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CANADIAN ARCHITECT AND BUILDER,

A Monthly Journal of Modern Constructive Methods,

(With a Weekly Intermediate Edition—The CANADIAN CONTRACT RECORD),

PUBLISHED ON THE THIRD SATURDAY IN EACH MONTH IN THE INTEREST OF ARCHITECTS, CIVIL AND SANITARY ENGINEERS, PLUMBERS, DECORATORS, BUILDERS, CONTRACTORS, AND MANUFACTURERS OF AND DEALERS IN BUILDING MATERIALS AND APPLIANCES.

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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.

EDITORS' ANNOUNCEMENT.

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 "Canadian Architect and Builder" is the official paper of the Architectural Associations of Ontario and Quebec.

The publisher desires to ensure the regular and prompt delivery of this Journal to every subscriber, and requests that any cause of complaint in this particular be reported at once to the office of publication. Subscribers who may change their address should also give prompt notice of same, and in doing so, should give both the old and new address.

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CLOSE OF VOLUME IV.

THE present number completes the fourth volume of the CANADIAN ARCHITECT AND BUILDER. A comprehensive index to this volume is presented herewith. As a result of continued effort and the generous support which we have received, we are enabled to look back upon a year of progress. Satisfactory increase is shown in the number of subscribers and advertisers, in return for which, we have sought to add to the value of the paper. Nowhere do we find information of equal quantity and value supplied for so small a price. Our policy in the future, as in the past, will be to endeavor to increase the value of the monthly and weekly issues to the fullest degree warranted by the measure of support accorded us. To every reader we extend the wish for a Merry Christmas and Happy New Year, and to those who have assisted in any way to advance the interests of the CANADIAN ARCHITECT AND BUILDER, may 1892 bring added prosperity.

WE regret to learn that our esteemed contemporary, the *American Architect*, has recently suffered considerable loss and inconvenience in consequence of the building in which are its offices having been partially destroyed by fire.

THE publication of Mr. Doran's paper on "Building Inspection," read at the last meeting of the architects and students of Montreal, together with several other articles intended to appear in this number, is unavoidably deferred owing to unexpected demands upon our space.

THE sketch which we present of Mr. Chas. Baillairgé, City Engineer, of Quebec, outlines the record of an unusually busy and useful life. Conjoined with a brilliant mind, Mr. Baillairgé is the possessor of a lightsome disposition, and the physical ability to work eighteen hours a day. To this fortunate circumstance is no doubt largely due the extent and value of his accomplishments, and the fact that at the age of sixty-five, a further period of usefulness appears yet to lie before him. That such may be the case, is the wish of his many friends.

THE near approach of the municipal elections is being taken advantage of by the Toronto Trades and Labor Council to urge upon the city Council the passing of a by-law for the inspection of scaffolds. A committee consisting of three members of the Trades and Labor Council, three members of the Builders' Association and the City Commissioner, has been appointed to draft a by-law and report. Such a by-law as the one proposed is not likely to prove satisfactory to anyone except those who may succeed in getting appointments as "inspectors." Builders will have the right to insist that when the by-law comes into operation their liability for accidents on ("inspected") scaffolds shall be transferred to the city.

THE Toronto plumbing by-law makes it compulsory that the drainage in all new buildings shall undergo proper inspection. The ordinance is a wise one, and is, we trust, faithfully administered. There is reason to regret that it was not enacted at a much earlier period in the city's history. The character of much of the work done prior to the existence of the present law, is of the worst description. The outbreak of disease has led in recent instances to an examination of some of these unvisited drains, disclosing the fact that they were laid in the most careless and criminal manner, without the use of an ounce of cement. It is safe to assert that many a life has been sacrificed to this wilful neglect, and as the provisions of the present law are not retroactive, the injury will continue.

A CENSUS was recently taken of the vacant houses in the city of Toronto. The number is shown to be about 4,000. By some this is taken to indicate lack of prosperity. Others do not so regard it. They point to the fact that many of the houses that are vacant are old and dilapidated, and have been deserted by their occupants for those of modern date wherein greater convenience and comfort are afforded. It should also be borne in mind that houses are constantly being erected which, having been ill-designed and planned, appear to everyone except the builder to be undesirable, and consequently are shunned by house-hunters. Making due allowance for such causes as mentioned, we are nevertheless of the opinion that four thousand vacant houses is a greater number than should exist. We believe it to be the fact that increase in population has as yet failed to overtake the abnormal building enterprise following what is known as the "Toronto real estate boom."

THE corner-stone of the county and city buildings at Toronto was laid by the Mayor in the presence of a distinguished company of citizens, on the 21st of November. Unfavorable weather marred, to a considerable extent the proceedings. The occasion called forth reference to the progress made by the city of Toronto and the Dominion since a similar ceremony was performed in 1844 in connection with the erection of the present city hall. Seven years have elapsed since the first steps were taken to obtain a suitable site on which to erect the new buildings. A great deal of time was spent by the city and county authorities in arriving at a satisfactory understanding on all points. The work was further delayed pending the vote of extra money by the citizens. Subsequently there arose the dispute over the payment of a clerk of works, and this was followed again by the death of one of the contractors. The massive foundations are now in however, and it is hoped that nothing will interfere with the completion of the building in the shortest period consistent with thorough workmanship.

A SETTLEMENT of the differences between the carpenters and joiners and master builders of London, England, by reason of which building operations in that city have been paralyzed for six months past, has at last been reached. Mr. J. Macvicar Anderson, President of the Royal Institute of British Architects, who was asked to adjudicate upon the case, and by whose award both parties to the dispute consented to abide, has announced his decision. Some of the minor demands of the workmen, touching the hour at which work should begin, etc., are found to be sustained by the evidence. The demand for increased pay, however, is found not to be sustained, the conditions, such as the decrease in the trade of the country, pointing to the curtailment rather than the expansion of wages. The arbitrator calls attention to some results of this strike which we have not before observed, but which are worthy of the serious consideration of carpenters and joiners, as being in some degree likely to succeed a strike in any part of the world. On this point the arbitrator says: "The recent strike has been the means of inflicting injury on the trade of the carpenters and joiners of London, from which, in my judgment, it will not recover, for a large amount of carpenters' work has been superseded by other methods of construction which are likely to be increasingly adopted in future."

THE scheme for bringing water for Toronto use from Lake Simcoe will probably die the death of its aldermanic sponsors, and will be interred with their bones on the 1st of January next. Apart from the fact that the quality of the water is much inferior to that at our doors—simply to be had for the pumping—the cost of the enterprise would considerably outweigh its possible advantages. It is stated that the revenue for power supplied to manufacturers would be enormous. We have shown in a previous issue that the idea is fallacious. If the power is to be distributed hydrostatically to the different factories, new mains of immense size would have to be laid all over the city—if electrically, the loss in transmission, cost of maintenance of apparatus, and the smallness of the available power would put revenue out of the question. Especially would this be the case were the whole arrangement under municipal control. Then it is stated it would do away with the necessity for a trunk sewer, probably by using the present suction pipe as an outlet. Even if it were large enough, it must be remembered that it could only be

reached by means of a trunk sewer intercepting all the others. The power to be developed by the city water supply from Lake Simcoe, which would have to be developed miles outside the city in any event, is purely a figment of the imagination, and it is well that the citizens should have this fact impressed upon them before they determine to spend fifteen or twenty million dollars to get bad water.

THE Canadian Society of Civil Engineers has issued its ballot list for officers for 1892. Mr. John Kennedy, chief engineer, Harbor Commissioners, Montreal, has been nominated for president, and an opposition ballot has been issued in favor of Mr. E. P. Hannaford, chief engineer of the Grand Trunk Railway. It appears from the regulations of the society that a Nominating Committee is specially struck at each annual meeting to prepare this ballot. This committee is elected by the whole society. In its composition it is made as representative as possible. The duty of the society is to acknowledge its wisdom in selecting this committee and accept the nomination made by them. The rules empower any five members to present a list of names to the council, who shall issue them for ballot. This gives an opportunity for certain districts or branches, such as mining, electricity or hydraulics, to be represented, but after the decision of the Nominating Committee has been announced, an opposition ballot should be issued only for very special reasons, none of which appear to exist in the present case. We look upon the nomination of Mr. Hannaford as a compliment to him from some of his numerous personal friends; the wisdom of it is doubtful. He has been placed in opposition to the carefully considered selection of the specially appointed Nominating Committee, with whose duties and powers he is fully conversant. As a former vice-president and member of the council, Mr. Hannaford has rendered good service to the society. He has shown many tokens of his deep interest in its welfare. He has now an opportunity of serving it still more, and he can by a very simple act lay the society under a perpetual obligation, and create for himself an even greater and higher *prestige* than that which he so honorably occupies.

AT intervals during the last three years the necessity of providing means of imparting technical instruction to artisans has occupied the attention of the City Council of Toronto. On each occasion the question, after having been to some extent considered, was on various pretexts "referred back." So frequently did it meet this fate, that its friends were almost ready to despair. It is therefore doubly gratifying to the friends of the movement to observe that definite action has at last been taken. An appropriation of \$6,000 for the purpose of founding a technical school has been voted in Council, and a Board of Management appointed, comprising representatives of the City Council, the Architectural Guild, the Trades and Labor Council, the Association of Stationary Engineers and the Manufacturing interest. The Toronto Architectural Guild will be represented on the board by Messrs. S. G. Curry and Mr. E. Burke. It has wisely been decided to establish at present but one school, to be located in the centre of the city. The course of instruction has not yet been outlined. The selection of subjects to be taught is a matter requiring the most careful consideration, and will, we trust, be approached with due deliberation and a proper knowledge of the requirements of the various classes of students. In view of the decadence of the apprenticeship system, it is from technical schools the coming generation must receive instruction of an elementary character pertaining to the various trades, a fact which should give additional interest to the present movement. Gratifying success has attended the classes for technical instruction conducted for several years past in the city of Montreal under the direction of the Council of Arts and Manufactures of the Province of Quebec, and if equal interest is manifested, the success of the Toronto school will be assured.

Messrs. J. M. Williams & Co., of Hamilton, Ont., have leased the stove foundry of Mr. Mowat, at Dundas, Ont., and are starting it up with a force of fifty hands, for the manufacture of stoves, furnaces, etc.

The Richmond Slate Manufacturing Co., have purchased a slate quarry in the county of Brome, near Sutton Junction, Que. It has been reported on as being very valuable, and so situated as to be capable of being very easily worked.

COMPETITION FOR CHURCH DESIGNS.

The Presbyterian Church in Canada has determined upon making an effort to improve the architecture of its churches, and with that object proposes to issue a pamphlet containing, approved designs with letterpress explaining the same and essays on church architecture.

It is proposed to have a competition of designs for churches as per the list of requirements given herein, and to illustrate those designs which may be deemed of sufficient merit by the experts. It is hoped that there will be such a hearty response on the part of the architects that the committee will be enabled to publish designs suitable to the needs of all congregations. It is to be distinctly understood, however, that only such designs will be illustrated as may be deemed by the experts to possess architectural merit worthy of illustration. In case there should not be a sufficient number of good designs sent in to permit of the publication of the pamphlet, the same will not be issued. The plan and perspective, with possibly one elevation, will be illustrated, as it is not desirable to give sufficient drawings to allow of the design being made use of except through the author. This pamphlet will be placed in the hands of representatives of every Presbyterian congregation in Canada, and it is hoped that any congregation proposing to build will select from amongst the designs the one which most nearly fills their requirements, and instruct the author to prepare drawings for the erection of the proposed church at the regular commission.

The publication of the pamphlet will at least bring before the notice of congregations proposing to build the names of architects who are competent to design churches of some architectural merit, which should benefit those who have been successful in having their designs illustrated.

The following prizes, namely, \$75, \$50, and \$25, will be given to the three best designs in order of merit, irrespective of the class under which they have been sent in. No money prize will be given to any design which is not of sufficient merit to allow of its being published, even though the same should be the best submitted in the competition.

Any architect who would like to send in designs for illustration and who does not care to enter the competition for the prizes, may send in designs, and the same will be published provided they are of sufficient merit in the judgment of the experts.

The experts, three in number, who will decide as to the merits of the designs which may be entitled to the prizes and the designs which may be of sufficient merit to be published, will be selected by the Council of the Ontario Association of Architects. The decision of the experts will be final on all points.

The excellence of a design will consist in the closeness with which the conditions have been fulfilled, the quality of the designs and the inexpensiveness of erecting the building. No limit has been made as to the cost in any class, as it is desirable that the designer should not be hampered except in so far that he must bear in mind that a good design which is inexpensive is of greater value than an equally good or even better design which will cost more money to erect.

The three designs which may be awarded the prizes will be chosen from among those standing first and second in the different classes. The experts will be instructed to favour the designs for small and inexpensive buildings in preference to those for large and costly ones.

The following drawings will be required: General floor plan, two elevations and one perspective. Other drawings may be sent in at the option of the designer. The drawings are to be in black and white to a scale of 8 feet to the inch. The plans and elevations are to be in line only, with the windows blacked in or not as may be preferred by the designer. The perspective should be a thoroughly good drawing, and may be rendered as thought proper by the author (but not in colour). The perspective is to be set up from a plan drawn four feet to an inch. Bad or inferior drawings will not be illustrated, no matter how good the design may be, but an opportunity will be afforded the author to prepare, or have prepared, suitable drawings.

Each competitor is requested to send in a short description of his design, and to state clearly the material which he would use in its erection, together with a statement of its cost. The experts will have a right to correct the estimate of cost placed on any design as may appear to them just. The above statement is to be printed in the pamphlet along with the selected design, together with the name of the author and his business address.

The following is a list of the classes of building which are required to meet the wants of the average congregations in each of the classes in which it has been thought well to divide church buildings:

- 1st. Country church to seat from 150 to 200 persons, with one room to be used as vestry and library. Church to be heated by stoves.
- 2nd. Village church, capacity 250 to 300 persons, with one room to be used as vestry and library. Church to be heated with stoves.
- 3rd. Large village church, seating 350 to 400 persons, with vestry and library. To be furnace heated.
- 4th. Small town church, seating 350 to 400 persons, with vestry, library and school room.
- 5th. Large town church, with seating capacity of from 500 to 600, with vestry, library, school room and kitchen.

6th. City church, seating from 600 to 1,000, with vestry, library, school rooms and kitchen.

7th. Large city church, seating from 1,000 to 1,500, with vestry, library, school rooms and kitchen.

In the last four classes the designer will himself settle the method of heating and arrange for same.

Competitors will please send in their drawings before the first day of April, 1892, to Mr. W. A. Langton, Registrar of the Ontario Association of Architects, Merchants' Bank Building, Toronto.

"CANADIAN ARCHITECT AND BUILDER" COMPETITION.

The report of the expert appointed to judge the designs submitted in this competition is as follows:

OTTAWA, 18th Nov., 1891.

SIR,—I duly received the thirteen sets of plans which had been submitted in response to your invitation to students for competitive designs for a suburban cottage to be occupied by a young doing man business daily in the city, owning the lot, possessing \$2,000 in cash and having an income of \$1,500 per annum. This condition hardly seems to give a definite idea as to the outlay to be incurred, and does not appear to have been understood by many of the competitors. After examination of the various designs the following have been selected:

"Piapot" is given first place. The arrangement of the rooms in this plan are very good, but the entrance and vestibule are too small. The elevation is simple in design and well drawn. Altogether, both in plan and design, it appears to be the most appropriate for a suburban cottage. No perspective sketch.

"Kata Phusin" is given the second place. The staircases in this design are not so well arranged as those of "Piapot." The design is simple and appropriate, and the perspective is freely sketched.

"Jack Plane" is given the third place. The arrangement of this plan hardly entitles it to this place. The relative position of the dining-room and kitchen is objectionable, and there is no provision for servants stairs. The elevation is plain, and the perspective well drawn.

"Kata Phusin" is given first place for his perspective. There is not much evidence of skill in the other designs, and they differ so little in degree that it is not worth while to attempt to grade them.

It occurred to me that in such a competition amongst "students," some consideration should have been given to the length of time the students have served in an architect's office, and also that a certificate should have accompanied each design, that all the drawings had been made by the competitor without outside assistance. There having been no condition to this effect, and as I had no information on the subject, only the relative merits of the designs have been taken into consideration.

The thirteen sets of plans have been returned to you this day by Dominion Express Co. I remain, sir,

Your obedient servant,

THOS. FULLER.

The names of the successful competitors are:—"Piapot," Mr. A. E. Wells, office of Mr. S. H. Townsend, Toronto;—"Kata Phusin," Mr. W. Lawrence Munro, office of Mr. G. M. Miller, Toronto;—"Jack Plane," Mr. J. W. Siddall, office of Messrs. Knox & Elliott, Toronto.

MONTREAL.

(Correspondence of the CANADIAN ARCHITECT AND BUILDER.)

Real estate for building purposes is reported to be in increasing demand in the upper western portion of the city.

The course of instruction in freehand, mechanical and architectural drawing, stair building, building construction, plumbing, wood carving, etc., under the direction of the Council of Arts and Manufacturers of the Province of Quebec, is now open.

It is a pleasure to be able to state that the members of the Province of Quebec Association of Architects in Montreal have entered in earnest upon their work. Regular monthly meetings have been established, at which papers of interest to the profession are read and discussed. Since the publication of your last number, classes for the instruction of students have been formed. A large class under the direction of Mr. Hutchison meets every Thursday afternoon, from five to six o'clock for the study of Roman architecture. Mr. A. F. Dunlop and Mr. Maxwell will conduct a pen and ink drawing class, and arrangements are now in progress for the organization of a modelling class.

At the regular meeting of architects and students held on Thursday evening last, there was a large attendance of students. Mr. Doran read a paper on "Building Inspection," which has been forwarded to the CANADIAN ARCHITECT AND BUILDER for publication. In his introductory remarks he stated that a committee had been appointed to deal with this subject, and pending the report of that committee, he would not refer to the present system of inspection, but would point out what he considered to be the requirements of a proper building inspection by law. The discussion on the paper was taken part in by Messrs. Walbank, Hodson and Hutchison. A hearty vote of thanks was tendered to Mr. Doran for his valuable paper.

Mr. Andrew T. Taylor, the well known architect, of this city, was married on the 9th inst. at Holy Trinity Church, London, Eng., to Mary, second daughter of Assistant Army General J. Elliott, H. M. Ordnance Department. The best wishes of numerous friends will greet Mr. Taylor and his bride on their arrival home.

Mr. A. F. Dunlop left for Toronto and New York on Thursday last.

I regret to learn that the condition of health to which Mr. Cliff, Secretary of the Province of Quebec Association of Architects, has been reduced by his recent illness, has made it necessary that he should indulge in a period of complete rest. As a result of his London, Eng., trip, he is leaving shortly for Florida. It is earnestly hoped that the change may prove beneficial.

HOW TO ESTIMATE.*

By Wm. H. Hodgson, Architect.

II.

CARPENTER AND JOINER WORK.

\$ C.

- 7,000 ft. of beamlock timber (board measure) in joists, rafters, plates, lintels, etc., and labor in same
- 21 3/4 squares (100 ft.) of 3/4 in. G & T flooring, 3 1/2 in. wide, ground and end floor
- 12 1/2 squares of 1 in. matched flooring, 5 in. wide, attic and part cellar
- 23 squares of 3/4 in. matched roof boarding, 7 in. wide
- 2 1/4 squares of 1 in. rough boards, laid diagonally and carpet felt (between flooring)
- 5 squares of 4 in. x 4 in. studding at gables, sheeting 1 cth. sides, and on one side double thickness of sheeting paper
- 33 3/4 squares of 4 in. x 3 in. stud partition
- 25 squares of 2 in. x 1 1/2 in. furring, on walls
- 1 square of floor pugging at gables, projections
- 3/4 square (75 ft.) of 2 in. plank on 4 in. x 4 in. cedars
- 130 running ft. of 3 in. x 4 in. cedar joists bedded in concrete
- 25 squares of beam and corbels dressed and guided
- 34 running ft. of dentil, mould, cornice, etc., firm and secure
- 98 running ft. of dressed beaded fascia, soffits and bed moulds to eaves
- 80 running ft. of gable eaves, and bed moulds
- 76 running ft. of narrow double beaded soffits, matched stuff and sheathing paper, tight to walls
- 31 running ft. of matched beaded soffits, and 25 dressed rafters
- 69 running ft. of 3/4 in. matched sheathing 4 in. wide, 3 ft. high, and mould capping, grounds, etc.
- 30 running ft. of 3/4 in. matched side sng., 2 1/2 in. wide, 5 ft. high, double beaded, capping grounds, etc.
- 183 running ft. of 1 1/2 in. single base, with grounds scribed to floors, and with fillets
- 274 running ft. of 2 in. single base, with grounds scribed to floors, and with fillets
- 220 running ft. of 7 in. torus base
- 170 running ft. of angle bead
- 92 running ft. of 3 in. ridge rolls
- 100 running ft. of shelving and supports
- 30 running ft. of 2 1/2 in. picture mould—dining room
- 30 running ft. of bead rail, and 10 hooks
- 100 running ft. of 2 in. x 2 1/2 in. dressed slatted walk, on 4 in. x 3 in. cedars, and 24 ft. round curb, at front
- 18 running ft. picket fence, 6 ft. high, to match gate
- 2 hardwood sills to fuel doors, 3 x 15 x 16, weathered
- 1 board's boxing and trimming for same
- 3 rolls of 2 in. x 2 1/2 in. herring bone bridleing, 162 feet in all
- 8 2 in. basement stair steps—stairs to attic and from porch to cellar
- 15 1 1/2 in. stair steps, mould nosing, and 1 landing, cherry rails, newels, brackets, etc., 2 in. turned pine balusters, etc., complete, and mould span rail to closet, 1/2 breadth
- 7 front steps, turned newels, and balustrade complete
- 2 rear steps to porch
- 1 2 1/2 in. front outside door, oak veneer, complete with architraves, etc.; lock, \$3.00, upper panel for glass
- 1 2 1/2 in. vestibule door in 2 parts, mortice lock \$2.50, complete as above, and brass bolts, and copper washers for glass
- 2 1 1/2 in. porch doors, mortice \$1.20 to one, and \$2.00 to slide brass bolts, fulllights, complete, as above
- 13 1 1/2 in. ground and second story doors, mortice lock \$1.35, brass bolts complete as above
- 3 1 1/2 in. swing doors complete as above, brass bolts and one doorway for jambs, etc., prepared to receive door
- 4 1 1/2 in. 3rd story doors, complete as above, mortice \$1.20 of them with fulllights
- 1 2 1/2 in. sliding door, over head tracks, patent hangers, sliding door lock and flush handle complete, as above
- 4 1 1/2 in. head and flush doors, complete frames, etc., rim locks 2 side doors, panelled, etc., complete, hung on top
- 1 side dormer window
- 7 (windows) for mould casings outside
- 1 borrowed light, etc., complete
- 5 cellar windows, complete, hung on top
- 1 2 in. large front sash, mould transom, elliptic finitght for plate glass complete, architraves, etc., and with Willer slide blinds, in pocket behind window back
- 2 2 in. English sashes, 3 of them for plate glass, and 3 with transoms, fullights and Willer skilling blinds, as above
- 5 semi-circular head sashes, complete
- 30 centres for 30 arches
- 3 chimney saddles
- 2 cold air inlet and stout wire gland, lined valv., etc., firm and secure
- 1 bath fitting up complete, cherry sheeting and watern, 30 in. x 18 in. x 14 in.
- 2 water closets complete and 1 wash basin, cherry ends and seats, double lid for slop, sink
- 2 sinks fitting up complete, and hardwood capping
- 2 dressers in kitchen and pantry, doors, drawers, shelving, etc., complete
- 6 tiers of 1 in. shelving supports to kitchen and pantry
- 2 tiers of 1 1/2 in. shelving, each end of ladder
- 1 hanging shelf in ladder and iron rods from ceiling
- 6 shelves in linen closet, ends enclosed with cedar joists and spring catches
- 1 side gate, roundell posts, footed and capped and hardware complete
- 2 fuel bins—1 large for furnace coal and smaller in kitchen
- Fit up 4 bed room closets with rails and 24 hat and coat hooks, and shelves, etc., complete
- Bracketting for a plaster arches, and cove in drawing room
- Dressing ends of 76 projecting rafters to main roof
- Trimming registers and cutting for hot air pipes, etc., attendance on plumber cutting holes, boxing pipes, etc., etc.

NOTE.—Beginning with bearing timbers, (dress-nd) the measure, thus: joist 30 ft. x 10 in. x 3 in. = equal to 6 ft. 3 in. cut—to bring into board

*The first of this series of articles, together with the plans and specification on which the bills of quantities were based, is special to the CANADIAN ARCHITECT AND BUILDER for November, 1891. Back numbers will be supplied.

measure; multiply by 12 (for a foot square) gives the board measure 75 feet. Flooring, roof boarding, studding, furring, etc., measured length and breadth, thus: 25 ft. x 16 ft. gives = 400 ft., equal to 4 squares of 10 ft. x 10 ft. Lineal measure or running feet applies to cornices and dressed work generally, the sizes stated either in quantities or specification. Items in numbers, such as doors, windows, etc., as above.

SLATER.

\$ C.

- 24 3/4 squares (100 ft.) of Rockland slating on 1 ply tarred felt
- 5 squares of Dancy's Ontario tiles on 1 ply tarred felt
- 32 lineal feet of galvanized iron n valley lngs, 15 in. to 18 in. wide
- 98 lineal feet of galvanized iron strips, 5 in. wide at eaves to gutters
- 12 lineal feet of galvanized iron strips 15 in. wide on cornice (3 front windows), 5 in. up behind thing
- 92 lineal feet of galvanized iron strips, 28 gauge, ridges
- Step and cloak flush to (5) chimneys and walls, checks and apron of dormer

NOTE.—Measured, and contents given in squares, before mentioned, lineal measure, also, and the sizes as above.

TINSMITH.

\$ C.

- 98 lineal feet of galvanized iron, 28 gauge, eaves troughs 5 in. wide and holdfasts
- 34 lineal ft. of 4 in. galvanized iron, 28 gauge, to porch
- 75 lineal ft. of 4 in. octagon down pipes to porch, 3 connections to gutter and drain pipes
- 16 lineal ft. of 3 in. octagon down pipes to porch

NOTE.—The measurements for this work as given above, lineal.

PLUMBING AND GASFITTING.

\$ C.

- 95 lineal ft. 1 1/2 in. iron gas piping, hold fast, &c., leaded joints
- 118 " 3/4 " " " " " " "
- 90 " 3/4 " " " " " " "
- 147 " 3/4 " " " " " " "
- 32 " 1/2 " " " " " " " " to fire places, with cocks and keys
- 30 lineal feet of 3/4 in. iron gas piping to gas stove in kitchen
- 90 " " 3/4 in. lead supply water main pipe, 6 lbs. to the yard
- 100 lineal feet of 1 in. lead supply pipe, branches, 6 lbs. to the yd.
- 105 " " 3/4 " " " " hot water, 8 lbs. to the yard
- 22 lineal ft. of 3/4 in. lead waste and overflow pipe, plated rim to bath
- 10 lineal ft. of 3/4 in. lead pipe (heavy) and Dubois trap and screw
- 28 lineal ft. of 3/4 in. lead waste, 3 lbs. lead safes and brass flap valves
- 37 lineal ft. of 1/2 in. cast iron soil pipe, tarred, and holes, screws, &c., complete
- 4 lineal ft. of cast iron soil pipe, 6 in., above roof and flashing
- 110 lineal ft. of 4 in. cast iron soil pipe at basement, digging, leveling, &c.
- 12 lineal ft. of 2 in. cast iron soil pipe waste, with iron hangers
- 35 lineal ft. of 3 in. cast iron vent pipe, with vent connection
- 10 lineal feet of 4 in. cast iron pipe with return bend top
- 30 lineal feet of 3 in. galvanized iron soil pipe
- 12 lineal ft. tin speaking tube, silver plated mouth piece
- 1 1/4 oz. copper bath, Dubois trap, plated plug and chain complete
- 1 marble earthenware oval wash basin, counter sunk, marble top, back end; Mott's, standing waste, Dubois trap and screw brass clamps
- 1 porcelain flushing rim washout water closet (Hodone or Unites) valve, lulls and ball cocks, etc., complete, (distern lined with 4 1/2 lbs. lead, &c., with porcelain drip trap, complete
- 1 flushing rim water closet in basement, top, castern, etc.
- 2 plated double Fluber bath and basin cocks
- 1 key cock and loose connections
- 1 stop and waste cock, boxed in
- 1 7 in. dia. enamelled valve at bath room, ceiling
- 1 9 in. x 12 in. dia. enamelled valve at kitchen, ceiling
- 1 1 1/2 in. counter sunk marble safe, under water closet, &c., complete
- 1 pair brass Floor cocks
- 1 galvanized iron cylinder, 40 gals. and stand, 1/2 brass connections, shut off cocks, inch iron pipe to stove, 3/4 supply cock and 3/4 sediment, pipe and cock
- 2 cast iron sinks, trapped, &c., complete
- 2 vents to waste pipes, and Y branches, 1 1/2 and 2 in.
- 4 vents to waste pipes and to water closet, 3 in.
- 1 30 in. galvanized iron sink, brackets and enamelled backs, &c., complete

NOTE.—In these works there are many and various items, as will be noted in the above, comprising lineal measure and numbers.

PLASTERING.

\$ C.

- 104 1-9 superficial yards of a coat work, hard white finish
- 404 2-9 superficial yards of 1 coat work on walls
- 233 3/4 superficial yards of a coat work, lime washing
- 11 1-9 superficial yards of 3 1/4 in. thick mortar, utti floors
- 30 lineal feet of eave, drawing room, ceilings and walls
- 69 lineal ft. of 2 1/4 in. cornice, dining room
- 72 lineal ft. of 20 in. cornice, halls
- 24 lineal ft. of 15 in. cornice, vestibule
- 26 lineal ft. of mould beams
- 2 30 in. centre pieces
- 1 18 in. centre piece
- 30 window and door frames for filling, air tight

NOTE.—Superficial measure is given, that is, the walls and ceilings are measured through openings are measured and deducted from same, showing the net number of superficial yards done. Cornices and other mouldings in plaster are lineal measure, the girths of same added for mitring internal and external angles. Centres are numbered, giving diameters.

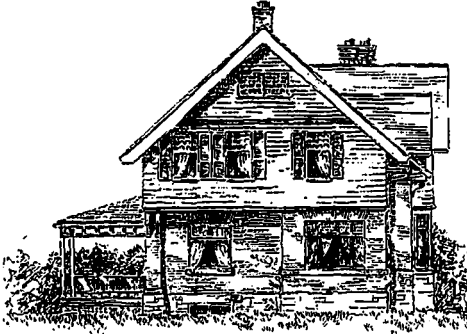
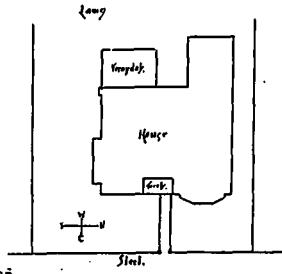
PAINTER AND GLAZIER.

\$ C.

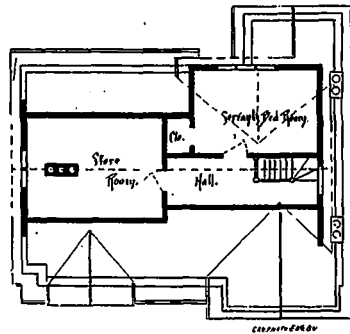
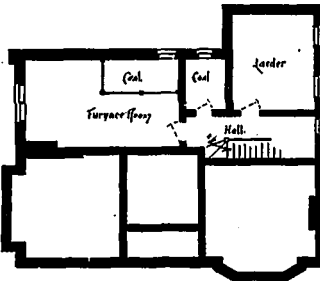
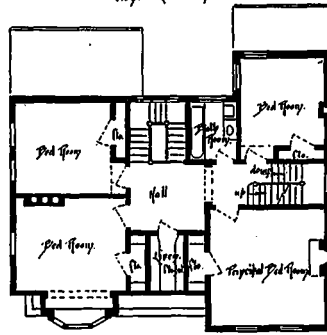
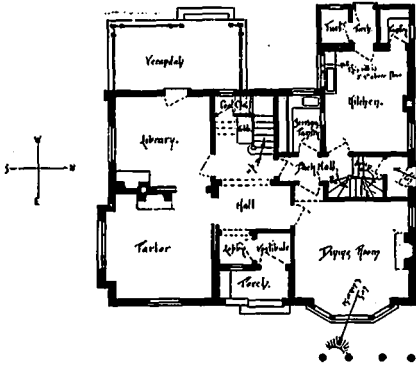
- 440 superficial yards of 3 coats painting
- 282 superficial yards of staining, oiling, and 2 coats copal varnish
- 34 superficial yards of ceiling, and 2 coats copal varnish
- 216 superficial ft. double diamond star glass

Canadian Architect Competition for a Suburban Cottage

Design by "Piafol"



Front Elevations

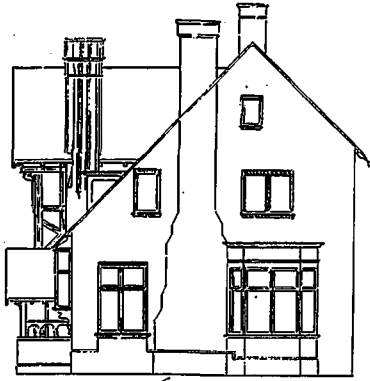


Scale for plans

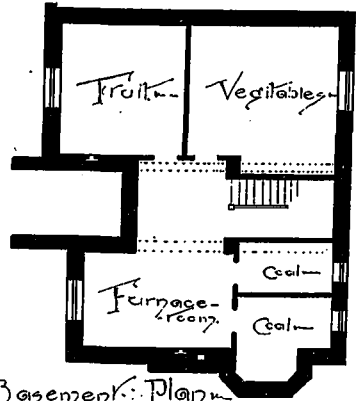
Scale for elevations



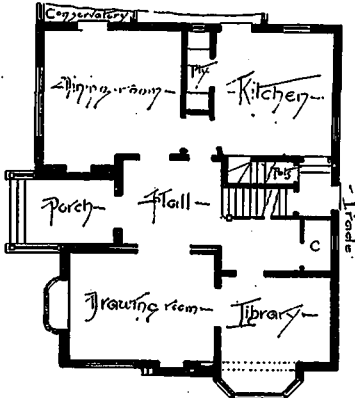
"C. A. & B." COMPETITION FOR A SUBURBAN COTTAGE.
DESIGN BY "PIAFOI" (A. E. WELLS), AWARDED FIRST POSITION.



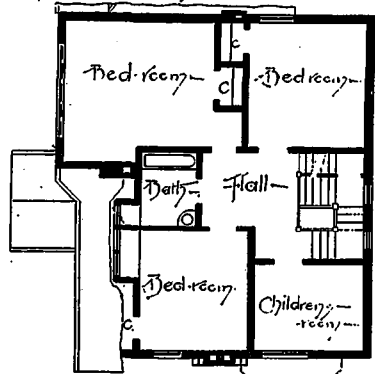
East Elevation



Basement Plan

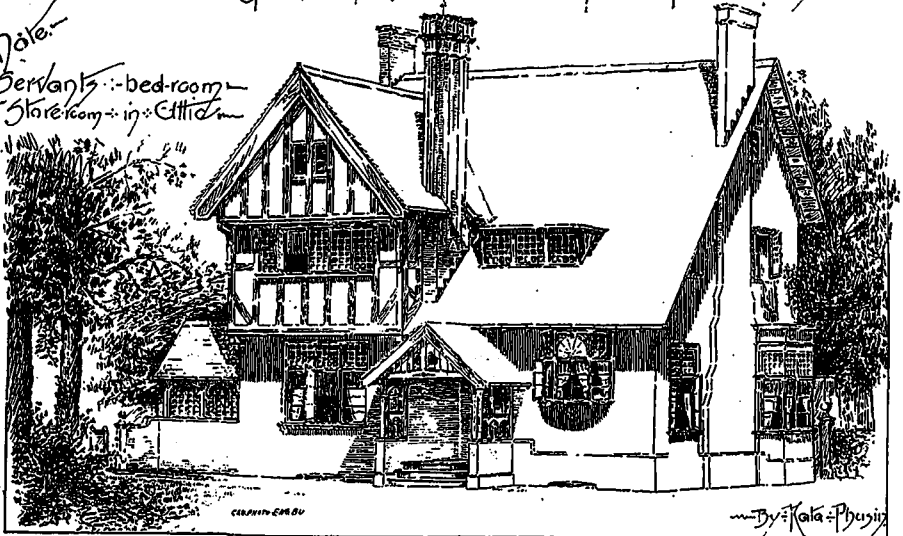


Ground Plan



First Floor Plan

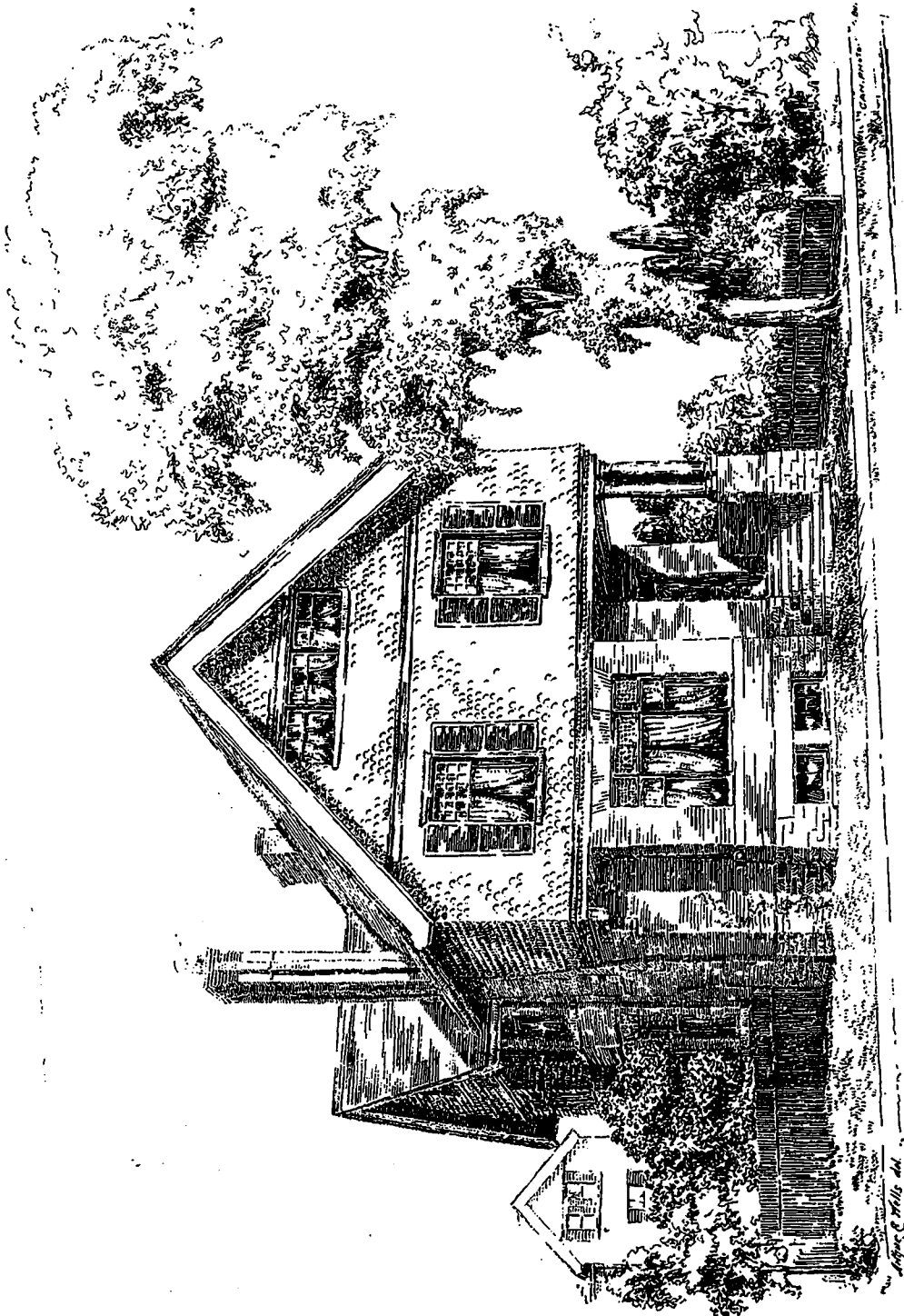
Date: _____
 Servants' bed-room
 and store-room in attic



By: Kata Phusin

"C. A. & B." COMPETITION FOR A SUBURBAN COTTAGE.

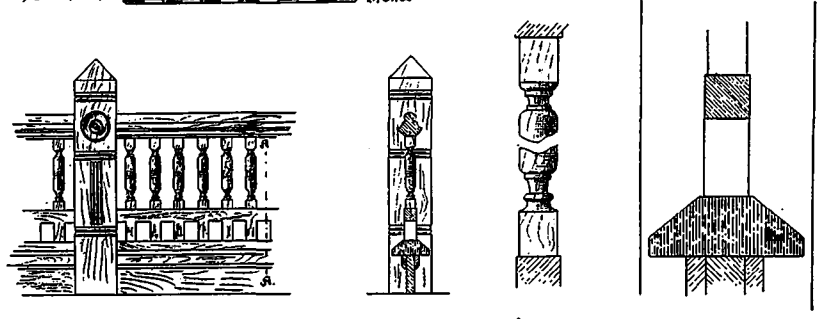
DESIGN BY "KATA PHUSIN" (W. LAWRENCE MUNRO), AWARDED SECOND POSITION.



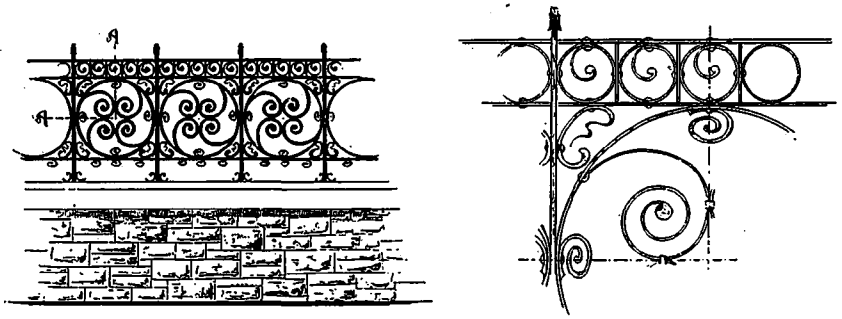
RESIDENCE OF MR. JAS. HEDLEY, ST. JOSEPH ST., TORONTO.
S. H. TOWNSEND, ARCHITECT.

THREE DESIGNS FOR FRONT FENCE.

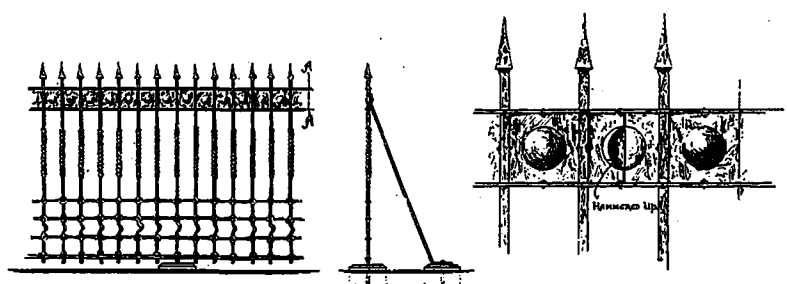
BY "ARM AND HAMMER."



ELEVATION. WOOD FENCE. SECTION. DETAILS A-A.



ELEVATION. IRON AND STONE FENCE. DETAIL A-A.



ELEVATION. IRON FENCE. SECTION. DETAIL A-A.

"C. A. & B." COMPETITION FOR "FRONT FENCE."

DESIGN BY "ARM AND HAMMER" (A. EWART), AWARDED SECOND POSITION.



RESIDENCE ON MADISON AVENUE, TORONTO

33 superficial ft. diamond star glass
 15 superficial ft. ground glass
 40 superficial ft. stained glass, glazing on y
 15 superficial ft. rolled cathedral glass
 7 superficial ft. rough rolled plate
 1 pane plate glass, 5 ft. 4 in. x 3 ft. 8 in.
 3 panes plate glass, 3 ft. 4 in. x 2 ft. 7 in.
 1 pane bevelled glass, 2 ft. 3 in. x 2 ft. 3 in.
 4 pairs blinds, &c., 3 sts. and priming
 Cleaning windows, and scrub floors, tics, &c., complete

NOTE.—Painting measured and given, superficial yards in quantities as shown. Glazing, measure superficial feet, and in plate glass at per pane, with size stated.

CLIMATIC INFLUENCES UPON ARCHITECTURE.

By G. F. STALKER.

THE elements with which an architect is bound to concern himself in the preparation of his designs, and in the course of his practice, are so varied and so numerous that it is almost impossible to catalogue them. It is a still more difficult matter to assign to each its proper position of importance; for what would exercise a dominating influence in one country, and under a certain line of circumstances, would be of little account in another country and under changed conditions.

This may be said to be a kind of truism and so apparent as to render it almost unnecessary to be set down here. Still the fact remains, that buildings have been, and are being erected, by architects of good ability, which are disappointing and unsatisfactory. Artistically, and on paper, the designs may be more creditable to their authors; but practically, and *in situ*, they are failures. The cause of this may be the fact that this truism, like all other truisms, and just because it is a truism, is very much overlooked or neglected. And there is probably no element affecting architectural design so frequently and so easily left out of consideration as that of climate. One would think that this cannot certainly apply to Canada, for everyone knows that here we have plenty of climate. But when we are engaged upon our designs we are generally comfortably officed, and we become so engrossed in working out the architectural lineaments of some pet style or theme, that we forget that just outside the window the thermometer registers zero, the snow is deep in the streets, and the wind is keen.

The artistic treatment and scientific construction of a building are the chief characteristics which distinguish an architect from a builder. But common sense does not belong exclusively to any class of men, neither is it the outcome of any kind of technical education; and architects, like other men of professional culture, are sometimes distinguished for their want of it. And so it happens that artistic skill is often misapplied, and constructive ability absolutely wasted for very lack of common sense. We admire the beautiful conceptions of men of genius, and are sometimes tempted to imitate them, without giving a thought to the suitability of local surroundings and circumstances. Fashion is an absolutely despotic mistress over all who swear allegiance to her. And there is such a thing as fashion in art. And just as we see the votaries of fashion in dress attired in Canada in a style which is only suitable for Paris or London, so we find the followers of fashion in art designing their buildings as if locality and climate were in these days reduced, by some artificial means, to a universal dead level. But nature will assert herself in spite of us, and if we willfully and persistently blind ourselves to the fact that dress was originally, and is still, primarily intended as a covering for our nakedness, and a protection against the scorching sun of summer and the biting frost of winter, and that buildings were, and are still, primarily erected as shelters for man, we must expect to pay dearly for our temerity in so doing.

The problem, in this respect, set before architects in Canada is, it must be confessed, more difficult in solution than in countries where the difference of the temperature in summer is not evidenced by such a tremendous dip of the mercury in winter as we are accustomed to. We do not make our own weather, but the climate of this country, like that of all other countries, is practically a settled thing, and, in a general way at least, pretty well understood. It cannot be said to be capricious, neither is it uncertain, and, on the whole, it is not very variable; one year resembles very closely those that have gone before it. But we can say this of it, that it is very decided. We have a very short spring and a very short autumn; but when summer is here, we might as well be living in the tropics, and when winter is with us we are practically absolutely ice-bound. Business men, engaged in whatever industry of our country you like to name, are forced to take our climate into their reckoning. They would be considered almost culpably careless and negligent of their duty if they did not. Even building operations must be suspended during the winter; and this, of itself, should be a sufficient reminder to architects that our climate is a very important and potent factor in true Canadian architecture.

It may be urged in this connection that we can accomplish all that is necessary to bring the natural elements into subjection by artificial means. We can defy the frosts of winter by our furnaces, stoves and winter sashes, and we can modify, to a bearable extent, the heat of summer by a judicious adjustment of summer blinds. And for such mercies, even coming "in such questionable shape," let us be thankful. But it is not wise to rest and be thankful with such a condition of things. The effects of climate have had a very direct influence upon the

mins of all the great architects of the world; so much so, that wherever a true style of architecture has grown into existence, we can, from the buildings which still remain as examples of it, almost infallibly tell what were the climatic conditions of the country and the time to which they belong. A thorough student of architecture is as little likely to go astray on this point, after a careful examination of a building, as he would be in regard to the date of its erection. And when we consider how carefully and systematically buildings were designed and erected in ancient times (for nothing was done in a hurry then) this is not to be wondered at. What was more natural than that the architects in those days, being allowed time to think, and to think of everything, should give some consideration to the climate of their country in the preparation of their designs? And to what other cause can we ascribe, for example, the difference in the forms, and particularly the slopes of the roofs, that have always been, and are still considered characteristic features of the several styles of architecture? There is nothing in the internal arrangements and formation of an Egyptian building that of necessity demands that it should be covered with a flat roof, neither is it necessary from structural or æsthetic reasons that a Gothic building should be finished externally with a pitched roof. But Egypt is a country of almost perpetual summer, and its climate is dry, while western and north-western Europe are damp and rainy.

If one reflects for a little on some of the more striking points which distinguish one style from another, and endeavors to find a reason for such marked and distinctive features as exist, one is forced to admit that climate has had a very powerful influence in the production of such a variety of architectural expression. True, it has not been the Alpha and the Omega of design, but it has existed from the beginning and will continue to the end, asserting its prerogative and refusing to be left out of consideration in any style of architecture that pretends to be true and national. The size and number and the positions of openings, the aspect of buildings, the sites on which they were erected and the general disposition of their parts, were not matters which were allowed to arrange themselves at hap-hazard, nor were chosen or decided upon carelessly. They were the outcome of the imagination, the result of foresight engendered by long experience, and the thoughtful and vigorous application of keen intellectual acumen, regulated to a very large extent by a wholesome utilitarianism and a recognition of surrounding natural exigencies. But if we continue our reflections a little further, and call to mind the general features of the buildings which have been erected in recent years, and in Canada in particular, we cannot fail to be struck with the want of consideration that has been shown to Dame Climate. We certainly have not a Canadian style of architecture, though considering our age as a nation this is a pardonable offence, if offence it be. But we have not even given a Canadian expression to any style that we have followed. Norman Shaw, in England, revived Queen Anne, but he clothed his work with such freshness and originality of treatment, that one can scarcely recognize in his buildings that they are only a revival of a defunct style. And so with Richardson, of Boston. He revived and modernized the style of Normandy and the north of France, but he treated it in such a manner, and made it so suitable to the local surroundings he had to deal with, that his work only bears a family likeness to its original. So also with Thomson, of Glasgow, who designed in as pure Greek as if he lived in the days of Phidias, but who had mental vigor enough to make the style of his adoption his servant, and to look as much at home among the rugged hills of cloudy Scotland as in the plains of sunny Greece; and these men, being men of genius, have each had their crowd of imitators who have, in their turn shown us how much and how little they have imbibed the spirit which animated their great masters. Norman Shaw revived in England a style that had been practised there more than two hundred years ago, and had been found suitable to the country. Richardson revived, in the northern states of America, a style which existed nearly a thousand years ago in a country subject to climatic conditions similar to his own, while Thomson's revival was only in the spirit of pure Greek architecture, the local and climatic conditions of Scotland being entirely dissimilar from those of Greece. In each case, however, the revivals were successful, and depended for their success not only on the great artistic ability and natural genius of these men, but on the manner in which they grasped and gave expression to local surroundings and modern requirements. And it is in this latter quality that the greatest distinction between Shaw, Richardson and Thomson, and their host of disciples lies.

It has already been said that there is such a thing as fashion in art; and it may be safely affirmed that the three most fashionable styles of architecture at the present time are Queen Anne, Norman and Neo-Greek, and Norman Shaw, Richardson and Thomson are respectively the prophets of these schools. Some might be disposed to call them the derogatory leaders of fashion in architecture, but this would be inadvisable for the great names for they are in no way responsible for the "run" which their distinctive revivals have had. On the contrary, being men who could appreciate true art in any style, they would have preferred to see men of great ability striking out in new and original findings, where they would have had more freedom and probably have discovered and set before the world new beauties, rather than follow in their wake (sometimes too

blindly) and produce designs which can only be said to be "after" their manner.

Now, let it not be understood for a moment that these observations are made in the spirit of fault-finding. It is quite natural, and the thing to be most expected, that men of genius in any walk in life will have followers. But the thing which is not always done, which, in fact, is rarely done (more's the pity), is to follow them intelligently. Had any of the three men, to whom reference has been made, lived and practiced their profession in Canada, the probability is that they would have brought about the same revivals which they have done, but their respective styles would have been made to serve the local and climatic conditions of this country, whereas those who have followed Shaw and Richardson into the Queen Anne and Norman styles (the Neo-Grec has not taken root here) have erected buildings which would have suited England or a more southern climate very well, but which are altogether unsuitable for Canada.

But the fact of the great difference in the climate of this country from that of any of the countries where a national style of architecture has existed, or does exist, so far from casting a damper upon our architects, should stimulate them to accomplish what has hitherto been neglected, and to give a Canadian cast of features to our buildings. The Greeks took as the basis of their noble marble structures which are still among the glories of art, the humble wooden huts of the primitive days of the country. But these huts had all the requirements of good buildings, as far as they went, and they were admirably suited to all their local surroundings. There are huts in Canada too, which those who have lived in them tell us afford stronger protection against the severity of our winters at all events than our modern houses. And, if we want examples of greater refinement in buildings than there is to be found in our log shanties, but which have fulfilled the requirements and stood the test of a climate similar to our own, we can find them in the picturesque Swiss chalets, or in the more substantial villas of the northern Tyrol. But it would be, perhaps, as unwise to imitate these as to continue in the line of imitation that has taken such root among us. The chief thing, the only thing for us to do in this matter, is not to ignore our climate, although it can treat us with supreme contempt, but to give it in our architecture that consideration and study which is its due, and which will give a certain amount, at least, of national character to our buildings.

ONTARIO ASSOCIATION OF ARCHITECTS.

THE Council of the Association met on Wednesday, Dec. 16th. Present, Messrs. Storm, Rastrick, Edwards, D. B. Dick, Arnold, Burke, Curry and Townsend.

Of the business done the following is of general interest: The Registrar was instructed to open a register for assistants desiring employment. Any registered draughtsman out of employment may send in his name to the Registrar without fee, and the Registrar will send lists of all names so received to any registered architect applying for it.

In the matter of the Presbyterian Church Competition, it was announced that the Committee Board of the Presbyterian Church having the matter in hand is about to issue a circular to architects containing the conditions of a new competition.

A form of Students' Indenture has been adopted by the Council for the use of members of Association, and when printed may be obtained free of charge on application to the Registrar.

Examiners were appointed for the examinations to be held on April 7th.

Preparations were made for the proceedings of the next convention.

ESTIMATING.

11 BERRI ST., MONTREAL, Nov. 26th, 1891.

EDITOR CANADIAN ARCHITECT AND BUILDER.

DEAR SIR,—The remarks in the last issue of your valuable paper re Bills of Quantities seem very opportune. Nothing at times causes so much trouble and unpleasant feeling to all parties concerned as the disputes that will and do arise in reference to the quantities contained in a structure. The English system of employing qualified quantity surveyors works most satisfactorily, and I can speak from experience, having had seven years in that branch of the profession, also estimating. They are prepared much in the same way as is described in that concise and lucid series of articles now running in your journal on "How to Estimate," by Mr. W. H. Hodgson. I may think of any use to you, I will gladly send you a copy, say, a legal and printed form of contract is also in use amongst the building fraternity which alike protects employer, architect, and contractor, and is of the most detailed character. If you together with blank bills of quantities of a large contract for your perusal or publication if you think of any material use.

Yours very truly,

WM. STANLEY GOSNELL.

P. S.—If you would not take it out of place, I would ask, could you not open a column in your widely read paper for "Situations Vacant and Wanted, &c.," for the convenience of the building trades generally.

OUR ILLUSTRATIONS.

"CANADIAN ARCHITECT AND BUILDER" COMPETITION FOR A SUBURBAN COTTAGE—DESIGN BY "PIAPOT" (MR. A. E. WELLS, TORONTO), AWARDED FIRST POSITION.

A note accompanying this design says:—"The author has sought to obtain the most favorable aspect for the various rooms, and at the same time keep them in their proper relation one to another. The parlour and library both have a south aspect, and the dining-room is placed where the rays of the morning sun will flood the room at the breakfasting hour. The library and verandah adjacent, overlook the lawn. The entrance is placed where it does not interfere with the privacy of the verandah or lawn, and being on the east side of the house, it is sheltered from the cold winds of winter.

The kitchen at the north-west corner of the house, projects sufficiently to the west to admit of a south window; thus it is not dependent for sunshine on the low rays of the western sun, which in summer would make the room uncomfortably hot. The sill of this window is placed sufficiently high to prevent the verandah and lawn being overlooked from it. The second window in the kitchen is placed diagonally opposite this one, in order to ensure thorough ventilation by a current of air across the kitchen.

The kitchen is separated from the dining room by a passage that has direct communication with the outside air, with the doors so placed that the interior of the kitchen cannot be seen from the dining room.

The kitchen and sewing pantry, by not being connected by a door, both gain in accommodation. The stairs to the cellar is arranged so that the person tending the furnace need not pass through the house to get at it.

The soil pipe stack runs straight up through sewing pantry and bath room, and the fixtures in each floor are grouped around it, so that the cost is reduced to a minimum and the whole system is very simple and direct. It will be seen that every fixture has an abundance of sunlight about it.

The bath room is placed with regard to the convenience of the occupants of the different bed rooms. None of the bed rooms on this floor have sloping sides, but are finished under the rafters with a plaster cone about two feet in radius.

The cost of this house would probably range from three to four thousand dollars, which amount could be raised easily on the security mentioned in the conditions of competition.

PHOTOGRAPHURE PLATE—RESIDENCE ON MADISON AVENUE, TORONTO, E. J. LENNOX, ARCHITECT, TORONTO.

"CANADIAN ARCHITECT AND BUILDER" COMPETITION FOR A SUBURBAN HOUSE—DESIGN SUBMITTED BY "KATA PHUSIN" (W. LAWRENCE MONRO), AWARDED SECOND POSITION.

RESIDENCE FOR MR. JAS. HEDLEY, ST. JOSEPH ST., TORONTO. —S. H. TOWNSEND, ARCHITECT, TORONTO.

"CANADIAN ARCHITECT AND BUILDER" COMPETITION FOR A FRONT FENCE—DESIGN BY "ARM AND HAMMER" (A. EWART, OTTAWA).

TORONTO ARCHITECTURAL SKETCH CLUB.

THE regular fortnightly meeting was held on the 7th inst. Mr. Pearson, president of the Club, being absent from the city, Mr. Barrett, vice-president, occupied the chair.

Different subjects of interest bearing on architecture were discussed, Messrs. Gregg, Parker, Wells and Woolnough taking part.

Messrs. H. Boswell, T. Connell and W. Mollington were elected members of the Club.

CORRECTION.

TORONTO, Dec. 10th, 1891.

EDITOR CANADIAN ARCHITECT AND BUILDER.

DEAR SIR,—In your next issue kindly correct a printer's error in the report of my remarks on Classic Architecture before the Toronto Architectural Sketch Club, which is misleading, though the context may set the reader right. It occurs on page ix. of the November issue, first column, third paragraph, fourth line, "that of the Syrians" should read "that of the Lydians." There are a few other typographical errors, but probably the reader would know them to be such. For instance, "Mediocl Habou" and "Bern Hassau" should be Medinet Habou and Beni Hassan.

Yours truly,

R. W. GAMBIER-BOUSFIELD.

It is a relief, says Mr. Brown, in *Painting and Decorating*, after the endless succession of houses finished in hard wood—white pine stained in many cases—to find a return in the better work to china gloss. Many people imagine that this class of work looks well only in white, but I have seen some very nice effects in colors, especially in pale and delicate tones. One room in pink was very dainty, and another in blue gave a very pretty effect. A parlor finished in chocolate and gold was rich and warm in color tone, and the gold gave a much more brilliant effect than when used with the customary accompaniment of white. The gas fixtures in this room were in gold ornolu, thus harmonizing with the woodwork.

CANADIAN CITY ENGINEERS.

II.

MR. CHAS. BAILLAIRGE, C.P.E., M.A. & F.R.S.C., City Engineer, Quebec, since October, 1866, was born at Quebec, Sept. 27, 1826, and is therefore now 65 years of age. His father, P. F. Baillairgé, who died in 1865 at the age of 68, and who had been "Road Surveyor," Quebec, for 36 years and up to the time of his death, was a son of P. Florent Baillairgé and of Melle. Careux de St. Germain, both of French origin. His mother, Charlotte Lefebvre, daughter of the Honorable Her Majesty's Navy, was born in the Isle of Wight, England, of Helen Welling of Jamaica, Long Island, N. Y., whom he met and married there after the War of Independence of the U. S. Our subject's grand uncle, Frs. Baillairgé, de l'Académie Royale de Peinture et de Sculpture, France, and who carved several of the statues of the Basilica, Quebec, had his studio in the quaint old building in St. Louis street, opposite Parrot street, now occupied by Campbell's livery stables, and was almost daily visited during the latter's stay in Quebec by the late Prince Edward, Duke of Kent, father of our reigning sovereign, Queen Victoria.

Mr. Baillairgé, whose portrait we reproduce, was educated at the Quebec Seminary, where, finding the ten years curriculum too long and slow, he, after seven years' tenure, entered upon the study of mathematics, philosophy, logic, etc., and commenced his apprenticeship in architecture, engineering and surveying, receiving his diploma as sworn surveyor of lands in 1847. At the age of 17, he, with another schoolmate, designed and built a double cyphered carriage for common roads, often at that time driving to the country with it, with his friends. In 1848 he married Delle. E. Duval, daughter of John, and step-daughter of H. J. Duval, for many years Chief Justice of the Court of Appeals of Lower Canada, by whom he has had eleven children, four of whom survive.

During the nineteen years previous to his entering on his present occupation of city engineer in 1866, he designed and superintended the construction of the Laval University buildings, the asylums and churches of the Sisters of Charity and Good Shepherd, the Music Hall, the new jail, and of very many private residences. He designed and built the Church of Sts. Marie, Beauce, a view of the elegant interior of which, of Gothic architecture, appeared in Vol. II, No. 7 of this journal for 1860. Many other parish churches, presbyteries, school houses, colleges, villas and other structures were erected after his designs. In 1860 he erected on the St. Foy Road, the cast iron bronzed monument to the braves who fell there under General Levis in 1800, and to which Prince Gerome Napoleon contributed, at a cost of over \$5,000, the crowning statue of Bellona.

Mr. Baillairgé was for many years hydrographical surveyor and engineer to the Quebec Harbor Commission, member and chairman of the Board of Examiners of Land Surveyors, and a representative of St. Louis Ward in the Quebec City Council from 1858 to 1861. His services have often been required by the Local and Federal governments, by the courts and clergy, and by private concerns, as arbitrator on disputed claims and boundaries, and on questions of technology, and during this busy period of 19 years, laboring as he always has done, and sitting down for 18 hours out of every 24, he found time to write and deliver in the old House of Assembly, Quebec, and elsewhere, numerous lectures and conferences on "Steam and the Steam Engine," "Astronomy," "Mechanics," "Optics," "Assurances," and the like. In 1863-5 he was called to Ottawa as joint Architect and Engineer with Messrs. Fuller and Page on the Parliamentary and Departmental Buildings, then under construction, and during those two years he completed in French language, his 900 pages treatise (including mathematical tables) on "Plane and Spherical Geometry and Trigonometry," published in 1866, where he shows at page 330, the fallacy of Thorpe's pretended solution of the trisection of an angle, for which the Government Patent Bureau granted him letters patent of invention, poor man, after his laboring at the solution, so he says himself, during 34 years of his existence. Mr. Baillairgé's work, at pages 232 to 331, contains the solution of some 200 pertinent problems, among which he introduces at page 251 Mr. Steckel's fallacious solution of the hydrographical problem of the four points, not heretofore solved by a simple solution. We would like to invite attention to Mr. Baillairgé's easy solution, founded on his new theorem Prop. LX, page 189, of the heretofore difficult problem of dividing up land by a straight line running through a given point (page 197) and at page 280 to his novel solution of the important and difficult problem of laying out city blocks between two parallel streets where every inch of frontage is precious, in a way to contain the greatest or proportional areas, with proportional frontages on each of the streets.

Since our subject has entered on his civic duties in Quebec, he has planned and built Dufferin Terrace, which is 1500 feet in length and flanks the crest of the cliff overlooking Champlain street at a height of 180 feet above mean tide level of the St. Lawrence. The foundation stone of this structure was laid by Lord Dufferin in 1878, and the terrace when completed inaugurated and thrown open to the public by Their Excellencies the Marquis of Lorne and the Princess Louise in 1879. In 1881 he reported on, and in 1883-5 put in the new line of 30 inch water pipe from Lorette to Quebec, a distance of nearly nine miles. During his 25 years as City Engineer he has had occasion to plan and build wharves, ferry landing piers, the slips, pontoons, and ferry boats. The new dredge and water works, in the adjoining parish of St. Foy were planned and carried out under his superintendence, as well as those in the recently annexed municipality of St. Saviour, under the more immediate direction of Mr. Gallagher, Asst. City and Water Works Engineer.

He has planned and built fire and police stations, market halls, etc., and many of his yearly reports, as those of 1868, '70, '72 and '78, are voluminous, interesting and instructive, and have been sought after by City Engineers and others of many portions of Canada and the United States. Steep hills have been replaced by grades of easy access; the fortification walls have been cut through and streets prolonged to meet those in the suburban districts; and many an advantage has been erected as designed by him, to afford communication between the upper and lower wards of the fortress city,

In 1874 Mr. Baillairgé published in both languages his "Key to the Stereometrical Tableau," "Clé du Tableau Stéréométrique," giving applications thereof to numerous solid forms. This system (see De Broeker's letter from the Ministry of Public Instruction, St. Petersburg, 14-20 February, 1877) was to be taught in all the elementary schools of Russia, and by a subsequent letter of a year and a half later, from the same source, Mr. Baillairgé was informed that "the system having been found to work well, will moreover be applied to all the polytechnic schools of the Russian Empire."

In February, 1874, Mr. Baillairgé was called to France, when in the "Grand Conservatoire des Arts et Métiers" he received the gold medal of the "Société de Vulgarisation de l'Enseignement en France," also the medal called "Philippe de Girard" given by M. de la Boronne de Pages for the most useful invention or discovery of the year, and he has since received 13 medals of honor and 17 diplomas from France, Italy, Russia, England, Brazil, Japan, Belgium, Canada and the United States of America. After the death of his first wife in 1878, Mr. Baillairgé in 1879 married Anna, daughter of Capt. Benj. Wilson, of the English navy, by whom he had six children, four of whom survive.

In 1854 Mr. Baillairgé published in both languages "The Stereometrical," ("Le Stéréométrique") thus perfecting his system, by applying the prismoidal formula to some 200 elementary geometrical forms, giving in each case the nomenclature of the solid and of the class which it belongs, the nature and mode of arriving at the areas of the opposite bases and middle or other sections, the form or shape and area of the developed lateral and other surfaces thereof, of the object of which the model is representative or suggestive, and of the many other uses to which the figures may be applied. In 1860 our subject was chosen by Lord Lorne, then Governor General of Canada, as one of the members of the so-called "Royal Academy of Arts," and in 1882 he was made one of the foundation members of Section III of the Royal Society of Canada, before which he has read many papers, several of which have been published in the yearly transactions.

Being, as he is, of a humorous and versatile turn of mind, Mr. Baillairgé in 1873 wrote a play, which he called "Le Diable devenu Cuisinier," which was played by the Mangard Compey (then in Quebec at the Music Hall, and then at Jacques Carrier Hall, to the great delight of the audience on each occasion; and in 1875, as member of the "Club des 21" of the literati, artists and savants of Quebec, he read a paper in which in his happy style, he hit off the peculiarities and portrayed the qualities of every member of the club, and of the chairman himself, the Count de Frenio Real, then Spanish consul at Quebec. His later works are, in 1888, a French dictionary (some 700 pages) of homonymous words and of the corresponding elements thereof; his last work of 1890 being a vocabulary of nearly 500 pages of "English Homonyms" and one of over 200 pages of "Homonymes Francaises," both for the use of schools and educational purposes in general, and at different times he has edited articles on the art of building, the defects in our system of construction, and many other subjects too numerous to enumerate.

We may say in conclusion, that Mr. Baillairgé is of opinion that a good City Engineer should know enough of land surveying to plan and lay out streets and squares and take the levels absolute and relative thereof, widen and prolong them as required, and prepare designs and "crosses verbal" of all lands and parcels of land of whatever form or size, to be explicated for the purpose; to lay out parks and burial grounds; that he should be enough of an engineer to grade and pave hills and roadways, lay down sidewalks, crossings, water channels and put in drains; to compute the size of plan and lay out and superintend the construction of city drains and sewers and water and gas distribution pipes, man holes, hydrants, drinking fountains, water troughs, etc.; fire alarm and light circuits, and attend to the position of each post (if for overhead systems), or put in underground channels therefor (if to be laid beneath the surface); to plan, specify and superintend the construction of retaining walls and crib work for roadways on side hills, wharves, ferry piers, landings, pontoons and slips and ferry boats, terraces, high class straight or tortuous or zig-zag, to overcome differences of level, public stairways of wood or iron and the like; to lay out city tramways, etc., and enough of an architect to plan and build fire and police stations, market halls, nests of shambles, weight houses, public conveniences, elevators, crematories and the like.

PUBLICATIONS.

The Canadian Shoe and Leather Journal has issued an exceedingly attractive special number in the interests of spring trade, 1892.

The publishers of the Dominion Illustrated have issued a Christmas number which for beauty and interest is not surpassed by any European publication of similar character. The number reflects credit on the country as well as on the publishers. The announcement is made that the Dominion Illustrated will in future be published monthly as a magazine, the subscription price being reduced to \$1.50.

SOCIETIES.

The third annual dinner in connection with the School of Practical Science, Toronto, took place (at the Arlington hotel recently). The faculty, graduates, guests and students numbered one hundred. The occasion was greatly enjoyed.

The General Water Pipe Co., of Liege, Belgium, is seeking information regarding the extent of the Canadian market, with a view to establishing a branch of its business here.

The importations of cement into Canada during the last few months is said to have been in excess of the requirements, and (unless it) the market is looked for in consequence,



R. CHAS. BAILLAIRGE, C. Y. ENGINEER, QUEBEC.



STEAM HEATING.

At this season of the year the heating of houses is a subject of interest to nearly every one. Many of the readers of our paper are especially interested in steam heating, and are now engaged in getting such appliances ready for the winter's work.

The most important part of a steam heating apparatus is the boiler, and next to that in importance is the furnace. Unless these are suitable and of sufficient capacity, all the rest of the apparatus will be found unsatisfactory, no matter how skillfully it may be done. Some steam fitters advocate the use of sectional boilers of cast iron, and containing the furnace within the parts of the boiler. These, no doubt, are cheaper and more convenient to sell and erect in place; but when that much has been said in their favour, the list of their good qualities is about complete. In some circumstances it is necessary to have a boiler in which steam is quickly raised, but it should be remembered that a boiler in which steam can be quickly raised is also one in which it will quickly go down, should the fire become dull.

For this climate, with its great variations of temperature during the winter, the boiler of a steam heating apparatus should be made large enough to give ample steam for the coldest weather, and the furnace part should be so arranged that the fire may burn slowly and yet maintain a steam pressure. The boiler should contain a considerable quantity of water, and it will be found of advantage to have the furnace brick, so as to form a reservoir of heat, which will be radiated to the boiler whenever the fire becomes dull.

The boiler and furnace should be of such capacity and so arranged as not to require the constant attendance of the man in charge. The first cost may be more, but the annual expenditure for fuel, attendance and repairs will be less when the boiler is large and the furnace made so that a slow burning fire keeps up steam. The comfort and satisfaction obtained will more than repay for the greater outlay.

In another article the size of boiler and furnace in proportion to the amount of piping to be kept hot will be discussed—at present it is proposed to say something about getting ready for winter.

The boiler, it is assumed, is all right and not requiring any repairs; what, then, should be done in order to get ready? The boiler should be carefully gone over, and all dirt and dust removed from it and from the furnace. This should be done, even though it was all cleaned out in the early summer. The next thing to do is to remake the hand hole and man hole joints. The hand hole joints should be very carefully made, as they should be absolutely tight in order to prevent the slightest amount of leakage. Corrosion of the boiler head soon follows a little leakage at the hand holes. In making these joints, it is a good plan to use moderately thick rubber, and to make a paste of black lead and oil, and put it on both sides of the rubber. The hand hole cap should not be screwed up too tightly when the boiler is cold, and should be screwed up after steam has been up or the water at the boiling point. All the valves about the boiler and its connections should be examined, and the spindles properly packed if new packing is needed. Then close the blow-off cocks, see that any check valves either in the feed or return pipes are in order, and while free to rise have not too much lift. The lift should never exceed one-fourth the diameter of the valve, and may be less. Open the valves on the steam and return pipes, and then turn on the water and fill the boiler to within a couple of inches of the level at which it is intended to keep the water when steam is up.

While the water is being run in, the gauge cocks, or safety valve, should be open to allow the air to escape from the boiler. The fire should then be lighted, and the water slowly heated until steam is raised. When steam has begun to flow through the pipes the valves at all the radiators should be opened, and any requiring packing marked for attention by re-packing. If any radiators do not heat, the air valves should be opened to allow the air to escape.

When steam is up the return pipe should soon become warm,

showing that circulation is going on throughout the apparatus. If it does not become warm, the cause of the stoppage of circulation should be searched out and removed.

ELECTRIC LIGHT AND HEAT.

It is certain that we are upon the eve of great discoveries in the field of electrical science. The perfection to which electric lighting has attained, great as it is, is but the threshold as it were of the possibilities yet to be realized. When it is considered that of the amount of energy expended not one-tenth appears as light, leaving the larger proportion to take the form of heat, it is at once seen that absolute perfection is yet a long way off. Light without heat is the dream of the scientific explorer in the realm of nature, and when it is successfully achieved our present wasteful methods will appear crude indeed. We are burning up our stoves as well as our fuel. We are like the Chinaman who invented cooked pig—we burn down our house to get roast pork. The experiments of Tesla with currents of high frequency are upon this line, and may yet take practical shape. If a medium of sufficient tenacity could be found capable of transmitting the almost inconceivably rapid vibrations of light as set in motion and maintained by the subtle force of electricity, the grosser form of caloric would be passed and left behind, and the cold and brilliant aurora glow of heatless light would be attained. But where is this medium to be found? The molecules of ordinary metals are incapable of being attuned to the rapidity required. Copper, our best conductor, would probably be too inert to transmit the vibratory force, and be dead as so much wood. Although the electric current may be weighed and measured with precision and appears to follow certain fixed laws, but little is known of its actual constitution, and in what manner it is transmitted along the most favorable path. But there are immense possibilities in it, and before long we may look for further discoveries in its application to the production of light.

A valuable paper on "Sanitary Plumbing" was read by Mr. Cesare Marani, lecturer in Sanitary Engineering, at a recent meeting of the Engineering Society of the School of Practical Science. Messrs. Burke, Curry, Townsend and Bousfield, members of the Ontario Association of Architects, were present, and took part in the discussion which followed.

It is proposed in future to charge builders in Toronto with the cost of plumbing inspection in buildings under construction. The proposal is a proper one. There is no valid reason why the cost of this work should be charged against the general expenditure of the city. If inspection of old plumbing is required, a fee of \$5 must be deposited by the person who desires the work done. There is no better reason for free inspection of new work than of old. The charge should simply form another item in the builder's estimate, and should ultimately come out of the pocket of the owner of the building.

A jury recently found the city of Toronto guilty of negligence in allowing foul-smelling refuse to be dumped in proximity to a citizen's dwelling, thereby causing an outbreak of diphtheria in his family and the death of two of his children. While the verdict was undoubtedly just, the amount of damages awarded to the plaintiff—less than \$400—was ridiculously small. It is well, however, that the courts should sound the warning that those who carelessly endanger the public health will be called to account. The comments of the judge upon the danger arising from the system of ventilating sewers into the public streets were timely. An improvement which would secure the discharge of sewer gas at such a height that it would not assault the passerby or invade citizens in their homes or places of business is urgently required.

PERSONAL.

The death has taken place since our last issue, of Mr. John T. Stokes, engineer of the County of York. Mr. Stokes held this position for twenty-five or thirty years. His life was one of great activity and usefulness, and the integrity and kindness of his character caused him to be deservedly esteemed.

The friends of Mr. Ernest Wilby, formerly a member of the Toronto Architectural Sketch Club, who went to England early in the year with the object of prosecuting the study of his profession, will be pleased to learn that since March he has been employed in the office of Mr. Calcutt, a prominent London architect.