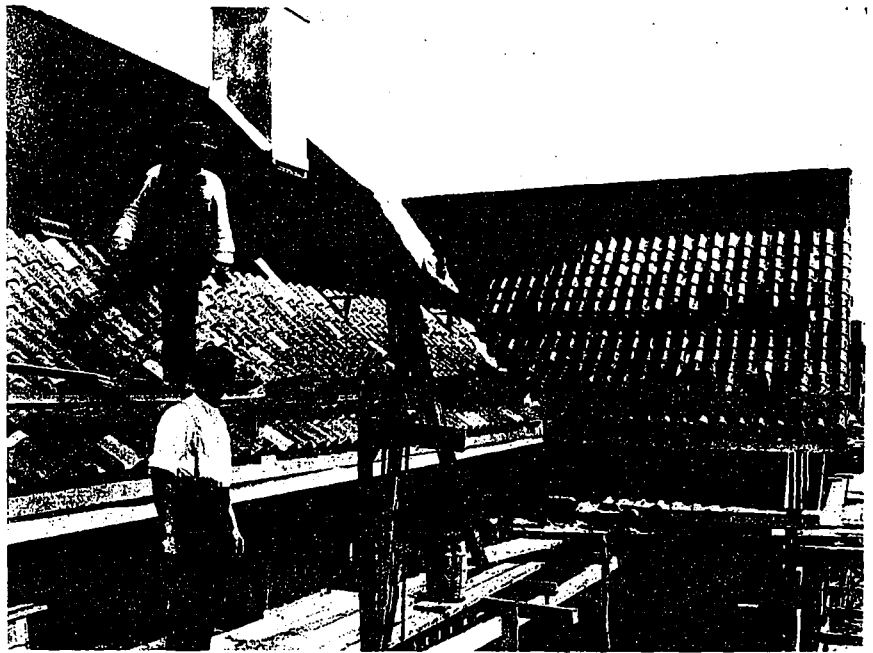
Every facility is being provided for medical research work, both clinical and in laboratories, with lecture rooms for demonstrations and training of the staff.

OTHER BUILDINGS.

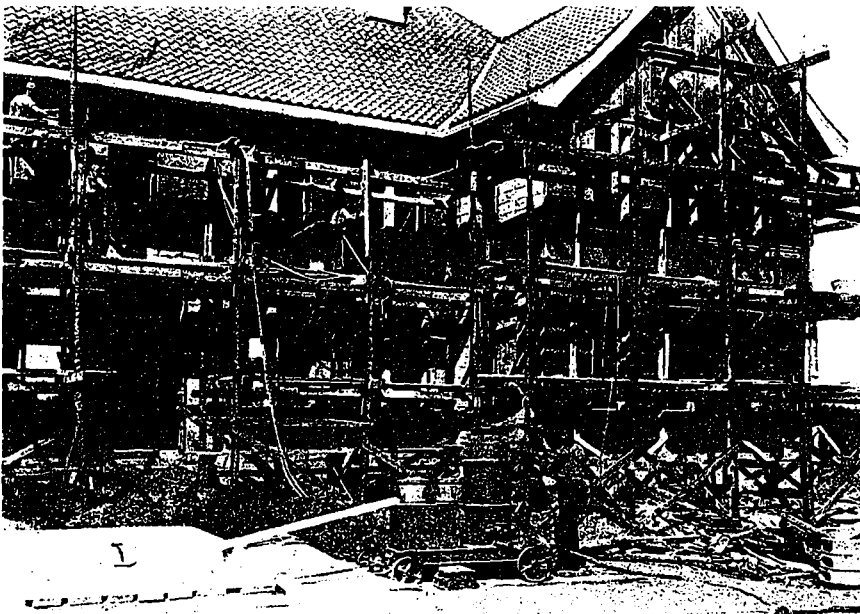
The nurses' home and annexes, officers' quarters, surgical, pathological, church, hall and recreation buildings are all centrally located, so as to be convenient to all sections of the institution, while the power house, stores building and workshops are adjacent to the railway siding, which was purposely kept as far away from the patients' buildings as practicable.

WORK COMPLETED.

The buildings erected and ready for occupation so far include the eight cottages of the women's centre and the central kitchen and dining room building for the group. The sewage dis-



LAYING SPANISH ROOFING TILE MADE AT GOVERNMENT CLAY PLANT.



tion, it will perhaps be better to confine attention to the details of those buildings which can be illustrated.

COTTAGES.

With the exception of some single rooms for specially privileged patients, the ground floor is reserved for day use, while the sleeping accommodation is provided on the upper floor. The sleeping wards and day rooms are extremely bright and cheerful, and their openness and lack of any suggestion of restraint, strike the visitor at once as being unique. They are so arranged, however, that supervision by the nurses is rendered almost per-

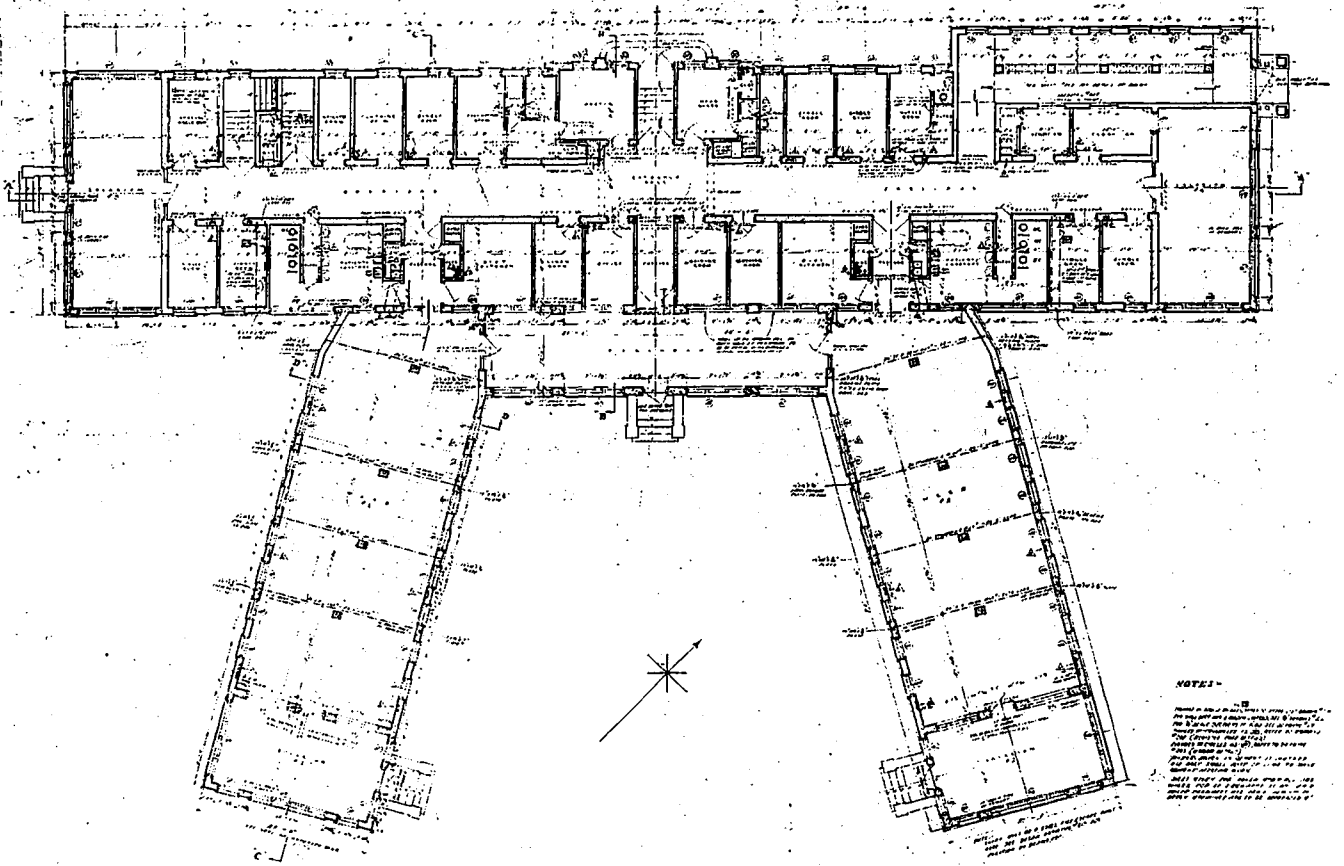
PUTTING ON STUCCO WITH "CEMENT GUN."

posal plant for the entire hospital is also completed. Part of the cold storage plant, power house, men's cottage centre and dining-room building for that group are also almost finished. Infirmary No. 1 is up to the roof level, and infirmary No. 2 is well up in the second story. All underground work, such as sewers, water, heat, light and power mains, have been completed for the two cottage centres. Materials have been delivered to the site for the construction of the reception hospitals.

While the plans for the buildings not yet erected embrace many features which would be of interest to readers of CONSTRUCTION,



ENTRANCE, INFIRMARY NO. 1, SHOWING USE OF TAPESTRY BRICK AND TILE PATTERNS.



**NOTES**

1. All work to be done in accordance with the specifications and drawings of the architect.

2. The contractor shall be responsible for the accuracy of the dimensions and for the proper execution of the work.

3. The contractor shall be responsible for the proper placement and setting of all masonry and concrete work.

4. The contractor shall be responsible for the proper placement and setting of all steel work.

5. The contractor shall be responsible for the proper placement and setting of all woodwork.

6. The contractor shall be responsible for the proper placement and setting of all plumbing and electrical work.

7. The contractor shall be responsible for the proper placement and setting of all mechanical work.

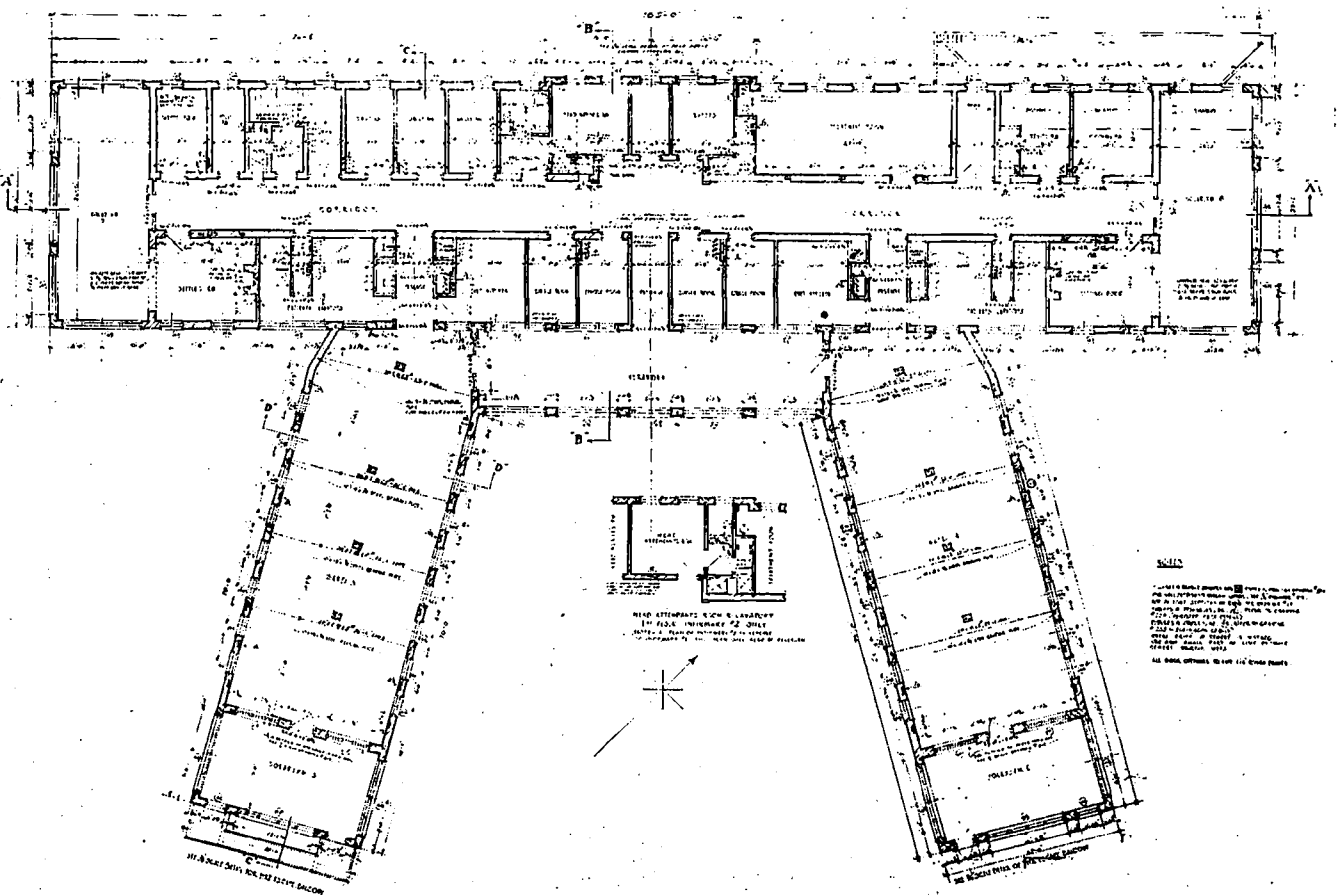
8. The contractor shall be responsible for the proper placement and setting of all finishing work.

9. The contractor shall be responsible for the proper placement and setting of all other work.

10. The contractor shall be responsible for the proper placement and setting of all other work.

INFIRMARY NO. 1, GROUND FLOOR PLAN, HOSPITAL FOR INSANE, WHITBY, ONT.

JAMES GOVAN, ARCHITECT.



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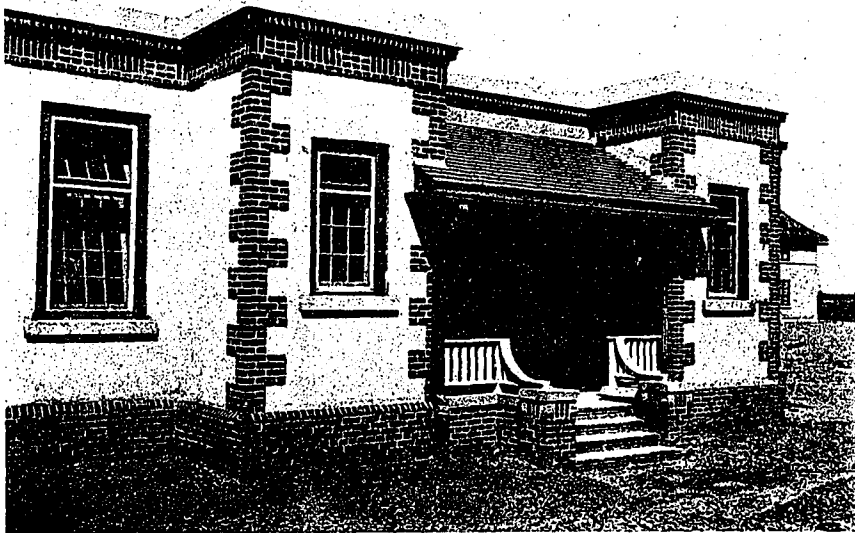
7. The contractor shall be responsible for the proper placement and setting of all mechanical work.

8. The contractor shall be responsible for the proper placement and setting of all finishing work.

9. The contractor shall be responsible for the proper placement and setting of all other work.

10. The contractor shall be responsible for the proper placement and setting of all other work.

INFIRMARY NO. 1, UPPER FLOOR PLAN, HOSPITAL FOR INSANE, WHITBY, ONT.



ONE OF THE ENTRANCES TO DINING ROOM, BUILDING NO. 1. THIS ADMITS PATIENTS FROM TWO COTTAGES.

fect. Each cottage is a hospital in itself, having its own facilities for hydro-therapeutic work, and its own diet kitchen. Convenient access to external balconies is provided at the front and rear wing of each cottage, so that patients can be easily removed in the event of a fire taking place—a most unlikely occurrence, when the fireproof nature of the materials used in the construction of the buildings is taken into account.

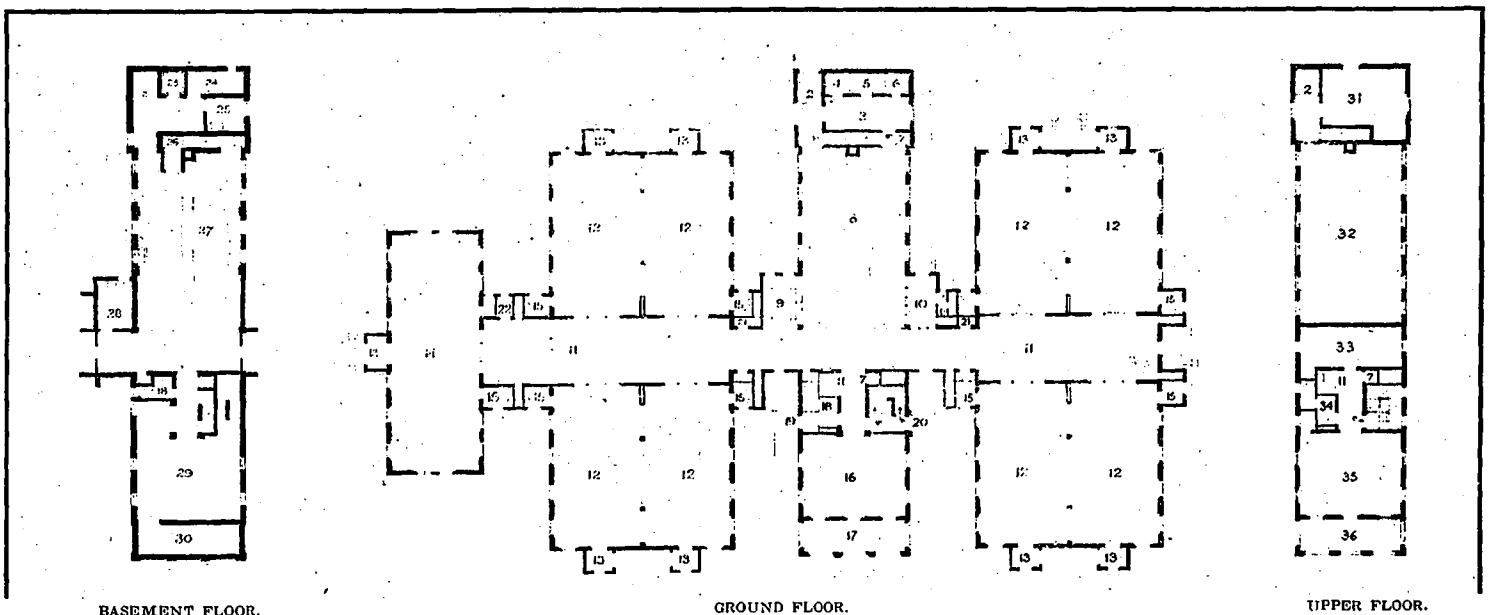
The entire absence of the drab neutral colors, which are so characteristic of hospitals of this kind, is noteworthy. While no expensive finishes and decorations have been used, the general

effect of the harmonious color combinations of tan, delicate green and ivory on the walls and ceilings, together with the warm reds of the quarry tile floors and brown linoleum, relieved by the brighter patterns and colors of the window draperies—all tend to create a home-like atmosphere. This effect is added to by the simple lines of the furniture, which has the necessary strength without being cumbersome, thus maintaining the domestic character of the rooms.

In the wards and single rooms the provision of small tables with a drawer for each patient to take care of brush, comb and other toilet articles, and a small brass



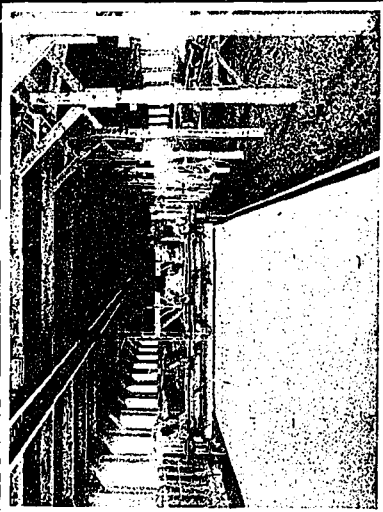
END OF NURSES' DINING ROOM WING OF DINING ROOM BUILDING NO. 1, WOMEN'S CENTRE.



KITCHEN AND DINING ROOM BUILDINGS AT COTTAGE CENTRE 1 AND 2, HOSPITAL FOR INSANE, WHITBY, ONT. JAMES GOVAN, ARCHITECT.

INDEX TO PLAN OF KITCHEN AND DINING ROOM BUILDINGS: 1, Goods receiving platform; 2, Hoist; 3, Dry stores; 4, 5, 6, Cold storage rooms; 7, Dumb waiter; 8, Kitchen; 9, Alcove for dish washing machine; 10, Chef's office; 11, Serveries; 12, Patients' dining rooms, one for each cottage; 13, Patients' entrances; 14, Dining room, Infirmary patients; 15, Patients' toilet rooms; 16, Dining room for help; 17, Verandah; 18, Coat room and closet for help; 19, Entrance for help; 20, Entrance to nurses' dining room; 21, Drying closets; 22, Utility room; 23, Fish cold storage; 24, Fuel store; 25, Sterilizing room; 26, Fresh air duct to kitchen; 27, Scullery; 28, Grease pit room; 29, Sub Power Station for Cottage Centre; 30, Transformer room; 31, Cold storage, primary tank room; 32, Upper part of kitchen; 33, Exhaust ventilating chamber; 34, Nurses' toilet and coat room; 35, Nurses' dining room; 36, Nurses' balcony.

Sieghart Beam Fireproof Floor construction



Beds of Beams just before cutting.



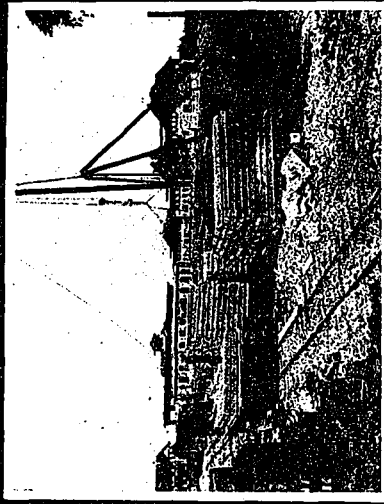
From the Factory to the Seasoning Yard



In the Seasoning Yard



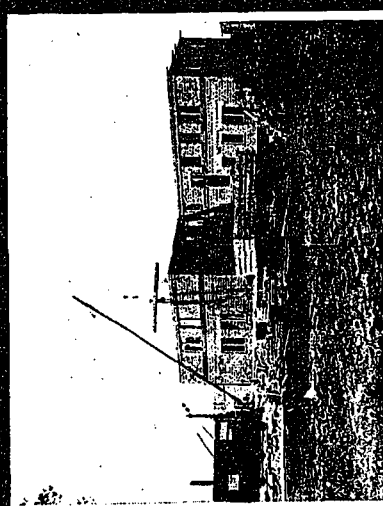
From the seasoning yard to the Delivery Railway



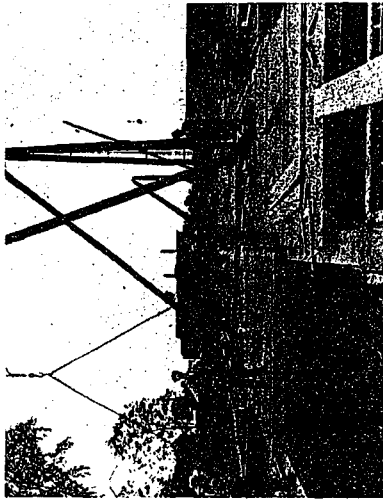
Delivering Beams at the Building Site



Conveying Beams at a large building from pile to crane



Lifting Beams directly by Travelling Crane to Upper floors



Placing Beams on the Building



Floor ready for creating and finishing

PROGRESSIVE PICTURES OF SIEGHART BEAM MANUFACTURING AND LAYING. HOSPITAL FOR INSANE, WHITBY. GNT. JAMES COVAN, ARCHITECT.

rail for an individual towel, is proving to be a very successful solution of a problem which has caused a great deal of worry to the administrators of such institutions.

CENTRAL KITCHEN AND DINING-ROOMS FOR COTTAGE CENTRES.

As the climatic conditions of this country

make it extremely difficult to carry food from a central kitchen to a large number of separate buildings and have it served hot and palatable, at Whitby it has been deemed advisable to bring the patients to the dining-rooms, which are grouped round the central kitchen. Provided that patients are suitably clothed to cross the short distance from the cottage to their

dining-room, there is no objection to this arrangement. It must be remembered that patients with bodily infirmities which would make it inadvisable for them to be exposed in our extreme weather conditions will not be housed in these cottages, but will be accommodated in one of the special hospital buildings provided for such cases.

Each cottage has its corresponding dining-room, so that the classification of patients is maintained during meal times. To facilitate supervision, and also to make for more compact planning, cross-lighting and cross-ventilation, the dining-rooms are arranged in pairs, with a low dividing wall between, just high enough to prevent patients from seeing into the adjacent dining-room while they are seated at the tables, but which does not prevent a nurse in one dining-room from exercising a certain amount of supervision over patients in the next. An opening through one end of this dwarf wall allows nurses access from one dining-room to another.

A vast amount of care and detailed study has been given to the kitchen and its equipment. Competent critics with a wide experience in this special branch of hospital and hotel work have declared that it is superior to anything of its kind on the American continent. At first glance this part of the building is only remarkable for its orderly simplicity; but it is just this simplicity and bareness which distinguish it from work done elsewhere. The entire absence of all piping, hoods, lighting fixtures and other impedimenta between the top of the cooking equipment and the ceiling, marks a great advance in this branch of institution work. This kitchen has now been in operation long enough to demonstrate that it is a success. Even without the mechanical ventilation system in operation, it is possible to stand in the middle of the room and scarcely be able to realize that a meal is in course of preparation. The low pressure steam (less than five pounds) on all the cooking equipment, and the down-draught method of taking vapors from the kettles and smoke from the range have almost entirely eliminated all odors and visible signs of cooking, even when the equipment is being used to full capacity. Gauges recording steam pressures, a clock and an automatic indicator of the amount of steam used in the kitchen, are mounted on a specially designed sanitary type of gauge board,



INFIRMARY NO. 1. WARDS AND SUN ROOMS.

which is placed on the side wall so as to be under the observation of the chef either from his office or the kitchen. This arrangement allows him to discard rule of thumb methods in his work and be guided by the temperature of the cooking medium, while the recording counter checks wastage of steam.

The apparatus used in the kitchen, scullery and serveries embraces many new sanitary features not hitherto found in standard goods of this kind. It was all manufactured under the direction, and in many cases to the special designs of the department, and the manufacturers are to be congratulated on the results of their co-operation in the working out of the advanced ideas which distinguish this part of the work.

The danger that a helper may be locked into a cold storage room is even greater at such an institution than in a general hospital or commercial building. This has been overcome by a contrivance invented by the architect, which provides for the locking securely of all refrigerator doors from the outside, while permitting their unfastening from the inside by very simple means.

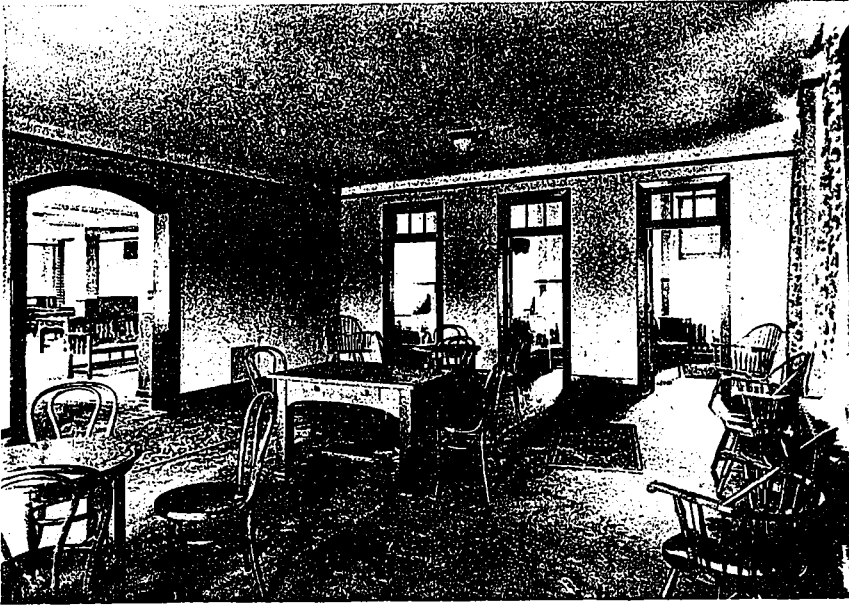
#### INFIRMARIES.

The most notable features of these buildings are: First, the arrangement of connecting the main wards by verandahs, which can be closed



SEIGWART BEAM LOAD TEST. TYPICAL BEAMS FOR ALL DIFFERENT SPANS HAVE BEEN TESTED IN THIS MANNER TO CHECK CALCULATIONS.



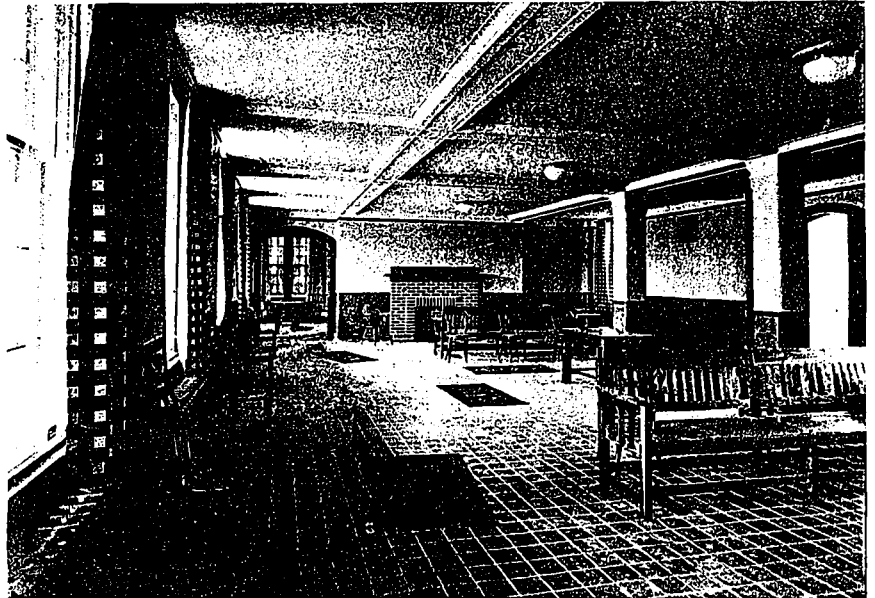


SIDE DAY ROOM IN WOMEN'S COTTAGES, SINGLE ROOMS FOR PRIVILEGED PATIENTS IN BACKGROUND.

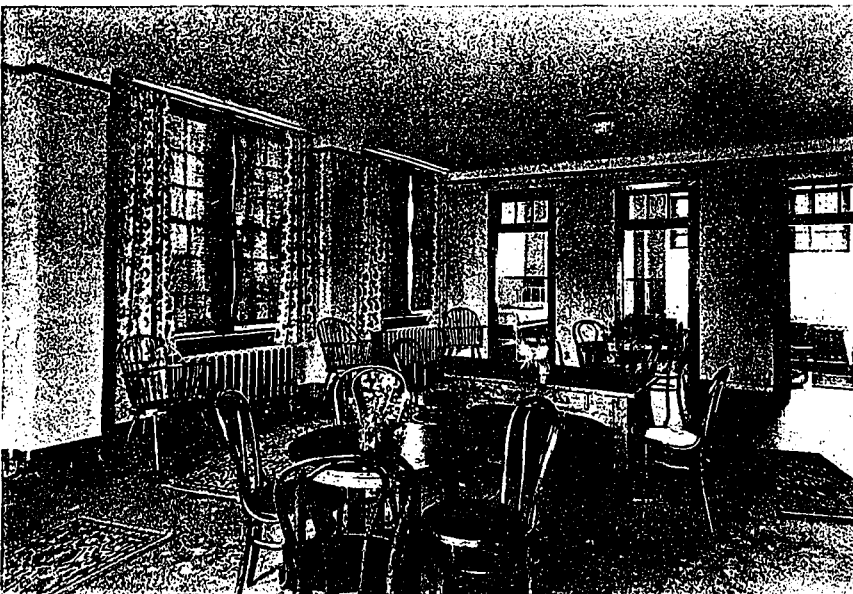
with storm sashes in winter time, thus enabling nurses to supervise the wards, verandahs and sun rooms without being disturbed by traffic in and out of the central administrative portion of the building; second, a sloping ramp connecting all floors, thus doing away with the need for an elevator, which cannot be used with this class of patient, and also providing a very safe type of fire exit for the patients who will be quite powerless to use an ordinary stairway; third, the large proportion of patients accommodated in sun rooms is unique in this type of building.

#### SEWAGE PURIFICATION SYSTEM.

The system installed embraces



CENTRE DAY ROOM IN WOMEN'S COTTAGES.



ANOTHER SIDE DAY ROOM IN WOMEN'S COTTAGES.

the most reliable features of modern sanitary practice, and the details have been approved by the Provincial Board of Health. As there are two drainage levels on the site, it is necessary to collect sewage from the lower level in a sedimentation chamber, and pump it to the main disposal plant for treatment in contact beds. The system provides for the convenient removal of sludge, and bacterial treatment by rapid filtration through a bed of crushed stone to break up and render inoffensive the organic matter in the liquid, and final chemical treatment to destroy any remaining disease-producing bacteria. Provision has also been made

whereby sewage can be stored and pumped on to the land of the farm for fertilization and irrigation purposes in dry seasons, if required.

#### NOTES ON CONSTRUCTION.

To permit of the most extensive use of the great variety of building materials produced at the Ontario Reformatory in Guelph and the Government clay plant at Mimico, and the employment of prison labor as far as practicable, the work was undertaken and carried out by the construction organization created by the department of the Provincial Secretary. The many admirable methods of construction adopted have aroused the interest and won

the approval of those who have visited the institution and have been in a position to compare it with other work of similar character.

No attempt need be made to describe the details of construction of the various buildings, but the following special points are worthy of consideration.

Fireproof floors are being made of hollow reinforced concrete beams, manufactured in a special factory on the site. The adoption of this type of floor has resulted in a reduction of approximately fifty per cent. in cost as compared with other types of floor which have been tried out by the department, not only on this job, but also at other institutions. This is largely due: first, to the elimination of all temporary wood formwork; second, to the effective use of concrete where it performs its greatest service, viz., in the top flange of the beams, and its omission in the centre of the beam, where it only adds weight to the floor; and third, to the use of factory methods in the manufacture of the beams, with more effective inspection than can be obtained where the work is spread over a large area of buildings. These beams are also used in many other ways, such, for instance, as roof construction, and also as stair steps.

A large deposit of gravel and sand on the lake front of the property has been of great value in providing material for the construction of buildings, roads, sidewalks, etc.

With the exception of the basement walls of cottages one to eight, which are of mass concrete, all walls, exterior and interior, have been built with hollow clay tile blocks and bricks supplied from the Government clay plant at Mimico, or concrete hollow tile blocks supplied from the Ontario Reformatory, Guelph.

The extraordinary success which has attended the operation of the Government plant at Mimico is responsible for the use at Whitby of clay products for purposes which are almost unique on this continent. Many unusual shapes have been made to meet special requirements. An example of this is the stair step-nosing, which allows the use of quarry tile for finishing the top of the concrete beam steps of the stairs. Other products used from this plant are Spanish and shingle tiles for roofs, cove bases, which have been used throughout all buildings at the junction of floors and walls, quarry floor tiles of several shapes and sizes, which have not only been extensively used for interior floors, but also for verandahs and balconies. Special rounded edge tiles are being used to form sanitary window stools in the interiors of men's cottages and hospital buildings. Hollow window sill blocks are being used with good results, and as may be seen from the illustrations, tapestry bricks of remarkable quality have added color to the architectural composition of the buildings. It is unfortunate that the photo-



A PATIENT'S SINGLE ROOM IN WOMEN'S COTTAGES.

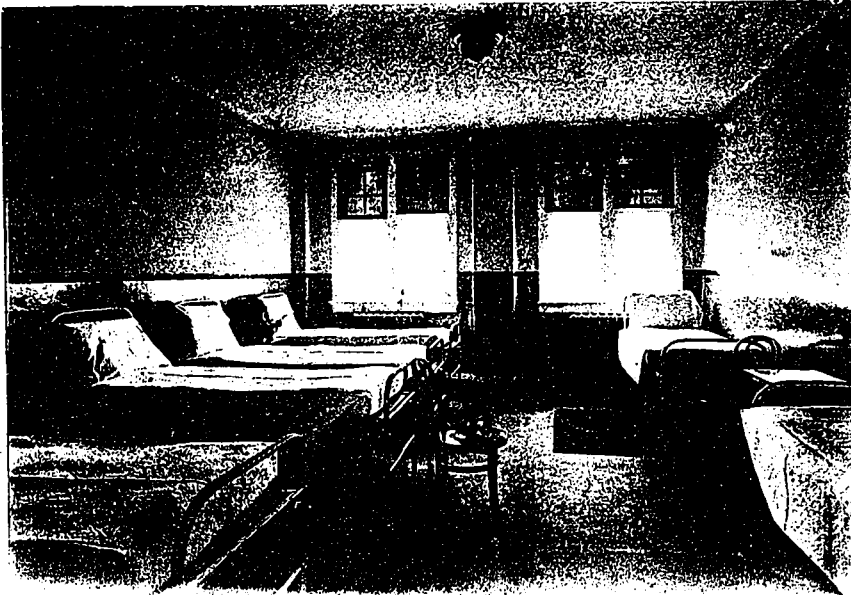


A TYPICAL COTTAGE CORRIDOR.





CENTRE DORMITORY IN WOMEN'S COTTAGES. NOTE OPENINGS TO CORRIDOR ON RIGHT HAND SIDE WITHOUT SCREENS OR DOORS, ALSO RACK FOR PATIENTS' CLOTHING AT NIGHT.



A SMALL WARD IN WOMEN'S COTTAGES.



A LARGE WARD IN WOMEN'S COTTAGES.

graphs give no conception of the great variety of colors of these bricks, roof tiles and floor tiles, which are being produced by this small plant at Mimico, but some little idea of the great diversity of the output may be obtained from the illustration of an exhibit of its wares.

The varied products of the Ontario Reformatory at Guelph have also contributed much to the success of the Whitby undertaking. Special hospital sanitary slab doors, in both oak and white-wood, wood trim of all kinds, windows, frames and furniture, are the output of the woodworking factory at that institution. In addition, hydrated lime and alea lime were supplied from the Reformatory, and at the machine shop there were manufactured the many different types of racks and shelving which have been used throughout at Whitby, to the entire exclusion of insanitary stationary wood shelving. As the illustrations indicate, these racks are made with welded joints where it is absolutely essential to do away with dirt-collecting corners, and in other cases with standard pipe fittings and specially cast clamps. All this equipment is assembled in unit sections, mounted on casters, so that it is quite clear of the walls, and can be moved about for cleaning purposes.

Instead of following the usual custom of folding patients' clothing and storing it on open shelving, it will be hung on coat hangers suspended from rails in closed metal cabinets. These hangers can be slid along the rails, which in turn can be pulled out of the cabinets. By this arrangement the handling of clothing is not only simplified, but its appearance and wear are also improved. These cabinets are also of sectional construction on casters.

Nearly all the exterior stucco and interior plaster work has been applied with a cement gun, and the use of alea lime stucco, with its extremely high proportion of sand (amounting to five parts of the latter to one part of alea lime—eighty-five per cent.

hydrated lime and fifteen per cent. alca—and one-quarter part of cement), has given results which are very gratifying, both in regard to quality of product and low costs.

The walls of the power house differ from those on all other buildings, in that they are of ferro-dovetail sheets carried on the structural steel members, and having outside and inside plaster applied with the gun, which consists of three and one-half parts sand to one of cement, and one-tenth part of hydrated lime. It was not considered desirable to risk the danger of corrosion of the metal by using a stucco with high lime content on this building.

The sloping roofs of cottages and on the centre part of infirmaries are of slow-burning wood construction, from which patients are separated by fireproof ceilings having fire doors in openings.

It is interesting to note that the costs of some of the later roofs were reduced below those built earlier, by making special detailed studies of the roof members with a view to reducing the time required by carpenters for erection and having much done by machinery at the woodworking shop on the site, which would customarily be done by workmen at the buildings. To do this it was found necessary to increase the amount of timber used, but the decrease in labor costs was much greater than the increase in cost of materials.

In this connection it can be further stated that the very efficient system in operation for obtaining unit costs of all the work has been found to be of inestimable value in the preparation of the drawings, as the work has progressed from stage to stage. To an equal extent costs have been materially reduced, and more satisfactory results obtained on the job by devoting time in the architect's office beforehand to the study of field problems and the preparation of the necessary exhaustive details required to meet them.

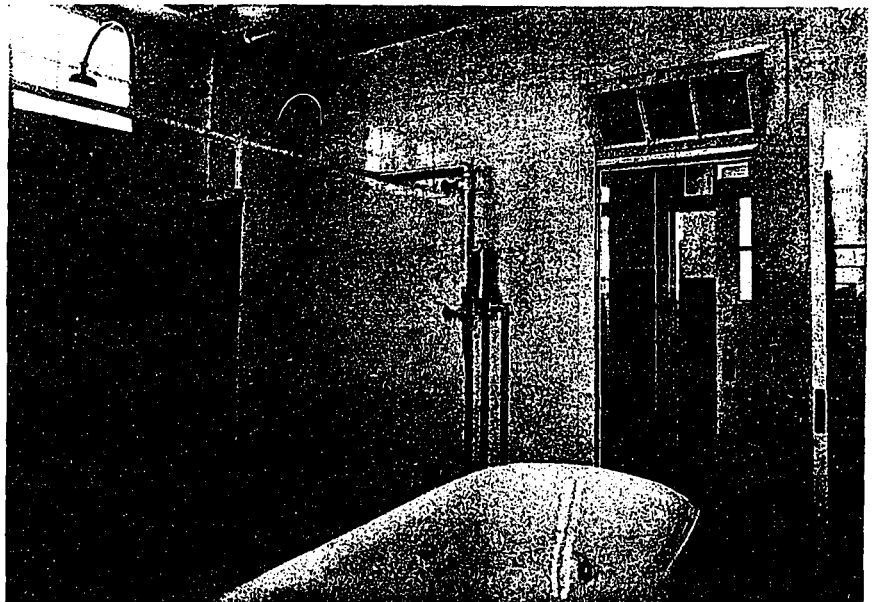
The illustrations of the special



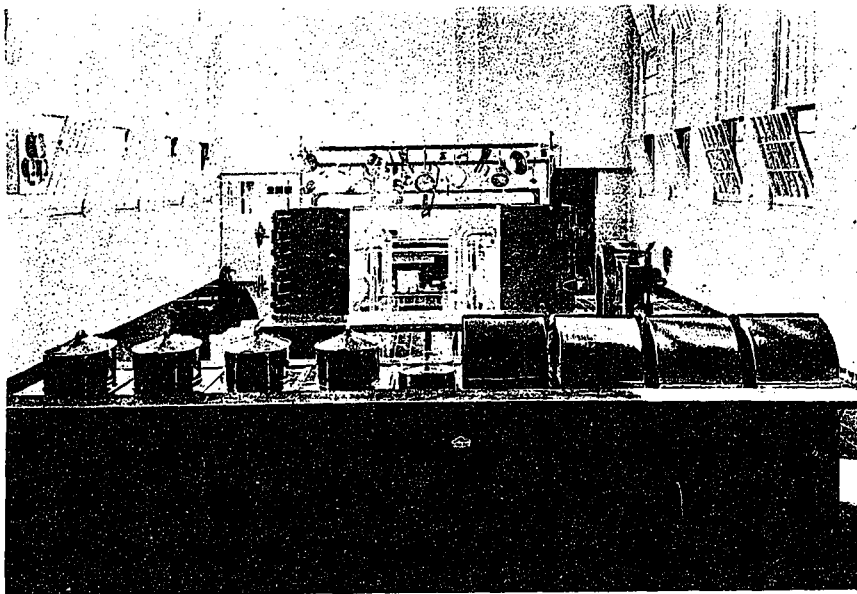
DIET KITCHEN IN WOMEN'S COTTAGES.



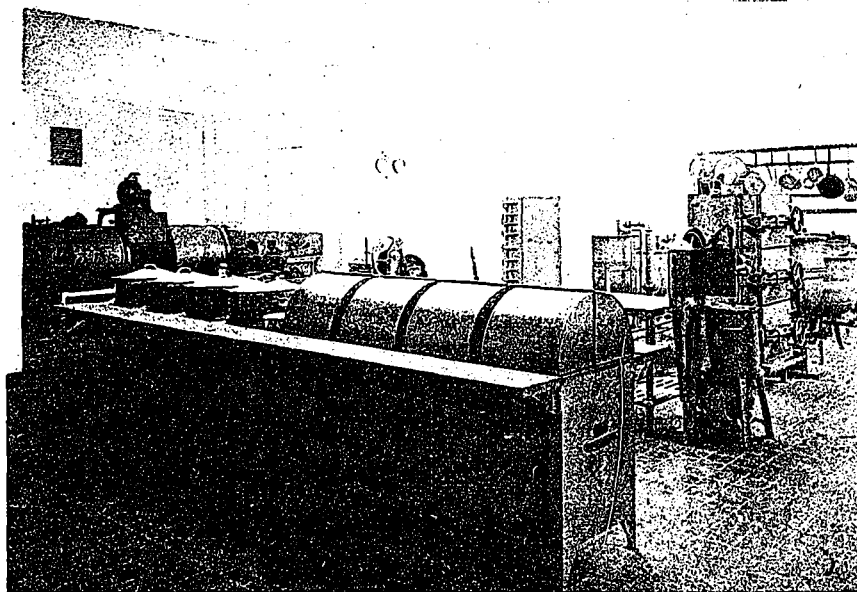
PATIENTS' LAVATORY IN WOMEN'S COTTAGES. NOTE PLUMBING CHAMBER FOR ALL PIPING BETWEEN BASINS AND CLOSETS.



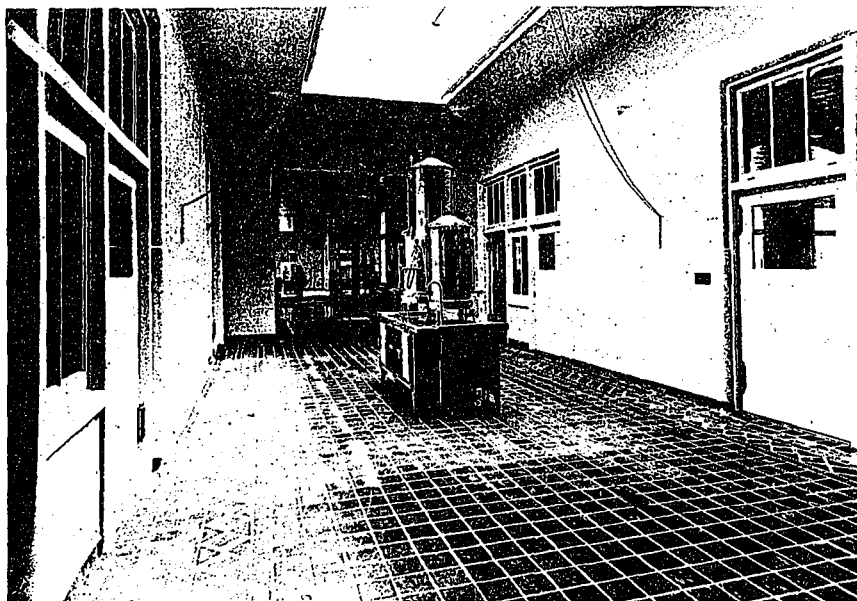
PATIENTS' BATH AND TREATMENT ROOM IN WOMEN'S COTTAGES.



INTERIOR OF KITCHEN. NOTE ABSENCE OF OVERHEAD HOODS, PIPES, FIXTURES, ETC.



INTERIOR KITCHEN, SHOWING ALCOVE FOR DISH WASHING MACHINE.



A SERVERY BETWEEN KITCHEN AND PATIENTS' DINING ROOMS.

Gilbreth scaffolds should be studied, as this scaffold affords a most convenient method of dealing with the problem of handling materials in wall construction. It not only enables the bricklayer to perform his work with greater efficiency and comfort, but it avoids all delays in the raising of scaffolding, as the workmen are carried up with the scaffold while the jacks are operated, without necessitating any stoppage of the work.

The method of taking care of all plumbing piping in chambers, to which access can be had at all times, may be seen on the various plans and in the view of the patients' toilet room in one of the cottages. This does away with the use of all exposed piping in the toilet rooms, which might be tampered with by the patients, and allows the use of ordinary iron or rough brass piping in a position readily accessible, instead of nickel-plated or other more expensive material.

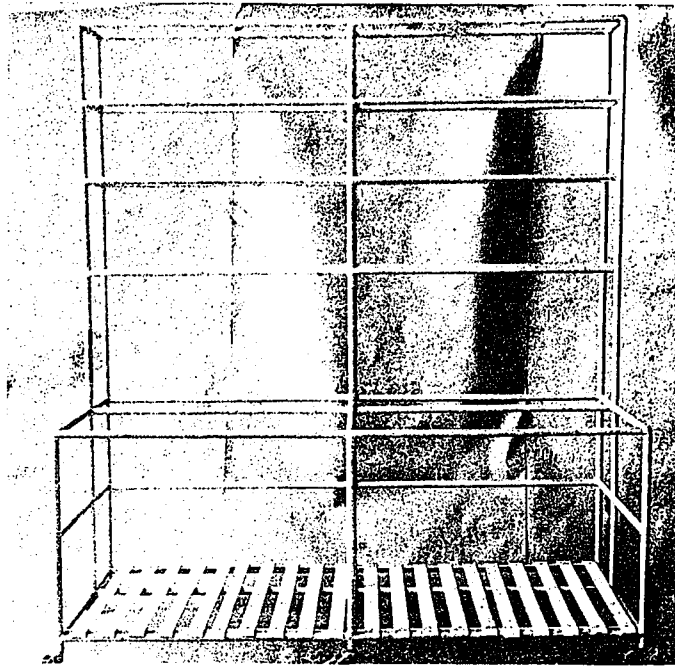
In place of the usual hot and cold water taps and w.c. tanks, small push buttons on the walls above the fixtures operate valves located in the plumbing chambers. To accomplish the desired results some of the fixtures were specially designed and manufactured for this work.

### *Heat, Light and Power*

The heating, lighting, ventilation and other mechanical services for a group of buildings of this size and nature present an important and by no means simple power plant problem, especially when the buildings are of a cottage type and extend over a considerable area of ground.

There are now installed in the boiler room of the power house four boilers of three hundred and twenty horse-power each, these being arranged in two batteries with provision for additional batteries as the hospital section is developed. Further provision has been made for forced draft equipment, economizers, and the installation of super-heaters within the boilers. The boilers are of the B. & W. type, made in

Ontario, with settings built of a high quality fire brick, having outside walls of nine inches thickness. Over these two inches thick eighty-five per cent. magnesia blocks are secured, the whole being enclosed by steel casings as illustrated. The working pressure under which these boilers are operated is one hundred and fifty pounds. As the high pressure steam headers and feed water lines, main and auxiliary, are interconnected and liberally valved, continuity of operation is insured as far as possible; further, extra heavy fittings are used throughout. A Murphy automatic stoker is installed under each boiler, each stoker containing sixty-three square feet of grate surface.



FOOD RACK IN KITCHEN STORE. NOTE SANITARY WELDED JUNCTIONS OF PIPE, UPPER SHELIVING NOT SHOWN IS OF THE WIRE TYPE AS SHOWN IN ANOTHER ILLUSTRATION. ONTARIO REFORMATORY INDUSTRIES.

A fifteen hundred horse-power open feed water heater, with a V notch meter and recorder, is arranged to permit of feed water measurement. Double acting single cylinder boiler feed pumps are provided in duplicate. An overhead hand-operated ten-ton double girder crane was erected in the apparatus room to facilitate any necessary repair work. The steam and exhaust piping system has been designed and installed so that in the future, if desired, steam may be supplied to engines and current generated, space being provided in the building for the number of engine generator sets required for the completed institution.

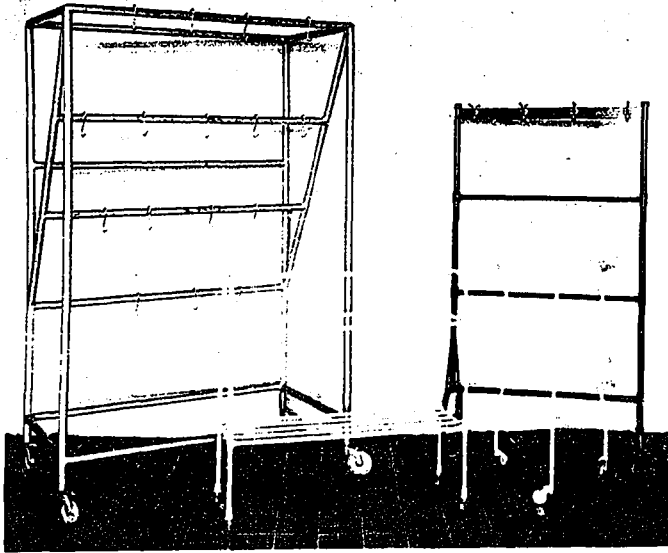


A DINING ROOM FOR PATIENTS FROM ONE COTTAGE.

The proper selection and installation of indicating and recording instruments for the power plant is a subject which is seldom given much consideration as compared to the operating equipment. In this case care has been taken to provide for all the records necessary for complete and satisfactory determination of operating costs. Recording instruments having standard depth cases, uniform in size, design, material and finish are mounted upon a dull black marine slate board in the chief engineer's office. A Venturi recorder is also installed in this office, being connected to a Venturi meter in the flow of the hot water heating



ANOTHER VIEW OF TWO DINING ROOMS, SHOWING OPEN DIVISION.



MEAT RACK, TOWEL RAIL STAND, LAUNDRY BAG HOLDER AND DORMITORY CLOTHES RACK, ONTARIO REFORMATORY INDUSTRIES.

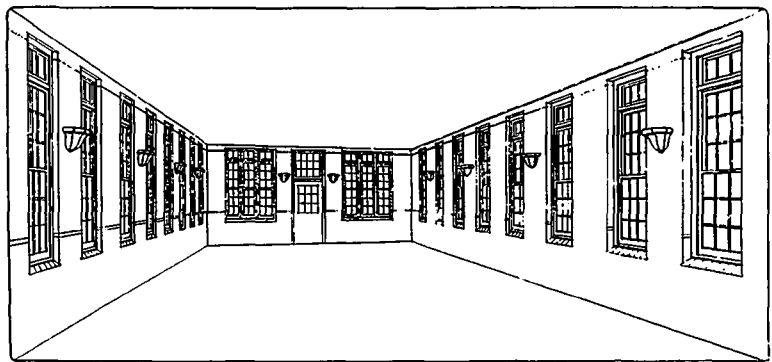
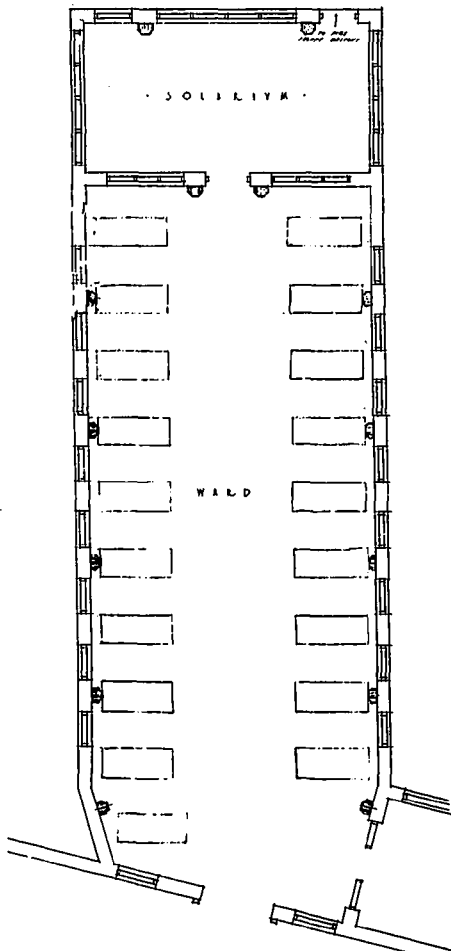
main. These instruments, together with those of the indicating type located at desirable points throughout the plant, furnish in connection with a simple form of log sheets an accurate basis for computing actual unit costs; the performance of the plant can thus be checked and leaks and wastes in its operation readily detected.

Coal is delivered from railroad cars on a

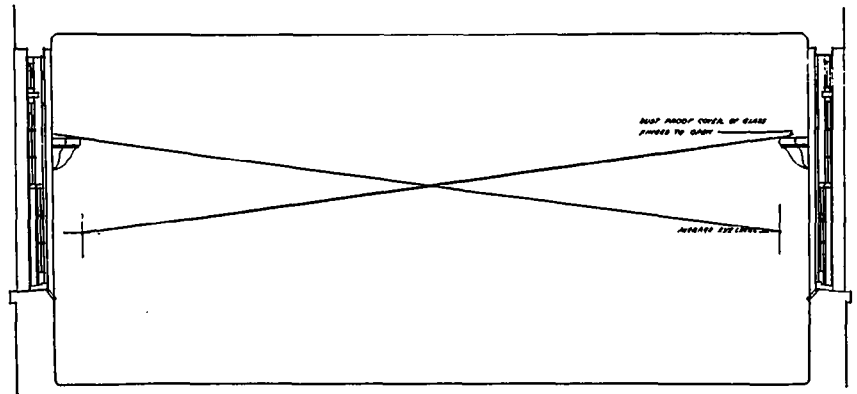
siding into a track hopper. This has an outlet over a scraper conveyor which discharges into the V bucket conveyor in the boiler room, the latter being used for the removal of ashes and delivery of coal into the overhead storage bunkers. An overhead travelling weigh hopper is used for the weighing of coal. Coal used is soft slack.

The chimney stack of reinforced concrete is one hundred feet high, and has an inside diameter of eight feet.

The heating system is of the hot water forced circulation type in which the water is heated in steam heaters and circulated through the buildings by pumps. Two one hundred and twenty-five h.p. steam turbines running at one thousand five hundred r.p.m. are direct connected to twelve inch centrifugal pumps each having a capacity of two thousand seven hundred and fifty g.p.m. Provision has been made for a third unit. One high and one low steam pressure heater have been installed for heating the circulating water, with provision for a second set. Due to the arrangement of piping, the heaters may be operated in parallel or series as desired, the temperature of the water being controlled by varying the effective heating surface. This is accomplished by adjusting the main return valve at these heaters, thereby allowing the con-



INTERIOR VIEW OF WARD



CROSS SECTION THROUGH WARD

NEW TYPE OF INDIRECT FIXTURE FOR HOSPITAL WARD LIGHTING IS BEING USED AS INDICATED IN ABOVE DIAGRAMS, HOSPITAL FOR INSANE, WHITBY, ONT. JAMES GOVAN, ARCHITECT.

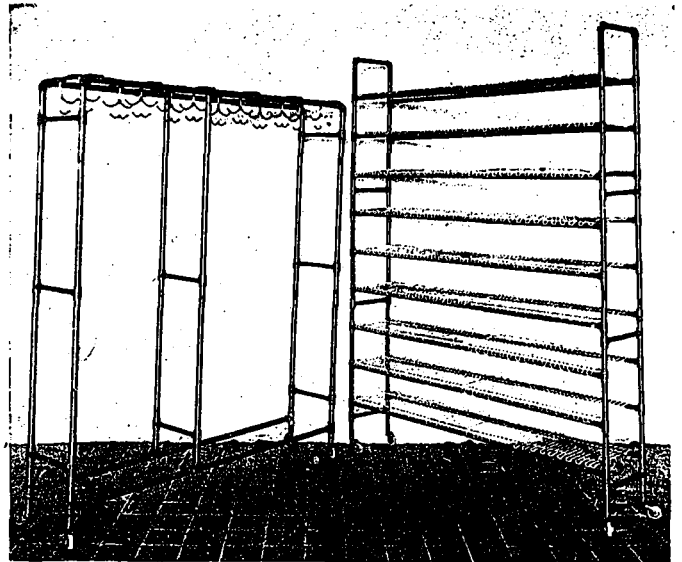
densate to back up and decrease the available steam space, thus when only a slight rise of water temperature is desired, the heaters are nearly flooded. The condensate from the hot water heaters is discharged through traps and flows to an automatic pump and receiver from which it is discharged to the feed water heater. A large expansion tank equipped with an automatic cold water make-up is connected to an air compressor by means of which a constant pressure is maintained upon the system.

HOT WATER HEATING AND STEAM DISTRIBUTION  
PIPING IN CONDUIT.

Flow and return mains for the hot water heating system, live steam and return mains, are installed underground and insulated with Ric-Wil sectional tile conduit, the chief insulating material being moulded integral with the tile. The latter is supported upon a hollow tile base drain which rests upon a concrete base. This base drain tile was specially manufactured at the Government Clay Plant. The conduit system is designed throughout so that repairs can be made with a minimum of disturbance should they become necessary, the larger mains being in separate conduits. Provision for expansion has been made in the runs at approximately every one hundred and twenty feet, the expansion joints and anchor fittings of special design being bolted securely to concrete bases which are integral with the concrete bases under the main runs, thus insuring positive alignment. These joints are of the sliding sleeve type packed to suit the medium being carried. Large concrete pits with manholes have been located wherever expansion joints and anchor fittings occur so as to permit of ready access to the same.

Direct radiators of the Hospital type set three inches out from the walls are installed throughout the buildings. Each radiator has one valve located at the supply end, this being of the lock shield packless type. The majority of the radiators are connected on the shunt system, in a few buildings, however, the radiators are connected from separate flow and return mains. The general design of the system has been such as to simplify adjustment and operation, pipe sizes being arranged accordingly with such variations as tend to provide an equal resistance to all radiators. The major portion of the piping is accessible in spaces to which the patients have no access, being run in plumbing and piping shafts, basements and attics. The control valves are located at convenient points in the pipe shafts.

The heating of the Greenhouses will be done by means of a gravity hot water system, the main items of equipment being hot water heaters to which exhaust and live steam will be

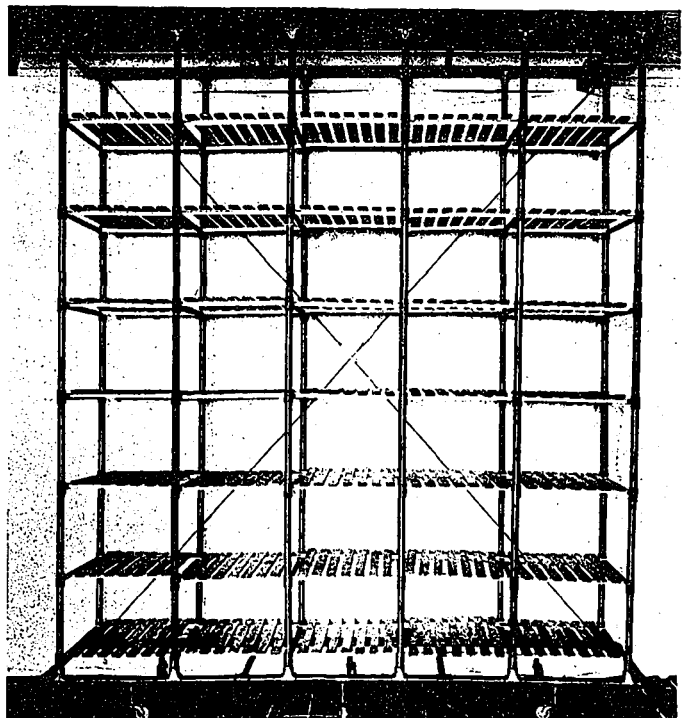


STAND AND RACK FOR PATIENTS' OUTDOOR CLOTHING AND BOOTS IN COAT ROOMS. ONTARIO REFORMATORY INDUSTRIES.

pipied, live steam being supplied from the Power House and reduced in pressure. Use will be made of exhaust steam when available.

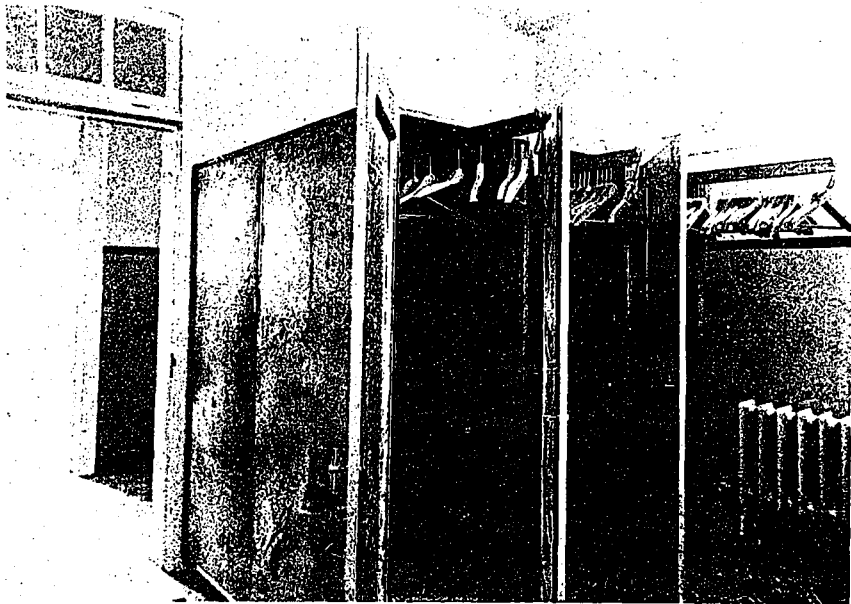
As the heat losses for the somewhat novel type of building construction adopted at Whitby were not known, a number of tests were conducted at the University of Toronto in order to determine the actual coefficients for such losses.

A full report giving all the data obtained would take up too much space in this article. It will therefore be published separately, covering fully the work done. The following is a summary of the results in so far as they affected



TYPICAL SANITARY MOVABLE RACK FOR LINEN AND CLOTHING. EACH DIVISION OF CEDAR SLATTED SHELVING IS A SEPARATE UNIT, AND THE WHOLE RACK STANDS CLEAR AND INDEPENDENT OF WALLS. ONTARIO REFORMATORY INDUSTRIES.





PATIENTS' CLOTHING CABINETS.

the construction adopted at Whitby:

1. A brick wall is a better insulator than a hollow wall of similar thickness.
2. A hollow clay tile wall is better than a hollow concrete block wall.
3. A hollow wall built with the webs of the blocks running horizontally is better than one built with the same blocks having the webs vertical.
4. The heat losses through hollow walls are

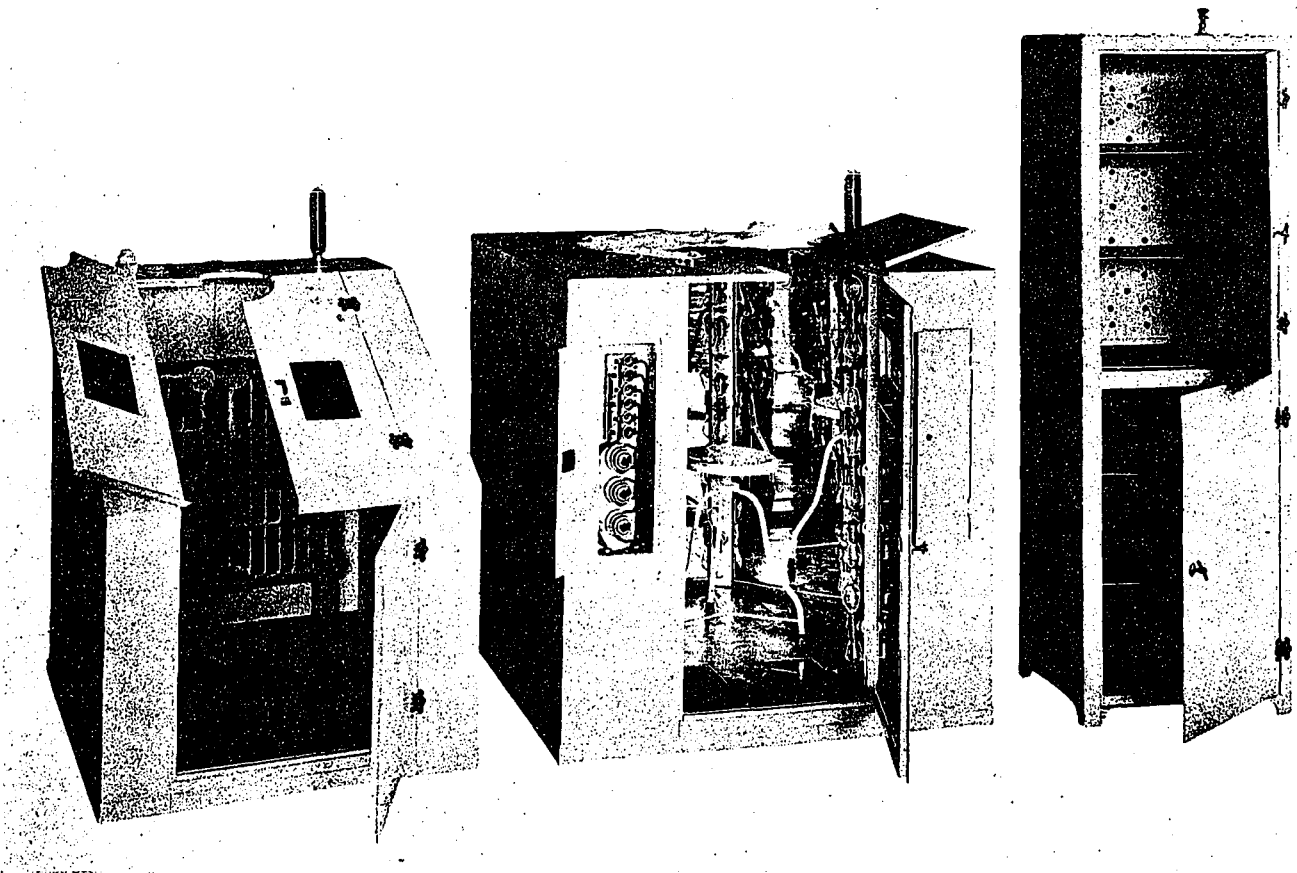
reduced very considerably when the spaces in the walls are filled with a material which, when placed in the wall, forms a number of very small air spaces separated from each other. For instance, it was found that ordinary pit gravel had practically the same value as an insulating material as mill shavings.

5. Tarred or asphalted felt, tarred or asphalted papers and heavy waterproof papers are all of great value in reducing heat losses through walls.

6. Equally good results were obtained by coating the walls with a good coat of a damp-proofing material which completely filled the pores and prevented air leakage through the wall.

7. Ordinary plaster, even three coat work, has little practical value as insulating material on a wall.

As the Ontario Government is able to produce hollow tile blocks very economically at its own clay plant, and as their use has many advantages which offset their disadvantages as a heat insulator, hollow walls have been used in the greater part of the construction at Whitby. Steps have been taken, however, to reduce the



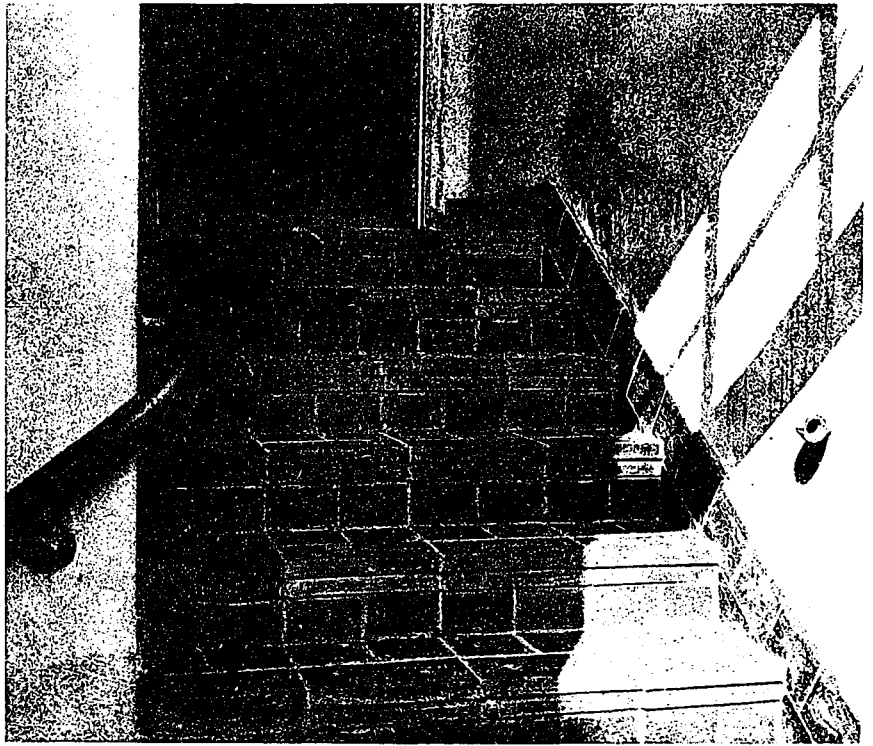
HOT AIR CABINET, ELECTRIC LIGHT CABINET AND BLANKET WARMER (NEW CANADIAN PRODUCTS), HOSPITAL FOR INSANE, WHITBY, ONT.  
JAMES GOVAN, ARCHITECT.

heat losses to a point lower than is obtained in general building practice. Paper, damp-proofing materials, cork, mill shavings, etc., have all been used, either separately or in combinations, to get the results desired in different parts of the buildings.

It is interesting to note that incidental to these tests, the usual constants for heat losses of standard brick and concrete construction were verified as practically correct.

The mechanical ventilation in the cottages is furnished by separate supply and exhaust systems. All fans are located in the basement so as to avoid noise, conserve space, and permit of easy attendance. Further, in each cottage all mechanical equipment has been confined to one room in the basement. This precaution, of course, tends to avoid any danger resulting from interference by the patients. The mechanical ventilation as provided will be used to supplement the direct heating system during spells of very cold weather. At such seasons it has been found in other Ontario public institutions that natural ventilation cannot be depended upon to provide a sufficient amount of fresh air. By making the comfort of patients and nurses dependent to some extent on the operation of the mechanical ventilation system, it is expected that the tendency to have no ventilation at all during severe weather, which is found in many hospitals of this kind, will be absent at Whitby.

The supply system consists of the usual fan, vento stacks and ducts, the latter being arranged so that by means of a damper, air can be supplied to the ground floor during the day and to the upper floor at night, in accordance with the requirements in each cottage building. The living rooms are located upon the ground floors, while the upper floors are used for sleeping rooms. By a similar arrangement air can be exhausted as desired. This method of design and operation permits of an economical fan installation due to the smaller size of fan required. Air is supplied in all buildings to the corridors and exhausted from the individual rooms, transoms being located over the doors to each of the lat-



TYPICAL STAIRCASE, SHOWING USE OF SPECIAL STEP NOSING, STRINGER AND OTHER TILES MADE AT GOVERNMENT CLAY PLANT.

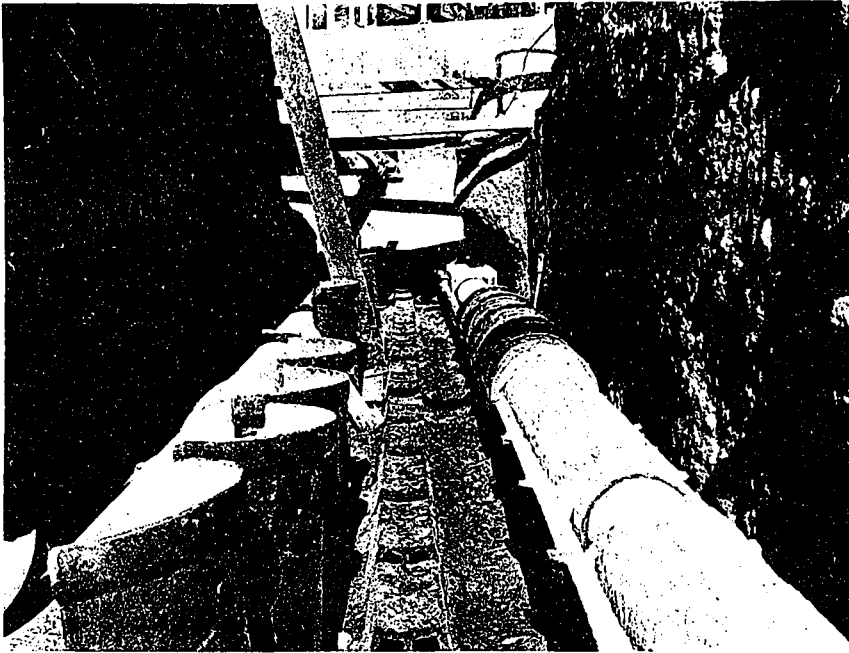
ter. The exhaust ducts are carried up to the attic for sanitary reasons. From this point they are collected and lead to one main duct, which is extended down to the exhaust fan. All closets and utility rooms are arranged for the exhaust of air by gravity, the flow of which is increased when the mechanical supply system is put in operation, although there is no direct connection between the system of ducts.

The vento stacks are arranged four rows in



HOSPITAL FURNITURE, BLANKETS, MATTRESSES, TWEEDS AND OTHER FABRICS, BROOMS, ETC., MANUFACTURED AT ONTARIO REFORMATORY, GUELPH. BRICK, HOLLOWWALL AND SILL BLOCKS, ROOFING, FLOOR AND DRAIN TILES, FLOWER BOXES, ETC., ETC., MADE AT GOVERNMENT CLAY PLANT, MIMICO.





HOT WATER AND STEAM MAINS INSULATED WITH CONDUITS.

depth, the last three being supplied from the hot water circulation system, while the outer stack is supplied by steam to avoid freezing. The fresh air for ventilation is automatically controlled by a regitherm connected to a by-pass damper.

Dining room ventilation is arranged so that air is supplied to the dining rooms and exhausted from the kitchen. The exhaust system is equipped with a by-pass damper so that with the mechanical system stopped, ventilation will still be insured through the gravity discharge of air to the outside atmosphere. Direct radiation is figured for wall and window losses only. The intention is to introduce warm air shortly before meal times and rapidly heat the dining

rooms to the desired temperature.

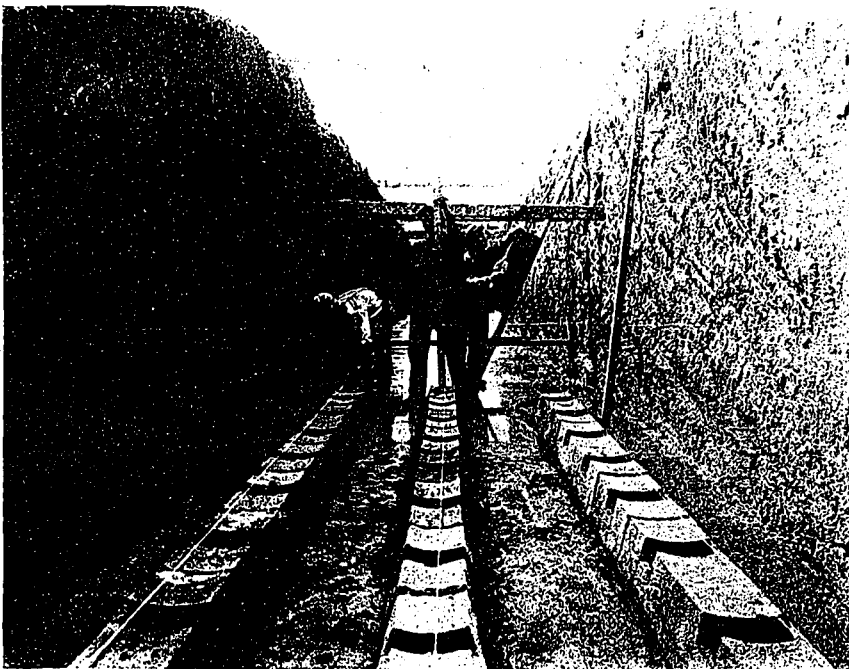
While electric ranges have not been adopted for the first installation in the main kitchen, it is possible that they may be installed at some future time. For this reason provision has been made for an indirect supply of warm air to the kitchen in order to prevent the piping from freezing during the hours when all of the equipment will not be in use. This has rendered unnecessary the use of direct radiators located round the kitchen. In such rooms they are the least desired, for sanitary reasons.

In connection with the kitchen, individual vents have been provided in order to remove the steam vapors from the cooking apparatus, thus avoiding the use of the usual unsightly and insanitary hood. These vents are extended down to the floor and connected underneath to a main vent duct, one end of which exhausts to the atmosphere by gravity. The large amount of cooling surface of the main duct condenses most of the vapors, the condensation being drained to the main grease pit, where waste grease is recovered.

The supply of domestic hot water is provided for by the use of individual steam tube heaters in the basement of each building, steam being supplied from the high pressure main in an underground conduit and reduced in pressure at the buildings. The larger buildings near the power plant, and the laundry, will be supplied by hot water pumped direct from a large heater located in the power house. This location permits the use in the heater of a portion of the available exhaust steam from the power house auxiliaries.

High and low pressure steam is also used for the heating of domestic water, cooking, drying in a number of the buildings, sterilizing in the medical buildings and a portion of the ventilation in each building.

A careful investigation, together with extensive experimental work in other institutions under the direction of the Provincial Secretary's Department has established the fact that low pressure steam of not more than five pounds pressure is both efficient and desirable for the cooking of food. Low pressure steam has proved to be sufficiently high in temperature to accom-

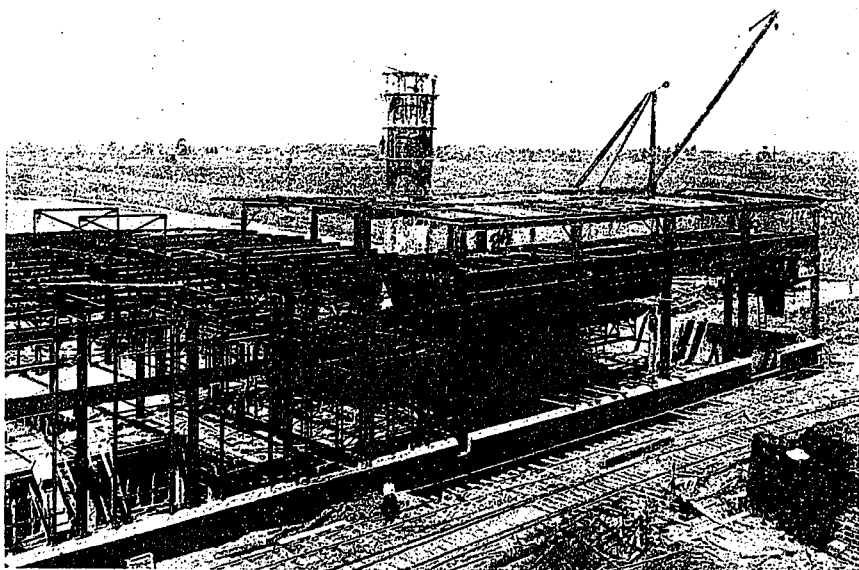


BASE DRAIN TILE READY TO RECEIVE STEAM AND HOT WATER MAINS ON TOP. TILE MADE AT GOVERNMENT CLAY PLANT.

plish the desired results quickly and satisfactorily. For many other reasons it has also been demonstrated at Whitby to be more satisfactory than steam at higher pressure. In an institution such as this, where it is desired to measure the condensed steam as a basis of accounting charge for the steam used by the different departments for cooking, the tilting type of steam trap may be made to serve an additional purpose. Each operation of this trap represents a certain number of pounds of condensate, so that by attaching a suitable counter giving the number of times the trap has operated, a record of the steam consumption is secured from which accurate costs may be figured. By connecting the drips from all kitchen apparatus to a main tilting trap equipped with a counter, all condensation is measured, this being the method followed in this instance.

The condensation return system consists of return traps in the cottages, infirmaries and dining-room buildings, together with the necessary receivers, pumps, and pipe lines. The traps in each of the two cottage centres are grouped, and the condensation from each group is collected into a return tank, one tank being placed in each dining-room building. The water of condensation runs from each tank by gravity to the suction of a motor-driven centrifugal pump, the starting and stopping of the pump being controlled by a switch operated by a float in the tank. The float rigging can be adjusted to permit the pump to return small or large quantities of water as desired, and the rate of discharge of the pump can be controlled by a valve. The two pumps discharge into one main return pipe, which empties into the feed water heater in the power house.

This scheme was adopted in order as far as possible that all traps of the same group would have to work against the same back pressure. For this purpose the traps were grouped in their natural order as determined by the structural conditions, and pumps were provided to discharge positively through the long return lines. The pumps, being motor-driven, are entirely independent of variations in steam pressure for reliability in operation. The traps, being vented, are under atmospheric pressure only,



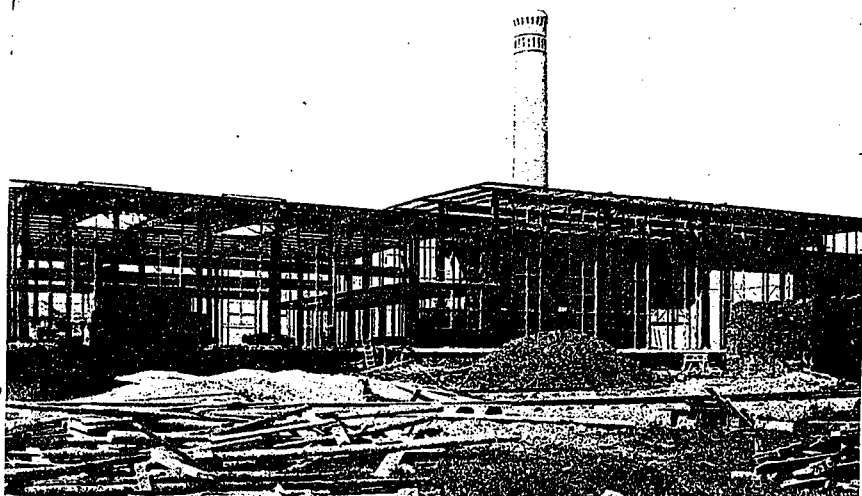
POWER HOUSE UNDER CONSTRUCTION, SHOWING HALF OF OVERHEAD BUNKERS IN BOILER ROOM.

and each trap of a group has the same freedom of discharge, all traps being roughly the same distance from the return tank of their group.

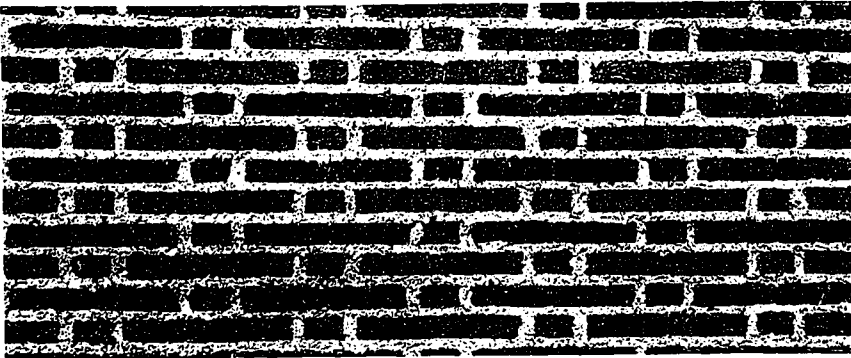
The fire protection system, supplied direct from the mains of the town of Whitby, with a connection also to the fire pumps of the institution, is extensive and complete in detail. The hydrant system is of good design, well gated with liberal-sized mains, and covers the entire property as a loop.

All buildings are equipped with standpipes, with fire reels and hose on each floor. Portable hand chemical fire extinguishers are well distributed at advantageous positions throughout the buildings. The fire brigade will be organized from the staff of the institution.

The question of refrigeration and cold storage facilities has been carefully studied, and the cheap and plentiful supply of good ice derived from the water adjacent to the property, together with inexpensive facilities for har-



POWER HOUSE IN COURSE OF CONSTRUCTION. UPPER WALLS ARE OF STRUCTURAL STEEL COVERED WITH FERRO-DOVETAIL AND STUCCOED BY USE OF CEMENT GUN OUTSIDE AND INSIDE.



DETAIL OF TAPESTRY BRICKWORK IN BASE OF COLD STORAGE PLANT AND POWER HOUSE. NOTE USE OF ONE AND ONE-QUARTER ROUGH PEBBLED JOINTS AND DOUBLE STRETCHER AND SINGLE HEADER FORMING DUTCH BOND.

vesting, indicated that a refrigerating system calling for the use of natural ice should be adopted. The original decision to make use of natural ice has already been amply justified, since ice has been harvested and stored at the cold storage plant at a cost which makes the operation of this system much lower than that of any mechanical plant.

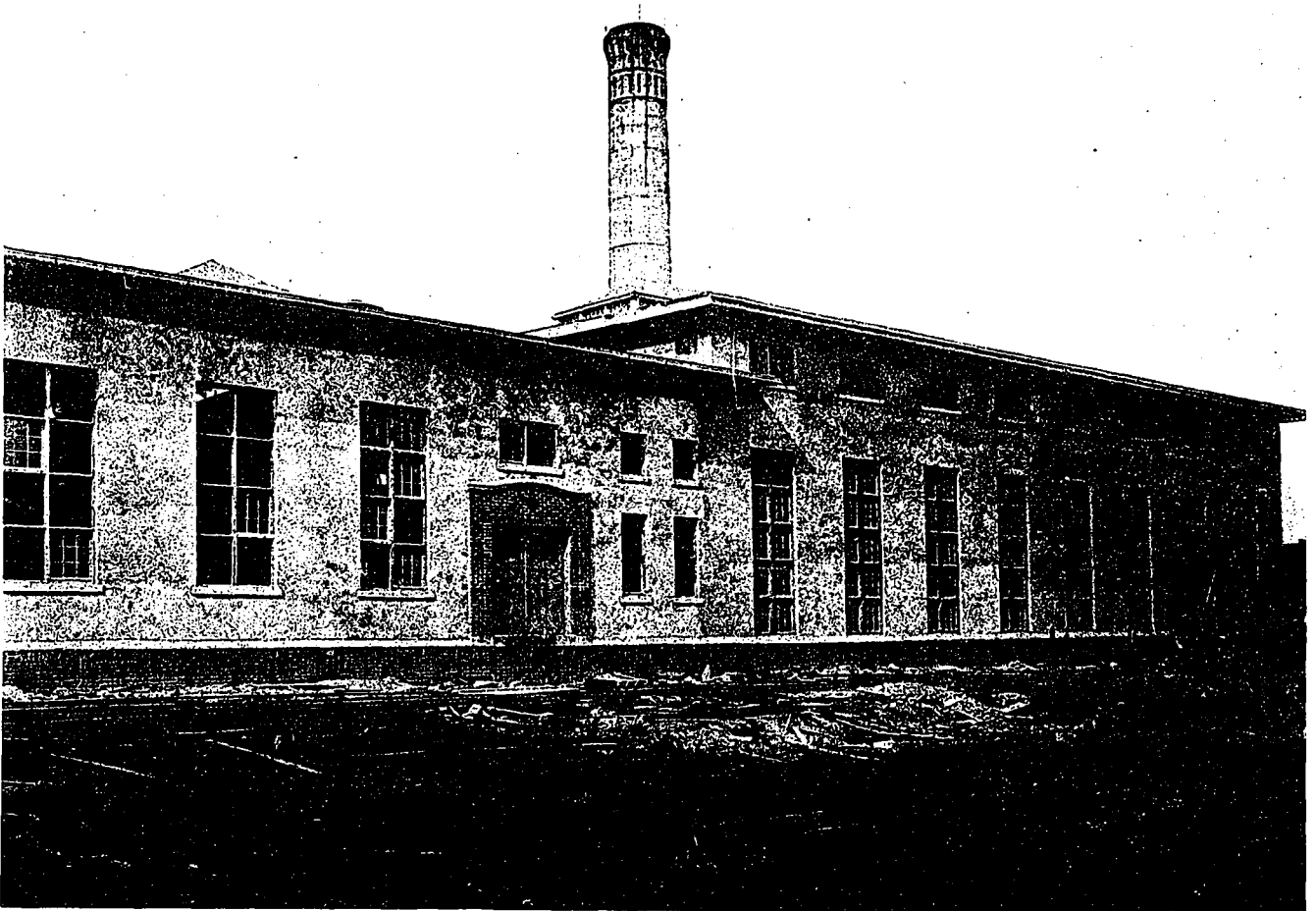
The ice is stored in a building which has its floor, walls and ceiling thoroughly insulated, thus doing away with the use of any loose covering material, such as sawdust, shavings, etc., to prevent ice melting.

The system of refrigeration adopted was the brine system, and this is already in-

stalled in eight cold storage rooms of the dining-room buildings. It will also be applied in the main cold storage rooms attached to the general store rooms.

Crushed ice and salt are used in overhead tanks to cool the brine passing by gravity through the coils in the tanks and the cold storage rooms. The circulation of brine is maintained by the difference in temperature between the cold brine in the cooling tank coils and the

slightly warmer brine coming from the coils in the cold storage rooms. By this method low temperatures can be maintained simply by the use of ice and salt mixed in the required proportions, provided that the equipment has the proper amount of cooling surface. The simplicity of this system permits of its operation by unskilled labor. Surplus moisture in the cold storage rooms is taken up by calcium chloride, as used in the process in the troughs over the cooling coils. The calcium chloride dissolving as it absorbs the moisture, drips over the coils and removes the frost from the surface of the pipes, thereby maintaining the system at its maximum efficiency, as well as providing a



POWER HOUSE FROM RAILWAY SIDING, HOSPITAL FOR THE INSANE, WHITBY, ONT.

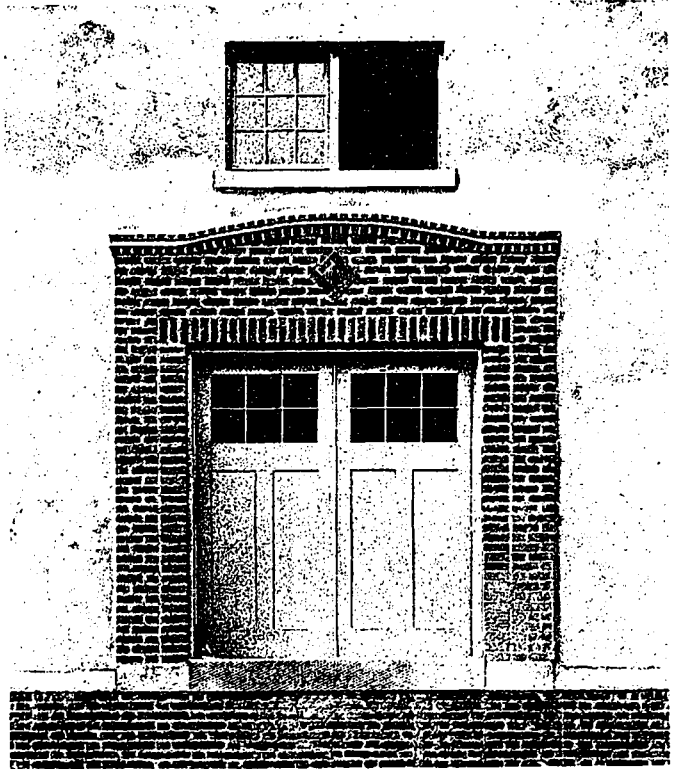
JAMES GOVAN, ARCHITECT.

pure and dry atmosphere within the room.

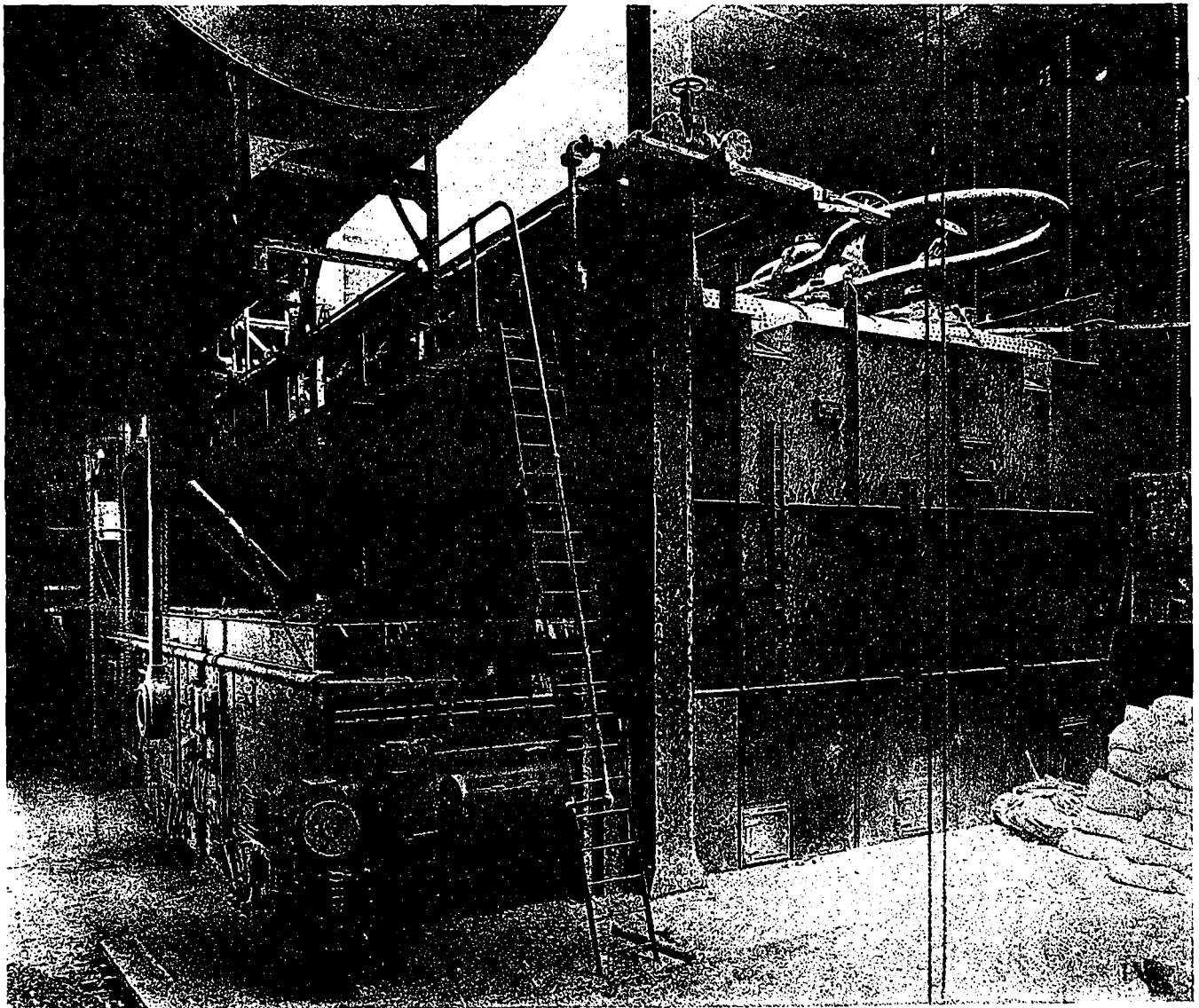
The general scheme of electric distribution is as follows:

Three phase two thousand two hundred volt current is distributed by underground cables installed in duplicate from the main switch-board in the generator room to the various transformer stations throughout the institution. The transformer stations, which are located at the different centres, contain the necessary equipment to transform the current from two thousand two hundred volts to two hundred and twenty volts, together with a low tension distributing board, each station being laid out so that equipment may be installed in duplicate.

The cables from the low tension side of the transformers run to this board, and are connected to bus bars through the switching apparatus. This board has mounted on it the switches controlling the low tension distribution feeders which are run underground to the different buildings comprising the centre. The current thus supplied is three-phase at a pressure of two hundred and twenty volts, this be-

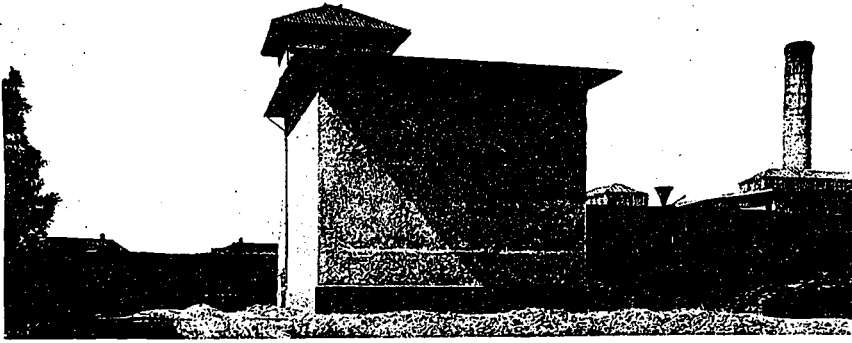


GOODS ENTRANCE TO POWER HOUSE.



BOILER ROOM, SHOWING HALF OF THE BOILER, STOKER AND COAL STORAGE EQUIPMENT, HOSPITAL FOR INSANE, WHITBY, ONT.  
MACMULLEN, RILEY AND DURLEY, CONSULTING ENGINEERS.

JAMES GOVAN, ARCHITECT.

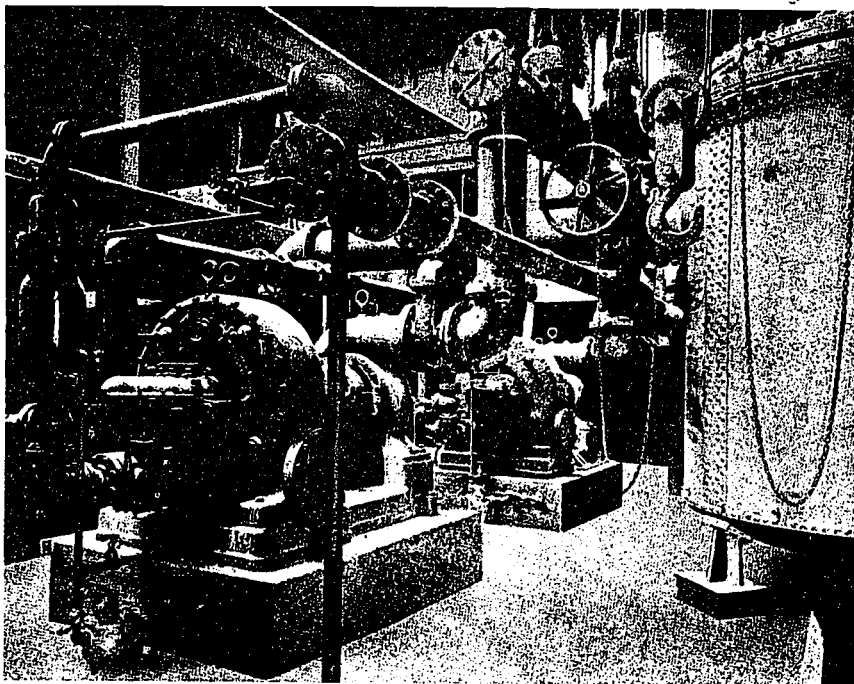


PORTION OF COLD STORAGE PLANT, WITH PART OF POWER HOUSE IN BACKGROUND.

ing used to operate the electric motors for fans, etc.

One phase of the three-phase system is continued to the main lighting switch, thence to an auto-transformer for lighting, which is installed so that a three-wire system may be used for lighting in the different buildings. This allows the use of standard one hundred and ten volt lamps, while the distribution feeders are designed for two hundred and twenty volts, a much more economical voltage to distribute than one hundred and ten volts. Lighting in the cottages is controlled from one panel box located on the ground floor, in which are located the switches controlling the various circuits. In the diet kitchens, electric ovens and other cooking appliances have been installed, and are fed directly from the lighting panel, one circuit being allotted to each appliance.

Direct illumination is used in the cottage and dining-room buildings, the fixtures being designed and manufactured with the special object of making them as sanitary as possible. Some of these fixtures can be seen in the il-



STEAM TURBINES, PUMPS AND HEATERS FOR HEATING BY HOT WATER CIRCULATION.

ustrations of the various wards, day rooms, etc. Their construction and position on the ceiling make it almost impossible for patients to tamper with them, while the glassware diffuses the light very satisfactorily, and kills the glare without reducing the efficiency of the unit to any considerable extent. Night light circuits and specially arranged fixtures have been provided, so that the general lighting can be cut off, while the nurses are enabled to

exercise proper supervision without disturbing the slumbers of the patients.

The lighting in the kitchens is worthy of special note, the rooms being forty-four feet long, twenty-five feet wide, and approximately twenty-one feet high. The objects sought in working out this lighting were: First, to eliminate all drop cords, chains or rods above the cooking kettles, which would collect grease; second, to provide an even diffusion of light without shadows, all over the floor area; third, to evolve a fixture which would be absolutely sanitary. The results obtained have fully come up to expectations. There are eight ceiling outlets, each provided with a one hundred and fifty watt lamp, which, together with an X-ray reflector, are inserted into the space above the ceiling. The only parts of the fixture which extend below are the shallow frosted bowl, used to diffuse the light, and the metal band which takes the bowl and fastens to the ceiling. These fixtures are steam and air tight, and the cleaning of them is a very simple operation. Their position in the room is such that the required intensity of light is at a plane about the level of the serving tables.

In the hospital buildings a new system of ward lighting by indirect means has been worked out, which is already attracting the attention of hospital authorities elsewhere. The fixtures, which are of compo-plaster work, are colored the same as the walls on which they are located, and are placed at such a height that none of the rays from the lamp can strike the eye directly. An X-ray reflector is used to direct the rays up to the ceiling, which in turn acts as a reflecting surface, the result being a well diffused, soft, even illumination, which will be of distinct therapeutic value in the treatment of patients accommodated in these buildings. The top of the fixture is made dustproof and sanitary by a protecting

glass plate. This arrangement of fixtures gives an illumination quite as satisfactory as concealed cove lighting, and at the same time eliminates all the dust collecting, insanitary features of the latter system, which make its adoption for hospital wards impossible.

Two separate circuits in a ward each feed half of the fixtures, and, furthermore, the wiring is so arranged that some of the lamps can be operated on half voltage. With these provisions different intensities of illumination can be obtained merely by the operation of a few switches, and the half voltage arrangement provides a very satisfactory dim night light. In addition, switches control individual fixtures, so that in case of emergency a nurse can obtain light in any part of the ward without being encumbered with a portable lamp.

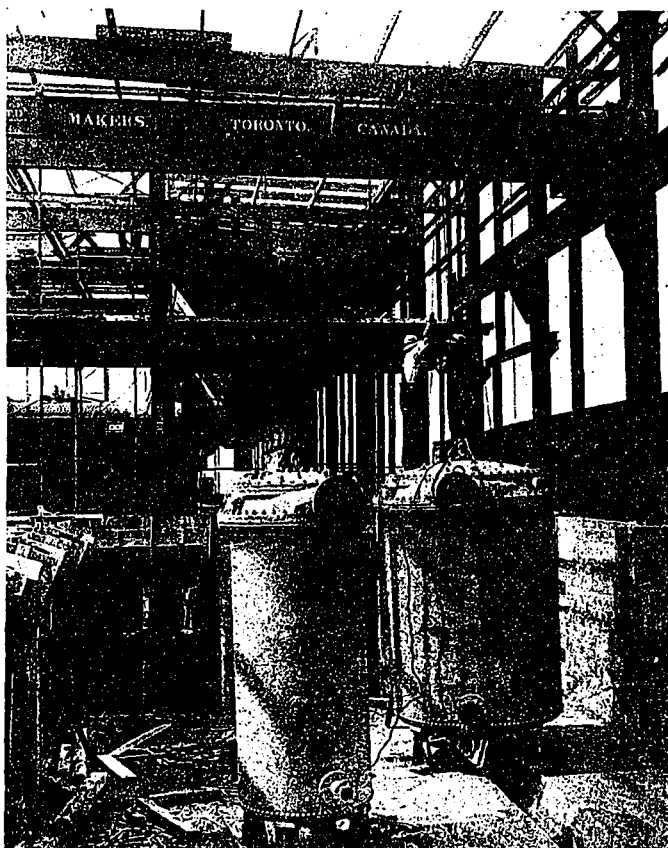
Not only is the absence of all overhead wiring very noticeable at the institution, but this effect is enhanced by the elimination of road lighting standards. This has been accomplished by lighting all roads and grounds with specially designed fixtures placed on the walls of the buildings, these fixtures being of a very simple type of sheet copper lantern, having a highly efficient reflector behind the lamp, which is type C, nitrogen gas filled, one hundred watt. The necessary air circulation is obtained through a gauze screen in the bottom of the lamp and openings in the soffit of the overhanging cover on top, the direct glare being softened a little by the use of slightly obscured glass.

The telephone system is of the common battery manually operated type, and will have no connection with the Bell telephone system, the latter being only installed for communication outside of the institution. A private exchange will be located in the administration building. Wires are run underground in lead-covered cables, suitable potheads are located in all buildings where cables enter, and terminal strips are installed so that any necessary changes can be made to the system very readily, or any trouble located. It will be unnecessary to have an operator on duty at night, as the following scheme will allow the night attendant in the power house to handle all night calls. This night service is not a general service, but will allow a sufficient number of telephones to be connected. All that is necessary to change over from the day service to the night service is for the operator to turn over a switch at the switchboard, thereby transferring all calls to the 'phone located in the power house, the latter being supplied with a number of buttons, one button for each line that can be called on the night service. All that the attendant at the power house has to do is to find out who is wanted and to press the button corresponding to the number called. He then puts up the re-

ceiver, connection having been made between the two parties.

In connection with the telephone system there is a general call, by means of which, on a code previously arranged, any official wanted can be signalled at every point where a telephone is located, by the use of a special buzzer.

It has been decided to install a combination watchman and fire alarm system. The wires for this system are carried in the telephone cable, and therefore will enter every building in the institution. The watchman's calls come over the same wires and are signalled with the same mechanism as the fire alarms. This is an



INTERIOR OF POWER HOUSE UNDER CONSTRUCTION, SHOWING TWO OF THE HOT WATER GENERATORS, THE END OF OVERHEAD COAL-BUNKERS, CRANE FOR HANDLING EQUIPMENT IN ENGINE ROOM, AND END OF FIRST BATTERY OF BOILERS.

advantage, as it ensures that the system is always tested and in proper shape for operation. The signals are given in code, each box having a certain number. The watchman signals by inserting a key in the box and turning it. This signalling is registered on a tape, the time of the signal being also registered by means of a time stamp. For a watchman's signal the code number of the box is registered on the tape once. However, when a fire alarm signal comes in, the code number of the box is registered several times, and certain gongs are operated, which are not at all affected by the watchman's signal. The necessary current to operate this system will be supplied by means of a duplicate storage battery equipment, which will in turn be



charged by means of a motor generator set, all located in the power house.

In addition to the general fire alarm system mentioned above, there is a local automatic fire alarm system in each cottage to notify the attendants should any fire occur in the roof space. This is thermostatically operated, and will ring the bells located on the first and ground floors. There is no connection whatever between the two systems, the local one being operated by means of dry batteries in the basements of the cottages. Other dry batteries similarly located operate the bells, buzzers, annunciators, etc., in the buildings, which serve as signals for attendants, etc.

#### ORGANIZATION.

The whole of the organization for the designing, construction and administration of this institution is under the personal supervision of Mr. S. A. Armstrong, Assistant Provincial Secretary, with whom the following have been associated on the work:

Dr. J. M. Forster, Superintendent; Dr. Harvey Clare, Assistant Superintendent Hospital for Insane, Toronto, as medical advisers, to-

gether with the members of the medical staffs of the various public institutions.

Mr. James Govan, architect.

Mr. A. C. B. Nicol, assistant architect.

Mr. James S. Hogg, clerk of works.

Mr. T. L. Rowe, superintendent of construction.

Mr. F. W. French, business manager.

Messrs. MacMullen, Riley and Durley, Toronto and Montreal, consulting engineers (Mr. M. A. Boyd, former, and Mr. T. W. Reynolds, present, manager of the Toronto office), who prepared plans, etc., for heat, light and power work, and supervised its installation.

Mr. George Black, Provincial Director of Heat, Light and Power, as consultant for the department.

Mr. S. E. Todd, Provincial Farm Director, in charge of landscape garden and roads layout, with Messrs. Harries and Hall, landscape architects and engineers, consulting.

Mr. L. E. Granger, Director of Domestic Economy in the public institutions of Ontario, as consultant.

Mr. C. R. Young, consulting engineer on structural steel and reinforced concrete.



ALCIDE CHAUSSE, MONTREAL, HON. SECRETARY, ROYAL ARCHITECTURAL INSTITUTE OF CANADA.



J. W. H. WATTS, OTTAWA, HON. TREASURER, ROYAL ARCHITECTURAL INSTITUTE OF CANADA.

# Royal Architectural Institute of Canada

**A**FTER the war broke out the conditions in the architectural field were such that it was decided to postpone the annual meeting of the Royal Institute from the 21st and 22nd of September, 1914, until some later date. The postponed meeting was held in Quebec on the 8th and 9th of September, at which time the postponed seventh annual assembly was held, with which was incorporated the eighth and ninth general meeting.

The Royal Architectural Institute of Canada was founded on the 19th of August, 1907, and in-

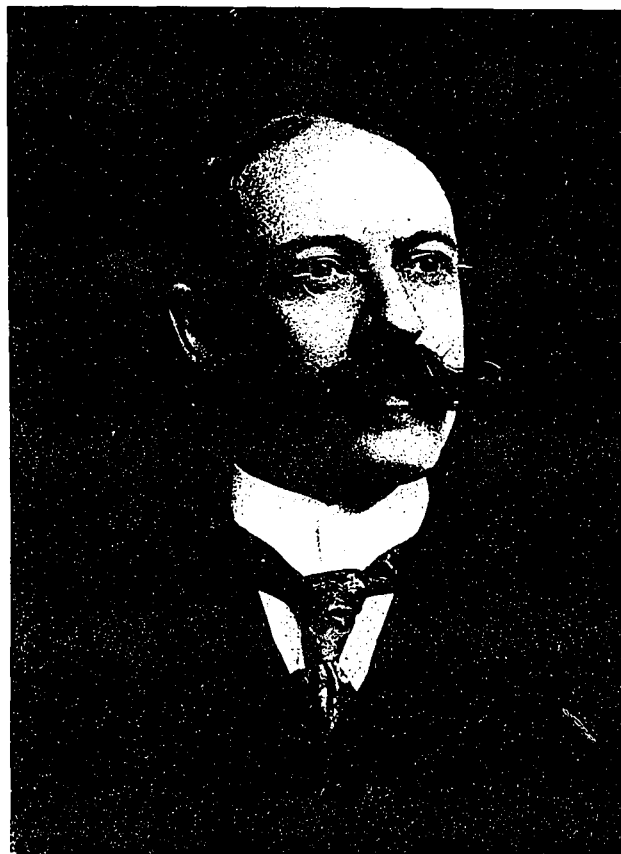
born at St. Fidele, County of Charlevoix, P.Q., on the 22nd of October, 1871. His father is Cyrias Ouellet, contractor, of Kamouraska, P.Q.

After a brilliant course of classical studies, at Levis College, he graduated in Arts at Laval, in Quebec, and entered the office of Messrs. Tanguay & Vallee, architects, of Quebec, for the study of his profession.

In 1893, he passed the final examinations and practiced for two years in the office of his former patrons, after which he opened an office for himself in 1895.



JOS. P. OUELLET, QUEBEC, PRESIDENT ROYAL ARCHITECTURAL INSTITUTE OF CANADA



A. FRANK WICKSON, TORONTO, VICE-PRESIDENT, ROYAL ARCHITECTURAL INSTITUTE OF CANADA.

corporated by an Act of Parliament in June, 1908, and April, 1912. It includes the Alberta Association of Architects, the Manitoba Association of Architects, the Ontario Association of Architects, the Province of Quebec Association of Architects, and the Saskatchewan Association of Architects, and is allied with the Royal Institute of British Architects.

It is to be hoped that before the next Assembly, which will in all probability be held at Hamilton, the two architectural associations in British Columbia will have joined hands, thus ensuring affiliation with the Royal Institute.

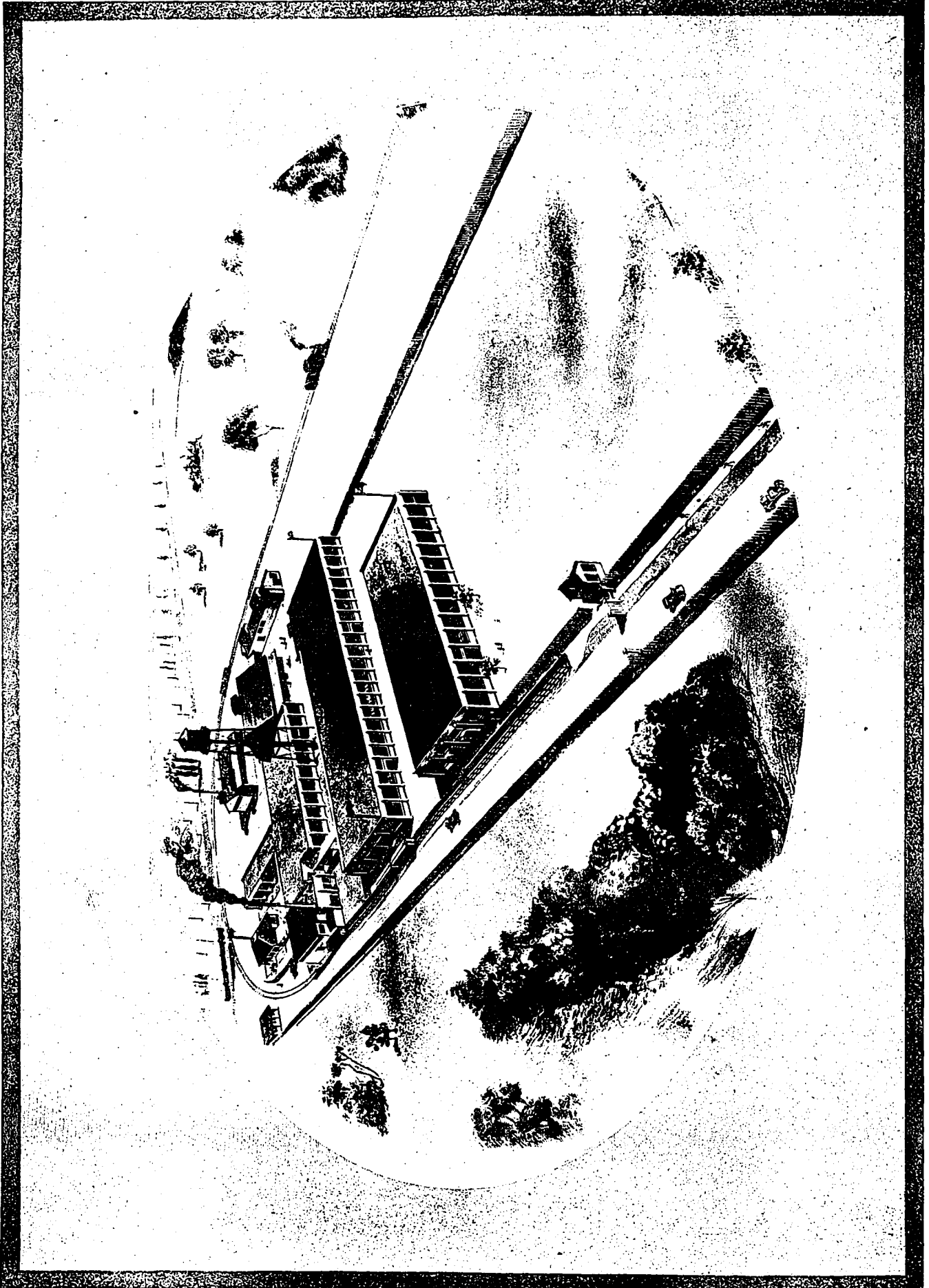
Mr. Jos. P. Ouellet, the new President of the Royal Architectural Institute of Canada, was

Mr. Ouellet makes a specialty of church architecture, in which he excels, and, although relatively young, he has a good many important churches to his credit, which tell highly in favor of his artistic taste, and are only the prelude of still greater successes.

He was elected President of the P. Q. Association of Architects when he was only 30 years of age, and now is, at the presidency of the R.A. I.C., scarcely forty-five years old.

Mr. Ouellet has since twenty-eight years of age devoted a good part of his leisure to military matters, and holds a prominent position in the Canadian militia as Brigade Major of the City of Quebec Infantry Brigade.





GENERAL VIEW OF PLANT, CANADIAN CARTRIDGE CO., LTD., HAMILTON, ONTARIO.

# A Canadian Designed Arsenal

*Construction of Buildings. Method of Manufacturing Brass Cartridge Cases.*

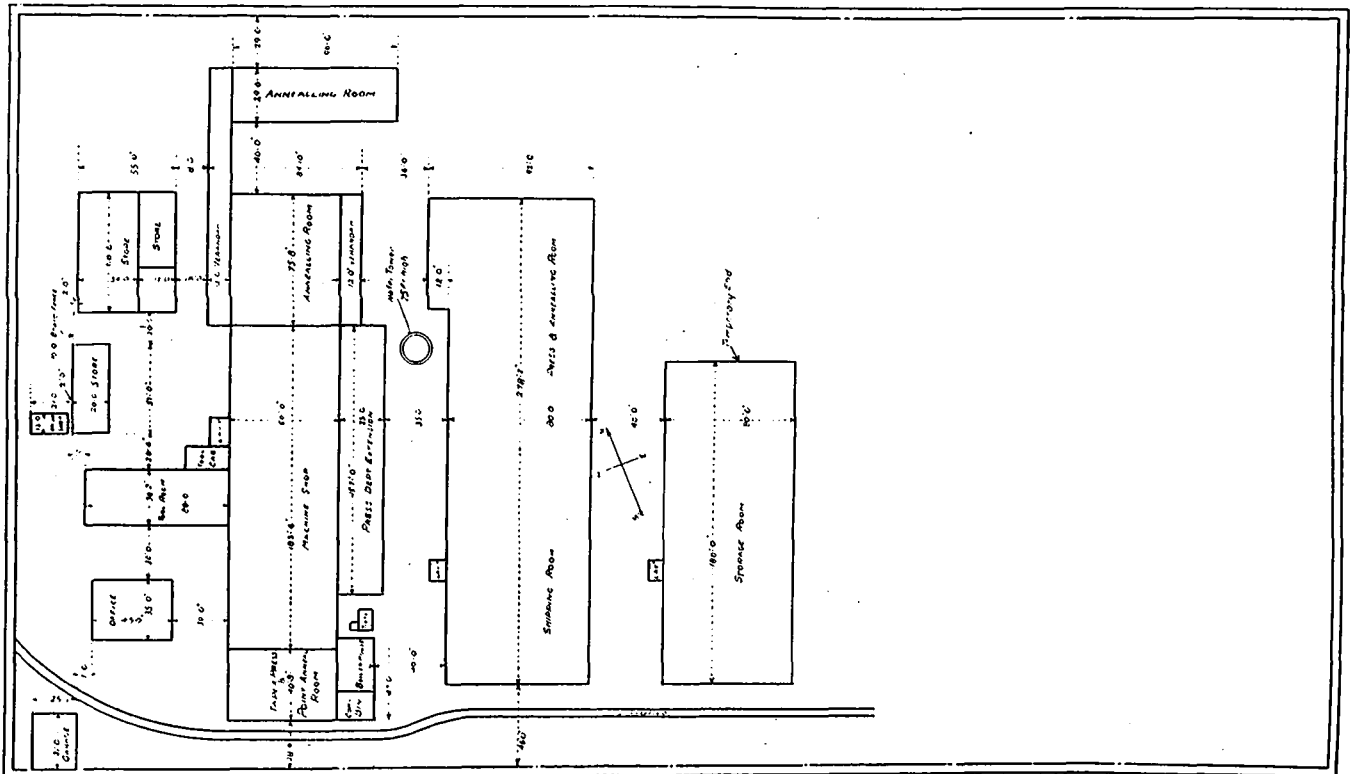
**A**N instance of Canadian enterprise where precedents had to be created, and the design, erection and installation achieved through sheer determination, coupled with considerable creative genius, is exemplified in the buildings and plant of the Canadian Cartridge Co., at Hamilton. The first of its kind in this country, it offers an interesting illustration of factory construction and equipment.

The general arrangement and appearance of the buildings are shown in the prospective view, and more definitely in the plan. The buildings are located on a block of six and one-half acres owned by the company, and situated in the industrial district of Hamilton. This area was secured to allow for the erection of additional buildings. The wisdom of this has been proven from the fact that the plant has already been extended.

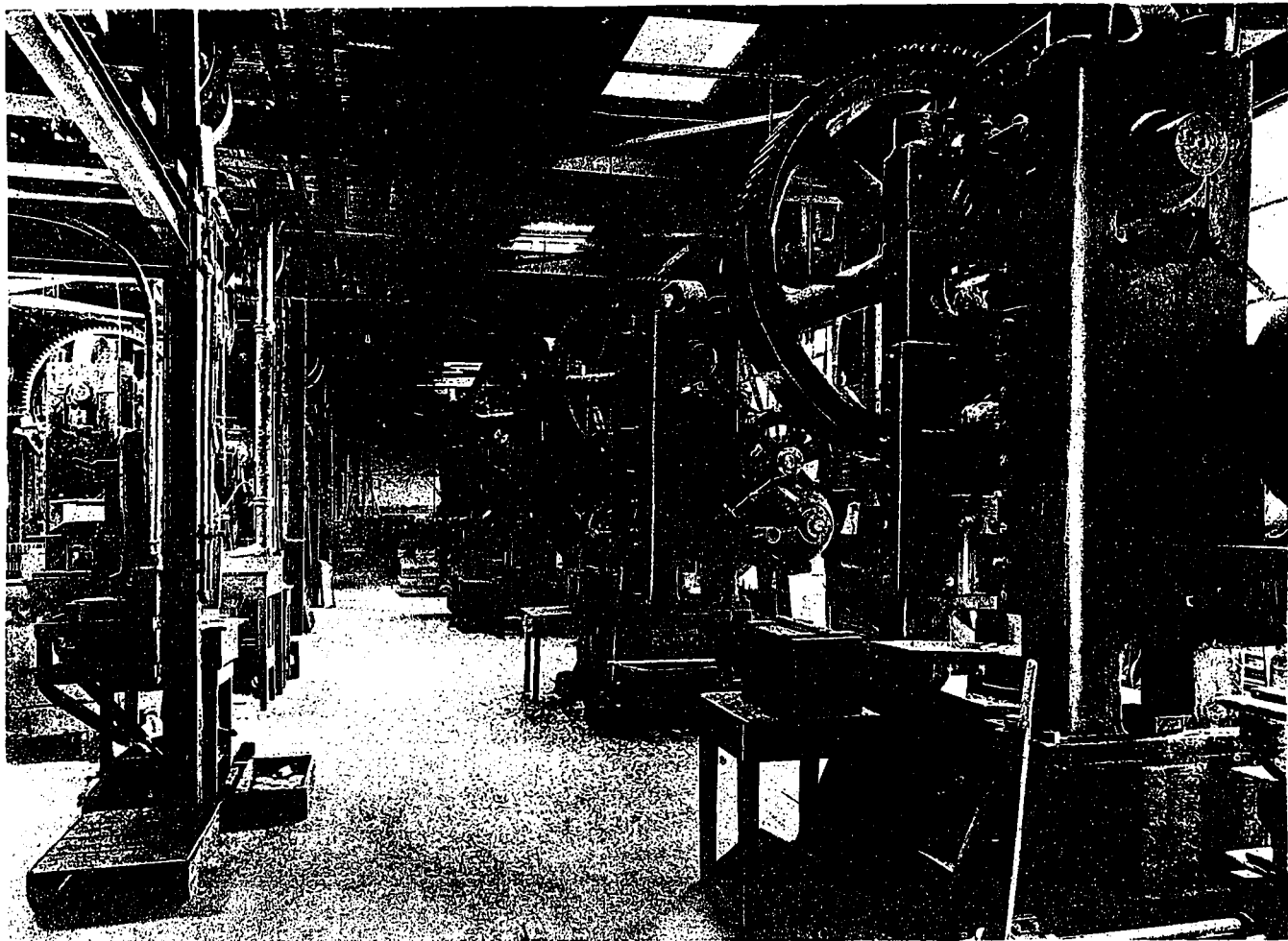
The main buildings are constructed in accordance with the most modern factory practice; the walls are of pressed brick, built on concrete foundations, and the roofs, which are carried on heavy steel columns and girders; are made of two by five timbers, laid on edge, close to-

gether, as recommended and approved by the Fire Insurance Underwriters. The roofs are covered with heavy tarred paper, tar and gravel. In consideration of future extension, the buildings are designed to carry additional storeys. Iron covered fire doors are provided between departments. Large windows with steel sash fitted with tilting or ventilating section, provide the maximum amount of light and ventilation, a recognized necessity in modern industry. Floors are of concrete, six inches thick, covered with tarred floor paper, overlaid with one and one-half inch maple flooring.

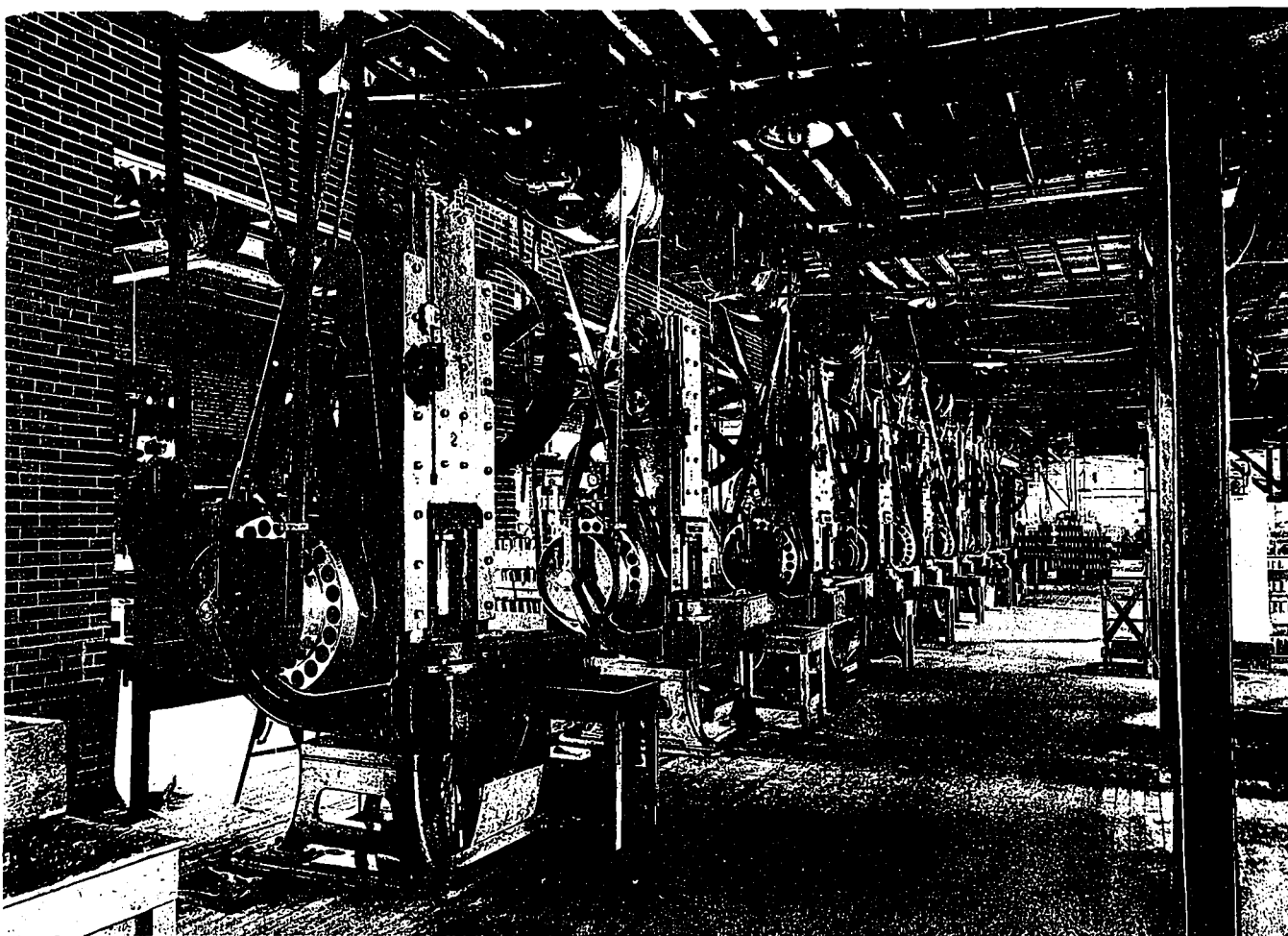
The plant is served with two railway sidings, one at each end of the buildings, the floor of the latter being on the same level as the floor of the freight cars, facilitating expeditious loading and unloading of merchandise. Mechanical conveyors carry the packed cartridge cases from the shipping room across the platforms into the freight cars. Heating is provided by steam radiators, supplied from the company's boiler plant, which also supplies hot water required for the various processes. Lavatories, wash basins, sanitary drinking fountains, and



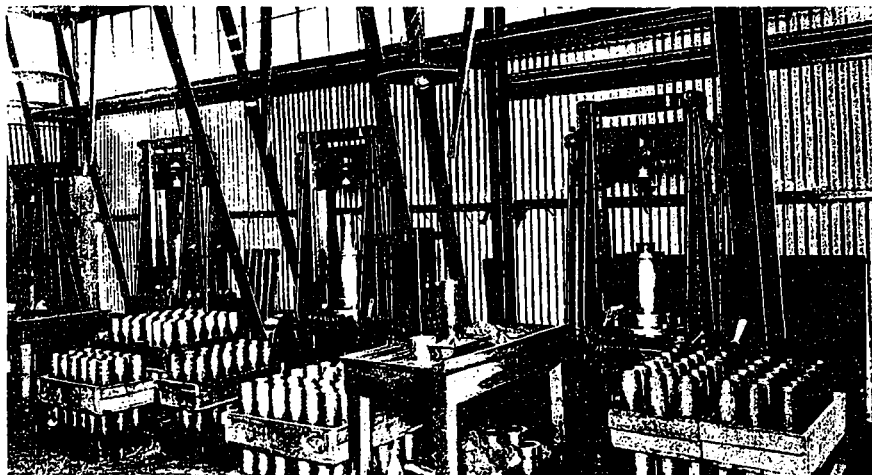
PLAN OF BUILDINGS AND GROUNDS, CANADIAN CARTRIDGE CO., LTD., HAMILTON, ONTARIO.



HEAVY DRAW PRESSES—EARLIER DRAW OPERATIONS.



RACK AND PINION PRESSES—FINAL DRAWS.



TAPERING PRESSES.

racks for the workmen's clothing, are all indicative of the thought given to the comfort of the workmen.

#### PROCESS OF MANUFACTURE.

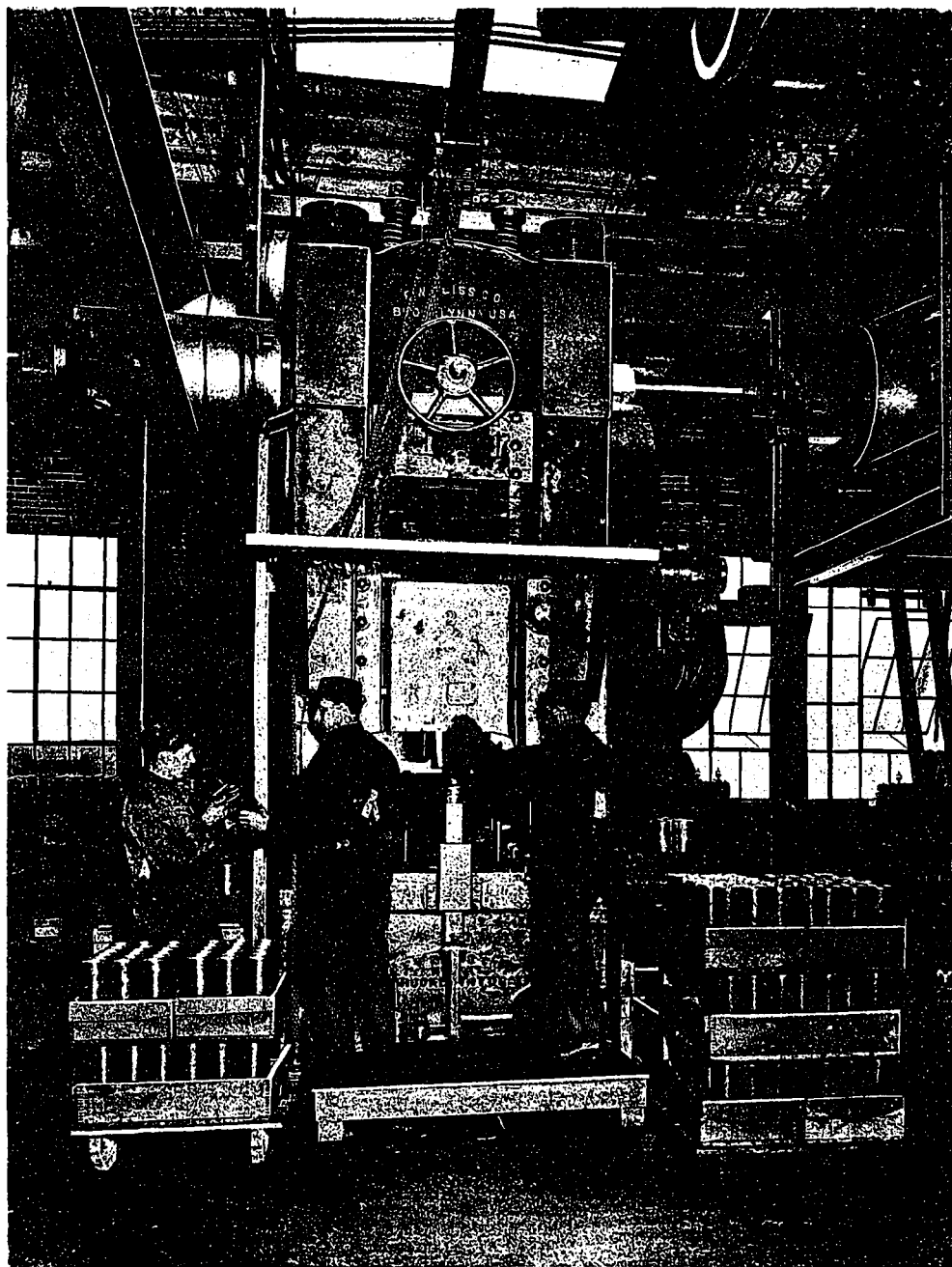
Minimum handling of material and economy of operation are in constant evidence. These are a reflection of the well arranged grouping of the buildings, the proper allocation of the various departments, and the skillful placing of machinery and equipment. The function of the plant is to turn out brass cartridge cases conforming to the British Admiralty standard. Three different sizes of cartridge cases are manufactured, being thirteen-pounder horse artillery; eighteen-pounder quick-firing field gun for shrapnel or high explosive, and 4.5 howitzer. With from four hundred and fifty to five hundred hands employed the output in this plant is six hundred thousand cases per month.

The actual manufacturing of the brass case consists for the most part in a series of stampings or drawing of the metal from its original shape, that of a circular disc, to the extended cylinder of brass

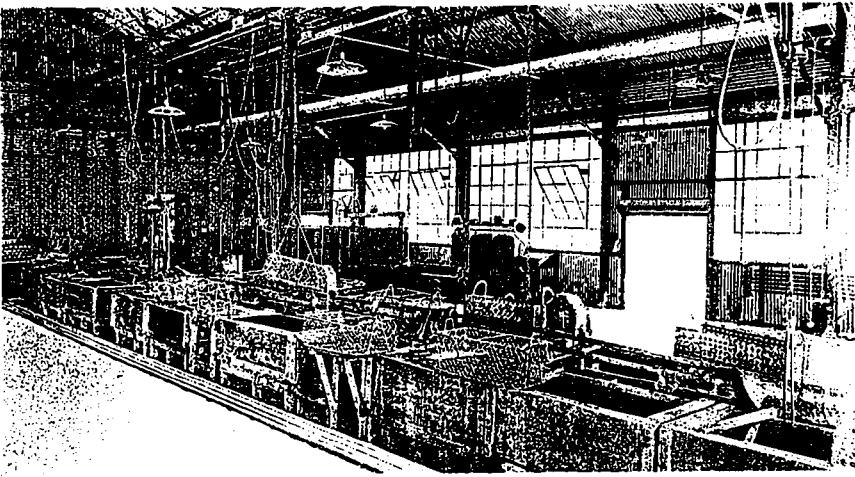
having the required dimensions and accuracy of measurement within the limits of four one-thousandths of an inch.

The first operation towards the completion of the case is that of cupping, which consists in stamping the metal disc, which is the form in which the raw material for the case is received in the plant. This disc is placed in a powerful press and stamped in the form of a cup or bowl, having an oval bottom. From the cupping press the stamped discs are taken to the annealing room, be-

ing an adjoining department, and carefully annealed by passing through a furnace kept at a constant temperature of about twelve hundred



HEADING PRESS, CANADIAN CARTRIDGE CO., LTD., HAMILTON, ONTARIO.



PICKLING DEPARTMENT.

degrees, the time occupied in this process being from forty to sixty minutes.

A careful maintenance of the proper temperature in the annealing furnace is insured by pyrometers, the readings of which are registered by recording meters, which not only show the temperature at any one time, but keep a record of the temperature throughout the twenty-four hours each day. After each an-

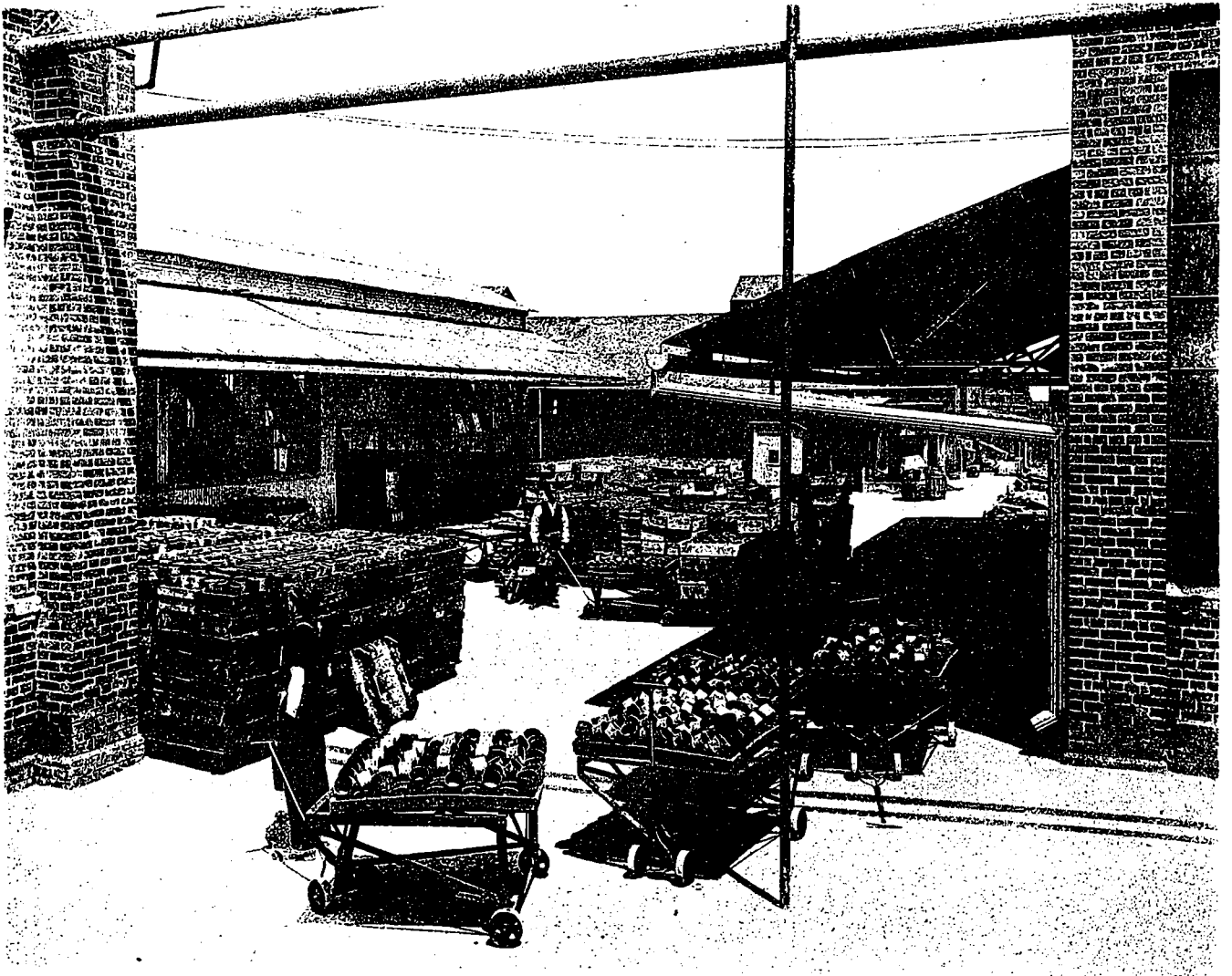
nealing, tests are made from selected samples to determine the hardness of the metal. This is accomplished by means of a scleroscope and microscope, and affords a thorough check as to whether the proper temperature in the annealing furnace is being maintained.

From the annealing furnaces the cups are taken to the open air to be cooled, after which they are washed in a weak solution of sulphuric acid and rinsed in clear water. This washing removes all deposit from the metal, and reduces the possibility of scratch-

ing the surface in the press, to a minimum.

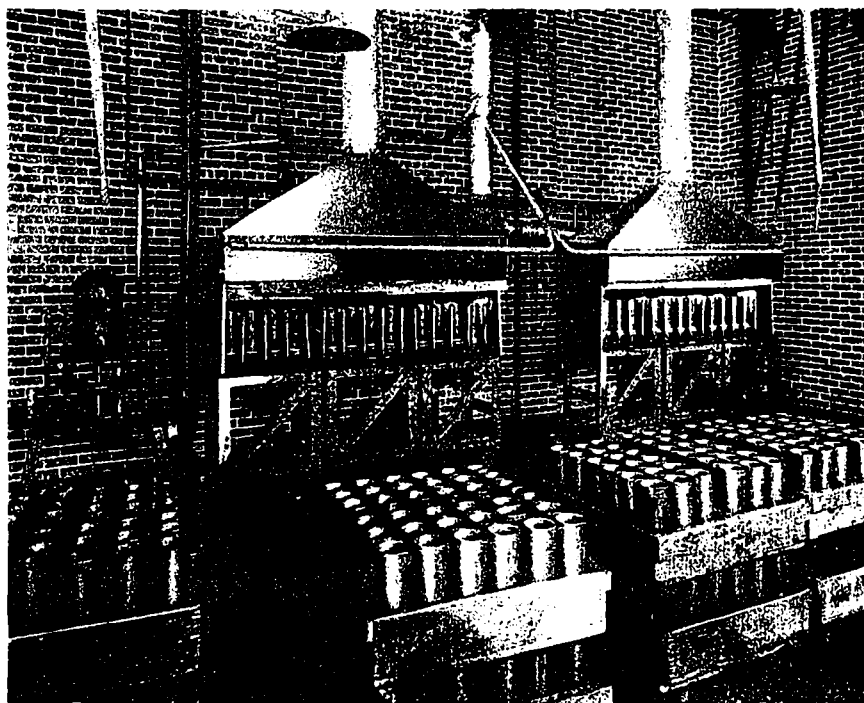
The second operation is known as drawing. The same style of press is employed as for cupping. In this press the length of the sides is increased by about an inch, the bottom being oval as before.

Inasmuch as the process of drawing hardens the brass, it is necessary that it be annealed and washed after each drawing. The embryo



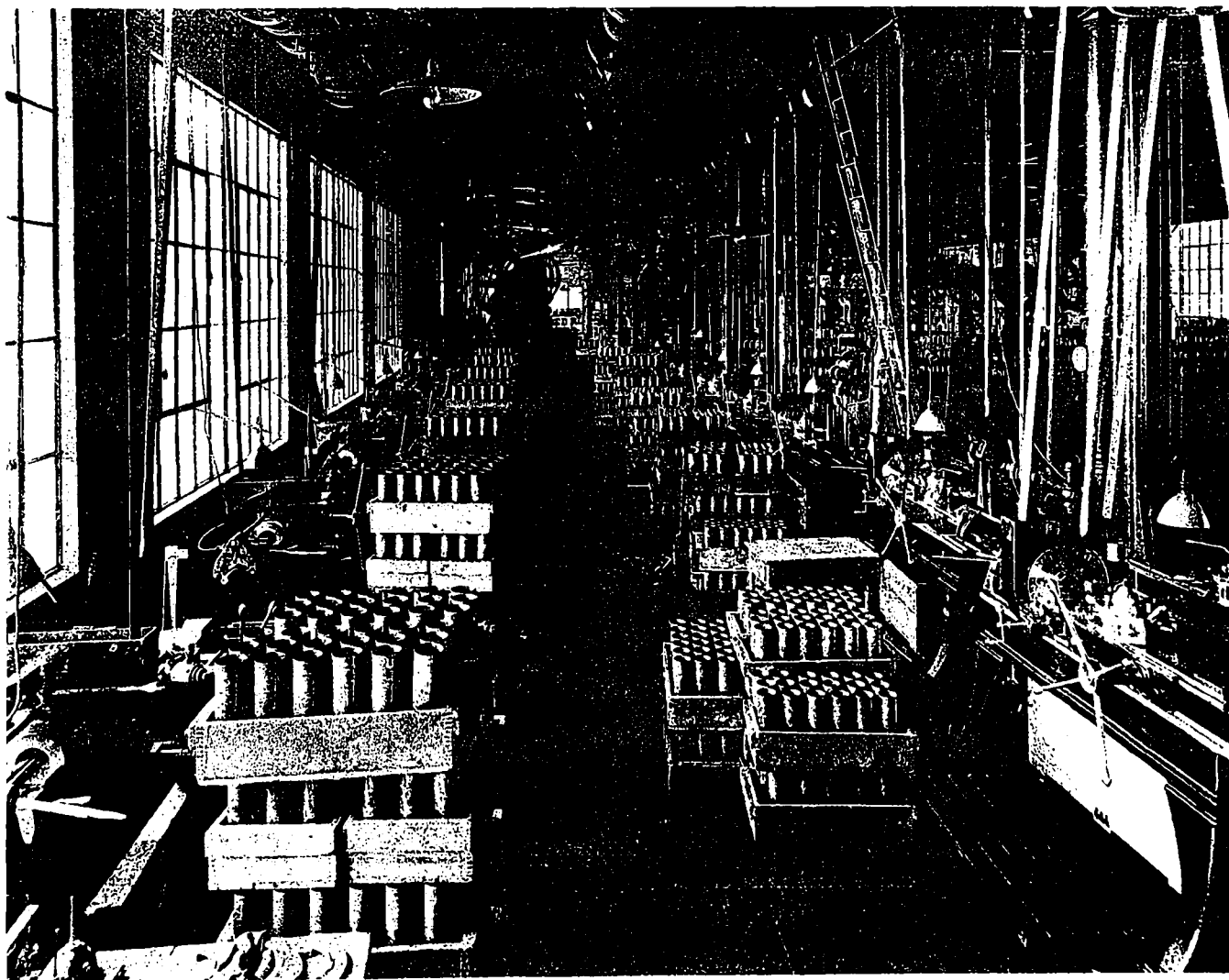
METHOD OF COOLING CASES AFTER ANNEALING, CANADIAN CARTRIDGE CO., LTD., HAMILTON, ONTARIO.

cases are again taken to the annealing room, where they go through the same process of annealing, cooling, and washing as before. In the second draw a similar press is employed as before. The operation consists in again slightly lengthening the sides, after which the first indent is made in the base. This indent later becomes a priming hole in the cartridge case. When again annealed and washed the cases are brought to another press with a longer punch, in which they are lengthened about four inches. The fourth draw consists in lengthening the case considerably, when the second indent is made, and the shape of the base changed. A different type of press, of a rack and pinion pattern, is employed in the fifth draw, which consists, as in the fourth, of drawing out the sides still further, after which it is trimmed to a specified length.

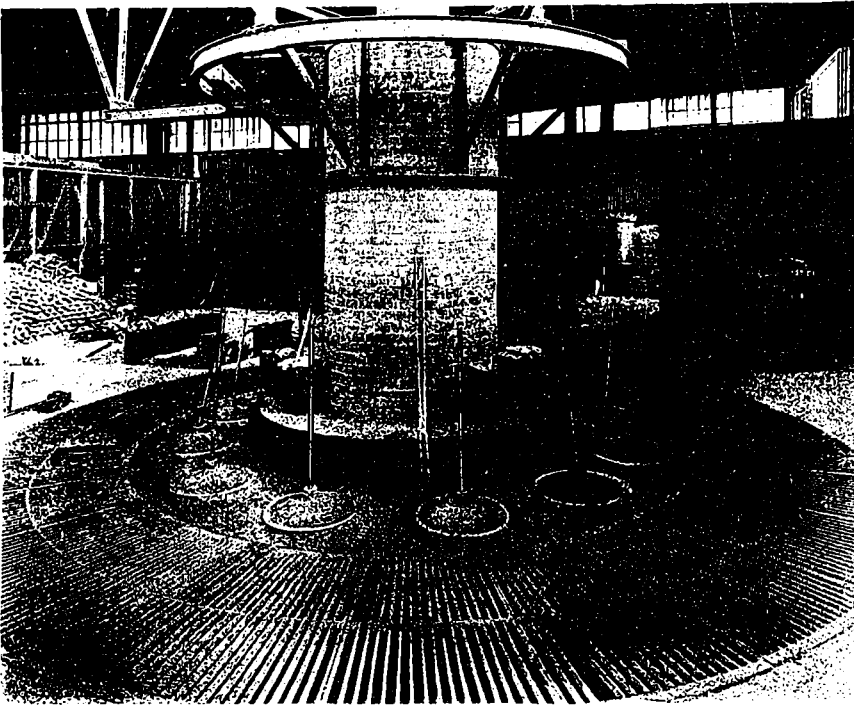


POINT ANNEALING FURNACE, BEFORE TAPERING.

Since the physical qualities of brass differ very materially from those of steel, the punches and dies are designed with a view to drawing



LATHING DEPARTMENT, CANADIAN CARTRIDGE CO., LTD., HAMILTON, ONTARIO.



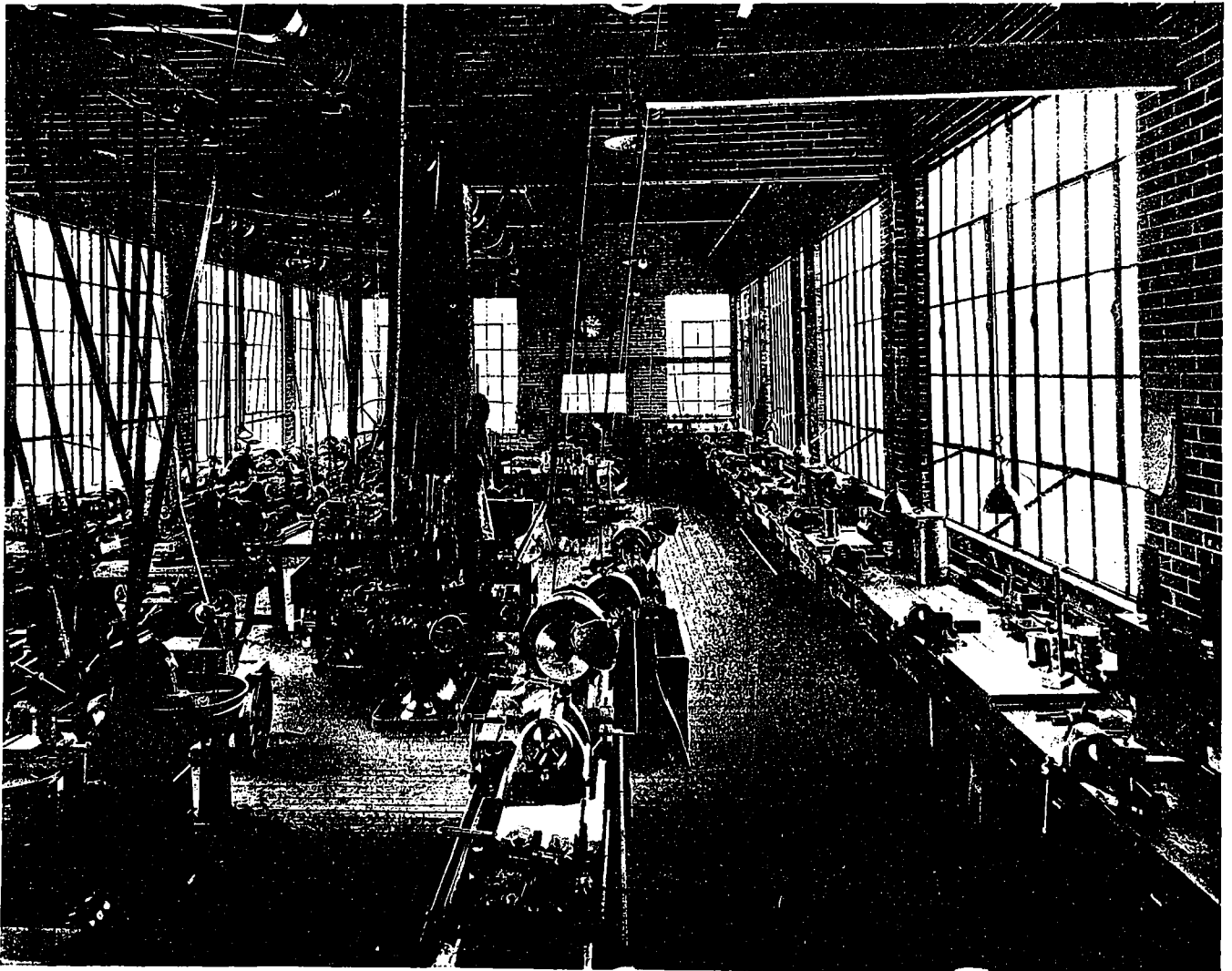
FURNACE FOR MELTING SCRAP.

the case to the size required with a degree of accuracy within the limits of four one-thousandths of an inch. It would be impossible, as in the case

of steel shells, to accomplish this on a lathe. The sixth and final draw is on a press similar to that used in the last operation, when it is again trimmed to a specified length. In the presses in all operations a compound of soap and oil is used somewhat thicker in consistency than is used for lathe work.

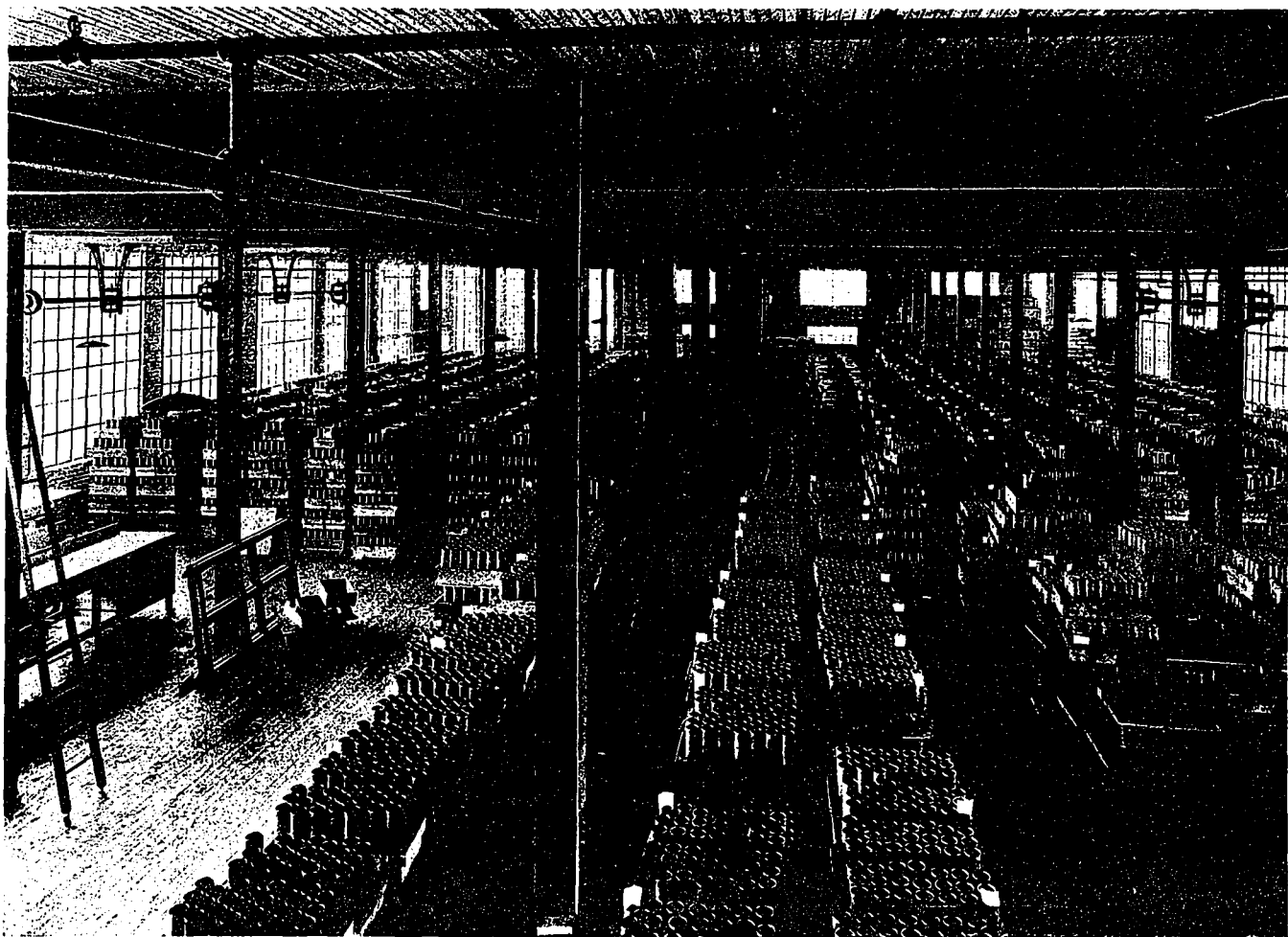
At this point the cases are washed in a solution of soda water to remove all grease, and are then rinsed in clear water. They are now ready to be headed. Heading is performed on a one-thousand-ton toggle joint press, two blows of the header being necessary. The die on the header flattens the base and makes the flange of the proper size and shape. The indent hole is also increased at this operation.

Following the heading the cases are taken to a point annealing oven, where they are annealed by gas about half way down their length from



TOOL ROOM, CANADIAN CARTRIDGE CO., LTD., HAMILTON, ONTARIO.





CASES IN BOND, AWAITING RESULTS OF FIRING TEST, CANADIAN CARTRIDGE CO., LTD., HAMILTON, ONTARIO.

the mouth. The annealing is necessary because the shape of the case is changed in the next operation. Up to this time the sides are perfectly straight. They are now tapered in a press to fit the shape and taper of the gun in which they are to be used. Machining follows. Special turret lathes are required to finish the heads, and drill, recess and thread the priming hole, as well as trimming the case to the proper length. From the lathes the cases are taken to the primer rectifying machine, where all holes are tapped or cleared to the proper gauge. This constitutes the final mechanical operation on the case.

#### TESTING.

As in the case of testing shells for the British Government, the same high standard is maintained in the production of the cartridge cases, and similar efficient and elaborate testing methods adopted. The company has its own staff of inspectors, who examine the cases from time to time during the process of manufacture. The Government inspectors perform the final examination, and accept or reject the finished product. The cases are inspected for machining, size of pilot hole, dents and imperfection of metal, by the company's inspectors, after which the case is brushed inside and out with a revol-

ving wiping apparatus. In the stamping press the date, including the day, month and year are stamped on the base, together with the company's private trade mark and serial letter. When the Government examiners have made a thorough test, both as to machining and defects, they gauge for all sizes, and also check up the markings already stamped. If O.K., the Government acceptance mark is applied.

From each lot of one thousand shells the Government examiner extracts three which are sent to Quebec to be proved, the balance of that lot being kept in the plant until the result of the firing test is received. This test consists of firing one shell at nineteen tons pressure, and the two others at fourteen tons each, the normal firing pressure being thirteen tons.

When the Government inspectors have passed on the cases and placed their official stamp thereon, they are taken to the shipping room and packed in special wooden boxes furnished by the Government, under the supervision of a Government inspector, after which the official stamp is placed on the box.

Of further interest in connection with the manufacture of cartridge cases in this plant is the fact that the company maintains a tool room, employing thirty-five hands, where all tools are



made or repaired. In conjunction with this is a blacksmith's shop and tool-hardening department.

Inasmuch as there is considerable scrap brass from the machining operations, provision has been made for taking care of this. One of the illustrations shows a melting furnace installed in the plant having twelve pits, capable of taking No. 80 crucibles. Here all scrap, after hav-

ing been passed through the annealing furnace and baled, is melted down and poured into ingots. This brass is sold in the open market.

The Canadian Cartridge Co., Ltd., was organized and started by F. W. Baillie and F. P. Wood, the former holding office as president and general manager, and the latter vice-president. There are no other shareholders in the company.

# CONSTRUCTION

A JOURNAL FOR THE ARCHITECTURAL  
ENGINEERING AND CONTRACTING  
INTERESTS OF CANADA



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FRASER S. KEITH - - - EDITOR AND MANAGER

Vol. IX Toronto, October, 1916 No. 10

## *Progressive Hospital Construction*

In the light of the many recent outstanding instances of irregularities connected with the erection of public buildings, it is refreshing to be able to point to a striking example, contradicting in every particular the popular idea that extravagance prevails when the general public are paying the bills. At the Provincial Government Hospital for Insane at Whitby the people of the Province have an institution to which they may point with pride, not only because it is conceded to be one of the finest of its kind in

the world, making a distinct advance in mental hospital design and equipment, but also because it has been erected by a Department of the Ontario Government, utilizing strict, economical and highly efficient business methods.

In the selection of plant and equipment, methods of construction, purchase and testing of materials, and in the use of an accurate unit cost system to permit the checking of costs for work as it is executed, the most up-to-date methods and ideas of the large contracting firms have been followed and in many ways improved upon. Not only can contractors draw valuable lessons from this work, but Canadian manufacturers also have been shown that goods and materials can be made in this country which were never made here before.

Notwithstanding regrettable delays due to difficulties of financing such a large undertaking since the war broke out, and the greatly increased cost of labor and materials, the methods adopted for carrying out the work show, in the carefully scrutinized costs now available, that great economies are being effected and that the work compares more than favorably with that of the best private contracting organizations.

Especially praiseworthy is the amount of research and experimental work which has been done in developing the scheme and in producing the materials which have been used in construction. Members of the staffs of our universities have been called upon to assist in solving many problems, and their scientific equipment has been used in a way we do not believe has been attempted in this country before.

The quality and properties of the shale at the Government Clay Plant were thus tested and reported upon before any development was attempted. Tests of the sand and gravel from the Whitby property: an investigation of all the best systems of reinforced concrete floor construction which occupied many months; experiments on various types of wall construction and insulation to determine values for heat losses; freezing and thawing tests of the products of the Clay Plant; crushing experiments on many varieties of hollow clay and cement blocks; experiments with different mixtures of subflooring materials to produce a resilient cushion between linoleum covering and the hard concrete

of the structural floors; the development of the manufacture of roofing and floor tiles equal to the best which can be imported; the many new types of hospital lighting fixtures evolved; the method of arranging plumbing piping and the special fixtures designed and standardized for institution work; specially designed hospital hardware; numerous new ideas in the kitchen arrangement and equipment; the careful studies of the orientation of all buildings for sunlight—this work and much else of practical and scientific interest are suggestive of the laboratory rather than a large undertaking by a Government in this country.

Giving credit where it is due, a large share falls to the lot of Mr. S. A. Armstrong, Assistant Provincial Secretary, whose genius for organization is reflected in the masterly manner in which his Department is carrying on the work.

The originality and initiative displayed and the advanced ideas incorporated in the designing of this institution and in the working out of the many problems arising during its erection are all indicative of a harmonious and effective co-operation between designers, builders and craftsmen which reflects the greatest credit on all who have been associated on the work.

It is impossible to mention all the unique features which distinguish this undertaking, which are of such interest to all classes of our readers—professional and lay—that we believe a careful perusal of our descriptive article will stimulate a desire for more information on many points just touched upon.

The scheme is not yet completed, but what has been done justifies the expectation that the buildings yet to be finished will show the same originality of conception and capacity for detailed study which the architect, Mr. James Govan, has so successfully brought to bear on the work already done. We hope to be able to furnish our readers later with further details of some of his work not yet far enough advanced to be illustrated.

### *Developing The Individual*

Taking outsiders for granted and making Canadians prove their mettle seems to be the order of the day in this country. Everybody is doing it. The heads of the Federal Government and many private corporations are equally engaged in following out the idea. It has become a national pastime. It even appears to be a national policy. In the early days of shell contracts, tens of millions of dollars' worth of orders were handed over to our neighbors with few questions asked, but when a Canadian wanted to keep his plant busy by manufacturing munitions, it was, generally speaking, a case of "Show me." They did. Our Canadian manu-

facturers showed the whole world that they could meet an emergency with as great a resourcefulness as was ever exhibited by any nation.

When we require an expert to advise on railway valuations, we choose the head of an American railway whose lines compete with our own.

A Dominion arsenal is needed—surely beyond the scope of Canadian intellect. What was done to secure it is a matter of inglorious history. The jokers at Ottawa perpetrated a grim one. For already we had an arsenal, planned, erected, installed and operated by Canadians. The plant of the Canadian Cartridge Company at Hamilton is an arsenal in every sense of the word. While the complete shell is not manufactured, the creation of this plant—by Canadians—involved all the problems necessary for a complete arsenal. The skill in designing the structures, the technique in co-ordinating departments, and placing equipment, the working out of economical and efficient process, the precise operation in the various stages of manufacture all in their essentials, required every possible demand that could be made upon technical adaptability to produce the Lindsay arsenal.

This is not a narrow, provincial question affecting a few individuals in the country, but one that strikes at the very root of our national life. We must, both as Government and as individuals, get rid of the idea that every time a special occasion arises, requiring scientific knowledge or special ability, it is necessary or even advisable to look beyond our borders to obtain it. This tendency is an insult to our universities and to our technically trained professional men and an absolute deterrent to the best development of the country's interests.

### *Hopeful Outlook*

The spirit manifested at the annual assembly of the Royal Architectural Institute of Canada augurs well for the future of the profession in this country. It was clearly impossible to settle all the important matters demanding attention. The meeting itself was an indication that we are getting over the shock occasioned by the adverse conditions forced upon us by the war. A courageous, hopeful outlook was evident, justified by the fact that conditions have already improved in the building line. Harmonious co-operation indicates and assures progressive development. Canadians owe much to our architects and engineers. The future will surely bring the deserved recognition. CONSTRUCTION appreciates the attitude of the Royal Architectural Institute of Canada towards ourselves, and hereby thanks the members who at the annual meeting gave us such a unanimous expression of their good-will and esteem.

# Architectural Digest

Articles of More Than Passing Interest From Our Contemporaries

## THE EVOLUTION OF GAS LIGHTING AND HEATING.

By Prof. Vivian E. Lewes.

The real inception of the gas industry came at the end of the eighteenth century, at a time when there was a marvelous wave of scientific activity spreading over the whole of Western Europe. We had in this country at work men like Priestley and Cavendish. In Edinburgh there was Black, who, with limited means at his disposal, did an enormous amount of work and effected vast improvements in all forms of scientific work. He showed us that the weight changes which take place whilst the matter is altering in form were far more important than the changes perceived by the eye, and in introducing the chemical balance he put a new weapon in the hands of scientific observers. At the same time there was at work in Sweden a little apothecary named Scheele, who discovered more facts than any man breathing; and in France there was the master-mind of the great philosopher, Lavoisier, who had the faculty of weaving facts into theories of the most beautiful character. He showed us what combustion really was, and he (Prof. Lewes) could assure his audience that at the present day one-half of our scientific information was due to Lavoisier's theory of combustion. At that time two men were born in England who were destined to throw an enormous amount of scientific light upon the civilized world. One was William Murdoch, and the other Humphry Davy. Murdoch was born in 1751, the son of a miller in Lugar in Ayrshire, and as a boy showed extraordinary adaptability and extraordinary experimental skill. He began as soon as he was able to do so to make experiments. There happened to be an outcrop of Scotch shale in his father's cabbage garden, and he used to experiment with it and ignite it. He carried on a certain number of experiments, and finally was able to distill it, and it was recorded that in an old cave by the side of the mill stream he used to make gas by which he illuminated the cave, using as a retort his mother's teapot. Subsequently young Murdoch went to Birmingham and obtained employment at the Soho works, not many miles away, where were the great works of Bolton & Watts, renowned for the beauty of the workmanship they turned out. They were pioneers in stationary steam-engine work, and their pumps were also world renowned, and to them went young Murdoch. Watts himself happened to see him, and at first treated him very much as he treated any other lad who turned up and wanted a job. The youngster was standing with a billycock hat in his hand, which finally dropped on to the floor, and the ring of that billycock hat on the floor attracted Watts' attention. "Hallo!" said Watts, and Murdoch shamefacedly produced his billycock hat, which was one he had turned out of an old log of wood. Watts was so struck by this fact that he took him on at 5s. a week. In 1780 Watts sent Murdoch into Cornwall to push the sale of his firm's pumping engines. At that time the tin mines of Cornwall were at their zenith, and powerful machinery was necessary for keeping them clear of water, owing to the great depths to which they went. Murdoch's duty in life was to push pumping machinery amongst the mine owners. He settled down in a small house at Redruth, near Truro, and set to work to do this, but it left him a good deal of spare time, sufficient at least to work up many of the early schemes of his boyhood; and remembering the experiments which he had made in distilling the shale at Lugar, he set to work to do something on a bigger scale. After making trials he hit upon a form of pot not unlike an ordinary washing boiler, and in that distilled coal. He sent the gas through a rough sort of scrubber, and finally by a pipe into his front office, and he found that every night the villagers would come up and see this wonder. The news of it spread, and finally he had people coming from a great distance to see that in that day was as great a wonder as radium or X-rays, or any other modern scientific wonder is now. The great wonder of the thing was that it was a flame burning without a wick, as up to that time all illuminants had had wicks. No one had ever for an instant believed that it was possible to get an illuminating flame without a wick, and Murdoch's wickless flame was among the wonders of the day. At that same period also he designed practically a motor tricycle driven by a small engine, with which he used to frighten the neighborhood into the belief that he was at least, if not the devil, a very fair imitation of him. In fact, we should have had in Murdoch the inventor of the locomotive if it had not been for the opposition of Watts, who naturally did not like this experimental work which was being done. Undoubtedly Murdoch, but for this, would have invented the locomotive many years before Stephenson. Murdoch returned to the Soho Works in 1801, and put up there a fair imitation of a gas works for illuminating the works and shops, and this attracted a good deal of attention. By this time it would have been thought that Murdoch's claims to the discovery of the utilization of coal gas must have been established. Murdoch did not claim that he discovered coal gas, because it was well known 100 years before that coal could be distilled, but Murdoch had shown the way in which it could be practically used, and in which it could be harnessed for the good of civilization. Unfortunately, like so many inventors, he did not reap the reward of his invention, because in 1801 a Frenchman in Paris found out that if one distilled wood in a retort away from contact with air, a gas was obtained which also gave a very good light. Lebon took and furnished a sort of show house in Paris and exhibited this wonderful invention, which made ordinary smoke burn with luminosity, and this also attracted a good deal of attention. To one of his shows came a German named Winsor, who was enormously impressed with Lebon's discovery, and tried to buy the secret. In this he was unsuccessful, and he went back to Germany, bent on finding out how it was done. Within two years he had discovered the secret of illuminating gas, and he found that he could obtain it not only from wood, but from peat and coal.

Winsor got a charter to enable him to light a portion of London, rather a come-down from his original idea, but it was something to go on with. In 1808 he put in two or three lamps in Pall Mall in order to demonstrate the process. In 1810 he

formed a company—the Chartered Gas Company—which was the forerunner of our present Gas Light and Coke Company, now the premier gas company in the world. These first two or three years of the Chartered Gas Company were anything but a bed of roses. Winsor's ideas as to the distillation of coal had gone very little beyond the experiments which he had shown in the Lyceum Theatre, and when he came to try to do it on a practical scale, he was met with troubles which he had not the faintest idea how to get over. Fortunately at that time he succeeded in getting hold of Clegg, who had been an assistant to Murdoch. Murdoch had really done a great deal of work in perfecting the system, all of which Clegg knew, and Clegg it was who joined Winsor and made his work a success. In 1814 Westminster was lighted. Two years later Liverpool also adopted gas, and had never regretted it since. Glasgow followed in 1817, and finally, in 1818, came Dublin, so that the whole of the United Kingdom was at this time taking up gas lighting. This industry, so started, has never looked back. It has gone on increasing, and within the last 100 years it has grown with such leaps and bounds that, looking back even five years, we realized that none of us, even such a short period ago as that, dared to imagine the great developments which it had since made.

There were various methods by which was at that time used to be burned. When Murdoch first made gas at Redruth, and burnt it in his village parlor, he burnt it at the end of a pipe that gave a big flaring flame with a maximum of consumption and a minimum of light, and inasmuch as his holder was a very small one, his shows did not last for any length of time. On one occasion, when he had a room full of people watching the flame, he had the uncomfortable feeling that his holder was only half full, and he knew it would only last about ten minutes. He was not at all sure what would happen if the holder grounded. He had the dim idea as the back of his head that unless the pressure of the weight of the holder was on the gas, the gas might flash back and cause an explosion. He had a very primitive method of arranging the gas supply in those days. He had no taps, and his method of closing the end of the pipe was simply to have a little plug of clay, which he plugged into the end. On this occasion, however, he was anxious and hurried, for that little plug had got knocked on to the floor and he could not find it. The flame was growing smaller and smaller, and he looked around anxiously for something to stop the flow of gas. He happened to see his wife's thimble on the table and rammed it over the end of the pipe. That thimble was in the condition that every good housewife's thimble should be. The head contained several holes bored by the unsympathetic needles, but a curious thing happened when he put this on, and he noticed that the gas was still hissing through these small holes, and in order not to waste it uselessly, put a match to it, and to his astonishment he found that the gas escaping through these tiny holes gave a much better light than when he was burning gas as the end of an open pipe. He at once had the idea of making a burner. He first went to work by welding up the end of the tube and drilling in it three or four holes, which was an enormous advance, because he found that from the consumption of two or three cubic feet per hour, he could get as much light as with twenty previously. From that point he began to develop his burners, and when he set up to the illumination at the Soho Works, he constructed a burner which was at that time considered a remarkable success.

In 1820, Neilson, the man who would always be remembered as having introduced the hot blast into iron making, made what was known as the union jet burner; it was immediately a success. This simply consisted of a burner in which in the head were two little jets at an angle towards each other, and when these two jets of flame impinged upon each other they flattened out into a flame narrower and higher than was given by the batswing burner. They also drew in a little air at the base of the flame to increase the illumination, and the fact that the flame came out in a more upright form was responsible for its being given the name of the fishtail burner, which was the burner of the people for considerably over eighty years. Until 1900 it was the burner most generally used.

Whilst these changes were going on in the burners themselves, Humphry Davy was playing his part in illumination. He it was who explained why any flame containing hydrocarbons possessed light-giving properties, and the researches which led to this were brought about by the successful attempt of Davy to solve the problem of the miner's lamp. At this time coal was being more and more largely used, and at that time, especially in the north of England, there were a large number of fiery mines which were known to be dangerous for some reason or other, although it was not clearly known in those days why there was no such thing as a method of rendering the working of such mines safer. The miner's means of light was a tallow dip on the end of a piece of wood, and he became so skilful in flame that he was in a dangerous atmosphere, and that for the flame that he was in a dangerous atmosphere, and that for the sake of his own life and that of his comrades that tallow dip should be put out. Nevertheless a large number of accidents did happen in coal mines from explosions, and in 1838 a Royal Commission was appointed to enquire into the causes of them, and to find out in what way mines could be rendered safer. At that time Davy was at the Royal Institution in Albermarle Street, and also was an ardent fisherman, and was away in Scotland enjoying his holiday salmon fishing. On his way down to London by the coach he stayed at Newcastle, and went to some of the pits where there had been explosions and brought samples of the gas away and experimented with them, and he found that the factor which gave rise to the explosion was a gas known as methane or marsh gas, which was occluded in the coal and which, as the seams were worked, and the pressure gradually fell, found its way into the seams and formed with the air an explosive mixture which would ignite when a light was brought near. Davy then carried out experiments to see how the trouble could be overcome, and he finally found out how to construct a miner's safety lamp.

## THE ARCHITECT IN LITERATURE.

The word "architect" does not occur in English until 1563, in which year John Shute, the dates of whose birth and death are alike unknown, published his "First and Chief Groundes of Architecture, used in all the Auncient and Famous Monumentes," in the introduction to which he describes himself as painter and architect, and mentions his studies under the best architects in Italy, whither he was sent by the Duke of Northumberland in 1550. The next reference to the word, according to the Oxford Dictionary, occurs in "Paradise Lost," over a century later, for the architect had not come to his own sufficiently to be realized as a person in any of those books of characters, such as *Barle's* and *Overbury's*, which were the delight of the educated in the reigns of the first Stuarts; the Good Architect therefore does not balance the Bad in literature, whatever he may have done in life. Inigo Jones, satirized on the stage as *Vitruvius Hoop*, is described as "eminent in architecture," and this is in itself proof that the word "architect" was no recognized part of the vocabulary of the day. In Milton even the word is probably one of his own learned coinings; it had taken no hold when introduced by Shute, and does not reappear after "Paradise Lost" until well on in the eighteenth century. Satan, in fact, is not only the earliest example of the word in literature, but of the profession. The fallen archangel, once "known in Heaven by many a towered structure high," recalls his powers in hell, and the growth of his new capital is described with a fierce power and bitter admiration singularly striking in the case of a blind poet. It is as if the memories of Milton's early travels—of castles set on lonely Italian hills, of the overwhelming mass of St. Peter's—were blended into one great and gorgeous vision. Nor would it be surprising, in the case of so stern an opponent of Rome, if Milton had in his mind's eye the actual image of the vast cathedral when he wrote:—

A fabric huge  
Built like a temple, where pilasters round  
Were set, and Doric pillars overlaid  
With golden architrave: nor did there want  
Cornice or frieze, with bossy sculptures graven.

The very doors "opening their brazen folds" suggest their Roman counterpart. Fancy might even take the lines further on as symbolical of the Christian Gothic theory as against the forms borrowed from the Pagan temple, and contrast the "towered structures high" which Satan had raised in Heaven with the columns and architraves of Pandemonium, which could not but be in a style the reverse of that celestial architecture:—

Nor aught availed him now  
To have built in Heaven high towers; nor did he scape  
By all his engines, but was headlong sent  
With his industrious crew to build in Hell.

It is as if Milton's early love of cloisters pale and high embowed roofs were taking its revenge on the unwilling recognition of the splendors of that great cathedral which to him was the embodiment of Satan's kingdom upon earth, and on the stately Neo-Classicism of a dynasty which he abhorred, the Banqueting House of Whitehall, that fragment of a mighty plan, and the Corinthian portico added to St. Paul's by the King, whose death-warrant Milton signed, in 1633.

Fantastic, then, as it may seem, we may regard Pandemonium as the first capital, Satan as the first architect, of modern fiction, and he has to wait long for a successor. The earliest novelists were interested in men and not their houses; one cannot imagine Tom Jones as interested in architectural improvements, or one of Smollett's heroes calling in professional advice, and even the first efforts of the romantic revival deal in buildings as they were, not as they were to be made. The Castle of Otranto is already built; so is that castellated erection in which much of the action of its little-known predecessor, "Longsword, Earl of Salisbury," takes place, while Mrs. Radcliffe's castles, including that which is chiefly known to modern readers by Miss Austen's allusions to *Laurentina's* skeleton, date back to a hoary antiquity. But the heaven was working; it is only a step from Gray's admiration of the ivy-mantled tower to his friend Mason's love of ruins for their own sake, and with Mason we at last come to another architect in literature. Mason's "English Garden" is not a work familiar in our mouths, but the activities of its hero Alexander, "an English country gentleman, as his name implies," are really noteworthy. On his "site" that worthy "first his taste employ'd," the "blank horizon" of the "sacred" site in question being only broken by a thin line of beech, whose "tameless" was thus done away

"Draw we round you knowl,"  
Alexander cries, "in stately Norman mode,  
A wall embattled; and within its guard  
Let every structure needful for a farm  
Arise in castle-semblance: the huge barn  
Shall with a mock portcullis arm the gate,  
Where Ceres entering, o'er the stall-proof floor,  
In golden triumph rides; some tower rotund  
Shall to the pigeons and their callow young  
Safe roost afford; and every buttress broad,  
Whose proud projection seems a mass of stone,  
Gives space to stall the heifer and the steed.  
So shall each part, though turn'd to rural use,  
Deceive the eye with those bold feudal forms  
That fancy loves to gaze on."

Filled with the idea of carrying out the beautiful scheme in the three latter lines, Alexander proceeds to "build of old, disjointed moss-grown stone A time-struck abbey," whose prosaic purpose is to conceal the whereabouts of the dairy and the icehouse. The "fane conventual" accordingly arises, and Alexander proceeds to "lead his pensive maid" around its glories, and to propose the erection of a "proud rotunda" built of "forms pellucid," on "Ionic shafts"—"anglice," a conservatory—which the maid, Alexander's "living goddess," viewed reluctantly after all, not, we regret to read, because of Alexander's bad taste, but because:—

"My wish, thou know'st, was humble as my state,  
I only begg'd a little woodbine bower,  
Where I might sit and weep."

But we must leave these pseudo-pastoral love scenes for the creations of the Tibbey family at Northanger Abbey, those admirable kitchen quarters, built by the general's father, which

called forth Catherine's reluctant admiration, and that "tolerably large eating-room" which we are sure must have been a creation of General Tibbey's own, with such modest pride does he admit it to be one of the necessities of life.

"Northanger Abbey" was got ready for the press in 1803, though not published till 1817; thus it actually, though not apparently, preceded "Waverley," with its romantic joy in the picturesque domain of the Baron of Bradwardine, which would not, however, have called for mention here had not Waverley, who probably fulfilled Flora's prediction that he would "refit the library of Waverley Honour in the most exquisite Gothic taste, draw plans and landscapes, and write verses, and rear temples, and dig grottoes," rebuilt the whole after its destruction in 1744, as a surprise for his father-in-law the Baron, who promptly entails it on his second grandson, the first, who is to have Waverley Honour, being not yet even in sight. Scott, however, greatest of antiquaries and most loving of archaeologists, hardly comes into our purview, since his characters live in or near ancestral homes and are not themselves, like their creator, the architects of their own dwellings. Perhaps the earliest professional architect in literature—for the elegant Alexander was only an amateur—was Mr. Pecksniff, who held that proud position, not by virtue of qualifications or of practice, for he "had never designed or built anything," but by virtue of his brazen (Dickensian prose for brass) plate and his reception of the pupils who spent from three to five years "in making elevations of Salisbury Cathedral from every possible point of sight (sic); and in constructing in the air a vast quantity of castles, Houses of Parliament, and other public buildings." In so far as beginning his adult life as a pupil of Pecksniff's constituted an architect, Martin Chuzzlewit was one, but we are not told that the varied fortunes of that young man included any efforts at putting his profession into practice. If Pecksniffs were common at the beginning of the nineteenth century, we feel that Adam Bede, that admirable master-builder, was justified in his contempt: "As for th' architects, they set up to be fine fellows, but the most of 'em don't know where to set a chimney so that it shan't be quarrelling with a door. My notion is, a practical builder, that's got a bit o' taste, makes the best architect for common things; and I've ten times the pleasure i' seeing after the work when I've made the plan myself."

The function of the practical architect on which Adam Bede insists is explained and broadened by two novelists of our generation, Mr. Howell's architect in "The Rise of Silas Lapham," who knows what a woman wants in a scullery better than she does herself, and Mr. Arnold Bennett's Card, who in the course of his meteoric career creates a fitting house for his grim old mother, having previously bought up through an agent the lease of her hotel and turned her out in the role of the rapacious landlord in order to ensure her living in a style befitting her position as his parent; and so admirable did the new house prove that its unwilling tenant was constrained to admit that, servantless as she insisted on remaining, she could clean everything up and be ready for callers by ten o'clock. We feel that there is a distinct opening for the Card in modern life.

But we must retrace our steps and leave the light comedy of Howells and Bennett for the more serious paths of fiction, in which the architect as a character is curiously infrequent. It was reserved for Mr. Hardy, wise by his own experience, to treat the architect as hero. No one can help liking Stephen Smith in "A Pair of Blue Eyes" any more than the ill-fated Elfrida who lacked the courage to be true to him, or the excellent George Somerset of the "Laodicean," who "sketched or measured many old country churches now pulled down or altered." If more of our architects had the true passion of Mr. Hardy and his heroes for the legacy of the past, the architect in fact might play a larger part than he has in fiction, and the restoration age of the Victorian era might have been less unhappy than it was in the eyes of a generation that has grown as much beyond the ideals of a Scott or a Butterfield as it has beyond those of the forgotten Gothicisms of Alexander—"The Builder."

## TO BUY PULP MILLS.

Capitalists in the United States are very much interested in the vast expanse of pulp lands in Canada. Following a conference of New York capitalists, a deal is now pending for the purchase of several pulp mills at Reversing Falls, near St. John, N.B. The syndicate includes Hugh Chisholm, President of the Oxford Paper Company, of Portland, Oregon. If the deal goes through extensive additions will be made to the present plants.

## PUBLIC TENDERS.

The Dominion Government is now calling for tenders for the various materials required in the erection of the new Parliament Buildings at Ottawa. The general contract for the work was awarded some time ago to P. Lyall & Sons' Construction Co., Ltd., of Montreal, who will supervise all the work. The Government is steadfastly adhering to the policy of giving contracts to the lowest tenderer whose materials are up to the architects' specifications.

## BIG JUMP IN BUILDING.

Despite building conditions, and the lack of labor due to the war, the City of Windsor reports that building permits for the nine months preceding September totalled \$1,088,550, or a little less than the total for the year 1913, which was the largest year in the history of the City of Windsor. Forty-four permits were issued in September, as compared with thirty-four in the same month last year. Over four hundred permits have been issued to date this year.

Architects, engineers and contractors are invited to contribute information on construction work, whether it be proposed or in progress, and such information will be published in these columns.

# CONSTRUCTION NEWS

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

## BUILDING PERMITS.

CHATHAM, ONT.—Permits issued to date this year total \$243,849.

PORT ARTHUR, ONT.—Permits issued for the month of September totaled \$93,035; for September last year the permits only totaled \$2,220.

QUEBEC, QUE.—Building permits issued for week ending Sept. 2 totaled \$8,500; the total for week ending August 25 was \$31,095.00.

SUDEBURY, ONT.—The permits issued since January 1 total \$140,375, as compared with \$97,065 for the corresponding period last year.

WINNIPEG, MAN.—Permits this year are nearly half a million dollars in advance of those for a corresponding period last year, the figures being \$2,195,300 and \$1,721,900 respectively for the nine months ending September 30. The total for September alone is \$231,850.

## BUSINESS BUILDINGS.

BRANTFORD, ONT.—Architect G. W. Hall, 321 Colborne St., has prepared plans for an office and dairy building, to cost \$5,000. Jago & Richards have been awarded the contract, and building operations are well under way.

CALGARY, ALTA.—Architect George M. Lang has prepared plans for a business block on Eighth Ave. Tenders have been called.

DUNDAS, ONT.—John Bertram & Sons, Ltd., have commenced work on an office building to cost \$20,000.

LONDON, ONT.—Architect L. Carrothers, Bank of Toronto Building, has prepared plans for an office building to cost \$75,000. Architect L. Carrothers, Bank of Toronto Building, has prepared plans for a Hydro office building to cost \$100,000, work has started.

MURKIRK, ONT.—Horton Bros., 34 John St., St. Thomas, have been awarded the contract for a bank building, to cost \$10,000.

NEW CARLISLE, QUE.—Architect P. Levesque, 115 St. John St., Quebec, Que., has prepared plans for an alteration to a bank to cost \$25,000.

NIAGARA FALLS, ONT.—Architect C. M. Borter, Main St., has prepared plans for a bank to cost \$40,000. Architect C. M. Borter, Main St., has prepared plans for an office building to cost \$10,000. Tenders will be called.

OSHAWA, ONT.—Architect Geo. D. Redmond, 33 Fairview Blvd., Toronto, has prepared plans for an office building to cost \$5,000. W. J. Trick Co., 131 Delaware Ave., Toronto, have been awarded the contract.

OTTAWA, ONT.—Architect J. A. Booth, Booth Building, has prepared plans for an addition to an office building to cost \$50,000. Morcross Bros. have been awarded the contract. Architects Richards & Abra. Booth Building, have prepared plans for an office building to cost \$30,000. Doran & Devlin have been awarded the contract.

PETERBOROUGH, ONT.—Bond & Smith have been awarded the contract for building an office building and apartments to cost \$10,000.

PETERBOROUGH, ONT.—The Royal Bank, Hunter St., have commenced work on a new bank at the corner of Hunter and George St., to cost \$10,000. Purdy & Henderson, of Montreal, have been awarded the contract.

PORT ARTHUR, ONT.—Architect John Warrington has prepared plans for a business block to cost \$80,000. Mr. Edwin C. Penniman has been awarded the contract.

SUMMERSIDE, P.E.I.—Mr. P. C. Clark has started work on a new building for the Canadian Bank of Commerce.

TORONTO, ONT.—The Brown Brass and Copper Rolling Mills, of New Toronto, are excavating for a new office building to cost \$40,000. Architect F. S. Mallory, 65 Adelaide St. East, has prepared plans for an office building on Front St. East to cost \$6,000. Architect C. J. Gibson, 53 Yonge St., has prepared plans for an office and warehouse to cost \$25,000; work has started.

## CIVIL ENGINEERING.

GUELPH, ONT.—Plans are being prepared for a new Victoria Bridge.

MISSION CITY.—J. Harper and E. Conley have been awarded the contract for the erection of a bridge at the Law Slough.

MONTREAL, QUE.—J. H. Dubuc, City Engineer, is preparing plans for a new \$100,000 bridge which is to span the tracks of the Canadian Pacific Railway Co. between Wurtele and Lesperance Sts., on Sherbrooke St. East.

PETERBOROUGH, ONT.—Tenders have been called for taking down and rebuilding the west pier of the Wallace Point bridge over the Otonabee River and Trent Valley Canal. E. M. Elliott, County Clerk.

SHERBROOKE, QUE.—Tenders have been called for the construction of a reinforced concrete bridge over the Yamaska River, at Savage's Mills.

SCHOMBERG, ONT.—Tenders have been called for the erection of a concrete bridge.

TORONTO, ONT.—Tenders have been called for the erection of the Cherry Street bascule bridge superstructure.

VANCOUVER, B.C.—Tenders have been called for the sub-structure of the bascule bridge, Selkirk Water, Victoria, B.C., by T. H. White, Chief Engineer of the Canadian Northern Pacific Railway, Vancouver.

WINNIPEG, MAN.—Tenders have been called for the con-

struction of a reinforced concrete bridge in the Municipality of Brokenhead.

WINNIPEG, MAN.—F. McClain and R. McQueen have been awarded the contract for the erection of four truss bridges. The municipality of Strathcona is building a \$1,500 bridge over a small river. The municipality of Roblin have called for tenders for the erection of three bridges.

## CLUBS, HOSPITALS, THEATRES AND HOTELS.

HAMILTON, ONT.—L. Solman, Manager Alexandra Theatre, Toronto, is selecting a site to build a theatre to cost \$250,000.

INGERSOLL, ONT.—Architect W. G. Murray, Dominion Savings Building, London, has prepared plans for a hospital addition to cost \$10,000. R. G. Wilson & Son have been awarded the contract and work has started.

PORT DOVER, ONT.—The Canadian Pacific Railway Co. are looking for a site to erect a summer hotel to cost \$40,000.

SAULT STE. MARIE, ONT.—Nicholls Bros., Gore St., have commenced work on a picture theatre to cost \$12,000. Tenders wanted for interior fittings.

TORONTO, ONT.—Architect T. W. Lambe, Ruddy Building, may be instructed to prepare plans for a theatre to cost \$200,000. The new theatre will be built at Hamilton Ont.

TORONTO, ONT.—Architect J. D. Fre, 122 Westmount Ave., is preparing plans for a picture theatre to cost \$10,000. Architect G. D. Redmond, 33 Fairview Blvd., has prepared plans for a theatre to cost \$25,000.

VANCOUVER, B.C.—Skene & Christie, have been awarded the contract for the terra-cotta work on the Pantages Theatre at a cost of \$95,980. John Coughlan & Sons have been awarded the steel contract.

WINDSOR, ONT.—The Hotel Dieu, Ouellette Ave., has awarded Urel Jacques the contract for erecting a hospital addition at the cost of \$40,000.

## FIRE LOSSES.

APPLERY, ONT.—George Shaw, barns destroyed by fire; loss \$6,000.

BETHANY, ONT.—Thomas Atkins, farm buildings destroyed by fire; loss \$6,000.

BRAMPTON, ONT.—J. W. Hewetson Shoe Co.'s factory was destroyed by fire; loss \$2,000.

BROCKVILLE, ONT.—Fusman & Cohen, Louis St., Kingston, warehouse destroyed by fire; loss \$6,000.

BROMHEAD, SASK.—Fire razed the town of Bromhead from Tergunod's livery barn to the wheat fields adjoining the town limits; loss \$70,000.

CALABOGUE, ONT.—The Renfrew sawmill was destroyed by fire; loss \$5,000.

CHANNEL GROVE, ONT.—The Canadian Locomotive Co.'s hotel, Kingston, Ont., was destroyed by fire; loss \$25,000.

CHARLOTTETOWN, P.E.I.—The Baptist parsonage and out-buildings destroyed by fire; loss \$3,000.

MITCHELL, ONT.—Fullerton, Hibbert & Logan's agricultural exhibition buildings were destroyed by fire; loss \$3,000.

OTTAWA, ONT.—A grocery store, the property of T. B. Woodroffe, was destroyed by fire; loss \$10,000.

PETERBOROUGH, ONT.—The farm buildings of Thomas H. Atkins, Cavan Twp., were destroyed by fire; loss \$15,000.

PICTON, ONT.—A store belonging to Albert Powers was destroyed by fire; loss \$25,000.

SARNIA, ONT.—The planing mill of the Laidlaw Lumber Co. was destroyed by fire; loss \$30,000.

SASKATOON, SASK.—Fire destroyed the building of the Grand Trunk Railway at Asquith.

ST. MARY'S, ONT.—St. Mary's Candy Kitchen factory was destroyed by fire; loss \$2,000.

ST. THOMAS, ONT.—St. Thomas Dehydration Co.'s factory was destroyed by fire; loss \$30,000.

ST. THOMAS, ONT.—The St. Thomas Construction Co.'s factory was destroyed by fire; loss \$20,000. George McAllister's barrel factory was destroyed by fire; loss \$20,000.

TORONTO, ONT.—E. H. Harcourt & Co.'s building on Wellington St. West damaged by fire; loss \$2,000.

TORONTO, ONT.—The factory of the Harry Webb Co., Ltd., on Buchanan St., was destroyed by fire; loss \$150,000.

## MISCELLANEOUS.

AYLMER, ONT.—J. Davis has been awarded the contract for erecting warerooms to cost \$5,000.

BELLEVILLE, ONT.—Tenders have been received by Architect J. W. Evans for the erection of a steel and concrete machine shop to cost \$100,000.

BRANTFORD, ONT.—P. H. Secord & Sons, Ltd., have been awarded the contract for the erection of a garage to cost \$20,000. L. Taylor, Colborne St., is the architect.

BRIDGEPORT, ONT.—The City of Kitchener has prepared plans for the city waterworks to cost \$100,000.

BROCKVILLE, ONT.—Chas. R. Rudd has prepared plans for a garage to cost \$15,000.

COLLINGWOOD, ONT.—Architect Phillip C. Palin has prepared plans for a garage to cost \$10,000.

DOVER TOWNSHIP, ONT.—A. Cadotte has prepared plans for a stock barn to cost \$7,000.

PORT WILLIAM, ONT.—Work has commenced on a con-

crete elevator to cost \$800,000; Barnett, McQueen & Co., Minneapolis, Minn., have been awarded the contract. Architect D. A. Gordon, Luci Court, has prepared plans for an elevator on Sells St. to cost \$30,000; work has started.

**GLENCOLIN ONT.**—Gordon Staley is having plans prepared for a planing mill to cost \$5,000.

**HALIFAX, N.S.**—Tenders have been received by Andrew Grant, 242 Lower Water street, for the erection of a concrete building on Lower Water street.

**HALIFAX, N.S.**—Tenders have been received by N. C. Mitchell, Naval Store Office, H.M.C. dockyard, Halifax, for the construction of a concrete base for a steam wharf crane.

**HAMILTON, ONT.**—E. R. Gray, James and James Milne, City Engineers, are preparing plans for the waterworks addition to cost \$300,000. Contracts have been awarded for a military barracks to cost \$36,000.

**LINDSAY, ONT.**—Westinghouse, Church, Kerr & Co., of Montreal, have been awarded the contract for the erection of the new arsenal at Lindsay.

**LONDON, ONT.**—Architect A. M. Piper has prepared plans for garbage stables to cost \$11,000. R. G. Wilson & Son, 193 College St., has been awarded the contract for the erection of a cafe addition to cost \$5,000; Watt & Blackwell, Bank of Toronto Building, are the architects.

**MERRITTON, ONT.**—Purdy & Henderson, 10 Cathcart St., Montreal, have been awarded the contract for the erection of paper mills to cost \$200,000; J. G. Jensen, New York City, is the engineer.

**MONTREAL, QUE.**—Tenders have been received by L. N. Senecal, secretary, office of the Board of the Commissioners, City Hall, Montreal, for the erection of the Church bridge and appurtenances.

**OTTAWA, ONT.**—William T. Joy, 134 Sparks St., Ottawa, and 85 High Park Ave., Toronto, has been awarded the contract for the erection of a restaurant to cost \$60,000. Geo. C. Crain, 285 Clemow St., has been awarded the contract for the erection of a machine shop to cost \$9,000, and also the contract for the erection of a finishing shop to cost \$4,000.

**OTTAWA, ONT.**—Tenders have been received by R. C. Desrochers, 111 St. John St., Ottawa, for the construction of a timber wharf, with high, intermediate and low sections, and with warehouse and open shed, at Gagetown, N.B. Tenders have been received by R. C. Desrochers, Secretary, 111 St. John St., Ottawa, for the construction of a freight elevator and alterations to Postal Station A, Montreal, Quebec. Tenders have been received by R. C. Desrochers, Secretary, 111 St. John St., Ottawa, for the construction of protection works, being the improvements to and completion of the protection dyke at Laprairie, County of Laprairie, Quebec.

**PARIS, ONT.**—P. H. Secord and Sons, 133 Nelson St., Brantford, have started work on a dining-room to cost \$6,000.

**PETROLEA, ONT.**—J. & J. Kerr & Sons have been awarded the contract for the erection of a flax mill; R. W. Pawcett, 116½ Front St., Sarnia, is the architect.

**FORT STANLEY, ONT.**—Watt & Blackwell, Bank of Toronto Building, have received tenders for the erection of a restaurant to cost \$12,000, and for a bath house to cost \$10,000.

**ST. JOHN, N.B.**—Tenders have been received by J. W. John, 111 St. John St., Ottawa, for the construction of elevator foundations at St. John, N.B.

**ST. THOMAS, ONT.**—Contracts have been awarded for the erection of knitting mills to cost \$50,000; J. T. Findlay, 386 Talbot St., is the architect.

**SUDBURY, ONT.**—The Day Construction Co. has started work on a cold storage building to cost \$15,000.

**TORONTO, ONT.**—Work will not be proceeded with until next spring on the nurses' home, Bond St., Rynes, Feldman and Watson, 195 Bond St., are the architects, the home will cost \$40,000. Contracts have been awarded for a stable on Queen St. West to cost \$10,000; Burke, Horwood and White, 229 Yonge St., are the architects. Architect S. L. Yolles, 67 Baldwin St., has prepared plans for a garage to cost \$25,000. Wells Bros. of Canada, 56 Gould St., have been awarded the contract for the erection of stock pens to cost \$15,000; Henschein & McLaren, 431 Dearborne St., Chicago, Ill., are the architects. Wells Bros. of Canada, Ltd., have also been awarded the contract for the erection of a wagon shed on Dalhousie St., to cost \$7,500; M. Max Dunning, Chicago, Ill., is the architect. Tenders have been called by S. T. Burgess, 435 Yonge St., for a heating plant for a three-storey building. R. H. Whiteway, 51 Woodycrest Ave., is calling for tenders for the drain work on one pair of residences to cost \$5,000. Tenders were called for plumbing, heating, electric wiring, roofing and kitchen equipment for the refreshment pavilion, opposite Keele St. subway to cost \$8,000, being erected by the Toronto Harbor Commissioners, 50 Bay St.; Chapman and McGriffin are the architects. Tenders are being called for by the City of Toronto, for the erection of a lavatory and waiting room at Sunnyside to cost \$10,000; tenders close Oct. 17, 1916. Wm. Vokes, 228 Rusholme Road, is excavating for a garage on Duke St. to cost \$10,000; tenders will be called for plumbing and heating.

**VANCOUVER, B.C.**—Ralph Simpson has commenced the erection of a new shingle mill at Arrowhead.

**VANCOUVER, B.C.**—Tenders have been received by J. G. Sullivan, chief engineer of the Canadian Pacific Railway Company, for the construction of a jetty pier.

**VANCOUVER, B.C.**—The Canadian Pacific Railway Co. have prepared plans for wharves at Vancouver to cost \$1,500,000. The City of Vancouver is spending \$5,000,000 on extension to wharves.

**VANCOUVER, B.C.**—Tenders have been received by M. H. Macleod, general manager of the Canadian Northern Railway Co., for the construction of freight offices and freight sheds at False Creek, Vancouver.

**VERDEN, MAN.**—Tenders have been received by Architect E. Prain, Syndicate Block, Port St., Winnipeg, Man., for the erection of a skating and curling rink at Verden.

**WINNIPEG, MAN.**—The congregation of the Bethel Mission have decided to erect a new building.

**WINNIPEG, MAN.**—Architect J. S. Metcalf has prepared plans for a concrete elevator to cost \$25,000. The Public Market Company Union Stock Yards are building a concrete addition with a brick veneer front at a cost of \$7,050.

## PLANTS, FACTORIES AND WAREHOUSES.

**ACTON, ONT.**—Architect J. M. Jeffrey, 9A Wellington street east, has prepared plans for a factory, to cost \$15,000.

**AYLMER, ONT.**—Work has started on warehouses for E. Thayer, on Main street; cost \$5,000.

**BELLEVILLE, ONT.**—Mr. H. C. Long, of the Maple Tire Co., is calling for tenders for the erection of a warehouse, to cost \$60,000. The Maple Leaf Tire Co., Ltd., is erecting a factory on Town line and Union street, to cost \$40,000.

**BRANTFORD, ONT.**—P. A. Secord & Son, 133 Nelson street, have been awarded the contract for building a warehouse addition at a cost of \$15,000.

**COCHRANE, ONT.**—The Hudson Bay Company is contemplating erecting a warehouse on Fifth avenue, to cost \$30,000.

**CATRAM, ONT.**—T. Kenny Co., 132 Christina street Sarnia, has started work on remodeling a warehouse at a cost of \$5,000.

**CHATHAM, ONT.**—Tenders are being called by Engineer W. G. McGeorge, of the Dolson Creek Mechanical Works, for a pumping plant; tenders closed October 7.

**DUNDAS, ONT.**—John Bertram & Sons, Limited, Hall street, have started work on a factory addition, to cost \$30,000.

**GALT, ONT.**—The Galt Paper Box Co., King street, are excavating for a factory addition, to cost \$10,000.

**HAMILTON, ONT.**—George Mills, King street east, has been awarded the contract for erecting a factory addition at a cost of \$6,000. W. Yates, Jr., 18 Leeming street, has started work on the Bell Thread Company's factory addition; cost \$10,000. Architects McEhie & Darling, Bank of Hamilton Building, have prepared plans for a factory, to cost \$15,000; Geo. F. Mills has been awarded the contract and work has started. The Acme Stamping Co., Sydney street, have had plans prepared for a factory addition at a cost of \$15,000. H. G. Christman Co., Federal Life Building, have started work on a factory addition, to cost \$5,000. MacKay & Paulin, Bank of Hamilton Building, may be awarded the contract for erecting a warehouse on Dewey street, to cost \$75,000.

**KITCHENER, ONT.**—The Kimmel Felt Co., Ltd., Kitchener, Ont. are excavating for a factory, to cost \$40,000.

**LISTOWEL, ONT.**—J. W. Scott & Son, Listowel, have started work on warehouses.

**LONDON, ONT.**—George F. Whalen will build two new pulp plants, one at Quatsino Sound, and the other at Swanson Bay.

**LONDON, ONT.**—A. B. Green, York street, has prepared plans for an auto showroom, to cost \$5,000. C. S. Hyman & Co., Richmond street, are excavating for a warehouse on Richmond street, to cost \$6,000. The McClary Mfg. Co., Wellington street, have prepared plans for a factory addition, to cost \$35,000.

**MONCTON, N.B.**—Fred Ryan, contractor, of Fredericton, N.B., has been awarded the contract for erecting a smelting plant for the Bathurst Lumber Co.

**MONTREAL, QUE.**—Peter Lyall & Son are erecting a warehouse on Western avenue, in Notre Dame de Grace Ward, to cost \$20,000.

**NEW WESTMINSTER, B.C.**—The Saskatchewan Steel and Bridge Co. are looking for a site on which to build a new plant.

**NIAGARA FALLS.**—The Perfection Tire and Motor Co., Madison, Iowa, is erecting a factory in Poplar Park, to cost \$65,000.

**OTTAWA, ONT.**—The Ottawa Car Mfg. Co., 311 Slater street, have prepared plans for a factory on Albert street, to cost \$250,000. Architects Jas. Holden & Graham, 147 Albert street, have prepared plans for a factory on Albert street, to cost \$30,000; work has started.

**PORT ARTHUR, ONT.**—The Thunder Bay Construction Co., Port Arthur, have been awarded the contract for erecting a starch factory, to cost \$60,000.

**PORT COLBORNE, ONT.**—The Foundation Co., Ltd., 224 St. James street, have been awarded the contract for erecting a nickel plant, to cost \$3,000,000.

**RENFREW, ONT.**—Architect John McNicol, Renfrew, has prepared plans for a factory addition, to cost \$10,000; tenders have been called.

**SARNIA, ONT.**—The Ontario Cannery, Sarnia, Ont., have prepared plans for a canning factory, to cost \$75,000.

**SIMCOE, ONT.**—Architect W. C. Tilley, 11 Temple Building, Brantford, has prepared plans for a factory, to cost \$12,000; the factory is ready for the roof.

**ST. JOHN, N.B.**—Tenders are being called for the erection of a wharf, warehouse and shed, at Gagetown, N.B.

**ST. THOMAS, ONT.**—The Canadian Woodenware Co., Gravel road, have started work on a factory, to cost \$20,000.

**TILLSONBURG, ONT.**—The Maple Leaf Tool Co., Tillsonburg, are preparing plans for an addition to their factory, to cost \$10,000.

**THREE RIVERS, QUE.**—D. A. Gordon, M.P., will erect a sugar beet refinery at Three Rivers.

**TORONTO, ONT.**—Architect R. S. Hambleton, 41 Sussex avenue, has prepared plans for a factory addition at a cost of \$8,000. Architect Henry Simpson, 79 Spadina avenue, has prepared plans for a factory, to cost \$30,000. R. C. Kirby, 537 Yonge street, has been awarded the contract for erecting a bread factory on Dovercourt road, to cost \$20,000. Architects Ross & MacDonald, 908 Royal Bank Building, have prepared plans for the hydro buildings on Caer Howell and Murray streets; tenders have been called. J. V. Gray Construction Co., Confederation Life Building, are excavating for three factory buildings on Paton road to cost \$25,000. The Canada Met. Co., 35 Fraser avenue, is erecting a new munition plant on Fraser avenue, to cost \$25,000; F. S. Mallory, 65 Adelaide street east, is the architect. The Massey-Harris Co., King street west, has started work on a factory addition, to cost \$5,000. C. A. Scott, 575 Logan avenue, has started work on a factory addition on Geary avenue, to cost \$12,000. Tenders have been called by Architects Curry & Sparling, 105 Bond street, for the erection of a factory, to cost \$8,000. The F. W. Woolworth Ltd., 4 Queen street west, have started work on a warehouse on George street, to cost \$40,000; S. L. Yolles, 67 Baldwin street, is the architect. The Dominion Building Products, Limited, has prepared plans for a factory addition, to cost \$5,000. Wells Bros., 96 Gould street, have started work on a warehouse on Dalhousie street, to cost \$75,000. The Dominion Building Products, Limited, have started work on a brick plant, to cost \$30,000. The Sheet



Metal Products Co., 199 River street, have prepared plans for a factory addition, to cost \$6,000; Brown & Cooper have been awarded the contract. Architect E. J. Smith, 30 Shannon street, has prepared plans for a factory addition, to cost \$6,000. The Toronto General Repair and Construction Co., 40 Camden street, have started work on a factory addition on Morrow avenue, to cost \$7,000. Mr. J. G. Kent, Confederation Life Building, is erecting a warehouse on Queen street west, to cost \$40,000.

WELLAND, ONT.—Ernest Platts, Pelham, Ontario, is having plans prepared for a warehouse and offices on North Main street, to cost \$12,000.

WINNIPEG, MAN.—The Niagara fruit growers will erect a cold storage plant in Winnipeg; work will start this fall.

#### PUBLIC BUILDINGS AND STATIONS.

ASHCROFT, B.C.—Tenders have been called for the erection of public building at Ashcroft, B.C.

BRANTFORD, ONT.—The Lake Erie and Northern Railway have started work on a new station, to cost \$25,000.

DELHI, ONT.—The Grand Trunk Railway, Delhi, Ontario, have prepared plans for a new station, to cost \$6,000.

FREDERICTON, N.B.—A new \$3,000 pumping station will be erected at the Experimental Farm; the building will be of concrete.

HALIFAX, N.S.—John J. Grant, of New Glasgow, has been awarded the contract for a new library building.

HAMILTON, ONT.—A new radial station is to be built on the site now occupied by the Murray Street School, to cost \$100,000. Architect E. T. Sifton, engineer, City Hall, is preparing plans for a new hydro station.

KIRKLAND LAKE, ONT.—The North Bay Light, Heat and Power Co., 17 Main street west, North Bay, have started work on a transformer station, to cost \$20,000.

LETHBRIDGE, ALTA.—Tenders have been called by J. M. Cameron, general superintendent, Canadian Pacific Railway, for the construction of two stations at Manyberries.

MONTREAL, QUE.—Architect Kenneth G. Ren is preparing plans for the new city hall, the cost of which is to exceed \$200,000.

OKAVILLE, ONT.—Architect Wm. Conroy, 72 Queen street west, Toronto, has prepared plans for a new fire hall, to cost \$10,000.

OTTAWA, ONT.—Tenders have been received by J. W. Fuglsley, Secretary Department of Railways and Canals, for the erection of a station building at Manouan, Que.

ST. JOHN, N.B.—Tenders have been called by the St. John Railway Company for the erection of a pumping station.

TORONTO, ONT.—The Hydro-Electric, 226 Yonge street, is about to start work on a sub-station on Jefferson avenue, to cost \$20,000. Contracts have been awarded for the new Hydro sub-station at Duncan and Nelson streets; the cost will be \$96,000.

WINNIPEG, MAN.—The Manitoba Bridge and Iron Works have been awarded the contract for the steel work on the dome of the new capitol.

#### RESIDENCES, STORES AND FLATS.

ALTON, ONT.—Architect J. M. Jeffrey, 9A Wellington street east, Toronto, prepared the plans for Andrew Dods' new residence; cost \$30,000.

ARNHEM, ONT.—Mr. Paul Kitzner, Elgin street, is having plans prepared for a residence on Elgin street, to cost \$6,000.

AYLMER, ONT.—H. Z. Balcom is erecting several houses. F. McCusker, Aylmer, O. C., has prepared plans for a variety store, to cost \$5,000.

BRANDON, MAN.—An apartment house will be built on the corner of Twelfth and Princess streets next spring.

BRANTFORD, ONT.—R. S. Mason, Toronto, has commenced work on stores and office alterations, to cost \$5,000.

CHARLOTTETOWN, N.B.—Mr. T. B. Riley, Queen street, is erecting a three-storey store.

CHARLOTTETOWN, N.B.—John Power has been awarded the contract for building a new double tenement house on Ruston street east.

COLDWATER, ONT.—Nicholson Bros. are having plans prepared for a store, to cost \$10,000.

CONISTON, ONT.—The La Berge Lumber Co., Sudbury, have been awarded the contract for erecting a boarding house, to cost \$14,000.

COPPER CLIFF, ONT.—George R. Craig, 2 Park W., has prepared plans for a residence, to cost \$7,000; La Berge Lumber Co., Sudbury, have been awarded the contract. Architect H. E. Jones, Copper Cliff, has prepared plans for G. E. Silvester's residence, to cost \$6,000.

CREIGHTON, ONT.—Architect Martin Hasset, Sudbury, has prepared plans for a store and residence, to cost \$12,000.

FENELON FALLS, ONT.—Alex. McLeod, 57 Ben Lomond avenue, Toronto, has started work on erecting stores and apartments, to cost \$16,000.

HALIFAX, N.S.—Tenders have been received for the erection of a brick building on the premises of the Maritime Home for Girls.

HAMILTON, ONT.—Architect W. H. Hunkin, Lister Building, is preparing plans for an apartment house on York street, to cost \$8,000. J. M. Farewell, 88 St. Clair avenue, is erecting a residence on Proctor boulevard, to cost \$5,000. Begg & Co., 38 North James street, have commenced work on store alterations, to cost \$10,000. H. E. Welton, 46 Arthur avenue, is having plans prepared for a store on King street east, to cost \$10,000. Work has started on Mrs. T. W. Brennan's apartments on Tisdale avenue. S. B. Coon & Son, architects; cost \$20,000.

LONDON, ONT.—Dr. Hadley Williams, 498 Queens avenue, is erecting a residence; J. M. Moore is the architect; the cost is \$10,000. Morsan & Sons, London, have commenced work on a residence on Broughdale avenue, to cost \$5,000.

OSHAWA, ONT.—Architects Ellis & Ellis, Manning Chambers, Toronto, have prepared plans for a residence for W. J.

Burns, to cost \$8,000; W. J. Trick & Co. have been awarded the contract. Architect Darling & Pearson, 2 Leader lane, Toronto, have prepared plans for a residence for R. S. McLaughlin, to cost \$75,000; Dickie Construction Co., Limited, Ryrie Building, Toronto, have been awarded the contract.

OTTAWA, ONT.—Chas. Joyce, 383 Somerset, is erecting a store and apartments on Spadina and Somerset, at a cost of \$12,000. C. A. Bowman, 16 Monk street, is building a residence in Rockcliffe Park; Milton & Burgess are the architects; the cost is \$7,000. H. Boylan has commenced work on alterations to apartments; the cost is \$10,200, and W. H. George, Castle Building, is the architect. A. E. Thomas, 53 Queen street, is erecting a residence on Sunnyside avenue, to cost \$5,500. M. P. Davis is building a residence on Laurier street; J. W. H. Watts, Central Chambers, is the architect; the cost is estimated at \$15,000. A. E. Paquette is erecting stores and apartments at the corner of St. Patrick and Chapel streets; the estimated cost is \$12,000. Work has been held up on the stores and offices being erected for McKinley & Northwood, on Rideau street; J. A. Ewart, Union Bank Building, is the architect; the building will cost \$10,000 when completed.

PARRY SOUND, ONT.—Wm. Beatty Co., Ltd., have commenced work on a new store; Jas. Thompson, 43 Victoria street, Toronto, is the architect; the cost is estimated at \$10,000.

PERDUE, SASK.—Work has started on a store at the corner of Celtic and Oceanic streets.

PORT STANLEY, ONT.—D. A. Cattanach, Hillcrest, Port Stanley, will erect several summer cottages, estimated to cost about \$10,000.

RENFREW, ONT.—Architect E. Ewan Parry, Renfrew, has prepared plans for a store and apartments on Raglan street for John Mitchell, to cost \$20,000; G. T. Moore, North Bay, Ont., has been awarded the contract.

SARNIA, ONT.—Architect A. M. Coleman, corner of Cornwall and Milton streets, has prepared plans for a residence for W. H. Stewart on London road, to cost \$12,000.

SUDBURY, ONT.—McWilliam & Morganay are having plans prepared for a store and warehouse on Elm street, to cost \$14,000. D. E. Hennessey is erecting a residence, to cost \$5,000. Work has started on a store and residence for Mr. German; Martin Hasset is the architect; the cost is estimated at \$5,000.

TORONTO, ONT.—J. W. Butchart, 1 St. Ives avenue, will erect a residence for E. O. Burnett, in Lawrence Park, to cost about \$6,000. Architect J. C. Irie, 116 Westmount avenue, has prepared plans for several residences on Millerson avenue, for E. T. Miller & Sons. Work has started on a residence for J. J. Allen, on Roxboro drive; Hynes, Feldman & Watson, 105 Bond street, are the architects; the cost will be about \$12,000.

J. M. Skelton, Room 36, 33 Richmond street west, is erecting a residence at the corner of Heald and Avin streets. Architect D. C. Cotton, 54 Adelaide street east, has prepared plans for a residence for A. A. Kennedy, on Glen road, to cost \$6,000.

Architect W. Bredin Galbraith, Traders Bank Building, is preparing plans for a residence for W. R. Levack, 61 Gothic avenue, to cost \$10,000. Geo. E. Case, 56 Oakwood avenue, is excavating for two residences on Glenmount avenue to cost \$6,000. J. M. Walkey, 226 Shaw street, is erecting a residence on Davenport road, to cost \$5,000.

Turton & Chenevix, 155 Ellesworth avenue, have prepared plans for four detached residences on Humewood avenue, to cost \$16,000. G. S. Petrie, 493 Dupont street, is excavating for a duplex residence on Westmount avenue, to cost \$8,000. T. Prest, 129 Beauchamp avenue, will erect a duplex residence on Keele street, to cost \$7,000.

Architects S. B. Coon & Son, Ryrie Building, have prepared plans for a residence on East Roxboro street, to cost \$15,000. Brown Brass and Copper Rolling Mills, New Toronto, are erecting a boarding house, at a cost of \$14,000; Henry Simpson, 75 Spadina avenue, is the architect. A. A. Thompson, 88 Warren road, is erecting a residence on St. Clair west; Edwards & Edwards, 18 Toronto street, are the architects; the cost will be \$12,000.

Work will start on a new residence for Mr. E. L. MacLean, in Rosedale. Turke, Horwood & White, 229 Yonge street, are the architects; the cost will be \$15,000. Architect W. Bredin Galbraith, Traders Bank Building, is preparing plans for a residence in the High Park district, to cost \$6,000.

Architect W. Bredin Galbraith, Traders Bank Building, is calling for tenders for a residence on Indian road, to cost \$6,000. A. R. Doherty, 56 St. Andrews Gardens, has commenced work on a new residence on St. Andrews avenue, to cost \$7,000. J. W. Butchart, 1 St. Ives avenue, has commenced work on a store and residence at the corner of Dundas and Bloor streets; the cost will be \$6,000.

Architect J. Varcoe, 11 Oakmount road, has prepared plans for an apartment house on Ashworth avenue, to cost \$15,000. Architect C. S. Corb, 71 Bay street, prepared the plans for C. S. Blackwell's residence on Dunvegan road, which will cost \$30,000. J. J. Vaughan, 32 Summerhill Gardens, is excavating for an apartment house, to cost \$12,000.

W. J. & C. W. Callow, 6 Sword street, have prepared plans for one pair of semi-detached residences, to cost \$5,000. H. H. Williams & Co., 38 King street east, have taken out the excavation for a store and warehouse on Yonge street, to cost \$30,000; C. J. Gibson, 51 Yonge street, is the architect. Architect C. M. Willmott, 104 Stillard avenue, has prepared plans for a residence on Stillard avenue, to cost \$5,000.

Gagnon & Cummings, 2359 Queen street east, are excavating for an apartment house on Queen street east, to cost \$9,000. J. W. Butchart, Lawrence Park, has commenced work on two residences, to cost \$12,000. Wells Bros., of Canada, Ltd., 96 Gould street, were awarded the contract for the erection of a home on Hlecker street for the Hebt. Simpson Co., Ltd., to cost \$10,000. A. A. Mitchell, 502 Palmerston boulevard, is contemplating the erection of a pair of duplex residences, to cost \$14,000.

WINDSOR, ONT.—D. W. McGregor is erecting a residence on Victoria avenue; J. C. Pennington, La Belle Building, is the architect; the cost will be about \$10,000. Work has commenced on a store on Ouellette street for Geo. Muir; J. R. Sculland, La Belle Building, is the architect; the cost is estimated at \$20,000.

#### SCHOOLS, COLLEGES AND CHURCHES.

ANDERSON TOWNSHIP, ONT.—Architect A. C. Malloy, Amberburg, has prepared plans for a public school to cost \$5,000; Joseph Dufour, 132 Aylmer avenue, and John Trombley, 131 Caron avenue, Windsor, have been awarded the contract.

AUBIGNY, MAN.—Work has started on a new school, to cost \$2,500.



**BEAMSVILLE, ONT.**—Tenders have been received by A. E. Hoshal, chairman Building Committee, for the erection of a High school, to cost \$20,000; W. W. Lachance, Village Inn., Grimsby, Ont., is the architect.

**BERTON, ONT.**—Architect John Wilson, Collingwood, Ont., has prepared plans for a school, to cost \$20,000.

**BIRCHCLIFFE, ONT.**—Architect Wm. Fraser, 34 Victoria street, has prepared plans for a school addition, to cost \$30,000.

**BRANTFORD, ONT.**—John McGraw & Son, Temple Building, has started work on the excavation for a school, to cost \$20,000.

**BRUCE MINES, ONT.**—A. R. Wood, 136 Pilgrim street, Sault Ste. Marie, has been awarded the contract for the erection of a school, to cost \$30,000; Thomas R. Wilks, 612 Queen street, Sault Ste. Marie, is the architect.

**COLLINGTON, ALTA.**—Tenders have been received for the erection of a school house.

**EAST SELKIRK, MAN.**—Tenders have been received by E. C. Goulding, secretary-treasurer Happy Thought S.D., No. 1,452, for the erection and completion of a four-room stone school building.

**EDMONTON, ALTA.**—Tenders have been received by Lac La Biche School Board for the erection of a frame school.

**GALT, ONT.**—Architect J. Evans, 30 Water street, Galt, has prepared plans for a school addition, to cost \$12,000.

**GUELPH, ONT.**—R. D. McNair, Campbellton, has been awarded the contract for the erection of new school.

**HAMILTON, ONT.**—Architect Stewart Witton, King and Hughson streets, has prepared plans for a school, to cost \$40,000. Architect F. W. Warren, Bank of Hamilton Building, has prepared plans for a church, to cost \$9,000; work has commenced. The Park Baptist Church, King street west, is having plans prepared for a church on King street west, to cost \$10,000.

**KEMPTVILLE, ONT.**—Hon. J. S. Duff, Minister of Agriculture, Toronto, is having plans prepared for an agricultural school building, to cost \$100,000.

**KITCHENER, ONT.**—Architect A. W. Holmes, 10 Bloor street east, Toronto, has prepared plans for a church, to cost \$45,000.

**LOUISEVILLE, QUE.**—Architect Pierre Levesque has prepared plans for a church, to cost \$173,000; Joseph Couture, Levis, Que., has been awarded the contract.

**MEDICINE HAT, ALTA.**—Tenders have been received for the erection of a two-storey four-room brick school building, in the village of Empress, Province of Alberta.

**MIMICO, ONT.**—Work has started on an addition to the Industrial School, to cost \$5,000.

**NOTRE DAVANTAGE, QUE.**—The excavation is well under way for the new Roman Catholic church which will be built on the corner of Riverdale and Glen streets.

**PEMBROKE, ONT.**—Architect W. C. Keighley has prepared plans for a school, to cost \$53,000; H. P. Beck, 18 Woodlawn avenue, Ottawa, has been awarded the contract.

**PORT CREDIT, ONT.**—Architect D. C. Cotton, 54 Adelaide street east, has prepared plans for a school, to cost \$20,000; H. T. Darragh, 161 Close avenue, Toronto, has been awarded the contract.

**QUEEN HILL, ONT.**—La Berge Lumber Co., Sudbury, has been awarded the contract for the erection of a frame school, to cost \$4,000.

**SIMCOE, ONT.**—Architects Chapman & McGillivray, 95 King street east, Toronto, have prepared plans for two schools, to cost \$40,000.

**SHERBROOKE, QUE.**—Architect W. Gregoire has prepared plans for the St. Elie d'Orford Church.

**ST. CATHARINES, ONT.**—The School Board has prepared plans for a school addition, to cost \$20,000.

**ST. JOHN, N.B.**—Architect A. Sincennes, Moncton, is preparing plans for a college, to cost \$200,000.

**ST. JOHN, N.B.**—Architect P. Neil Brodie has prepared plans for a school to be built on Bentley street; the contracts have been awarded.

**ST. THOMAS, ONT.**—The Anglican Church is having plans prepared for a church, to cost \$10,000.

**SUDBURY, ONT.**—Architect Victor L. Morgan, Empire Building, has prepared plans for a school, to cost \$23,000; Harry Evans, 272 College street, has been awarded the contract.

**SWANSEA, ONT.**—Architects Jeffrey & Watson, 9A Wellington street east, Toronto, have prepared plans for a school, to cost \$30,000.

**TIMMINS, ONT.**—Architects Ellis & Ellis, Manning Chambers, Toronto, have prepared plans for a school, to cost \$25,000; P. H. Secord & Son, Brantford, have been awarded the contract.

**TORONTO, ONT.**—Architect A. Post has prepared plans for a school addition, to cost \$7,000; Wickett Bros., Ltd., 35 Deer Park Crescent, have been awarded the contract for the masonry work. Tenders have been received by Architects Curry & Sparling, 105 Bond street, for the erection of a Masonic temple, to cost \$175,000.

**TWEED, ONT.**—Ellis & Ellis, Manning Chambers, Toronto, are receiving tenders for the erection of a school, to cost \$25,000.

**VICTORIA, B.C.**—Tenders have been received by J. E. Griffith, Deputy Minister of Public Works, for the erection of the county line school. Tenders have also been received for the erection of a school in the Esquimalt Electoral District.

**WINNIPEG, MAN.**—Tenders have been received by Wm. Lawton, secretary-treasurer, School Board, for the erection of Wentworth School.

#### MAY ADD FIVE STORIES.

The new Paris building at the northwest corner of Portage avenue and Garry street, Winnipeg, Man., will probably be altered, and an additional five stories added. This is one of the handsomest structures in Winnipeg. L. Landrat, head of the building company in Paris, France, discussed the matter with his agents, Messrs. Bingham and Frahouet, of Winnipeg, a few days ago, and a member of this firm stated that nothing definite had been decided on, but he did not deny that the matter was under serious consideration.

#### PORT HOPE SANITARY MANUFACTURING CO.

Considerable satisfaction is expressed in business circles from the fact that the Standard Ideal Co., of Port Hope, which has been in liquidation for some months, has been purchased by a strong company, which will carry on the business in a progressive manner. The new company has been incorporated under the name of the Port Hope Sanitary Manufacturing Company, with head office at 1010 Royal Bank Building, Toronto. The new company is capitalized at \$1,250,000. The directors include L. M. Wood, president; R. J. Cluff, president of the



**FRED ARMSTRONG**

General Manager, Port Hope Sanitary Manufacturing Co.  
*British and Colonial Press.*

Cluff Manufacturing Co., vice-president; W. J. Cluff, president Canada Pipe and Steel Co.; W. D. Ross, vice-president Nova Scotia Steel Co.; M. L. Davies, vice-president Standard Chemical Co., directors, with Fred Armstrong as managing director and general manager. With such a strong board, and in such efficient management, a bright future for this company is assured. Mr. Fred Armstrong has resigned from active connection with Fred Armstrong Co., Ltd., which will in future be managed by Mr. Wm. Armstrong.

#### TECHNICAL SOCIETIES.

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

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

**CANADIAN INSTITUTE.**—198 College St., Toronto. President, J. B. Tyrrell; Secretary, Mr. J. Patterson.

**CANADIAN NATIONAL ASSOCIATION OF BUILDERS' EXCHANGES.**—Western Section—President, C. R. Frost, 609 Second St., Edmonton, Alta.; Secretary-Treasurer, A. M. Frith, 294 McDougall Ave., Winnipeg. Eastern Section—President, Geo. Gander, Toronto; Secretary-Treasurer, P. L. Fraser, Builders' Exchange, Toronto.

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

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

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

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

## CONTRACTORS and SUB-CONTRACTORS

As Supplied by The Architects of Building  
Featured in This Issue

Provincial Hospital for the Insane, Whitby, Ont.:

Architect, James Govan.  
Assistant Architect, A. B. C. Nicol.  
Engineers, McMullen, Riley & Duley.  
Brick, Provincial Government Clay Plant.  
Bow Off Tank, Jencks Machine Co.  
Bottlers, Goldie & McCulloch Co., Ltd.  
Boiler Feed Pump, Bowden Machine Co., Ltd.  
Carpets and Rugs, Robert Simpson Co., Ltd.  
Casements and Window Construction, also doors and window trim, Provincial Reformatory, Guelph.  
Concrete Chimney, General Concrete Construction Co.  
Concrete Work, Provincial Government.  
Crane, John T. Hepburn, Ltd.  
Coal Handling Apparatus, Canadian Link Belt Co., Ltd.  
Cement, Canada Cement Co., Ltd., National Portland Cement Co., Ltd.  
Electric Fixtures, McDonald & Willson, Ltd., Geo. J. Beattie, W. E. Dillon Co., Ltd.  
Electric Wiring, Electrical Fittings Co., Ltd., Northern Electric Co., Ltd.  
Electrical Distribution System, Northern Electric Co., Ltd.  
Expanded Metal, Steel and Radiation, Ltd.  
Fire Doors, A. E. Ormsby Co., Ltd., and W. E. Dillon Co., Ltd.  
Fire Hose, Dunlop Tire and Rubber Goods Co., Ltd.  
Feed Water Heater, Canadian Grisco Russell Co., Ltd.  
Ferro Doyetail, Pedlar People, Ltd.  
Flooring, Provincial Clay Plant Tile.  
Fittings, Taylor Forbes, R. Bigley Mfg. Co., Ltd., Fred Armstrong Co., Ltd.  
Furniture, Ontario Reformatory, Guelph, Ont.  
Glass, Pilkington Bros., Ltd., Consolidated Plate Glass Co., Ltd.  
Hoists and Dumbwaiters, Rocolson Elevator Works, Ltd.  
Hardware, Belleville Hardware Co., Ltd.  
Heat Regulating System, Johnston Temperature Regulator Co. of Canada.  
Heating System, C. A. Dunham Co., Ltd.  
Interior Fittings, Cabinets and Wood Work, Ontario Reformatory, Guelph.  
Inter-Phone System, Northern Electric Co., Ltd.  
Kitchen Utensils and Equipment, Gurney Foundry Co., Ltd.  
Limeum, Robert Simpson Co., Ltd.  
Metal Lath, Pedlar People, Ltd., Galt Art Metal Co., Ltd., Steel & Radiation, Ltd.  
Paints, Martin Senour Co., Ltd.  
Packing, Garlock Packing Co., Ltd.  
Plumbing, Fred Armstrong Co., Ltd.  
Pipe, Page & Hersey, R. Bigley Mfg. Co., Ltd.  
Pipe Conduit, Ric-Wil Underground Pipe Covering Co.  
Pipe Covering, Armstrong Cork Co., Ltd., H. W. Johns-Manville Co., Phillip Carey.  
Power Machinery, John Inglis, Ltd., Smart Turner Co., Ltd., Storey Pump and Equipment Co., Ltd.  
Refrigerators, John Hillock & Co., Ltd.  
Refrigeration Equipment, Madison Cooper Gravity Brine System.  
Refrigeration Insulation, Robinson Bros. Cork Co., Ltd.  
Reinforcements, Barnes & Peckover, Pedlar People, Ltd.  
Radiators, Gurney Foundry Co., Ltd., Steel & Radiation, Dominion Radiator Co., Ltd., Taylor Forbes, Ltd.  
Radiator Valves, Dole.  
Roofing, Provincial Government Clay Plant Tile.  
Screens, Watson, Ltd.  
Structural Iron and Steel, Hamilton Bridge Co., Ltd., Dominion Bridge Co., Ltd.  
Tile Wall, C. W. Beal.  
Tile Floor, Provincial Government Clay Plant.  
Terra Cotta, Provincial Clay Plant.

Varnish, Martin Senour Co., Ltd., James Langmuir & Co., Ltd.  
Ventilating Duct System, W. E. Dillon Co., Ltd.  
Ventilating Fans, Canadian Sirocco, Ltd., Canadian Buffalo Forge Co., Ltd.  
Contractors—General. All work carried on by Assistant Provincial Secretary.

### CIRCULATION REPRESENTATIVE

We have an opening for a good live travelling Circulation Representative to call on the Architects, Engineers and Contractors throughout Canada. Salary and Commission. Address CIRCULATION MANAGER, "CONSTRUCTION."

### NEW C.N.R. TERMINAL AT MONTREAL

Work will be commenced next month on the new terminal station of the C. N. R. at Montreal, and, according to Sir Donald Mann, vice-president of the company, trains will be running through the terminal about the first of May next year.

### NEW THEATRE FOR VANCOUVER.

The contract for the new Pantages Theatre on Hastings street, Vancouver, B.C., has been awarded to Skene and Christie, a local firm of contractors. The cost of the terra-cotta work alone is estimated at \$100,000. The entire cost of the new theatre will be in the neighborhood of \$300,000.

### ACTIVITY IN WEST.

Several small buildings and warehouses are now in course of erection in Winnipeg. The Strand Theatre is making alterations at a cost of \$10,000. The Queen's Hotel is spending \$20,000 in alterations to its premises. The Ashdown Company is erecting a stable, warehouse and garage on James street at a cost of \$26,000.

### NEW INDUSTRY FOR CANADA.

Arrangements are now being made to establish a soda industry at Amherstburg, Ont. A suitable site has been selected near the limestone quarries, Anderson township, by the Sival Process Company, of Syracuse, N. Y., and an issue of \$300,000 stock has been made to provide funds for building and equipping of the new plant.

### NEW HOMES FOR SOLDIERS.

Capt. Symons, architect of the Military Hospital Commission, is now at work on the plans for alterations to the Elmhurst Convalescent Home, and the Mowat memorial Military Hospital at Kingston, Ont. Capt. Symons is well known to the architects of Canada as a most able and efficient designer. He designed two of the Queen's University buildings, which are a standing tribute to his ability.

### WINTER QUARTERS FOR SOLDIERS.

Many of the battalions which have been summering at Camp Borden are now preparing for their winter quarters. At Hamilton a contract has just been awarded by the city for the erection of bunk houses and other buildings to house the soldiers over the winter. These buildings are now in course of erection, and will cost over \$50,000. Niagara Falls is also falling in line, and has commenced active building operations on several bunk houses for the 176th Battalion; the estimated cost is about \$8,000. Several large schools in Toronto have been turned over to the soldiers for the winter months, and the necessary alterations are now in progress. The Exhibition authorities have turned over several of their buildings to the soldiers, and they are now being fitted up as winter quarters.

### Catalogues, Etc.

**Kawneer Store Fronts.**—Boosting Business is the title to an interesting and attractive booklet that has just been published by the Kawneer Manufacturing Co. It shows in an illustrated and descriptive way how the demand for serviceable and attractive store fronts has been met and how many advantages, both structural and commercial have been incorporated in these fronts.

**The McAlear System.**—This book contains in detail a complete description of the McAlear System and appliances and is also an authoritative text book on the Science of Steam Heating for all classes of buildings. The many phases of vacuum and vapor heating are well covered. The Arthur S. Leitch Co., Kent Building, Toronto, are Canadian representatives and from whom this book may be obtained.

**Stanley Garage Hardware** is the title of a booklet just published by the Stanley Works at New Britain, Conn., illustrating and describing a new line of builders' hardware, especially designed for garage use. The line includes garage door holders, garage hinges, garage door bolts, and garage door latches and pulls. Valuable information for architects and suggestions designed to help in specifying garage hardware are contained in this booklet, a copy of which may be had on request.

**Kieley & Mueller Specialties.**—A catalogue superseding all previous issues has been published. It gives a comprehensive description of the Kieley line, setting forth by statements, cuts and illustrations the different specialties and the services for which they are suitable. It invites the attention and consideration of all architects, engineers and contractors as to the values and advantages of Kieley specialties. The Canadian representatives, Arthur S. Leitch Company, Toronto, will forward this catalogue upon request.

**Protecting and Decorating Brick and Concrete Buildings.**—The Martin-Senour Co., Ltd., producers of paints and varnishes, have issued an illustrated and very descriptive book on their Concrete-tone. Owing to the attention that cement is claiming as a building material, the protection of the surface is important. What Concrete-tone will do, and how to use it, is amply described in this book. A color card is enclosed with the book, giving the colors that may be had for interior, exterior and floor dressing. Copies may be had from Martin-Senour Co., Montreal.