



PUBLISHED MONTHLY IN THE INTERESTS OF

Architects, Civil and Sanitary Engineers, Plumbers, Decorators, Builders, Contractors, and Manufacturers of and Dealers in Building Materials and Appliances.

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Canadian Architect and Builder

A JOURNAL OF MODERN CONSTRUCTION METHODS,

PUBLISHED MONTHLY IN THE INTEREST OF

ARCHITECTS, CIVIL AND SANITARY ENGINEERS, PLUMBERS, DECORATORS, BUILDERS, CONTRACTORS, AND MANUFACTURERS OF AND DEALERS IN BUILDING MATERIALS AND APPLIANCES.

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SUBSCRIPTIONS.

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EDITOR'S ANNOUNCEMENTS.

Contributions of technical value to the persons in whose interests this journal is published, are cordially invited, and if found to be of sufficient merit, will be paid for. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

SALUTATORY.

THE rapid improvement in methods and materials of construction, in decorative art, and in sanitary appliances, which has marked the history of the last ten years in Canada, and the field of usefulness which seems to lie open to a printed medium of information and communication between the thousands of persons interested in such subjects, has led to the publication of this, the first number of THE CANADIAN ARCHITECT AND BUILDER.

While great improvement has taken place, the development along this line may be said to have only fairly commenced. The advance in civilization and wealth is creating the demand for a better class of public, and private buildings than those adapted to more primitive times. It is a pleasing fact that the skill of our architects, sanitary engineers and artificers is responding to this demand, and the pleasing results are beginning to be observable on every hand.

In other parts of the construction field—in the building of pavements, sewers, bridges, canals, etc., improvements in materials and the methods of using them are not less easily discernible. Had there existed a journal devoted to this important field of knowledge, the extent of these improvements, the causes which have led up to them, and the means employed to carry them out, would doubtless be more generally understood. The

publisher of THE CANADIAN ARCHITECT AND BUILDER believes the time has arrived when a journal aiming to fulfil such a purpose, will prove a useful addition to the technical literature of the country, and assist in bringing about many needed reforms. The encouragement bestowed upon this enterprise thus far, seems to justify that opinion.

The scope of this journal is to a large extent indicated by the present number. In the matter of its contents, the reader will allow for the fact that perfection in any line of endeavor is not attained as the result of first efforts, but is the reward of a determination to succeed, coupled with persevering industry. With the assistance of a corps of regular contributors, embracing men of well-known ability in the fields of architecture, engineering, construction, decoration, sanitation, etc., every effort will be made to render the contents of each number of this journal increasingly valuable. From all the principal cities correspondents will supply contractors and others interested with reliable information concerning what is being done and what is intended to be done in construction work in their respective localities.

THE CANADIAN ARCHITECT AND BUILDER is designed also to be a journal of Public Works, and a medium of communication between architects or municipal or other corporations who may desire to receive tenders for construction works of any kind, and contractors and builders prepared to undertake such works.

Realizing how largely the public health depends upon proper conformity on the part of householders and house-builders to the requirements of sanitary laws, we shall do what we can to eradicate wrong notions and inculcate right ideas and practices in regard to that subject.

The value of illustrations in a paper of this class is fully understood, and to this department careful attention will be paid. We shall feel obliged to any one who will send us for publication drawings of a character likely to prove interesting and instructive to our readers. Friends who may desire to thus assist us, will please note that drawings should be made with pen and black ink on white paper or cardboard. In the case of architects, we shall be pleased if they will loan us original drawings which can be photographed down to the required size for engraving.

To the many persons who have encouraged us in our venture by the bestowal of advertising favors, by giving us their names as subscribers, by promises of future support, and by contributing of their experience to the columns of this initial number, we extend our sincere thanks.

In conclusion we tender to every reader the wish for a happy and prosperous new year, with the hope that before its close a permanent and mutually beneficial acquaintanceship shall have been established between this journal and that particular portion of the public whose interests it seeks to promote.

A PROPOSITION has been made to add an architectural department to the curriculum of the School of Practical Science in this city. The government should deal more liberally by this institution, so that lack of necessary funds may not stand in the way of carrying out such a desirable suggestion.

IN cases where contractors' deposits, accompanying their tenders for public works, are held by the city for any considerable length of time, as is frequently the case, the Toronto City Council has decided to allow interest on such deposits. This seems to be only just to the contractors, some of whom have had money locked up in this way for a year.

ONE of the most difficult problems which any young man is called upon to decide is the choice of the business or profession to which he will devote the energies of his life, and in which he hopes to attain eminence. Looking out over the fields of activity, he sees nearly all of them filled to overflowing with workers, and in some of them men are seeking employment without being able to find an opening for their labor. Under circumstances like these, it is gratifying to learn that there is still plenty of room in the architectural and engineering professions for young men of ability and ambition.

THE CANADIAN ARCHITECT AND BUILDER would suggest to the Builders' Association of Toronto, the advisability of erecting a building designed for the use of the Association and for architects' offices. In Boston, Philadelphia, and other American cities, where such buildings have been erected, their utility and success as a business speculation are universally acknowledged. The intimate business relations between architects and builders makes apparent the advantage of having them located in one building as compared with the present state of things, under which a vast amount of valuable time is wasted in running to and fro between a large number of offices situated in various parts of the city.

A TORONTO architect recently remarked that the CANADIAN ARCHITECT AND BUILDER would prove very useful to the members of the profession by supplying them with the names and addresses of manufacturers and dealers in builders' materials. Hitherto, he said, the want of this information had been very much felt. "We know all about English and American supply men through the architectural journals of those countries," said he, "but while we know also that there are plenty of such dealers in Canada, and even here in Toronto, we have had no way of finding them out except to go out and search for them, and that takes too much time. On the other hand, a great deal of inconvenience and delay is experienced in dealing with English or American firms." Thus it appears that our advertising columns, as well as the contents of our reading pages, are likely to serve a useful purpose, and add interest to this new venture.

THE annual report of the Medical Health Officer for the city of Toronto, presented a few days ago to the Local Board of Health, should lead to immediate steps being taken to improve the sanitary condition of the city. The increasing prevalence of infectious diseases, due no doubt to increase of population and inadequate sanitary provisions, is truly alarming. For

example, the deaths from diphtheria in 1885 were only 64 as compared with 202 in 1887. Perhaps if these figures had been published a little earlier, the citizens would not have voted down the by-law to provide money for the construction of a trunk sewer. It is to be hoped the incoming Council will present to the citizens at an early day a fully considered scheme for disposing of the city sewage. As suggested by the Medical Health Officer, the time has also arrived when the Council should order the filling up of all privy pits and wells, at least within the thickly-populated portions of the city, and prohibit kitchen stoves and refuse to be thrown into back yards, there to exhale poisonous disease germs. Careful attention to these matters and to the purity of the water supply would, we believe, greatly lessen the prevalence of infectious diseases.

An investigation of the records indicates that there was expended in new buildings in Toronto last year about \$1,250,000. This is something like \$100,000 less than in 1886, a fact due to the prolonged strike on the part of workmen engaged in the building trades last summer. The most important of the building permits issued during the year are recorded on another page of this paper. The fact that permits are only required from persons building within the fire limits, and that many persons within said limits evade the regulation requiring permits to be obtained, will show that a large proportion of the building done is not indicated in the record. As shown by our correspondent's letter, Montreal expended in 1887, about \$4,000,000 in the construction of 1100 new buildings. The extent of operations in other cities and towns is indicated under the heading "The Record of 1887," and shows a satisfactory rate of progress. Advances to hand seem to indicate that building operations during the year 1888 will be brisk, especially in this city and in Montreal, where a number of public and other large buildings are to be commenced. We trust that common-sense methods will be adopted by employers and employees to settle the hours of labor and rate of wages, so that the strikes which have resulted so disastrously in past years may not be repeated.

SOME people are very proud of what they are pleased to call their democratic principles. Unfortunately it sometimes happens that in their anxiety to be thought democratic, they show an entire disregard of the recognized canons of good taste. The other day, for example, a writer in a Toronto daily paper related a remark which a young lady was overheard to make, to the effect that it was a pity that a long row of houses—every one alike—should have been built on St. George street, as they were out of harmony with the tastefully-designed residences and handsome lawns which make that such a delightful thoroughfare. Satisfaction was expressed by this democratic writer with the action of the "enterprising builder," who put up the houses and contempt for the "aristocratic notions" of the young lady. As a matter of fact, the remark made by the latter was one that might naturally be expected to fall from the lips of any person possessing even in a limited degree the ability to decide between beauty and deformity. The fact is that the "enterprising builder" has been allowed to follow too much his own sweet will in the building up of this city. The result of his operations appears in row after row and street after street of houses, all apparently constructed after the one design, and exhibiting to the beholder a uniformity that is monotonous and extremely uninteresting. This does not apply to the more expensive class of houses built during the last five years, which display a variety of design which is in pleasing contrast to those we have been speaking about. It is to be hoped that the departure from the old stereotyped methods and designs which has already commenced, will mark the future growth of the city, and that, even at the danger of exposing himself to the contempt of the man of democratic ideas, the "enterprising builder" will fall into line with the march of improvement and the dictates of good taste.

FROM small beginnings and under disadvantages and rebuffs all great reforms seem to flourish most satisfactorily. A few years ago a number of gentlemen whose profession led them to be deeply interested in questions affecting public health, formed an association for the study of sanitary questions and the spread of sanitary doctrines. For some time the association was successfully carried on, and much interest taken in its proceedings. Last year, from some unaccountable reason, it collapsed suddenly. This is a matter of sincere regret. However, it left a legacy behind it, in the form of a draft of a Health Act, and more particularly of a

Plumbing By-law for the city which has since been adopted by the City Council, and one of its chief recommendations has been carried out in the appointment of two inspectors of plumbing. It is gratifying to learn that at the examinations held, the candidates presented papers of great excellence, showing much study and thought on the prime questions of health. Thanks to the energy and determination of the chairman of the Local Board of Health, we are now embarked on a system of thorough inspection of all plumbing, and the inauguration of the greatly-needed measures which will tend to promote the healthiness of the citizens and protect their lives, more than fresh air in open parks. Although the by-law has been enforced for a few weeks only, the change is marked already. No prosecutions have yet been necessary to cause architects or plumbers to fall into line, and we are very pleased to learn that firms who are occupying the first places in the profession are fully in accord with the spirit of the by-law. The point at which the shoe will pinch is not in the upper class of work, but in the house "with all modern improvements." We do not desire to interfere with the enterprise which is building up our city so rapidly, but we wish to point out as a duty from which we will never shrink; that the person who introduces plumbing into a house, and the workman who contracts to put it in, hold the lives of their fellow citizens in their hands and exercise an influence which no physician pretends to do. It is in the houses of our artisans where the greatest evils occur. Builders, speculative or otherwise, must be brought to learn that it is their duty to construct houses with such safeguards from sewer air and other mephitic vapors that the health of the inmates shall not be endangered. It is a gross injustice for those who know how dangerous the entrance of sewer air is to the health of the inmates to cover up joints with putty, slip clay pipes together merely cementing the upper part of the joint, or supply cast iron pipes of the thinnest calibre. Far better to have only a sink properly arranged, than "all modern improvements" which are a snare and delusion, source of bad health, and the cause of death.

BRIDGE INSPECTION IN CANADA.

An subject is scarcely needed for making this the subject of the first article on engineering topics in this new journal; as none who has read the news of travel for the last quarter of a century or less will deny its vital importance, from the fact that, of all accidents to travellers on land, the most appalling and fatal beyond all controversy have been bridge accidents.

Mr. Telford, the father of the engineering profession in England, when seeking from George IV. a charter for the Institute of Civil Engineers, defined engineering to be "the art of adapting all the forces in nature to the use and benefit of man," and a pursuer of this art who, when the above department of the profession comes within his province, does not, by giving it his most skillful attention, aid in bringing into use the safest and best-contrived patterns, is culpably untrue to so noble a standard; and those whose part it is to scrutinize the engineers' work are even more guilty if they do not require a full and intelligent conformity to the same.

Without intending to seat ourselves unflinchingly in the place of judgment, we think that we can perceive the pressing need existing for a marked change in the system of inspection of bridges by the Canadian Government. In the first instance, personal experience shows that the oversight of bridges by Dominion engineers during their erection is not invariable; and after erection, the tests used by them are not as crucial as the urgent claims of the case call for. Secondly, that this is becoming a real and felt want in the States where bridges are generally the same pattern as those in Canada, is plain from a communication read by Mr. Willard S. Pope, President and Engineer of the Detroit Bridge Company, before the American Society of Civil Engineers, who have been lately considering it. He strongly urges the appointment of a Government-commission, headed by an engineer of the highest skill and integrity, without conformity to whose standards the building of no bridge should be begun; without whose examination, none should be carried forward or opened for traffic; and whose officers should inspect all bridges annually. Thirdly, in Great Britain, except in the matter of annual inspection, all the above ground is more than covered, it being a *sine qua non* that, besides drawings of all bridges, full descriptions of every class must be deposited with the Government before railways, etc., are begun. Its officials make periodical inspections of same during erection, and, prior to traffic, exhaustive tests.

It may, therefore, be confidently expected that a Government so forward in keeping pace with the march of pressing progress as that of the Dominion will not be behind in this instance.



White paint to be a very durable paint has been made of a very finely powdered zinc, mixed with oil and siccative. A varnish of this produced which may be applied with a brush in the ordinary way.

A brilliant black varnish for iron, stone, wood or concrete can be made by stirring up ivory black in ordinary shellac varnish. It ought to be applied to the surface, when the article to be coated is cold.

TO CLEAN MARBLE.—The following process is recommended: Wash the surface with a mixture of finely powdered pumice stone and vinegar, and leave it for several hours, then brush it hard and wash it clean. When dry, rub with waxing and with wash-leather. Oiled and varnished acids are also used, but they will injure the polish of the marble.

A brick, says a technical contemporary, being about as porous as a lump of sugar, and having six sides, needs a careful filling for water-tight work in ocean-pools, etc., and a thin grout or porridge of cement is commonly used. Heating the brick and soaking beforehand in this material has been recommended. A common way common wall all his life without learning how to make brick water-tight.

DURABILITY OF WOODS.—In some tests made with small squares of various woods buried an inch in the ground, the following results were noted: Birch and aspen decayed in three years; willow and horse chestnut in four years; maple and red beech in five years; oak, ash, hornbeam and Lombardy poplar in seven years; oak, Scotch fir, Weymouth pine and silver fir decayed to a depth of half an inch in seven years; larch, juniper and arbutus were unharmed at the expiration of the seven years.

TO MAKE CAST BRASS HARD AND DUCTILE.—It is said that 2 per cent by weight of finely powdered bottle glass placed at the bottom of the crucible in which red brass is being melted for castings gives great hardness and at the same time ductility to the metal. Ferrous castings are said to be almost an impossibility when this is done, and the product is likely to be of great service in parts of machinery subject to strain. An addition of 1 per cent of oxide of manganese facilitates working in the lathe and elsewhere where great hardness might be an objection.

BROWN STAIN FOR WOOD.—A brown stain for wood for the imitation of oak, walnut and cherry tree wood is obtained by thinning ordinary tincture of iodine with alcohol, more or less, being added of the latter according as a lighter or darker shade of brown is desired. The stain should be applied with a broad brush or rag. After it has dried, the work should be polished. It is possible, however, to dispense with ordinary French polish by adding white shellac to the stain. One or other of these processes of polishing is indispensable to give permanency of stain.

PLASTER FOR MOUNDINGS.—Where walls and ceilings are to be moulded whilst yet in a plastic state, some decorators are using a fibrous plaster with the object of securing greater firmness and durability. The idea itself is not new, animal hairs having formerly been combined with lime, but this is a new application. In England and France a fine wire netting is at times inserted between two courses of plaster, to afford greater firmness in holding picture frames. The tenacity of some of the old mouldings in old New York houses, whilome aristocratic, is very remarkable, retaining as they do their original sharpness of outline.

GIVING STEEL A LUSTRELESS POLISH.—A finely polished, lustreless surface on wrought steel can be produced by either of the following operations: After the steel article has been tempered it should be rubbed on a smooth iron surface with some pulverized oil-stone until it is perfectly smooth and even, then laid upon a sheet of white paper and rubbed back and forth until it acquires a fine, dead polish. Any screw holes or depressions in the steel must be cleaned and polished beforehand with a piece of wood and oil-stone. This delicate, lustreless surface is quite sensitive and should be rinsed with pure soft water only. A more durable polish is obtained by first smoothing the steel surface with an iron polisher and some powdered oil-stone, carefully washing and rinsing. Then mix in a small vessel some fresh oil and powdered oil-stone, dip into this mixture the end of a piece of elder pith, and polish the steel surface with a gentle pressure, cutting off the end of the pith as it commences to become soiled. In conclusion it should be thoroughly cleaned in soft water, when the article will be found to have a fine, lustreless polish.

HOW TO MAKE LIGHTNING RODS EFFECTIVE.—Prof. Tyndall, in a letter on lightning conductors, points out that the abolition of resistance is absolutely necessary in connecting a lightning conductor with the earth, and this is done by closely embedding in the earth a plate of good conducting material and of large area. The largeness of area makes atonement for the imperfect conductivity of earth. The plate, in fact, constitutes a wide door through which the electricity passes freely into the earth, its dispersing and damaging effects being thereby avoided. A common way of dealing with lightning conductors, adopted by ignorant practitioners is, Dr. Tyndall remarks, to carry the wire rope which forms part of the conductor down the wall and into the earth below, without any terminal plate. Such a "protection" is a mockery, a delusion, and a snare. Some years ago a rock light-house on the Irish coast was struck by lightning, and was found by the engineer's report that the lightning conductor had been carried down the light-house tower, its lower end carefully embedded in a stone perforated to receive the object had been to invite the lightning to strike the tower arrangement could hardly, he believes, have been adopted if the conductor, as the contact of link with link is never per-



THE NEW Y. M. C. A. BUILDING AT DETROIT.

ON this page is presented an illustration from an excellent drawing by Mr. Geo. C. Booth showing the main entrance to the Young Men's Christian Association of Detroit. The building, which is considered the finest in the city, is constructed of red brick and red sandstone, the exterior being rich with bold and delicate carving, and the interior abounding in ornamentation of polished hardwood, principally oak.

The main entrance is on Grand River Avenue. Broad doors of paneled oak and stained glass lead to a wide stairway with walls of richly paneled bog oak of a sage green color. This opens into the main reception hall a capacious and luxurious room, with ceiling of terra cotta plaster work and bog oak beams. On one side is a fireplace of artistic design, reaching from floor to ceiling. Richly-carved pillars of Lake Superior red stone form its sides, and above are elaborate carvings in oak, with a design of the society's national emblem.

The hall in the rear is built in opera house style. The wood-work and frescoing displayed here are extremely rich and tasteful in design.

The furnishing and decoration of the main parlor, leading off the main entrance, is marked by an aesthetic elegance which is rarely seen surpassed.

The building also contains a private office for the secretary, lecture room, directors' room, general reading room and boys branch reading room, dining room, gymnasium and bath rooms.

There are chandeliers for both gas and electricity. They are of rich antique pattern, and designed to match the furnishings of each room.

The sanitary appliances are of a high order. In the assembly hall, the ventilation is so perfect that the air is changed every eight minutes.

The total cost of this handsome structure, is \$118,000.

The architects of the building are Messrs. Mason & Rice, of Detroit.

ARCHITECTURE IN CANADA.

BY JAMES DALYOUNG.

LOOKING at the principal cities and towns in Canada from an architectural standpoint, they must be considered a failure. This is especially true as regards the character of our homes, and I trust you will make an effort in your new journal to impress upon the public that if our homes are to be beautiful, the errors that have crept into society and for which the architects are to a great extent responsible, must be corrected. One error is that clients dictate too much in regard to style, and insist on being "in the fashion" notwithstanding the advice of the architect. On the other hand, it is to be feared that few architects have the courage to stand up for their opinions, or else they are unable to impart the knowledge which their clients require and are in search of. When the client finds that the architect is wanting either in courage or knowledge, he frequently takes the management into his own hands so far as the art portion is concerned, and at once instructs the architect regarding his "taste," or want of taste, as it evidently is ninety-nine times out of a hundred: To be sure the architect will occasionally come across

people of good judgment who require his services, who are content to leave the designing of the building in his hands. In such cases the architect is to blame if he does not at least make a truthful building. How often we find, however, that the architect is ready to belittle his profession by attempting to make a monument to himself out of what should be a merchant's home. For instance, it will be decked off with galvanized iron cornices, etc., painted and sanded to look like stone; it will have good honest pine grained to imitate rosewood or oak; and in all likelihood will have a tower and balcony, and no way to get to either; and they would be of no use if they could be got to. His client's comfort, which ought to be the highest consideration, is in this way almost lost sight of entirely.

If architects wish the public to have that respect for their profession which it should have, they must be educated in science and art, and be able and not afraid to impart it to their clients. They must discard fraud in building, put away all imitations, and build truthfully showing the import and meaning of every feature. Neither must they be afraid to introduce new ideas after giving them careful thought, for this is where the true artist excels. He must give more study to the requirements of the age in regard to comfort, sociability and entertainment. The more truthful we make our homes, the better they will meet the above requirements, and

make an effort we will succeed in producing a Canadian nineteenth century style. As I said before, I do not think it necessary to start afresh—to make a new style—any more than did the Greeks, the Romans, or the architects of the middle ages. Had they worked in strict accordance with the styles of their predecessors, we would still be building pyramids. We have more scientific knowledge than they had. Why then should we be discouraged from trying to make architecture again a living art as it was in and previous to the thirteenth century?

This is a question which calls for an answer from the architectural profession in Canada, and I think the time has come when it should be intelligently dealt with.

THE ARCHITECT.

BY JAMES YOUNG.

AS an architect of many years practical experience, I desire to submit a few observations under the above heading, which I trust may be thought appropriate for the first issue of a magazine that is intended essentially for the benefit of the building profession.

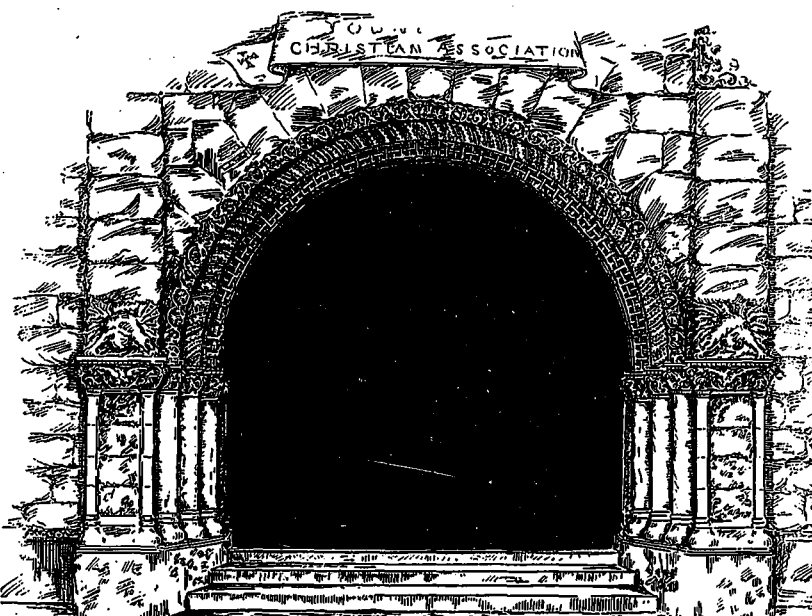
It is said that there is much in a name. What does the name "Architect" imply? It means in the accepted term, "a master builder;" that is, one who by long study, aided by a general proficiency of education, has acquired

a proper knowledge of the elements of architecture, and the ability to practically lay out his designs and plans, both general and in detail, with specifications, so that the same may become the basis for a contract, and that the building erected from them under his practical direction and superintendence, be carried out to a final completion in the best possible manner.

Now it must be apparent, even to the most casual observer, that to reach such attainments and become a duly qualified architect, is an arduous undertaking requiring ability, patience and perseverance, often under more or less very trying circumstances. The same may be said of the other learned professions—say surgery, law, or even land surveying. The student in each case goes through the necessary course of study, finally passes his examination, and is admitted to practice under a degree conferred on him by the faculty. This ordeal is deemed necessary to protect the public from imposition and the professor in his practice—he is a "professional man."

In what manner does the architect now become a professionalist? Are his attainments of such a lofty order that he is at once proclaimed by public intuition and requires no safeguard against the inroads of pretenders and the assumption that surround him? How frequently do we see a newly-risen sign setting forth a new aspirant for the name and practice of an architect—self-made, self-ordained—who, having acquired the rudiments of drawing (however creditable that may be), and a slight knowledge of building construction, but without the ceremony of further initiation, constitutes himself an architect fully fledged, ready for work? And yet there is no law to prevent his doing this. He has the right to place his name on the roll of the profession without let or hindrance.

The question arises: if he considers himself qualified, is he privileged to do this? What responsibility does he assume, and can he be prevented from doing so? The answer is, "yes, he has the privilege, there being no restriction"—his patrons' probable claim for assumption may be satisfied, if he is in a position to give such satisfaction, and he will be at liberty to style himself an



ENTRANCE TO NEW Y. M. C. A. BUILDING, DETROIT, MICH.

the coming generation will be better able to attain the summit of perfection which we should strive for—that is to say, a style of architecture suitable for our homes in this country.

It strikes me the few real architectural students that we have, pay too much attention to the study of the history of architecture, in place of developing architecture, and attempt to make ancient styles conform to modern requirements; others again try to squeeze the styles into such a form as will suit the so-called "tastes" of their clients or accord with the "fashion." This is all wrong. To gain the respect and esteem of the public a radical change must be made for the better. Let us leave all untruthful and flimsy building in the hands of the speculative builders; when in a short time it will be appreciated according to its true value, and the profession will gain the admiration as well as the patronage of all honest people. I believe if the architects in this country would begin to design (not copy) buildings, keeping in view the purpose for which they are building, drawing no line that does not express a purpose, that a new and perfectly suitable style would soon beautify our cities and towns. To do this it is not necessary to disregard the styles of the Greeks or Romans or the architecture of the middle ages, but to develop them in such a way that they will give expression to thought. Why people of to-day should follow the Greeks or the Romans more than the Greeks or the Romans followed the Egyptians, I cannot understand, and I think if we

architect and practice the profession just as long as the architects are so regardless of their own interests as to allow him to do so.

Can an individual, however skillful he may think himself to be, put up his sign and practice as a surgeon, barrister-at-law, or even as a land surveyor? Certainly not; although these professions are surrounded by a large area of amateur practice and quackery. Their surely the profession of an architect is as deserving of legal right and protection as that of the surgeon, lawyer or land surveyor. But the architects of to-day have no such protection—the name is merely a suggestive one. No doubt we have noble institutions in some cities, for instance the "Royal Institute of British Architects," the "Institute of American Architects," and others, and members thereof have no doubt proved their qualifications—because they thought fit to do so—not that they were required to do so, or that it was necessary as a qualification to practice.

And now to remedy all this, and to place the architect on the same footing as members of the other professions, let architects get themselves incorporated as a body, in the same manner and way that the land surveyors have done. This is a duty they owe to themselves and also to their students, who pay them large fees and devote years of time in learning the profession; for why should these students, at the expiration of their term of servitude, not be required to pass the examination and secure the degree that would distinguish their profession and protect their practice of it from the inroads of any who for want of ability, means or opportunity, have not graduated and obtained the license to practice?

The profession of architect has a right to be so protected. Its aspirations are noble. Its object is to benefit and improve society and mankind in general; and certainly no more selfish object can be imputed to it in desiring incorporation than to that of the provincial land surveyor. Why not architects have, then, a regulated scale or tariff of legalized fees which they can demand for service done? At present their commission or fee may be established by usage, but is not by law. In a recent case in one of the Canadian law courts, an architect who had attended for three days to give expert evidence in a building suit, was informed by the judge that he could only claim for his time the same rate as laborers' wages. At the same time a young P. L. S., who was also a witness, received \$4.00 per day for his time, the learned judge remarking that he often felt surprised at the apathy of architects in not getting themselves incorporated, which would entitle them to professional pay.

No doubt the suggestions herein made have long since engaged able minds than mine, but why has action not been taken in the premises? Will the rising generation of young architects not rise in their might and right, and have established for themselves an Act that will forever raise the standard and dignity of their profession and secure them against imposition and empiricism?

In conclusion, I hope to see in future issues of the CANADIAN ARCHITECT AND BUILDER, comments on this subject from architects, and especially from the junior members of the profession.

POSITION, STANDING AND DUTIES OF AN ARCHITECT.

By "CONSTANS FIDES."

THE position, standing and duties of an architect are so misunderstood by the general public, that perhaps it would be well through your new journal that the employer and the public should be better informed thereon.

An architect is supposed to have had a good education, and to be capable of designing any class of private or public building. He should be a good mathematical scholar, a good draughtsman, a free-hand draughtsman, an artist, capable of putting all his designs in perspective, as also all details for the purpose of illustrating details that are difficult for the workman and contractors to understand. He should know harmony of colors, and be capable of showing the public at a glance what his building is intended for when executed. He should be a sober, honest and truthful man, free from bias, showing no favour, polite and genial to all—in fact his standing, if he knows his profession, should be justly conceded to him by his employer and the contractor and the many artisans that he must of necessity be thrown into contact with; whose suggestions he should be ready to hear, and, if found practical, to adopt, provided they do not interfere with execution and design. We can all learn a little from the most humble, however poor and uneducated he may appear. The writer has derived much valuable information from such a one, and would therefore advise architects to listen quietly to the sober practical talk of a good artisan.

An architect should act as an impartial judge between the employer and contractor. He should never allow the contractor, his foreman or men, to have any suggestions made to the employer unless he be present. I would not say that the contractors or men would do or say anything tending to dishonesty, but it is better that all such conversations should be heard by both parties. It will save many disputes, and perhaps a law suit, which it is better for both parties to avoid.

An architect's duties are to make and submit small scale drawings or perspectives to his employer, and afterward, large scaled drawings and details of what is decided upon. In my younger days details were always submitted to the contractor. This procedure is far more honest to both the employer and the contractor, not perhaps necessary for the employer, but most decidedly of advantage to the contractor who is thereby better able to give an honest and fair tender. If large free-hand perspectives be given the more laborious geometrical details may be dispensed with until the contract is let.

The specifications should be precise and full, describing everything so far as possible in the vernacular of the different trades. There is no necessity for describing why such and such materials are called for. I have seen whole pages written that were quite ridiculous, and of no earthly use but to make the party tendering smile. The architect must, in conjunction with the contractor, lay the building out, having proper lines strained beyond the outer intended walls if possible, and permanent stakes driven, which should never be removed until the building is up to the ground floor. All angles should be properly and truly squared off, and proper bench marks left or fixed upon. In large buildings this will be found absolutely necessary. In my own practice I adopt it in the most simple building. I am aware it cannot always be done. If you have a clerk of works you will have to depend upon him, and if he should be employed by the proprietor, you had better have nothing to do with the work at all—far better to give up the entire work to the proprietor and his factotum, for you will never have a moment's rest.

The architect's duty is to measure and appraise the work as it proceeds—always in the presence of the contractor—to give certificates, and, finally, to make out all accounts in a business-like manner for the different trades. It is absolutely necessary that all accounts should be detailed in full—every item priced and carried out to a separate column—and not, as I have seen it done, without detailed prices. No honest purpose can be served by attempting to hide details. The proprietor is entitled to know what he is paying for. I have found it best to have a schedule of prices for the separate trades made out as soon as the contract is signed, based on the tender, witnessed, signed and filed away. No honest contractor can object to this. If the architect is honest the contractor need not fear that his competitors will obtain his prices.

Architects' charges are moderate, considering that they require to spend half a life-time in study in order to obtain a knowledge theoretical and practical of their profession and of the different trades connected therewith. The tariff of charges laid down by the Royal Institute of British Architects, the Royal Hibernian Society of Architects, Dublin; the American Institute of Architects, U. S.; the Paris Architects, the Berlin Architects, the Vienna Architects and the Russian Architects, are all commendable and equitable. The law courts of all these countries are guided by their tariffs, and were all architects to study and be guided by the same, there would be less objection to the charges made by the professional employer. I recollect a remark made in court at the conclusion of a trial by Chief Justice Cockburn that he was astonished at the knowledge of the most practical kind shown by the architects who had given their evidence before him. He had been perfectly in the dark regarding knowledge which they had shown themselves to be individually possessed of, and wondered how they had acquired it. He then suggested to his learned legal brethren that they should take a leaf out of the architects' book.

The Toronto Public Library has expended \$350 in the purchase of the architectural work, "La Basilique de Saint Marc a Venice.

Architect Timewell, of Winnipeg, has commenced work upon the buildings for Dr. Barnardo's training home for boys at Russell, Man.

Mr. S. Defries, of this city, who has recently visited Salt Lake City, describes the Mormon temple as a magnificent piece of architecture.

The auditorium at Grimsby Park, Ont., is to be covered by a dome 112 feet in diameter at its base and 34 feet at the top. From the circle at the top will rise a row of

pillars 20 feet high, capped with ornamental work and enclosed with amber glass. The dome will be cone-shaped and will be entirely supported by nineteen oak pillars 21 feet high, buried a depth of six feet in the ground, and surrounded by masonry up to the ground's surface. The dome is designed to shelter 8,000 persons.

A new system of building houses of steel plates is being introduced by M. Danly, manager of the Societe des Forges de Chateleneau. It has been found that corrugated sheets, only a millimeter (0.994") in thickness, are sufficiently strong for building houses several stories high, and the material used allows of architectural ornamentation. The plates used are of the finest quality, and as they are galvanized after they have been cut to the sizes and shapes required, no portion is left exposed to the action of the atmosphere. Houses so constructed are very sanitary, and the necessary ventilating and heating arrangements can readily be carried out.

The Architectural Draughtsmen's Association of Toronto, which forms the Architectural Section of the Canadian Institute, has been devoting its energies for the past few months principally to sketching from architectural models, competition designing and readings. During the remainder of the winter a number of instructive papers are to be read by members. The different branches of the building trade will be taken up and practical talks given by some of the most able builders of the city. It is hoped that those draughtsmen and students who are not already members, will become so, and make this Association the great success which its objects merit. Reports of meetings will be given in future numbers of this paper.

DESIGNS FOR CHEAP COTTAGES.

WE show this month four designs, with accompanying floor plans, of cheap cottages.

These designs will be found to meet the wants of that large class of persons who desire a house of their own, yet whose income will admit of no more than a modest outlay. That there is a large and increasing demand for such houses is plainly evidenced by the correspondence received at our office.

The houses are exceedingly picturesque, and if carried out according to the drawings, which any builder can execute, will be found to make exceedingly attractive homes. The floors are well arranged, as will be seen by reference to the plans, all the rooms being of good size and convenient of access to each other.

The prices given are inclusive of everything. Without foundation, each house can be built for about \$200 less. The estimates are based on the figures of a reliable builder. In some localities, where the conditions are more favorable than here, they can, of course, be built for less, while in other places the cost may exceed the figures given.

PERSONAL.

Architect Gordon, of the firm of Gordon & Helliwell, Toronto, is at present in Europe.

Architect Symons, of this city, has recently recovered from a severe attack of diphtheria.

Messrs. Gerrie & Sterling, contractors, of Rat Portage, Ont., have dissolved partnership.

Mr. John Atkinson, a well-known builder, who resided in this city for more than forty years, died on the 8th inst.

We regret to record the failure of Mr. W. H. Boulter, builder, of this city. His liabilities are estimated at about \$25,000.

Mr. Edward Martin, builder, of this city, was recently presented with a handsome gold watch by his employees as a mark of their esteem.

The sad intelligence comes from Ottawa that Mr. John Papiste Gouverneur, Inspector of Government Buildings, dropped dead on the street in that city, on the 4th inst. His death is attributed to heart disease.

A pleasant evening was spent by the members of the Amalgamated Society of Carpenters and Joiners, at their annual dinner at the Albion hotel, in this city, last month. President James Ross presided over the festivities.

D. L. Symons, of the firm of Strickland & Symons, Toronto, has been appointed teacher of architectural designs and construction in the Toronto School of Art.

Mrs. Geo. Watson, of Norfolk County, is the first female contractor we have heard of in Canada. She is said to have built the Universalist Church at Nixon, Ont.

Mr. E. M. Ross, foreman for the J. T. Pease Furnace Co., this city, was recently presented with a complimentary address and a gold headed cane by his fellow-employees.

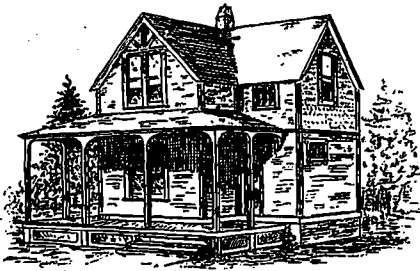
Mr. Andrew Onderdonk, well-known as the contractor of some of the largest public works in Canada, is building the six mile tunnel through which the city of Chicago will be supplied with water. The undertaking will take four years to complete.

Thomas V. Walker, widely known as the architect of the Capitol at Washington, died at Philadelphia recently. Dr. Walker was one of the most gifted architects produced by the United States, and has left many monuments of his genius, the most magnificent being the capitol.

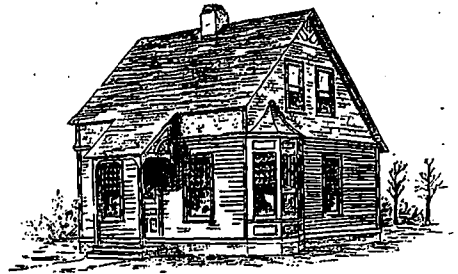


NEW CITY HALL AT HAMILTON, ONT.

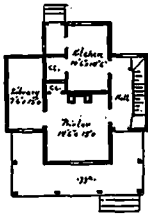
JAS. BALFOUR, ARCHITECT.



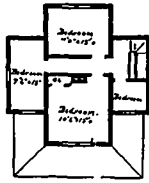
COTTAGE COSTING \$1,200.



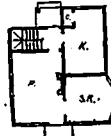
COTTAGE COSTING \$800.



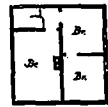
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First Floor.

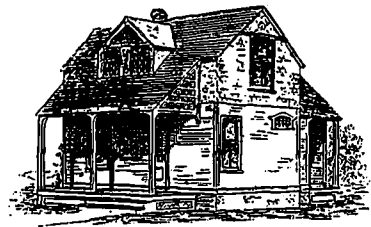


Second Floor.

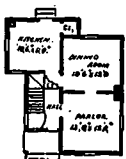
DESIGNS FOR CHEAP COTTAGES.



COTTAGE COSTING \$950.



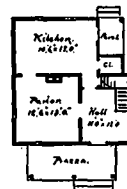
COTTAGE COSTING \$950.



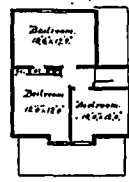
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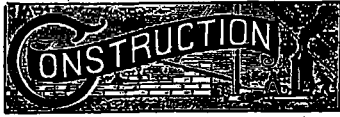
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First Floor;



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MONTREAL.

(Correspondence of THE CANADIAN ARCHITECT AND BUILDER.)

The past year has been of considerable importance in the building annals of the City of Montreal.

There were about eleven hundred (1100) new buildings erected during the year 1887 at an estimated cost of four million (4,000,000) dollars as against six hundred and ninety nine (699) in the previous year. And the highest record during the past twenty three years was in 1871; when there were one thousand and sixty buildings erected.

There is nothing of the "boom" about this large increase but it is the natural result of a demand for increased accommodation.

The current year will certainly show a still further increase, especially in the amounts expended, as there are a number of very important buildings under way.

The first in importance are the two new depots, the C. P. R. and the Grand Trunk, at an estimated cost of three hundred and fifty thousand dollars.

The other important buildings under construction are the New York Life Insurance Company's office on the Place D'Armes, the new Methodist Church on St. Catherine street, and the Technical Schools, the latter being the property of the order of Christian Brothers.

As soon as the C. P. R. depot and offices are completed the present building on St. James street will be taken over by the Imperial Life Insurance Company and three storeys will be added, thus adding another to the many imposing structures on St. James street.

The Mechanics' Institute will be entirely re-modelled at a cost of thirty thousand dollars. A storey will be added and a handsome clock tower will complete what will certainly be a fine building worthy of the institution.

The competing plans for the new Protestant Insane Asylum to be erected between Montreal and Lachine are hung in the Mechanics' Institute. There are five exhibits, and they will be adjudged in the course of this month.

The Building Inspector states that the cost of building materials such as brick, lime, stone and timber, was last year 25 per cent higher than in 1886. Wages also were higher. Carpenters were paid \$1.50 to \$2, painters \$1.75, plumbers \$2, bricklayers \$3.50 to \$4.50, being an increase of about \$1 a day; stonemasons \$3 to \$3.25, being an increase of about 50c.

WINNIPEG.

(Correspondence of THE CANADIAN ARCHITECT AND BUILDER.)

Things in Winnipeg and Manitoba generally, are always quiet at this time of the year, and particularly so just now in consequence of the undecided position of railroad and political matters.

The difficulty here is that any one having an idea of erecting new buildings will wait until later on in the year to see what is going to turn up to warrant the outlay, and generally before any decision is arrived at, the season is so far advanced that a great deal of valuable time is wasted getting ready; our actual building season being so very short.

However, the prospects for building are very good this year. All lines of business have been benefited by the splendid crops we have had, and a great number of people have thus been enabled to square up old matters and have cleared the atmosphere as it were, so that new liabilities can be entered into.

Endeavors are being made by both men and contractors to establish combinations in order to keep up prices for labor and contracts generally, but on account of the transient or migratory nature of both artisans and contractors, this will be a difficult matter for some time yet. Men who will take work at any price are continually coming in; and as most people building insist upon the lowest tender being accepted, there is often trouble in getting work finished, and a season often passes before a respectable contractor can get work.

At a meeting of builders, contractors and sub-contractors held in Winnipeg last month, "The Builders' Association" was formed. The Association, which is designed to include all interested in the different branches of construction work, elected the following officers: J. G. Latimer, president; E. Cass, vice-president; J. A. Girvin, and vice-president; J. L. Wells, treasurer; H. J. Raymer, secretary. A committee was appointed, composed of Messrs. J. H. Harris, James Thompson, Murray (of Murray & McDiarmid), and the

president and secretary to draft a set of by-laws.

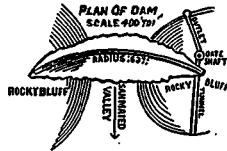
"The Amalgamated Council of the Building Trades of Winnipeg" is the name of another new organization composed of delegates from the various unions in connection with the building trades. The officers elect are: President, B. Nicolson; vice-president, C. Harrison; recording-secretary, W. H. Reeve; financial-secretary and treasurer, T. V. Rutherford. The following rate of wages was approved: bricklayers, 45c. per hour; carpenters, 30c. and 45c. over-time; plasterers, 40c. and laborers 20c. over-time 30c.

As a natural consequence in a comparatively new country, partly owing to the migratory habits of some contractors, the tenders for works publicly advertised for during the last two years in Winnipeg have been very wide; and in many cases bids have been below actual cost, causing great dissatisfaction among established builders, and loss to those to whom the works have been awarded. In order to endeavor to establish a more healthy basis, the builders and contractors are forming an association by which they hope to obtain a fair price for their work, and shut out irresponsible men. The price of labor in Winnipeg to day is:—Carpenters, \$1.50; painters, \$2.50; labourers, \$1.75; bricklayers, \$4.00; masons, \$4.00; plasterers, \$4.00. Prices of materials:—dimension stuff, spruce \$16.00; dimension stuff, pine \$18.00; drop siding, \$22.00 to \$34.00; flooring, \$22.00 to \$35.00; clear pine, \$35.00 to \$50.00; shingles, \$2.00 to 3.50; bricks @ \$10.50, cement @ \$5.00, plaster @ \$2.75, lime @ 20c. to 25c., nails @ \$3.75 to \$4.50.

THE GREAT DAM AT SAN MATEO.

Our readers have heard of the great dam which is being constructed at San Mateo, Cal., to furnish a water supply for San Francisco. As an engineering work it is exciting notice everywhere.

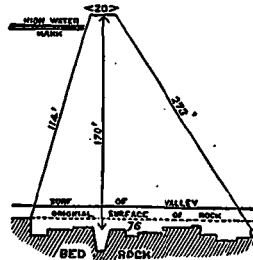
As the system for building the dam is original, a de-



PLAN SHOWING POSITION OF CONCRETE BLOCKS—SCALE 40' TO 1'.

Dotted line A. B. C. D., showing approximate position of Block in next layer.

tailed description, may not be found uninteresting. Herman Schussler, the chief engineer of the company, has had charge of the work from the outset. After the excavations which laid bare the bedrock, the most important thing was the manufacture of the concrete. Every thing in this branch of the work was original. An enormous structure, consisting of three platforms, was built



CROSS SECTION OF DAM—SCALE 80' TO 1'.

on the side hill near the site of the dam. On the upper platform are placed the huge bins for sand, that is hauled in wagons from Northbeach in San Francisco. Near by is the rock crusher which grinds the coarse rocks into pieces no larger than walnuts. The crushed rock then passes into a larger roller, and is thoroughly washed by a two inch jet of water. Cleaned of all dirt it falls into a chute, and is emptied into boxes that hold exactly

twenty-two cubic feet. These boxes are on wheels, and when one is ready to be emptied there are brought at the same time on tram cars one barrel of Portland cement and two barrels of sand. In this proportion they are emptied into a chute, which leads to the mixer on the third platform. On this platform are ranged the three engines that furnish the motive power for all the work. They are detached, so that any accident to one does not retard the work of the others. The mixer is made of 5-16 boiler-iron, in shape like a cube set askew. This revolves and thoroughly mixes the material, and the concrete falls into carts that are run on a big platform out over the dam. Each carload is dumped into large pipes and falls to the level of the dam, where workmen wheel it to the place required. The capacity of the concrete machines is 450 barrels per day, each of twenty-two cubic feet, or 10,000 cubic feet of concrete. No description can give any idea of the ingenuity with which time and labor have been saved here. Everything runs like clock work, and the plan of using barrels instead of box-cars saves an immense amount of rehandling of material.

Down at the dam the same originality and ingenuity are shown. The blocks of concrete are laid on the following plan: After the bedrock is carefully cleaned and all moisture gathered up by sponges, the work of laying a concrete block is begun. First is made a framework of wood of varying sizes, twenty feet or less square and six feet thick. Into this the concrete is dumped from wheel-barrows. Men with shovels spread it even, and stamp it down with heavy iron rammers. When this framework is filled it is covered even with boards, kept wet to prevent rapid evaporation, and allowed to dry from seven to ten days. At the end of that time the concrete in the bulkhead is as hard as rock, and tests have shown that in moving it does not scale off from the foundation, but it brings away the solid bedrock, of which it has actually become an inseparable part.

The sections of concrete are all laid with reference to a common center, indicated by a flag. In all other dams of this kind the concrete is laid as a monolith in large blocks covering the entire area. Mr. Schussler's plan has seen to break joints with every block of concrete. The dimensions of the dam are: Height, 170 feet, width at base, 176 feet; width at top, 20 feet; slope on water-side, 1 foot horizontal to 4 feet vertical; slope on the lower side, 2 feet horizontal to 3 feet vertical. The area of the reservoir is 1,800 acres; storage capacity, 32,000,000,000 gallons; elevation above tide, 300 feet.

The arrangements for drawing water from the reservoir are peculiar. A shaft 14 feet clear of brickwork is sunk from the rocky bluff on the water side of the dam which is tapped by four tunnels from the reservoir side. At the point where each of the four tunnels joins the reservoir it will be provided with a movable iron screen. At the point where each of the four joins the shaft it will be pointed with a 44 inch water gate. Each tunnel is 35 feet above the other. All these four gates connect in the shaft with a vertical cast-iron pipe, 50 inches in diameter, which again at the base of the shaft has an elbow that leads into the main outlet of the tunnel. This is 7 feet 6 inches clear of brickwork, through which the 50 inch pipe is to run and connect with the 44 inch pipe that leads to San Francisco. At the outlet of this latter tunnel, which has a length of 306 feet from the shaft, the main regulating gate will be placed in the 30 inch pipe. The four gates mentioned in connection with the main shaft are intended to allow water to be drawn from different levels of the reservoir. An iron winding staircase will be constructed in the shaft to admit of easy access to the three gates. The top of the main shaft will extend 10 feet above high water mark.

The direct water shed of this reservoir is 24 square miles, but it is so situated that it can receive the waste waters from the adjoining San Andreas Reservoir, as well as from Pilarcitos, both of which are in the neighborhood and at higher elevations than this. The company proposes to make this Lower Crystal Springs Reservoir the receptacle not only of direct and immediately adjacent water sheds, but also of the water shed of San Francisco Creek, which has an area of twenty-five square miles, the Pescadero and San Gregorio water sheds, which have a combined area of fifty-five square miles, and eventually that of the Calaveras water shed, which lies on the east side of San Francisco Bay, and which has an area of 140 square miles. In order to connect the San Francisco water shed with this Crystal Springs water shed a tunnel five miles long and eleven feet clear in diameter is to be constructed, while it will take an additional five miles of tunnel to bring in the Pescadero and San Gregorio water shed, and a two mile tunnel and twenty two miles of pipe to connect the Calaveras water shed.

THE BUILDING RECORD FOR 1887.

AYLMER, ONT.—This town expended \$87,200 in new buildings last year.

PERTH, ONT.—59 new buildings were erected here last year at a cost of \$81,525.

TILSONBURG, ONT.—Tilsonburg expended about \$75,000 in new buildings last year, and the indications are that that amount will be exceeded next season.

WOODSTOCK, ONT.—About \$350,000 was spent in new buildings last year, notable amongst which are the new hall of Woodstock College, the new furniture factory of James Hay & Co., and a couple of organ factories.

BELLEVILLE, ONT.—About \$150,000 was expended in new buildings last year and \$100,000 on water works construction.

SMITH'S FALLS, ONT.—The citizens of the town and the Canada Pacific Railway Company expended in new buildings last year \$187,000.

BRANTFORD, ONT.—This city spent \$500,000 in new buildings in the year 1887.

PETERBOROUGH, ONT.—The value of the new buildings erected in Peterborough last year is estimated at \$200,000.

WATERLOO, ONT.—The building operations in this town last year involved the expenditure of \$101,500.

MONCTON, N. B.—The total amount spent in building during 1887 was \$70,000, including \$9,000 on church extension and improvements, \$12,000 on new railway shops and \$7,000 on the basement of the new Roman Catholic church, to cost, when completed, \$40,000.

HALIFAX, N. S.—The growth of this city is indicated by the fact that new buildings valued at \$750,000 were erected during the year just closed. Among the most prominent of these are new city hall, Dalhousie university, a ladies' college, a sailors' home, two or three churches, and quite a number of stores and dwelling houses.

STRATFORD, ONT.—\$450,000 were spent in erecting new buildings last year, of this sum \$200,000 was expended by the G. T. R. Co., on their new shops. The new comb house and jail cost \$96,000, and new high school and brewery \$109,000 each.

Following are the permits for buildings costing \$1,000 and over issued by the Building Inspector, Toronto, during the year 1887:

W. D. S. Sym, ad. and alterations at 131 Church St. \$2,000; J. D. Nasmith, bk. alterations and ad. to store, s. w. cor. Jarvis and Adelaide, \$2,900; J. Wanless, a storey bk. ad. alterations to store, s. w. cor. Yonge and Queen Sts., \$16,000; Donato Ginnini, a storey r. bk. front dwell., 255 Eglarston St., \$900; Geo. Welch, two storey r. bk. front dwell., n. Mutual St., \$1,500; W. C. Gilbert, two storey r. bk. front dwell., Mutual St., \$1,500; R. Hibbit, three attached r. bk. front dwell., Parliament St., \$2,400; Mr. Fallick, two s. d. a storey r. bk. front dwell., w. s. Parliament St., \$2,000; A. Little, 3 attached 3 story bk. dwell., Sardinia Ave., G. Kerr, alteration and ad. to 259 and 261 Simcoe St., \$1,000; Thos. Burns, erection and alteration n. e. cor. King and Parl. Sts., \$1,800; R. Thompson, two s. d. bk. dwell., Mr. Calhoun, three attached 3 story bk. stores, n. e. cor. Spad. Ave. and Carr Lane, \$800; R. H. Lear, bk. ad. to 15 and 17 Richmond W., \$400; W. L. Williams, three pairs s. d. a storey bk. dwell., on Dovercourt Rd. \$14,400; Messrs. Rolston, two s. d. a storey and attic bk. dwell., College St., \$850; R. H. Gray, one storey bk. ad. to 8 Queen W., \$350; Alex. Barnum, alteration to 9 and 11 Buchanan St., \$1,200; Thos. Douglas, seven attached 3 story r. c. dwell., cor. Orde and Murray \$8400; Ald. Baxter, three r. c. a storey dwell., n. e. cor. Vannalee and St. Andrew St., \$400; Langley & Langley, W. J. Harris jr., 3 story r. c. factory in rear of 17 and 19 William W., \$1,500; J. R. Thompson, 1 storey bk. ad. rear of Winston Chambers, \$1,500; H. Nelson, 1 1/2 story bk. stable e. s. St. George St., \$1,100; I. Hewitt, 2 story r. c. dwell., 154 Seaton St., \$1,000; Dr. Wagner, alterations 7 Gerrard E., \$150; F. Clements, seven attached 2 story and attic r. c. dwell., e. s. Major St., \$8400; J. J. Lucas, r. c. ad. to cor. Teruley and Louisa, \$2,700; Mr. McDunry, one pair s. d. a storey r. c. dwell., rear 66 and 68 Beverly St., \$2000; Catharine C. Howard, alterations and ad. cor. Wellington and Peter St., \$900; Cook's Church, alterations and ad. \$17,000; J. W. Brown, s. a. store and dwell., Bathurst St., \$2500; Mr. Parker, pair s. d. a storey and mansard bk. dwell., Boswell Ave., \$6000; Geo. Gray, pair s. d. bk. dwell., Richmond St. W., \$4000; H. Garde, pair s. d. s. bk. fronted dwell., Hurley St., \$1800; W. B. Crapan, 2 storey r. c. dwell., Bleeker Pl., \$900; W. H. Stoecheuse, pair s. d. bk. dwell., Dovercourt Rd., \$3000; J. Hofland, 1 storey bk. ad. 254 and 266 Church St., \$900; R. Spencer, ad. and alterations cor. Markham and Colby Sts., \$1500; C. Procter, a storey bk. factory, Pearl St., \$8000; Thos. Patine, a storey and attic bk. dwell., Huron St., \$2300; Jas. Good, 2 story and attic bk. dwell., Rosedale, Ave., \$4700; Girls' Institute, cor. Shepherd and Richmond Sts., \$4000; Geo. W. Miller, 2 story and attic r. c. bk. ceased dwell., Elizabeth St., \$1500; J. Murray, a storey and attic bk. dwell., Lowler Ave., \$3000; R. Millicamp, a storey and attic bk. dwell., Queen's Park, \$7000; A. C. Beble, pair s. d. bk. dwell., Hope St., \$2500; F. A. Campbell, 1 storey bk. ad. Richmond St. W., \$1400; T. Sullivan, 3 story bk. stop, Alton St., \$2500; A. Mitchell, five attached 2 story and mansard bk. dwell., Grange Ave., 17,500; Cobban Mfg. Co., ad. to factory, cor. Hayter and Teruley Sts., \$1800; W. Kendrew, 2 storey ad. at 506 and 508 Yonge St., \$1000;

Messrs. Dmley & Crossman, bk. stone and glass con., s. e. cor. Spadina Ave. and Phoebe St., \$1000; John Fraser, three a storey bk. dwells., University St., \$5000; Jos. Walker, 3 story bk. and r. c. dwell., n. s. Alice St., \$3700; A. Harvad, two story bk. stores, n. s. Queen St., \$7000; Thos. Webb, two 3 story bk. stores, also ad. to store cor. Yonge and Agnes Sts., \$5000; T. Thompson & Sons, 3 story bk. store, 135 King St. E., \$9000; S. R. Clarke, 4 bk. stables in rear of stores, cor. Augusta Ave. and College St., \$1000; W. Pringle, r. c. stable, Rose Ave., in rear of Stephenson House on Parliament St.; W. F. Rogers, pr. s. d. a storey bk. dwell., Sussex Ave., \$4000; T. R. Williams, 2 story bk. ad. n. e. cor. Queen and William Sts., \$1000; Bishop Strachan school, 3 story bk. ad., \$8000; St. Simon's Church, Brick Church, Howard St., \$9000; Geo. McCoskey, bk. ad. to 11 Temperance St., \$1000; W. Adams, semi-detached r. c. houses, cor. Sarah and Belmont Sts., 1560; W. Adams, 8 r. c. houses, cor. McMurtry and Belmont Sts., \$6400; W. H. Clendinning, boat house Esplanade, \$6000; W. H. Stoneham, 6 pr. a storey bk. front houses, McPherson Ave., \$1600 each; W. H. Robinson, 2 storey res., Concord Ave., \$1600; T. Hurst & Son, pr. a storey attached r. c. dwell., Darling Ave., \$1400; W. D. McIntosh, 3 attached 2 story dwell., s. s. Water St., \$2800; Brown & Low, gal. iron, 2 story work shop, Esplanade St., \$1500; Thos. Pedlow, two a storey r. c. dwell., Ontario St., \$1000; Mrs. Robinson, two 3 story attached bk. dwell., 6 and 8 Edward St., \$2800; R. W. Abel, 2 attached bk. fronted stores, 221 Parliament St., \$3000; H. J. Brown, s. d. bk. houses, Gwynne St., \$6000; W. S. Thompson, 2 d. bk. houses Gloucester St., \$12000; W. L. Thompson, 11 attached 3 story bk. stores, Spadina Ave., \$35000; W. S. Thompson, bk. factory, Pearl St., \$3500; W. S. Thompson, bk. offices, Adelaide St. E., \$2000; Jos. Duggins, 4 n. a storey r. c. dwell., w. s. Chestnut St., \$1400; E. Hewitt, seven a storey a. bk. dwells., Carlton Ave., \$11000; E. Hewitt, pr. a storey bk. houses, James St., \$12000; E. Hewitt, 2 pr. a storey bk. houses, St. George St., \$84000; C. S. Williams, 3 n. a storey bk. stores, Centre St. S.; Land Security Co., Toronto; 1 a storey bk. warehouses, cor. Bay and Esplanade Sts., \$50,000; J. Elliott, 3 story and attic bk. ad. to hotel s. e. cor. Church and Shuter, \$15,000; Consumers Gas Co., 2 story bk. rector house s. e. cor. Berkeley and Front, \$60,000, also a storey purifying house s. w. Berkeley and Front, \$10,000; J. Dickie, six a storey attached r. c. dwell., e. s. Berkeley St., \$7500; W. Gooderham, 3 story bk. Institute, \$8000; J. Hocking, three 2 story r. c. dwell., cor. D'Arey and Huron, \$3500; J. B. Bastedo, two 2 story r. c. houses n. w. cor. Huron and St. Patrick, \$3800; C. R. Peckerin, ad. to factory cor. Bay and Temperance, \$3000; G. M. Miller, 3 story warehouse n. s. Richmond, \$8000; C. R. Ruedie and B. J. Hill, 2 stone and bk. houses, Sherbourne St., \$10,000; D. Richards, 2 pr. s. d. houses, Major St., \$18,000; Geo. Pepper, eleven 2 story and attic bk. dwell., w. s. Spadina Ave., \$50,000; Geo. Pepper, ten 2 story and attic bk. dwell., w. s. St. George, \$60,000; Geo. Pepper, one 2 story bk. coach house, St. George St., \$3000; R. Armstrong, 6 d. a storey and attic bk. dwell., cor. George and Gerrard Sts., \$19,000; W. S. Thompson, 11 d. stores e. side Spadina Ave., \$30,000; Mrs. Morrison, bk. dwell., Beverly St., \$5000; Thos. Land Inv. Co., 2 a storey bk. stores, e. s. Yonge, \$25,000; J. O'Malley, two 2 story a. stores, 160 & 162, Queen W., \$20,000; G. G. Dermot, 3 bk. front man. roof dwells., rear of 27 and 29 Maliland St., \$2800; J. Thompson, 2 a 3 story bk. stores e. s. Yonge St., \$11,000; Mrs. Emily Stone, 2 story bk. residence, 113 Church St., \$9000; H. Hutchinson, bk. res. 2 story, 281 Sherbourne St., \$4000; J. Cooper, 2 story store and dwell., 84 Davenport Rd., \$4000; R. Jones, 2 story r. c. dwell., 217 University St., \$1000; J. Thompson, 2 n. a storey r. c. dwell., 169 and 171 Seaton St., \$4500; E. Henderson, 2 story bk. ad. to dwell., St. Joseph St., \$13,000; G. Thompson, 2 story r. c. dwell., Homewood Ave., \$1000; B. Pickering, 2 story bk. dwell., Berryman St., \$1000; R. G. Brookes, 2 story and attic bk., n. e. cor. Jarvis and Isabel Sts., \$16,000; T. W. Field, pr. s. d. bk. dwells., also 2 story bk. dwell., \$6500; G. Wright, pr. s. d. bk. dwell., \$5000; Mrs. Hope, 2 story r. c. dwell., Duke St., \$1100; F. P. Appleton, 5 n. a storey r. c. dwell., n. s. McPherson Ave., \$4000; C. R. S. Dinnick, 5 pr. s. d. and r. d. a storey bk. dwell., w. s. Brunswick Ave., \$51,000; Mrs. I. Hodgson, bk. cost. n. s. Grange Ave., \$5000; T. H. Palm, alteration to dwell., 63 Yorkville Ave., \$2000; A. Morrison, alteration to dwell., 176 St. George St., \$2000; J. Lamb, 3 a 3 story bk. stores, cor. Queen and Sherbourne, \$28,000; H. Elliott, pr. s. d. bk. dwell., Wellesley St., \$9000; A. Jaffry, 3 story bk. store, w. s. Yonge near College, \$5000; D. Carlisle, s. d. a storey bk. dwell., \$4500; E. A. Levian, 2 story bk. dwell., s. s. Linden St., \$1000; W. Nesbit, alteration to dwell., cor. St. Vincent and Grange, \$3000; Mr. Hubbard, 3 story bk. store n. w. cor. Soho and Queen, \$5000; T. Walker, 1 storey bk. blacksmith shop, George St., \$1000; J. Burgess, pr. s. d. a storey r. c. dwell., e. s. Ontario St., \$2300; I. Fletcher, two 3 story stores, 226 Yonge \$6000; Geo. Davis, pr. s. d. a storey bk. dwell., e. s. Gros. St., \$2000; G. P. Sharpe, 2 story bk. store, 108 York St., \$4500; G. W. L. Shaw, 2 story bk. dwell., w. s. Gwynne St., \$2800; R. S. Williams, alteration, to 143 Yonge St., \$5000; J. Robertson, 2 story bk. ad. to cor. John and Mercer, \$4000; Mrs. Swain, pr. s. d. a storey bk. dwell., Hayden St., \$7000; J. W. Bowden, 4 n. a storey r. c. dwell., Winchester Ave., \$5000; J. W. Bowden, 2 story bk. ad. to 28 Winchester; Mr. J. Lister, bk. ad. to dwell., cor. Dalhousie and Wilton Ave., \$3500; Mr. Davis, 2 bk. front dwell., e. s. Ontario, \$2800; G. McKibbin, pr. s. d. a storey and attic, w. s. McCaul \$5000; Mrs. Lavlor, a storey r. c. dwell., 66 Wiam St., \$1350; J. Hewlett, 2 story and attic bk. dwell., Sherbourne St., \$3500; J. Hewlett, pr. s. d. a storey and attic n. s. Isabel St., \$17,000; W. Bonnell, one story brick warehouse, 84 Bay Street, \$1500; Geo. Anderson, warehouse, Esplanade and Sherbourne, \$3500; F. I. Phillips, a storey bk. dwell., e. s. Queen's Park, \$9000; R. Thill, r. c. a storey dwell., Birch Ave., \$1600; Mr. Behune, 2 story bk. stable, College Ave., \$2500; Geo. Acheson, 2 story and attic bk. dwell., s. w. cor. College and McCaul, \$6000; Col. Twemp, 2 story and attic bk. dwell., n. e. cor. Bloor and George, \$330,000; E. Parker, s. d. a storey dwell., \$8000; T. M. Chaston, 3 story bk. store, cor. Huron and Sussex, \$5000; E. Davis, r. c. house ren. front, Birch Ave., \$1950; C. L. Van Wormer, stables, College Ave., \$3000; J. Sniger, man. roof s. e.

cor. Queen and York, \$1100; G. Vokes, one a storey bk. dwell., Manning Ave., \$3200; R. Dinnis & Son, 3 story bk. factory, cor. Anderson and William, \$3000; Cap. Hooper, dwell., Rosedale, \$5000; J. Carlow, alter, to 256 Yonge St., \$1000; Keith & Fitzsimmons, a storey bk. ad. 109 King W., \$1000.

CANADIAN SOCIETY OF CIVIL ENGINEERS.

THE first annual meeting of the above Society was held in Montreal on the 12th inst., being presided over by the President, Mr. F. C. Keefer, C.M.G., of Ottawa. The following gentlemen were elected to official positions for the ensuing year: President, Mr. Samuel Keefer, Brockville; Vice-Presidents, Col. C. S. Gzowski, Toronto, Mr. E. P. Hannaford, Montreal, and Mr. H. F. Parley, Ottawa; Treasurer, Mr. H. Wallace, Montreal; Secretary, Mr. H. T. Bovey, Montreal; Members of the Council, Messrs. H. Abbott, Port Moody, B.C.; F. R. F. Brown, Montreal; F. N. Gisborne, Ottawa; J. Holson, Hamilton; W. T. Jennings, London, J. Kennedy, Montreal; L. Lesage, Montreal; A. Macdougall, Toronto; H. A. McLeod, Ottawa; H. McMurphy, Halifax, N. S.; P. A. Peterson, Montreal; H. S. Pool, Shelburne, N.S.; H. N. Ruttan, Winnipeg; P. W. St. George, Montreal; C. Schreiber, Ottawa.

A perusal of the Secretary's annual report shows the Society to be in a prosperous condition. The Society was granted incorporation in June, 1887, and already has a membership of 423. The death of three members is recorded during the year, viz., Messrs. H. W. Kefer, T. Guerin and T. W. Harrington.

The volume of transactions for the year 1887 contains the following papers, which were read and discussed at thirteen ordinary meetings of the Society, and it is pleasing to notice that, so far, the discussions have been of the widest character.—On "Frazil Ice," by Mr. G. H. Henshaw; on the "Canadian Pacific Railway Grain Elevators," by Mr. S. Howard; on the "Foundations of the St. Lawrence Bridge," by Mr. G. H. Masry; on the "Superstructure of the St. Lawrence Bridge," by Mr. J. W. Schaub; on the "Warming, Ventilating and Lighting of Railway Cars," by Mr. J. D. Barnett; on the "Construction of a Guard Lock," by Mr. L. N. Rheume; on "Snow Slides in the Selkirk Mountains," by Mr. G. C. Cunningham; on "Petroleum as Fuel," by Mr. L. M. Clement; on the "Works on the River Missoua, at St. Joseph," by Mr. H. K. Killy; and on the "Quebec Harbour Improvements," by Mr. St. G. Bovey; "Water Purification," by Professor Leeds; and on the "Necessity of a School of Arts for the Dominion," by Mr. C. Ballinger.

Only one student meeting has yet been held, but the Council hopes to see considerable development in this department by the establishment of regular students' meetings, thus awakening the interest of the younger members of the profession, on whom must ultimately depend the status and strength of the Society.

An effort will be made to have branches of the Society formed at suitable centers throughout the Dominion.

Nearly two miles of asphalt pavement were laid in Brantford last year.

A new iron bridge is being erected over the Desjardins Canal on the Grand Trunk railway.

The new international bridge at Sault Ste. Marie will be opened for traffic in a day or two.

A temporary levee against the floods has been completed in Montreal at a cost of \$40,000.

The town of Chatham is considering the best means to adopt for supplying the citizens with pure water.

Messrs. Parson & Duncan, have made extensive alterations and additions to their tannery, at Beaverton, Ont.

The snow sheds in the mountain section of the Canadian Pacific are of an aggregate length of seven miles. The Government is building a new break water 3,600 feet long at Port Arthur, the cost of which will be \$350,000.

Operations on the Milton waterworks have been discontinued until the spring. The reservoir is about completed.

The recommendation has been made that a building society should be organized at Vancouver, British Columbia.

A handsome church has been erected for the Episcopalians of East Hamilton, Ont., by contractor Ferdinand Slater, of Watertown.

Mr. Beemer, the wealthy railroad contractor is said to have subscribed half a million dollars towards the erection of a bridge between Quebec and Lewis.

The new submarine waterworks tunnel under the lake at Chicago will cost \$748,000. The tunnel will be eight feet in diameter, and will extend a distance of four miles.

The feasibility of allowing the Niagara Central railway to build another bridge across the Desjardins Canal at Hamilton is occupying the attention of the Privy Council.

President Tyler of the Grand Trunk Railway Company, estimates the cost of the St. Clair tunnel at \$486,000. The company expect to save £10,000 a year in transportation of freight and passengers by means of this tunnel.

The high level steel bridge on the St. Catharines and Niagara Central railway which is designed to cross the Grand Trunk at Merriton will be put in position early in February.

The Cochran Manufacturing Co., have lately erected a new building, 40 x 54 feet, two and a half stories high, at Dundas. The brick-work was in the hands of contractors Palmer & Hickey.

The number of workmen engaged in constructing the dyke which is designed to protect Montreal from damage by floods, has been doubled, with a view to completing the work on time.

Owing to the refusal of workmen to endanger their lives, the building of the great iron tower, 1,000 feet high which was intended to be the leading feature of the next world's fair at Paris, has been abandoned.

The recent disastrous fire at the Insane Asylum at London, Ont., has led to the consideration of the necessity of laying an 8-inch pipe to connect the institution with the city water works system.

The construction of a swing bridge over the canal at Fenelon Falls, Ont., has been commenced. When it is finished and the new railway bridge built, boats will be able to pass from Sturgeon to Cameron lake.

The contract for the east end of the Cape Breton railway has been taken from contractors Sims & Slater, of Ottawa, whose securities have promised the government to get competent men to push the work on more rapidly.

By the recent completion of three new locks, navigation has been opened on the Trent Valley Canal between Lakefield and Port Perry. The locks are 134 feet in length, 56 feet in width and have six feet of water on the mitre sill.

Toronto builders and plasterers are now charged by the city authorities 2½ cents net per barrel of lime for city water. They are also required to deposit 50 per cent. of the amount usually paid for water during the season. This regulation applies to all brick and stone work.

The Dominion Bridge Co., of this city, are constructing a railway bridge over the St. John river from Fredericton to St. Mary's, a distance of 2,000 feet. The superstructure of the bridge will be put on during the winter. The cost will be about \$350,000.

With a view to prevent too rapid, and consequently poor work, the *Engineering and Building Record* advocates a law prohibiting the adding of more than a specified number of feet to the walls of a building in process of construction in one day.

Mr. Y. K. Blatch, of the Department of Inland Revenue Ottawa, has been engaged three years on a large colored map showing the canals and water power of Canada, and competing canals of the United States. The map will also show canals proposed as well as defunct, profiles, lockages, and tables of comparative sizes of locks.

A very nice piece of engineering, by Chief Engineer Hobson, has lately been in progress at the crossing of the Grand Trunk over the Desjardines Canal. A new iron bridge is being put up in place of the old one, piece by piece and the work will be completed without delaying any of the trains.

The Chatham Dredging Co. are engaged in perfecting a drainage system, which, by the aid of earth embankments and pumping machinery, will reclaim some 5,500 acres of swamp land in the township of Tilbury, Ont. The cost of the work will be \$45,500, and the undertaking is expected to be complete by next June.

The total number of building societies in the United Kingdom is 1,846; they have a membership of 581,681—an average of 315; they have a total annual revenue of twenty and a half millions sterling—an average of more than £10,000; their total liabilities amount to £51,193,459, and their total assets are returned at £52,931,611.

A few miles beyond St. Thomas, on the Canada Southern railroad, is a very deep ravine, across which an arched bridge about sixty feet long, composed entirely of stone, has recently been constructed. It is very high, and said to be the largest arch bridge of the kind in Canada, and is considered a triumph of engineering skill. The bridge is used both by the railroad company and as a wagon road.

On the 9th of Nov. the first truss of the great bridge to cross the Hudson river at Poughkeepsie, was finished and swung clear. It is 525 feet long between the centers of the towers, 82 feet deep and 32 feet wide; and is the largest and heaviest steel truss in the world. It carries a floor system on top for a double track. The piers are of steel 100 feet high standing on masonry piers 30 feet above high water mark. The foundations are sunk 125 feet below high water mark.

The Dominion Subway Company has recently been incorporated with a capital stock of \$100,000. Its purpose is to construct and operate underground conduits or other apparatus and appliances for underground electric and other wires and plant and pneumatic tubes. Among its leading members are Messrs. J. E. Hudson and W. H. Forbes, of Boston; Messrs. C. F. Sise, H. McKay, A. Robertson, J. R. Thibauden, G. W. Moss and R. Archer, of Montreal.

The Sault Ste. Marie canal has the second largest lock in the world. It is built of solid masonry, 560 feet long, 80 feet wide, with walls 40 feet high, the lift 18 feet, and the depth of the water in the basin 16 feet. This lock belongs to the U. S. Government and cost \$3,000,000, and will accommodate, four at a time, the largest vessels ever brought to these waters. A new and still larger lock to cost \$5,000,000, is now being constructed. The canal now has a larger daily traffic than the great Suez canal.

The enlarged Welland Canal is regarded as one of the grandest exhibitions of engineering skill in the world. The water level of Lake Erie is over 300 feet higher than that of Lake Ontario, and this canal has been built to allow loaded ships to pass from one lake to the other. For this passage 28 miles of canal and 26 locks are required. The small village of Port Colborne stands at the entrance of the canal. The first lock is built near the entrance, to keep back the swashing sea, after which comes a stretch of 14 miles through a farming country to the second lock, after which the locks are located about as thick as possible until Lake Ontario is reached. The greater part of the descent is in the upper half mile of the route, and it takes about 13 hours to get through the canal with no hindrances.

Plans have been adopted and contracts let for increasing the roadway of suspension bridge from ten to sixteen feet. Although the change will practically necessitate the re-building of the structure, it will be accomplished without interfering with railway traffic over the bridge. The present anchor plates on the New York side are 18 feet below the surface of the ground; the new plates will be 50 feet below the surface, 26 of which will be solid rock. The cables are composed of galvanized steel wires ropes 2½ inches in diameter, seven of these ropes forming one cable, each rope having a separate fastening to the before mentioned anchor bars. There will be one pair of cables on each side of the bridge seven inches in diameter, or four in all. On the Canadian side the anchorages will be similar, except that the anchor will be set 36 feet below the surface of the earth, owing to the fact that the rock comes to the surface of the earth at that point. The present cables are amply competent to carry the additional load of the widened bridge. They are of first-class charcoal iron, but as the moduli of elasticity of steel and iron are not the same it is impossible to equitably divide the load between the two sets of cables of different materials, necessitating the abandoning of the present cables for steel ones. The present suspenders by which the bridge proper is held to the cables are ¾ wire rope, for which ¾ wire rope will be substituted. The present truss system of six feet in depth will be changed to iron of twelve feet in depth, and all transverse beams will be of plate and angle iron, the flooring being secured to rolled I beams. The system of overhead stays will be abandoned, owing to the change made in the depth of the truss. It is the intention to abandon the river guys, substituting therefor a lateral wind cable system that will far more effectually perform the service imposed upon the river guys, and thus do away with the damage incident to them by floating ice and falling rocks, which has been an expense of no small amount. The work of stringing the cables has already begun, and the contract calls for the completion of the whole work by 15th April next.

PUBLICATIONS.

Dixie, the handsomest and brightest trade journal published in the Southern States, marked the attainment of the third year of its existence by issuing a special Christmas number, enclosed in cover of artistic design, lithographed in half a dozen colors, printed on the best of paper, and its pages sparkling with literary gems from the pens of some of the foremost writers on this continent. *Dixie's* special number deserves to be called a superb success.

The different fields for trade journals in this country are being rapidly taken up. The unoccupied area has been narrowed during the past month by the publication of the prospectus of *The Canadian Shoe and Leather Journal*, to be published in this city about the first of February by the Journal Publishing Company, under the management of Mr. James Acton. We wish the new venture success.



BOILERS FOR STEAM HEATING.

By Geo. C. Row.

A BOILER intended to be used for a steam heating apparatus, should be designed to hold a large proportion of water for the amount of heating surface, and the heating surface should be large in proportion to the grate surface—that is, the proportions should be larger than is usual in boilers intended to be used for steam engines.

The reason for this is, that in a heating boiler a slow fire may be used with great economy, and as the boiler will most likely be often left for a length of time without any attention being paid to the fire, there should be a sort of reservoir of heat stored up in the water.

It is also advantageous in such boilers to have a large quantity of brick-work about the furnace, which will absorb heat when the fire is strong and give it off when the fire is low, and thus tend to maintain a more uniform temperature in the boiler.

Cast iron sectional boilers are often used, but they are most frequently recommended on account of some other reasons than their real value as safe and economical boilers to use. They may be convenient to make, and easy to set up in position, and hence from a maker's point of view be good boilers; but the man who pays for the coals, and the woman who grumbles about the want of heat on a cold day, find by experience that there are other ways of determining whether or not a boiler is a good one. The use of a boiler in a steam heating apparatus is merely to absorb the heat produced in the furnace, and by so doing change water into steam, which is conveyed by pipes to the radiators, where it again gives off the heat while changing steam to water.

There are thus four elements in the complete apparatus, viz., the furnace, the boiler, the piping and the radiators. And there should be a complete cycle going on by means of these, which may be described thus: heat absorbed producing steam from water, and heat radiated producing water from steam. Defects or derangement in any one of these four, will affect the working of the whole, and sometimes it is very difficult to determine exactly where the difficulty really is. Hence frequently a boiler is blamed as being a bad heater, when the trouble really is in the furnace or chimney. In other cases, the fact that in a certain boiler steam can be very quickly got up, is held to be sure evidence that it will answer well for heating, while really the getting up steam quickly is merely evidence of the small quantity of water in the boiler.

In a certain large steam heating apparatus several upright tubular boilers were put in by the designer, who reckoned the amount of heating surface in the boilers by calculating the whole length of the tubes as available and useful for steam making. When the job was started, it was found that while the mains were hot, the radiators remained comparatively cool, and the building could not be heated. By adding more boilers the difficulty was removed, and the apparatus worked all right. The mistake of having the boiler too small is much more frequently made than that of having the boiler too large.

It is better to estimate the boiler by its capacity for evaporating water into steam, than by its heating surface; as no proper comparison can be made between a vertical tubular boiler with fire-box, and a horizontal tubular boiler with brick furnace, if the square feet of heating surface in each be the only dimension given. But if the number of pounds of water at a given temperature which each is capable of making into steam of a given pressure be stated, then a fair and useful comparison can be made, and more especially if the amount of fuel used be also known.

It is usual to state for comparison the number of pounds of water of 212° temperature evaporated into steam at the pressure of the atmosphere per pound of coal as the measure of the evaporative power of the boiler. Thirty pounds of water evaporated in an hour is called a horse power. The term applied to boilers is very confusing, as it is often supposed to have the same meaning as the "horse power" of an engine, whereas there is really no necessary connection between the two; except that it is supposed that an engine ought to do a horse power of work for each thirty pounds weight of steam which it gets from the boiler. Some engines will do a horse power of work with twenty pounds weight of steam, and others will need no less than sixty pounds.

The boiler that is most successful for heating a building, is the one that supplies all the heat needed in the coldest day and gives the least trouble at all times.

costs about \$2. The other cup, B, is a simple engine oil cup with cap, but the appliance (clasp, etc.), connecting with the fresh air inlet pipe has to be made to order.

the required point, fifteen pounds. If a leak is shown, a little soap and water applied to the pipe or suspected place, will show the position of the leak by the formation of a bubble.

TESTING HOUSE DRAINAGE SYSTEMS.

In the proposed law governing the erection of buildings in cities in Illinois, recently before the legislature, Section 13 provides that "Every soil and every waste-pipe hereafter constructed and placed as such in any such city or village, shall be of cast-iron, or brass, or porcelain (except subordinate, lateral and connecting pipes not exceeding eight feet in length, which may be of lead.)

At the various conferences which were held to consider this bill, this section was abundantly discussed, and particularly the manner in which the test should be applied. It was stated that a column of water in the soil-pipe might, in some cases, give too great a pressure at the foot and not enough at the top, while an air test would give an equal pressure throughout the system, but defects would be difficult to discover.

The inspector of plumbing in the city of Minneapolis, Minn., Mr. Hazen, has designed a pump and gauge for applying the air pressure test to systems of plumbing, and the Northwestern Architect gave illustrations of its construction and use which we herewith reproduce, giving in addition some particulars of the apparatus supplied by the Sanitary News.

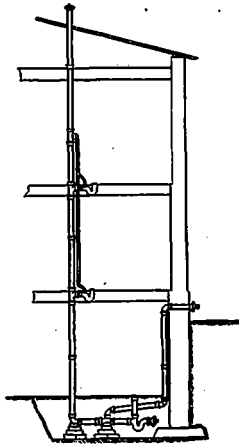
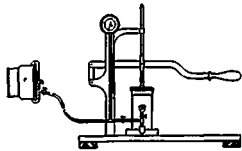


FIG. 2 shows the iron system of house-drainage complete, including the running trap and fresh air inlet; traps for water-closets and wastes for fixtures are all calked in, the traps wiped on to wastes and the wastes pinched together at top and soldered.

In using this apparatus to test a system of plumbing it is necessary to have a two-inch, or a four-inch, iron plug with rubber gasket to fit on the shoulder of the fresh air inlet pipe, held in place by a clamp over the end of the hub, with a set screw in the center is screwed down on the plug.



The test pump devised by Inspector Hazen is not patented and any mechanic is at liberty to construct one like it. In making the pump, brass pipe is used, and the joints may be soldered after having been screwed together. The gauge is an ordinary steam-gauge, and

Two New York plumbers were recently fined \$50 each for defective work.

The Kingston Electric Light Company have ordered 650 incadescent lights to be used for lighting stores and private houses.

Winnipeg contemplates the construction of an extensive sewer system and other sanitary improvements calculated to reduce there.

Mr. Michael Hurley, Quebec, the patentee of an invention for heating railway trains by steam, has received an order from the government to introduce his patent into one of the Intercolonial trains.

Natural gas has been conveyed into dwelling houses in the vicinity of Petrolea, Ont., and is said to afford a steady uniform heat for cooking. The method of using the gas is said to be to throw it on the wood and ignite it.

By request of the Dominion Government, Dr. Montizambert, quarantine officer at Grosse Isle, on the St. Lawrence river, recently paid a visit to New Orleans and made an inspection of the very excellent quarantine service maintained at that point.

Carefully framed by-laws similar to that now in operation in Toronto, regulating the manner in which plumbing shall be done, will serve to develop reading intelligent class of workmen, and weed out of the business the inferior men whose carelessness has destroyed the health and lives of many residents in large cities.

According to Dr. Hunt, secretary of the New Jersey State board of health, diphtheria is largely due to damp cellars which are suddenly heated in the fall, and his theory is verified by various reports where the disease has raged. It is claimed that during the summer in many cellars a good deal of vegetable matter is allowed to decay, and when the fires are started in the fall this decayed matter is stirred up and mingled with a peculiar dampness, which must be in the cellar, and it pervades the entire house.

One of the recommendations urged in favor of the use of electric lights in the interior of buildings is its great superiority in point of cleanliness over gas. It certainly does not coat ceilings and pictures with the grimy layer which gas burned in large quantities is sure to do. However, it is remarked at Washington that the use of the electric light has led to an enormous increase in the number of spiders' webs in public buildings of the city. The light attracts flies and moths, and insects, of course, attract the spiders. It is complained that in many cases the cobwebs cluster so thickly as quite to hide the ornamental details and to obscure the architectural outlines in the interior of the edifices.

BUILDING MATERIALS.

Table listing building materials such as Yellow ochre, Green chrome, Portland Cement, and various types of bricks and tiles with their respective prices.

CEMENT, LINN, etc.

Table listing cement and linseed oil products including Portland Cement, White's Cement, and Grey Lime.

BRICK - M.

Table listing various types of bricks such as Canadian, Common, and Hollow bricks.

COMMON: CARGO LIST.

Table listing common cargo items like 1 1/2 inch siding, 1 inch siding, and 1 1/2 inch clear and pick.

FRONTS:

Table listing front materials such as Craton, Chicago pressed, and various types of fronts.

CEMENT, LINN, etc.

Table listing cement and linseed oil products including Portland Cement, White's Cement, and Grey Lime.

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Table listing various types of paints and enamels such as White lead, Red lead, and Enamelled iron.



A HANDSOME BUSINESS OFFICE.

THE illustration on this page shows the handsomely decorated interior of the private business office of Mr. J. Ross Robertson, proprietor of the *Evening Telegram*, of this city. In elegance of appointments and elaborate decoration, it is perhaps not equalled in Canada. The room opens off the main business office, and owing to the size of the latter, is necessarily small. It is L-shaped, and in order to relieve its smallness, one side of it is entirely framed with mirrors, which apparently enlarge the apartment. The transoms of the two windows looking out upon Bay Street, are of variegated stained glass, one representing steam and the other electricity, the former being a picture of three cherubs harnessing the vapor that floats out from the old tea kettle of Watts' vision, and on the other cherubs are

OMENEH, ONT.—The Presbyterians contemplate building a new church.
 KINGSTON, ONT.—The sum of \$100,000 is to be spent in reconstructing the city water works.
 LONDON, ONT.—There is an impression abroad that London needs a new city hall.
 PARIS, ONT.—The erection of a new city hall to cost nearly \$20,000 will probably be undertaken shortly.
 HUNTSVILLE, ONT.—Tenders for the erection of a public school building to cost \$5,500 will be called for shortly.
 STRATFORD, ONT.—Stratford is badly in need of an opera house and steps will probably be taken in the spring to erect one.
 SMITH'S FALLS, ONT.—Mr. John McLaren will build this winter a four storey brick hotel, 60 x 80 feet, to cost upwards of \$10,000.
 TRENTON, ONT.—The contract for the erection of a new post office in this town, has been awarded to Mr. Walter Alfred, of Belleville.

PETERBOROUGH, ONT.—Architect J. E. Delcher is preparing plans for a handsome summer hotel building, to be erected in the spring at Chemong Lake Park, about five miles from Peterborough, by a joint stock company.
 LINDSAY, ONT.—The erection of a new post office to cost \$40,000 and a collegiate institute to cost about \$30,000 will be commenced here shortly. Contracts are now being let for many new buildings to go up in the spring. In fact this town looks forward to quite a building boom next season.
 QUEBEC.—It is understood to be the intention of the Dominion Government to continue the carrying out of Lord Dufferin's scheme of embellishment for Quebec, by giving out shortly the construction of Prescott and Hope gates to contract.
 OTTAWA, ONT.—A new suspension or cantilever bridge cross the Ottawa river from the old ferry at Rockcliff to Gatineau Point, is being talked of. The bridge would be interprovincial, and its cost, which is estimated at \$750,000, would probably be borne in part by the governments of the Dominion, Ontario, and Quebec.—Contracts for about fifty miles of the Oxford and New Glasgow railway have been let by the Department of Railways and Canals in four sections as follows: Sections one and three to J. O'Brien, of Renfrew, Ont., and Thomas Cooke, of Oxford, N. S.; section two to D. M. Sutherland, of Shubenacadie, N. S.; section four, to Archie Stewart and Ralph Jones, of Ottawa. The total cost of the four sections will be about \$420,000.
 MONTREAL, QUE.—A five-story stone and iron building is to be erected on the site of Northmeier's Hall, St. James Street, to include three stores on ground floor and wareroom above.—The



A HANDSOME BUSINESS OFFICE.

snatching the lightning as it darts from the clouds. The windows are shaded with heavy plush curtains. The floor is covered with velvet carpet, while a chandelier of rich ormolu work depends from the centre of the ceiling. The ceiling and walls are hung with *Lincrusta Walton*. The general tone of the ceiling is buff, while the raised designs are of delicate lilac and pale copper bronze. The cornice, enriched with artistically wrought friezes, is olive shaded while the dull bronze of the lions' heads that adorn the upper frieze is relieved by electric blue which gives the room a bright and pleasant appearance. The decorative work was done throughout by Messrs. J. McCausland & Son, of this city. The furniture, a walnut suite, consists of a massive and handsome Wooten desk with comfortable writing chair and heavy library chairs in Morocco leather. Vases for flowers, photographs and various articles of *virtu* are placed about the room. Upon a mottled marble pedestal is a fine specimen of statuary called "The Coquette of Florence," while upon an easel opposite rest the etchings of "A Lancashire River," and "Breaking up of the Agamemnon." "The Old Politician," by Guzzardi, and other fine paintings decorate the walls. Within easy reach is a set of speaking tubes affording communication with every room in the building.

CALGARY, N. W. T.—It is expected that the Government will spend something like \$100,000 in the erection of new police buildings next season.
 HAMILTON, ONT.—As soon as the necessary sum of \$7,500 can be raised to complete the building fund a new Y. M. C. A. building will be erected.
 PORT HOPE, ONT.—Mr. Hamilton McCarthy, of Toronto, has been given the contract for the work on the memorial statue of the late Col. Williams.
 BELLEVILLE, ONT.—\$23,000 has been subscribed towards the capital stock of a company which is being organized to build a bridge over the Bay of Quinte.
 WARTON, ONT.—This town has contracted with Mr. J. Ronald, of Brussels, to build water works at a cost of \$7,500, exclusive of engine house and docks.
 BOWMANVILLE, ONT.—Public School Board are about to rebuild a school lately destroyed by fire, to include all latest improvements in heating, ventilation, &c.
 AURORA, ONT.—Messrs. McQuillan & Co., of Parkdale, have the contract for putting in a system of water works here, the price, exclusive of the well and tank-house, being \$8,600.
 MOUNT FOREST, ONT.—The new high school building designed by architect Ritchie and built by contractor Gray of this town, cost \$12,000, and is believed to be one of the most complete in the province.
 NEW HAMBURG, ONT.—The Church of England congregation are raising funds, and will shortly begin the construction of a new church from plans supplied gratuitously by Architect F. Darling, of Toronto.

Canadian Pacific Railway Company will erect Mammoth Stables capable of housing 400 horses, for the accommodation of ranch horses in transit to England.—In view of a probable deficiency in the city water supply, during the present winter, the Water Committee will endeavor to secure a loan of \$1,500,000 to complete the aqueduct, which would afford such a head of water as would make it possible to pump between 40 and 50 million gallons per day by hydraulic pressure, alone, and more than double the present supply.—The C. P. R. Company will build large workshops in the east end of the city.—Contractors Davis & Sons, of Ottawa, will build the new C. P. R. depot on Windsor Street.—Several new hotels for Montreal and its suburbs will probably be commenced in the spring, a site having been selected in the centre of the city for a large commercial hotel. New summer hotels will also be built at Lachine, Belœil, and Lacombe.
 TORONTO, ONT.—The Consumer's Gas Company will erect a two story brick retort-house to cost \$60,000 and a purifying house to cost \$40,000.—The City Council are considering the matter of establishing a Collegiate Institute in the Northwest part of the city.—A new agricultural hall will probably be built here in the spring.—It is proposed to spend some \$20,000 in improvements to the exterior and interior of St. James Cathedral.—Wm. R. Gregg, architect, 9 Victoria St., reports: Dwelling house on east side of Bellevue Avenue, near Oxford St., of red brick with Ohio stone dressings, for Jos. Gibson, Esq.; residence for Geo. McKibbin, Esq., on the north side of Wilcox, near St. George St., white brick and brown stone; pair of dwelling houses on west side of McCaul St., near College St., also for Mr. McKibbin; pair of semi-detached houses of red brick, N. E. corner of College and Howland Place for Dr. McPhedran.



HEAD OFFICES OF THE CANADA LIFE ASSURANCE CO., TORONTO.



PAGE

MISSING



A DEAD BLACK PAINT.

PROBABLY many of our readers, especially those who are the possessors of optical instruments, have, at some time or other, been in need of a "dead black" paint or varnish for brass work, such as tubes diaphragms, etc. We have often been in the same boat, and all the formulae and recipes given in the books were unsatisfactory because of their vagueness. The following can be relied upon to give a first-rate dead black, and it is easily made: Take two grains of lampblack, put it into any smooth, shallow dish, such as a saucer or small butter plate, add a little gold size, and thoroughly mix the two together. Just enough gold size should be used to hold the lampblack together—about three drops of such size as may be had by dipping the point of a lead pencil about half an inch into the gold size will be found right for the above quantity of lampblack; it should be added a drop at a time, however. After the lampblack and size are thoroughly mixed and worked, add 24 drops of turpentine, and again mix and work.

WARPING OF WOOD.

IT is said that the wood on the north side of a tree will not warp as much as that from the south side and that if trees are sawn in planes that run east and west, as the trees stood, it will warp less than if cut in the opposite direction. However this may be, it is certain that the tendency to warp when sawed into boards is much greater in green than in dry wood, and that the convex side of the curve is always toward the heart. This warping, due to unequal shrinkage, and to the more open texture of the external portion of the tree, is not found to occur in the middle plank or board of the log, excepting as it may in slight degree reduce the breadth. This quality of not warping, which is in many cases absolutely indispensable for certain uses, as for example, in the sounding boards of pianos, is secured in the case of spruce timber by first quartering the logs, and then sawing them with the angle downward. It is then sawed into boards very nearly at right angles with the line of annual growth, and a small triangular strip must be taken off to make the board square edged, but qualities of stability and strength are secured that could not otherwise be had.

HOW MIRRORS ARE MADE.

ONE of the factories in Chicago employs 150 men and boys, and its spacious four floors present an interesting series of sights to visitors whose nerves are steel and tympani proof against splitting. On the first floor he will see huge stacks and piles of glass in assorted sizes ranging from sixteen feet by seven feet square down to the smallest ovals for mirrors. These are all polished, some being run over by huge felt-covered wheels kept powdered with rouge, and the larger sheets scrubbed by sweating toilers with hand blocks covered with felt like the printer's proof planer in rouge. After the glass is thoroughly polished it is taken up to the next floor, where it is laid on tables and cut into the sizes ordered. It then passes into the hands of the bevellers, who, with sand and water and large grindstones, artistically finish the edges of the glass. It takes a trip upward again, to another floor, and is once more put through a polishing process, to remove any scratches or blemishes that may be on the glass. After every spot or scratch, no matter how minute, has been removed, careful hands convey the now beautiful and sparkling glass to the room where it goes through the final process, the silvering. Huge jables of cast iron or stone made like billiard tables, with raised edges, are used in the silvering room. These tables are of great strength and solidity, and all round the edge is a drain, for the superfluous mercury is poured over the tables in quantities sufficient to float the glass, which, after being inflated, is gently and carefully pushed across the table containing the mercury. Great care must be used to prevent blemishes, the least speck of dust being ruinous to the mirror. Mercury, like molten lead, is always covered with a dirty-looking scum which cannot be removed by skimming. The least bit of this scum would spoil the mirror, so the difficulty is obviated by showing the scum along the edge of the glass. After successfully floating the glass on the mercury, a woolen cloth is spread over the whole surface and square iron weights are applied

until the whole presents a compact mass of iron, two or three pounds to the square inch. After this pressure has been confined ten or twelve hours the weights are removed and the glass placed upon another table with slightly inclined top. The inclination is gradually increased until the unamalgamated quicksilver is drained away and only the perfectly amalgamated remains, coating the glass and perfectly adherent. This ends the process, and the erstwhile rough piece of glass emerges from the silvering room a gorgeous mirror.

TERRA COTTA AS A BUILDING MATERIAL.

THE recent introduction into Canada of terra cotta for building purposes, suggests a few remarks on the manner of its use, and its value for the purposes it is designed to serve. As a building material terra cotta is chiefly intended for decorative and protective purposes. It takes the place of expensive stone carving for exterior and interior decoration. As a fire-proof material, it ranks among the very best. Blocks or tiles of terra cotta may be used to advantage for roofs and walls of buildings including a constructive frame-work of columns, posts, brackets, beams, girders, rafters, etc., on which the support of the building depends. Mr. S. E. Lording writes on this subject in *Building*, says: "All the iron-work is incased in porous terra-cotta, tile, or brick-work. Slate, tile, and furring strips are nailed or screwed to this porous tile sheathing."

"The hollow or porous tiles or bricks forming roof and wall are faced with vitreous tile, slate, or other water and weather proof coatings, or with a single thickness of brick or tile. The interior faces of these porous terra-cotta tiles may be plain or paneled, and glazed, or finished with plaster, paint, etc. Any desired wall finish can be applied to this ground. The porous tiles forming the sheathing in roof and floor or wall are made spongy, or like a porous-stone body, by thoroughly and evenly mixing equal or various proportions of sawdust or other combustible or vegetable matter with pure clay. When carefully burned, to avoid sudden shrinkage or melting together of the particles of clay, the spaces left by the burning of the combustible materials form an open, spongy body that increases the value of the burned clay-work as a non-conductor, decreases its weight and its liability to crack when heated and cooled suddenly, and will allow screws or nails to be driven into this porous clay-work and securely fasten to this sheathing or ground-work the tiles, slates, interior furnishings, flooring, etc., required in finishing and decorating the exterior and interior walls and floors. The use of iron or steel secures a light, strong construction, and when incased in porous terra-cotta or concrete, the combination forms a complete wall protection against any fire that would destroy this supporting frame-work."

"Above this fire-proof web or wall, the furring strips or scantlings of any required size may be placed, leaving the required space for water, gas, and heating pipes, etc., and supporting the floor or the flooring or wall finish." This principle of construction applies to all stories. We started with the roof merely to show its special value there, the other floors that may be added only requiring the additional strengthening of the supporting columns as each story is added.

"Blocks or tiles, if of porous terra-cotta, also form the interior ground-work to receive both exterior and interior finish, making altogether a light, strong, fire-proof building. These walls, if supported in each story by this constructive frame, can be made much lighter. The whole structure will be as safe as a fire-proof construction; as, if heavier walls were built from the foundation extending through several stories, and heavy enough to support themselves, while they protect the constructive steel or iron framework which supports the floors and roofs of the building. With such a construction brick or stone work should not be used above the ground or foundations to support floors and roofs."

"The highest uses of clay and stone are to protect and to decorate, and when applied to these purposes, then massive or heavy walls of stone or brick will not or need not be built. Light walls of porous or hollow material, insulating and protecting a metallic or wood frame-work, will be used. These light walls, as stated above, may be as useful and still lighter, if they also rest upon and are supported by this iron or steel frame-work."

In the construction of ordinary dwelling houses for outside walls and inside finish it costs no more than for lumber but giving the additional advantages of a warm dry vermin proof building, impervious to sound, cool in summer, and at small additional cost can be made absolutely safe from fire. The porous terra-cotta costs less for fire-proofing purposes than common brick, and architects' plans need but little if any changing either in details of construction or cost for application of this ware. Its cheapness and cost of application should warrant its use in hotels, places of amusement, public buildings warehouses and first-class dwellings. Its manufacture was first commenced in Canada by the Rathbun Company at Deseronto, Ont. Other companies have also been formed for manufacturing this line of material, and no doubt we shall see it coming into general use resulting in lower insurance rates and greater comfort and security to our people in construction methods in the direction indicated above.

It is estimated that over 300,000 worth of granite was shipped from New Brunswick to Ontario purchasers last year.

An incendiary attempted to set fire to Eglin's fish and deer factory, in Montreal, recently, but fortunately his plans miscarried.

There is reason for the belief that in the near future, glass and paper will take the place of many building materials of the present day.

Messrs. Snider & Stockle, of Plattsville, Ont., have placed a new engine in their brick and tile yard in anticipation of a large trade next season.

From the village of Rockwood, Ont., large quantities of building stone were shipped to Toronto, Brantford, Stratford, Berlin, and other places.

A granite tile 800 years old, taken from the tomb of William the Conqueror at Caen, Normandy, was recently on exhibition in a show window at Detroit.

It is reported that there has been discovered near Tilsonburg an immense bed of marble, side by side with the finest sandstone for building or paving purposes.

Mr. E. Buchanan, of the East Selkirk, Man., stone quarries, reports a poor demand during last season. He burned 25,000 bushels of lime which sold at 15 to 20 cents per bushel.

The Canadian Granite Company, of Ottawa, are preparing a table designed by Mr. Louis Faizer, and executed in gray granite, which is to be erected over the graves of Osagood and Rogers, two sharpshooters who fell in the Northwest rebellion.

There is a large supply of building stone, pronounced by architects to be of good quality, in the vicinity of Selkirk, Man. Specimens of it may be seen in the monument on the market square, in the post office, Winnipeg, and other important buildings.

Mr. B. V. Stahford, of Amport, lately finished a handsome altar and credence table for the Anglican church in Torbolton. They are built of walnut and red oak. He has also manufactured a set of three chairs in walnut and fine hair plush for the pulpit of St. Andrew's church, Amport.

The manufactory of the Asphalt Pavine Co., at Ottawa, was totally destroyed by fire on the morning of the 1st. of December last. The contents of the building were also burned. The company gave employment to fifty hands. The loss amounts to about \$10,000; with insurance of only \$4,500.

Persons who may not know the nature and color of black birch after dressing and polishing, may be interested in knowing that the grain of the wood is very fine, the color mottled and slightly darker than satin wood. Black birch makes beautiful furniture, and the only complaint made against it for house trimmings is the care and extra time required in nailing the boards, to prevent splitting.

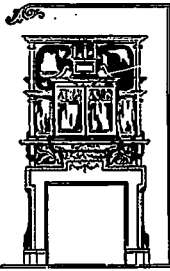
A NEW BUILDING MATERIAL.—A new building material called stone brick, harder than the hardest clay brick, is made from granite mortar, but a scientifically made and perfect mortar; in fact, a hydraulic cement and the grinding together of lime and sand in a dry state—including also some chromia, which is usually present in sand—and the subsequent heating by steam, give the mixture the properties of the burned hydraulic cements at present in use.

The Montreal branch of the International Terra Cotta Company, is now in active operation. The company manufactures porous earthenware, terra cotta lumber, brickwork, cellular pottery, etc., and their goods bid to enter largely into the building of the future. They show samples of blocks for exterior walls, covered with a perfect water proofing which closes the pores of the material, and prepares it for receiving coatings of paint in any ornamental style to suit. These blocks are as smooth as the pressed brick that go into the construction of buildings, and when laid in walls have the appearance of dimension stone.

Mr. John Radigan, of Hamilton, Ont., has lately patented and commenced to manufacture a circular corner metallic lath, a few particulars of which may prove interesting to architects and builders. The purpose of this invention is to provide a reliable ground for plastering on, in forming round corners or stucco partitions, and also in forming circular plaster columns. It is claimed that this metallic lath having no spring or shrinkage, will prevent cracking or breaking of the plaster. This metallic lath are made the same depth and thickness as the ordinary wood laths, so as to break joint with them, and are made curved inward on the outer edges to form an effective key to hold the plaster. Rounded corners of any required radius can be made. Each lath is formed of strong sheet iron rigidly curved, and is held on by nails at each end driven into the stud, and can be used to form both corner and angle stud corners. In curves of six inch radius, the corner or angle stud can be dispensed with, and the ordinary angle head is not required. Seven of these circular metallic laths form a foot in height on the partition, leaving the ordinary key between them.

Some years ago, says a contemporary, the following whitewash was used on the east end of the White House, and is as good to-day as when first applied: Take one half-bushel of nice unshucked lime; slack it with boiling water, cover it during the process to keep in the steam. Strain the liquid through a fine sieve or strainer, and add to it a peck of salt previously dissolved in warm water, three pounds of ground rice boiled to a thin paste, one-half pound of powdered Spanish whiting, and one pound of clean glue which has been previously dissolved by soaking it well, and then hang it over a slow fire in a small kettle within a larger one filled with water. Add five gallons of hot water to the mixture, stir it well, and let it stand for a few days covered from dust. It should be put on hot, and for this purpose it can be kept in a kettle on a portable furnace. It is said that about a pint of this mixture will cover a square yard on the outside of a house if properly applied. Fine or coarse brushes may be used, according to the neatness of the job required. It answers as well as oil paint for wood, brick, or stone, and is cheaper. It retains its brilliancy for many years. There is nothing of the kind that will compare with it, either for inside or outside walls. Buildings or fences covered with it will take a much longer time to burn than if they were painted with oil paint. Coloring matter may be put with it and made of any shade desired. Spanish brown will make a reddish pink, when stirred in, more or less deep according to the quantity. A delicate tinge of clay is very pretty for inside walls. Finely pulverized common oil well mixed with Spanish brown makes a reddish stone color; yellow ochre stirred in makes yellow wash, but chrome goes further and makes a color generally esteemed prettier. It is difficult to make rules, because tastes differ. It would be best to try experiments on a shingle and let it dry. Green must not be mixed with lime, for it destroys the color, and the color has an effect on the whitewash which makes it crack and peel.

Mr. John Page, Chief Engineer of Canals, will arbitrate upon the claims of Mr. A. P. Macdonald for extras in connection with his contract on the Troy Canal.



J. WRIGHT F. WRIGHT J. SYCAMORE

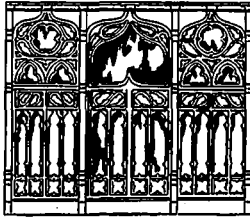
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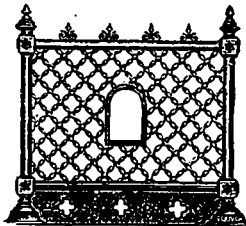
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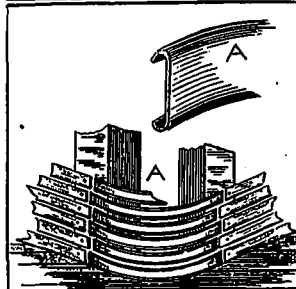


ENLARGED SECTION SHOWING HINGES

It is singular, but nevertheless a fact, that in the almost innumerable inventions of the 19th century, it has been left to the year 1887 to present to the public a simple device, whereby any person can take out a window sash without the use of screw-drivers, chisels, hatchets, or some other tool to remove the stops which are more or less defaced and injured in so doing. A few removals show the wear and tear they are subjected to with almost a certainty that they will not be placed back again in exactly the same position they were taken from. The window becoming loose, rattles and annoys. When cleaning is required, a person jeopardizes life and limb by getting out on the window sill of the second, third, or fourth story for that purpose. If glazing is needed, often a ladder must be brought into requisition. By the use of this simple invention all the above difficulties are overcome. Fig. (1) illustrates the sash being removed with perfect ease. Fig. (2) is an enlarged view of the section which is inserted in the side of the frame; the window is raised to the point showing the indentation, then pressed gently to the right, when section (2) recedes into the frame sufficiently to allow the sash to clear the stop on the opposite side; when the cords are detached and attached to the hooks on the face of the frame, the sash can then be taken to the kitchen and washed without making slops around the carpet. The action of the hinges through section (2) immediately back flush with the casing. The upper sash is provided for and removed in the same way. The attention of architects and builders is called to this invention. Its simplicity and utility recommends itself at a glance. No person building but will adopt it. It can be inserted in old frames with little expense. To the trade, architects and builders, hinges will be supplied at \$1.50 per dozen pairs. Send for sample dozen and test their utility. The patent for sale in county rights, or entire Dominion. For further information, apply or address—

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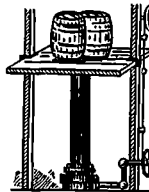
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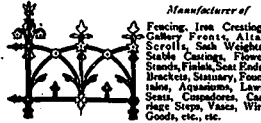
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