head room, and where the plan 'or area for the stairs is confined in may make two revolutions in the height of the story that is, in ascending or descending we may go twice round the newel or well hole; and this becomes necessary, otherwise the steps would be enormously high. or extravagant floor-room must be allowed for the stairs.

As grand and principal staircases require broad and low steps, they therefore require to be numerous, and admit of only one kurion in the b eight of the story, the plan being always proportioned to the height of the buildings.

It may not be amiss to give an example here for a principa building, in order to show the number of steps both in the grand and in the common staircase.

For this purpose, suppose the story of a house to be 16 feet high from floor to floor, the height of the steps of the servants' sta case to be not less than 7 mches, and that of the grand staircase to be not more than 6 inches.

Now the height of the story reduced to inches is 192, and first dividing by 7. thus :

Then, for the principal stairs, dividing by 6, thus :

6)192 \_\_\_\_\_ steps. 6 inches the rise.

So that the servants' stairs require 37 steps and the grand stair case 32; but the space or area required to execute the common stairs must therefore have two revolutions in the height.

This being allowed, will reduce the area to half of what it otherwise would have required.

We must, however, observe that when the height of the story is less than 14 feet the stairs will not admit of two revolu In planning a large edifice particular attention must be paid to the situation of the stairs, so as to

give the ost convenient and easy access to the several rooms.

With regard to the lighting of a grand staircase, a lantern-light or a sky-light with a horizontal light under it is the most appropriate.

By introducing these more effect is produced and the light admitted is more powerful, but, indeed, where one side of the stair-case is not a portion of the exterior wall a lantern or skylight is the only way in which the light can be admitted.

In stairs constructed of stone the steps are made of single blocks ; quarter-spaces and half-spaces are, however, often made in two or more pieces and joggled together; but when the material is wood, the risers and trends must be made of boards, which are fastened together with glue, brackets and screws; and these, though done with the utmost care, can never be made so firm as not to yield a little to the passenger.

lo pre ent the stairs from becoming rickety, in ength of time, the steps must have an additional sunport under them, and, that the appearance may be both light and pleasant, the whole must be confined all a space as possible. to as sm

This additional woodwark, which is processory to the firmness and durability of the construction, is called the carriage of the stair. The carriage of the stair usually consists of several

pieces framed together, and each flight of steps is generally supported by two pieces of timber, placed under the steps, and parallel to the wall, being fas-tened at one or both ends to pieces perpendicular to the walks.

The pieces of timber which are thus placed under

the steps are called rough strings. The subject of hand railing is too intricate and would require more space than is allotted to us to discuss it here.

NOTE .- A portion of the notes on the proportions on the steps and risers are the substance of that given by an anonymous writer in a English work on carpentry and joinery.-D. W. King, in Building.

# BOWMANVILLE.

(Correspondence of THE CANADIAN ARCHITECT AND BUILDER.)

THE private tender of Messrs. Munson & Bunney for the rebuilding of the Congregational church and vestry has been accepted by the building committee. Before its recent destruct by fire this was one of the finest churches of its size in the Doion, and a view of the plans which have been prepared by Mr. Bunney warrants the opinion that it will undoubtedly retain its reputation. The church is to be finished and ready for occupation by January next

Our School Board has not decided on any plans yet. During the year there has been nothing but wrangling over them, and two or three architects have been discharged. Messrs. Power & Son, archicets, of Kingston, are now engaged preparing plans, and it is hoped the Board will adopt them and proceed at once to creet the building.

## WINNIPEG.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

THE building trade in Winnipeg has not been very brisk this senson, but the prospects are very encournging. There are a few small private residences being erected, but except the Herdier Bock which is now almost completed; there have not been any businese blocks built this year. Bricklayers and masons have very little to do.

Panters and plumbers are basy. Carpenters are well employ-ed, there being several working outside the city on the stations for the Red River Valley railroad, and also on several elevators that Messas. Timewell & Son are architects for. C F. Stevens, is creating a face residence in Fort Rouge. Mr. Wheeler is the architects the architect.

Messrs. O'Connor & Brown, proprietors of the Queen's hotel, are advertising for leaders for alterations and improvements

The Winnipeg waterworks are putting down several miles of water service and the city is adding to its drainage system. Mr. Doidge, contractor, has about nished his block pavement contract.

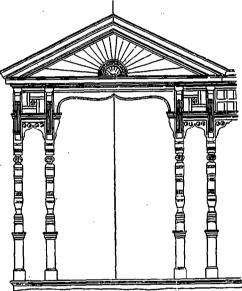
ninex. The new buildings for the General Hospital are nearly finished.

### OTTAWA.

BUILDING operations here have been much brisker this sum INCOME OF THE CANADIAN ARCHITECT AND BUILDER.) mer than for the past ten years. A large number of private s, schools, churches and business blocks are being erectreside ed. It is estimated that the building operations for the present n will amount to \$200,000.

The competitive designs, under motto, for the new police sta The competitive designs, under motto, for the new police sta-tion for which st 5,000 has been voted, have been before the Pro-perty Committee of the City Council for the past three weeks, but up to the present time they have not been able to deside upon the most appropriate plan. Four designs were sent in, and although under motto, one of the competitors signed his specification, and in place of ruling him out for irregularities, his plan is still before the committee. This is one of the beauties of competitions.

The want of an architectural association is seriously felt here. An effort has been made at different times to form an architects guild in this city, but the trouble appears to be to define who ar qualified to become members. It is to be hoped that through the CANADIAN ARCHITECT AND BUILDER the architects of the different cities and towns will give their views on the necessity of a national association, and that during the coming winter a meeting of architects may be called and an effort made to form an



DETAIL FOR VERANDAM

The contract for the new Roman Catholic church for this city has been awarded to C. J. Lyons for \$74,500. It is expected that the foundations will be laid this fall, and the work completed in two vears.

For seventy yards of surface provide 1,000 pieces of lath, and cleven pounds of 1nth nails.

For 100 square feet of roof, 1,000 shingles, laid four inches to the weather, and five pounds of shingle-nails, will be necessary.

Mr. Sylvester J. Campbell, builder and contractor, Galt, Ont., has disappeared, leaving a large number of sorrowing creditors.

Mr. John Purdon has been given the contract to build an ad ditional wing to the asylum at London, Ont., at a cost of \$20,000. Messrs, Harding & Leathorn, of London are laying the new works mains of Goderich. There will be 35,000 feet all told and 47 hydrants.

In estimating amounts of siding and flooring, allow one-fifth more than the surfaces to be covered for the lap in siding and the matching in the flooring.

The contract for the construction of a new water works system at Brantford has been given to the Waterous Company, of that city at the price of \$106,278.

There are in Cannon \$4 loan and building societies, of which 66 ave their headquarters in Ontario. The subscribed capital of the Ontario companies amounts to \$72,878,225.

A Brantford paper makes the statement that the members of A branchord paper makes the submittent that the memory of the London School Board have had their portraits carved in stone and placed over the windows in a new building, and are now quarreling with the artist because he didn't make them appear better looking.

For some time past builders in Germany have resorted to the use of a composition of cork, sand and lime, molded into bricks, for the construction of light partition wills. This is said to exclude sound better than ordinary brickwork, while being light and a good anductor of heat and cold.

We learn from the Victoria, B. C., papers that building opera tions are very brisk in that city at present. Architects have neve been so busy before, the brick and lumber yards have all they ca do to supply the demand for materials, and carpenters and brickfully employed. Over half a million dollars worth of new buildings are in course of erection.

The Canadian correspondent of the Liverpool Journal of Comays that " in all parts of Nova Scotia there is great activity in building, and there is scarcely a town or village that does not show material improvement. A considerable number of Nova Scotians have recently returned from the United States with a ock of experience, which they intend to utilize for the large si int of themselves and their own country.

A brick dwelling with a shingle roof is estimated to last 75 years, ad depreciates 1 % per cent. per year. The plastering therein 20 years, 3%per cent.; painting, 7 years, 14 per cent.; shingles and outside blinds, 6 per cent.; cornice and base, 48 years, a% per cent.; sheathing, 50 years, 2 per cent.; flooring, 20 years, 5 per cent.; doors, windows inside blinds, stairs and newel, 30 years, 1% per cent.; building hardware, so years, 6 per cent.; sills and floor joists, 40 years, 3% per cent.; dimension lumber, 75 years, 1% per cent.

Captain Shaw, Chief of the London Fire Brigade, in a maga-zine article on the protection of dwelling houses from fire, says : "there is a great deal of faulty construction in houses in consequence of architects being seldom employed. Cracked walls are almost sure to give way in case of fire. "Party walls should be carried at least three feet above the highest part of the roof. All roofs should be provided with windows or openings by which the inmates of a house could escape in the event of the stairs becoming impassable. The best material for stairs is wrought iron and the rst stone, since the latter yields to an amount of heat which does not aflect ordinary respiration. Whenever a

house has both wooden and stone stairs the lumates should, in case of fire invariably make for the wooden stairs, as affording the only hope to escap

In joinery, as in all systems of construction, says Violiet-le-Due, the material used must regulate the mode of joining and determine the form, wood being a material possessing special properties, that must be considered in arranging works in joiners as well as those in carpentry ; mediceval artisans never abandoned this correct principle. A knowledge of wood is one of the conditions required of the joiner; after acquiring with its texture and strength. The best wood for joinery is oak, on account of its stiffness, the delicacy of its fibres, its uniform hardness, its dura-bility and its beauty. Hence, at least in France during the middle ages, oak was exclusively em-ployed in the joinery of buildings.

The subject of masonwork in freezing weather continues to occupy a good deal of attention in the technical journals. The stories of the excellence of stonework laid with hot mortar in Stockholm and other Northern cities in winter, and then allowed to freeze, have multiplied, while, on the other hand, a recent report by an American engineer, Mr. Emil Kuichling, appears to show conclusively that mortar, particularly if made with cement, and used hot, lost a large part of its strength ; the resistance, as determined by actual experiment, of briquettes of neal coment, mixed hot and then exposed for seven days to the air, being, on an average, only one-eighth that of briquettes of the same cement, mixed at the same time, with water having the temperature of the air, and then exposed in the same way, Curiously enough, briquettes made with Portland cement and cold water would not freeze, even at a temperature of thirteen degrees Fahrenheit, unless exposed to the wind, and the setting process appeared to go on undisturbed even at this temperature ; while

made of the same cement, mixed with hot water, With natural cements the resistance to freezing variably froze. was much less than with the Portland, but no details are mention-ed on the subject. The addition of sail to water, sometimes made to prevent freezing, is found to injure native cements, while Port-land is not affected.-American Architect and Building News,

## [ADVERTISEMENT.]

"The pleasing effects attainable by the use of mortar stains has led to their widespread adoption by the architects and builders, especially in the beauliful suburban towns adjacent to large cities, where the demand for them is steadily upon the increase. The character of the coloring matter used is of course an important consideration, and as results are not always immediately manifest, too much care cannot be exercised in their selection.

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