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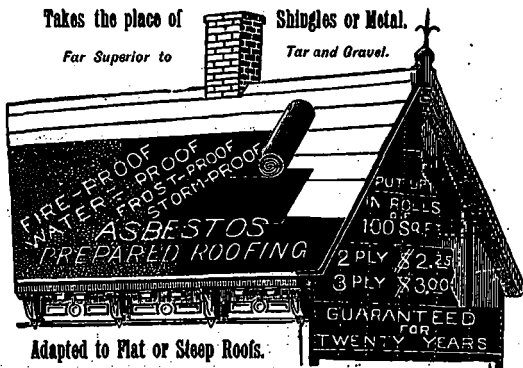
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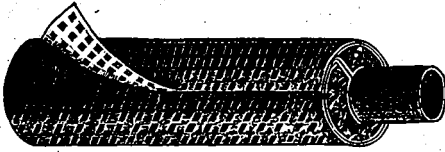
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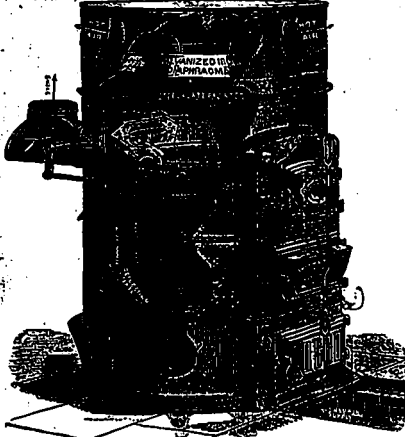
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1 1/2" " " " " " " " " " " " "	25 00	28 00
" " " " " " " " " " " "	18 00	19 00
" " " " " " " " " " " "	18 00	20 00
" " " " " " " " " " " "	13 00	15 00
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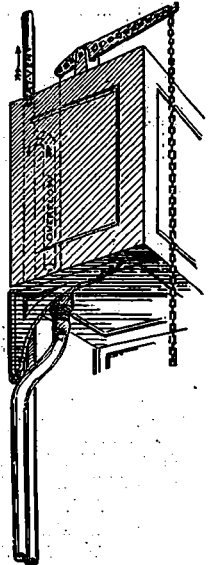
White lead, Can.	6 7 50
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Red lead, Eng.	2 1/2 2 1/2
" " venetian.	30 1 00
" " vermilion.	10 12
" Indian, Eng.	6 1/2 12
Yellow ochre.	15 25
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Blue chrome.	25 40
Black, lamp.	15 25
Blue, ultramarine.	15 25
Oil, fuscad, raw (per Imp. gallon).	59 68
" " " " " " " "	50 75
" " " " " " " "	75 1 00
" " " " " " " "	90 1 25
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" " " " 2 to 2½ inch, ".....	3 25
" " " " 2½ to 3 inch, ".....	3 00
" " " " 3 inch and larger.....	2 75
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" " " " 1¾ " ".....	4 50
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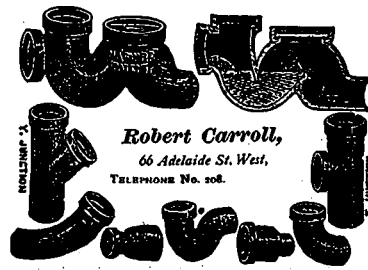
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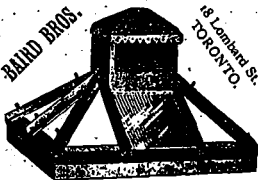
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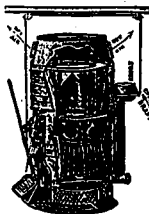
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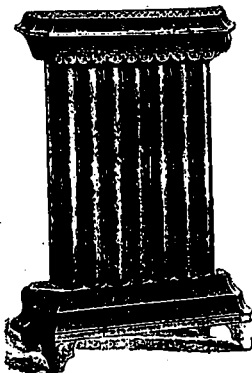
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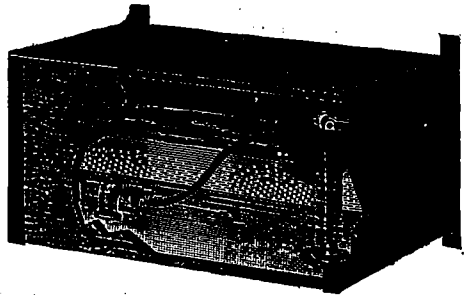
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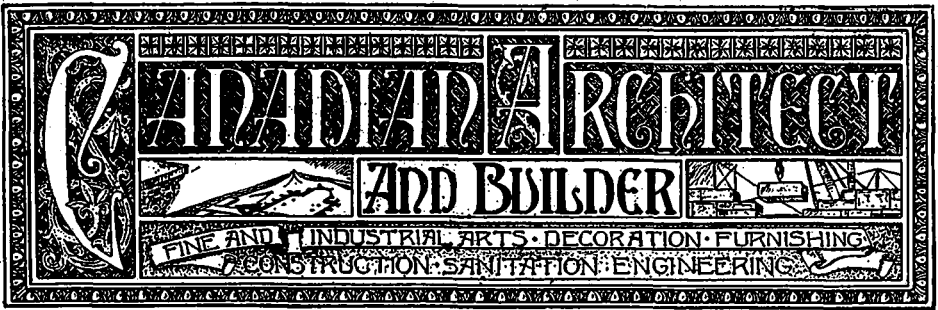
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SUBSCRIPTIONS.

THE CANADIAN ARCHITECT AND BUILDER will be mailed to any address in Canada or the United States for \$2.00 per year. The price to subscribers in foreign countries, is \$2.50. Subscriptions are payable in advance. The paper will be discontinued at expiration of term paid for, if so stipulated by the subscriber; but where no such understanding exists, it will be continued until instructions to discontinue are received and all arrearages are paid.

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ADVERTISEMENTS.

Prices for advertising sent promptly on application. Orders for advertising should reach the office of publication not later than the 15th day of the month, and changes of advertisements not later than the 5th day of the month.

EDITOR'S ANNOUNCEMENTS.

Contributions of technical value to the persons in whose interests this journal is published, are cordially invited. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

The Ontario Association of Architects has appointed the "Canadian Architect and Builder" its official paper.

THE Commissioner of Public Works of the city of New York, has set a good example to his contemporaries in other cities, by adopting the suggestion of the Local Board of Health to compel contractors making excavations in the city for building or other purposes, to use disinfectants on the work.

THE cities of Toronto and London, Ont., have decided to erect crematories for the disposal of garbage. The health of the citizens of these cities has long demanded action of this character, and they should find cause for congratulation even in its tardy arrival. It is to the credit of London, that although the smaller city of the two, it took the initiatory step in this important reform.

IN commenting on the conditions of the recent competition for plans for a new Court House building at Woodstock, Ont., we pointed out the extreme difficulty, if not the impossibility, of constructing a building which should contain the accommodation required, for the sum of \$60,000, the limit of cost fixed by the county authorities. This view seems to be justified by the fact that it has been found impossible to erect the building in accordance with the preferred design of Mr. Jas. Balfour, architect, for less than \$100,000. Mr. Balfour no doubt had in mind the limit of cost in the preparation of his design, and endeavored to approximate as closely as possible thereto, but the extent of the requirements as compared with the fixed appropriation for the erection of the building, seems to have rendered the task impossible.

WE were somewhat surprised to be shown a copy of a letter from the Stonecutters' Union to different parties in Toronto, stating that the Union intended to have a picnic and that it took this means of allowing the parties to whom those letters were addressed the opportunity of contributing to the picnic funds. That a body of men of the standing of the stonecutters in Toronto, and earning the wages which they do, would so far forget their manhood, is more than we can understand. They surely do not propose to enter into competition with the Fresh Air Society and seek to divert from that Society funds which it requires for the most excellent work which it is doing in sending children who are sadly in need of the invigorating influence of fresh air of the country, where they may enjoy it for a few short hours. One would suppose that men earning 40 cents per hour, and having more work than they can do, would scorn to have others do for them what they are so well able to do for themselves.

THE plea is being urged by a Toronto newspaper that the street cars should be run on Sundays in order that tradesmen, clerks, etc., might recuperate their wasted energies by spending Sunday at High Park or some of the other suburban pleasure resorts. While there may be some ground for this appeal, we are disposed to coincide with the many who have expressed the opinion that the running of street cars on Sunday would open the door for the indulgence of vicious practices which under existing circumstances cannot be carried on within the limits of the city proper and under the watchful eye of the police. We fear that whatever benefits might be conferred by the proposed new departure, would be more than counterbalanced by resultant evils. A much better plan in the interests of the masses would be the establishment of a number of parks of medium extent throughout the thickly-populated districts of the city. These could be reached and enjoyed with little exertion, and without entailing upon a considerable number of persons the necessity of Sunday labor.

A MEETING of the Board of Directors of the Ontario Association of Architects was held in Toronto on June 16th, to arrange preliminaries in connection with the approaching annual convention in November. Some eight or ten papers on a variety of interesting subjects have already been promised. It is proposed to hold an exhibition of drawings at the Canadian Institute rooms. Members of the Association are urged to assist in making this exhibition as large and interesting as possible. Those who may wish to send drawings for exhibition should correspond with the Secretary of the Association on the subject at as early a date as possible. It is intended that the convention shall extend over at least two days, and shall include a dinner on the evening of the first day. The Secretary has been in communication with the promoters of the movement in England for incorporation, and from this source has gained information which will prove of much service to the committee appointed by the Ontario Association to further similar objects in Canada. This committee we are pleased to learn, is making satisfactory progress with the work assigned to it.

ANOTHER example of the ignorance or carelessness displayed by contractors in estimating for work put up to tender, is to be found in the bids sent in recently for the erection of a new public school building in Toronto. There were sixteen bids for the masonry work. Between the highest and lowest of these, there was the startling difference of nearly \$3,000, the highest being \$10,750, and the lowest \$7,987. Again we ask, is it a matter for wonder that there are so many failures in the ranks of the contractors? While in other branches of business the keenness of competition, reducing profits to a minimum, has led men to study more closely the details of their business, and exercise the greatest caution in their calculations in order that the small margin of profit may not be lost, our master builders adhere to the old slipshod methods of a past age. In the easy-going times when profits were sufficiently large to guarantee the most ignorant and careless against loss, men might pursue such methods and even make some money, but it cannot be done now, and the sooner Canadian contractors come to this understanding the better it will be for their chances of success in life. It may safely be assumed that in no branch of business is competition more keen or the margin of profit more narrow, than in the building trades. In many cases a difference of 10 per cent., not to speak of 30 per cent., is sufficient to turn profit into loss. In view of this, the contractor who hopes to succeed must substitute for guess-work in estimating the most approved methods of arriving at exact calculations.

THE distinguished Scientists composing the American Association for the advancement of science will convene in the city of Toronto, on the 27th inst. Daily sessions will be held from that date until September 7th. The morning and afternoon meetings of the Association and of its Sections will be held in the University Buildings, Queen's Park, where will also be the offices of the Permanent and Local Secretaries during the meeting. The Council will meet at the Queen's Hotel at noon on Tuesday, Aug. 27th. The Association will be called to order in General Session, at 10 a.m., on Wednesday, August 28th, in the University Convocation Hall, by the President, Mayor J. W. Powell, of Washington, who will resign the chair to the President elect, Professor T. C. Mendenhall, of Terra Haute, Ind. After the adjournment of the General Session the Sections will organize in the respective halls. In the afternoon the Sections will meet and the Vice-Presidents deliver their addresses. In the evening Mayor Powell will deliver the Presidential address in the Pavilion, Horticultural Gardens. The meetings of the Sections will be held on the following days (except Saturday and Sunday) until Tuesday night, when the concluding General Session will take place. Saturday will be devoted to excursions, complimentary to the Association, including one to Niagara Falls and one to Muskoka. Arrangements are being made for an excursion, starting Sept. 3 or 4, to the Huronian District, and also one to the Pacific Coast. During the week two popular lectures, complimentary to the citizens of Toronto, will be given by prominent members of the Association. The usual daily programmes will be issued by the Local Committee during the week of the meeting.

DURING the past few days there have been two most serious scaffold accidents in Toronto. One resulted in the death of a bricklayer, and the last one may also be attended with equally serious results. Greater care should be taken in the erection of scaffoldings. Where men's lives are endangered it does not pay to adopt a policy of economy in the erection of scaffolds, nor does it do to build them in a careless manner and trust to their being sufficiently strong to answer their purpose. The amount saved in material and time through erecting unsafe scaffoldings will not make any man rich. The scaffolder should also remember that on him depends the lives of his fellow-workmen, and that he should do his work well and see that his employer furnishes him with the necessary material for the erection of safe scaffolding. The foreman on the work should see that all scaffoldings are amply strong for their purpose, and properly erected. It may do for the workmen to accept a

scaffold as safe, but no foreman should do so. He should examine all scaffoldings with the especial object of seeing that they are properly erected, and that all material used is perfectly sound. A cry has been raised for the appointment of a scaffold inspector because a few accidents have occurred which might have been prevented by ordinary care and a knowledge of material on the part of the scaffolder. One would be led to suppose that an inspector would be able to stop the erection of dangerous scaffoldings throughout the city. How many have any idea of the number of scaffoldings which are erected in Toronto during one season's building, or of their very temporary character? The most dangerous scaffoldings, and those which have been the cause of nearly all the accidents, have been scaffoldings erected to do some small piece of work, and which will consequently be removed within a few hours, or at the most a day or two. Such scaffoldings are generally erected in as slight a manner as possible, and often come down before they have fulfilled the service for which they were erected. Would it be possible for an inspector to examine every one of these scaffoldings throughout the city? And in case he was able, who would be held responsible? as many of these erections are put up and taken down by the workmen themselves without their employer knowing anything about the matter. It may be safely said that accidents to large or important scaffoldings are very rare, and to oversee such erections would be about all the work which an inspector would be capable of doing beyond what indirect good he might effect by the fact that he might possibly come along and find an unsafe scaffolding, and then be able to make an example of an employer or of a workman who did not value his own life sufficiently to observe ordinary care in the erection of a scaffolding.

With some exceptions, men who work on scaffoldings should be able to judge to some extent as to what is a safe scaffolding, and if such is the case, why should the general public be put to the expense of seeing that they do not endanger their own lives? If a bricklayer or a carpenter is not capable of judging the strength of a scaffolding, who should be? We do not consider that a labourer has that knowledge, but he is never required to go where the properly qualified mechanic does not precede him or follow very soon after. If it was distinctly understood that no labourer should go on a scaffolding until the foreman had inspected it and his permission had been obtained, every precaution would be taken that is reasonable for the protection of the lives of men who work on scaffoldings. The foreman, along with the scaffolder, should then be held responsible for the occurrence of accidents. We do not believe in the policy of protecting every man from what to a large extent would not occur if he used due care and ordinary intelligence. Individual responsibility should be made a factor in men's lives, instead of encouraging them to believe that their steps should be surrounded by all manner of safeguards to protect them from their own ignorance or carelessness. What the city requires more than a scaffolding inspector is an efficient and sensible building by-law, with inspectors to see that its provisions for safe building are faithfully carried out. Where there is so much unsafe and reckless building it is only natural that inferior scaffoldings should be erected. A careful examination of buildings and scaffoldings will show that good scaffoldings are used in the erection of solid buildings, and bad scaffoldings for "jerry" buildings. It is only natural that where men are allowed to erect very inferior buildings for the supposed shelter of their fellow men, they will consider any manner of scaffolding strong enough. Many more lives are endangered and lost through bad building than through bad scaffolding, and yet not one word is spoken to alleviate the evil. And the lives thus lost did not in any way contribute to the result, except in so far as they may have accepted as true the statement that all was right when all was wrong.

If inspectors are to be appointed let them attend to the work which most requires attention, and not to minor matters, simply because they are brought vividly to mind by unfrequent and thus startling accidents. Scaffold accidents can

be put a stop to in very short order by making those who are responsible suffer the consequences of their own carelessness or ignorance, and the persons whom we would hold responsible are the contractor, the foreman and the scaffolder. But so long as little or no effort is made to place the consequence of accidents on the right shoulders, so long will they happen. Those in authority should have persons to examine into any accident where lives have been endangered, even though no fatality results. Waiting until some one is killed before investigating an accident, is on a par with locking the stable door after the horse has been stolen. With a stringent building law and competent building inspectors, no unsafe building would be erected, and few if any dangerous scaffolds. The last two accidents could have, and very likely would have occurred, even though there had been an inspector of scaffolds, and he could not have been held responsible, as no man or set of men could be expected to see that every put-log, scaffold pole and plank that enters into the erection of the scaffolds of a city is perfectly sound. It would require a tremendous amount of time to examine every put-log to see if it was sound, and not attacked by dry-rot. That can only be done by the man who actually erects the scaffold, as he handles every piece, and he, before all others, should be accountable for all bad materials entering the scaffold.

The suggestion has been made that architects should be held responsible for the strength of scaffolds necessary to the erection of buildings according to their designs. This would only be a partial remedy, as possibly not one half of all the buildings erected are under the supervision of an architect. However, it would not be just to throw upon an architect such responsibility. He has many duties to perform, and has no more time to spare than will allow him to see that the building is being carried out according to his plans and specifications. He might be able to give a general supervision to the scaffolds and determine whether they were properly put up, but he would not have the time, nor could he be expected to examine every piece of timber in the scaffolds of a building to determine their strength or if they were free from rot of every description. Workmen as a rule do not like to receive any advice from an architect as to the strength of scaffolds or ladders. Very often they will persist in endangering their lives after they have been warned, with no other apparent reason than to show that they do not desire advice, or do not value their lives. It is very often necessary to insist on men using reasonable caution when engaged in dangerous positions, and when such is the case, their employer or foreman should not be held accountable.

"CANADIAN ARCHITECT AND BUILDER" SERIES OF PRIZE COMPETITIONS.

WE have decided to hold a series of competitions of work which will be of interest to our general readers. While we must make the paper one of especial interest to architects, it is also our desire to have as much matter as possible which will be both useful and interesting to our many other subscribers.

We have not yet decided the subjects for the competitions or their arrangement, but we may mention a few which are here determined to submit to competition, viz :

The plan of a bath room, showing the best position of fixtures, details of finish, with specifications of fixtures.

Suitable details for the interior of a small house—details to include those for staircase, doors, architraves, base, windows, two mantles, etc.

Plan of serving pantry, showing cupboards, shelving, etc., with details of same.

Design for verandah, with details.

" " front fence, with details.

" " front door, with details.

" " three plaster cornices.

Essay on Heating.

" " Plumbing.

We do not propose to give large prizes, but we hope they will be sufficient to induce large numbers to enter the various competitions.

Full particulars of these competitions will appear in the CANADIAN ARCHITECT AND BUILDER for September.

THE CITY OF TORONTO WATER FRONT.

THE importance to a growing town or city of securing railway connections, or to a railway of gaining access to a large distributing centre, cannot be estimated with any closeness in figures. The time was, and that not many years ago, when Toronto had to make great sacrifices to secure railway facilities. No matter what demands a railway corporation made, they had to be conceded, or the service which it might render might be transferred to another point. But Toronto has grown beyond dependence on railways. In fact, the position is reversed. Now it is the railways that must gain access to this city at any cost. But railway-like, they prefer to gain all they can with as small cost to themselves as possible, little caring how much injury may accrue to others. The Grand Trunk came in years ago, when Toronto had to have railway connections, and appropriated the bay front. At that time it may not have been a serious matter that a number of railway tracks cut off the inhabitants from the water. There were not many tracks, there were not many trains, there were not many inhabitants, nor were they in any great hurry, and could without much inconvenience wait while one of the short trains of that day made its way along the esplanade. But now it is different. There are thousands of people crossing these tracks every day to the steamboats which carry them to the many places of resort. This is not a matter of pleasure only to these people; it is also a question of health. That which is of great importance to the healthfulness of a people should receive every consideration, certainly more than the material welfare of a railway corporation. It is a question if the people of Toronto would have opposed the scheme of the C. P. R. to take possession of a very large and important tract of land in front of the most central and valuable part of the city, if they had not gone about it in a most arrogant and domineering manner. The city was informed that the C. P. R. wanted the land and that it would take possession of the city front whether or no. It mattered not that the people did not wish to be served by the railway at so great a cost, and that the land could not be made to serve any useful purposes by the railway. The railway wanted to come to Toronto and do business with its people, and because a Railway Act which makes every provision to allow railway corporations to expropriate everything of value to them, and none to protect the individual in his rights, enables them to take an arrogant position, they proclaim that they do not care whether the people of Toronto want them or not, they are coming, and they will also take all the land they want for railway purposes or otherwise, even though by so doing they cut off the people from the water front. When it is remembered that the bay front from Brock street to Simcoe street is in the possession of the G. T. R., so that no one can make any use of it whatever, some slight appreciation can be gained of the unfathomable depth of the C. P. R. assurance when they coolly propose to extend the barriers to Yonge street. From Yonge street to Brock street is very nearly one mile, and for the entire distance it would not be possible to gain access to the water front except by passing over the property of either the G. T. R. or C. P. R. A people that would quietly submit to such wholesale expropriation, without protest, followed by action, would not be deserving of even the right to have a look at the water of the bay across the railway tracks. These two railways would if they got their own way allow the people but a small and very inefficient outlet to the lake at some point so far east that it would not suit the convenience of any of the citizens except a few who might live directly north of such outlet. We would then see our people going long distances east and west, as the case might be, through the hot and dusty streets to gain the only outlet to the cool and refreshing lake breezes. Such a condition of things must not be. The convenience of the railways is of comparatively little importance, compared with the convenience to, and the health of, the citizens of Toronto.

The railways would not be nearly so anxious to secure the

city front if it was not so valuable in the present, and if they did not consider that present values are but the suggestion of those of the future. The bay front in the possession of railways, and Toronto would be at their mercy. Everyone knows the value of water communication in lowering and keeping down freight rates. Without water communication, what might not freight rates be raised to by companies whose sole purpose is to make all they can without regard to other interests? If this expropriation of the water frontage were allowed, it would only be a question of a year or two when there would be another demand, and more frontage would go to the advantage of some company without the people receiving any benefit. If the C. P. R. can take possession of the water front and close the streets from Yonge to Simcoe, what is to prevent them in the future claiming that they want more space and taking possession of the frontage as far east as Church street, or even Sherbourne street? And if such should take place, what benefit would the lake be to the citizens except to remind them of the stupidity of those who gave up such a valuable property?

We are pleased to know that the great presumption of the C. P. R. has at last stirred the people to action, and that they are not alone satisfied with opposing the C. P. R. in its demand for the water front, but propose to take the aggressive, and determine if it is

not possible to remove the railway tracks from the level and place them on a viaduct or high level-trestle. The railway companies coolly propose that many of the streets should be closed, and that the few remaining ones should have bridges crossing the tracks. It should be a better plan to make steam, not the citizens of Toronto, do whatever work is required in the form of climbing. The question is, what

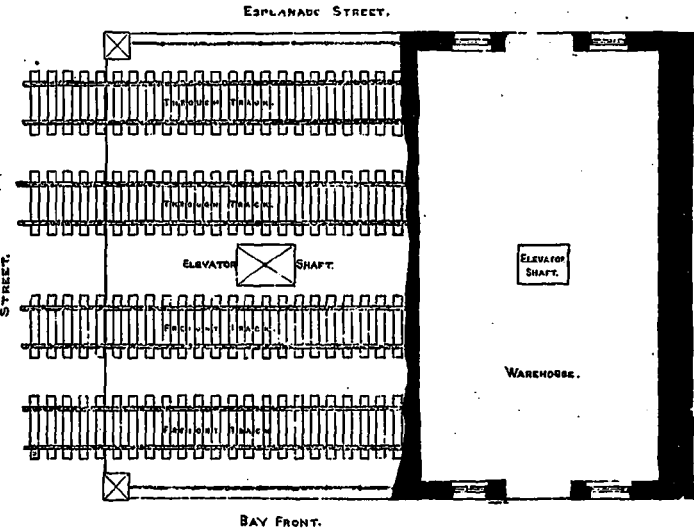
form should this overhead scheme take, that it may meet every interest with the least disadvantage and at the smallest outlay? Mr. Davies was the first to propose the viaduct scheme many months ago, but at the time it was considered too costly and the suggestion dropped out of view. It has, however, been revived by Mr. Brock, who most earnestly advocates the scheme, with the difference that he proposes that there should be vault accommodation below the tracks. This scheme would remove all the tracks from the level, and consequently all danger to life. The railway tracks being on a level with our streets, causes serious loss of life each year. The law states that trains must not run within the city limits at a greater speed than five miles an hour. That they exceed this limit is admitted, and we are at a loss to know the reason why the city council does not take some means of making the railways observe the law. The railways without hesitation make the city live up to all its agreements with them, even to the smallest item. Then why is the city so very lenient with them? If the railways did not run their trains at a higher rate of speed than five miles an hour within the city limits, it would cause them a delay of at least one and a half hours, which must be a serious loss to a railway company in these days of competition. A viaduct scheme would allow them to run their trains at a high speed

without danger to the citizens, and thus save them much time.

The question now to be considered is, what shall be done with the water front without injury to any interests, not excepting those of the railway? We are in favor of what may be called the viaduct scheme, but would advocate that such arrangement be made as comprehensive as possible. The suggestion that storage vaults could be built between the piers of a viaduct is a good one, but we would go further and propose that a row of warehouses or storehouses be built with a double frontage, above which the railway tracks could be placed, as suggested in the accompanying sketch. These warehouses could be from 60 to 100 feet or more in depth, with a frontage on Esplanade street, and one on a street to the south of same. Such number of tracks could be built above the warehouses as might be required for through trains, and also for the disposal of freight cars. The sketch shows two through tracks and two freight tracks, one for cars being unloaded, the other to be used for shunting purposes. The warehouse would be in width from center to center the length of a freight car, so that a car would stand opposite to the elevators to the warehouses. These elevators could be run from a line of shafting driven by an engine at some convenient point. Such an arrangement would allow of freight

being unloaded directly into the storehouse without cartage, where it could remain until such time as it might be convenient to remove it to the business warehouse. In fact, the goods need never leave these storehouses until they are sent to the purchasers, as they could be loaded into cars from these storehouses with equal facility to that with which they were unloaded. More-

over, goods could be received by rail and shipped by water, or *vice versa*, without cartage, the idea being to have a combined street and wharf on the bay side of the warehouses, alongside of which vessels of all kinds could lie and unload. The street or wharf could be made of such width as might be determined upon as most convenient. If these storehouses consisted of two storeys and a basement, the tracks need not be placed at a greater height above the present rails than 32 feet. The streets to the bay would be kept full width and crossed by iron girders. The wharfage front we would have as straight as possible, but running parallel to the storehouses. At the ends of all streets, with a few exceptions, we would build a pier somewhat after the form suggested in sketch; these piers to be carried to the windmill line with a straight face towards the bay. These piers would enclose basins by which vessels could be brought to the wharf in front of the storehouses, where they could discharge their cargoes. Passenger steamers would lie along the outside face of the piers or run into the entrance to the basin and lie alongside of the pier at these points; the entire space enclosed by the cribwork of these piers to be filled in with earth and sodded, with the exception of such space along the outside edge of the cribwork as might be required for the loading or unloading of such vessels as might not require to go



BAY FRONT.

to the wharves. A fountain could be placed in the center, and trees planted over nearly the entire space. These piers are shown with a bridge from the end of street to piers, with the object of having a channel along the wharfage front to allow of the water in the basin being changed by every movement of the water in the bay. The construction of a number of such piers in front of the center of the city, and their gradual extension in time, would make Toronto, with its Island, one of the most beautiful cities on this continent.

It may be urged that to lift the tracks 32 feet above the present level would raise them much too high for station purposes. We have not the levels necessary to determine what should be done, but believe that any difficulty in this direction might be overcome. The height of the tracks could be dropped gradually as the station was approached, if the height should prove too great, and an inclined approach could be made from Front street up to the station level.

We would be in favor of a station after the style of the Broad street station in Philadelphia, with such changes as circumstances might render necessary. Trains enter the above station above the street line, and passengers ascend by a staircase or take the elevator to the platform level. Cabs, etc., drive under the station, so that passengers may obtain a cab, attend to their baggage, and drive to their destination without being exposed to inclement weather. We would prefer to have a station with a number of through tracks, with platforms between them, to be reached by the passengers passing beneath the tracks, thus doing away with the necessity of passing over tracks to enter the right train, as is very often necessary at the Union Station in Toronto. This plan would also prevent people not acquainted with the station taking the wrong train. All platforms to be closed in by gates, etc., according to the English method. The waiting rooms, ticket offices, baggage rooms, etc., to be on the lower level, and arranged with the utmost consideration for the travelling public. The height of such passage need not be more than eight feet, with inclined ways as well as stairs to the level of the platform; all baggage to be received from and handed over to travellers in a central baggage room of ample size, divided into divisions according to the different lines of railway connections, that passengers could easily find their baggage on coming from the landing platform.

We have not the slightest hesitation in stating that one of the most convenient and commodious railway stations could be designed with the railway tracks at a height of 32 feet or more above the level of the Esplanade.

The above scheme may seem to many chimerical, but we believe that the more it is studied the more favourably it will appear. The storehouses should rent readily, and pay a fair interest on the outlay for the viaduct scheme, as there would be a large saving in cartage to many of the occupants, which would allow them to pay higher rents for warehouses placed

as those would be than for those without the same facilities for slipping and receiving goods. The party walls between the warehouses would be made heavy enough to carry the iron girders for the tracks overhead, and as the space would only be about 33 feet, the wall need not be excessively heavy, nor would the girders be of a costly size. The roof would require to be inclosed in fireproof material, and covered with asphalt or some similar material. These warehouses would then have the advantage of being fireproof, and consequently would draw high rents, as insurance could be obtained at low rates.

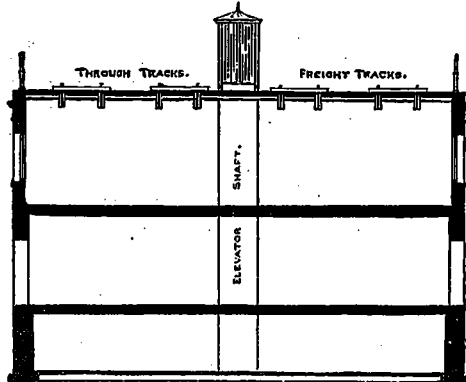
It would be necessary for the railways to have yards at convenient points for ordinary freight. There should be several, so that freight might be delivered at the most convenient point, that cartage as far as possible might be saved. Building material, for instance, is very heavy and bulky, and if it has to be carted from one end of the city to the other, the cost of delivery is very great. If four freight yards were opened common to all railways, the interests of the city would be well served. There should be a yard at or about the foot of Brock street, one east of Sherbourne street, one at North Toronto, and another at Parkdale. All through

freight should be handled in railway yards outside of the city limits. If railways were made to pay taxes on the full value of the property they occupy, they would not find it so advisable to hold more ground within the city limits than they absolutely require.

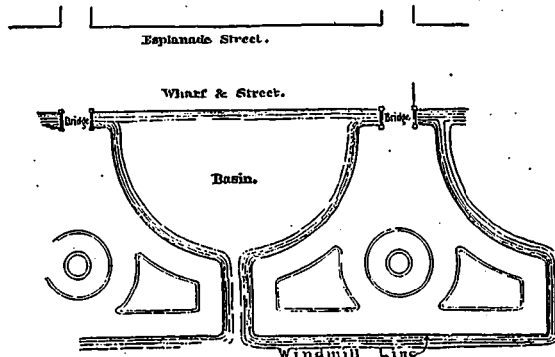
Just as we were drawing the above to a close, the thought came to us that the railways could use blocks of the above storehouses as freight sheds. For instance, the block from Church to Yonge streets could be used as a freight shed, and goods delivered to the different storehouses according to their destination. Goods for Hamilton could be delivered at the Hamilton storehouse, and transferred to the freight car for Hamilton by means of the elevator.

Openings could be left in the party walls so that communication could be had with all the sections of the freight shed. The fact that such freight sheds would be fire proof would make them much more valuable to the railways. Each of the railways could have such blocks as they considered most desirable and were willing to pay rent for on the same basis as tenants of the storehouses.

We have thrown out the above suggestions, not that we expect they will be adopted, but with the hope that they may lead to the study of the problem from several points of view. We may have drawn on our imagination to some extent, but if it causes others to think out a solution of the problem, good will result. We do not think that a studied out scheme on the above line would cost more than the city could afford. To a very large extent there would be a direct return for the expenditure, and the balance would not be greater than the city can afford to pay for increased health for the citizens, and the improved appearance of the city front.



SECTION THRO WAREHOUSES.



QUERIES AND ANSWERS.

(No. 7).—Is lake sand much used for building or other purposes in Toronto? How and where is it obtained? Would a preference be given to it over pit sand at nearly the same price? An answer will much oblige.—M. E. PARK, Cornwall, Ont.

(Reply to No. 7).—Lake sand is not much used in Toronto for the reason that it is next to impossible to obtain it. Contractors are not allowed to take it from the lake shore in proximity to the city. Lake sand is certainly much preferred to pit sand, especially for large and important buildings. We are inclined to believe that contractors on such work would be willing to pay 25 cents per load more for it than for pit sand.—THE EDITOR.

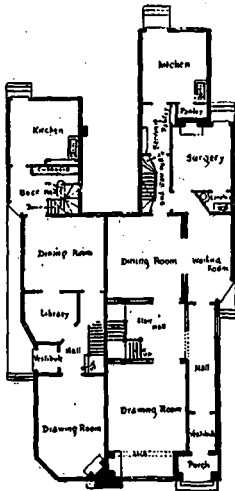
OUR ILLUSTRATIONS.

RESIDENCE FOR MR. C. BECK, PENETANG, ONT.—MESSRS. KENNEDY & HOLLAND, ARCHITECTS. TORONTO AND BARRIE.

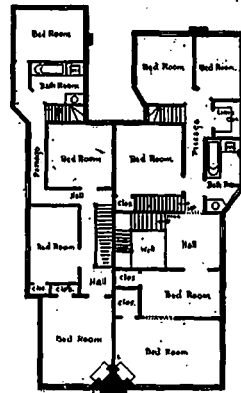
Size of building is 68 feet by 75 ft 6 in., by 53 ft. high. Built of red brick with stone dressings, and tuck-pointed. Roof of entire building is slated. Interior elaborately finished in hardwood. Supplied with all modern improvements and conveniences. The job was let by separate contracts. The contractors were as follows: Contractor for carpenter work, Bryan Bros.; mason work, R. Jocelyn; painting and glazing, A. Bowen; plumbing and heating, H. Evison, Collingwood. Total cost of building, including grounds, \$27,000.

HOUSE FOR DR. NATTRESS, CARLTON STREET, TORONTO.—STRICKLAND & SYMONS, ARCHITECTS, TORONTO.

The plans and elevations are adapted to a frontage of 40 feet, without light on either side. They are built of red brick and Credit Valley stone, and cost about \$8,000.



GROUND PLAN



FIRST FLOOR PLAN

PLAN OF HOUSE FOR DR. NATTRESS.

HAMILTON.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

THERE has not been much change in building operations in the Ambitious City since my last report, and up to now the building season of 1889 has by no means been a busy or profitable one, compared with former years, either in point of quantity or price. There has not been any stagnation in general building, but owing to the number of empty dwelling houses to be found now in every part of the city, there has been very little desire on the part of capitalists to invest in the erection of new ones. However, there have been contracts let for building some very good brick dwelling houses in different parts of the city, mostly in blocks of two, three, and four all two story brick, with stone cellars. Some are in the Queen Anne style, and in all of them is shown a decided improvement in outward appearance at least, over those formerly erected. The old style, plain brick front, without any effort at design or ornament, has been decided in favor of bay window, the porch, and tasty display of ornamental and colored brick work in arches and string courses is having good effect at a small additional cost, with the result that these newly finished houses are quickly rented, thus leaving the old ones to stand vacant.

The system of the new city hall is now completed, with the exception of the main tower. It is a very fair specimen of architecture, real and chaste in design and ornament, and in its prominent situation shows a good effect.

The new Presbyterian Church on the corner of Emerald and King streets has just been commenced.

The plans for the new free library will be submitted for tenders in a few days.

The Young Men's Christian Association building, now in course of erec-

tion on James street south, will be, when finished, a plain substantial building, neat in appearance, but in my humble judgment, not approaching by any means in architectural design smaller buildings in other cities; but, in this case, the means justifies the end.

There are two commodious school buildings being erected, one in the east and the other in the west end of the city. Both are brick buildings with stone dressings, but neither has the architectural design and appearance of the Victoria School lately erected on Hunter street in this city, a building that does infinite credit to the architect.

I may remark that there are quite a number of villa residence being erected in the suburbs and adjoining townships, so that our contractors, though not doing the rushing business of former years, have so far kept a considerable number of hands employed, and if the fall trade is good (as some expect it will be) both employer and employee will have little reason to complain at the close of the season.

I am unable to send an official record of the month's building operations, for the reason that no official record worthy of the name is kept. However, our late inspector will now be probably succeeded by an official who will straighten out matters effectually, and then it will be easy to give a true and correct record of building operations in Hamilton.

I am glad to observe that the CANADIAN ARCHITECT AND BUILDER is fast coming into the hands of our building operatives and their apprentices.

WINNIPEG.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

THERE has been a much needed improvement in the building trade generally, and now all classes of mechanics are well employed, but contractors are cutting prices very low. Work has commenced on the Reformatory at Brandon for the Provincial Government and the Home for Incumbles, and the Deaf and Dumb Institute will go on in a few days.

Tenders are invited for the Northern Pacific Hotel, which promises to be a very fine building. Mr. Joy, of St. Paul, Minn., is the architect.

Mr. Wheeler is to make extensive alterations to our opera house. He is also preparing plans for additions to some of the public schools.

Messrs. Timewell & Son let the contract to Smith & Gibson, contractors, to erect a solid stone building at Morden, to be used as a bank. They are also building one at Boissevain.

There is to be a stone church built at Deloraine.

Mr. J. M. Ross is building a brick store on Main St., this city, cost \$10,000.

The three stores built by Mr. Brydon, contractor, for Mr. Freeman, are completed, also the addition to the Foulds Block.

There are several private residences going up in different parts of the city. Work on the new city market is progressing very slowly.

QUEBEC.

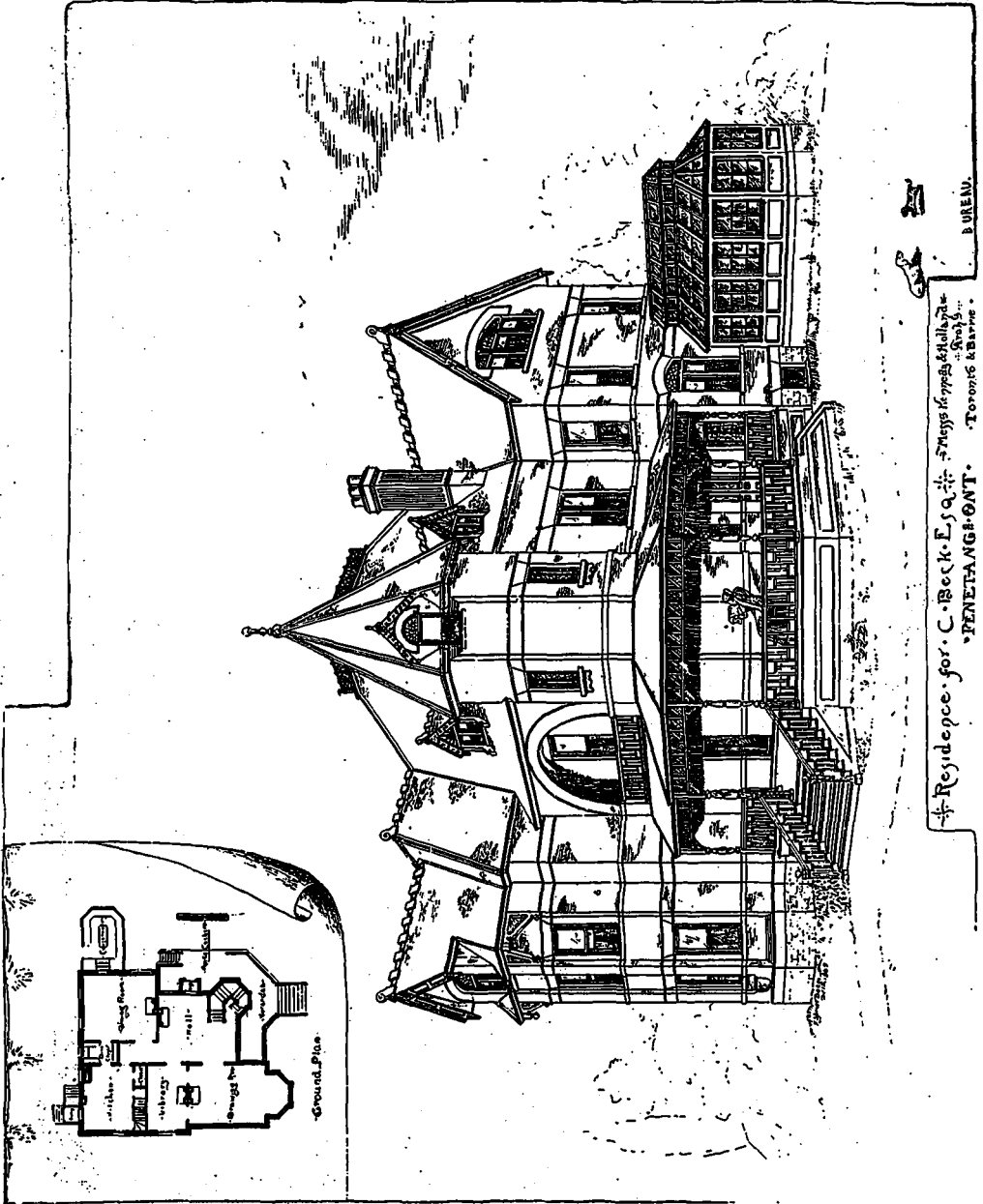
(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

THE JACQUES CARTIER MONUMENT.

ON the 24th June last, St. Jean Baptiste Day, took place the unveiling of the above monument, the ceremony being witnessed by an immense concourse of people estimated to number from 25,000 to 30,000 persons; the following description of the monument and its site is taken from the Quebec Morning Chronicle:

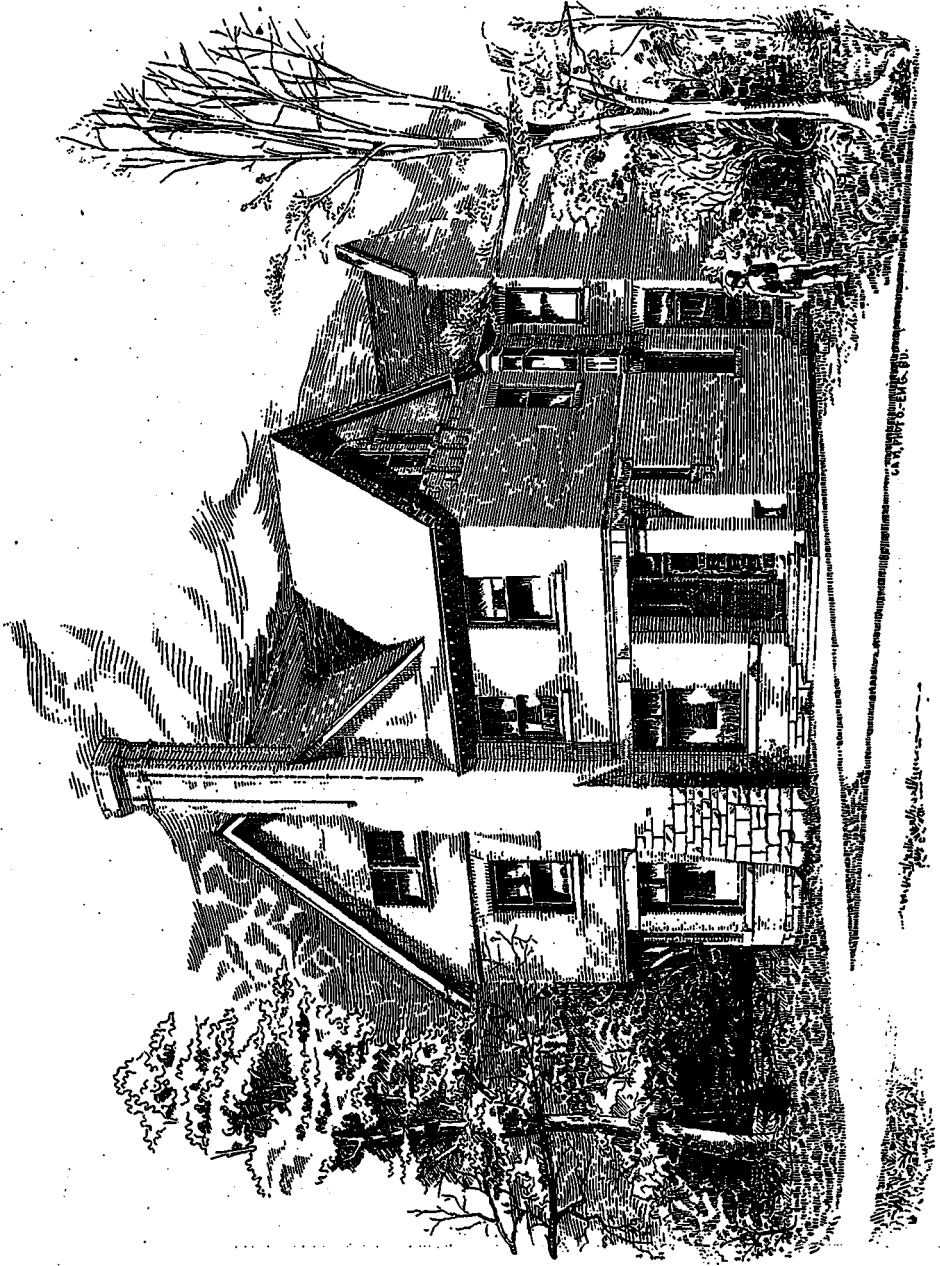
The site of the monument is on the north branch of the St. Charles and immediately overlooking the river with the city of Quebec in the background, an excellent view being obtained of its principal points of interest. Nearest is St. Rochs, then the suburbs of St. John surmounted by Mount Pleasant, and away to the east, the Parliament House, the Upper Town and the Battery, the Basilica and Laval University. The monument is surrounded at some distance by an iron railing which encloses however a space considerable enough to contain several hundred people.

The monument, which is erected in the centre of the enclosure above described, is about 24 feet high. It is almost square in form, measuring 8 1/2 feet at the base and 3 feet at the summit which has quite an ornamented cornice. Below the cornice, the granite of which the monument is composed is polished on each of its four sides. On the north face is found



Residence for C. Beck, Esq. - Plans by Messrs. Pennington & Co. - Toronto & Ottawa.

BUREAU.



HOUSE FOR DR. NATTRESS, CARLTON ST., TORONTO.
MESSRS. STRICKLAND & SYMONS, ARCHITECTS, TORONTO.

Jacques Cartier's shield with the device: *Semper fidelis*, and immediately below, the following inscription:—

JACQUES CARTIER
ET SES HARDIS COMPAGNONS
LES MARINS
DE LA GRANDE HERMINE
LE PETITE HERMINE
ET DE L'EMERILLON
PASSERENT ICI L'HIVER
DE 1535-36

Below this is the crest of Lord Stanley of Preston, Governor-General of Canada, and device: "*Sans changer.*"

On the east side is this inscription:—

LE 23 SEPTEMBRE 1625
LES PERES
JEAN DE BREBEUF, ENNEMOND
MASSE, ET CHARLES LALLEMANT
PRIRENT SOLENNELLEMENT POSSESSION
DU TERRAIN APPELE FORT JACQUES-
CARTIER, SITUE AU CONFLUENT
DES RIVIERES ST-CHARLES ET
LAIRET POUR Y ERI-
GER LA PREMIERE
RESIDENSE
DES MISSIONNAIRES JESUITES
A QUEBEC

Below is found the crest of Lieutenant-Governor Angers with the device: *Par droicts chemins.*

The south side is surrounded with the arms of the *Cercle Catholique de Quebec*, representing the Sacred Heart, with the device: *In manifestatione veritatis* and this inscription:—

LE 3 MAI, 1536
JACQUES CARTIER
FIT PLANTER A L'ENDROIT OU IL VENAIT
DE PASSER L'HIVER UN CROIX DE
35 PIEDS DE HAUTEUR PORTANT
L'EOUSSON FLEURDELYSE ET
L'INSCRIPTION
FRANCISCUS PRIMUS DEI GRACIA REX
REGNAT

Below the inscription is the crest of Cardinal Taschereau and the device: *In fide, spe et charitate certandum.*

On the west side is engraved a palm with the names of the Jesuit martyrs Jogues, Garnier, Masse and De None at the right and Brebeuf, Lallemand, Buteau and Daniel on the left. Below is the shield of the Jesuit Order and the device *Ad majorem Dei gloriam.*

The monument was designed by Mr. E. E. Tache and executed by Mr. J. A. Belanger. The granite of which it is composed comes from the quarries of Migwick, on the line of the Quebec & Lake St. John Railway.

MONTREAL.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

"A PROPHET HATH HONOR SAVE IN HIS OWN COUNTRY."

CANADIAN architects, if you want to be employed on Canadian works go at once, rent an office in Albany, Syracuse, Boston, New York, or some small American town—but it must be American, otherwise you will never be appreciated by the Canadian public. In Montreal to-day it does not matter what your antecedents may have been. Hang up your shingle as an architect from Boston and New York; run down every other local architect; never mind your own social standing; keep up lots of style; take all the credit trades will give you, and when any important work is to be given, our public will ask no questions, and will put aside well-known and reliable men to make room for you. For all this we have but ourselves to blame. There is no *esprit de corps* among our Montreal architects, but on the contrary, a feeling of jealousy prevails. It is a great pity we have not some such society as the R. I. B. A., of England, to raise the standard of our profession.

"Honor and shame from no condition rise,
Act well you part, therein the honor lies."

Y. M. C. A. BUILDING.

There is no little excitement among the building trade of this city regarding the awarding of the contracts for the above building. The building committee of the Y. M. C. A., following the example of other corporate bodies of Montreal and Toronto, employed an American architect to prepare plans, specifications, etc., for the proposed new building on Dominion square. Our builders naturally jeered the local architects at the "Committee having to go outside of the Dominion to get a very ordinary building designed." We could only "grin and bear it." To-day, however, the tables are turned and there is a great howl. A syndicate from Syracuse, U. S., have tendered for the construction of the work and underbid the Montreal contractors I hear some \$30,000 on the original plans, and some \$10,000 on revised plans, and were consequently awarded the contract. So the architects have the laugh this time, and wonder how it is the Committee have to "go outside the Dominion to get a very ordinary building erected."

I cannot understand how it is an American syndicate can come into a

Canadian city and underbid the local contractors, unless it is accounted for by the fact that our builders, not knowing the architects and their style of work, interpret their specifications differently from the American syndicate who are perhaps acquainted with the architect's style. We shall watch the progress of the contractors with interest, and perhaps may yet learn how to build cheaply.

It is rumored that Mr. Warden King, Chairman of the Building Committee, who is also proprietor of a large foundry here, has resigned his position as chairman, and issued a circular to that effect to the local builders. This I understand was done previous to the opening of the tenders, but as the Yankees say, "I guess he smelt a mice" and wanted to keep in with the building trade, but even that does not soothe their angry passions, and they are unanimous in saying that when the collectors come round they will be told to go to Syracuse and collect the necessary funds to erect their building.

DUTY ON PLANS.

Have Canadian architects no protection? We live under a protective Government—our bread, clothes, the material we use to gain our living, are all taxed to help to make the revenue of "this Canada of ours"? Our local corporations levy business taxes on us to keep up the city, and yet plans and specifications can be imported from the States free of duty under the very eyes of our otherwise watchful Custom House officers. It would be interesting to know whether they are classed as works of art, artful works, or simply smuggled across the line.

CITY HALL NOTES.

Mr. P. W. St. George, City Surveyor, has just returned from a two month's leave of absence. I hear he has visited all the chief cities on the other side and studied the question of pavements, roads, sewers, etc. It is earnestly hoped that he has obtained a few good pointers on the construction of roads especially, for Montreal to-day possesses worse roads than any other city I have ever seen. This is in a measure accounted for by the fact that no sooner is a street put in good order by the Road Department than the Water Department or Gas Company come along and cut it up again. Then again it strikes me as ridiculous to see a road made by spreading a few inches of macadam over the surface, burying it in fine sand, which the first heavy shower of rain washes away and conducts to the nearest gully, from which it has to be removed and carted to the dump. Surely there is some better treatment for roads than this. That it is possible to make good roads in this country, I would refer the Department to the roads of the Turnpike Trust.

I do not wish it to be inferred that I am finding fault with our City Surveyor, because if the money was not forthcoming and he himself not armed with the necessary authority, we must hold him blameless in the premises.

The Council have at last appointed an assistant to Mr. McConnell, Superintendent of the Montreal Water Works. The fortunate candidate is a Mr. Laforest, of Joliette. It is to be hoped that he will prove an efficient assistant to the worthy chief, and will doubtless be given ample opportunity to show a good record.

BUILDING NOTES.

The building trade is considered brisk, an improvement if anything on last month. Contracts have been let for the following buildings:

A large Catholic Church, on St. Antoine St.; a house on Dorchester St., for R. Forsyth; a block of tenements on Bishop St., for Mr. Roman; two houses on Dorchester St., for Geo. Roberts, builder; a block of tenements on Versailles, for Wm. Moore; an addition to the Merchants' Cotton Factory; a house on Sherbrooke St., for Mr. Allan, and some stores on St. Catherine St. for W. Weir.

HOW TO ESTIMATE.

By "CATO."

IN connection with excavations, the following data will be found serviceable as it gives the approximate quantity of the work. A good laborer ought to do in a day of ten hours hacking ground with a pick, light earth 16 cubic yards; clay, 10 cubic yards; gravelly soil, 7 cubic yards; chalk, 20 cubic yards. Filling barrows, average soil, 20 cubic yards per day. Wheeling, 25 cubic yards; depositing and returning, 35 cubic yards.

A load equals 1 cubic yard of 27 cubic feet. An ordinary contractor's cart, 6 feet long x 3½ feet wide, 22 feet deep, will hold 45 cubic feet, or 2½ tons of clay.

A contractor's wheel barrow will hold one tenth of a cubic yard, or about 2½ cubic feet.

1 ton of pit sand will equal 29 cubic feet; 1 ton of pit coarse gravel, 19 cubic feet; 1 ton clean shingle, 23 cubic feet; 1 ton stiff clay, 10 cubic feet, and 1 ton mould or earth, 32 cubic feet.

If it be desired therefore to figure up how long it will take to pick out any of the above mentioned kinds of ground, all that is necessary after finding the number of cubic feet in the whole excavation, is taking for instance the number contained in that stated in the June issue, say 5,400 cubic feet. For filling into barrows, working to the table

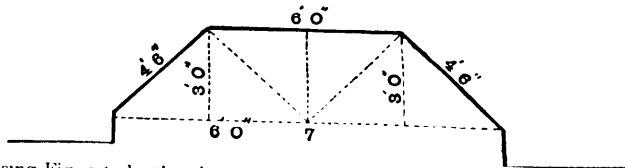
20 x 27 = 540	540)5400(10 days.
	540
	—
	00
Wheeling 25 yards depositing and returning.	
25 x 27 = 675)5400(8	
	5400

The above process can be worked out for loading carts allowing one laborer to fill about 35 cubic yards per day.

Trenches for footings, etc., are measured by their superficial dimensions multiplied by the depth and price per cubic yard as before.

For pier and post holes allow double measurement, that is, if a pier hole figure up 96 cubic feet, allow 192 feet, or 7½ cubic yards at price per yard as before.

In finding the solid contents of an angular excavation, as for bay windows, etc., the surest method is to take a square outside dimension of the whole, or if it be possible, to form rectangles of the plan, after the manner seen in the sketch, and to multiply by the depth for solid contents. Allow at least 25 per cent above actual cost, as more labor is required in hacking and digging angles, and this percentage will cover it. They come under the arithmetical heading of the triangle, and if it be required to find the exact contents of an angular bay, or in other words, the number of cubic feet of earth which must be taken out to allow its entry, the following method can be gone through: Divide the figure into triangles, and find the area of each separately, by multiplying the base by half the altitude. Thus, sup-



posing Fig. 2 to be the plan of a bay window, divide it into three triangles as shown, and taking one side of each as the base, bisect it, and join the point of bisection with the opposite angle. Measure the joining line, and then multiply the whole length of the base by half the length of the joining line, and the result will be the area, thus:—A bay window 12 feet long, 6 feet across the front, and 3 feet deep. Then 6 ft. × 1 ft. 6 in. = 9 square feet × 3 = 18 square feet × by the depth, 9 feet = 162 cubic feet. Add the sums of the three areas together and multiply with the depth of the excavation, as in a square excavation, and the result will be the contents in cubic feet, which divided by 27, will give the number of yards desired.

BUILDING OPERATIONS IN TORONTO.

FROM the records in the City Commissioner's office, we have prepared the following statement showing the number of building permits granted for the first six months of the present year, compared with the number granted for a similar period in 1888. The statement is prepared with a view to showing the class and value of the buildings which are being erected. It is interesting to note that, exclusive of the new Board of Trade building, to cost \$300,000, and for which no permit appears to have been obtained, the value of new buildings for which permits have been granted this year, exceeds those of last year by upwards of \$100,000. The amount spent on residences this year is \$200,000 in excess of 1888, and there is a large reduction in number of cheap, rough-cast houses. Below are the figures:

1889.			
Class of Buildings.	No.	Total Cost.	Alterations and Additions amounting to
Outhouses, stables, etc.	19	6,185	
Warehouses	6	61,200	300
Churches	1	15,000	3,200
Factories and Workshops	14	13,100	
Hotels	1	8,000	13,800
Hospitals	1	75,000	16,000
Public Schools	3	50,653	
Brick Dwellings	3	18,000	
R. C. Dwellings	107	613,700	63,300
Stores	32	29,550	1,500
Public Halls	61	226,600	40,200
Boat House	2	19,000	1,750
Offices	1	1,200	
			7,050
		\$1,120,188	\$164,100
			1,120,188
			\$1,284,288

1888.			
Class of Buildings.	No.	Total Cost.	Alterations and Additions amounting to
Outhouses, Stables, etc.	16	4,185	
Warehouses	3	75,450	2,500
Churches	6	200,500	16,000
Factories and Workshops	6	11,500	5,500
Hotels	1	12,000	7,000
Livery Stables	2	16,000	
Grain Elevators	1	25,000	
Skating Rinks	2	38,000	
Hospitals	1	21,000	
Public Schools	1	20,000	
Brick Dwellings	128	416,900	27,300
R. C. Dwellings	48	51,450	2,900
Stores	67	223,000	5,200
		\$1,114,985	\$66,400
			1,114,985
			\$1,181,385



SCULPTURE IN CANADA.

Editor CANADIAN ARCHITECT AND BUILDER.

DEAR SIR,—As one who has a genuine desire to advance all branches of art in Canada, I ask your permission to occupy a short space in your columns for the purpose of making public a few thoughts which have suggested themselves to me on the subject of a recent sculpture. Criticism is at all times apt to appear ungracious, but those to whom the onward progress of art is dear, can understand the motives which prompt this letter.

A few weeks ago there was unveiled in Toronto a bronze statue of Dr. E. Ryerson, who was so widely known to fame, and whose memory is probably destined to survive many of those whose deeds were more showy but less useful.

A man of plain, determined, weighty and beneficent career, and who possessed such individuality, should be a subject which a true sculptor would have no difficulty in grasping and transferring to the clay.

With your permission, I will point out what may be considered serious defects in the execution of the statue.

The pose is effective and natural, the garb becoming, the accessories suitable, but going into details, noticing a rather large amount of conventionality of treatment, one can but notice the sad lack of artistic feeling. Surely the talented Doctor did not possess so huge a head, so out of proportion to the frame. Massive and square it certainly was, the hair abundant and the aspect benevolent but determined, yet the writer's personal recollection is that most decidedly Dr. Ryerson possessed a well balanced and finely proportioned figure, the head by no means predominating as in this bronze.

The hands are simply terrible, one of the ill-assorted pair not only larger than the other, but the extended right hand, reversing nature and the traditions of art, shows that the index finger was at least a half diameter thicker than the others. Is this designed "au naturel" or shall we look upon it as a conventionalized representation of the mighty finger which guided the pen? If the latter, the fashion of naming the object considered necessary in the dawn of art had better be made use of, so that there shall be no danger of future Canadians exhuming this work and imagining that their ancestors were so singularly formed.

While on this subject of proportions, I cannot disabuse my mind of the idea that the feet, limbs, trunk and head belonged to a diversity of people, for most assuredly the feet don't fit the legs, the legs the body, nor the body the head. Throwing around such a trunk the flowing robe of a D.D. does not conceal this disproportion, and in no particular way helps the picturesqueness, whilst the tame modelling of the drapery is made more conspicuous.

Nothing in the way of accessories is so hard to arrange naturally and gracefully as drapery, either in painting or sculpture, and yet, with what pleasure can the eye dwell on the efforts of the early fathers of art—the revivalists to whom we owe so much! In early examples, failure in drapery is most rare—in latter days, the rule, perhaps because we are so particular about each particular hair that the garb must be left in slovenly modelling. The example under notice appears not only thin and harsh and hard, but a graceful fold or line can with difficulty be picked out. Compare, for instance, the graceful lines imparted to that ungraceful garment, a frock coat, as set out in the George Brown statue in Queen's Park—every wrinkle, fold and crease is intelligible and natural.

A very serious error, and one which the most ignorant modeller should have avoided, is that of making the pedestal on which rest the books, overhang the circular base to such an extent as to give an impression that one touch would upset the lot.

As such laudatory notices appeared in the local press, I was anxious to get a calm study of the subject, hoping that the attention not only of artists, but also of the public, might be engaged to forward the cause of art by intelligent criticism, and

that mistakes once pointed out might be avoided in future works.

It will not do to settle down in calm complacency and cry "well done," whilst better remains before, and if the next statue erected in the country be not a nearer approach to a great work than the subject of the present letter, and rise above tame mediocrity, the artistic community will be sincerely to blame if by keeping silence where speech would be golden, they permit the public to rest content and plume themselves on the advances culture and art have made in our Canadian home.

Respectfully yours,

ONWARD AND UPWARD.

MEMORIAL WINDOW.

Editor CANADIAN ARCHITECT AND BUILDER.

DEAR SIR,—A two-line notice in a local paper recently announced that a memorial window was inserted to the memory of Charles Jones, Esq., in the Cathedral at Hamilton. This appears, on inspection of the window in question, rather scant recognition of a work important and meritorious as a specimen of Canadian art-decoration. The window, although of one opening only, attains the height of over 17 feet from the sill, and over 3 feet in width. Within this space are illustrated two Scripture subjects—the larger and most considerable showing "Nicodemus Coming to Christ by Night." The smaller, in the base, is "The Charge to Peter." In the former somewhat uncommon theme, a like uncommon effect is produced by partial representation of lamplight from one pendant lamp and another on a brazier. Although treated in a somewhat conventional manner, the balance of tone and rich harmony of color, enhances the interest of the leading *motif*—the placid majesty of the Great Teacher and the rapt attention of the timorous, but enthusiastic disciple. The base subject is less a departure from traditional treatment, and though possessing good points, is less successful than the larger. The ornament is elaborate and appropriate. The window is from the studio of McCausland & Son, Toronto.

HAMILTONIAN.

"ART EDUCATION IN ONTARIO."

Editor CANADIAN ARCHITECT AND BUILDER.

DEAR SIR,—Your last issue contained a letter on the above subject, in the course of which the writer, after delivering some unvarnished criticisms on the men of light and leading, is kind enough to break the current of his strictures by a word of commendation and encouragement to the "Toronto Art Students' League." As representing that society, permit me to say, we are grateful for any recognition in our arduous uphill fight, especially from one so conversant with the whole subject, and whose opinion, endorsed by the silent authority of the CANADIAN ARCHITECT AND BUILDER, should have due weight with all interested in art matters. It is too true, as "Anti-Humbug" pertinently points out, that the money voted for the encouragement of art is at present worse than wasted. Whilst those who make a pretense, get well paid, others doing the *real work*, very politely and courteously, but none the less unmistakably, refused a cent of the grant for that purpose, on the ground that all moneys voted for art purposes are required for some years yet to form the nucleus of a building fund. But while at the present rate of progress this may be a good prospect for the next generation, it is well to remember the old proverb which says that "while the grass grows, the horse starves." Thus while the life-class in Ottawa and Montreal get \$300 a year each (I don't know what other support is awarded elsewhere) we are to starve on the husks of prodigal promises for the future.

I suppose having tramped it thus far without a lift from "carriage folk" (to use an *unhackneyed* expression) we can foot it the rest of the way up the "hill difficulty," but like "poor Joe," it's "werry 'ard to keep movin' on" without plenty of "chivving" from policeman "Debt." Of course we could greatly augment our numbers and friends if we prostituted the purposes of art study to flirt with amateurism, and opened our ranks to all forms of dainty *diletante* triflers. But being, like Mark Twain's pilgrims, "just a handful" of earnest workers, we have the temerity to consider that some responsible duty devolves on us to keep ourselves pure and unspotted in that re-

spect, and for the sake of the art reputation of the Queen City, and the prospect of equipping some of the art students of the rising generation, to save a corner of solid ground for the coming men to build up this fair city's art future upon.

Just over a score of us, and ne'er a millionaire among us, the expenses of carrying on the class weigh heavily on our devoted shoulders, but we must not be misunderstood to be asking charity when we demand our just rights of recognition and aid; much less would I desire the impression to be left that we wish to disparage the efforts of other bodies of artists, but simply to protest against the position of being, although acknowledged to be efficient and praiseworthy, the only section left out in the cold, while some others, according to "Anti-Humbug," owe their inertia to too much "coddling."

Thanking your correspondent and yourself on behalf of the Art Student's League, I am,

Yours faithfully,

SAM'L M. JONES,

Corresponding Secretary.

PLUMBERS AND THE ADVANCE OF SANITARY SCIENCE.

L. D. HOSFORD, of New York, in a short address urging the importance of registration of plumbers, based on competent examination, said:

Another question which has suggested itself to my mind while sitting in this room is, What are we doing in the line of progress in sanitary science? Are we not to a certain extent a mutual admiration society? What developments are being made in the prosecution of our business? We are continually growling about interference from a class of people known as sanitary engineers and scientific men.

It must be acknowledged that they find business to do and work to condemn—we must have in the past done poor work, otherwise there would be no such men condemning our work and no such work to condemn, consequently we are directly responsible for this class of men. Is the proper attention paid to the development of scientific problems appertaining directly to our business?

I have been a member of the New York Association of Master Plumbers for about two years, in which we have a committee called the Sanitary Committee, which to my knowledge has never been heard from with but one exception in that time. Is that right?

Ought we not to employ scientific men to lecture in our local organizations? Are we too proud or bigoted to accept their instruction? We advocate this class of instruction in our trade schools to-day and some of the scholars are better versed in technical knowledge than some of the master mechanics. I confess my ignorance on a thousand subjects appertaining directly to my business, and I find on conversing that my colleagues are equally ignorant. Ought we not to give more attention to this particular point?

I am aware that the National Association can do little in this matter except through the councils of the local Association. I consider that the ventilation of the dwelling house belongs as much to the plumbing business as the ventilation of the drainage system. Should we not have a blackboard, a course of lectures on plumbing in every council of local associations?

In one of the reports read on this floor yesterday the statement was made therein that a certain department had forced the plumbers to good work. Is not this rough on the plumber? Ought he not to lead rather than be driven in such matters? It is true that upon the recommendation of our Association Health Board rules and laws are sometimes founded? Is not this the proper way at all times?

We have received from the author, Mr. J. A. L. Waddell, consulting engineer, Kansas City, Mo., a copy of a timely treatise, in pamphlet form, entitled, "Iron Viaducts for Highways." The writer in this little work gives many useful hints regarding faulty design and construction of viaducts; with instructions as to the proper manner of letting contracts for these structures so as to secure efficiency and economy.



TORONTO PLUMBERS' PICNIC.

THE day selected by the Master Plumbers of Toronto upon which to enjoy their second annual picnic, proved to be very unpropitious, a heavy rain-storm setting in early in the forenoon and continuing throughout a considerable portion of the day.

In the afternoon a baseball match was played between East and West end plumbers, the teams being composed as follows: East End—Messrs. Wright, Forrester, Whitelaw, Hogarth, Jordan, Kinghorn, Bevis, Fullerton and Ritchie; Whitelaw, captain. West End—Messrs. Erwood, Rogers, Muirhead, Torbet, Gibson, Carlyle, Higgins and Knox; J. Sims, captain. The score was 17 to 29, in favor of the East.

Following the baseball contest, came other athletic events, which were decided as follows: men's 100-yard race, age, 20 to 40 years, won by Mr. Wm. Ritchie; Men's 100-yard race, age, 40 to 100 years, won by Mr. Joseph Wright; three-legged race, won by Messrs. Ritchie and Carlyle; ladies' race, won by Mrs. Stark. A great deal of interest and not a little amusement centered in the tug-of-war. The *pos session* of the teams representing East and West, was as follows: East—Messrs. Fiddes, anchor; Ewing, W. Ritchie, Whitelaw, Wright, Hogarth, Bevis, Kinghorn, Jordan, Carlyle, W. J. Forrester, captain. West—Messrs. Sims, Hynes, Gibson, Rogers, Torbet, Burroughes, Higgins, Muirhead, Knox and McMillan; Mr. Kennedy, captain. The East end team scored a victory after a hard fought struggle. W. J. Burroughes presented the prizes to the successful competitors.

Ample provision was made for satisfying the abnormal appetites created by these contests and the healthful lake breezes. Credit is due the Committee of Management, Messrs. W. J. Burroughes, N. Whitelaw, H. Hogarth, Thos. Cook and Fred Armstrong, for the success which attended the day's proceedings in spite of adverse circumstances.

SEWAGE DISPOSAL AT THE ASYLUM FOR THE INSANE, LONDON, ONTARIO.

THE question of the disposal of the sewerage of the London Asylum for the Insane has occupied the attention of the authorities for many years past. Up to the present time all the sewage from the institution has been delivered into a small brook leading into the south branch of the Thames River, which flows through the city of London. This brook is not over ten feet wide and is ordinarily very shallow, running nearly dry at times; and, considering that the asylum shelters over a thousand persons, the necessity for some other means of disposal is apparent.

A number of engineers have been asked on different occasions to give their ideas as to the remedy for the evil, but no definite action was taken in the matter until early in 1888, when the Ontario Government decided to employ Col. George E. Waring, Jr., of Newport, R. I., to examine into the whole question and to make a report with such plans and information as would be necessary for carrying out the work advised. Col. Waring found it out of the question to do anything with the sewage except by some method of purification, and advised that it be applied to the land in much the same manner as is done at the State Hospital for the Insane at Norristown, Pa., where the work, done under his direction, has been such a decided success.

The plan as recommended and finally carried out is as follows:

The old system of sewers is used for the removal of storm water, and a new system of small, vitrified sewer-pipes has been laid, connecting with all fixtures and flushed by automatic flush-tanks, and delivering all small wastes into an underground brick tank near the main asylum building. This tank has a capacity of 100,000 gallons to the spring of the three arches with which it is covered. The present daily water consumption of the asylum is about 60,000 gallons. The sewage enters a small

chamber at one end of the tank and passes through a vertical screen into the tank proper. Perfect ventilation is secured by means of six man-holes, three at one end having perforated covers, and three at the other end being connected by 10-inch pipes, underground, with the chimney of the pump house.

The situation of the asylum building rendered disposal by gravity impossible, and thirty feet east of the tank a pump house has been built, containing an 8-inch Webber centrifugal pump attached to the shaft of a 25 h. p. Westinghouse automatic engine. The suction to the pump is 10-inch iron pipe, with a bend at the end dipping into a small sump in the bottom of the tank at the lower end so that the sewage may be entirely pumped out. About one hour's pumping per day will be required. The discharge-pipe from the pump is 8-inch spiral-riveted pipe, 1,526 feet long, entering at the bottom of a brick distributing well, four feet in diameter in the disposal field.

Four feet above the bottom of this well leads out a line of 18-inch vitrified earthenware channel pipe, running at the end of a track of land 610x334 feet, which has been thoroughly undermined, and graded to a perfect level, with parallel alternate ditches and beds running longitudinally through it. The ditches, eighteen in number, are 8 feet wide at top, 2 feet wide at bottom, and 1½ feet deep. The beds between are 10 feet wide at top. The channel pipe from the distributing well has an opening into each ditch, with a gate to regulate or shut off the supply. The sewage is run into six of the ditches on one day, six others on the next, and the remaining six on the third day, when the first six will be again brought into requisition.

The discharge pipe from the pump has a continuous rise, being highest at the distributing well, so that when pumping is stopped all sewage in the well and in the pipe will run back through the pump into the tank and cannot freeze in winter.

Beyond the level track is a gently sloping field of about twelve acres, with three shallow ditches across it following the general contours of the ground, and from two to three hundred feet apart. These are distributing ditches for broad surface irrigation, and have a carrier ditch running from the end of the channel pipe at the head of the level track connecting them. It is intended to dispose of the sewage on the level track generally by intermittent downward filtration, and to use the irrigation ditches for relief if necessary, or for agricultural purposes.

Friday, July 5, a formal inspection of the work was made by Kivas Tully, Esq., Architect-in-Chief of the Province of Ontario; Dr. O'Reilly, Inspector of Asylums and Prisons; the Hon. Mr. Drury, Minister of Agriculture; Col. George E. Waring, Jr.; the Provincial Board of Health, Mayor and City Council of London, London Boards of Health and Trade and Hospital Commissioners, and others, to the number of eighty. Col. Waring gave an explanation of the details of the work as they were examined. Forty thousand gallons of sewage were pumped on to the land in the presence of the visitors; and the practical and successful working of the whole system shown. The sewage was almost odorless, and, having been thoroughly beaten in its passage through the pump, nothing but very small fragments of solid matter was visible. The soil of the field is mostly a light gravel, and absorption, therefore, is very rapid, as was shown by the entire disappearance of the 40,000 gallons of liquid in less than one hour.

The work has been done by the Department of Public Works of Ontario, under the general direction of Kivas Tully, Esq., Architect-in-Chief, and under the inspection of C. G. Horetsky. The entire execution of the work has been directly controlled by F. W. Farquhar of the firm of Waring, Chapman & Farquhar, civil engineers, New Port, R. I.

Construction was begun in October, 1888, and suspended in December on account of cold weather; then resumed in April, and received the first working test June 26, 1889.

The items of construction are as follows: 1 sewage collecting tank, 1 pump house, containing boiler, pump, and engine; 1,526 feet spiral riveted force-main, 3,865 feet 6-inch sewers, 640 feet 4-inch sewers, 2 automatic flush-tanks, 1 distributing well, 320 feet 18-inch channel pipe, 2,700 feet 3-inch tile underdrains, 2,700 feet 4-inch tile underdrains, 1,250 feet 6-inch tile underdrains, 3,000 cubic yards of grading, 10,800 feet settling ditches, and 2,700 feet irrigating ditches.

It is impossible yet to give the exact cost, which is in the neighborhood of \$15,000.



CONTRACTS AWARDED.

MIDLAND, ONT.—Mr. Robt. Reed, of Owen Sound, has secured the contract for the harbor works at this place.

LUCAN, ONT.—Messrs. Vanwick & Co., Parkhill, have secured the contract for the High School, their tender being \$6,000.

VICTORIA, B. C.—The Provincial Government have awarded the contract for the addition to the asylum, to Mr. Hugh F. Keefer.

VANCOUVER, B. C.—Messrs. Turnbull & Co., have been awarded the contract for the new Provincial Court House to be erected here.

GOUDERICH, ONT.—The contract for additions and improvements to the Huron County Buildings has been awarded to Edward Sherman.

PORTAGE LA PRAIRIE, MAN.—Mr. T. Kelly, of Winnipeg, has been awarded the contract for erecting the Home for Incurables, at the price of \$14,000.

ORILLIA, ONT.—Messrs. Boyes & Mathews have received the contract for the new church for the parish of St. James. The new building will cost \$16,000.

STRATHROY, ONT.—Messrs. Lewis & Cluff, of Ottawa, have been awarded the contract for the new post office building, at the contract price of \$15,000.

WINNIPEG, MAN.—The contract for the new North Presbyterian Church has been awarded to Messrs. Bears & Read, at \$3,000. Mr. J. W. Grievé was the architect.

TORONTO, ONT.—The contract for driving piles and laying 200 feet of 30-inch pipe at the foot of Bay street has been awarded to Medler & Arnold at \$135.00 per lineal foot. The St. Lawrence foundry has been awarded the contract for supplying the pipe at \$39.50 per ton.

CONTRACTS OPEN.

NEWMARKET, ONT.—H. L. Cane, chairman Fire and Water Committee of the town Council, will receive tenders up to the 19th inst., for piping lead, valves, hydrants, and specials required for the extension of the water works system, tenders for the laying of the same, including excavating for the piping, etc., laid complete. Tenders to state the price per foot for the piping and the price each for hydrants.

WINGHAM, ONT.—The by-law appropriating \$8,000 for a town hall has been carried.

NEW GLASGOW, N. S.—About \$50,000 worth of new buildings will be erected this summer.

HARLOCK, ONT.—The members of the Burns' Church will build a new church on the old site.

MEDICINE HAT, N. W. T.—Only \$1,000 more is required to cover the cost of the proposed new hospital.

HAMILTON, ONT.—The congregation of All Saints Church have decided to erect a chapel in the West end.

PETERBORO' ONT.—A by-law has carried appropriating \$25,000 for the erection of a new market building.

LUCKNOW, ONT.—The ratepayers have assented to a by-law appropriating \$10,000 for a system of waterworks.

CHATHAM, ONT.—T. J. Rutley, architect, is advertising for tenders for the erection of a brick block on King St.

LACHINE, QUE.—An effort is being made to find a means of draining the town and establishing a system of sewers.

NEW WESTMINSTER, B. C.—Clowe & Maclure, architects, have prepared plans for a new public hospital costing \$10,000.

SARNIA, ONT.—Plans are being prepared for the erection of a four story brick hotel on the site of the Alexander House, to cost \$30,000.

VICTORIA, B. C.—The by-law to enable the city to raise \$175,000 for the purpose of extending the waterworks, improving Beacon Hill Park and fire apparatus, has carried.

ORILLIA, ONT.—It is said that the admirers of a more advanced ritual have decided to separate from the Church of England here, and have selected a site for a new church.

GALT, ONT.—Plans prepared by Mr. Robt. Mellish for the new hospital, have been accepted, and tenders will be asked as soon as they are altered somewhat, with a view of reducing the cost.

BRANTFORD, ONT.—The plans of Mr. Alex. White, of Woodstock, for the new drill shed, here, have been approved by the Government, and tenders will shortly be called for the erection of the building.

SMITH'S FALLS, ONT.—Plans are being prepared by Mr. Martin, architect, for the reconstruction of the McLaren hotel, recently destroyed by fire.—The R. C. Church will be improved at a cost of \$8,000.

WINNIPEG, MAN.—The Baptists of Manitoba intend erecting a college shortly.—Christ Church, recently built at a cost of \$15,000, having got in a dilapidated condition, a new and costly edifice will be erected.

CAMPBELLFORD, ONT.—Mr. John Galt, C.E., is preparing plans and specifications for a system of waterworks, and tenders for construction will be asked in a few days.—An appropriation has been made for electric lights.

MONTREAL, QUE.—The plans for the proposed new Y. M. C. A. building have been revised, and new tenders will shortly be called for.—The widening of St. Lawrence Street and expropriation of the old buildings on the west side will result in the erection of seventeen new blocks between Craig and Dorchester streets.

WINDSOR, ONT.—Mr. Jas. McKellar of this town, will give \$1,000 and a valuable building site for the purpose of erecting a Congregational Church.—The Board of Education advertise for tenders for the building of an addition to the Third Ward School, the Catholic school, and a new four room school in the First Ward.

NIAGARA FALLS, ONT.—The water commissioners ask tenders, accompanied by plans and descriptions, for furnishing and erecting two sets pumping machinery, together with turbines, iron flumes, penstocks, etc., complete. Each set of machinery to have a pumping capacity of one and one-quarter to one and one-half million gallons per 24 hours. Particulars may be obtained from town clerk.

KINGSTON, ONT.—\$1,000 is to be expended in improving St. Paul's Church.—\$2,100 has been appropriated by the Council for an addition to the Louise St. school.—It is probable that an additional scheme will be submitted for the purpose of increasing the area of the water mains.—The Oddfellows intend to erect a large building on the corner of Princess and Sydenham streets, costing \$20,000.

TORONTO, ONT.—A. R. Denison, architect, has been instructed to prepare plans for a new fire hall for St. Alban's ward.—The St. George's Society have purchased a site on Elm St., whereon they propose to erect a building suitable for their work.—The sum of \$15,000 has been subscribed to a fund for the erection of a new Y. M. C. A. building in the west end.—Plans have been prepared for alterations to the city Registry office, to cost \$7,000.—Tenders will be asked for alterations to St. Andrew's market buildings, to cost \$15,000.—Plans have been approved for increasing the height of the tower of College St. fire hall, at an estimate cost of \$2,000.

Ten miles of new sewers have been constructed by the Works Department of the city of Toronto during the present year.

Mr. Stephen Saunders, who for many years occupied a prominent position as a builder in the city of London, Ont., died at his residence, 527 Dundas street, a fortnight ago. He was a native of Devonshire, England, and had resided in London, Ont., since 1848, and was held in high esteem.

The *Hamilton Herald* is the name of a new one-cent evening paper. The *Herald* shows marks of push and enterprise, and we believe will make a place for itself in a field which cannot be said to be overcrowded.

GEO. F. BOSTWICK,

Agent for Messrs. W. Stahlshmidt & Co., manufacturers of Office, School, Church and Lodge Furniture, Preston, Ont.,

— ALSO HANDLING —

I Beams, Channels and other Heavy Iron Work,

GOLDIE & M'COLLOCH'S SAFES, VAULT DOORS, LININGS, &C.,



AMBERG'S CABINET LETTER FILES,

◆◆ Church and Opera Seating and Other Furnishings. ◆◆◆

24 Front St. West,

TORONTO.

MANUFACTURES AND MATERIALS

RECENT CANADIAN PATENTS.

House Sewerage System.

No. 31,333. George McNeill, Ottawa, Ont.
Claim.—1st. A system of house drainage consisting of a vertical central ventilating pipe, having its lower end connected with the street sewer by a continuation laid with a proper fall, an egg-shaped trap connected to said pipe by a short outlet pipe placed some distance from the bottom of said trap, and the waste pipes of a building having their lower or discharge ends connected with said trap below its connection with the ventilating pipe, 2nd. A trap consisting of a vessel having a removable cover, an outlet placed some distance from the bottom, and branches below the level of the outlet for connection with the waste pipes of a building.

Extension Seat for Pew Ends.

No. 31,412. George F. Bawbridge, Toronto, Ontario.
Claim.—An extension seat, consisting of back, seat and brace, to fold and shut into lower part of pew end.

Impliments and Machinery used in the Manufacture of Brick, Tile and Earthenware, and Method and process of Using such Impliments and Machinery.

No. 31,346. Albert S. Locke and Robert P. Locke, Toronto, Ont.
Claim.—The adjustment of the cleats attached to the under side of any kind of pallet, so as to balance the weight of the bricks resting on the pallets, and the construction or adaptation of moulds and dies to correspond with the position of the cleats on any such pallet, 2nd. The improved method of manufacturing bricks and tiles by means of pallets, moulds and dies, constructed and arranged as herein described. 3rd. The arrangement of the cleats at intermediate points under the pallets, and the

construction of pallets of lighter or thinner material than any now in use, the cleats being moved towards the centre of the pallets, the material of which the pallet is made does not require to be so stiff, strong or thick as in pallets having the cleats at or near the ends. 4th. The combination of pallets, moulds and dies, having spaces between the cavities, and between the holes in the dies corresponding to the position of the cleats on the pallets. 5th. The cleats made with holes or arches instead of being solid, thereby decreasing the weight and allowing the free circulation of the air through the bricks when drying. 6th. The method of equipping a brick yard cheaply, by means of a system of pallets, moulds and dies above described. 7th. And also we claim as our invention the above described method of constructing pallets, cleats, moulds and dies, and the combination of and methods of handling and using the pallets, cleats, moulds and dies above described, and in any form or way in which the same may be combined or used in the working of a brick and tile yard or factory, substantially as and for the purpose hereinbefore set forth.

Kenneth Chisholm, M. P. P., Brampton, Ont., quarry owner, has assigned. The Howard Furnace Co., of Berlin, Ont., (limited), with a capital stock of \$24,000, has recently been incorporated.

The sewer pipe trust at Pittsburg has dissolved. The small dealers undersold the trust. Prices are now lower than ever.

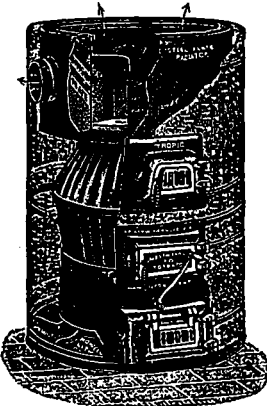
It is reported that Cleveland, Ohio, capitalists have about completed arrangements to establish an iron tubing factory in Ottawa. The syndicate possesses a new welding process.

Suit has been entered by Mr. R. Forsyth, of Montreal, Canadian agent of Mr. Peter Smart, Edinburgh, holder of the Canadian patent for composite pavements, for \$5,000 against Mr. G. Baccorini, of the same city, for alleged infringements of patent.

A new hydraulic brick is now manufactured in eight different shades of red and brown which, on cheap houses, is designed to supply the place of brownstone or sandstone for trimmings. The shades of color run from a rather dark brown to a reddish hue, and at a superficial glance might well be taken for the stones the place of which they supply.

- THE NEW TROPIC HOT AIR FURNACE -

Latest and Best Steel Plate Furnace in the market.



**LITTLE GIANT FURNACES,
 BOYNTON FURNACES,
 PENINSULAR FURNACES**

The Largest and Best Assortment of Cast and Steel Furnaces ever made.

**Patent Peerless Registers.
 UNION STAEM and HOT WATER RADIATORS.**

**Laidlaw Mfg. Co.,
 HAMILTON**

AND
 279 Queen St. West, Toronto.

THE NATURE AND USES OF ASPHALT.

IN a paper read before the Society of Arts at the Massachusetts Institute of Technology, Capt. F. V. Green states that asphalt is a variety of bitumen, found in a native condition and not manufactured, and in a solid form is commercially known as glance pitch. Glance pitch is found in limited quantities in various parts of the Rocky Mountains and Texas. It is very pure and is used to make a high grade of varnish, but its brittleness makes it useless for paving or roofing compounds.

The asphalt of Trinidad is found in a so-called "lake" about 130 feet above the sea-level, on the island of that name. The "lake" is a level tract, about 114 acres in area, of brownish material of an earthy appearance. It is sufficiently hard to bear the weight of carts and animals, and yet its consistency is such that excavations fifteen feet in depth are filled up by the flow of adjacent material in a few months. It is estimated that the amount of asphalt in the lake is upwards of six million tons. On partial analysis it yields approximately 40 per cent. of pure bitumen, 40 per cent. of earthy and vegetable matter, and 20 per cent. of water. The material is heated in large tanks at a temperature of about 300° Fah., to drive off the water and let the larger portions of the earthy matter settle and the vegetable matter to be skimmed off the surface. This refined asphalt contains about 60 per cent. of pure bitumen and 40 per cent. of finely divided earthy matter invisible to the eye. This material is too brittle for commercial use, and it is therefore mixed with a heavy, dark oil, known as the residuum of petroleum, in the proportion of six parts of asphalt to one of residuum. This is the material so largely used in paving and roofing compounds.

On the coast of California, near Santa Barbara and also in certain portions of Colorado, Utah and New Mexico, are found large beds of sandstone containing from 15 per cent. to 20 per cent. of bitumen, and it is from these mines that the asphalt pavements of various cities in Europe have been obtained. Those most suitable for paving contain about 10 per cent. of bitumen and 90 per cent. of fine limestone.

The uses of asphalt may be divided into five classes—viz.: 1st, as a varnish for paint; 2d, as an insulating material; 3d, as a water-proofing material; 4th, as a cement in ordinary construction; 5th, as a cement in roofing and paving compounds.

FOOT-POWER MACHINERY.
 COMPLETE SETS FOR CONTRACTORS AND BUILDERS.
 Machines for ripping, cross-cutting, scroll-sawing, mortising and planing, forming edges, grooving, gaging, rabbeting, cutting dados, and turning. Builders use our Hand Circular Rip Saw for lumber to a mill five miles' drive from their shops. The same is true in regard to scroll-sawing, mortising, toothing, cutting stuff for drawers boxes, etc. Builders using these machines can bid lower and save more money from their contracts than by any other means.

Read the following letters from Builders:
 CLARENCE F. LEE, carpenter and builder, Astorville, N. J., says: "I have had one of your Hand Circular Rip-Saws for about three months, and am much pleased with it. I have done the ripping for 15 houses in that time, which is over forty miles through inch boards. Have ripped as high as 3-inch plank. Table is also good for rabbeting; having rabbeted all joints and saved all drips for 200 windows."
 ALEX. SHIELDS, Lima, Ohio, says: "A few days since we had some 150 small drawers to make for a drug store; the steam power mill wanted 60 cents each for making them. With my foot-power machinery I made them, and saved 25c above good wages on the job. If desired, these machines will be sold ON TRIAL.
 The purchaser can have ample time to test them in his own shop and on the work he wishes them to do. Descriptive Catalogue and Price List Free.
 W. F. & JOHN BAILEY CO., No. 743—Stuby St., Rockford, Ill.

**FOR LIGHTING CHURCHES, HALLS, STORES,
STATIONS, STREETS AND PRIVATE RESIDENCES.**

**CRYSTAL
CARBON
GAS
FIXTURES
COST
CONSUMERS
NOTHING**

A system of increasing the illuminating power of gas by the use of a cheap, solid hydro-carbon, whereby a dull, flickering flame is rendered intensely white and steady. It affords the means of saving one-half the consumption of gas, besides giving a better light than the common burner.

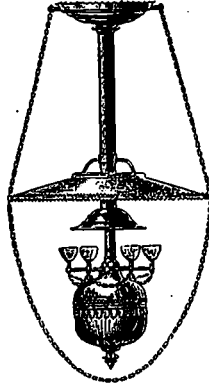
The lamp is a cheap and ornamental gas-fixture, is simple in operation, and cannot get out of order.



RESULT OF TESTS.

With a consumption of but three feet of gas per hour the photometer registered twenty-seven candles, or nine candles per foot! (Ordinary gas burning gives from two to two and a half candles per foot.) The above shows an increase of from 360 to 450 per cent. over the common burner.

For particulars, address



KBITH & FITZSIMONS,

109 King St. West, TORONTO.

Champion Safe Works.



SEND FOR CATALOGUE AND PRICES.

EVERYTHING FIRST-CLASS.

SAFES from \$30 to \$3,000.

— ALSO —

VAULT DOORS, steel-lined, with Combination or Key Locks; VAULT DOORS, Fire-Proof only; DIVISION DOORS for buildings.

EXPRESS CHESTS, MONEY BOXES, COMBINATION LOCKS for all purposes.

S. S. KIMBALL,

Office and Salesroom:

577 CRAIG ST.,

MONTREAL.

THE MANUFACTURE OF SEWER PIPE.

FOLLOWING is a description of the method of manufacturing sewer pipe followed by the Delaware Terra Cotta Co., as given by Mr. Frederick H. Robinson before the Engineers' Club of Philadelphia:

The material of which the pipe is made is composed of three ingredients—two kinds of clay and a sand and clay mixed. The first is a very strong clay obtained from brickyards in the north-eastern part of the city. It underlies the clay of which bricks are made. The second is a strong clay containing a red coloring matter, and is obtained from the south side of the Christiansi River in New Castle Hundred, near the bridge on which the Delaware Railroad crosses the Christiansi. The third ingredient, a material composed of fire clay and sand is obtained on the Christiansi River in New Castle Hundred. These ingredients are mixed in the proportion by measurement of two parts of the strong clay first mentioned, one part of the clay containing the red coloring matter and one part of the fire clay and sand; made in these proportions, the mixture is placed in the pan where water is added. The wet pan is a shallow, circular, iron pan in which the clays are crushed and mixed by two iron wheels following each other on edge around the pan, driven by a horizontal axle attached to a vertical shaft. This pan is placed on the ground floor.

After the materials are properly mixed, this clay is turned by a suspended shovel into the buckets of the elevator, which are attached to an endless band in which it is raised to the third floor of the building.

Projecting from the third floor toward the second, is the casting which contains the iron mould for the pipe. Into this the clay from the wet pan is thrown, and an iron plunger, moved by the piston of a steam cylinder, which piston is attached to the upper end of the plunger rods, descends vertically, compressing the clay in the mould below.

After the clay is thoroughly compressed in the mould, an iron table under the mould, attached to the upper end of a piston passing below the second floor and forming, as it were, the bottom for the mould, descends with the pipe standing upon it. The alternate upward and downward motions of the piston which moves the plunger, and the piston which moves the table, are controlled by the operator on the second floor, where the pipes are removed from the mould.

Pipes under five inches in diameter are, when taken from the mould, immediately removed to another part of the second floor, where they have placed in them a wooden frame of the proper length to which their ends are trimmed off and then smoothed with leather. As those over five inches in diameter come from the mould, they immediately have their spigot ends trimmed off and are then taken by an elevator to the first floor where their ends are finished up. These, with the smaller pipes from the second floor, are placed on end on the drying floor of the first story of the building, where they remain from three to six days, when they are ready for burning. Branches are made by placing the branch piece, while damp, upon the main pipe and then trimming and shaping them.

Traps are formed by hand in plaster of Paris moulds which are made in halves, dividing lengthwise.

The walls of the kilns are of brick and are 13 inches in thickness. The kilns are circular, the largest being inside, 22 feet in diameter and 8 feet high to the square, mounted by a dome.

The kiln is filled with pipes from the drying floor placed on end. It is fired from eight fire-places at equal distances around the kiln. Gas coal is used. Inside the products of combustion pass through short vertical stacks towards the top of the kiln, whence they are beaten back among the pipes, and finally escape through a flue built

around the kiln near the bottom and pass in an underground flue to the stack.

At the proper stage of burning, which is ascertained by small test pieces of clay which may be drawn and examined, the attendant passes three times around the kiln and each time throws into each fire-place a shovelful of common salt. By this the pipes are glazed.

After the sealing of the kiln, three days are required in which to fire up and burn, and three more in which to cool off and remove the pipes which are inspected and are then ready for the market.

The site selected for the new county buildings at Chatham has been found to be insufficiently large to accommodate a structure erected in accordance with the accepted design. Additional land will probably be purchased.

A new process of hardening plaster so as to make it available for the construction of floors in place of wood, has been brought before the French Academy of Science by M. Jute, says an exchange. A mixture of six quarts of plaster of good quality and one part of finely sifted, recently slaked white lime is employed like ordinary plaster. After it has become thoroughly dry, the object manufactured from it is saturated with a solution any sulphate whatever whose base is precipitated in an insoluble form by lime. The sulphates especially recommended for the purpose are those of iron and zinc. In order to obtain the maximum of hardness and tenacity, it is necessary to temper the limed plaster well in as brief a space of time as possible, and with no more water than is strictly necessary.

Mr. Frank Wickson, architect, Toronto, has formed a partnership with Mr. Norman B. Dick, of that city.

Mr. Charles Hinkel, a Washington architect, is said to have constructed a plan of an American exhibition tower to surpass the French tower. The plan represents the tower in half elevation and a half section. It is to be 1,500 feet high, while the Eiffel Tower is only 1,000 feet high and the Washington Monument only 507. The tower would weigh 30,000 tons. The cupola at the lower part of the tower is 260 feet high and 280 feet in diameter. Around the foot of the tower are 48 iron buildings.



Toronto Water Works.

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NOTICE is hereby given that sealed tenders, addressed to the undersigned and marked "Tenders," will be received by registered post only up to the hour of two o'clock p. m. on

MONDAY, 26th AUGUST,

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Plans and specifications may be seen and all particulars obtained on and after Tuesday next, 13th August, at the office of J. A. Fowler, Architect, 13 Victoria Street.

Each tender must be accompanied by a marked cheque or cash deposit for five per cent. of the amount of the same, and also furnish the names of two good and sufficient sureties for the satisfactory completion of the work if accepted.

The lowest or any tender not necessarily accepted.

JAS. B. BOUSTAD,
Chairman Com. on Water Works.

Water Works Department, City Hall,
Toronto, 9th August, 1889.

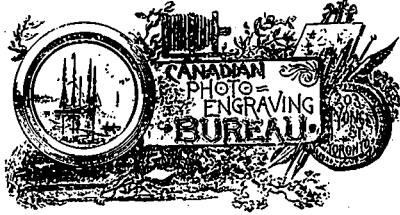
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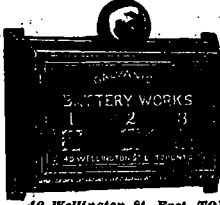
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Tenders will not be considered unless made on the form supplied and signed with the actual signatures of tenders.

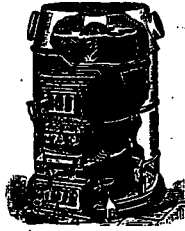
An accepted bank cheque, payable to the order of the Minister of Public Works, equal to five per cent. of amount of tender, must accompany each tender. This cheque will be forfeited if the party decline the contract, or fail to complete the work contracted for, and will be returned in case of non-acceptance of tender.

The Department does not bind itself to accept the lowest or any tender.

By order, A. GOBEIL, Secretary.

Department of Public Works, Ottawa, 20th July, 1889.

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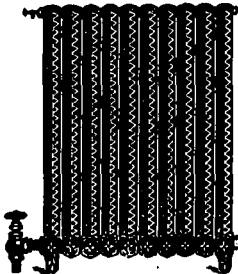
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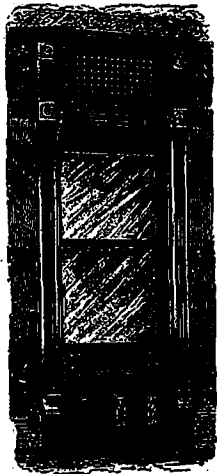
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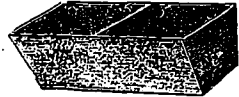
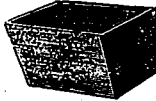
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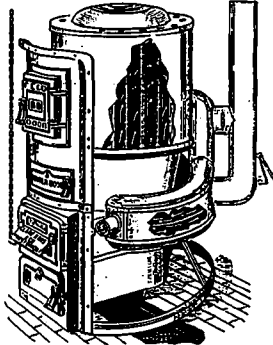


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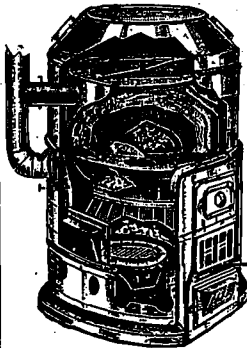
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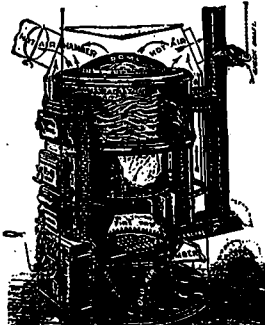
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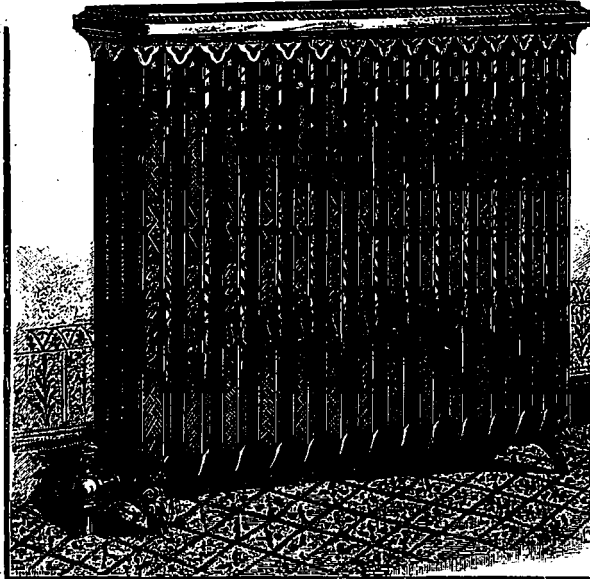
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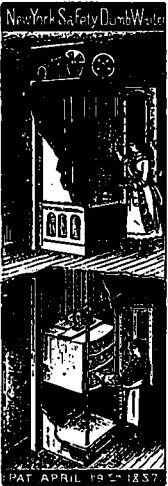
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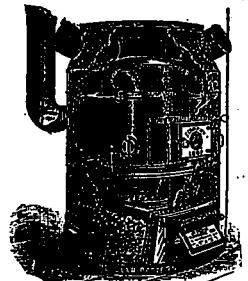
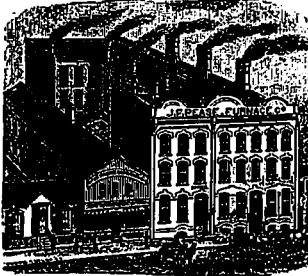


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