THE CANADIAN ARCHITECT AND BUILDER

Vol XX.—No. 3 Toronto, Montreal —MARCH, 1907— Winnipeg, Vancouver PRICE 30 CENTS $3.00 PER YEAR

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NOTES.

The Schultz Brothers Company, Limited, who were recently incorporated by the Ontario Government, have decided on the establishment of a sand lime brick plant at Brantford. The capacity of the plant will be 30,000 brick per day, and the company expect to have same in operation by May 1st. The initial cost of the works will be $40,000.

The plasterers of Peterboro' who intend going into the lathing business will have to deal with some unexpected difficulties, according to reports. The plasterers in the past have been in the habit of using rough lumber belonging to contractors for making mortar pits, piling material on, and any other purpose for which it was needed, never thinking of paying for use of same. This season, however, the contractors are not going to allow this, and will compel the plasterers to supply their own material.

The Executive Committee of the Canadian Association of Master House Painters and Decorators held a meeting on March 7th and arranged the programme for the convention to be held at London, July 25th to 27th next. In the absence of both President Brooke and Vice-President Reynolds, ex-President McKenzie, of Hamilton, occupied the chair. In the evening the Toronto branch of the Association gave a complimentary banquet to Mr. Stewart N. Hughes in honor of his election to the presidency of the International Association at the recent convention held at Boston. Mr. J. W. Knott, on behalf of the Toronto Association, presented Mr. Hughes with an address and referred to the honor conferred, not only on him (Mr. Hughes), but upon the Toronto and other Canadian branches. Mr. Hughes replied, thanking his friends, and assuring them of his desire to uplift the craft in every possible way.

Please mention the CANADIAN ARCHITECT AND BUILDER when corresponding with advertisers.

NOTES.

It is reported that the Parkin Elevator Company, of Hamilton, may amalgamate with the Hespeler Hoisting Company and remove their plant to the later place.

A new plumbing and heating firm has been organized at Regina by Hastings & Willoughby. Mr. Hastings was formerly foreman for Smith & Ferguson, and the new firm start business with every indication of success.

The Amherst Red Stone Quarry Comsany, of Amherst, N. S., has recently been reorganized and formed into a joint stock company, to be known as the Amherst Red Stone Quarry Company, Limited. Mr. W. Dennis is managing-director.

The Canadian Architect and Builder

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ILLUSTRATIONS.

CANADIAN ARCHITECT AND BUILDER Competition for a Small Suburban Town House.—Design submitted by "Sir Christopher Wren."

ADDITIONAL ILLUSTRATIONS IN ARCHITECTS' EDITION.

Concrete Houses in Charles Street, Toronto.—Beaumont Jarvis, Architect.
House in Vancouver, B.C.—Parr & Fee, Architects.

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Tests of Sand Lime Bricks.

At the recent meeting of the Sand Lime Brick Association in Chicago, a paper was presented by Mr. E. W. Lazell, Ph.D., giving the results of tests of over one hundred samples of sand lime bricks from fifteen different factories. These tests comprised:—Transverse test (including modulus of rupture), compression test, absorption test, compression after absorption (this latter test being made on bricks saturated with water). In the samples of mixture submitted, the fineness of the material was determined and also its chemical composition. The average modulus of rupture obtained was 446 pounds. The average compression strength in pounds per square inch was 2,922. The average absorption was 15.16 per cent. The average compression strength in pounds per square inch when the bricks were saturated with water was 1,961, which shows a loss of 32.88 per cent. from their strength when dry. Only five lots met the full testing requirements of the Bureau of Buildings of New York, showing that a higher standard of manufacture is desirable.

The Hochelaga School Fire.

By a fire which took place on February 26th in the Hochelaga Protestant School, Montreal, sixteen of the children lost their lives, and a lady teacher, in her efforts to save them, shared their fate. Two minutes' grace would have sufficed to save them, but circumstance seemed to combine with circumstance to seal their doom. Doors in the basement, where the fire broke out, were left open, which might have been closed and so checked sufficiently long the suffocating smoke. The warning of fire was not immediately given to the occupants, and the stairway had become impassable. There were no fire escapes from the upper floor, and children and teachers looked for rescue from the windows. A slight trouble with a horse and a short delay owing to street cars on the road, brought the escape ladders only in time to perform half the work of rescue. The teachers kept by their children in each case, and the children behaved well and remained under control. Chief Benoit of the Fire Department gave evidence that "if there had been exterior fire escapes those children would have been living now." The city by-laws call for exterior stairs, or other means of escape. The Protestant Board of School Commissioners, when they had been called on by the City Inspector to provide means of escape, had objected to the provision of external stairs as being themselves a mere source of danger where small children were concerned, and declared that the fire drill practised in their schools was a means of escape more reliable than external stairs. In view of this the demand for these escapes seems not to have been peremptorily pressed. Though it makes a poor show in face of the actual occurrence, there is a certain weight in the School Commissioners' contention. It should be remembered, however, that escape stairs need not be, and, in the case of schools, must not be of a steep and difficult description. In case of sudden disturbance children are not so dangerous to one another as grown-ups are. They may be nervous and lose control of their fingers or limbs, so as to let go what they should hold, or stumble when they ought to run; but they are not liable to crowd one another to the crushing out of life, nor to trample one another down regardlessly. They may be trusted to bicker down a reasonably easy stair in fair time, without more damage than a few superficial bruises to a few individuals.

All the world is wise after the event, but it behooves an architect to be watchful in his plans and insistent on all reasonable provisions, so far as these can be made inherent in the very structures themselves, and

there is little doubt that the best precautions are those that are part and parcel of the building. There must be ample exits. The staircases cannot be too easy-going nor too accessible; they should be arranged so as to be cut off as much as possible from access to fire or smoke, and the chance of communication of these from one floor to another should be minimized. In buildings containing many people, two stairs at opposite ends are a necessity. When every internal provision is made, external escapes are still essential. What form they should take may be open to some little variety of opinion. As in the case of the Hochelaga School, however, it most frequently happens that the victims of a fire are overcome by smoke rather than by actual heat. One of the most useful provisions is, therefore, ready access to ample fireproof galleries, from which even the most helpless people could be rescued by fire ladders. This safeguard is particularly applicable in the case of schools and hospitals. For hospitals they may be made extensive enough to accommodate all the beds of the wards to which they are attached, and may be made useful adjuncts for airing purposes. In factories where many hands are at work on upper floors, outside galleries should preferably surround the whole building, and should have communication with the staircases of the building in addition to having escape stairs of their own.

Technical Education.

The subject of the establishment of technical schools seems to be in the air at the present time. The Hon. Dr. Pyne has been broaching it in Ontario, the Hon. W. A. Weir in the Province of Quebec, and Premier Murray in Nova Scotia. There seems to be inclination on the part of the various Governments to see something of the kind definitely established. The question is also receiving a good deal of attention in the United States, where several trade schools are already in operation. It would be well that all whom such projects concern—employers and employed alike—should take a close interest in any initial step that may be taken in this matter, for it is important that the kind of scheme entered upon should be such as shall meet the local demands and appeal strongly to the classes which it is intended to benefit.

In the United States the growing scarcity of skilled hands in the building trades is largely the cause of the demand for trade schools, and what is there being asked is, whether such schools cannot be made recruiting grounds of skilled workers, who would thus receive at these schools a complete training, each in his own branch, and issue from the school equipped to take his place in the ranks of trained workers. It would seem too sanguine to hope for this result altogether, for a farther period of practical experience would be required to fit even the most distinguished graduates of such a school to be useful workers. Yet no doubt men with such a preliminary training would rapidly become workmen of a high degree of usefulness.

This is a very different idea of a technical school from that in operation in England. There the apprenticeship system is still in force. The technical schools for the most part assume that their students are at work during the day earning their living, or at least, by apprenticeship to a trade, preparing themselves to earn their living thereby. Their classes are therefore mostly open in the evening, and are not for instruction in the ordinary handicrafts of the trades, but for supplementing the student's daily experience, necessarily of a limited and partial nature, by the systematic study of his subject as a whole and to help him to realize the full scope and possibilities of his art and his materials. The subjects taught are thus mathematics, drawing, chemistry, physics, nature and properties of materials, statics and dynamics, and a number of other subjects which vary according to the industries distinguishing each locality.

These are two radically different ideas of a technical school; each has its own special merits, and the real question is, which is the one most suited to the economic conditions of Canada? Which will appeal to the Canadian worker and the Canadian employer? The English method has the advantage of being to some extent a tried system. That of the United States does not exist as a system, but only as scattered and local experiments. It seems to imply that its students can afford to spend a certain time and a certain amount of money in learning a trade. It involves the execution of qualities of work merely for the sake of learning how to operate. It aims at enabling a young man to become proficient in a trade without spending an unduly long time on uninstructive routine work, and it seeks to give him a knowledge of the work by which he is to earn his living, which will enable him to find in that work a field broad enough to give ample scope to his mind, and which he has received instruction enough to be able to till independently and with profit. Both systems have the same ultimate end, to make the workman a more intelligent, more efficient man, by giving him the opportuinty to exercise more of his intelligence on his everyday employment. The Englishman has got the men; his object is to supply them with the means of self-improvement. The American is in want of men, and seeks to attract them by providing a bill of fare for them by putting at their service the keys of the gates of knowledge.

The subject of technical education has a very wide application and goes far beyond the building trades. The school established by Sir Wm. Macdonald at St. Anne, on the Island of Montreal, deals with agricultural interests, and as agriculture is the mainstay of the country, this subject is of the first importance, but it is only part of a scheme which must extend over every subject in which Canada wishes to excel. Such a scheme must eventually include collections of examples in all industries and laboratories for the study of processes and of the properties of materials. It is by such complete system that Germany has made such rapid advancement in her industries and trades. In addition to the benefit that systematic education brings to all individuals, one must look at the advantages to be attained by the community at large from the establishment of centres where an extended system of observation, experiment, comparison, analysis, and selection, can put our present somewhat vague knowlege of principles and materials on a scientific, reliable and thoroughly economic basis.

A TRUE BASIS OF CONTRACT.

By Wm. Brown, C E.

To the minds of many contractors the question often arises, "Why are so many tenders rejected?" To answer this query by indicating some points that may discover the cause, and suggesting others that may be helpful to contractors in making out their tenders, so as to minimize the chances of rejection, is the aim of this article. The general ground for the rejection of tenders is because that they are all too high. Yet the judgment given is sometimes very erroneous, because of no proper basis to arrive at this conclusion. Proprietors expect to have a certain amount of work done for a limited amount of expenditure, and if the tenders returned exceed the limit (notwithstanding that the tenders, according to plans and specifications, have been carefully and reasonably prepared), yet they are rejected upon the ground of being too high. The fault in such cases does not rest upon the contractors when they have returned carefully calculated and prepared tenders. But discrepancies may arise on the part of the contractor, being incapable of forming a proper estimate.

Stewart N. Hughes, of Toronto,
Recently appointed President of the International Association of Master House Painters and Decorators.

This leads us to formulate what may be termed "A True Basis of Contract." The first element to be considered is an uniform method of extracting the quantities from the plans, and calculating the same, also pricing each item at current rates. When this procedure is adopted, a reliable tender may be formed. But when each contractor adopts a method of his own, different from the others competing, it is natural to expect that there will be a disparity in the amounts (often very great in extensive contracts) that is very conflicting to the proprietor. The great necessity in the first place is to have an uniform and well-wrought-out system of measurement, with well-defined rules for each class of work, and having thoroughly trained professional men to measure the plans and prepare accurate schedules of quantities, which are supplied to each contractor tendering. When each item in the schedules is priced at current rates, and correctly calculated, then there should be very little difference between the amounts given in the tenders sent in. At any rate there will be the least chance of all the tenders being rejected, which sometimes occurs.

When such an accurate and reliable method is not at hand, then the contractor has to do his best in extracting the quantities from the plans, in order to arrive at the amount. The methods of "cubing" and "squaring" are not reliable in every case, so that a better plan is to take off as much detail as possible, that shall give him a basis upon which to price the time and materials, labor to be expended, and percentage of profit required for each item. When this is intelligently and correctly done, then he may come very close to his competitors. But whenever "guess-work" is resorted to, then financial disaster may follow in its train. The cost of materials, the time and labor expended on same, and the percentage of profit required, are the most important factors which compose the true basis of every well-constructed contract. But in cases where it is impossible to execute the work at any prescribed amount, then no true basis can be established for the carrying out of the contract, except at a loss to the contractor. Many contractors, however, compete under such circumstances, which is not only prejudicial to their own interests and that of the proprietor, but also to the others competing, and to the trade in general. A contract may be drawn up that seemingly has all the elements of a true basis, and yet either of the parties in the contract may agree to certain alterations which may not produce what may be termed "a first-class" job. Thus an architect may allow a certain quality of material to be used that is inferior in quality to that specified for the purpose required, and yet no apparent breach be made, so long as the acquiescence of the proprietor is granted. But whenever this is done unknown to the proprietor, and against his wishes, then a breach in carrying out the terms of the contract might cause litigation. A true basis of contract can only be fulfilled when there exists between the contractor and proprietor no ambiguity as to the meaning of the written terms of the specification and general contract, and to the details contained therein regarding the materials, their quality and durability, and to the time and labor expended in the execution and finish of the completed work. This means that the element of conformity to terms must have an important place in the basis of every thoroughly constructed schedule of contract. Without this the whole fabric of contract building would fall, and leave nothing but a disastrous ruin, it may be, to many victims.

But the contract terms must be so stated and minutely described that only one meaning can be placed upon them. The question of expenditure of money does not necessarily enter into the "true basis" of a contract. Thus the error occurs frequently of rejecting all offers, because they are seemingly too high. But this in many cases is the result of the standard put upon the amount of work expected by the proprietor, because of the limited capital at his disposal. But if the proprietor is content to accept inferior material and workmanship in the construction of his building, and specifies this accurately in his specification and contract, then he may legitimately carry out his ideas upon a true basis of contract.

Another reason why so many tenders are rejected is because no details of prices are given for the different items required in the building, but only a lump sum offer, however large the amount. This is a greatly mistaken method to adopt, especially in extensive contracts. The chief characteristic feature, therefore, of "a true basis of contract" consists more of a "moral" nature than of a "materialistic," and if this were attended to and thoroughly performed, then there would be fewer disputes and less cause for litigation.

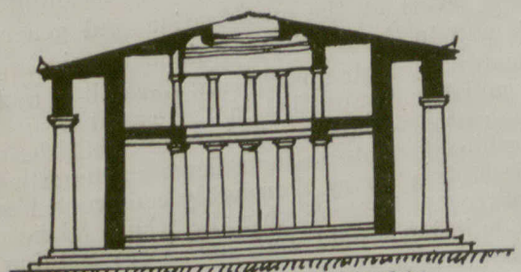
CANADIAN PLUMBER HEATING AND LIGHTING ENGINEER

[NOTE.—Contributions suitable for publication in this Department are invited from subscribers and readers.]

ANCIENT METHODS OF LIGHTING.

The following answer and sketches were submitted in answer to a question in the examinations of the Society of Architects, as to how the Greek temples were lighted:—

No examples of Grecian architectural art remain sufficiently intact to afford us reliable information as to the manner in which light was admitted to the ancient temples. Adequate lighting was probably, however, obtained in one of the two following methods, viz.: By skylight or by clerestory. The open skylight or hypæthral method is the theory favored by M. Botticher, who suggested that the temples were lighted by large horizontal openings in the roof, which would certainly admit light, but at the same time would let in the rain and wind. The theory put forward by Mr. James Fergusson is that temples were lighted by a form of clerestory. The sketch makes his suggestion clear, and it will be seen that with this arrangement the danger of damage and inconvenience, which might be caused by the weather, should the first method be adopted, would be avoided. Many authorities, competent to express an opinion upon the subject, support the theory that the only light entering the temples came in through the door openings.



The PARTHENON
BOTTICHERS THEORY
OF LIGHTING

The PARTHENON
FERGUSSON'S THEORY
OF LIGHTING

RADIATOR EFFICIENCY.

Short, vertical cylinders are presumably the best that can be devised for giving off heat. If they be increased in height, say two or three times, they would do less duty, because the air in contact with the upper parts would have been warmed by the lower part as it passes upward; and, therefore, is not capable of extracting as much heat.

The higher a radiator is, the lower its efficiency per square foot of surface, and 36 or 38 inches has been established as a fair limit of height. (Baldwin on Heating.)

Prof. R. C. Carpenter, in a series of tests at Sibley College, demonstrated the fact that "with radiators of the same height and same dimensions no difference could be traced, which was due either to material or to thickness. With radiators of the same material and the same height, but of different depths, or with varying numbers of tubes, we find invariably that higher results are obtained from the thinner radiator, or those with the fewest rows of tubes.

VENTILATING THE BRITISH HOUSE OF COMMONS.

In the new system recently installed for ventilating the House of Commons in London, fresh air is admitted at the terrace or river front, and, after going through tempering coils situated close to the inlet, passes through a specially-constructed copper gauze screen upon which water jets are continually playing whenever the fan is at work. This screen abstracts all the dust and a large amount of bacteria from the air, which then passes through a glazed tiled subway to a large "Cyclone" input fan, capable of delivering 70,000 or 80,0000 cubic feet of air per minute if required, but normally delivering about 60,000 cubic feet per minute. On leaving the fan the air passes (if the weather is foggy) through a cotton-wool filter, which is remarkably effective in taking all fog out of it. If the outside atmosphere is fairly clear, the air passes at once into the heater chamber, which is a room practically the size of the debating chamber, and in which are situated the heating batteries. Above the heater chamber is the mixing or equalizing chamber, where, as the name indicates, the air is brought to an even temperature and velocity, after which it passes through the floor of the debating chamber into the House itself.

TANK LININGS.

Making tank linings from the sides of old copper lined bathtubs is the way one master plumber secures a good lining and a closet tank at a moderate price in spite of the high cost of copper. The sides of the tub only are used, as these are usually 14 ounces, and are much better than the ordinary hot rolled copper, which is 8 to 10 ounces in weight, although sometimes 6 ounce copper is used.

Hurtubise & Theoret, marble dealers, Cote des Neiges, Que., have dissolved partnership.

A. R. Mitchell, of Freemont, Ohio, was recently in Brantford representing the Mitchell Reversible Window Company, who are considering the establishment of a branch factory.

CHARACTERISTICS OF TIMBER.*

By Prof. Penhallows, McGill University, Montreal.

In the lecture to-night the following points will be discussed :

1. The age of trees.

2. The origin of fractures under artificial and natural strains.

3. Qualities of durability and hardness.

Looking at a transverse section of a small log of lignum vitae a white zone is seen on the outside and this encloses a black interior. The same thing is noticed on examining a transverse section of a hardy Catalpa. These different zones are of importance for we have here the distinction between the light sap-wood and the dark heart-wood.

This difference is of structural importance for the sap-wood is of inferior value for building purposes.

The sap-wood is that part of the tree most recently formed, for in all trees the wood development goes on from the inside of the bark, and so the outer ring gives us the extent of the last year's growth.

This new wood contains the maximum percentage of water, and is the particular part of the wood utilized for the movement of the nutrient fluids. These cells thus have definite functional properties, and if the bark is removed and these become dried up the tree dies. This is also the case if the cells are greatly compressed, and girdling causes the death of a tree in this manner.

The heart-wood, on the other hand, is a dead structure, and its removal does not injure the tree, although it constitutes by far the greater part of the tree. This fact is proven very easily by experiment, and is also confirmed by the numerous cases of living trees with hollow trunks.

The heart-wood is simply a mechanical tissue which is necessitated by the upright habit of trees, and each year's sap-wood is converted into heart-wood.

The sap-wood, being composed of a living functional tissue, contains albuminoid substances which contribute markedly to decay, and so the sap-wood is very susceptible to decay. This is frequently seen in the pines, and is the cause of those streaks which are so deteriorating to building material.

The heart-wood contains no albuminoid substances for it is a dead tissue, and it is in this part of the tree that the mineral substances taken up from the soil are deposited. Thus there is more ash in the heart than in the sap-wood. In some trees pigment is deposited in these mechanical cells of the heart-wood, this being the case in such woods as the lignum vitae, rose-wood, mahogany, braizel wood, logwood, etc. This coloring gives the peculiar value to these woods for certain purposes. In some cases the pigment may be extracted from the wood and is of great commercial value, e.g., logwood.

GROWTH RINGS AND THEIR RELATION TO AGE.

When we look at a cross section of a tree we see rings which are arranged concentrically. There is usually considerable eccentricity which is due to the difference of growth in sun and in shade. The north and the south ends of a tree can thus be easily told by the appearance of the tree when cut. On examining one of these rings under a high power of the microscope it can be seen that there is a broad white portion and a narrow darker portion. These rings are a clue to the age of trees and are known as annual rings. In this latitude one ring is formed each year the rings being the product of alternating periods of growth and rest. As we proceed further south there is less differentiation until in the very southern latitudes many trees show no annual rings for in those regions there is no rest period. In our trees growth terminates about the first week in July, whilst in the southern countries trees keep on growing the whole year round.

We will now see if there is any way of telling the age of a tree by its size and to do this we will take two illustrations. In Conway, N. H. there is an elm which is 125 years old and which measures 8.27 feet in diameter exclusive of the bark. This gives it a diameter of 344.23 cm. in the metric system and a radius of 172.11 cm. Thus its rate of growth per year was 1.37 cm.

At New Haven we also have famous elms and one of these has a recorded age of 109 years. The diameter of this tree is 149.6 cm. including the bark, or 141.6 cm. without the bark. The radius is 70.8 cm. and the annual rate of growth is 0.65 cm.

Thus it can be seen that the rate of growth per year is very different for these two. Now it is an established fact that different trees grow at different rates, and it can be seen from the above that even trees of the same species do not grow at the same rate. The difference in the rate of growth is due to the difference in conditions and is most frequently correlated with a difference in moisture.

Saco Valley in Conway, N. H. is famous for its elms for it is a most favorable locality for this species of trees and thus the trees there grew at about twice the rate of the New Haven elm which shows about average growth. We thus see that it is impossible to tell the age of a tree by its circumference, the most reliable and practically the only way being by the number of growth rings.

We will now examine sections of different woods microscopically and thus see the minute as well as the gross differences in structure.

Transverse section of Douglas Fir (Pseudotsuga douglasu)—The growth rings are well shown here and in each ring a great difference in the size and character of the component cells is noticeable. We see on one side of the ring a large-celled, comparatively thin-walled tissue which is the spring-wood formed at the beginning of the season during active growth. Then there is a dense wood formed at the conclusion of growth, and this is the small-celled, thick-walled summer wood. Thus each ring is composed of two zones and this makes the annual rings easily visible.

Running in a radial direction we see fine lines which are the medullary rays and which radiate from the centre. These lines are very prominent in hardwoods and give the character of the grain, whilst in pines and other soft woods they are not so easy to distinguish.

In a section of White Spruce (x about 2,000) we can see the component cells very clearly and these show primary, secondary and even tertiary layers of growth in the cell-walls, i.e. in the component elements of the wood. When the wood is acted on in the manufacture of pulp by means of soda or by sulphite of lime the primary wall is dissolved and the secondary walls or cells are separated and come out as fibres. Thus this

* Lecture delivered before the Natural History Society of Montrea and published by pemission.

makes the finest paper and renders the spruce forests of great value.

In another transverse section of the Douglas fir the growth rings are seen to be much thicker. Another element is here noticeable, viz., canals which traverse the length of the wood, resin canals. In the summer woods we find cells which secrete resin, this resin being secreted either in the cavities of cells or in the cell-wall itself. In many coniferous woods, especially in spruces, pines, etc., we get openings bounded by secretory cells, the resin being poured into these openings which are the resin canals. In many cases we find the resin canal filled up with a cellular tissue which blocks the canal.

In a tangential section of the Douglas fir we see the ends of the medullary rays. We also see here how the ordinary wood cells are put together to form the wood as a whole. The wood cells dovetail into one another and this dovetailing occurs at different levels and not in a straight row. This quality gives timber its great elasticity and hence its strength. The medullary rays lie between the wood cells and thus pass through them, establishing a channel for fluids and gases from the surface to the centre of the tree. Resin canals are frequently present in the medullary rays.

HARDNESS AS DETERMINED BY STRUCTURE.

The quantity of mineral matter present in the tissue does not materially affect the hardness of the timber. Hardness depends on the quality of the cell-wall and on structure.

The cell-wall is made up of cellulose, the purest form of which is the fibre of the cotton. In the cellulose is about 44% carbon. Oxygen and hydrogen make up the rest.

On comparing the cotton fibre with other wood fibres we note differences in hardness, elasticity, etc. On examining chemically we see a modification of the fibre which is in the line of preservation from decay. The qualities of durability depend greatly on the chemical composition of the component substances. Lignification is the common method by which nature ensures durability. Lignin is the substance which is infused in the cell wall composed of pure cellulose and a lignified cell contains 65% of carbon instead of only 44%. This means greater durability, for durability of wood is synonymous with the excess of carbon. Cork, commonly known to us in the form of stoppers for bottles, is the bark of a species of oak and is the most durable plant tissue known. In cork we find 70% to 75% of carbon. Other things being equal the less lignified woods are the most resinous, the most lignified woods are the least resinous.

Coming back to the Douglas fir we find that the more summer wood, which is hard and flinty, the harder is it to saw the log. In the coarser grained varieties of the Douglas fir the summer wood is the most plentiful and that makes them hard to work. The finest grained varieties are the easiest to work and are the most valuable for appearance though not for durability.

On examing a beam of Douglas fir broken in the testing laboratory it is seen that the fracture took place along the face of a growth ring and the spring wood is thrown up in patches. The principal direction of fracture is the grain, i.e. the medullary rays, although breaks also occur at the edge of the thin-walled spring wood. The thin-walled spring wood fractured right along the line of medullary rays.

Star-shapes in seasoning, etc., are determined by the lines of the medullary rays.

In the Black Spruce (Picea nigra) we see a clear differentiation between the spring and summer wood, and we also note resin canals and medullary rays. In tangential section we see the wood cells with their tapering ends interlocking thus assuring elasticity and strength.

The Bald Cypress (Taxodium distichum) is widely used for shingles and clapboards and also for beautiful interior finish. It is one of the best woods for building purposes.

It has a broad zone of summer wood with dark cells which are resin cells, not resin canals. This gives a resinous character to the wood and the volatile compounds of the resin penetrate the whole wood and give it valuable antiseptic properties.

Common Red Cedar (Juniperus virginiana) is found greatly in Ontario in the region of the great lakes. The spring wood is very wide and shows scattered cells.

A transverse section of Red Sequoia (Sequoia sempervirens) shows dense summer wood and spring wood with specialized resin cells. We also see resin sacs which are distinguished from resin canals by being very much shorter for they are not much longer than broad. These resin sacs may be produced as a result of injury which is a curious fact. The cells of the medullary rays are very large and very open.

White cedar (Thuza occidentalis) is used greatly for fence posts, telegraph poles, etc. The summer wood here is very thin, and this gives the tree its very workable properties with the saw, etc. This is a quality of soft, uniform grain. Resin cells are scattered through the wood, which is often fine grained.

In white pine (Pinus strobus) there is a predominance of fine spring wood, and here even the summer wood is thin-walled. Hence the wood is very workable.

The summer wood in larch or tamarack (Larix Americana) is broad and the whole structure is flinty. Thus the wood is very unequal and of very hard grain.

Common poplar (Populus tremuloides) is a soft wood. The whole wood is very open and porous. We find that there are large vessels here which convey fluids and gases from the roots to the leaves. In the coniferous woods no such vessels were present for the constituent cells served this purpose. They also served mechanical purposes.

In the broad leaved trees (woods) there is specialization for mechanical and for conductive purposes. The small cells are the mechanical elements. The large vessels serve for conduction. In the vessels air is present for the most part, the water forming a thin layer between the wall of the vessel and the contained air. We often find intrusive cells in these vessels, of the same nature as those mentioned above for the resin canals, and these intrusive cells block up the vessels. The mechanical cells are very fibrous.

The willow (Salix alba) is softer than the poplar because of the larger size and the greater number of the vessels.

In white oak (Quercus alba) the vessels are of

enormous dimensions. The wood cells are much more devoted to mechanical purposes than in the soft woods, such as the poplars and willows. The cavities of the cells are nearly obliterated by the great secondary thickening of the cell walls in certain patches. Mingled with these are cells with larger cavities. This explains the unequal grain of the oak. The vessels become filled with intrusive cells, and when this occurs they become functionally useless and are only of service as a means of support and strength. In the white oak there are vast numbers of medullary rays of ordinary size, but every now and then we have very prominent medullary rays, and this is important in cabinet work. This gives the quality of quartered oak.

Red oak (Quercus tinctoria) is a wood of far more uniform grain than the last. The vessels are more uniform and smaller. Although the wood is of much closer grain it is more workable. We have medullary rays of one row of cells and now and again very broad rays.

The live oak (Quercus virens) of the Southern United States is very hard, and was used greatly for shipbuilding before iron came into use.

We thus see that different qualities of hardness and durability depend partly on chemical and partly on structural properties.

MONTREAL NOTES.

Whilst the official figures of the Building Inspector's office give the value of building carried out in 1906 as somewhat over $8,000,000, the annual report of the Builders' Exchange reckons this as a merely nominal figure, representing about 60 per cent. of actual value, which it estimates somewhat enthusiastically at about $15,000,000. However this may be, activity in building certainly continues to be rapidly increasing, and prospects for the coming season would appear to be good. In the down-town section, the Light, Heat & Power Company's building, the Royal Bank, the Macintyre building, Mark, Fisher & Company's building, and the Canadian Transport Company's building are amongst those whose structures are in a fairly completed state, and will probably be in occupation before the close of the summer. Of new buildings likely to be soon under way in that quarter, some of the principal are: The new Eastern Townships Bank, at the corner of St. James' street and Victoria square, and a new building for the Credit-Foncier, at the northeast corner of St. Lambert Hill and St. James' street, to be a fireproof structure fifty or sixty feet high, with two main fronts, 100 and 90 feet long respectively, in Indiana limestone, Messrs. Cox & Amos being the architects. The Jas. Coristine Company are to build a seven-storey office block on Lemoine street, to cost about $82,000. Mr. H. C. Stone is the architect, and Mr. C. E. Deakin the contractor.

Up-town Drummond street seems to be much in view for new buildings. Emmanuel Church is there approaching completion. Almost directly opposite the Natural History Society are in the possession of a fine site and are making arrangements for the erection of a new museum. The Y. M. C. A., who will probably very soon be quitting their premises in Dominion Square to make way for in view for their new quarters. They are said to be a great hotel, have also a site in Drummond street having plans prepared in the States, therein adhering to a somewhat antiquated tradition which they ought to have good reason to mistrust. In University street the Ross Realty Company are to erect a new apartment house on a lot above Sherbrooke street, and which has the property of McGill University adjacent in the rear. This is quite nice for the apartment house, but one would like to see McGill University in possession of the whole of this block. The University, however, is not in affluent circumstances financially, and is strenuously endeavoring at present to obtain benefactions to make up for the annual excess of expenditure over revenue and to make its buildings adequate to its enterprises.

The W. Henry Bell Furnishing Company has leased the building at the corner of St. Catherine street and Peel street, and is to remodel the interior. A little farther east the Royal Bank is to erect a new branch office, and the season will see the completion of the St. Catherine Street Branch Postoffice.

The Prince of Wales Fusiliers are to erect a new armory on Esplanade avenue, facing the park.

In regard to the loss of life by fire which recently occurred at the Hochelaga Protestant School, many criticisms have been offered of the laxity of authority over such matters. What was said in these notes with regard to a disaster occasioned some time ago by the falling of a tank can only be repeated. We have the outline of an organization; it remains to fill it up efficiently, to give due assistance and authority to the office of the Building Inspector.

P. Q. A. A. SKETCHING CLUB.

On February 13th Mr. Philip Labee, electrician, addressed the Sketching Club on the subject of "Electric Installation." Mr. Labee defined the terms in use and explained the relationship of pressure and resistance. He enumerated the various ways in which electric energy expended itself in ordinary installations, pointing out that a low percentage of loss of energy was not the all-important consideration some people were apt to imagine. The benefits of inspection were insisted on, and the awkwardness arising from changing standards and rules and from the want of a uniform national standard. The lecturer then reviewed the ordinary requirements of house and office installations, pointing out the advantages of easily accessible main switches, metal conduits and other provisions. In conclusion, he pointed out how desirable it was from the electrician's point of view that an architect calling for tenders should have outlets and switches marked in red ink, not only on his own copy of the plans, but on that from which the estimate had to be made up. A table of outlets and switches attached to the specification was also desirable.

On February 20th Mr. J. P. Anglin read a thesis on the development of the Corinthian Capital, illustrating the theme by more than eighty drawings and photographs, besides lantern slides. The sequence included Egyptian prototypes, the early examples of Greece, the fully developed types of ancient Rome, and the variations of the Renaissance, with related forms occurring in Byzantine and Gothic architecture.

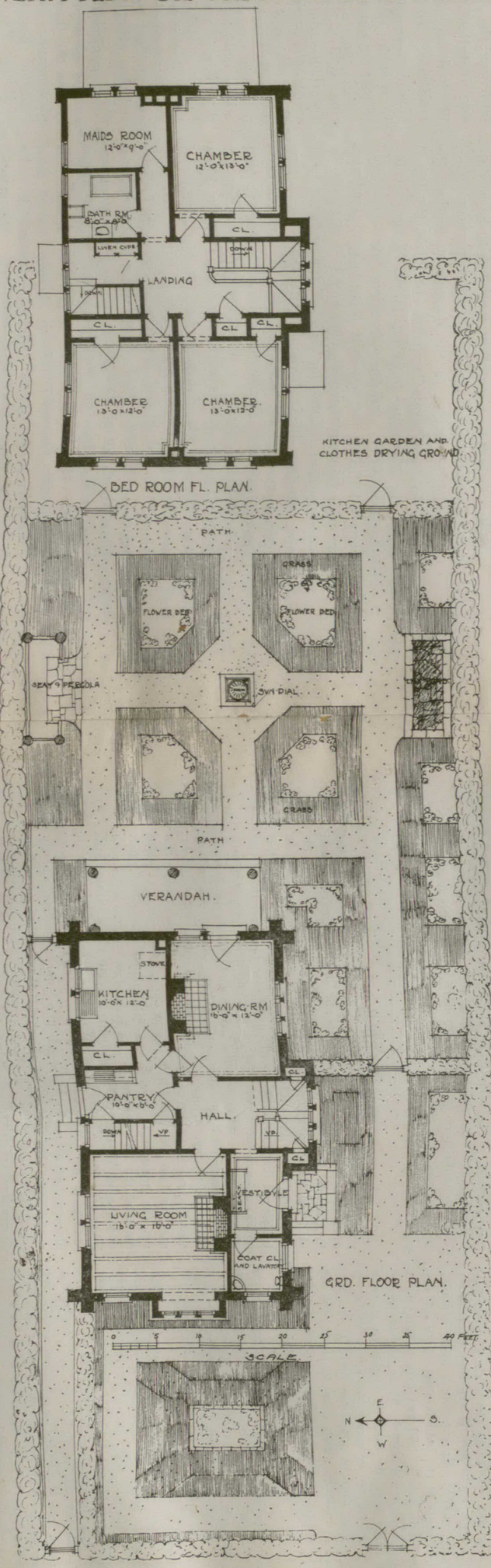
Mr. Byers, on February 27th, described a three years' ramble in Europe, illustrating his route with numerous slides, prepared from his own negatives.

On March 6th a series of slides illustrating Scottish domestic architecture, lent by McGill Univeristy, was exhibited and discussed at large.

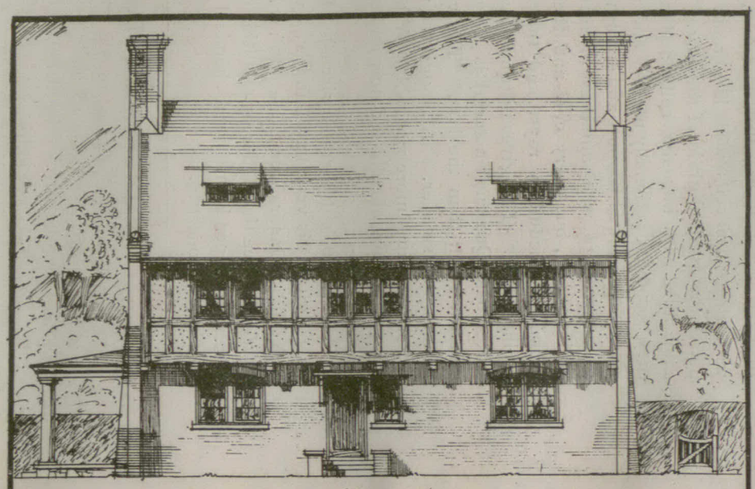
CANADIAN ARCHITECT AND BUILDER COMPETION

FOR A SMALL SUBURBAN TOWN HOUSE

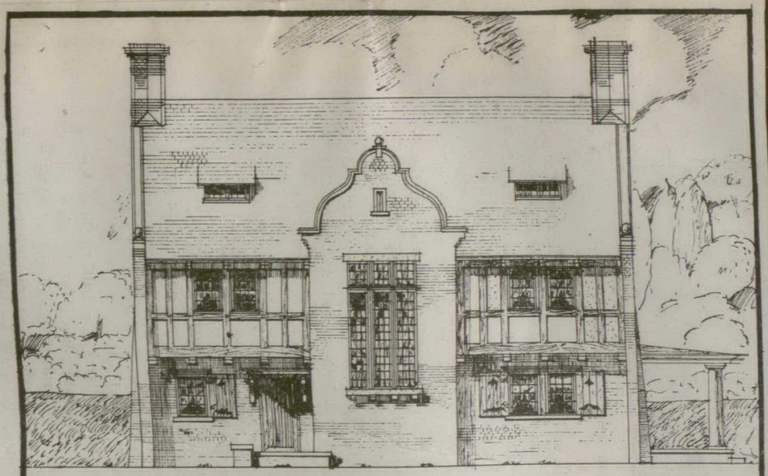
SUBMITTED BY "SIR CHRISTOPHER WREN"



PERSPECTIVE



NORTH ELEVATION



SOUTH ELEVATION

EAST ELEVATION

[NOTE.—Contributions suitable for publication in this Department are invited from subscribers and readers.]

MINING AND PREPARATION OF MATERIAL.*

By J. S. McCANNELL.

In dealing with a subject of this description it is not my intention to do more than mention a few of the many ways in which clay and like products are handled and prepared for manufacture. Hardly any two plants have the same way of preparing material, owing to the different formations and locations of the raw product.

In some European countries the material is taken from the beds of rivers. We read of the London brick makers obtaining their supply of sand from the bottom of the River Thames, where it is raised into boats made for the purpose.

The Dutch clinkers or paving bricks, which have been famous for centuries, are manufactured from the slime deposited by the river on its shores and at the bottom. This is collected by men in boats, who have long poles with a cutting circle of iron at the end, also a bag net with which they draw up the slime. This is mixed with sand to make the pavers.

The manner of taking material for brick making from the bottom of rivers and lakes with poles is not of modern origin, as will appear from the following inscription which stood upon the brick pyramid near Cairo, the translation being as follows: "Do not undervalue me by comparing me with the pyramids of stone, for I am better than they as Jove exceeds the other Deities. I am made of brick from clay brought up from the bottom of the lake adhering to poles." So we see that the ancients realized that clay brick was then, as it is now, the best and most durable building material.

In getting the material out in its raw state a great deal depends upon its location as to how it can best be handled. Much of the soft clay must be dug out with a spade and handled with horses and carts if the haul is close, or if the distance is great a track is usually laid and cars holding from a yard to a yard and a quarter are used. These may be hauled by a horse, or a cable may be used by attaching it to a drum and hauling the car up by means of power from the engine. Electricity may also be used for hauling up cars by means of a storage battery. This kind of power will no doubt be used extensively in the near future, when we get properly hitched on to Niagara Falls, or use water power in our own counties.

Where the material is hard enough to blast, dynamite is used for blowing out the clay or shale, which is loaded on cars or carts by hand or by means of a steam shovel.

In mining clay it is very important if possible to get natural drainage, so as to avoid the necessity of pumping out water in the wet season.

As you all know, in the treatment of clays there is a great deal of difference in the preparation for the machine. Some clays will go direct to the pug mill, and others having stones and other impurities must be put through separate machines for the removal of these impurities. In the case of our own material, which is almost all a shale, we put everything through our dry pans, which are five in number, before the clay is ready to go to the hoppers. In the case of the stiff mud bricks we feed the dry clay, which has been first put through the dry pan, to our pug mill, where it is tempered to the proper stiffness before being made into bricks. With our dry press bricks the clay is tempered in the dry pan ready for going to the brick machines, by means of a small spray of water.

Another means by which the material is frequently brought in from the clay pit is by means of the aerial wire rope tramway. This system is used in several large plants. The wire rope over which the tramway buckets travel is supported by wooden towers. The buckets make a complete circuit of the tramway, the loaded buckets travelling from loading terminal to discharging terminal upon the wire cable, and after discharging its load the bucket continues around a terminal sheave wheel and proceeds upon a second track cable on the other side until near the loading station, where it is automatically detached from the traction rope by means of the automatic clip arrangement, and this clip passes on to the bucket just ahead, which has just been loaded, and picks this bucket up and carries it on in the same way as the preceding one.

A great deal has been said and written about weathering clay before it will make a good brick. This is something that actual tests alone can determine. Of course, some materials must be dried out before they can be ground up. Our own experience with our shale is that we can make better brick direct from the bank than by any other way, owing to the fact that the moisture is more uniform when the clay is fresh than if it were partly dried out.

A steam drill is used in many plants for drilling the holes into which the dynamite charges are placed for blowing out the shale or clay. In our plant we use hand drills, which make holes to the bottom of the beds which we wish to blow out. A dozen or more of these holes are exploded at once by means of an electric battery, and this will supply clay for several days' run.

I might add that while in tempering and preparing the raw material it is very important to have the water and clays mixed in the right proportion, this will not necessarily make good bricks. It requires to have mixed with it an experience and skill which is acquired only after using a good deal of that grey matter called "brains."

*Paper read at the convention of the Association of Canadian Clay Products Manufacturere, Toronto, December 12-14, 1906.

MARBLE.

Looking backward into history we find the faddist who discovered a use for the various colors and shapes of marble found in Greece, Italy and Asia and he made such good use of his skill and discoveries that the sight-seer of to-day will go around the world to see and study the handiwork of the artist and thus brings out the thought that without the raw material the artist could not have shown what was in him and that is why Carrara marble quarries are famous and have been instrumental in making Florence and Rome show places of the world. As we look about us to-day, in our own country, the public building, the hostelry, the home is made more charming and attractive by the molding into shape and form the marble of America and while yet the quarries of Europe are still called upon to furnish material the development in the past few years of marble deposits in Vermont, Georgia, the Pacific Coast States and other sections has led to a portrayal of the wealth of beauty in marble in our own country and all we need to become a show place and educator of the world is to use our brain and energy to originate by the use of the skill that we find in our own people and promote the use of our own products in the interior decorations and educate ourselves to acceptance of the artistic and then we have our commercialism which is commented on so much, sugar coated and made easy to adminster and take.

The business of the late Mr. Thos. Hanley, of Port Arthur, has been taken over by Mr. H. R. Halton and Mr. John Hanley, who will continue under the name of Hanley & Halton. Both men have had considerable experience, and already have a large amount of work on hand.

BUILDING-UP HINTS FOR BUILDERS' EXCHANGES.

By J. H. Laurer, Secretary Montreal Builders' Exchange.

By courtesy of the editor of The Canadian Architect and Builder I have been invited to make a few suggestions for the benefit of the various Exchanges throughout the Dominion in general, as to the best methods by which to build up the membership in Builders' Exchanges.

The first difficulty to contend with is the general apathy of contractors and their failure to realize the value of co-operation. When the remarkable results achieved by organization of workingmen are considered for a moment, none but a wilfully blind person could deny the enormous power of co-operation, locally, provincially and nationally. Employers act as isolated units, refuse concerted action, prefer to "run their own business," and then fall easy victims individually to any union demands, however extravagant. The employee contributes his weekly quota to his union, far greater in proportion than the trifling dues charged by employers' associations; while the employer despises or thinks himself superior to the very means which have proved beyond argument the strength and power of his own employees. If organization is good for the worker it must at least be equally good for the employer. Surely every intelligent employer (and we will assume that their intelligence is at least equal to that of their employees) must see that the labor vote to-day controls Parliaments in Great Britain, Australia, New Zealand, and is even being wooed with pathetic—however insincere—protestations of devotion by Liberal and Conservative alike here in Canada; while the employers' vote, because weak, shiftless and disunited, is absolutely ignored.

Suggestion 1.—Impress upon contractors the need of acting in trade matters as a unit; let them adopt a consistent policy, similar to the Canadian Manufacturers' Association, acting in unison throughout the Dominion in promoting or opposing legislative measures which are constantly being exploited, both provincially and federally, and their annual fee will be saved many times over by having their representations respected at headquarters.

In labor problems, lay down general principle of action. Have a definite programme to face labor troubles, and live up to it. From experience, both here and elsewhere, the writer is more than ever convinced of the value of the "open shop" principle as the most just and unassailable position for contractors to adopt.

Suggestion 2.—Take in the "Open Shop" (Union Trust Building, Cincinnati, Ohio) for your reading room, and act upon its suggestions.

Then there is the vexed question of price-cutting and cut-throat competition. Combines are illegal; but common sense will surely appeal to every contractor to realize that no individual can expect to do all the work; there is enough to go all round without sacrificing legitimate profit. The better class of contractors will refuse to cut down their carefully-figured estimates at the behest of certain architects because of alleged or imaginary lower prices of other competitors, and the best architects will equally refuse to lend themselves to hawking tenders given in confidence all over town with the idea of "scalping" prices.

Suggestion 3.—Print and circulate a high standard of a "Code of Practice." People won't live up to it all at once, but gradually it will make itself felt. Put yourself in touch with your local Architects' Association and insist (1) that bulk and separate tenders shall not be called for on the same job; (2) that general contractors in submitting tenders shall be required to state their sub-contractors at the time, and if these are satisfactory to the architect they shall not afterwards be allowed to be changed. The reason for this is obvious. The curse of contracting to-day is "trading on sub-bids."

To build up the membership of your Exchange you must show contractors that it is an advantage to be organized in such an association. Naturally at first you will have more contractors outside than in. Endeavor first to secure the men who have the work. Enthusiasm is necessary for success. Start with your directors; induce them to secure the good-will and adhesion of their colleagues outside; when you have secured the "men who count" the others will follow; appoint an influential "Admission Committee," who are workers, to canvass likely or desirable contractors outside; hold weekly meetings of this committee to report and follow up. Don't be afraid of printers' ink; nothing can make money without advertising except the mint.

Suggestion 4.—A large admission fee is not desirable (if any). The annual dues should not be too cheap; a thing is appreciated at its cost, and what costs little is valued accordingly.

A feature which has put new life into many Exchanges is the permanent exposition of building materials. The writer is strongly in favor of this extension of the permanent usefulness of the local Exchange, which has the advantage of making it valuable to property owners, architects and the general public alike.

Suggestion 5.—Correspondence is strongly urged with the secretaries of the following successful Exchange exhibits, to whom the writer gladly acknowledges many courtesies:—Philadelphia, Pittsburg, Baltimore and Cleveland, where plans, rents and other details can be obtained first-hand.

There is, of course, the "personal equation" of the secretary; he must not be one to sit in his office and expect members to grow up like mushrooms in a night, or he will expect in vain. If he is one to look for work and go after it he will not look in vain and will find plenty to keep him busy.

There may be many other and better suggestions from secretaries of longer and wider experience; these fugitive remarks are rather in the nature of hints than an attempt at an exhaustive analysis of so wide a topic. The writer has made no mention of an attractive reading room, with telephones and needful accommodation for stationery, as well as the absolute necessity of keeping a daily record of "advance notices" of all new work coming out or in course of construction, for the simple reason that these form the essential elements of any Exchange worthy of the name.

CEMENT AND CONGRETE

[NOTE.—Contributions suitable for publication in this Department are invited from subscribers and readers]

PRESERVATION OE STONE, CONCRETE AND CEMENT BY METALLIC COMPOUNDS OF SULPHUR.

A patent has recently been taken out on the continent for the preservation of stone, concrete and cement by a new process, based upon the employment of sulphur, pure or compounded, with the metallic salts. It may be noted that all the processes which have been previously introduced can be placed in two distinct groups—namely—the first group or class—for covering the body under treatment with a coating or burnish which will preserve it from all external influences.

The second group of class—for impregnating the body under treatment with antiputrative salts which will fill up the intercellular spaces, and thereby prevent all decomposition or alteration.

The first method has been considered insufficient when the blocks or pieces of stone, concrete or cement have been exposed to any mechanical action which is likely to injure the coating or burnish, because then the climatic action is just as likely to act upon the material, destroying it as if it had never been treated with any one of the chemical compounds. It has also been observed that when the body has been exposed to the action of certain acids or alkalies, which are likely to attack the coating, that this first method is then quite useless.

The second method is much more satisfactory, since, by reason of the fact that it fills up the spaces or pores, and penetrates the mass generally, it forms a conjunction of very superior qualities. Notwithstanding this latter recommendation, this method also has its defects, because, in the evaporation which necessarily follows, parts of the dissolved bodies which have been employed in the impregnation of the materials are re-dissolved and so carried off, leaving spaces or pores which are apt to be attacked in the course of time by various climatic or atmospheric compounds.

The process which has recently been introduced tends to avoid these various disadvantages, as well as to improve the material under treatment. Sulphur possesses very many advantages which contribute, in addition to the preservation of the stone or other matter, to give it a greater hardness and firmness. Its fusion temperature is about 115 degrees C., or 240 F., and the stone or concrete at this temperature does not alter, only losing the intermolecular water, which is replaced by the sulphur or sulphur compounds.

Its low mechanical resistance and its great fragility have been the reasons why it has not been before used for the above purpose, but seeing that stone, whether natural or artificial, may be said to possess a number of qualities which sulphur lacks, it has been discovered that, when thoroughly impregnated, a resistance is formed, which, in practice, has been found to give very good results. The process which is being followed for impregnating the various bodies with sulphur consists in melting the latter in a vessel heated with steam and maintained at a temperature of 140 degrees C., or 284 degrees F. The material to be treated is then completely submerged in this bath, and when the water which is contained in it is entirely evaporated, the sulphur is substituted, filling up, in this latter process, all the spaces or pores.

BOND BETWEEN CONCRETE AND STEEL.

The following conclusions are a series of tests by Mr. Todd Kirk, at the University of Illinois:—

Little difference is found in the bond resistance per square inch of surface of bar in contact with the concrete, whether the bar is embedded 6 or 12 inches. Evidently a length may be found beyond which the stretch of the steel would cause uneven distribution of the bond stress along the length of the bar and cause failure to begin at the point of the greatest stress in the steel and thus give results not representative of the real bond resistance This limitation applies to length for use in experimental tests of bond. In simple beams the bond stresses are applied along the length of the bar, and stretch and bond exist together.

The richer mixture of concrete gives somewhat higher bond resistance than the leaner, the values for the 1.2.4 concrete averaging, say, 10 to 15 per cent. higher than the 1.3.5½ concrete. For plain round mild steel rods, the average for the bond resistance ranges from 350 to 450 pounds per square inch of contact surface.

Flat bars gave much lower resistance than round bars. Only three tests were made with flat bars, and these may not be representative. It should also be noted that the results with flat bars are much lower than tests made elsewhere. It should also be noted that for a bond stress of 125 pounds per square inch the tensile stress developed in the bar was only 9,000 pounds per square inch.

The value of bond resistance will depend upon the smoothness of the surface of the bar, the uniformity of its diameter and section, the adhesive strength of the concrete, and the shrinkage grip developed in setting. The effect of smoothness of surface and uniformity of diameter and section is seen in tests made with cold rolled shafting and tool steel. The average bond developed with cold rolled shafting and tool steel was 147 pounds per square inch of contact surface, as compared with about 400 pounds for ordinary plain, round, mild steel rods. It should be stated that not only was there a very noticeable difference in the smoothness and finish of the surface of the rods, but the section of the cold rolled shafting and tool steel was very uniform, the diameter not varying more than 0.0001 or 0.00002 in. at one-quarter inch intervals throughout the length, while mild steel rods will vary as much as 0.0015 in. It is to be expected that the smoothness and uniformity of section of drawn steel wire will operate to give low values of bond resistance, though, of course, as the section of wire is small compared with the circumference, the bond stresses developed when wire is used are relatively small. Attention is called to the fact that in the reinforced concrete beams tested at the University the bond stresses developed in beams failing by tension of the steel, diagonal tension of the concrete or other similar methods, amounted to from 73 to 193 pounds per square inch

In these tests the bars began to slip when the maximum load was reached. After slipping began, the resistance to motion was still considerable. This running friction, taken when the bar had moved about one-quarter inch, amounted to 54 to 72 per cent. of the bond developed in the case of mild steel bars, and to 32 to 49 per cent. in the case of the cold rolled shafting.

OUR ILLUSTRATIONS.

SHEPPARD APARTMENTS, JARVIS AND CHARLES STREETS, TORONTO.—BEAUMONT JARVIS, ARCHITECT.

The construction of these buildings (being eleven in number, 18 feet wide and 60 feet deep) is of Monolithic reinforced concrete. The greatest thickness of division walls is 4 inches in basement and continuing through roof the same thickness. Quarter inch rods were used 2 feet apart, isolated reinforced concrete piers 12″ x 12″ 14 feet apart; with 12″ x 12″ reinforced girders on top at each floor to carry the joists. The Jarvis and Charles street fronts are also a monolith, the casting being done in position on the works and as there is considerable repetition of arches, columns, etc. the expense of moulding forms was very small.

When it is remembered that there are 22 suites of apartments in this block, the cost, which is estimated at $45,000, seems reasonable.

DESCRIPTION OF DESIGN SUBMITTED BY "SIR CHRISTOPHER WREN," MR. CECIL BURGESS, MONTREAL, IN COMPETITION FOR A SMALL SUBURBAN HOUSE.

A type of dwelling, such as might be seen in an English suburb, has been selected as a suitable solution of the problem. The exterior being carried out in red brick set in Flemish bond and half timber work with "Rough Cast" plaster on metal lath and a greenish tint given to a shingle roof.

The window heads throughout ground floor to have pent eaves of red tile, all other window heads to be made of 4″ brick arches.

It is proposed to have a basement about 7′ to 8′ high under entire house, basment to contain coal bunkers, furnace room, laundry, kitchen, larder and one sleeping room and toilet room either for gardener or maid.

The living room on ground floor will have wood wainscoting and dark green stained burlap panels and beamed ceiling. The finish of this room will be of natural oak.

All other rooms on this and bedroom floor to be finished in white wood, enamel painted.

The floors throughout living room to be hardwood and the basement floor to be cemented.

The bathroom will have a Keene's cement dado and jointed to imitate tile and will be white enamel painted.

ALBERTA ASSOCIATION OF ARCHITECTS.

Following are the provisions of the Act assented to by the Legislature of Alberta on May 8th, 1906, incorporating the above Association:—

Whereas it is deemed expedient for the better protection of the public interests in the erection of public and private buildings in the Province of Alberta, and in order to enable persons requiring professional aid in architecture, to distinguish between qualified and unqualified architects, and to ensure a standard of efficiency in the persons practising the profession of architecture in the Province, and for the furtherance and advancement of the art of architecture;

And whereas the persons hereinafter named have, by petition, set forth that it is desirable that they, together with such other persons as may be hereafter associated with them, be incorporated by the name of "The Alberta Association of Architects," having for its objects the acquirement and interchange of professional knowledge amongst its members, and more particularly the acquisition of that species of knowledge which shall promote the artistic, scientific and practical efficiency of the profession of architecture;

Therefore, His Majesty, by and with the advice and consent of the Legislature of Alberta, enacts as follows:

1. This Act may be cited as "The Alberta Architects Act."

2. R. Percy Barnes, Edmonton; H. A. Magoon, Edmonton; Jas. E. Wise, Edmonton; F. Deggendorfer, Edmonton; E. C. Hopkins, Edmonton; H. D. Johnson, Edmonton; W. M. Dodd, Calgary; W. Stanley Bates, Calgary; Gilbert Hodgson, Calgary; J. Llewellyn Wilson, Calgary; G. M. Lang, C.E., Calgary; K. G. Gorden, Calgary; F. J. Lawson, Calgary; J. J. O'Gara, Calgary; Alex. Pirie, Calgary; James A. Macdonald, Lethbridge; Wm. S. Williams, Medicine Hat, and all other persons who may be hereafter associated with them, shall be, and are hereby constituted a body politic and corporate under the name of "The Alberta Association of Architects" hereinafter referred to as the "Association."

3. The said association shall have power:

(1) To acquire and hold all lands and property necessary and required, in order to carry out the objects and purposes for which incorporation is sought, and to alienate the same at pleasure and others to acquire;

Provided that the annual value of the real estate, held at any time for the actual use of the association, shall not exceed five thousand dollars; and the said association shall also have power to sue and be sued, and implead in their corporate name.

(2) To make and pass by-laws in accordance with this Act, for the direction and management of the association; the admission to the study and practice of the profession of architecture, and all rules that may be deemed necessary for the maintenance of the dignity and honor of the said profession, and alter or amend the same when deemed advisable; provided that no such by-laws or amendments thereto shall be valid or take effect until approved by the Lieutenant-Governor-in-Council.

4. The head office of the association shall be in the city of Edmonton.

5. The said association shall be governed by a council, hereinafter referred to as the "Council," consisting of a president, two vice-presidents, (1) a secretary and a treasurer, and six members, all of whom shall be members of the association and shall be elected annually in the manner provided for in the by-laws of the association.

The first council to consist of the first eleven persons named in the first section of this Act; and they shall hold office until their successors are elected.

6. The said council shall meet at the city of Edmonton within one month after the incorporation of the association for the purpose of organization.

They shall make such by-laws as may be necessary for the government of the association, subject to ratification at the first annual meeting of the association.

7. The council shall, through their secretary, give notice in The Alberta Official Gazette of the completion of its organization: whereupon any person practising the profession of architecture within this Province, on the coming into force of this Act, shall, upon payment of the proper fees in their behalf, become a member of the association.

(2) Any person who had regularly attended an architect's office during four years, at the time of the coming into force of this Act, shall be entitled to be registered as a member of the association by observing the above formalities.

The council may also admit to membership all members of associations of architects in the sister Provinces, also members of the Royal Institute of British Architects, and of foreign associations of architects of equal standing, on their presenting their credentials, upon payment of the proper fees, and the Lieutenant-Governor-in-Council may, at any time, by Order-in-Council, declare any association of architects to be an association whose members shall be admitted to practice under this section.

Architects not members of these associations, who shall have practiced for five years, shall be admitted without serving as students, but shall be required to pass the final examination.

8. Any other person who applies for admission to registration as an architect, after the coming into force of this Act, shall not be less than twenty-one years of age, and shall have served as a student not less than four years with a principal or principals, entitled to register under this Act, or with any other principal or principals approved by the council, and have passed such qualifying examinations as may be required

by the by-laws of the association, except in cases provided for by this Act.

9. The council shall admit, as student associates, those desirous of entering the profession of architecture.

Candidates must give one month's notice to the secretary, giving their full names.

They shall pay such fees and submit to such examinations as shall be necessary in that behalf.

Graduates in arts, sciences and letters of any university in His Majesty's Dominion shall not be required, however, to pass any preliminary examinations;

Provided that any person who, before the passing of this Act, was entered as a student for a shorter term than five years, but not less than three years, with a principal or principals, approved by the council, shall, on serving the full time of his indenture and passing the examinations prescribed by the council, be entitled to register under this Act.

Notice and evidence of existing studentship shall be given to the secretary within six months after the passing of this Act and shall be accompanied by such fee as the council shall, from time to time, direct, and by proper certificate of such studentship.

Upon and after the passing of this Act, students shall serve such term as is required to be served by the provisions of this Act, under indenture to a registered architect, which indenture and any assignment thereof, with affidavit of execution thereto attached, shall be filed with the secretary upon payment of such fee as the council may by regulation direct.

The council may shorten the period of studentship to a term, however, of not less than three years in favor of graduates of any recognized college or school of architecture or technology.

The council shall admit after sufficient examination every graduate of a recognized school of architecture or technology after one year's study, under a principal approved by the council, provided the course of studies followed by such candidate shall have been not less than four years.

10. The council shall appoint an examiner or examiners for the purpose of ascertaining and reporting on the qualification of all persons who shall present themselves for admission to the study or practice of architecture, such examiners to be approved by the Minister of Education.

The council shall also prescribe the subjects for such examination, which shall take place in January and July on the days previously fixed and advertised by the council.

11. The council shall fix a tariff for the services of members which, when approved of by the Lieutenant-Governor-in-Council and published in the Official Gazette, shall be accepted in all courts of law as evidence of the value of such services, except there is an agreement in writing.

12. The time and place of the annual meeting of the association and of special meetings thereof, and for meetings of the council, shall be fixed by by-laws, also the mode of summoning and conducting the same.

In the absence of any rule or regulation as to the summoning of meetings of the association or of the council, it shall be lawful for the president, or in the event of his absence or death, for the secretary, to summon the same at such time and place as to such officer seems fit, by circular letter to be mailed to each member.

13. After the expiration of six months from the publication of the notice of the organization of the council of the said association, no person can take or make use of the name or title of architect, either singly or in connection with any other word, name, title or designation, giving it to be understood that he is an architect under this Act, unless he is registered under this Act as a member of the said association.

Any person who, after the time above mentioned, not being registered as a member of the said association, takes or makes use of any such name, title or designation, as above mentioned, shall be liable upon summary conviction, to a fine not exceeding twenty-five dollars for the first offence, and not exceeding one hundred dollars for every subsequent offence.

In any prosecution hereunder the burden of proving that he is registered under this Act shall rest upon the accused.

14. The secretary shall, in every year, cause to be printed, published and kept for inspection at his office free of charge, under the direction of the council, a correct register of the names in alphabetical order according to the surnames, with the respective residence of all persons appearing on the general register on the first day of January in every year, and such register shall be called the "Architects' Register," and a copy of such register for the time being, purporting to be so printed and published as aforesaid, shall be evidence in all courts and before all justices of the peace, and others, that the persons therein specified are registered according to the provisions of this Act;

Provided always that in case of any person whose name does not appear in such copy under the hand of the secretary, the entry of the name of such person in this register shall be evidence that such person is registered under the provisions of this Act;

The secretary shall keep a similar register of student associates.

15. Members and student associates shall pay on such registration an annual fee as shall be required by the by-laws.

The names of those in default shall be removed from the respective registers by the secretary, after one month's notice to the parties, and shall not be re-inserted except upon the payment of all arrears and such fine (if any) as may be imposed by the by-laws of the association.

16. The council may direct that a name be removed from the register in the following cases (that is to say), at the request or with the written consent of the person whose name is to be removed, or where the name has been incorrectly entered, or where a person registered has, after the passing of this Act, been convicted, either in His Majesty's dominions or elsewhere, of an offence which, if committed in His Majesty's dominions, would be punishable by imprisonment for five years or more, or where a person registered is shown to have been guilty after his registration, either in His Majesty's dominions or elsewhere, of any conduct or breach of the by-laws, orders or regulations, of "The Alberta Association of Architects," or of conduct infamous in a professional respect.

When the council shall have removed the name of any person from the register, the name of that person shall not be again entered upon the register, except by a resolution of the council or by an order of a court of competent jurisdiction.

The council may, by resolution, direct the secretary to restore to the register any name removed therefrom either without fee or upon payment of such fee not exceeding the fees in arrears or unpaid, and one additional renewal fee as the council may, from time to time, fix; and the secretary shall restore the name accordingly.

The name of any person removed from the register at the request of such person, or with his consent, shall, unless it might, if not so removed, have been removed by order of the council, be restored to the register, on his application and on payment of such fees not exceeding such fees as shall be in arrears, and one additional registration fee, as the council, from time to time, may fix.

In the event of removal or expulsion an appeal shall lie to the association which, at a general meeting, may reverse the decision of the council.

17. Subject to the other provisions of this Act, all notices and documents required by or for the purpose of this Act to be sent, may be sent by post, and shall be deemed to have been received at the time when the letter containing the same would be delivered in the ordinary course of the mail; and in proving such sending, it shall be sufficient to prove that the letter containing the notices or documents was prepaid and properly addressed and registered and put in the post.

Such notices and documents may be in writing or in print, or partly in writing and partly in print, and when sent to the council or other authorities, shall be deemed to be properly addressed if addressed to the said bodies or authorities, or to some officer of the council, or authority, at the principal place of business of the council or authority, and when sent to a person registered under this Act, shall be deemed to be properly addressed, if addressed to him according to his address registered in the register of this association.

18. All moneys arising from fees payable, on registration or the annual renewal fees, or from sale of copies of the register or othewise, shall be paid to the secretary of the council, and by him paid over to the treasurer, to be applied, in accordance with such regulations as may be made by the council, for defraying the expenses of registration, and the other expenses of the execution of this Act, and, subject thereto, towards the support of museums, libraries or lectureships, or for other

public purposes connected with the profession of architecture, or towards the promotion of learning and education in connection with architecture.

The council shall have power to invest any sum not expended as above, in such securities as shall be approved by the Government of the Dominion of Canada or of the Province of Alberta, in the name of the body corporate and to change the same at will, and any income derived from such invested sums shall be added to and considered as part of the ordinary income of the association.

The association may also use surplus funds or invested capital for the rental or purchase of land or premises, or for the building of premises to serve as offices, examination halls, libraries, museums, or for any other public purpose connected with architecture.

19. It shall be the duty of the secretary to keep the register in accordance with the provisions of this Act, and the by-laws, orders and regulations of the council.

All deeds of the association shall be signed by the president and secretary and sealed with the common seal of the association.

Nothing in this Act shall authorize the association to impose any fees higher than the following:—

Admission as student associate	$20.00
Each examination	10.00
Annual fee	15.00
Admission to practice	25.00
Fines	5.00

HOW A FIRM OF ARCHITECTS GOT IT'S NAME ON A BUILDING.

Close observation on the part of a newspaper man in Boston several years ago revealed a striking device employed by the firm of McKim, Mead & White, the noted New York architects. The device, says the Pittsburg Gazette-Times, was an acrostic of names famous in history, literature and art by which the firm's name was to be engraved on the Boston Public Library. As may be observed, the arrangement defied literature, history and philosophy in arrangement, and this was the thing that attracted the newspaper man's attention. The names were conglomerated from all nations and ages into a seemingly neat ornamentation for the fine building. Beginning at the top of a space to be devoted to names famous in the world in various lines were the following:—

Moses,
Cicero,
Kalidasa,
Isocrates,
Milton.

These names, through their initials, formed the first part of the acrostic, spelling plainly "McKim." A slight space appeared before the next list of names, which was:—

Mozart,
Euclid,
Aeschylus,
Dante.

The initials of these names brought out the second name of the firm, "Mead." Another slight space, and the following names appeared:—

Wren,
Herrick,
Irving,
Titian,
Eramus.

Here was the name "White" also engraved, the whole device bringing out the firm name of "McKim, Mead & White" in connection with the world's famed men. It was in 1890, just before the building was completed, that the discovery was made and published. The list of names was changed.

CIVIC IMPROVEMENT IN TORONTO.

The Toronto Guild of Civic Art has decided to employ Sir Aston Webb, the celebrated English architect, to examine and advise with regard to the plan which the Guild has had prepared for the improvement of the city. The main feature of this plan is the construction of two thoroughfares running diagonally from the centre of the city in a northwesterly and northeasterly direction to the city limits. The Guild has appointed a committee to raise the sum of $5,000 to defray the preliminary expenses in connection with the scheme.

INFLUENCE OF COLOR.

It was known of color from recent scientific experiments that it could produce or induce peaceful or maddening sensations. There was one well-attested instance: he believed the experiment was tried in Italy. People of unsound or intemperate minds were placed alternately in blue or red rooms. The result was that the blue rooms incited towards tranquility of the mind, the red rooms the reverse. The lunatic was calmed by the one and excited by the other. Therefore decorators had a moral force which they could employ, plus the æsthetic charm. To carry the principle into practice, a gaudy public house might incite to drink, whereas a quietly-decorated one might incite to restrain.—Sir W. B. Richmond.

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Monthly Journal of Modern Constructive Methods,

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

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

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VIEW IN HALL.

HOUSE IN VANCOUVER, B.C.
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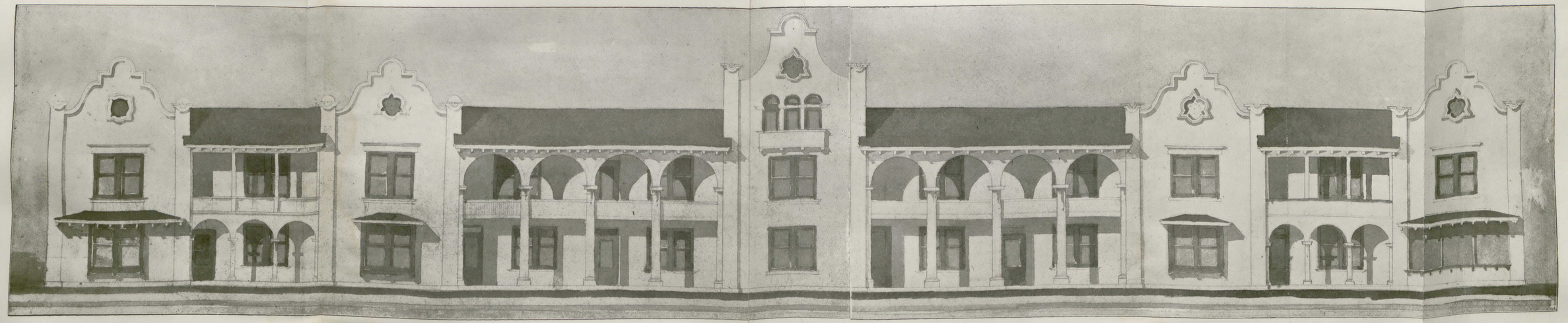
SUPPLEMENT TO
CANADIAN ARCHITECT AND BUILDER
MARCH, 1907



SUPPLEMENT TO
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CONCRETE HOUSES IN CHARLES STREET, TORONTO.
BEAUMONT JARVIS, ARCHITECT.

NOTES.

A new firm of architects has been established at Port Arthur, Ont., where Mr. Geo. Edge and Mr. A. Anderson have formed a partnership. Both these gentlemen are experienced men and, from present indications, a good business will be transacted.

It will be highly satisfactory to members of the Royal Institute of British Architects generally to learn, says Building News, that there will be a substantial margin to the good after all expenses of the late International Congress of Architects have been settled, and thus a considerable credit in favor of the Institute has been insured, largely owing to the popularity and great success of the Congress meetings, as well, of course, to the care and painstaking estimates calculated by the executive at the outset of the proceedings. Very likely it will be proposed that the extra services of the staff ought to be recognized in an appropriate way by a money payment proportionate to the work accomplished, and we think there can be little doubt such a proposition will be heartily supported by the members. Certainly the success of the Congress was not achieved without a vast amount of clerical labor efficiently accomplished.

DESCRIPTION OF DESIGN FOR MODERATE COST HOUSE.

Eight room frame house of "center hall" type. Main body of house is 29 feet and 6 inches by 38 feet. Basement walls are of stone. Arranged for furnace heat. First story is finished with oak except kitchen and pantry. Balance of house is finished in Georgian pine. Plain oak floors are provided for first story except in kitchen and pantry where maple is to be used. Second story floors are of quarter sawed Georgian pine. Mantels are provided for parlor and living room. Estimate cost $3,100.

DESIGN FOR MODERATE COST HOUSE.

Mr. A. E. Lewis, of Lewis & Company, plumbers, Belleville, Ont., has retired from that concern. The business will, however, continue to be operated under the old name.

EFFECT OF DURATION OF STRESS ON STRENGTH AND STIFFNESS OF WOOD.

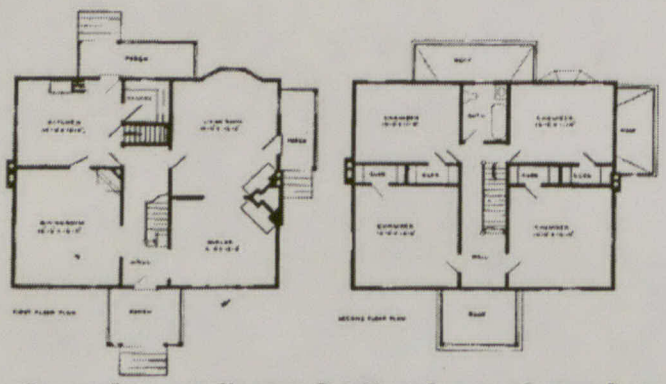
It has been established that a wooden beam which for a short period will sustain safely a certain load, may break eventually if the load remains. For instance, wooden beams have been known to break after fifteen months under a constant load of but 60 per cent. of that required to break them in an ordinary short test. There is but little definite and systematic knowledge of the influence of the time element on the behavior of wood under stress, according to Trade Bulletin No. 10, of the United States Forest Service Department of Agriculture.

This relation of the duration of stress to the strength and stiffness of wood is now being studied by the Forest Service at its timber-testing stations at Yale and Purdue Universities. The investigation should determine: the effect of a constant load on strength; the effect of impact load or sudden shock; the effect of different speeds of the testing machine used in the ordinary tests of timber under gradually increasing load; and the effect of long-continued vibration.

To determine the effect of constant load on the strength of wood a special apparatus has been devised by which tests on a series of five beams may be carried on simultaneously. These

beams are 2 by 2 inches in section and 30 inches in length, each under a different load. Their deflections and breaking points are automatically recorded upon a drum which requires 30 days for one rotation. The results of these tests extending over long periods of time may be compared with those on ordinary testing machines, and in this way safe constants, or "dead" loads, for certain timbers may be determined as to breaking strength or limited deflections.

factor, derived from these experiments will give equivalent values at standard speed. The tests also show concretely the variation of strength due to variations of speed liable to occur during the test itself. The results plotted on cross-section paper give a remarkably even curve as an expression of the relation of strength of speed of application of load, and show much greater strength at the higher speeds. A numerical expression of the law, averaging all species, both wet and kiln-



PLANS OF DESIGN FOR MODERATE COST HOUSE SHOWN ON OPPOSITE PAGE.

The experiments of the Forest Service show that the effects of impact and gradually applied loads are different, provided that the stress applied by either method is within the elastic limit of the piece under test. For example, a stick will bend twice as far without showing loss of elasticity under impact, or when the load is applied by a blow, as it will under the gradually increasing pressure ordinarily used in testing. These experiments are being extended to determine the general relations between strength under impact and gradual loads.

Bending and compression tests to determine the effect of the speed of application of load on the strength and stiffness of wood have already been made at the Yale laboratory. The bending tests were made at speeds of deflection varying from 23 inches per minute to 0.0045, and required from twenty seconds to six hours for each test. The woods used were long-leaf pine, red spruce, and chestnut, both soaked and kiln-dried. From the results are obtained comparable records for difference in speeds in application of load. A multiplication of the results of any test at any speed by the proper reduction

dry, gives the following table, which shows the increase in strength with the increase of speed of test:—

Minutes to move cross-head on inch.	Ratios of Ultimate Compression.	Strength Bending.
900	100	100
350	100.8	100.9
150	102.3	107.3
40	106.9	110.1
5	113.8	118.7

The first column, which gives the number of minutes required to move the cross-head of the testing machine over the space of one inch, is the reciprocal of speed. The second and third columns give the effect of this increase of speed upon compression and bending, respectively, and show that strength increases with speed. The strength at the lowest speed is arbitrarily fixed at 100 as a convenient basis for comparison. The ordinary bending test speed for small specimens is one-tenth inch per minute, or, reciprocally, 10 minutes are required to move the cross-head one inch.

Stephenson & Toole, plumbers, Winnipeg, have been succeeded by W. Stephenson & Company.

The Toronto branch of the Plumbers', Steam and Gas Fitters' Union have notified the employers that they will demand 45 cents per hour instead of 37 1-2 cents, as at present. The employers are given until May 15th to decide.

The Builders' Laborers and Amalgamated Carpenters, of Peterboro', are asking for an increase in wages. The former want $2.50 per day of nine hours, and the latter thirty cents per hour.

TORONTO BUILDERS' EXCHANGE.

The Toronto Builders' Exchange held an "at-home" in the Temple Building on February 28th, at which about 200 persons were present. A musical programme was provided, after which a dance was held. A most enjoyable evening was spent, and much credit is due to the committee who arranged the details.

The Builders' Laborers' Union of Toronto have communicated with the Builders' Exchange, asking that the minimum wage be fixed at thirty cents per hour, that the union be recognized and none but union men employed. The feeling among the members of the Exchange is that every member deal individually with his men, employing whom he wishes, paying them reasonable wages.

BOOK REVIEW.

"Modern Plumbing, Illustrated," by R. M. Starbuck, published by the N. W. Henley Publishing Company, 132 Nassau street, New York. Price $4. In publishing this book the author has added another work to his already complete list of books on this and kindred subjects. The book is a revision of the "Starbuck Plumbing Charts," published in 1899, and "Modern Plumbing Illustrated," published in 1900. Both these books were considered very good works at their date of publication, and now that they have been combined, much valuable reading matter and numerous illustrations added, the new book will no doubt meet with a hearty reception at the hands of plumbers and all persons connected with the trade. The book describes fully all modern methods and appliances used by the up-to-date plumber, and is indexed, so that information on any particular branch of the business may be readily found. It contains 390 pages, and is substantially bound in green cloth.

NOTES.

Messrs. Storey & Van Egmond, of Regina, were the successful architects in the recent competition for plans for a new Y. M. C. A. building for that city.

The City Council of Peterboro recently passed a by-law which compels all persons erecting buildings to first present the plans to the authorities for their approval and obtain a building permit.

The Ottawa chapter of the Ontario Association of Architects are considering the advisability of laying a complaint before the City Council against the city plumbing inspector. They claim this official is allowed to draw up plans for plumbing in the city, inspect and pass the same. The objection raised is against the official being allowed to inspect his own work, while other plumbers have not this privilege.

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