

the heated air of the house striking the underside of the roof boards. If some means is adopted which will allow of a circulation of cold air underneath the roof boards no ice will be found, and the roof will remain as tight as during the summer months. This circulation can be secured by double boarding the roof and leaving a sufficient space between the boarding to allow of a current of air entering at the eave and escaping at the ridge. By this means the heated air of the house is prevented from coming in contact with the boarding on which the roofing material is laid, and instead, a cold column of air is maintained below this boarding which is continually carrying off any heated air which may escape through the first boarding. But all leaks in roofs are not caused through ice. Bad materials and workmanship has much to do with leaky roofs, and until roofers have been trained to do their work properly, there will always be bad roofing where there should be good.

TORONTO BUILDERS' AND CONTRACTORS' FEDERATED ASSOCIATION.

At the last monthly meeting of the above Association held on Thursday evening, the 5th inst., after the ordinary business had been transacted the retiring president, Mr. Lloyd York, was presented by Mr. Geo. Moir, President elect, on behalf of the Association, with a handsome gold-headed cane. Mr. York is too well known to call for any lengthy comments here, he having built some of the largest edifices in the city, and being now engaged in the erection of the new Parliament Buildings. He was the first president of the Builders and Contractors' Federal Association, and as such was uniting in his efforts to further not only the interests of the building trade, but also the interests of both the architect and the capitalist.

The peaceful settlement of the troubles last spring and summer were in great measure due to his large experience with workmen; his broad and sensible manner of looking at their side of the question as well as the masters', and his undeviating course in bringing matters to a satisfactory conclusion even in the face of serious loss to himself. As to that, a general strike or lock-out, or in other words a general disaster to the city, was avoided during his term of office principally through his instrumentality, is sufficient reason alone for our wishing with the Builders' Association, that although the cane might be quite sufficient to support his bulky form, it may long be to him more for ornament than use.

PROGRESS OF THE PANAMA CANAL.

The *Panama Star and Herald*, of May 19, says:—"The work on the locks is progressing finely. A large amount of work has been done during the three or four months in which the contractors under the lock system have had charge. Excavations have been made, and are being made, to secure the masonry of the head and foot of each lock, while the digging of the canal proper between the ends of the locks is keeping pace with the other work. The one who observes for the first time the construction of the canal, is a very interesting sight to see the large number of men, all actively engaged; the numerous cranes lifting large iron buckets of earth and rock out of the excavations with ease and rapidity; the winches haul from drawing large and heavy trains of the DeCauville dumping cars out of the work, up steep inclines; the engines working the pumps attached to the drainage wells, which drain the waters of the works; the rock-crushing machines crushing hard rocks into the requisite size for use in making concrete; all these things tell to the spectator the tale of a gigantic undertaking, well handled, and being rapidly pushed to completion.

"The locks number ten, all told, and are located five on the Pacific side, and five on the Atlantic side of the isthmus. Nearly all the latest improved labor-saving machinery adapted to such work is being used on the canals. There are about eight hoisting cranes on each lock (five in all) of four tons hoisting capacity, and with a reach of about 100 metres depth, all busily engaged in hoisting large iron buckets of one cubic metre capacity, and unloading them upon flat cars upon trucks running out from the works to select dumping places. For the purpose of carrying the large amount of dirt and rock excavated out of the work there are about five locomotives to each lock and in all some 600 or 700 construction dirt carts.

"In places where they can be used, steam winches, of which there are some sixty in all on the entire work, draw up trains of DeCauville cars, fifteen or twenty of them to the train, and each of them of the hoisting capacity of half a cubic metre, running upon small tracks, placed in all directions, and running up and down steep inclined planes out of the works to dump.

"It is estimated that Locks Nos. 1, 3, 4 and 5 will be turned over in three or four months.

"Most of the work now being done is done at the excavations of the heads of the locks, where the masonry will be needed, the work between. It is intended to carry on while the masonry is being erected and the gates, etc., placed in position.

"To this work of canal building there are now employed about 5,000 laborers on the ten locks and about 1,000 skilled laborers, besides a small, and yet not so very small, army of clerks.

HAMILTON.

(Correspondence of THE CANADIAN ARCHITECT AND BUILDER.)

SINCE last report there has not been much change in building matters in this city; in fact there is little or no new building going on. There are a few private buildings in course of erection. Mr. Thomas Laury is erecting a new detached villa, residence on James street south, which will cost about \$12,000 when finished. Mr. Strong, who has sold the site of his fine row of eight detached houses in the city, is about to commence the erection of another terrace of a similar class of buildings on Beerside street. Mr. Strong is quite an enterprising builder, and deserves credit for the taste he displays in getting up his buildings, both as regards exterior design and interior finish; in fact he has been a very successful speculative builder. He has also perfected some very useful improvements in sanitary plumbing and heating.

Owing to a delay in getting the stone, the stone wall on the new city hall has stopped, but the delay will be longer, when the building will be fast pushed on to completion.

The price of stock brick, that is to say the run of the kiln here, has been reduced one dollar per thousand. This is no doubt intended as an inducement for those who propose building to come on with their work, and I believe it will have a tendency in that direction. It will also be a good thing for contractors who have work on hand on estimates on the last month's prices.

The bad effect of the strikes by the workmen in the spring is now apparent to all right-thinking men, and none can perceive it so well as the workmen themselves. If they only profit by this year's severe lesson, it will prevent a repetition of such folly in any ensuing year. There is a prospect of work stirring up this fall; in fact there are indications that quite a mass of work may come in now that all hands are ready to settle down to business. I give no building record this month; in fact none has been made, except for a few paltry additions and alterations, which are not worth mentioning.

The Berlin waterworks are expected to be ready for operation by the middle of July, over a mile of pipe being put down each week.

The cast iron water pipes for the Montreal waterworks are being manufactured by the Steel Company of Canada, Acadia Mines, N. S.

A disagreement between capital and labor has resulted in closing down all the Pittsburgh window glass factories for an indefinite period.

The Ormstown Brick and Terra Cotta Company has been incorporated with \$50,000 capital stock. Its head offices are at Ottawa.

New Westminster, B. C., cedar is used in Montreal for finishing work in first class residences, and in Ohio for railway carriage purposes.

A sheet of building paper thirty miles long and 3½ inches wide was turned out of the Northumberland Paper mills at Campbellford, Ont., the other day.

Messrs. Harding & Leathorne have been awarded the contract for the construction of the Goderich waterworks, at a cost of between \$8,000 and \$9,000.

Mr. John Clark, architect, Chesley, Ont., states that thirteen stores and one hotel are now under way there, and that all the buildings are to be all brick.

Mr. B. Gibson, of Whitley, was the successful tenderer for the contract for extending the Kingston waterworks system. The amount of his tender was \$30,800.

The work of plastering the interior of the new Departmental block has been sub-let by contractor Charlebois to James Strachan, of Ottawa. The amount is about \$80,000.

The construction of the new Halifax dry dock is giving employment to 150 men. A large amount of excavating is being done. The contractor hopes to complete the work this year.

The construction of a spill flume extending 800 feet into the bay, has been found effectual for the purpose of preventing the drifting back to the shore of sewage from the Hamilton sewers.

The owner of the Hastings quarry, where the white marble is found of which it is proposed to construct the Toronto court house, has offered the stone free to the corporation for the quarrying of it.

Messrs. McLean & Whitehead, Winnipeg, have the contract for building snow sheds for the C. P. R. Co., on the Eastern slope of the Selkirk mountains, and Mr. D. B. Campbell, of Strathroy has a similar contract on the western slope.

Contracts for the construction of a new iron bridge over the Thames at Delaware, Ont., to cost \$12,000, have been let as follows:—Mr. Isaac Crona, two stone piers, \$8,000; Hamilton Bridge Co., iron superstructure, \$5,150.

The Independent Workmen's Association of Hamilton, composed of workmen in the building trades who do not belong to the unions, have elected the following officers:—D. G. Mowat, president; Henry Shelley and J. Fuller, vice-presidents; Geo. Worthington, treasurer; James Plumley, secretary; Jas. Booner, inside sentinel; John Goodrich, outside sentinel. Trustees—J. Burke, J. Fuller and E. Woolter.

At the annual meeting of the Toronto Builders' and Contractors' Federal Association, the following officers were elected:—President, Mr. George Moir; Vice-President, Mr. Frank B. Lockwood; Treasurer, Mr. Wm. Forbes, re-elected; Secretary, Mr. J. Knox, re-elected; Rooms Committee, Messrs. Forbes, Fiddes, Wright, Gibson and Lockwood; Auditors, Messrs. W. Simpson and H. C. Dancy.

The route of the proposed Trent Canal is from Waukenaush, on the Georgian Bay, to Trenton, on the Bay of Quinte, passing through Lake Couchiching, Lake Simcoe, across country to Balsam lake, to Cameron's lake, to Surgeon lake, to Stoney lake, down the Otonabee river, to Rice lake, to Meyer's lake, to Wilson's lake, and thence down the Trent river, to the terminus of Trenton. This route touches Onllia, Fenelon Falls, Lakefield, Peterborough and Campbellford. The Canal Commission will go over the route early in July, and hold meetings in the various places through which it passes, for the purpose of ascertaining what advantages the canal would afford local traffic.

In walls, bricks of any kind, but more particularly fire-brick, if properly laid in sound mortar or cement, will resist all effects of heat for a considerable time; for slabs, stone is a very dangerous material, unless it is imbedded on some substance which can carry it when it gets hot. But of all building materials there is none which requires more extra care and delicate treatment than iron. Imagine a straight iron rod, supported, at its ends, and capable, at the ordinary temperature of the atmosphere, of carrying a heavy weight in the middle. Let a strong fire be lighted under it; in a few moments the rod will lose its straightness, first sagging in the middle, then dropping altogether, next fusing and running away. Yet this is a material which many persons call fire-proof, and put to carrying loaded floors which they designated by the same improper epithet. Wherever iron is used it should be protected by terra cotta, good brick work, sound plastering, or if nothing better can be found for the purpose, solid woodwork round it. Woodwork, if solid, will resist for a length of time every possible effect of heat short of actual fire.—*Builders' Trade Journal*.



PAPER STUCCO, ITS HISTORY AND USES.

By W. H. ELLIOTT.

PREVIOUS to the introduction of paper stucco, the use of ornament in relief had at all times been considered the most desirable form of decoration for interiors,

but on account of its cost it had been confined almost exclusively to public buildings and the mansions of the wealthy, if we except perhaps the conventional ugly centre flowers and heavy cornices composed of a shapeless bundle of mouldings framing an equally meaningless curve which are to be found in almost every ordinary house. The inclination of the artist towards relief effects was shown in the painted imitations of plaster stucco continually attempted. When neither the real nor the imitation in color was possible, simple wall papers of more or less merit were used with plain white ceilings, or worse still, white walls as well, it being considered, and with some reason, that an absence of design was preferable to an attempt at what was practically beyond the means of many who yet had the taste to avoid the gaudy effects of mediocrity. Decoration of the ceiling was out of the question, as nothing of a satisfactory nature was, or for the matter of that is now, furnished by wallpaper manufacturers; consequently that part of the room which from its position is most rarely interrupted, which presents itself from every standpoint as a whole, which is the longest flat surface in the room, and which, for these reasons, calls for decorative treatment, was absolutely treated with systematic neglect. We need not seek far for reasons. Even to-day clever, intelligent decorative artists are rare. We are all familiar with the badly drawn, badly colored ceilings in flat work to be met with even in dwellings of some pretension. Skilled decorators are to be found only in the larger centres of wealth and refinement. As a result, any attempt at meritorious embellishment of the ceiling required a great deal of time and money, both factors which nowadays must be approached with economy.

To overcome these difficulties the inventor of "paper stucco" sought for a substitute (not an imitation) for plaster of paris which should be within the range financially of ordinary decoration and at the same time crowd out the weak imitations in paint which were offered as a substitute. For grand and imposing building, no doubt plaster of paris possesses many good and acknowledged qualities; but for general use the objections to it are many. Aside from the score of expense already referred to, its production in an inhabited house is attended with an unendurable amount of dirt and fouling of the adjoining apartments. It is never safe, without special or expensive preparation, to burden an ordinary ceiling with a weight of plaster which may at any time, and indeed frequently does, fall and cause great damage. It is in addition certain to crack and separate with any settlement or shrinkage of the houses.

A different material, therefore, had to be obtained, which, while plastic in its nature, should be without the drawbacks of plaster of paris. After varied experiments to press ornaments out of materials of every kind, the method of producing plastic designs by means of layers of paper fastened together and pressed in moulds was hit upon and improved until we now have the varied and beautiful designs of paper stucco. That this method is the best for producing plastic ornaments of all kinds, and especially ceiling decorations, is proved by the fact that the original invention has now many imitations. For some purposes possibly a firmer pulp or stock can be obtained, such for example as *corton pierre*, which is capable in elastic moulds of more undercut effects, but no material at present in use combines so many advantages as "paper stucco." Not the least among its merits is the capability of shipment to any distance without damage in carriage. We have, then, a material which takes the place of plaster of paris, is free from the many defects of that material, and is cheaper in use even than the painted imitation of stucco. To those who would object to its composition as being only paper, it may be said that if it answers the purpose in view fully and satisfactorily, nothing further need be enquired as to its composition—that paper to-day is superseding many other materials in the greatest variety of uses—that as a matter of fact it is much more expensive pound