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AUGUST 4, 1894.

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ILLUSTRATIONS.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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CONTENTS.

ALTHOUGH the actual affair has passed by, we think that the interest and importance of Mr. Garrison's award, as arbitrator between the Boston Master Builders' Association and the Bricklayers' Union, in regard to a proposed cut in the rate of wages, justify us in availing ourselves of an unfilled space sufficient for printing it at length. We will say nothing here of the admirable spirit displayed by both masters and men in laying their case dispassionately before such a tribunal, as every reader will make his own comments; but it is worth while to point out the singular merits of Mr. Garrison's award. It would have been easy for him to give some arbitrary decision, based on nothing but his own whim, and he might have saved himself in that way from the criticism which his arguments will call out from dissatisfied and unreasonable people; but instead of doing this, he has thought best to try to convince both parties of the justice of his decision, by setting forth the grounds on which it was based; and he has done this with a considerate clearness which is worthy of the highest praise. If labor disputes were generally approached in such a spirit, they would soon become rare, and it is much to be hoped, not only that the members of the National Association of Builders will continue in their disposition to settle all such controversies in this way, but that they may always find arbitrators as firm and clear-headed as Mr. Garrison.

WE would like to invite special attention to a letter from Mr. Talcott Williams, of Philadelphia, printed in another place, in regard to an article in the Philadelphia *Press*, making one of the most sensible suggestions for raising the standard of the profession of architecture, and securing the public against incompetency, that we have ever seen. As our readers know, we have for years advocated, in connection with the opening of public employment to the profession, the establishment of examinations, the passing of which should entitle the candidate to classification as a "Government architect," and the restriction by law of the design and supervision of Government buildings to architects holding this rank. This, like the plan proposed by the Philadelphia *Press*, without attempting the almost hopeless task of excluding anybody definitely from the profession, would establish a certain differentiation among architects themselves, which, by giving the young and ambitious something to work for, would elevate the tone of the profession, at the same time that it afforded the public a means of judging of the comparative skill of architects which it very much needs.

WHERE would be some advantages in carrying out precisely the scheme Mr. Williams suggests, and there would be some disadvantages and more difficulties, and it is doubtful whether the advantage to the public would be very perceptible in this generation, since the men competent to do good work have now, as a rule, about as much as they are able to attend to properly, and could only undertake more at the risk of the quality of their output as a whole. There is, moreover, one very distinct defect and difficulty in the scheme, which, though apparently laughable, might prove dangerous. It would put the building operations of a great city absolutely at the mercy of the comparatively few men who could pass the required examinations, and if by chance any conceivable influence could induce them to combine on the lines of a trade union, and refuse to make the drawings or even to sign them, a tie-up would be effected which would be more disastrous than any strike or boycott that was ever devised by the most conscienceless board of walking-delegates. Although the men who practise architecture are distinctly high-minded, and not likely to do wanton injury to innocent parties, it is, nevertheless, conceivable, that in face of repeated decisions on the part of the courts, which seek to reduce all charges to a *per diem* basis — so manifestly unfair in most cases where it is applied — a strike of licensed architects might be arranged and carried out as being the only available means of righting an injustice.

AMONG the good works undertaken by the National Sculpture Society, one of the best is its recent offer of two prizes, one of three hundred dollars, and one of two hundred dollars, for the best set of designs in plaster, for the silver dollar of the United States. As the circular announcing the offer rather pointedly says, "The artists of the United States have criticised severely the existing coinage. On this account, especially, they should now be urged to make, under the requirements of the law, a more artistic design for a coin than now exists." The "requirements of the law," however, are, it must be confessed, a little opposed to the production of the most artistic possible designs for coinage. Under Section 3517 of the Revised Statutes of the United States, it is decreed that "Upon the coins there shall be the following devices and legends: Upon one side there shall be an impression emblematic of liberty, with an inscription of the word "Liberty," and the year of the coinage, and upon the reverse shall be the figure or representation of an eagle, with the inscriptions "United States of America," and "*E Pluribus Unum*," and a designation of the value of the coin; but on the gold dollar and three-dollar piece, the dime, five, three and one-cent pieces, the figure of the eagle shall be omitted." Owing, doubtless, to the clouds which have been, of late years, raised in this country by the apostles of collectivism, socialism, trades-unionism and the other 'isms which contemplate the forcible subjection of the individual to the organization, the exact appearance of the Goddess of Liberty seems to have been forgotten, and medallion portraits of various estimable young ladies, with unbecoming head-dresses, have, with the acquiescence of the Treasury authorities, been substituted for the ideal figure of our earlier coinage. At present, therefore, those artists to whose keener sight the goddess may condescend to reveal herself will be legally entitled either to embody their vision in their design at full length, or to present to us only the divine face or profile, at their discretion, and we hope that the artistic champions of American Liberty will be able to show her not less fair than the Greek Pallas Athene, or the Sicilian Arethusa.

AS to the eagle, less hope can be entertained. While we cannot quite agree with those who think that the coinage laws should be amended by substituting the turkey for the eagle, as the symbol of American aspiration, it cannot be denied that the aquiline character, on close investigation, does not present just the ideal which Americans prefer to contemplate. A bird which, like the bald-headed eagle immortalized in our coinage, waits around until it spies some industrious hawk carrying food to its nest, and then, with a savage screech, dashes upon the poor creature, and snatches away its property, is a much more appropriate representative of ancient imperialism, and modern socialism, than of the respect for individual rights on which our Republic is based. However, if the big, feathered bully which turns tail before the assaults of the tiny king-bird is not likely to inspire the artist with very lofty conceptions, it is a consolation to reflect that he could not be more ignobly represented than on our present

coinage; and that a sculptor with, perhaps, a little of the Japanese spirit in him might fill the allotted space agreeably, if not very nobly, with a well-modelled relief of an eagle in flight. The circular sent out by the Sculpture Society provides that the models submitted in competition must be six inches in diameter, cast in plaster, and mounted in pairs, one cast of each pair showing the obverse, and the other the reverse, of the coin, on boards of light-colored wood, twelve by twenty-four inches, and three-quarters of an inch thick. Models will not be received until January, 1895, but must be sent in time to be shown at the annual exhibition of the Society, which occurs early in the year. Preliminary studies of any size will be received and exhibited in connection with the finished designs. Further particulars will be announced in October, but, for the present, all information needed may be obtained from the Secretary of the Society, Mr. F. Wellington Ruckstuhl, 37 West Twenty-second Street, New York.

THE *British Architect*, in referring to some remarks of ours in regard to the impolicy of expecting architects to warrant the cost of carrying out their designs, brings up, indirectly, a question of considerable importance. Speaking of our anecdote of the builder who made his bid on eighth-scale drawings, under the hallucination that they were quarter-scale, it says that "an architect who knew his business would generally find ways and means of checking such stupidly reckless tendering as that referred to above." This is undoubtedly true, but, to our mind, the fact that the architect thought an estimate too low would be very far from justifying him in asking the bidder to revise it. In fact, this very problem is one of constant occurrence in practice, more particularly, perhaps, in that of young architects, who have more to do than their elders with inexperienced or careless contractors. A number of tenders are received for a given piece of work, and opened by the architect. His own judgment, reinforced by comparison with the other bids, convinces him that the lowest tender is too low, and that the work cannot be carried out for the sum specified without loss to the contractor. Is it his duty to reject this tender, and accept a higher one, or to notify the bidder that there is probably some mistake about his estimate, and ask him to revise it? We think decidedly that it is not. Of course, the architect has no right, even in the owner's interest, to take advantage of an obvious mistake, and we think it would be allowable for an architect who thought that a tender was too low to question the bidder cautiously, to ascertain whether he had really included all the intended work in his estimate; but further than this he cannot properly go. If his drawings and specifications are clear and full, so that an intelligent builder ought to be able to ascertain from them just what is intended, his duty toward the bidders is fulfilled, and his duty is then toward the owner, to get the work carried out faithfully and promptly, on the best terms that he can. With this object in view, he would be justified in rejecting a bid that he thought too low, and accepting, or rather, advising the acceptance of, a higher one, in the owner's interest, if he thought that the lowest bidder, finding himself losing money, was likely to abandon his contract, or in other ways cause the owner annoyance and delay, for which the saving in the contract price would not be a satisfactory compensation; but this decision should be based on the owner's interest, not on that of the builder. If, on the contrary, he knew the lowest bidder to be a man of means, able to bear losses due to his own carelessness, we think that it would be the duty of the architect to accept his tender for the owner, or, at most, to explain the circumstances to the owner, and put the responsibility of the decision entirely upon him.

WE know that many builders consider this a hard doctrine, but we think that it is the only just and rational one. After the architect has done all that he can to enable the bidders to estimate intelligently, it is not for him to propose to them to revise and raise their bids, on account of errors which he thinks that they may possibly have made, without reasonable evidence of such errors. It often happens that the lowest bidder has reasons of his own for making a low tender. We knew a case where a very low bid was made by a perfectly responsible man, for some exhibition buildings in South America. The tender was probably less than the actual cost of the buildings, but it turned out afterwards that the bidder had made a private arrangement for selling the structures, after the exhibition was over, to a new railroad company in the country, for use as station buildings, and he would have made a large profit, even at his own price. It is evident that if the architect had rejected the lowest bid in this case, simply because he thought that the bidder had made a mistake, he would have grossly betrayed the interest of his clients; and every architect of experience knows of similar cases, where builders of ingenuity and resource have been able to complete with credit, and even with profit, a contract which they had taken at a price which seemed recklessly low. It is, therefore, extremely unwise for architects to assume that a bid is based on a mistake, simply because it is low, or to come to the rescue of contractors who deliberately make tenders without trying to ascertain exactly how much work they are expected to do; and, while they should be, as they are legally bound to be, ready to adjust mistakes that may become evident before the signing of the contract, they have no right to assume the existence of mistakes, to the owner's prejudice, or, after the acceptance of the tender, to permit any corrections without the owner's consent.

THE investigations of the Lexow committee into official corruption in New York are to be resumed next month and it is to be hoped that the lead opened by Mr. Kilpatrick, a builder placed upon the stand before the recess, will be followed out. According to him, it is the custom of most builders in New York, to "buy their way both with the police and the building inspectors," and in the interest of the public, as well as of owners and contractors, it is quite time that the state of things generally understood to exist in New York building matters should be ameliorated. Architects do not often have much to do with any except the official at the head of the Bureau of Buildings in New York, and this post has generally been occupied by conscientious, earnest and intelligent men, to whose counsels and suggestions no architect need be ashamed of being greatly indebted; but it is at least common report in the building world, that the favors of the inferior inspectors, and of the police, who have control over street obstructions and similar matters, are often purchased, to the injury of honest people, who are unable to obtain by fair means the advantages which their competitors gain surreptitiously.

WHETHER the evil which has been complained of for so many years can be abolished by such an easy and transitory effort as an investigation by a volunteer committee is another question. To a large part of the class of men who furnish police-officers and sub-inspectors, there is nothing objectionable about bribery and extortion, so long as it is not found out; and the modern method of dealing with that class is certainly not calculated to diminish the prevalence of this opinion. On the contrary, the entire world of people of hazy intellect, and undeveloped moral notions, is told day after day, and week after week, by editors, politicians, philosophers, anarchists and others, that they are entitled to a share of the savings which those more honest and energetic than themselves have been enabled to lay up. The only difference in the teachings is in regard to the manner in which they shall get possession of this share. The anarchists tell them that the proper way is simply, when they can see a man with money or property, to kill him, and help themselves; and, if they happen to get, by this process, a little more than their proper share, to charge the surplus to interest on what they ought to have had before; the socialists, who shrink from this logical consequence of their teachings, advocate the more roundabout course of having the State seize the coveted goods, and distribute them among its constituents; while the politicians modify the latter idea by proposing that the property taken for distribution should be that mainly held by their political opponents. Thus taught, it is not surprising that people of this sort, who form a large and increasing portion of mankind, when they find themselves armed with a certain control over the affairs of others, should utilize their opportunities to transfer to their own pockets some of the money of which, as they are told, the rich merchants and builders under their jurisdiction wrongfully retain possession. The remedy for the practice of these extortions lies in strict supervision; but such supervision is difficult to secure; and if the Lexow committee can, after exposing official corruption, show how it is to be prevented, it will deserve the gratitude of the whole civilized world.

ELECTRICAL SCIENCE FOR ARCHITECTS.[1] — V.

SYSTEMS OF DISTRIBUTION.

LAMPS, or other electrical devices, may be connected in a number of different ways to form a distributing system, but considerations of safety, convenience or practicability have narrowed the methods down until there are but two in general use. These are the plain "series" and "multiple" systems. Arc-lamps, and incandescent lamps for street-lighting, are usually operated "in series," while incandescent lamps for general use, motors, and other devices are almost always operated "in multiple."

When lamps are operated in series, the same current passes through each, and all lamps in the circuit are interdependent. If the circuit be broken in any place, all the lamps will go out. With this system, the current is kept constant, and, if more lamps are added, the pressure at the dynamo must be increased to overcome the added resistance. To cut out any of the lamps, it is necessary first to make a by-path around the lamp to preserve the continuity of the circuit and then the connection to the lamp may be broken. But it is also necessary to either replace the lamp by an equivalent resistance or else lower the pressure at the dynamo, for otherwise the strength of the current would be increased in proportion to the decrease in the resistance of the circuit. Figure 2 represents an electric circuit in which the lamps are connected "in series."

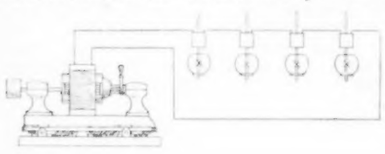


FIG. 2.

The principle of this series system can perhaps be brought out more plainly by showing its analogy to a system of water-wheels operated by one stream of water. In Figure 3 are shown three water-wheels "in series," or, as it is sometimes expressed in electrical parlance, "in tandem" or "in cascade." The pump, which is analogous to the dynamo, creates a pressure, raises the water to a height and gives it a definite "head." This pressure or head corresponds to the voltage or pressure in the electrical circuit. The water falls in a stream corresponding to the electric current, and operates the water-wheels which here take the place of lamps. At each wheel there is a definite resistance to the flow of the water and a part of the energy is transformed into the work done by the wheel. The water falls to the next wheel where it has a diminished "head," but the same in proportion for the number of wheels it has yet to operate. If another wheel were added, the pump would have to be run so that it would give proportionately greater pressure or head, but the current or flow of water would remain the same.

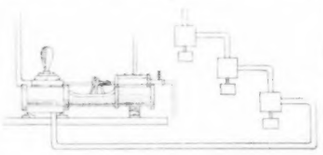


FIG. 3.

It will be noticed that the working of the wheels is influenced only by the pressure or head that exists between the point where it leaves one wheel and the point where it leaves the next. It makes no difference how many or how few are in series, provided only that the total pressure is sufficient to keep this pressure for each wheel the same. So in electrical-series working the current is kept constant, and the pressure necessary is the pressure needed for each device multiplied by the number of devices. Thus, a "2,000 candle-power" arc-lamp requires, approximately, 50 volts pressure. If there are 50 lamps in series, the total pressure at the dynamo is 2,500 volts; if there are 10 lamps in series, the total pressure is 500 volts. The current in the circuit would be the same in both cases, about ten amperes.

It will be seen, too, by the water-wheel illustration, that if one wheel is shut off by closing a valve in the pipe above it, all the wheels will stop, for the continuity of the circuit will then be broken. If one wished to stop one of the water-wheels, it would be necessary first to "short-circuit" one of them by opening a passage around it. The water running directly to the wheel could then be shut off entirely, and the current or flow would continue through the by-passage. This passage around the wheel could be made to offer exactly the same resistance that the wheel did, and in that case the pump could keep on developing the same pressure as before, and the other wheels would all continue to work uninterruptedly. If, however, the by-passage offered little or no resistance, the pump would, of course, have to be run so that it would not develop so much pressure, for, otherwise, the current would be greater through all the wheels, and might be more than they were made to operate with.

Water-wheels, operated as shown in Figure 3, would all be transforming the energy due to the current of water into other forms. They would be doing work and the "rate of work" could be measured by multiplying the pressure or head by the flow of water or gallons per minute. From this, the foot-pounds per minute or horse-power could be readily determined. And so with the electric circuit. There is work done at the lamps, where the electrical energy is transformed into heat and light energy, and this "rate of work" can be measured by multiplying the pressure, or volts, by the current, or amperes. One volt multiplied by one ampere gives one "*watt*," the unit of electrical "rate of work." 746 watts make one horse-power, and there is here the direct connection between electrical energy and the more familiar mechanical energy.

When an electric current is broken, power is no longer being expended, for although the electrical pressure may be kept constant, the current, the other factor determining the amount of power, has become zero. The hydraulic circuit used for illustration is not, of course, completely analogous to an electrical circuit, but it can be seen in this, too, that if a valve were closed just above the pump, the pressure might still be there, the steam might be in readiness pressing against the piston of the pump, but there would be no work done until the valve should be opened.

In the arc-light circuit, it is the number of lamps that determines the horse-power required to drive the dynamo. Each lamp is converting electrical energy into light and heat, which are given out to surrounding substances. The carbon rods are made to be a part of the circuit, and the mechanism of the lamp brings them together for the circuit to be formed through them. When the current is forced through the high resistance of the contact, the carbon points heat, and at the same time the mechanism causes them to be slowly drawn apart. The current follows across the intervening space, because the heated air and the hot vapors from the carbons are conductors to some extent. The resistance for such a short distance is, however, so great, that an intense heat is produced and the carbon points and particles are raised to a high degree of incandescence. This incandescence represents the expenditure of a definite amount of energy, of a certain amount of coal burned under the boilers. If there is a current of 10 ampères through the lamp, and a difference of pressure of 45 volts between the point where the current enters the lamp and where it leaves, then 450 volts, or about .6 horse-power, is a measure of the rate at which work is being done at the lamp.

The "series" system of lighting offers many advantages when arc-lamps are used. With these, a high potential circuit is not seriously objectionable, and when the pressure at the dynamo may be 2,500 or 3,000 volts, a comparatively small wire may be used to transmit the energy required for the 50 or 60 lamps in a circuit. For example, 5 miles of No. 6 copper wire has a resistance of about 10½ ohms. If this wire is carrying an arc-circuit current of 10 ampères, there will be required 105 volts ($E = CR = 10 \times 10\frac{1}{2} = 105$) pressure to force the current through the resistance of the wire alone. This will mean that the rate of expenditure of energy in the wire is 1,050 watts; (watts $= EC = 105 \times 10 = 1{,}050$) or about 1.4 horse-power (horse-power $= \frac{\text{watts}}{746} = \frac{1050}{746} = 1.4$). This, however, would be only 4.2% of the total energy of the circuit if the pressure were 2,500 volts at the dynamo. But suppose the total pressure at the dynamo to be 105 volts and the current to be forced through the circuit the same as before, 10 ampères. The loss in wasteful heating of the wire would be exactly the same, for it depends only upon the resistance and the current to be forced through this resistance. The total power of the circuit is now, however, only 1,050 watts ($105 \times 10 = 1{,}050$) so that the loss in the wire is 100%. The whole of the power is spent in simply forcing the current through the resistance of the wire. There would be nothing left at all for useful work. If any lamps were put in circuit, they could not have the full current. There would be an added resistance, and the current would immediately be less, by an amount that would compensate for the work one tried to add.

In street-lighting, where the lamps are so widely distributed, there is another advantage in the series system. Since the lamps are connected in circuit one after the other, only one wire need be run to the lamp, and another away from it, to the next. Where the "multiple system" is used, it is necessary to run two wires in all places, and from these leads are taken off and connected to the lamp.

The series system is also satisfactory for incandescent lamps in the streets, but it is unsuited for interior lighting. With lamps in all sorts of places, as they are in a building, the voltage must be kept low, and each lamp must be independent of the others. If there are many lamps in series, the voltage or pressure that is necessary is difficult to make safe, and the necessity, too, in the series system, of providing equivalent resistances or shunting devices for the lamps turned off, makes an awkward complication of devices. Incandescent lamps, and, in general, all devices except arc-lamps, are consequently run on the "multiple system" and even arc-lamps, for interior lighting, are in many places being thus connected.

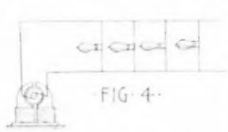


FIG. 4.

Devices connected "in multiple" are independent of one another, each receiving at its terminals the full pressure of the system which always remains the same, no matter how many of the lamps or other devices are being operated. It is here the current that changes, each lamp adding its one-half ampere, it may be, to the total output of the dynamo. The electrical circuit operated in this way is shown in Figure 4.

The hydraulic analogue may be represented as in Figure 5. Here, the pump keeps up between the two pipes, *A* and *B*, a

[1] Continued from No. 955, page 18.

constant pressure, and between the pipes are connected the water-wheels, *c*, *d* and *e*. It will be seen that the wheels are quite independent of one another. *c* may be shut off by turning a stop-cock in the small pipe leading to it, without interfering at all with *d* and *e*. If the pressure between *A* and *B* is kept constant, the only effect, caused by turning off one of the wheels, is to diminish by one-third, the amount of water delivered by the pump.

The power expended in the whole circuit is the same here, of course, as in the series system, the pressure multiplied by the current. But while in the series system the current remained always the same, while the pressure varied according to the number of devices operated, here there is always the comparatively low pressure required by one device, while the current from the pump or dynamo varies according to the number of devices operated.

The effect of a "short circuit" on an electric system may be appreciated by imagining a large pipe, one of very low resistance, connected directly between the two supply-pipes, thus making a "shunt" or by-passage around the water-wheels. There would be nothing to limit the flow of water through it except the resistance to the passage of the water and the ability of the pump to supply it. With an electric circuit on the "constant potential" or "multiple" system, there is an analogous action when the wires are connected by a conductor of low resistance, or when they themselves come together. The dynamo is so constructed that it tends to keep the pressure constant. A tremendous current passes through the wires forming the short-circuit, and if the dynamo is of sufficient size and if there are no protective devices in circuit, the wires will heat until they actually melt.

It is a common statement that the electric current chooses the path of least resistance, but this needs a qualification to make it exact. More current will go through a path of low resistance than through a path of higher resistance, but the total current will divide in exact inverse proportion. In Figure 5, a large pipe may be connected between *A* and *B*, and the flow of water in it will be proportional to the difference of pressure between *A* and *B* and inversely proportional to the resistance of the connecting pipe. But the current through any other pipe, no matter how small, between *A* and *B*, will also be proportional to the difference of pressure between its ends and inversely proportional to its resistance, just as if the larger connecting pipe were not there. If the large pipe carries so much water that the pressure between *A* and *B* cannot be kept up by the pump, then, of course, the amount that will flow through any other pipe will be smaller than before the large pipe was connected. This, however, is because of the effect on the pressure and not because the water chooses the large pipe to the exclusion of the smaller.

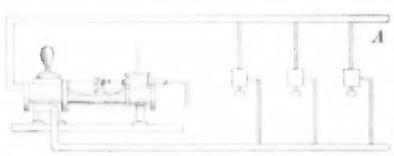
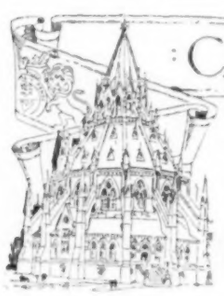


FIG. 5.

RUSSELL ROBB.

(To be continued.)



CANADA.

GOLD-MINING. — THE CONNOLLY-McGREEVY CASE. — DELAYS IN THE TORONTO COURT-HOUSE CASE. — THE LAND-SLIDE ON THE ST. ANN.

THE report of the Geological Survey Department on the mineral production of Canada, recently issued, contains some interesting facts concerning the gold output for the year 1893. From these it is seen that in Canada, gold-mining has reached a recognized position among the industrial pursuits of the country, a fact which is encouraging on the whole, though it is possible there has been no department of mineral prospecting that has been more replete with disappointment and even ruin to individuals. Gold in Canada is not to be found in such quantities as would excite mad rushes of gold seekers; there are no "diggings" where a fortune may or may not be made by a sudden stroke of luck. The precious metal here is so combined with the ore, that a great deal of dogged patience, hard labor and mechanical skill are necessary in its extraction. But, for all this, gold is to be had and the amount produced is on the increase year by year. Compared with copper and iron ore, the output of gold for 1893 was of much greater value than the iron and nearly equal to the copper, for the gold amounted to 51,609 ounces valued at $827,244, while the value of the copper was $875,864, the value of the iron being $298,618. The gold ore varies considerably; a great deal of it is altogether unprofitable for ordinary working. But there is no doubt that with capital wisely employed in the purchase of proper machinery, a great deal more might be realized. So hazardous have been the gold-mining undertakings and experiments, that it would seem as if the present gold miners were afraid to risk much capital and the machinery used is antiquated and wasteful, while for want of care a great deal of gold is lost in the washings. The results, however, obtained even by these crude measures give encouragement, and hope may be entertained of considerable improvement in the methods of working. As an example, we may quote a recent instance. Thirty days' work produced 4,047 tons of ore; twenty-nine days' work on this ore produced $2,644 worth of gold. The total expense of the reduction was $2,120, leaving a profit of $524. This was not by any means one of the richest ores, but the methods employed for the reduction of the ore must be materially improved before the possible profits can be realized.

As reported in an earlier letter, the Mining Acts of the Dominion appear to have been enacted for the purpose of enriching the Government, rather than for the purpose of developing the industry, the heavy royalties levied being such as render new undertakings very doubtful of success, financially, and existing operations almost unproductive of profit. Happily, an amendment has been secured which provides a great relief, insomuch that now all mining lands that have been heretofore sold or leased, and which have been affected by the royalty charge, and also all mining lands that may be sold or leased before the first day of the year 1900 shall be free from the imposition of royalty during all time to come. This will give a new impetus to mining and will be a welcome change to present and intending operators.

The concluding chapter of the celebrated Connolly-McGreevy case of conspiracy has been ended. It will be remembered that Nicholas Connolly and Thomas McGreevy, M. P., were indicted for conspiracy to defraud the Government in the execution of some heavy engineering contracts, Thomas McGreevy being a member of the Quebec Harbor Board and Connolly being a member of the firm of contractors, Larkin, Connolly & Co. The defendants were convicted and punished, but motion was made for a new trial. Three Justices of the Chancery Division delivered opinions upon this motion and upon a case reserved by the trial judge on questions of law. The decisions, of course, will form an important precedent and consequently are of great interest. The justices were of opinion that there existed abundant circumstantial evidence of the conspiracy charged, but one of the principal questions raised was whether evidence was given which established a conspiracy and whether it was proper to allow the Crown to give evidence of acts done in carrying out the conspiracy *before* showing that the conspiracy existed. As to this, the judges were unanimously of opinion that conspiracy can be proved, without proving an actual meeting of the conspirators and an agreement then entered into; it is not necessary to prove the design first, but acts in furtherance of the alleged design may be given in evidence, not only against the defendants who committed such acts, but against the other conspirators also. The motion for a new trial was dismissed and the conviction confirmed.

The case of Neelon *vs.* Lennox, in which the contractor, Neelon, sues the architect, Lennox, for wrongful dismissal from the works of the Toronto Court House, now in process of erection, promises to drag on for years and the patience of the profession must be exercised for an indefinite time, while it awaits the final result of the various trials to which the case will be subjected. The defendant architect is not alone on his side, as the City of Toronto is a party to the suit, and it is known that the plaintiff is "pretty well fixed," while it is stated that it is his intention to push the case to the utmost limits of the law even if it takes the rest of his lifetime and all his money to do it. The damages on the various counts, claimed by the plaintiff, foot up to the neighborhood of, now, nearly four hundred thousand dollars. It is most probable that before either party to the suit is satisfied, it will be taken before the Privy Council in England. The appeal allowed by the trial judge from his decision that the contract gave the architect authority to dismiss the contractor came up recently for argument, in the Chancery Division Court. The Court, however, agreed with the trial judge and dismissed the appeal with costs, but if the plaintiff, the contractor, chooses to pay the costs of such part of the proceedings as would be abortive in the event of a new trial, he may do so and a new trial will be allowed. This gives the contractor the opportunity of opening up his case from the beginning, and makes the proceedings, so far, of little effect.

M. C. Baillargé, C. E., of Quebec City, sends to the "*Canadian Architect and Builder*" a very instructive and interesting account of the alarming land-slide that occurred at St. Albans, on the north side of the St. Ann River about thirty-six miles from Quebec, in May. Some idea of the extent of the catastrophe may be gained from his description. He says: "The chasm created by the slide is, at the western extremity, not less than a square mile in area and as its average depth is some seventy-five feet, the quantity of soil and sand and clay removed and carried away by the river cannot have been less than seventy-five million cubic yards at the western extremity of the slide alone, and much more than this if the portion be added from above the falls which is said to extend some three miles eastward thereof, but which I did not make an inspection of." The St. Ann River flows in an opposite direction to the St. Lawrence, though, roughly speaking, parallel with it, and the scene of the slide inspected by M. Baillargé is about twenty miles from the point where the St. Ann joins the St. Lawrence.

There the "upper river" is separated from the "lower" by a fall of about one hundred feet. The channel of the river above the falls became completely blocked by an immense quantity of sand, clay, and forest debris from the first slide above the falls, and this caused the waters above the falls to rise above their ordinary level to a height of one hundred feet. The weight of this water burst through this dam, and made a new channel for itself, the rushing torrent reaching to a height of fifty feet above the ordinary level. A bridge spanning the river here, fifty feet high, was swept away, while the sandy shores overlying a clay formation were undermined, causing the immense land-slide mentioned above. This sand was carried into the St. Lawrence, rendering it "thoroughly muddy, and even thick with mud as far down as Quebec, discoloring the St. Lawrence for miles below. Some three houses were displaced and moved down with land towards the river, one of which . . . must be buried deep under the clay and sand, while the other two were found next morning some twenty arpents from their original position and about one hundred feet below and they had actually veered round by almost 180°, though maintaining their verticality. It must have been an awful night for the inmates of these two cottages, deafened by the roaring water and sliding earth; their cottages began to move in the dark and they could only wait in fearful suspense for what might be coming next. It was only at daybreak that Andy and Darveau found that they had travelled nearly a mile from their former position on the hill. Some twenty miles down the river from the falls the rushing water gradually ate away the shore, undermining several houses and out-buildings, and causing them to fall into the river and be carried away. The owners of the remaining houses were hastily moving their dwellings back, to prevent their sharing in a like fate. One man, who was thus engaged, informed M. Baillargé that this was his second removal in eight years, due to the same causes. Again reverting to St. Albans, it is to be feared that in the not remote future there may be a recurrence of these slides in adjoining parishes under concomitant circumstances, the subsoil being very probably honeycombed by water, infiltrating through the overlying sand, and the underground rumbling often heard in these vicinities seem to give warning of the impending danger."

On June 25, the United States Society of Civil Engineers visited the City of Toronto for the day, by special invitation of the Mayor and Corporation. They came over from Niagara by boat to the number of about three hundred, and were entertained by a luncheon at the Queen's Hotel, and afterwards taken round the city in special cars provided by the Street Railway Company, and in the evening attended a garden-party given by Sir Casimir Gzowski, President of the Canadian Society of Civil Engineers. The whole party left Toronto by the midnight train for Niagara.

A SUCCESSFUL ARBITRATION.

THE only case in three years where an umpire's services had to be called in to settle a disputed question of wages under the form of arbitration adopted by the National Association of Builders is that, the report on which will be found below and of special interest in view of the present condition of the labor question:

DECISION OF UMPIRE OF JOINT COMMITTEE, MASON BUILDERS' ASSOCIATION AND BRICKLAYERS' UNION.

I have carefully considered the arguments on each side of the contention between the Mason Builders' Association and the Bricklayers' Union No. 3 of Boston and vicinity, as given at the hearing, Wednesday, June 27, and herewith state briefly the points at issue and the conclusion forced upon me.

The members of the committee of the Mason Builders' Association aver that, in consequence of the present depressed condition of business, building has decreased, values have declined, and that, at the former rate of wages and material, there is no inducement for owners of real estate to venture on new enterprises. They, therefore, ask that the reasonable reduction in wages of bricklayers of four cents per hour, or about ten per cent, be yielded, from date to January 1, 1895. The present agreement is on the basis of forty-two cents per hour and eight hours a day, overtime to be paid for at an added rate of fifty per cent, or "time and a half" as it was expressed.

Collateral arguments and instances were adduced, but the above is the chief ground upon which abatement is asked. Selfish interest was disclaimed, and the lessened wage, the builders believed, by stimulating business, would result in more and steadier work for the bricklayers.

To which the members of the committee representing the Bricklayers' Union rejoined:

First. — That the gravity of the alleged depression was exaggerated, and they endeavored to show from figures obtained at the office of the Inspector of Buildings that the first four months of 1894 show an increase in the number of completed buildings above the same period of 1893, implying that the hard times had failed to materially injure the building business.

Second. — A weighty reason why wages in Boston should not be cut was their present low rate as compared with other cities of the country, New York, Baltimore, Indianapolis and Denver paying fifty cents per hour, Philadelphia forty-five cents, St. Louis fifty-five cents, and Cincinnati fifty-six cents, all on a day of eight hours. Buffalo pays thirty-six cents and St. Paul forty-five cents, both on a day of nine hours.

Third. — The irregularity of work and the large amount of time lost through enforced idleness — not only from cessation of outside bricklaying in wintery weather, but from unavoidable delay of material and waiting for other mechanics at all times — really reduces the seemingly high rate of wages to a low average. It was affirmed, and not denied, that the average workman does not earn over $11 to $12 per week, or about $600 per year.

Other contentions there were, but the three given cover the points deserving attention.

The amicable spirit of both parties and the evident desire to arrive at a just conclusion were manifest. In the same spirit let me consider the points raised.

I agree with the Mason Builders' Committee that the present depression is serious; that buildings have been put up on speculation in excess of the demand, that new enterprises are checked, contracts are few, and that the large number of empty houses for sale and the numerous idle bricklayers are sufficient to show the situation. I am not convinced, however, that a small abatement of mechanics' wages will stimulate new business.

The first contention of the Bricklayers' Union Committee is baseless and misleading. The increased number of buildings completed in the first four months of 1894 does not disprove the great depression, for it is evident that the initiation of these completed buildings antedates the panic. If the dates of beginning and the length of time occupied in the building were given, the statistics would be found valueless in this discussion.

The second objection urged against the cut of wages proposed is the comparative low price paid in Boston when the other great cities are considered. On its face it is a strong point, but conditions are always found on examination to account for the discrepancy. If there were no counter-balancing advantages in living in Boston over living in Cincinnati, it is safe to say that with bricklayers' wages at fifty-six cents per hour in the latter place as against forty-two cents here, there would be a hegira of workmen from this city to that. But the fact remains that, instead, bricklayers are drawn to Boston, and, as appeared in the testimony, from cities where the nominal wage is higher.

An agreement of fifty cents per hour in Denver means nothing when building is paralyzed, as at present, and employment in that line practically suspended.

The third reason for leaving undisturbed the current pay has decided force, correcting the unwarranted conclusion that large wages per hour are necessarily large in the gross, as was satisfactorily explained, by unsuitable weather and inevitable delays from causes beyond the bricklayers' control.

I deem it unnecessary to elaborate further the arguments or pleas advanced on both sides, and proceed to give the conclusion I have reached.

If the hard times and the dulness in building were caused by excessive wages paid to bricklayers and other similar mechanics, there would be ample reason for granting the mason builders' request. But it is evident that such is not the case and that some undefined cause makes the lot of both parties a trying one. Attempting to curtail the earnings of either cannot, therefore, be effective. Moreover, the mason builders have this advantage, they enjoy opportunities for profits on contracts that may furnish a fund with which to tide over such times as the present. The bricklayers have no chance for exceptional profits, and while their wages may be adequate to support themselves and families in prosperous times, they are in trouble when work fails them.

Again, for the mechanic to raise his wages is a hard and slow process, and if lowered to meet an emergency involves great exertion to recover them as times improve. They are, consequently, the last item of expense to be deliberately reduced.

It may pertinently be asked, if wages were fixed at thirty-six cents instead of forty-two, who would benefit by the concession? Chiefly the mason-builders, who have unfinished contracts estimated at the higher figure. It would be a transfer without consideration from the laborer to the employer. New contracts would be figured on the cut rate, and unless increased building resulted from diminished wages, nothing would be gained.

My own belief is that the primal cause of the cessation of building centres in the excessive and speculative advance in land values (aggravated by the financial distrust of our national credit) and that the return of better times must be preceded by the decline of the prices demanded for land. When they fall, capital will again be encouraged to invest in new buildings. Land values are the last thing to decline in a panic, but until they do, enterprise is checked and labor waits. The real enemy against whom both builders and employes should unite is land speculation, for he who controls the opportunity controls also the profits of him who uses it.

Convinced, therefore, that no general gain will accrue to the mason builders by the cut of the bricklayers' wage, and that the amount is too small to signify for the stimulation of business, I, therefore, decide that no abatement from the current rate be made.

Permit me to express my gratification, in view of the deplorable labor conflict now raging in the West, that you have instituted this fair and reasonable method of adjusting your differences of opinion.

Respectfully, (Signed) WM. LLOYD GARRISON,
Boston, July 6, 1894. *Referee.*

PEAT FUEL IN GERMANY.

"THE high prices demanded for coal and other fuel and the severe character of the winters in recent years, taken in connection with the dull times prevailing on both sides of the Atlantic, have raised the question of obtaining cheaper fuel to a plane of the highest importance."

Such is the introduction to an article that recently made the rounds of the American press. This, in addition to earnest inquiries from the northwest of the United States, addressed directly to me, has caused me to give careful attention to the process by which many parts of the German Empire secure their supplies of that comparatively inexpensive, but yet satisfactory, fuel — peat, or turf.

Peat, or turf, is used throughout Europe generally, wherever the ordinary cost of its production is not materially increased by cost of transportation. In the large and small cities, as well as in the country districts, it is used for fuel; in fact, in many localities, it is the only substance used for heating purposes. It is used likewise in industrial establishments, but its use in locomotives had to be discontinued in order to prevent danger of forest and field conflagrations.

According to experts on the subject, peat is composed of the following elements, the proportions varying with the respective qualities of the peat: Carbon, 40 to 60 per cent; hydrogen, 4 to 6 per cent; nitrogen, 25 to 35 per cent; oxygen, 1 to 6 per cent; and ashes, 1 to 15 per cent. Of the entire superficial area of Germany, about 5 per cent is covered by peat bogs.

PEAT BOGS OR MOORS.

Peat is the product of decayed organic matter. The main cause of the transformation of vegetable substances into peat (in German, *Verterfung*) is water of a certain composition and temperature, which, being almost still or flowing slowly in or above the earth permits of the mossy development of swamp plants, and at the same time preserves the latter from total decomposition by reason of exclusion of the air.

These conditions are found to exist more particularly in the temperate zone, where the necessary variations of temperature occur, and where tracts of land are found whose impervious beds lead to continual accumulations of water; while, on the other hand, other portions of territory, with loose and penetrable beds, especially in regions inundated by the overflowing of rivers, are subjected periodically or continuously to an extraordinary saturation.

The various theories that have hitherto been advanced to account for the origin and development of peat bogs generally agree that the moors are the product of a more or less extensive decay of certain plants in a mass of vegetation, which, under favorable conditions as regards locality, climate, and moisture, is continually being renewed in one section and matured in another.

The upper layer of peat or turf, which consists for the greater part of varieties of moss, is, when broken into fragments, a loose, fibrous substance, a mixture of root-fibres, leaves, stems, etc. The intermediate stratum, wherein the decomposition of the various materials has reached a more advanced stage, constitutes the main mass of the peat, often containing the trunks of trees and roots, and is called "peat fiber." The bottom layer, known as "pitch turf" (*Pechtorf* or *Speecktorf*), consists of a black, compact, pitchy mass, which shrinks rapidly on being separated into small pieces. It has, when cut evenly, a smooth, wax-like surface, contains the greatest amount of nitrogen, and consequently is the most valuable for heating purposes.

Every rational operation of peat bogs or moors must be begun by the draining of the territory to be worked, *i. e.*, the lowering of the water level in the regions immediately to be worked. This draining must be undertaken sufficiently in advance of the working of the peat moor itself, in order that the territory in question may attain the requisite degree of dryness. Even after this has been effected the peat still contains water in quantity equal to from 70 to 80 per cent of its weight, and this remaining moisture is then almost entirely removed by successive processes of drying in the air, manipulation with machinery, or subjection to artificial heat. Until within the last few years manual labor has been employed to work these peat bogs, but a very ingenious machine has been invented to take its place. This machine consists of three lancet-like knives, set in a square prism with open front, which by operation of a toothed rod, cogwheel, and crank, are sunk into the peat, cutting out a corresponding square prism of peat, which is received upon a horizontally working shelf is removed by a simple reversing of the above-mentioned contrivance. These machines are manufactured by the following firms: R. Dolberg, Rostock (Mecklenburg); C. H. Hall, Berlin; and Charles Muellers, Demmin (Pomerania).

Another method consists in plowing and harrowing the bog or moor by the use of steam power and wire cables, the material for which is manufactured by Heinrich Lanz, of Mannheim.

The process of drying the peat or turf, in so far as small moors are concerned, consists simply of exposure to the open air. When extensive territories are worked, artificial drying is, of course, resorted to, and the expense involved in the latter operation is by far the greatest incurred in the production of peat.

In Germany the following kinds of peat are known: (1) Cut peat (*Specktorf*), which is cut into the form of bricks by hand spades or special machines; (2) moulded peat, which is produced by cutting the peat mass into irregular pieces, mixing it with water and then moulding it into the respective forms; (3) machine or pressed peat, the result of pressing the turf, after previous separation, into pieces and drying in ovens in suitable moulds. In the category of "machine peat" is also included the so-called "ball peat" (*Kugeltorf*)—globes of turf of about four inches in diameter, made by passing the turf pulp through specially contrived appliances. In the peat works at Haspelmoor, and Kalbermoor, in the neighborhood of my district, the moor to be worked is first freed from vegetation, levelled, ploughed, and harrowed, and the loosened peat broken, so as to be exposed to the action of the air. It is then gathered by means of a kind of snow-plough, brought to the separating machine, taken thence to the drying oven and the press, whence it issues in the shape of smooth, shiny, dark-brown bricks.

A machine (the Schlickeysen system) in operation at Haspelmoor produces, provided suitable raw material is used, from 10,000 to 15,000 bricks in ten hours. Another machine (manufactured by Henry Clayton, Son and Howlatt, London), requiring 6 horse-power to operate it, can produce from 60,000 to 100,000 bricks per day.

Interested parties, *i. e.*, those contemplating the construction of peat works, should never lose sight of the fact that from the very beginning every prolonged and expensive kind of manipulation is to be avoided. It is unprofitable to employ any expensive mode of operation in the production of peat, as it naturally comes into competition with coal, which contains a greater amount of combustible ingredients. The cost of constructing a plant for coal demands a considerable outlay in the first instance, but the subsequent actual production resolves itself into the mere process of mining.

Mr. Hugo Classen, of Ansbach, Bavaria, engineer and technical expert on the subject of peat production, has superintended the construction of several of the most extensive peat-works in Germany, and consequently is regarded as an authority in the matter. He has, at my request, placed himself at the service of those who desire further information, and recommends the following works as especially adapted for the preliminary study of the question: A. Hausding's "*Industrial Production and Use of Peat*," published by P. Parey, Berlin; Dr. A. Vogel's "*Practical Guide for Estimating the Comparative Values of Peat Moors*," published by Fleischmann's Publishing House, Munich; Dr. v. d. Goltz's "*Handbook of the Entire Land Culture*" (Vol. iii), published by H. Laupp, Tuebingen; and Drs. E. and K. Birnbaum's "*Peat Industry*," published by Fleischmann's Publishing House, Munich.

PEAT COMPARED WITH OTHER FUEL.

The experiences of recent years, embracing numerous instances of failure, have demonstrated the expediency of entrusting the constructing of peat-works only to competent and experienced experts.

The following figures, indicating the relative powers possessed by various kinds of fuel for converting water into steam (kinetic power) will render it possible to institute a comparison between peat and other fuels: one kilogram (2 pounds) of wood converts into steam 3.4 kilograms of water; one kilogram of brown coal, 3.5 to 4.9 kilograms of water; one kilogram of "cut peat," 2.8 to 4 kilograms of water; one kilogram of "machine peat," 4.5 to 5 kilograms of water; one kilogram of hard coal, 7 to 8 kilograms of water; one kilogram of medium coal, 6 to 7 kilograms of water; one kilogram of poor coal, 4 to 6 kilograms of water.

It is reasonable to estimate, on an average, that 100 pounds of peat are equal, in respect to the really available heating capacity, to 50 or 60 pounds of so-called "pit" coal (hard coal). In the peat-works at Haspelmoor which are known to be a paying enterprise, the total cost of producing 100 pounds of air-dried peat amounted last year to 36 pfennigs (8.6 cents) which low figure was secured, however, mainly by reason of the comparatively low rate of wages and the inexpensive manner of living prevailing in that neighborhood.

In Germany the relative cost of peat, as compared with hard coal, is as follows: one hundred kilograms (220 pounds) of good Zwickau hard coal cost at the mine 1.20 to 1.62 marks (28.56 to 38.56 cents), while the cost of production of the same quantity of peat amounts to from 0.30 marks to 1.40 marks (8.14 to 33.32 cents), according to quality.

PEAT FOR OTHER THAN FUEL PURPOSES.

Besides its use as fuel, peat is turned to account on this continent as a fertilizer and as building material, it being used successfully as a filler for vacant spaces, separating layers for waterworks, reservoirs, ice houses, etc. By means of a process patented by a tanner in Mayence, it has also been made to do service in tanneries. The waste or superfluous particles of peat, known as "peat dust," have recently been brought into extensive use as a material for fitting up and preserving odorless vaults, an innovation deserving strong commendation, especially in localities where the sewerage is inadequate.

In Europe the countries that possess the most extensive peat bogs or moors are in Ireland, Scotland, Sweden, Norway, Denmark, eastern and western Russia, Holland, Austria, Hungary, Prussia, Bavaria, Hanover, Oldenburg, and Mecklenburg. Hanover and Mecklenburg alone have from 149 to 150 square miles, and Bavaria has 22 square miles of peat moors. The territory of the United States embraces very extensive peat bogs, and local experts are of the opinion that the operation of the requisite plant for producing the article, if undertaken by competent parties, would be especially profitable in those parts of the United States where distance from the coal-producing centres places the price of the better kinds of coal beyond the means of persons in moderate circumstances.

Louis Stern, *U. S. Commercial Agent.*

Bamberg, February 20, 1894.

FAILURE OF CAST-IRON COLUMNS.

If there is one situation in which, under certain conditions, the architect and the engineer feels himself thoroughly justified in employing cast-iron, it will be universally conceded that it is in the form of the column or pillar. It matters little or nothing, so

far as the principle is concerned, whether the section be that of the hollow cylinder or of the solid cruciform, or of the **H**, or of any other shape, which might suit the particular circumstances of the case. It is exceedingly rare that any instances have occurred in which cast-iron has been known to fail when subjected to the proper and fair amount of stress, both in character and amount, while acting as a vertical support to a vertical load. When, therefore, the failure of the material takes place under all these conditions favorable to the stability and durability of the column, especially when as in the example we intend describing, the failure is on a scale of considerable magnitude, it not only becomes endowed with a large amount of interest, but it carries with it a lesson which is worth the attention and consideration of all those — as the majority of our readers are — who are engaged in works of construction. It was on one of the Austrian railways near Eibenschitz, in Moravia, on the viaduct over the river Iglawa, that the cast-iron columns supporting the superstructure proved defective. The viaduct itself consists of six spans of 200 feet each, of lattice girders continuous over the intermediate piers. Each pier is built up of four cast-iron columns, having a maximum height of 90 feet braced longitudinally, diagonally, and transversely by channel irons, the whole being strongly bolted together. The columns are cylindrical, having a diameter of 1 foot 7 inches, and a thickness of 1½ inches, and are cast in lengths of 16 feet 5 inches, with internal flanges to take the connecting bolts. A rake or batter of 1 in 10 was given to the piers, the separate columns of which were securely bolted down to the foundations of masonry and concrete by holding-down bolts 14 feet in length, and 2½ inches in diameter. Over the piers the ends of the girders were supported upon a short bearing-beam, which was pivotted upon the pin of a roller bed-plate resting over the wrought-iron cap which united the columns of the pier.

It is not necessary to carry the investigation very far, before arriving at a conclusion, which if not completely decisive, will afford, at any rate, very valid reasons for the pillars evincing the unmistakable signs of weakness which characterized their behavior not very long after they were erected. In the first place, the length of each separate column is of a dimension sufficiently great to allow of a very considerable amount of vibratory action. This oscillation, or tendency to lateral deformation, would occur notwithstanding the efficiency, or as it might be deficiency, of the cross-bracing between the individual columns constituting the entire pier. It must also be kept in view, in considering the subject, that for the whole of this height of 90 feet the interior of the pillars was filled with concrete, and we have this important distinction to bear in mind. It is, that while the material of the columns, that is, the cast-iron, by reason of each column being cast in separate lengths of about 16 feet would yield a little to any swaying or rocking movement, such as no doubt takes place in a pier of the height of 90 feet, the concrete inside would not. This difference between the behavior of the cast-iron forming the hollow column and the material inside it which may be considered in the light of a core inside a casting, unquestionably led to the incipient splitting, or the development of the longitudinal cracks or fissures which were observed in the defective columns. At first these vertical or longitudinal cracks were barely perceptible; but as the operative cause which originally gave rise to them continued to act, excited by the *vis viva* of every passing train, they speedily became so apparent that the safety of the whole structure was seriously imperilled. It is very probable in analyzing the whole circumstances of this very peculiar, if not altogether novel, constructive defect, that the different rates of expansion and contraction of the cast-iron column itself and the concrete in the interior may have had something to do with the fissures in the ironwork. Both causes were at work, threatening first the stability of each separate column, and ultimately as an unavoidable sequence, that of the whole pier. These defects in the cast-iron columns became so serious that all the piers were removed and replaced by substitutes of wrought-iron — a change for which we are not aware there has hitherto been any precedent. — *F. C. in The Building News.*

THE ILLUSTRATIONS

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

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CITY BUILDING AND QUALIFIED ARCHITECTS.

PHILADELPHIA, PA., July 10, 1894.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — I would like to draw your particular attention to the enclosed article. I feel as if it pointed out, and for the first time so far as I am aware, the one method by which architecture can be raised to the position of a profession. No legislature will ever pass a general statute, but a provision that all building plans, or those costing over a certain sum, presented to the Building Department of any city, should be signed by an architect, would be so natural a development of the present building laws, that I think there is a chance of its being adopted in our more progressive States. Very possibly this suggestion has been made before, but most of the proposals for architecture as a profession, which I have seen, have been vague and would interfere with what might be called the fringe and outskirts of the work of an architect. They involve, in short, the creation of a new profession by law. The law cannot do that, but it can provide that at the point where the work and profession comes in contact with Government machinery, a certain standard of qualification should be required,

Yours sincerely, TALCOTT WILLIAMS.

ARCHITECTS AND ENGINEERS.

A FREE entrance to all occupations was the tendency of all our legislation up to thirty-five years ago, when Massachusetts and other States repealed the restrictions on admission to the medical profession, and in some States, like Indiana, all citizens were given the right of practising law before the courts without an examination. For the past twenty years the tendency has been reversed. Entrance to the medical profession has been attended with stricter examinations and this has also been true of law in all the Middle and New England States, as well as in some States of the West.

Architecture and engineering are extremely likely to be the next two professions which insist on a recognized status and legal qualifications. Among architects there has been for some time a strong movement in behalf of a required examination before practising, and a correspondent in the *Engineering News* urges that engineers be required to show a certificate of ability before being allowed to take up engineering. The proposal made is that the law require every set of building plans passed by a city building department to be signed by an engineer or architect who can show the certificate of a civil-service examination similar to that required by the United States Government.

As three-fourths of the plans submitted in New York have to be returned for amendment and a very large share of those which pass the building departments in our large cities are defective, a provision of this kind would undoubtedly be to the public interest. Public opinion is probably not ready for legislation which would prohibit the practice of architecture or engineering by unqualified persons; neither would it be easy to define these qualifications, but it would be possible to require all plans for buildings in our cities to be signed by some one whose qualifications had passed a public examination, because this would be simply an extension of the present requirement, recognized in our building laws, that a certain amount of technical knowledge is necessary in order adequately to plan a building.

This would reduce to a minimum the interference with private and personal rights and privileges. Architects and engineers could call themselves what they pleased and carry on their calling as they chose. The law would only require that all city building plans should carry proof that they were drawn by a competent person. In fact, this is

the principle adopted in dealing with the legal profession. Any one is at liberty to give legal advice or draw legal papers, and this liberty is freely used to the great profit of lawyers later; but when a man appears in court he must be qualified to do his work. Why should not the public, while leaving the utmost freedom to architects, engineers, and builders, as now, insist that all plans drawn under the building law shall be attested by the signature of a man qualified to draw them? — *Philadelphia Press.*

EXHIBITIONS

Boston, Mass. — *Annual Summer Loan Exhibition of Paintings; also, New Accessions to the Print Department:* at the Museum of Fine Arts.

New York, N. Y. — *Twenty-sixth Annual Spring Exhibition:* at the Metropolitan Museum of Art, opened May 8.

Group Exhibition by American Painters — William M. Chase, J. Alden Weir, Childe Hassam and others: at the Galleries of the American Fine Arts Society, 215 West 57th Street.

NOTES AND CLIPPINGS

The Czar's Memorial Chapel. — The Czar and Czarina have returned to Peterhoff from Borki (between Kursk and Kharkoff) where the consecration of the new Church of the Saviour in commemoration of the preservation of the Russian imperial family in the terrible railway accident of November, 1888, took place on Tuesday morning, June 26. There were present crowds of officials, officers and visitors from Kharkoff and the neighborhood, and a number of deputations representing the nobility, the burghers, the merchants and the peasantry of the district. Archbishop Ambrosia, at the head of the clergy in attendance, greeted his Majesty in a royal speech. After the consecration of the altar, a procession of the Cross, and prayers, the imperial party took tea in a pavilion erected for the nobility and then departed for St. Petersburg. Of all the numerous shrines, chapels and icons set up all over the empire to commemorate the providential escape of the Czar at Borki, this one is the most beautiful and striking. The memorial consists of two structures, the one a chapel or oratory built into the side of the railway embankment just where the dining-saloon car containing the Czar and his family was pitched by the accident, and the other a magnificent church in the Muscovite style of the seventeenth century, capable of holding about 700 persons, built a short distance from the embankment out on the open steppe, on the spot where their Imperial Majesties helped to alleviate the sufferings of those who had been injured. The church is now surrounded by a park of about eighteen acres, in which have been planted 70,000 trees. The entire work has cost about 250,000 rubles (£25,000), collected by public subscription, besides the gifts of land, church ornaments and paintings. The church has the form of a high cupola surrounded by six conical towers, the façades being in yellow bricks, with elaborate ornamentation in which the double-headed eagle plays a conspicuous part. A finely-ornamented iron staircase leads down from the railway on either side of the chapel. Within the latter are black marble tablets bearing the names of all those who were killed — namely, twenty-three — and injured, thirty-six. Professor Makofsky has spent two years and a half in decorating both the church and chapel with his best work in religious art. — *London Times.*

Vagaries of Lightning. — The annual average of lives lost by lightning is about 200. Such catastrophes always occur in the five months from April to September, while more than two-thirds of them take place during June and July. The annual average value of property destroyed by lightning during the eight years ending with 1892 was $1,500,000. In 1890 New York was the most unfortunate State with respect to property damaged by lightning. Pennsylvania and Ohio followed hard after, both of them away up in the hundreds of thousands of dollars, while Kansas reports only one fire worth $400 and Mississippi two, which averaged $75 apiece. The following year Pennsylvania led the way, closely followed by Missouri, Ohio and New York, with Delaware, Louisiana and Rhode Island at the opposite end of the report. In 1892 New York was again at the head, having lost nearly twice as much as in any of the other years. Next in order were Pennsylvania, New Jersey, North Dakota and Ohio. Florida and Mississippi lost the least that year — $325 each. During the nine years ending with 1892, 2,335 barns, 664 dwellings and 104 churches were struck by lightning. The destruction of barns is usually greatest in New York, Pennsylvania, Massachusetts, Indiana and New Jersey. In the destruction of dwellings, Pennsylvania and New York head the list with an equal number. Connecticut and Maine come next, and are also paired. The Weather Bureau asks for twenty years — of which eight years have passed — in which to determine from statistics "whether there exists a periodicity in the number of lightning strokes." The Bureau has discovered, however, that lightning does sometimes strike twice in the same place. The main object is to find out what construction of buildings is most liable to destruction by lightning, and to what extent the character of the land where buildings are located influences the frequency of lightning strokes. Some things have been proved already. The danger to a country building is five times as great as to one in the city, and a barn is four times as likely to be struck as a dwelling-house. With regard to trees, the oak has been most frequently struck, the proportion being over fifty times as often as the beech, which suffers the least frequently. — *N. Y. Commercial Advertiser.*

A German House Tree. — One of the most curious trees in Germany stands on the left bank of the River Oder, in Ratibor, Silesia. It is a maple, at least 100 years old, which has been twisted and cut into a sort of circular two-storied house. A flight of steps leads up to the first level, where the branches have been gradually woven together so that they make a firm leafy floor; above this is a second floor of smaller diameter, formed in the same way; and the ends of the branches have been woven into solid walls, and cut so that eight windows light each of the apartments. Below the first floor, at the level of the second, and at the top of the tree the boughs have been allowed to grow out naturally, while the intermediate walls and the edges of the window-like openings are kept closely clipped. — *Philadelphia Press.*

A New Topographical Map of Baltimore. — The topographical survey of Baltimore, which has been going on since June of last year, is one of great importance to the city. The field work will probably be finished in September. The cost of the undertaking will be considerably more than the $125,000 which was originally appropriated. It will be sufficient for the survey, but the drawing and mounting of the property-maps will also involve a large outlay. It will take several years to complete them. The topographical map to be prepared will be of great use in the future. The elevations will be shown by contour lines at five-foot vertical intervals. A skeleton map will be made with the contour lines and showing streets, alleys, roads, parks, streams, conduits, public buildings and railroad lines. The map will be on a scale of 500 feet to one inch, and will be about seven feet square. The property division of the survey is another important part of the work. The property-map which will be prepared will show the location of every piece of property in the city, its dimensions and character, the material used in the construction of every building and the purposes for which the building is used, the dimensions of every lot and its relative position regarding streets and roads, and the name of every property-owner, if possible. Such a map will be invaluable to the Tax Department. — *N. Y. Evening Post.*

Raising a Bridge. — The raising of a bridge in Switzerland upon the line of the International Railway, from Paris to Vienna, has attracted considerable attention from the methods pursued. The occasion for the change, says *Locomotive Engineering*, was that the river crossed — the Rhine — had lost in the sectional area of the passage between the piers, about 25 per cent in thirteen years, owing to the deposition of gravel and sediment, while the high-water level had risen to such an extent as to pile floating débris six feet deep on the bridge floor in times of flood. The alterations included some reënforcements, besides the raising of the whole structure about five feet. The bridge was continuous over a central pier, and had two main vertical posts there and four vertical end posts. To each of these posts an inclined strut was attached in a transverse vertical plane, presenting a surface for the top of an hydraulic jack to act upon. Eight special 100-ton jacks were used, with an eight-inch stroke and a working-pressure of 400 atmospheres, the piston being nearly 0.7 in diameter. The fluid used was a mixture of water, alcohol and glycerine. Sixteen men operated the jacks, their movements being synchronized by a code of signals, designed to secure uniformity of action. The bridge was raised a foot or two by short lifts, followed by thoroughly blocking, and then building under one course of cut-stone masonry. The total load was 546 tons, and the maximum load on a single jack was eighty-seven tons. The bridge was raised in four stages during intervals between trains. The longest interval between trains was about two hours. The weight of trains was rigidly restricted during the time the bridge was undergoing repairs, and their speed was limited to three miles an hour in crossing the bridge. In addition, a special block system was organized upon that section of the line upon which the bridge is located, so that operations could be suspended, and the track restored five minutes before the arrival of a train at the site.

Sculpture for the Congressional Library. — The sculpture to be used as decorations within and without the new Library of Congress is to be in complete and in low relief, and to consist of statues and busts in bronze and granite; also in bronze-relief doors and many large symbolical statues in plaster. The latter will decorate the inner dome, where they will be put about sixty feet from the marble floor of the central hall. They are to be figures 10½ feet high, and presumably colored to go with the stucco ornamentation of the vault. They are eight in number, and will rise against the spandrels between eight arches. John Q. A. Ward will model "Poetry"; Augustus St. Gaudens, "Art"; George Barnard, "Religion"; Bela L. Pratt, "Philosophy"; Daniel C. French, "History"; John Donoghue, "Science"; Paul Bartlett, "Law"; John Flanagan, "Commerce." Bronze doors, three in number, are said to have been given to Olin L. Warner, Frederick MacMonnies, and George Barnard. The inner dome has a balcony running round it, about thirty-five feet from the floor. Here are to stand sixteen bronze figures of famous men, each 6½ feet high. Daniel C. French will model Herodotus; Louis St. Gaudens, Homer; Frederick MacMonnies, Shakespeare; Charles Niehaus, Moses and Gibbon; John Donoghue, St. Paul; John J. Boyle, Plato and Bacon; George Barnard, Michael Angelo; Theodore Bauer, Beethoven; C. E. Dallin, Newton; Herbert Adams, Dr. Henry; F. W. Ruckstuhl, Solon; George E. Bissell, Chancellor Kent; Paul W. Bartlett, Columbus; and H. H. Kitson, Fulton. These names, and the names of sculptors, appear to have been shaken up in a bag and drawn out at haphazard. But there is this to be noted: no really questionable sculptors have been included in the orders, so that in the majority of cases we shall probably get fairly good works. The least known are Messrs. Bela Pratt and John Flanagan, young men who have worked with St. Gaudens. The windows in the balcony on the façade are to be decorated with nine colossal granite busts. Herbert Adams will model those of Scott, Dante, and Demosthenes, F. W. Ruckstuhl those of Franklin and Macaulay and another, and Jonathan S. Hartley those of Irving, Hawthorne, and Emerson. — *N. Y. Times.*

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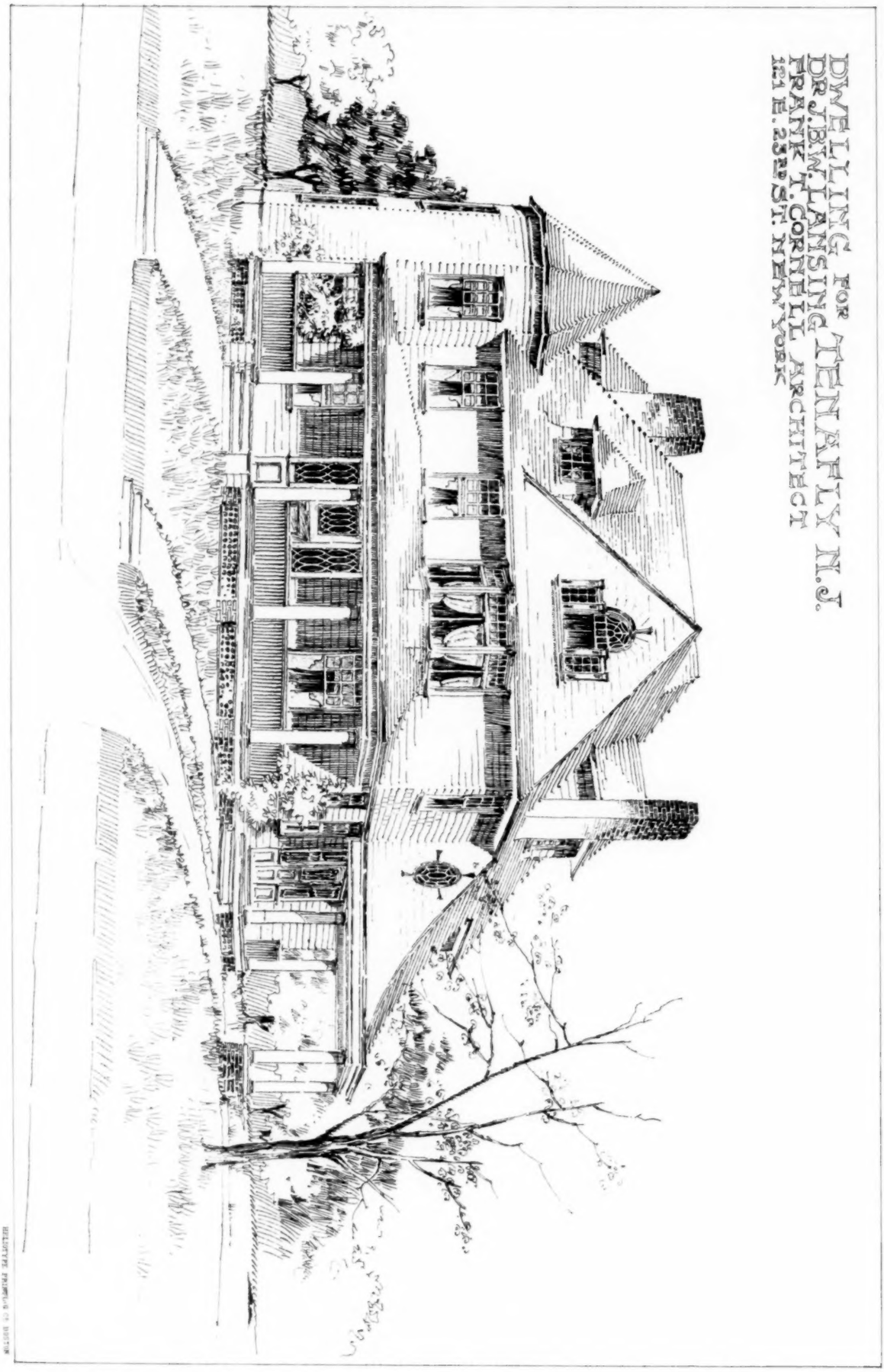

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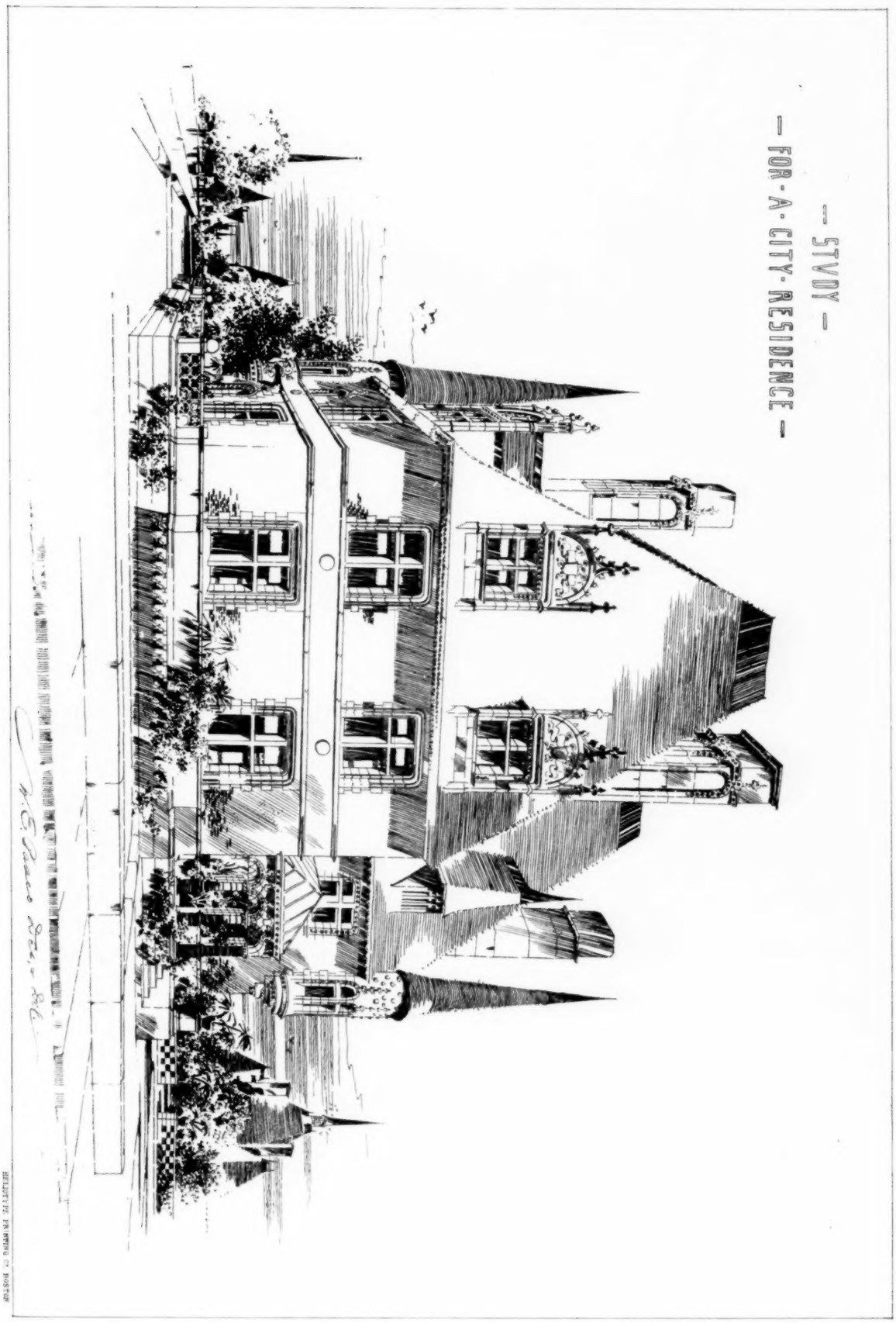

— STUDY —

— FOR A CITY RESIDENCE —

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