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IT is singular that, with a very good and detailed building-law, enforced by capable and honest officials, the City of New York is the scene of many accidents due to bad construction; and strangely enough, in the great German cities, particularly Berlin, where building-regulations are still stricter than with us, and are enforced by the police with the utmost strictness, such accidents are quite as common as in New York. The last catastrophe reported is the fall of a tenement-house in process of construction on Madison Avenue, after the walls had been carried up to the third story. One workman was killed by the fall, and eight injured. So far as can be judged by the accounts in the newspapers, the fall of the building was due simply to bad workmanship. The fact that the lot was sold at auction in June for $14,650, and in August was conveyed by the purchaser, subject to mortgages to the amount of $19,000, to another party, who obtained a building-loan for $12,000 more, suggests a sort of speculation which is becoming very common, and which does not conduce to sound construction. However this may have been, the work of building appears to have been carried on in the cheapest and poorest manner. The twelve-inch walls are reputed to have been made with two four-inch walls of good brick, filled-in with bats, and probably laid in inferior mortar. Every architect knows the behavior of this sort of wall under a load, and it is not surprising that it should have held out only to the third floor.

AS nearly all the accidents to new buildings which have occurred in New York are traceable to this method of constructing brick walls, it is becoming an important question whether there is any way of preventing such construction. Although, in the present case, the three inspectors of the Building Department in whose district the work was carried on were immediately suspended, it is not likely that they could have prevented the trouble. It is needless to say that no supervision, short of stationing an inspector at the elbow of every workman, can prevent bad workmanship. On an average, each of the Department Inspectors has about seventy buildings to look after, and it is, of course, impossible to watch details of workmanship, except so far as the results of bad work may be visible after its completion. Where, as in the case of a badly built wall, the defects are concealed as soon as the work is done, neither inspectors nor architects can guard against them, although they may, as in this, and many similar instances, be the cause of the ruin of the building and the loss of innocent lives. It has been proposed that the bricklayers', carpenters' and other unions should interest themselves in the matter of detecting and preventing bad workmanship, and some of them have done so to good effect; but it may be doubted whether the labor leaders generally have shown sufficient conscientiousness and good judgment to be entrusted with extensive powers in this direction. Probably the best way to better workmanship lies, for the present, in holding owners and contractors to strict liability for the acts or neglect of the people whom they employ. Every architect knows that many workmen are possessed with a sort of malicious instinct, which finds positive enjoyment in doing bad work surreptitiously. Some of these worthies, when employed directly by the day, and using materials furnished by themselves at a large profit, will use brick-bats, instead of good brick, in the interior of a wall; will shut up flues a few feet above the fireplace to which they belong, and will commit all sorts of similar mischief, apparently for the sole pleasure of betraying confidence, and doing secret injury Such workmen as these ought to be driven from the community without delay; and to hold their employers responsible for their acts is the most available method of identifying them, and either reforming or eliminating them. In the case of owners, while the moral responsibility for the employment of a bad contractor is not so evident as where a contractor employs a bad workman, it is reasonable to suppose that an owner should know something of the difference between an honest and responsible mechanic and the miserable thieves who go about underbidding the better men; and, if he chooses to employ a person who offers to do work for less than its value, in the hope of making a profit by robbing somebody, he ought to be held to a certain liability for the consequences, where these affect innocent parties.

THE Boston Art Commission has taken action this week in a very difficult matter, as it involved considerations of a very delicate nature, and we feel they deserve strong commendation for the decision they have reached. In declining to accept the statue of the Bacchante for the Public Library they were compelled to decline a piece of really artistic work and so run the risk of hurting the feelings of an artist of acknowledged ability and repute, while at the same time they certainly incurred the danger of wounding the *amour propre* of another artist, the architect of the Public Library itself, who desired to present this statue to the institution as a token of the great and well-sustained interest he felt in the work as a whole. Besides this, as the French Government had so high an appreciation of the artistic qualities of the Bacchante that they had ordered a replica of it for the Luxembourg, the Boston officials had to set their opinions against a verdict of some weight that had already been rendered. The decision we feel is wholly righteous, since to accept MacMonnies's statue for the particular site in question, where it would be the central feature of the court-yard, would offend every principle of appropriateness, suitability and decency. Probably whatever discussion may ensue will centre about the propriety of placing a nude female figure in a public place, but to our mind this is the least important consideration. It is not so much to the impropriety of the figure as to its total inappropriateness that we object. In the whole range of mythology, we doubt whether a less appropriate theme could be found for a statue in a public library than a dancing naked bacchante, and to have such a subject offered for such a site by an architect who finds Minerva's head the most suitable decoration for the keystone of the main entrance arch is a curious lapse that verges on illiteracy. If the figure would have been inappropriate, no less would it have been unsuitable, for what less suited to be the central feature of a water-fountain than the figure — no matter how beautifully poised or how skilfully modelled — of a naked woman, with the face of a hag (as the photographs show it), in hydrophobic saltation?

SOME of the New York papers are discussing the practicability of supplying cold to dwellings and apartment-houses, by means of brine, chilled by the expansion of ammonia, and allowed to circulate through a tank, in the same way that the cold-storage houses of our cities are kept at a low temperature. By enabling housekeepers to dispense with ice, these miniature cold-storage closets would form an excellent and economical substitute for the old-fashioned refrigerators, and the brine-chilled refrigerators are better than those cooled with ice, in being perfectly dry, as the cooling-pipes, which are kept at a temperature of about twenty degrees Fahrenheit, condense upon their surface the moisture in the air around them, and freeze it into a mass of frost-crystals, which often covers the pipes to a depth of an inch or more. In St. Louis, chilled brine for cooling purposes is supplied by a company, from mains

laid in the streets; but in the cities where cold-storage warehouses are not so common as in St. Louis, individual plants are likely to be required. According to the *Tribune*, a plant suitable for an apartment-house containing twenty-five families costs about five thousand dollars, but it thinks that the extra rents that tenants would pay for sharing in its use would afford a large interest on the investment. It is likely that opinions would vary on this point. The owners of some apartment-houses in New York already supply their tenants with ice gratuitously, as a special attraction; and it is probable that anything so simple as a cooling-pipe service would soon come to be regarded by tenants as a luxury to which they were entitled, without paying any extra rent for it. Under such circumstances, it seems as if small individual cooling-machines would be useful, not only to owners of apartment-houses, but to housekeepers in general. If we are not mistaken, the Raoul Pictet Company, in Paris, makes a domestic ice-machine, which sells for fourteen or fifteen dollars, and will freeze an ice-cream, or a carafe of water, in a few minutes; and it seems as if such a machine might easily be made to chill a tank of brine of sufficient size to keep a refrigerator of moderate size cool, with no further expense or trouble than that involved in turning a crank for a few minutes each day.

IT is interesting to observe the change in the way in which the English trade-unions are managed within the last few years. Instead of being utilized as the cat's-paws of glib-tongued adventurers, with a taste for notoriety, they have recently devoted an appreciable amount of time to the advancement of their own interests, as distinguished from the senseless abuse of other people which formed the sole stock in trade of the labor-reformers of the old type. It will be remembered that, at the last Parliamentary election the most prominent of the demagogues who had hoisted themselves into Parliament by flattering the labor organizations were unceremoniously dropped; and the recent Trades-Union Congress at Edinburgh showed a still more pronounced tendency in the workingmen to act for themselves, instead of putting their affairs in the hands of professional agitators. At the beginning of the Congress, the credentials of the persons who presented themselves for admission were strictly scrutinized, to see whether the bearers were really workingmen, or only oratorical hangers-on of the workingmen's associations. The avowed object of this scrutiny was to exclude socialists and anarchists, and confine the deliberations to people really belonging to the professions represented in the Congress. This, of itself, gave to its deliberations an importance which the proceedings of such assemblages, however violent and revolutionary in expression, have never had before; and it seems really possible that in the future the workingmen's associations may make valuable contributions to social science, and win respect and regard for their thoughtful common-sense, instead of making themselves ridiculous, in their public appearances, by threats of robbery and assassination against Capital, that is, their employers, demands for division of goods, or a "universal strike," and so on. So far as its conduct went, the proceedings of the Edinburgh Congress were unexceptionable. The President, Mr. Mallinson, a shoemaker, delivered an address, which is said to have been strongly anti-socialist, and made the excellent point that the socialists were much more successful in pointing out evils than in suggesting remedies for them. In regard to education, the Congress expressed the wish that improvements should take the direction of "equality of opportunity" for everybody, a sentiment which every American will applaud; and it criticised, not without reason, the failure of the present Ministry to keep its promises in regard to arbitration laws. It is to be noted, however, that with the resumption of the direction of union affairs by men who keep their brains in healthy condition by good, hard work with their hands, the anxiety of organized labor for Government paternalism has suffered a curious diminution. Two or three years ago, under the lead of the demagogue calling himself Keir Hardie, the Congress voted a demand that "all land and money," and "all the instruments of production, of distribution and of exchange," should be "nationalized," or, in other words, seized by the Government. This year, the Congress, without Mr. Hardie's assistance, simply called for the nationalization of mines and railroads, a proposition which has, at least, the merit of being intelligible, while Mr. Hardie's defies all attempts at rational explanation.

A GERMAN society of engineers recently considered the question, why firemen in charge of steam-boilers should be forbidden, as they almost always are in the "practical" text-books, to feed the boiler when any of its plates are red-hot. A commission was appointed by the society to investigate the subject, and report, and its report declared that, instead of avoiding the feeding of a red-hot boiler, the first duty of the fireman or engineer should be, on finding the water-line in the gauges low, and some of the plates or tubes red-hot, to open the feed-water valve immediately, to its fullest extent, so as to let in a large quantity of water, and reduce the temperature of the plates as rapidly as possible. There is absolutely no danger in this, while there is danger in every moment that the plates remain exposed to the heat of the fire without the protection of the water. Another custom of firemen is, when the water gets low, and the plates heat, to rake the fire forward from the middle, with the idea of diminishing its intensity. This treatment undoubtedly, after a time reduces the fire, but its first effect, by stirring the coals, and shaking off the blanket of ashes which forms upon them when they are left for a time undisturbed, is often to increase the heat materially, and with it the strain upon the plates. A far better plan is to open the feeding-doors. This draws the air through the fire-box over the top of the coals, instead of through the grate, and soon checks combustion; while, according to the opinion of the commission, it is extremely advantageous to pour water on the fire, in as large quantities as possible. The principal danger to be apprehended from the over-heating of the boiler-plates above the water-line is the severe strain due to the difference in expansion between the red-hot portions of the plates, above the water-line, and the portions kept at a temperature of about 212°, by having one side covered with boiling water. This strain frequently cracks the plates, or opens the joints. When such an accident happens, the water from the boiler runs down into the fire; and, if a considerable quantity of water should be thus poured out upon a mass of glowing coals, the steam generated would rush from the fire-doors, filling the space in front of the boilers with suffocating clouds. Hence, when the water sinks low in the gauge-tubes, with a hot fire in the furnaces, it is dangerous to remain in front of the boilers, and still more dangerous to attempt any slicing or poking of the fire. Instead of this, the fire-doors should be opened, and the feed-water should be turned on, or the pumps or injectors set in motion; and, if possible, a stream of cold water should be poured on the coals, sufficient in volumes to extinguish the fire quickly, without allowing time for the evolution of a large amount of steam. It will be remembered that the Society of steam-users of Great Britain recently made a series of experiments in suddenly admitting water to red-hot house boilers, and found that there was not the slightest danger in doing so, and the extension of the tests to power steam-boilers is a matter of utmost importance.

LE GÉNIE CIVIL publishes a picture of the steamboat with rotating keels which has just been launched in France. Although only a trial model, the boat is one hundred and twenty-five feet long, and is furnished with engines of five hundred horse-power; so that its preliminary trips, which will probably take place in November, will be watched with great interest. The scheme for its construction originated in the consideration that a large part of the power of a steamship is taken up in overcoming the resistance of the water to the passage of the hull through it. The greater part of this resistance is probably due to friction, and the inventor of the new boat, M. Ernest Bazin, reflecting that, in all mechanical devices, friction is relieved by substituting rolling for rubbing contact, conceived the idea of making his boat consist essentially of hollow wheels, which would float, at the same time that they were rolled over, or through, the water. In the experimental boat, these wheels, which are six in number, are shaped like a double convex lens, and arranged in pairs, and carry, supported on their axles, a platform, on which is mounted the machinery. Besides the five hundred horse-power screw which serves for propulsion, another engine, of fifty horse-power, turns the wheels, at a rate corresponding to the speed imparted to the boat by the screw, so as to reduce the friction in the water to the lowest possible limit. It is hoped that the trial boat will attain a speed of twenty-two knots per hour in the Channel, where the practice trips will take place; and that a steamer of suitable dimensions for ocean travelling may reach thirty-two knots.

ESTIMATING FROM BILLS OF QUANTITIES.

Chapel for the Adirondacks. Parish & Schroeder, Architects.

IF time is money, as it is sometimes asserted, then the builders, contractors and material-men of this great country of ours, waste millions of dollars annually in *figuring*, or to use the correct phraseology in *estimating*. This assertion is proved by the fact, that the very first persons to suffer for, and to admit this waste of time, are the contractors and material-men themselves. How often do we hear them say, "I am about *tired* of figuring," etc.? Is it to be wondered at when the entire system they practise is antiquated and away behind the times?

In a recent issue of a local building paper, a San Francisco contractor drew attention to the enormous waste of time involved by the present unsatisfactory manner of estimating, and wished for some one to suggest a remedy. A year or two ago, a very able article appeared in the *American Architect*, entitled the "Problem of Waste," and when touching upon "estimating," the author denounced the prevailing method to be reckless, unscientific and unpractical. The San Francisco contractor of to-day, however, is even more explicit, for he does not hesitate to say the present system (if we can call it a system) is rotten, and he is about right, too.

But your readers will say "What is the remedy? What can we do? Contractors must live," forgetting for a moment what a struggle living has been the last year or two, in the building business. The remedy as regards "estimating," which I suggest, is in the hands of the contractors themselves. With their splendid organizations and with a builders'-exchange in nearly every town of any consequence, what is easier, if properly applied? In a few weeks there would be a revolution in the system of estimating throughout this country that would be of incalculable value to the contractors and material-men everywhere.

Figuring would, to competent men, then be a pleasure; risks of loss would be reduced to a minimum, and all without putting them to any expense. The remedy I suggest, believing it to be the only solution of the difficulty, is the unanimous adoption of a National System of Estimating from Bills of Quantities. Not necessarily the same systems as adopted in older countries, but a modification of them, especially adapted to American practice, and with up-to-date ideas. Let us here briefly consider some of the leading points of the subject. In the first place, Whose duty is it to prepare these bills of quantities? These documents are usually prepared by disinterested quantity surveyors, men who have been specially trained in this particular business, for, be it remembered, taking off quantities, as they should be taken off, is a separate and distinct business from estimating the cost, and it calls for very different qualifications and experience than this latter process. In giving a bid upon a building, the only thing which can be reasonably required of a contractor is to say how much money the building will cost. The owner is the person (through the quantity surveyor) to say how much material of all the different kinds is required for the building, and this is only just, but we will consider this farther, later on.

There are three distinct processes or operations involved in the production of a properly constituted bill of quantities, each one of which, I admit, requires more time than is at present allowed, in many cases, to an individual bidder for making up a bid; but then, we get accuracy as compared with — shall I say "guesswork"? for experience teaches me that is all it amounts to very often under existing methods. Quantity surveyors are usually paid by a fee, or percentage, which is included in each bidder's total, and so the owner really pays for the quantities furnished to the contractors. The bill of quantities should form part of, or in reality be the basis of the contract, and the contractor would be bound to do no more work than would be clearly set forth in these quantities; in other words, it would be so much material and labor for so much money, no more, no less. One complete copy of the quantities would be furnished to each bidder who would simply have to price each item in the order set forth.

Let us then consider what a properly constituted bill of quantities should be. In the first place, the document should be printed or lithographed (so as to ensure every copy being alike), containing a complete account and a clear description of every item of labor and material, however small, possessing a money value, as called for by the drawings and specifications. The frŏnt or title page should begin with the name, or description, of the building, the owner's and architect's names and addresses, the place, date and hour for receiving and opening bids, date for completion of building and amount of penalty, if any; also the times and conditions of payment to the contractor, particulars as to bondsmen, certified checks, etc., and at the end, the bill should be endorsed by the surveyor who prepared it, and who should be entirely disinterested, as between the parties.

In my own practice I have found it a good plan to begin the list of items with a brief outline of the size and character of the building, then to follow with such items which cannot be measured in the usual sense, but for which some allowance is necessary: for example, plant, foreman, superintendent's temporary office, insurance, lighting, watchman, interest on retention money, pumping, maintenance, testing materials, strike contingencies, water, etc. In some estimates I have had to provide for all these items and it is convenient to have them collected under one heading, a separate sum for the same being carried to the general summary at end of bill.

Then we get to the items proper, beginning with excavator — each class of digging being kept separate: for example, surface digging or scraping, trenches for footings not exceeding five feet deep, trenches over five feet deep, digging to cellars, circular digging, wells, forming slopes, lawns, etc.; in engineering works, where blasting, mud or tide work and such items occur, the same would be segregated according to the difference in value. Under drainage, the quantity of each kind of pipe would appear with numbers of bends, junctions, hoppers, giving depths below surface, street-sewer connections, etc.

The brickwork bill would begin with a short but clear description of the bricks, mortar cement, etc., to be used; then come the number of common bricks in walls of different thicknesses, though (in the absence of any national standard for brickwork) I should prefer to give the number of square yards of each separate thickness, segregating the parts built in cement from those in mortar, etc., the footings and thick walls below ground, chimneys above roof, walls pointed one or both sides, all being kept separate. Brick facings measured by the square foot would be given as "extra" above price of the common brick, and so on. Brick mouldings, sills, etc., by the foot lineal; mitres, return ends, etc., for these should be given, since in good work these should be specially moulded, and not cut from ordinary stock. The same would apply to brick copings, bands, belts, imposts, cornices, etc. Fair arches are usually measured by the square foot, rough arches numbered, a detailed description of opening, rise, thickness, height, etc., being given. Numbers with detailed descriptions of such things as cutting holes, setting grates, ventilators, boilers, etc., would be given, together with the building of chimney-tops to detail, panels, etc., marginal sketches being given where necessary to clearly illustrate the detail.

Again, in the mason's bill would appear feet cube of rough stone in blocks from quarry. Tons or yards cube of rubble-stone, etc., beginning with the heaviest or largest items. Following this, come all the lineal stone items, *i. e.*, stock under 12 x 12. Small stones are usually just numbered and properly described. The labor on stone should, if the work be large, be taken off separately and described by the square foot, such as half-sawing, plain work, sunk work, plain work circular, sunk work circular, sunk work as in niches, grooves; then would follow moulded work, as in cornices or belts; moulded circular, rubbed and polished work, as on granite; straight and circular, and sometimes *circular circular*, as in spheres, etc., each and every piece of work having a different money value, and, therefore, to be accurate, each should be segregated and priced accordingly. In general terms the same principle would apply to millwork and all the different trades following.

The foregoing are merely brief illustrations of the scope and character of a proper bill of quantities, such as would be prepared by a qualified surveyor, and must not be taken as representing all the items in these trades. In some cases there might occur hundreds of items, indeed I remember some years ago preparing quantities for a job and the bill contained over three hundred fool's-cap pages of items; but I have no knowledge that the successful contractor found a single item *too many*, and I have reason to think there was not one too few. But to return, each trade in the quantities having been figured by the contractor and totalled, the amounts would be carried to the general summary blank always found at the end of a bill, this summary in its turn should then be totalled, and the sum thus obtained is the net estimate for the building. Only two points now require attention: the one is to add the percentage of profit required; and the other is to include the surveyor's fee, the result being the amount of the bid ready for the proposal form, if one is to be used.

Unsuccessful bidders retain the bills of quantities they have priced, and as everything is in minute detail, these documents become very useful to contractors for reference when making up future bids; indeed, by comparing their bids for a time with the figures of the lowest bidders, some very useful and reliable hints as regards percentages, etc., can be accumulated. Of course, to prepare such quantities as I have outlined requires considerably more time than one bidder usually gets for making up a bid, but twenty years' experience as a quantity surveyor teaches me that the only *safe*

method of estimating is to go carefully, through every item in the drawings and specifications, and to systematically measure and describe, piece by piece, every single part in detail, trade after trade, omitting nothing, guessing at nothing, considering all things and taking no risks; and when this has been conscientiously accomplished and put into a uniform and intelligent shape, we have then a complete and properly constituted Bill of Quantities. Moreover, there is no reliable "royal road, or short cut" method to estimating. Cubing and measuring by the square are but approximate guesses, at the best, and while being "near enough" for certain rough purposes, they are unworthy of the notice of the accurate estimator, when the object is to determine the amount of a contract.

Before proceeding farther, it may be interesting to see what systems of estimating are found to be successful in other large communities. In 1891 it was my privilege to visit the City of Melbourne, which is considered to possess the distinction of being the most American type of city in the world outside the United States. There, the same quantity system of estimating which I advocate as a remedy for the present unsatisfactory conditions in our country had been in operation for about twelve years. The Builders' Association of Sydney, N. S. W., whose institute I also visited, had just passed resolutions adopting the quantity system. Modifications of the same system, but covering the principle of measure and value, have been in use in France for years. In Scotland and Ireland quantities are largely used. In England the quantity system has been adopted for many years. In Germany and other parts the principle of quantities, or measure and value, prevails, and so it will be seen that the quantity system has been extensively tested for many years, and I know of no community where this system, once adopted, has been abandoned for the old method, such as we still use in the United States.

It is a mystery that some more able pen than mine has not, ere this, aroused an interest among building and architectural circles in this country upon this vitally important subject, if only sufficient to cause the appointment of a committee of leading architects and contractors to look into the subject, and to circulate information thereon, and this is necessary before anything satisfactory can be accomplished. Many contractors know nothing at all of the quantity system and its workings. Others have but a vague idea of the subject, imagining that some other man is to make up their figures for them, but the quantity system is nothing of the kind. These men would have plenty of opportunities left to exercise their skill and judgment in putting paying and yet winning prices to the quantities of work as furnished to them by the quantity surveyor, and many a contractor and material-man in this country would welcome the opportunity of being able to give more of his time to buildings in progress, and of exercising a closer supervision of the work that he really has, in place of wasting half his time, as many do now, in figuring, and figuring, and figuring, month after month, and year after year, and what does it amount to after all? These men *know*. Let the owner say how much labor and material he wants, then the contractor can tell him how much it will cost in very short order, and we shall hear no more about contractors and material-men wasting their time.

Some five years ago I was invited to address a meeting of the San Francisco Chapter of Architects upon this subject, and it was then pointed out that the contractors and material-men must take the initiative, and so it remains to-day.

But let us consider what *are* the advantages of the quantity system other than preventing this enormous waste of time, for we must recollect that many of the bidders in figuring a job are all going over precisely the same ground, each doing the same thing in fact, and which could be done by *one* and the same man, just as efficiently. In the first place, a contractor can make up a bid for a large building in an hour or two, and without going through the drawings and a voluminous specification. There is no risk of omitting any portion or parts of the work. How often does it happen that a man gets a contract simply through forgetting to include something. Many a reader will be able to recall some such circumstance in his own experience, which would never have happened if he had figured from a bill of quantities. Many a man has lost a profit, or more, upon a job, and many an owner has benefited thereby, through some such mistake in the items.

Quantities protect the competent bidder against the incompetent one, for the reason that they both start even, from the same well-defined basis as regards *quantity*; the competent man is not then handicapped, as is often the case now, by the incompetent man for-

Design for a Yacht-club Club-house, by Geo. W. Andrews, Cleveland, O.

getting his sheathing, flooring, or plumbing, etc., and thereby getting the contract. This is no imaginary case, it occurs daily under the present method, and everybody suffers in consequence, except perhaps the owner, and it is doubtful whether he doesn't suffer in the long run. But the mischief does not end here—competent men who do get in all their items endeavor to check this growing difficulty by cutting their itemized prices down to cost, or nearly so, and the result is, that to-day the average competition job is scarcely worth having, so far as "profit" is concerned. Dull times alone are not responsible for low prices: the present wretched method of figuring is equally to blame.

Again, if there are any changes on a contract, the builder's claim for payment is beyond dispute. A reference to the quantities discloses the price of the items; this, and a measurement of the quantity of extra work done, settles the matter once and for ever. Separate lists could be furnished to millmen, masons, plasterers and others, showing clearly in black-and-white exactly what these tradesmen were expected to furnish, and there would be an end to disputes as to whether this item, or that item, was figured upon or not, exclusive of the saving of time it would be to these men. Another point is that competitors would be relieved from troubling the architects with inquiries as to the meaning of this or that. All such questions would have been previously settled by the architect through the quantity surveyor.

There is no impediment, nor any real reason, why a National System of Estimating should not be inaugurated if the subject be properly ventilated and understood, and if once the quantity system

be introduced, the beneficial results will be immediately apparent and the only regret will then be that something of the kind was not done before.

A contractor suggested to me the other day that a quantity surveyor *might* favor a certain contractor. I do not hold this view personally; still the point may occur to some of your readers, and it would be unfair not to give it a moment's thought. Quantity surveyors are qualified men in regular practice, whose entire professional capital is *honesty* and *ability*, disinterested in every way, acting fairly and in good faith between owner and contractor, without fear or favor, and desirous only of doing what is just. They should not be in the regular employ of any person, their services being engaged by the architect (as the owner's agent) only as required, and for the special service indicated; and no surveyor in his senses would jeopardize his practice and place himself at the mercy of an unscrupulous contractor — for it would be only such who would try to benefit by those tricks. Moreover, detection would be the easiest thing possible. If quantities were taken manifestly "too full," the vocation of such a surveyor would soon be gone and contractors could decline to estimate upon his quantities. Any difference in quantities could easily be detected by a comparison of the different sets issued to bidders, whilst a spare set might be deposited with, say, the Estimating Committee of every Builders' Exchange, for public inspection of its members.

Again, there is no business probably in which such an amount of labor and judgment is necessary in making up accurate estimates as in the "building trade," no business in which the opportunities for mistakes are so numerous. Owners do not understand this, probably, when wanting bids upon buildings which may, or may not, be carried out — depending upon their fancy or depth of pocket. This is all wrong, and if contractors are willing to give their brains and time in making the money estimate, the owner should, in common fairness, accept his share of the responsibility, and say definitely and exactly, just *how much material* and workmanship he requires estimates upon.

In conclusion it is almost impossible to do justice in an article of this nature to this important matter. I shall be pleased to receive any suggestions or observations that may in any way assist in promoting the adoption of an improved National System of making up bids for modern building and engineering works.

G. ALEXANDER WRIGHT.

THE ARTISTIC ELEMENT IN ENGINEERING.[1]

A FRIEND of the writer, a successful business man and much interested in things artistic, when informed of the choice of subject for this paper, gave expression to a feeling of surprise, doubting if there were any relation between engineering and æsthetics.

One of the leading engineers of America once asked a professional brother what he did for recreation, and on being told of a modest interest in pictures and music, likewise expressed surprise, saying, "You are the first engineer that I have ever known to be a musician." There was also an implication, though unintentional, of a diminished respect — perhaps on both sides.

These two incidents may be taken to typify in a general way the attitude that is held by the business world, on the one side, and the engineering fraternity on the other, toward the relationship which it is proposed here to discuss. . . .

The engineer is primarily a designer. He works with the materials of nature as his medium and her powers as his tools, wherewith to express his thought and his purpose to serve and benefit man. Just as in the making of a picture, the brushes, paint and canvas are not the chief things, so here it is not the stone, steel and brass or the powers of gravity, steam, air and electricity that are most important, but rather the character and quality of the design and the degree of realization in its execution. The design may be bad or good, according as it ignores or harmonizes with principles underlying all such of acts of creation. The result may be a happy one only when the means employed are rightly chosen and properly adapted to the end sought. In this process of creating something of value, something that helps a man to a fuller, richer and better life, the artistic cannot be left out. In its absence the design falls far short of its possible perfection, and man is deprived of what is due him, though not perhaps distinctly conscious of the loss. In a certain sense, then, every engineer is an artist, and in some directions at least, as in architecture and other forms of construction and in the making of public parks, the result of his cultured brain may attain to the dignity of a work of "fine art." Perhaps, in its true essence, there may be as much fine art in the design of a machine to produce bolts as there is in the making of a picture for the *Salon;* certainly the well-planned tool with fine proportions and parts perfectly related is above the poor canvas. . . .

To the superficial or hasty thinker there may appear a conflict between the utilitarian and the artistic, but there can be no real antagonism. The result of an act of designing is to be judged as a whole in the light of all the purposes to be fulfilled. The physical conditions imposed by the materials used and the forces of nature employed are to be met. These conditions must be expressed in the design frankly and candidly, and in such a way as to indicate clearly its purpose and to gratify the observer through its proportions, symmetry, harmony and decoration. The end desired must be attained in the most direct and simple way, so that the expenditure of money may be a minimum. These are the three elements of design, scientific, æsthetic and the financial. A disregard of the requirements of the first may mean structural or organic weakness, on the one hand; or on the other, an excess of material that unduly adds to the cost and at the same time may produce heaviness or ugly proportions in the completed work. Non-compliance with the demands of the second makes the design fail in fulfilling its complete mission; this applies with the same force to those cases where a poorly directed attempt has been made to be artistic in expression, as to those in which no attention whatever has been paid to the matter. Artistic treatment often costs money, yet the mere expenditure of cash will not secure it. On the other hand, the proper display of good taste may often come without the spending of a dollar more than is made necessary by the other conditions surrounding the problem. A wealth of ornamentation may be brazen and vulgar, while beauty and grace may be found in the simple lines of a machine or bridge, or in the curving of the curb by the roadside. The disregard of the financial side may mean either a weak, meager and unsatisfactory result, or an unwise lavishness in expenditure, in both cases producing in the long run a loss and waste of money. . . .

We are not an æsthetic nation, but we have latent possibilities in that direction; we are young, confident and impressionable and have the courage to be original in design, which counts for much. We have evolved the American locomotive, the American truss bridge, the American automatic machine, the American much debated tall building, and many other things especially adapted to American needs. We shall grasp the artistic possibilities of construction quickly when we come to know what they are, and will apply them confidently, not always at first with the most happy results. We shall learn something from the Old World and will assimilate much that is good in its practice, but in the end engineering here will be both artistic and American. . . .

"The American designer is not an artist like the Frenchman, but is more attentive to appearance than the Briton. He is gradually curing himself of the tendency to tawdry ornament, needless accessories of fancy castings, stenciled paints, japanning out of place and bright work for mere effect." These are good qualities and in the line of improvement. Some recent installations of power plants illustrate a movement that will have considerable influence on engine design. In many of our larger cities there are engine-rooms fitted up in elegance, with marble floors and wainscot, decorated walls and ceilings, brilliantly lighted and with all the appliances of the plant, engines, dynamos, switch-boards and even the smaller accessories in keeping with the surroundings. These plants are used as drawing cards or advertisements. There are other plants not so used, where there is displayed less elegance, but fully as much artistic sense in adapting the room and its treatment to its purpose. In many of these places only the inclosed type of engines can be used. In all of them the standard of maintenance must have its influence on the matter of design, which will, in turn, react on the former. An engine might pound itself to death in a dark basement, but would have its slightest vagary looked after in one of these better planned housings. This result cannot be entirely accounted for by the larger room, the better light, the rules and regulations. There is a refining, educating influence in these artistically planned constructions that makes better men and more efficient workmen of the attendants. Whatever they may cost, there is a credit side to the balance sheet.

Our railways are contributing toward this change. They have found the decoration of passenger-trains a profitable thing, and so stimulated, have carried it to excess. Handsome terminal stations adorned in good taste, are supplanting the dingy, forbidding and inconvenient places so long in use, while the shed type of depot is being crowded out by beautiful, quaint buildings set in the midst of lawns and flower-beds. More significant still is the tendency to adopt a high standard of maintenance, under which the road-bed is kept trim and neat, flanked by sodded slopes and bordered by clean and well-kept buildings, which also requires the rolling stock, the shops and yards to be maintained in a high state of efficiency. This is not necessarily in itself artistic, but it furnishes at least a necessary foundation. That the railway management understands, to some degree, the commercial value of the artistic element in its business is further evidenced by the nature of its advertising, that seizes on any advantage of scenery or artificial effect that is at hand.

Not much can be said in praise of the artistic qualities of our bridges, for these attributes are conspicuous through their absence. The American bridge satisfies the conditions of stability and least cost, but of beauty of line or balanced proportion that make it fit into and harmonize with the landscape or even that makes it attractive, considered by itself, it has little. And this is to be the more regretted because an intelligent application of right principles would much improve the effect, without adding much, if any, to the cost or making the structure less safe and durable. . . .

In the entire field of engineering there is no portion of it that includes a greater variety of intricate and difficult problems for solution than that connected with municipal life. Here the engineer has to do with matters touching the home life, the dwelling, its heating, ventilation and lighting, its drainage and water-supply, etc.

[1] Extracts from the Address of the Vice-President before Section D, Mechanical Science and Engineering, at the Buffalo meeting of the American Association for the Advancement of Science.

There is the business life that demands attention for the stores, office-blocks, banks and exchanges, manufactories and shops, warehouses and elevators with all of their requirements of heating, cooling, lighting, ventilation, drainage, power and internal communication through elevators, pneumatic systems and alarms. Then there is the larger life of the city as a whole that needs public buildings, churches, schools, hospitals, libraries, museums, hotels, theatres, railway-stations and markets, each with its own peculiar demands; streets and systems for rapid transit, both intramural and suburban; the distribution of water, heat, cold, light and power; pneumatic systems for carrying packages; electrical conduits; sewerage and garbage systems, with the plants for their treatment or disposal; wharves and railway yards; parks, boulevards, playgrounds, plazas; the opening of new territory to accommodate the city's growth.

The engineer here comes in close contact with the people that daily and hourly use the results of his works. He already influences their health and bank accounts for the better, gives them greater ease and convenience at work or play and saves their time. This is what is asked of him and he meets the demand well. But what an uplift would come to city life, how much richer it would be, if he could put an artistic quality into his designing, and the people would learn to appreciate it. It is not to be inferred that there is an entire absence of this, but rather that artistic effects have been largely confined to individual cases, and not made manifest in the general life of the city. For instance, there are numerous examples of suburban dwellings, beautiful internally and externally and with harmonious settings; there are occasional business-blocks whose treatment is satisfactory, but very few public buildings that have an adequate artistic meaning and are so situated as to express this advantageously if they did possess it. Without detracting in the least from the acknowledged merits of Trinity Church, Boston, it must be admitted that its roomy location on one side of an open plaza adds greatly to its effectiveness. Think of its being placed in the middle of a block on Washington Street, or set in the midst of brownstone fronts on Fifth Avenue.

All public buildings need both room and an appropriate setting. They are the larger and more important pictures in the gallery of city structures; yet under the prevailing system of rectangular blocks, bounded by long, straight and narrow streets, the hanging committee has nothing but the walls of corridors on which to place them. The worst of the matter is that the exhibition is a permanent one. Along these alleyways must also be hung the narrow, vertically elongated panels that seem to be so popular to-day, in favor because they pay. The observer needs a twenty-story ladder in order to study their details or even to know if they have any, and can find no point from which they can be seen as entireties. At their sides hang strings of pictures whose horizontality exaggerates their skyward tendency. It is not the modern tall building in itself that is here objected to, but its location on sites that will not admit of a display of its best qualities. With wide, clear surroundings and effective grouping they may be made agreeable, as is illustrated by the happy combination at the southeast corner of Central Park.

One of the good results of the tall building craze is the bringing closer together of two branches of designers; from the architect the engineer will learn more of art and he will teach the former better construction. While retaining their separate functions, the collaboration will result in a higher mutual respect and appreciation and a better grade of work on the part of each.

It is undisputed that the rectangular plans of American cities are neither adapted to meet æsthetic conditions nor the demands of traffic. The long streets, without variation in width and direction and without the breaks afforded by little parks, are tiresome to the eye. They are not placed with any regard to the topography or the natural features of the landscape, or to give prominence to some important structure, nor do they furnish direct lines of travel. But the plan is weighted down to the ground by millions of money. So it is not a question of what it ought to be, but one of mitigating the present evils and avoiding a repetition of these in the future. Radical treatment must be resorted to by way of diagonal avenues from congested centers and the widening out of the intersections of important streets into parks and plazas. There must likewise be an heroic struggle with the water-fronts and internal water-courses, places full of picturesque possibilities, though usually given over to filth and ugliness. These changes are made imperative not only by æsthetic requirements, but also by the demands of health and business. . . .

In the design and maintenance of water-supply plants, American practice shows some respect for the artistic element. This is not confined to any particular system or any part of any one plant, but is quite general. The engine-houses are not ugly and their interiors are often attractive. Gate-houses, aqueducts and dams are decoratively treated and form pleasing features in the landscape. The slopes of reservoirs are kept trimmed and the grounds generally turned into lawns with flower-beds and perhaps a fountain. No doubt, the sanitary conditions imposed have much to do with this, but the result is none the less in good taste. We cannot avoid, however, a stray shot at the ugly standpipe with conical cap, sometimes seen in our smaller towns. This is unnecessary. When inclosed it has been made an interesting object, and even the bare pipe can be ornamented in such a way as to relieve its nakedness.

There is much encouragement in the growing appreciation and enjoyment of public parks and boulevards. Cities and towns all over the land are trying to beautify what they already have and are adding new territory to their park resources. Admirable skill has been shown in utilizing the natural features of the local landscape, the rocks, tree masses, meadows, ravines, ponds and streams, the wide expanse of ocean or glimpses of bright water. The curving roads and paths, with undulating gradients, have a beauty of their own and lead one from point to point of the ever-changing scene, and yet bind it all into one harmonious whole. While the landscape engineer deserves credit, not so much praise can be given park commissioners for the artificial adornments which they have added to his work. Notwithstanding the fact that these are sometimes labelled as artistic, they do not always fit in appropriately.

The writer firmly believes that there is a latent æsthetic quality in American life that is now struggling to find both means for its gratification and methods of expression. Before there can be knowledge of its meaning and power there must be many attempts and many failures. The whole process is one of education and that largely in the school of experience. This applies to the industrial and constructive arts as well as to the fine arts. The engineer will share in the general movement, but this is not enough. As a designer of so much that the world needs for daily use he must do more than keep up; he must keep in advance. He must not only have a capacity to enjoy, but also the power to originate and apply. To this end he must give preliminary study and thought to the principles of æsthetic design, so gaining an intellectual knowledge of them. American engineering schools are doing little or nothing to help the young engineer to this. So far as the writer knows, there is but one American text-book, Prof. Johnson's book on bridges, that includes any discussion of the matter. A course of study in engineering æsthetics near the close of college life would be a great help and stimulus to a young graduate, at least opening his eyes to the fact that there was such a thing. After knowledge comes the application of principles as tests to an engineer's own work and to that of other men. And, finally, with theoretical and practical knowledge well in hand and a love of what is beautiful, comes the impulse to work artistically. With such engineers and an appreciative *clientèle* American engineering would be artistic. To this end let us work. —*Frank O. Marvin, University of Kansas.*

BOOKS AND PAPERS.

JUST as the art of "sign-writing" is held to be one of the upper branches of the house-painter's work, so acquired skill in the art of lettering drawings is held to be evidence of a thoroughly trained and expert engineering draughtsman. Even on architectural drawings, no greater wrong can be done the author's work than to describe it on its face with a slovenly and really illiterate attempt at lettering.

Engineers are generally great sticklers in the matter of lettering their drawings and make greater demands on the skill and accuracy of their draughtsmen in this portion of their work, than architects are wont to exact when it comes to lettering architectural drawings. This is quite proper and reasonable and the reason is not far to seek. Engineering drawings have to be made with greater accuracy and the expenditure of a more minute skill, for the reason that, so far as topographical work goes, these drawings are made at scales varying from ten to hundreds of feet per inch and the several features of the drawing, as well as the multitudinous figures, must be legibly figured and lettered, each in its proper place and at its proper relative scale of importance. Architects, on the other hand, rarely have to work at less than a sixteenth scale, and on such drawings there is ample space enough for lettering, and so architectural draughtsmen are not compelled in their daily work to acquire the same nice sense of balance, proportion and accuracy of handling that their engineering fellows, at length, use automatically.

It follows from this that most publications that deal with the art of lettering have been prepared for and by engineers, not architects, and we have allowed several publications of the kind to accumulate on our table, awaiting a convenient time for their examination. The first of these is a little paper-covered pamphlet[1] which has the signal merit of being printed on cross-section paper, so that the student can easily construct his letters in due proportion. The few samples shown are mainly of the block-letter type, with variants upon it.

The next one, a somewhat larger and more ambitious work, seems to have been called into being because one of the instructors in a Western college did not find at hand the kind of book which he wished his pupils to have by them in their drawing-room. It is possible that it may have served its intended purpose, but as it exhibits, and therefore inculcates, little of that precision and nicety of handling that engineers like to have their draughtsmen employ, even when their own early training has not been such that they could acquire it themselves, it seems to us unlikely that they would care to advise the pupils in their office to procure and study this work.[2]

[1] "*A System of Easy Lettering.*" By J. Howard Cornwell, Ph. B. New York: Spon & Chamberlain. 1893. Price, 50 cents.

[2] "*Lettering of Working Drawings.*" By J. C. L. Fish, C. E., Asst. Professor of Civil Engineering in the Leland Stanford, Jr. University. New York: D. Van Nostrand Company. 1894.

The same publishers, later, issued another book [1] of about the same size which is in some ways an improvement on the publication just mentioned. It contains a greater variety of alphabets and the few pages of text give fuller and more varied advice and suggestion. Moreover, it has the practical advantage over the books before mentioned that it includes several illustrations of engineering drawings and one or two topographical maps, so that it fairly contains not only precept but example.

But the only book that seems to us to have been really "worth while" is the work [2] of an instructor in an Eastern college and has about four times the amount of matter that either of the others contains. Its four dozen plates give a great variety of alphabets, numerals, scales, etc., all executed with great accuracy, and named and proportioned with an agreeable sense of propriety. A few samples of map work and engineering detail-drawings fairly parallel those good features in Mr. Reinhardt's smaller book. The plates alone would make the publication valuable, but the great merit of it lies in its eighty-odd pages of text, which give in excellent form not only instruction about the formation of the letters themselves, but advice and suggestion about several related matters, such as spacing and word-spacing, the proportioning and distribution of the title words, the lettering of patent drawings, stencils, mechanical devices used for lettering, lettering for reproductive processes, blue-printing, etc. It is an excellent work and one which the architectural draughtsman could use to great advantage, for he could in the matter of lettering approach more nearly the standard of his engineering brothers without having the product of his hand do him any too great credit.

SOCIETIES

THE SECOND "AMERICAN ARCHITECT" COMPETITION.

WE desire to call to the attention of the several associations of architectural draughtsmen that we are unable to award and distribute the prizes for the Second *American Architect* Competition, ["A Baptistery Screen," published in our issue for May 16th], owing to the fact that before disbanding for the summer vacation only two sketch-clubs had communicated to us the result of their balloting.

Now that the autumn and winter work has begun, we trust that the officials of the several clubs which have not yet declared their preferences will be able to send us the desired information, without further delay. — EDS.

SKETCH-CLUB OF NEW YORK.

THE regular monthly meeting and dinner of the Sketch-Club of New York was held Saturday evening, October 3d; the President, Mr. J. Oliver Cummings, occupying the chair. Forty-five members were present.

Mr. G. A. Audsley read a paper on Hellenic Renaissance — Greek architecture adapted to modern requirements. This paper was one of the best ever presented to the Club and was thoroughly appreciated by the members present. Mr. Audsley has kindly consented to favor the Club with another paper illustrated by lantern slides, to be given in the near future at a special meeting arranged for it.

The proposition made to change the date of the annual election of officers was laid over until the next regular meeting, on account of the absence of Mr. Field, who made the proposition.

Mr. Sconce, Chairman of the Architectural Research Class, made a report on the work done by the class in his charge. About fifteen members have entered it and many more have promised to come in. They are all earnest workers, and the drawings displayed around the room were ample evidence that the class was a success. Every fellow who desires to enter into this interesting way of studying the history of architecture should report to Mr. Sconce at once. Life classes have been organized under the leadership of Mr. John Nolan; Pen-and-ink classes under Mr. J. J. Maginnis; and Water-color classes which are now being arranged by the Executive Committee, will be announced very soon.

Sketches have been made for the proposed decoration of the Club's rooms, and estimates are being made by decorators.

Besides the drawings exhibited by the Research Class, several water-colors and pencil-drawings representing summer work were shown. Those made by Mr. Kendrick were especially good. Messrs. Darsh and Van Suetendael have also done some good work.

Meeting adjourned 10.45 P. M.

HARRY P. KNOWLES, *Recording Secretary.*

SOCIETY OF BEAUX-ARTS ARCHITECTS.

THE Committee on Education of the Society of Beaux-Arts Architects has decided to hold three competitions for advance students (Class A), and three competitions for beginners (Class B) during the coming season.

Programmes will be issued: October 15, 1896; January 15, 1897; April 15, 1897.

Drawings will be rendered: January 15, 1897; April 15, 1897; June 30, 1897.

Competition Class A will be open to all students having obtained a Medal, one First or two Second Mentions, in any of the competitions held heretofore, and to all students in any of the colleges.

The Committee on Education will make exceptions in favor of students wishing to enter a competition in this class, upon application from the students, endorsed by their Professors, to the effect that the student is capable of doing the work in this class advantageously.

Competition Class B will be open to all students of architecture who may apply for admission, provided that their application is endorsed by their Professor.

Students of all colleges of architecture are especially invited to enter these competitions.

The competitions will be held under the direction of the Committee on Education, who will issue the programmes. The drawings submitted by the competitors will be exhibited publicly in this city at least two days before the judgment and at least one day after the judgment. The judgment will be rendered by a Committee of not less than eight, nor more than ten, which will consist of the five members of the Committee on Education, and five other members specially invited to serve as a Jury of Award. The Jury will classify the drawings in the order of merit, and will award First, Second and Third Mentions, respectively, to such drawings as may seem to them to deserve recognition. The Jury will award for each competition under Class A, one medal to the most meritorious drawing; it being, however, left to their discretion not to award a medal should none of the drawings prove deserving of such recognition.

Each student receiving a Mention will be entitled to receive from the Society a certificate of award. The programmes for the different competitions, and any other information relating to the competitions, can be obtained from Mr. Albert L. Brockway, Chairman of the Committee on Education, 55 Broadway, New York, N. Y.

As the students participating in these competitions are located all over the United States, it has been found very difficult to send them notices relating to the competitions, and hereafter, all notices, especially those relating to dates of Exhibitions, awards of the Jury, publication of the programmes and other important matters will be published in the *American Architect*, and the students are especially requested to give these notices their attention.

[The programmes for the First Competition may be found in our advertising columns. — EDS.]

(Signed) ALBERT L. BROCKWAY, *Chairman,*
JOHN M. CARRÈRE,
JOHN G. HOWARD,
WHITNEY WARREN,
E. L. MASQUERAY,
} *Committee on Education.*

NEW YORK, N. Y., October 15, 1896.

The exhibition of the drawings rendered in the last competition for "A Ferry House in the City of New York," and "A Public Mortuary Chapel in a Large Cemetery," will be held at the Fine Arts Building, 215 West 57th Street, New York City, from 9 A. M. to 10 P. M., on the 26th, 27th and 28th of October, excepting the evening of October 27th, when the exhibition will be closed for the judgment of the drawings. All students, members of the Society, and others interested are especially requested to visit the Exhibition and examine the drawings. Admission free.

ILLUSTRATIONS

[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

CLUB-HOUSE OF THE CALUMET CLUB, MICHIGAN AVE., CHICAGO, ILL. MR. CHARLES S. FROST, ARCHITECT, CHICAGO, ILL.

[Gelatine Print, issued with the International and Imperial Editions only.]

NEWTON NATIONAL AND SAVINGS BANK BUILDING, NEWTON, MASS. MR. W. G. PRESTON, ARCHITECT, BOSTON, MASS.

THE building is situated in a square formed by the junction of Washington, Centre and Hall Streets, the general outline of the building being triangular in form. The angles all being unlike, it has seemed advisable to introduce a circular bay at each of these points, harmonizing and simplifying the relations of the three sides with each other.

The building is to be semi-fireproof in character, and will be occupied by two banks, having their individual vaults in connection and away from all outside walls and dangerous exposures. The second story will be used for offices under control of the bank. The building is to have the basement of granite, and above that, white brick

[1] "*Lettering for Draughtsmen, Engineers and Students.*" A Practical System of Freehand Lettering for Working Drawings. By Charles W. Reinhardt, Chief Draughtsman *Engineering News*. New York: D. Van Nostrand Company. 1895.

[2] "*A Text-book on Plain Lettering.*" By Henry S. Jacoby, Assoc. Professor of Civil Engineering in Cornell University. New York: The *Engineering News* Publishing Company. 1895.

and terra cotta similar in color. The roof will be of red, glazed Spanish tile. The banks will be finished in mahogany, and the whole building heated by steam and lighted by electricity.

DIAMOND ICE COMPANY'S PLANT, STAMFORD, CONN. MR. H. J. CARLSON, ARCHITECT, BOSTON, MASS.

The owners desired to make use of an old stone tower that stood on the site, and also that the design should provide for a roof-garden.

ACCEPTED DESIGN FOR THE VICTORIA COUNTY COURT-HOUSE, VICTORIA, TEX. MR. J. RIELY GORDON, SAN ANTONIO, TEX.

LEICESTER PUBLIC LIBRARY, LEICESTER, MASS. MESSRS. EARLE & FISHER, ARCHITECTS, WORCESTER, MASS.

HIGH-SCHOOL BUILDING, GRANITE CITY, ILL. MR. F. C. BONSACK, ARCHITECT, ST. LOUIS, MO.

[The following named illustrations may be found by reference to our advertising pages.]

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XXXI: THE PARK, ST. CLOUD, FRANCE.

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XXXII: LA GRANDE ALLÉE, GARDEN OF THE TUILERIES, PARIS, FRANCE.

GILDED LEAD DECORATION ON THE QUEEN'S STAIRCASE, PALACE OF VERSAILLES.

[Additional Illustrations in the International Edition.]

READING-ROOM: CALUMET CLUB-HOUSE, CHICAGO, ILL. MR. CHARLES S. FROST, ARCHITECT, CHICAGO, ILL.

[Gelatine Print.]

CARD-ROOM IN THE SAME CLUB-HOUSE.

[Gelatine Print.]

BRITISH INDIA CONFERENCE ROOM: IMPERIAL INSTITUTE, LONDON, ENG. MR. T. E. COLLCUTT, ARCHITECT.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

TO LAY A BASEMENT FLOOR OVER CONCRETE.

BOSTON, MASS., October 13, 1896.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Will you kindly give me some information as to the following:

For economy of space it is proposed to use concrete with sleepers to support a basement floor, instead of girders and timbers. Which will rot the soonest, the sleepers imbedded in concrete flush at the top, therefore leaving no air-space; or to have them resting on or imbedded about three-fourths of an inch in the concrete, thus having a space between floor and concrete for ventilation of air; conditions being equal, to rest on sandy soil?

Would there be any more spring to a floor supported by 3 x 4s, resting on or slightly imbedded in concrete, than one supported by 2 x 12s on girders, using them the same distance on centres?

Respectfully yours, THOMAS F. POWER.

[SLEEPERS imbedded to the top either in concrete or sandy soil, and covered with a floor, will soon rot. If imbedded only three-fourths of an inch, they will last longer, and, if only laid on the concrete, longer still, but in this case it is not easy to get them firmly bedded on the more or less uneven surface of the concrete. The best plan that we know of in such cases is to lay first on the concrete spruce strips, one inch thick, and four or five inches wide, which have been well dried, and thoroughly coated all over with tar. The sleepers are then laid across these strips, at right angles with them, and the boarding nailed to the sleepers, and holes bored, a few inches apart, through the flooring, around the sides of the room. In this way a circulation of air is maintained in all directions under the floor. If the tarred strips are not more than two feet apart, the sleepers may be two inches thick. As to the spring of the floor, everything would depend on the span of the beams or sleepers. It is an easy matter to calculate the deflection for any given case. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

AIR-CUSHION IN AN UNDERGROUND RAILWAY-TUNNEL. — A curious defect has been discovered in Buda-Pesth's underground railway. There are not enough ventilating apertures in the tunnel, and the trains rushing through it compress the air in it like that in the tube of a Zalinski pneumatic gun. On some occasions the cars have been lifted from the track, and the passengers have been almost suffocated. One stretch of tunnel two miles long has only a single ventilating aperture, making it almost an air-tight compartment. Any constructing engineer ought to have known what would be the result of such pneumatic conditions. — *Boston Herald.*

THE CLOCK OF ST. MICHAEL'S, HAMBURG. — The largest clock in Germany is now being placed upon the tower of St. Michael's Church in Hamburg. This church spire is the first landmark of Hamburg visible to the shippers on the lower Elbe, as it is situated at the highest point of the old Hanseatic town. The four dials of the clock will each measure twenty-six feet in diameter. The minute-hand will measure twelve feet from the centre of the dial, while the hour-hand will be almost ten feet long. The clock is constructed in such a way that even heavy birds perching upon the hands will not appreciably interfere with the time-keeping of the clock. The chimes will be heard for one-and-one-half miles around and will be sounded by electricity. — *Boston Transcript.*

THE OLD MILLS OF MANTUA — Writing on some remarkably ancient mills at Mantua, which was a flourishing city in the Middle Ages, a correspondent of the *Miller* says: "Mantua stands on two lagunes, and between the upper and the lower of these a dike was constructed 700 years ago, and pierced with a number of arches. Over twelve of these arches are, and have been ever since the dike was made, twelve mills named after the twelve apostles. Each mill bears in front, over its entrance, a statue of an apostle, while a figure of Christ occupies a central position in the middle of a long line of statues. The water flows with great force along the dike to the lower lagune, and for the last 700 years this stream has served to grind the corn for the feeding of the multitude around." Presumably the roller milling system has not yet reached Mantua. — *Scientific American Supplement.*

HEART-BURIALS. — The body of Louis IX, after his death at Carthage in 1270, is related to have been boiled in wine and water in order to preserve it for transportation, and it was then shipped by Charles of Anjou (I) to Sicily. Here the flesh and viscera were deposited in the Benedictine Abbey of Monreale, near Palermo. The heart and bones remained, by desire of the soldiers, in the camp. Later, his son Philip (le Hardi) having carried them and those of his brother Tristan into Italy, they were brought to Paris in 1271. On March 21 of that year the bones, reduced to ashes, were deposited temporarily in Notre Dame, whence they were presently borne in state to the Benedictine Abbey of St. Denis, and at each spot by the way where the bearers paused, seven in number, Philip subsequently caused a cross to be raised. Charles of Anjou, dying at Foggia, 1285, his heart was sent to Angers, while his body was entombed in San Gennaro, at Naples. His viscera remained in the Duomo at Foggia. Philip II (le Hardi) died of pestilence at Perpignan, October 5, 1285. His flesh was buried at Narbonne. His bones were transferred to St. Denis. His heart was given by Philip IV (le Bel) to the Dominicans of Paris. — *Notes and Queries.*

CROSS-LIGHTING. — Some traditions die hard, being accepted without examination by nine persons out of ten and by all who are in or under authority and, like officials generally, opposed to or suspicious of innovation. Among these is the belief in the hurtfulness of cross-lighting. This method of lighting would seem only to be held injurious in schools, for in our own houses we are only too pleased if we can have windows on two or more sides of a room. Even in Germany, where statistics and experimental investigation pervade every department of administration, and where in each detail the executive is guided by an order in council somewhat inappropriately called an "Erlass," we find cross or double lighting still expressly condemned. Yet Cohn and Förster, Javal and Ferrand, Rumbold and a Royal Commission on School Construction have urged the groundless nature of the prejudice. Provided always, that the eyes are not dazzled and that no shadow falls on the reading or writing, it is impossible to have too much diffused daylight or its artificial equivalent. The loss of intensity with increasing obliquity of the rays of light is acutely felt in wide rooms, especially when not high in proportion, on the side opposite the windows; whereas, if there be windows or lights on each side, the intensity of illumination is equalized and its total amount doubled. It is only necessary that that coming from the right should be naturally or artificially the weaker, as by having the windows north and south or by filling those on the right with clouded glass. Windows in front are always objectionable, but light from behind, if not so strong as to cast a shadow, can but serve to increase the illumination derived from the proper quarter. As Cohn and Förster long since pointed out, reading or other work demanding clear but effortless vision is, in the open air when the sky is overcast, a real luxury. Under these circumstances the light is ample but shadowless; it comes from everywhere, but from no one quarter more than from another. The most perfect artificial illumination conceivable is that obtained by Hrabowski's arrangement of hemispherical milk-glass reflectors with prisms and mirrors by which the light of an electric arc lamp is diffused equally throughout the building, though the source is hidden from view. The light is photometrically equal to that of a clear summer day and as free from color; it is almost shadowless and is, in fact, superior to daylight in not being liable to fluctuations, although its intensity can be regulated at will. — *The Lancet.*

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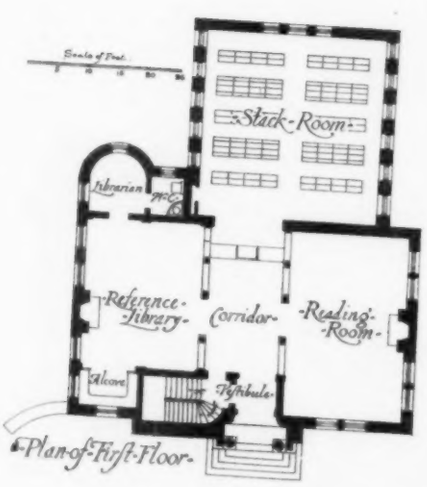
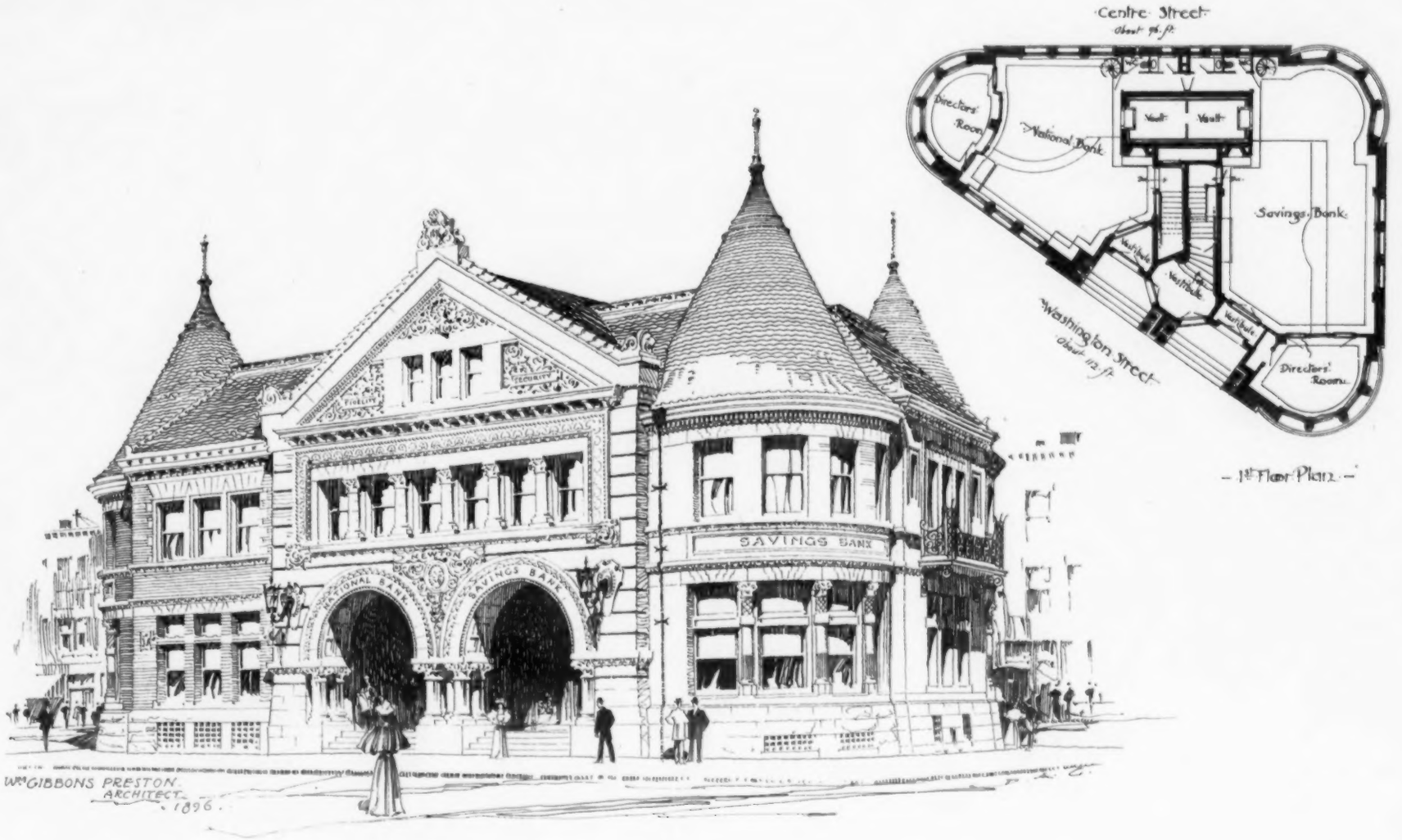


Plan of First Floor

Plan of Second Floor

No. 1056 American Architect and Building News, Oct. 17 1896.



– 1st Floor Plan. –

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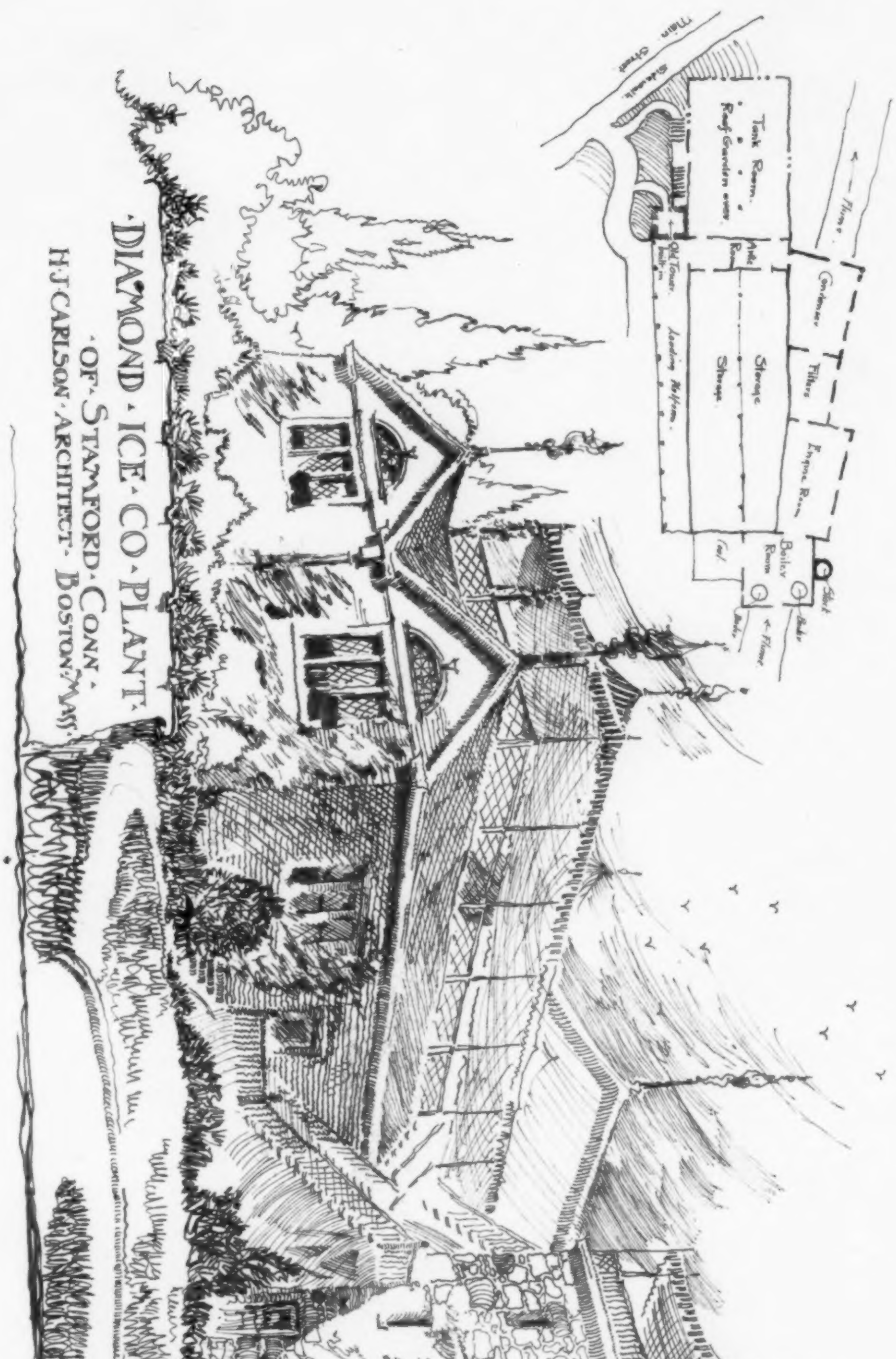
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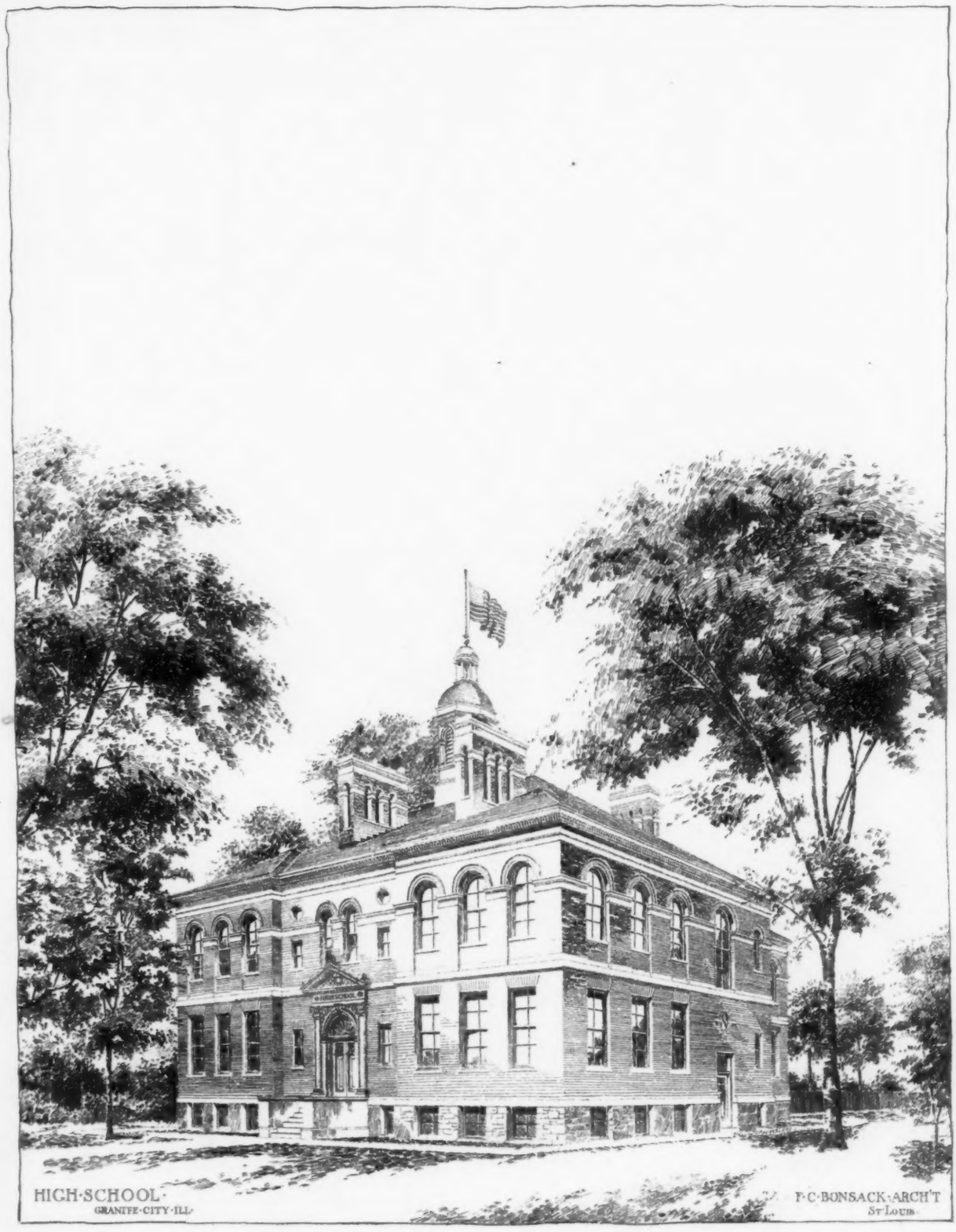
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CHARLES S. FROST, Architect

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CHARLES S. FROST, Architect.

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CHARLES S. FROST, Architect.

Grand Ballroom, Grand Hotel, Oct. 17, 1890. No. 1990.

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