Coming to the soil pipes inside a house, do not on any account have anything else but iron. They are all the better of being coated with some solution, though there is an objection to this, in that any blows that may be in the iron are very difficult to discover. Inspect all the pipes closely to see that they are sound and have the joints well made with oakum and lead. As in the fire clay drains, do not if it possibly can be avoided, use square branches. Inspect the inside of the branches to see that no ridge is there, a ridge sometimes occurring in the casting at the junction of the cones. Another point to be particular about is where a pipe is to be cut to make a short length. Do not allow a jagged edge to be used, as the consequence will be that when the oakum is put in some of it will be almost sure to get into the pipe thus, and form an obstruction. At the junction of lead and iron pipes I would advise you to use copper flanges, as brass is more liable to corrosive action than copper.

ARCHITECTURAL GUILD.

THE Architectural Guild held its monthly meeting at Long Branch on Thursday afternoon, the 9th of August. There was a very good attendance and the afternoon was spent in a very pleasant and profitable manner.

ARCHITECTURAL EDUCATION IN THE STATES.

UNDER the above heading the *American Architect* has a lengthy article on the architectural instruction given in the Massachusetts Institute of Technology. As it is the expressed purpose of the Minister of Education for Ontario to establish a Chair of Architecture in Toronto shortly, the course of study prescribed in the Massachusetts Institute published herewith will be of interest to those who may intend to study architecture in our own country. The regular course, as we mentioned last month, extends over four years, but a special course of two years has been planned for students who cannot devote the longer period to this branch of study. The special course is as follows:

FIRST YEAR.

FIRST TERM.	SECOND TERM.
The Orders and Elements of Architecture.	Original Design.
Sketching and Water-Coloring	Sketching and Water-Coloring
Mechanical and Free-Hand Drawing.	Mechanical and Free-Hand Drawing.
Materials.	Shades, Shadows, and Perspective.
Elementary Mechanics.	Common Construction.
Architectural History.	Graphical Statics.
	Architectural History.

SECOND YEAR.

FIRST TERM.	SECOND TERM.
Original Design.	Original Design.
Sketching and Water-Coloring	Sketching and Water-Coloring
Specifications.	Specifications and Contracts.
History of Ornament.	History of Ornament.
Problems in Construction.	Planning.
Ventilation and Heating.	Iron construction.
Working-Drawings and Framing.	Schools, Theatres, Churches.
	Ventilation and Heating
	Surveying.
	Stereotomy.
	Problems in Construction.

The regular course is the same for all departments of the Institute during the first year, and is confined to general studies, with the single exception of a large amount of mechanical and free-hand drawing. No one is allowed to continue in the department who does not have credits in mechanical drawing, including geometrical drawing, shades and shadows and descriptive geometry.

The regular course is as follows:

FIRST YEAR.

FIRST TERM.	SECOND TERM.
Algebra.	Algebra.
Solid Geometry.	Plane Trigonometry.
General Chemistry.	General Chemistry.
Chemical Laboratory.	Chemical Laboratory.
History of the English Language.	Political history since 1815.
English Composition.	French (or German).
French (or German).	Mechanical and Free-Hand Drawing.
Mechanical and Free-Hand Drawing.	Military Drill.
Military Drill.	

SECOND YEAR.

FIRST TERM.	SECOND TERM.
Materials.	Original Design.
Architectural History.	Common Constructions.
Drawing.	Architectural History.
The Orders and Elements of Architecture.	Shades, Shadows and Perspective.
Analytic Geometry.	Sketching.
Physics.	Differential Calculus
Descriptive Geometry.	Physics.
Political Economy.	English Rose.
German.	German.

THIRD YEAR.

FIRST TERM.	SECOND TERM.
Original Design.	Original Design.
Sketching and Water-Coloring	Sketching and Water-Coloring
Working Drawings and Framing.	Iron Construction.
Lecture on Fine Art.	Kinematics and Dynamics.
Integral Calculus.	Strength of Materials.
German Statics.	Stereotomy.
Structural Geology.	Physical Laboratory.
Physics: Lecture and Laboratory.	European History.
German.	German.
	Acoustics.

FOURTH YEAR.

FIRST TERM.	SECOND TERM.
Advanced Original Design.	Advanced Original Design.
History of Ornament.	Sketching and Water-Coloring
Sketching and Water-Coloring.	Planning.
Problems in Construction.	Schools, theatres and churches.
Specifications.	Problems in Construction.
Strength of Materials.	Specifications and Contracts.
Lecture on Fine Art.	Constitutional History.
Heating and Ventilation.	Heating and Ventilation.
Advanced French.	Advanced French.
	Thesis Work.

The two-year special course thus includes the mechanical and free-hand drawing of the first year of the regular course, the drawing and design of the regular second and third years, and the more strictly professional lectures of the second, third and fourth years, with a practical course of its own in trigonometry and graphical statics, without the higher mathematics, which are pursued quite extensively during the four years' course.

OUR ILLUSTRATIONS.

CHURCH AT ALMONTE, ONT.

STORE FRONTS FOR MESSRS. JOSEPH MCCAUSLAND & SON, TORONTO—DARLING & CURRY, ARCHITECTS.

DETAIL FOR VERANDAH.

HOUSE AT 399 WELLESLEY STREET, TORONTO.—KNOX & ELLIOTT, ARCHITECTS.

W. T. Whitepay, architect, late of Vancouver, B. C., has moved to San Diego, California, and opened an office.

Mr. James Wright, architect, of Montreal, has taken a partner in the person of Mr. Findlay. The firm name is now Wright & Findlay.

PERSONAL.

Mr. C. Schreiber, Chief Engineer of Government railways, is at present on the Pacific Coast.

Mr. Gobeil, secretary of the Public Works Department, has returned to Ottawa from the Isle of Orleans, where he spent some weeks recruiting his health.

It is rumoured that Mr. Collingwood Schreiber, Chief Engineer of Government Railways, will shortly resign his position, and that Mr. Walter Shanly, M. P., will be asked to become his successor. It is not considered probable that Mr. Shanly will accept.

HAMILTON.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

SINCE my last report, I regret to have to say that building prospects in Hamilton have not improved. There have been no contracts let for the number of private residences that were in contemplation in the spring, and very few tenement buildings have been erected this year—so different to previous years when whole blocks were built by those enterprising contractors, the Patterson Bros., of this city. In fact it is understood that they don't intend building any more for instalment speculation, as a number of dwelling houses built by them in this place remain undisposed of and to let; in fact, they have concluded that the procedure did not pay. It is quite apparent that the bad result of the strikes is having its effect, and there is little or no work for the building trades, who will have to face a long winter after a comparatively idle summer, and without the usual provision being made for the time when there is never work to do. I understand that the same state of things exists in Toronto and elsewhere. One would think that the unions would seriously consider the position, and change their programme.

The work on our new City Hall is progressing favorably now that the stone, which is brought from Nova Scotia, is coming to hand, and a number of stonecutters and masons have steady employment on the job. The contractor, Mr. Pigott, deserves great credit for his indomitable energy and perseverance, having had to contend with the most determined opposition of the labor unions, who made every effort to prevent the work from being carried on in opposition to their absurd regulations.

I am glad to see that the action of the Provincial Government in engaging a foreign architect to prepare plans for the new Parliament Buildings in preference to Canadian talent, is being condemned, and as the adopted designs are inferior to those prepared by the Toronto architects, and will cost vastly more for the building, there must be a very unpleasant reflection for the responsible parties. But when Canadian architects become incorporated and united as a body they will not be treated thus unfairly.

I am glad to say that our Building Inspector's book is ordered to be accurately kept in future, proper entries being made by the proprietors or their architects, so that hereafter I can forward you a correct statement of all new buildings to be erected in Hamilton.

The strength of fire-clay as a building material says one who ought to know can hardly be estimated. Recently a piece of beam filling, containing about three square feet, designed simply to be used as a ceiling and not intended to carry the weight of the floor above, was placed on supports and loaded with a weight of 5,000 pounds, which it carried without any sign of giving. That was about 1666 pounds to the square foot, and the strongest floors now made are only designed to carry about 300 pounds to the foot. I didn't see the use of making the test, as the article in question carried no weight but its own, but the architect made it and the clay stood it. Fire-clay is now subjected to a heat of 2000° in baking, is said to be a greater heat than is raised in the blast furnaces in which it is placed to reduce ore. The uses to which fire-clay brick, tiling and tubing are being put in modern fireproof buildings are now almost innumerable, and the end is not yet,

Architects, Engineers Builders, Contractors and others are invited to contribute to this department of their experience regarding methods of construction. Also particulars—such as location, character, cost and name of owner, etc.—of any works of construction in progress.

PROPORTIONS OF THE PARTS OF THE STAIRS.

THE breadth of the steps of common stairs is from 9 to 12 inches in the best staircases in private and public buildings. In such buildings the breadth ought never to be less than 12 inches nor more than 15 inches.

A step of greater breadth requires less height than those of less breadth. The first person who attempted to fix the relation between the height of the riser and width of the steps was Mons. Blondel, in his "Cours d'Architecture." If a person walking on a level plane over P space, at each step and the height which the same person could ascend vertically at one step, with equal ease was H; then, if h be the height of the step, and p the width, the relation between p and h must be such that when $p=P$, $h=0$, and when $h=H$, we must have $p=0$.

The conditions are satisfied by an equation of this form;

$$h=H\ 1-\frac{p}{P}$$

Blondel assumes 24 inches for P, or the step a person can make with ease on a level plane 12 inches for H, or the height a vertical step can be made with equal ease; and putting these numbers for P and H, in our equation, it becomes $h=\frac{1}{2}(24-p$, which is precisely Blondel's rule. We do not think that the rise, which is equal to a level step of 24 inches is more than 11 inches, but it would be difficult to ascertain the ratio exactly, and the above are so near and agree so well with our observations on stairs of easy ascent, when the breadth of tread includes the nosing, that they may be taken from the elements of a practical rule.

Hence, according as the tread p, or the rise h, is given we have

$$h=\frac{24-P}{2};\ \text{or}\ p=24-2h.$$

Thus, if the height of a step be 6 inches, then $p=12$, and $\frac{24-12}{2}=6$, the rise for a step that has a tread of 12 inches, including the nosing, ought not to exceed an inch, we have these general rules:

TO FIND THE PROPER RISE FOR THE STEPS WHEN THE TREAD IS GIVEN.

From 24 take 1=23; from the remainder, 23, substract the breadth of the tread in inches, and half the difference will be the rise.

Thus, if the tread be 12 inches, then

23
12
—
2)11
—
5½ inches, the tread required.

TO FIND THE PROPER TREAD WHEN THE RISE FOR A STEP IS GIVEN.

Subtract twice the rise from 23 and the remainder will be the proper width of the tead.

Thus, if the rise be 5 inches,

23
2×5=10
—
13 inches, the tread required.

Again, if the rise be 7 inches, then

23
2×7=14
—
9 inches, the tread for a step with a rise of 7 inches.

Before we set out the stairs in a building we must consider the height of the story and determine upon the height or rise of the steps, which being done we must take the height of the story in inches and divide the number of inches in the height of the story by the least rise proposed for a step; if the result be fractional, divide the height of the story by the number, neglecting the fraction, and the result will be the exact number of steps. For example, if the height of a story is to be 10 feet 4 inches, and the height of a step is to be not less than 7 inches, how many steps will be required in order to ascend to the given height?

Here (10 feet 4 inches) X 12—124 inches.

Now $\frac{124}{7}=17\ 5\cdot7$, which neglecting the fraction, is the number of steps required; and $\frac{124}{17}=7\ 5\cdot17$ inches, the height of the rise. But if there be no winders in the stairs, an even number of steps will be more convenient than an odd number. Therefore either 18 or 16 may be adopted; if we must have 16, $\frac{124}{16}=7\frac{1}{2}$ inches, which may answer very well; but if we are still confined for room on the plan we must have recourse to winders.

The breadth of a staircase may be from 5 to 20 feet, according to the destination of the building; but if the steps be less than 2 feet 4 inches in length, they become inconvenient for the passing of furniture, and such narrow stairs should be avoided, even in small houses.

When the height of a story is very considerable, resting places become necessary. In very high stories that admit a sufficient