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CONTENTS.

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CONTENTS.

THE Annual Convention of the National Association of Master Builders was held in Cleveland, Ohio, on Monday, Tuesday and Wednesday of last week. The attendance was large, and the hall of the Young Men's Christian Association was none too spacious to contain the delegates and other persons interested in the proceedings. Mr. McAllister of Cleveland, the President of the Association, made a brilliant address, taking for his theme the unsatisfactory character of those building contracts which put the contractor entirely at the mercy of the architect. This was followed by a dispute over the credentials of the Pittsburgh delegates, which resulted in the withdrawal of the whole delegation. The remaining time was occupied by the hearing and consideration of committee reports, and election of officers, and by various excursions and entertainments. The social part of the meeting was, indeed, particularly pleasant. Most of the delegates had rooms at the Hollenden House, which afforded also ample space for visiting parties from the other hotels; and many ladies were in the company, so that the aspirations of the distinguished divine who commended the Convention to the attention of Providence, and who prayed that the delegates might "have a good time," were fully answered.

IN the city of Philadelphia, during the year 1891, six thousand, seven hundred and thirty-eight new buildings were erected, and twenty-two hundred and ninety-seven others altered or added to. This is a great falling-off from the showing of the past two years. In 1890, ten thousand, one hundred and thirty-six new buildings were erected; and in 1889 the number was ten thousand, two hundred and fifty. In most cities, the completion of twenty or thirty new buildings every day would indicate the expenditure of a vast sum of money, but in 1891, forty-six hundred and thirty-two out of the total number of buildings were two-story dwellings, estimated to cost only two thousand dollars apiece; so that the total amount invested in building operations for the year, including alterations and additions, as well as new work, was less than twenty-eight million dollars. Nevertheless, Philadelphia is to be congratulated upon the fact that two-story houses are still popular there. Forty-six hundred new houses of this class will accommodate at least twenty thousand honest and industrious people, and an incalculable amount of domestic happiness and good American patriotism; and any city is fortunate that can show such progress in this direction; while the money that the cottages cost, devoted to tenement-houses of the New York pattern, would infallibly bring a large return in dissipation, Bohemianism, demoralization and misery, which are a bad investment for any community. Some time, we hope that a student of social science may investigate the relation of dwellings and politics, as shown in Philadelphia and New York. It is curious that Philadelphia should be the only large city in the United States which is generally Republican, all the others being Democratic. Of course, we do not say that all Philadelphia Republicans are saints, nor that all New York Democrats are sinners; but it is certainly a matter of scientific interest that the principles favored by Republicans should be more popular among people who live in detached cottages than among those who are crowded into tenement-houses.

AN important expedition has been sent out by Harvard University, to study the ethnology and archæology of Honduras, under the direction of Professor F. W. Putnam. Professor Putnam is at present detained in Chicago, where he is organizing the exhibit of American archæology, but will join the remainder of the party in Honduras as soon as he can be spared from the Exhibition councils. Meanwhile, the little band of scientific men has reached Honduras, and has erected a camp in the court of the great pyramid of Copan. Thirty-five native laborers have been engaged for the work of excavating, and casts and photographs of the carved stones, which lie about in great numbers, are being secured as rapidly as possible. The University, or, more specifically, the Peabody Museum of Archæology and Ethnology, has been, by a decree of the Government of Honduras, placed in sole charge of all the ruins in the country for a period of ten years, with permission to excavate at discretion, and to remove half of the objects of interest secured. The condition of the grant is that the work of exploration shall be continued from year to year during the specified term, and the University will do its best to utilize its opportunity.

M. CHARLES NORMAND, one of the most distinguished French architects, has been making a journey through Magna Græcia and the Morea, of which he gives an interesting account in *L'Architecture*. Of late years, the Italian Government has been excavating systematically in Sicily and Lower Italy, and has uncovered many remains of great value. At Metapontum, once an important Greek colony, but now an unhealthy waste, the ruins of two temples have been excavated, besides portions of a market, a theatre, houses and tombs. The temples, as is known by inscriptions found in them, date from the seventh and sixth centuries B. C., and are, therefore, about two hundred years older than the Parthenon. They are, of course, Doric, and M. Normand makes the curious observation that in the triglyphs of one of them the section of the grooves forms a pointed arch. He infers from this, which he considers a confirmation of the evidence derived from the profile of the Treasury of Atreus and other structures of the kind, that the pointed arch was known to the ancients; but it is hard to see any connection between a structural form and a treatment of surfaces intended only to secure certain contrasts of light and shade. However, even as means for gaining such contrasts, the form of the grooves is interesting, and shows much delicacy of observation on the part of the designer, while further skill is shown by the addition of a narrow projecting rib along the middle of the plain face between the grooves or glyphs. It has generally been supposed that the Italian temples, which are commonly of a coarse stone, were covered with stucco, and that this was subsequently painted; and the remains of Metapontum show many specimens of the stucco covering.

WE regret to record that when the electric trolley question came a second time before Brooklyn's mayor he decided not to veto it again.

WE have waited with some impatience for the appearance of the new coinage, expecting to be startled and delighted by an extraordinary exhibition of American skill in design. It will be remembered that a competition was held last year for designs for the new coins, but that all the designs were rejected as unsatisfactory. Another proposition was made, that Mr. St. Gaudens, or Mr. Warner, or one of the other sculptors of whom Americans are justly proud, should be commissioned to prepare models; but this met with no favor from the authorities, the Director of the Mint being reported to have said that no artist in America was capable of modelling a coin, and that the designer to the Mint could do the work better than any one whose name had been suggested. As Mr. St. Gaudens studied die-sinking and seal-engraving in the School of Fine Arts in Paris, and is particularly distinguished for his low-relief work, it would seem as if a designer who could surpass him must do something of remarkable merit, and it is not surprising that artists have expected the result with curiosity. Now that this curiosity is gratified, we may say, for our own part, that our high expectations are by no means realized, and that the new designs seem to us coarse and inferior, even as compared with the unpretentious little nickel-bronze five-cent pieces at present in use. The medallion head on the five-cent piece is popularly supposed to be a portrait of the same lady who was the model for the head on the silver dollar, and it is certainly the portrait of a beautiful head, rather delicately modelled; but the head on the new coins could hardly be that of any person except an idiot, and it is coarsely modelled, and still worse designed. To make sure of having something to fortify our own judgment, we have placed before us, side by side with a new twenty-five cent piece, a Greek coin, bearing a head in profile, of the same size, and very similarly arranged. By measurement with the dividers, we find that the distance from the chin of the Greek divinity, Athena, to the corner of her eye, is about four-fifths of the distance from the corner of the eye to the top of the head. In the American coin, the distance from the corner of the eye to the top of the head is exactly the same as that to the point of the chin. It is true that the Greek lady wears a helmet, but it is a very close-fitting one, and the American has a clumsy cloth cap, which ought to take up nearly as much room as the helmet. Another striking difference between the head of the nineteenth-century A. D. and that of the sixth or seventh century B. C., is that in the former the thickness of the neck is about half the diameter of the head, from the tip of the nose to the extreme outline of the Phrygian cap, while in the Greek head, so far as can be judged, the width of the head is about two and one-fifth times the minimum thickness of the neck. The head of the Greek lady being thus, in profile, about twenty per cent larger in two dimensions, above and behind the ears, the inference is that she must have possessed about one-third more brains than her American rival, which none of us will concede to be possible. Reversing the coin, we find a very awkward little eagle, quite inferior in effectiveness to the one on the old coins, and much too small for his place, so that he leaves a void above him, thinly sprinkled with stars, which, however, do little to remove the sense of vacancy. The edge of the coin is, for some reason, raised very high above the surface. This may, perhaps, be done to prevent filing or clipping, but it must increase the loss by wear. On the whole, the new coinage is a decided disappointment, not only because we were led to expect something better, instead of worse, than the present designs, but because, in the comparison which is sure to be made between ours and the British new coinage, which is modelled by the best sculptors in England, we had hoped not to come out very far behind. We firmly believe that our best sculptors are inferior in nothing to the best English ones, and, now that the British people have determined to procure little bas-reliefs by the most noted artists of the country to carry in their pockets, it is hard to have to content ourselves with things worse than we had before, when we might have had little masterpieces by our own artists.

AFTER the close of the regular Exhibition of the Philadelphia Art Club, an Exhibition of Water-Colors and Pastels is to be held, also under the auspices of the Club, and artists generally are invited to contribute works of this class. Pictures will be collected in Philadelphia and New York, and returned, free of expense to contributors. Entries must be made not later than March 1, on blanks which, with a circular of explanation, may be had from Mr. George Wright, Secretary, 220 South Broad Street, Philadelphia. The exhibition will be opened to the public March 21, and remain open three weeks, and a gold medal will be awarded for the best water-color shown, subject to the rules of the Club.

AN interesting piece of irrigation has been carried out at the mouth of the Rhone. Every reader of Daudet knows something of Provence, and of the Camargue, that malarious waste which occupies the triangle between the two outlets of the Rhone and the sea. Until within a few years, the principal product of the Camargue was bull-fighters, who, as the French law prohibits cruel sports, were obliged to give their antagonists considerable odds in the game, by fighting on foot, and depended, to amuse the spectators, on the agility with which they evaded the rushes of the bull by leaping into the air, and descending behind him, as he passed beneath. The bull-fighters still flourish in the Camargue, but, thanks to a few persistent scientific men, many other things now flourish there also. As the island, which is entirely composed of alluvium brought down by the river, is often partly overflowed, either by the sea, after severe storms, or by the river in time of freshets, the first step was to build dikes to keep it dry. The next was to dig ditches and provide pumps, by which the water soaking into the soil from outside of the dikes was removed, and thrown into a large basin, the "étang Valcarès," from which it ran into the sea. As this removal of the ground-water left the territory dry, it was necessary to apply water to the surface, which was done by irrigating canals and pumps, taking water from the Rhone at the upper part of the island. Provision was also made for flooding certain portions at pleasure, to destroy phylloxera, and planting was begun on an extensive scale. The climate is warm, and grapes grew admirably, while pasturage became profitable, and some new plants, among others the Australian "salt bush," have been cultivated with prospect of success. According to the *Revue Industrielle*, the Camargue has become transformed from a desert into a fertile and busy district, and a network of railways has been planned for it, and carried partly into execution.

THE *Scientific American* calls attention to the fact that sailing-ships are rapidly returning to favor among merchants as a means of transportation, in preference to steamships. In England, at present, there are one hundred and forty-one such vessels in process of construction, while last year, at the same season, there were only eighty-six. Elderly people, interested in navigation, will remember that the clipper ships of forty years ago made long voyages with nearly or quite the rapidity shown by the common merchant steamers of to-day. The "tramp" steamers, such as are chartered by merchants, do not go much more than ten miles an hour, even under favorable circumstances, and their average speed is probably less; while a clipper sailing ship, of the George Steers or Donald McKay sort, has often been known to sail more than four hundred miles in a day, and to average nearly nine miles an hour for a voyage of many thousand miles. As the price of coal in England is steadily rising, the economy of using sailing vessels, where great speed, or certainty of arrival at a definite time, is not important, has become very considerable, and the crew of a sailing ship may be much smaller than that of a steamer. Whether the marine insurance companies would favor the change from steam to sails is another question. Undoubtedly, a sailing ship is exposed to more dangers than a steamer; but, to compensate for this, the cargo of a steamer may suffer from heat and coal-dust, from which it would be free in a sailing vessel. Moreover, under the system on which the tramp-steamers are often sailed, the cargo is sometimes exposed to a very peculiar risk. In order to save as much room as possible for cargo, only coal enough is shipped to carry the vessel to the end of its voyage under favorable circumstances; and, if the circumstances should turn out not to be favorable, the coal-supply is occasionally exhausted before port is reached, and the cargo is levied upon for fuel. We have known five thousand dollars' worth of coffee belonging to a single consignee to be burned under the boilers in one voyage, and it is said that the furnaces of such steamers have been fed with tea. An account is kept of the precious fuel consumed in this way, and its value is assessed upon the entire cargo to reimburse its owners; but it is obvious that the loss is the same, whether the contributors are few or many.

ITALIAN ARCHITECTURE.[1] — XI.

CONTEMPORARY TIMES. — (*Concluded.*)

Fig. 8. Villa Siemiradski, Rome.

ROME has undergone a great transformation since 1870, that is since it was made the capital of Italy. Previous to that date works of importance had been executed, especially by Virginio Vespignani (1808 † 1882) a favorite of Pius IX. Employed as assistant architect from 1837 in the reconstruction of St. Paul's, Vespignani was appointed architect-in-chief in 1869, a place reserved for him by the Italian government. Vespignani had an important part in the recent enlargement of St. John Lateran, which was continued and completed by his son; he was also engaged on Santa Maria Maggiore, on St. Peter's and on the Campo Verano, the great churchyard of Rome. Before 1870 Vespignani's name was connected with three of the city gates, the Porta Salara, Porta Pia and Porta San Pancrazio. In short, Vespignani was the most active of all the Roman architects before 1870 and for a short time thereafter. Cipolla also distinguished himself at Rome, but not until after 1870. Having won a reputation by his earlier works elsewhere, he was entrusted with the construction of the Royal Stables, as well as with the decoration of the apartments of the Quirinale, on which, among others, the painters Barilli and Mariani gained distinction. Cipolla added to his Roman laurels by the erection of a small church in the Piazza San Silvestro, a real gem of architecture in the style of the Florentine Renaissance. Among other architects of note may be cited Signor Azzurri, who designed the Teatro Drammatico Nazionale, the construction of which presented certain financial and site difficulties hard to overcome. Signor Azzurri was likewise the architect of the charming little Siemiradski villa-atelier, a picturesque structure to which the reader's attention is invited (Figure 8).

In regard to the monumental edifices of Rome projected since 1870, it may be said that there are several in course of construction, as the national monument to Victor Emmanuel (Figure 9), a Classic building by Guiseppe Sacconi (living) and the Palais de Justice by G. Calderini (living). We will pass over the Finance Office, a colossal structure (39,370 yards square) by the Roman engineer Canevari (living) but possessing little of artistic value, and the War Office constructed by the corps of military engineers, superintended at first by Colonel Garavaglia and later by Colonel della Penne. Several private residences might be mentioned which are imitations of Classic art. Of public edifices, I will call attention to the Palazzo delle Belle Arti, an exhibition building in the Via Nazionale, the principal street in the upper part of Rome, which was begun by Monsignor Saverio de Merode, was continued after 1870 and completed as far as the Piazza di Venezia. The Palazzo delle Belle Arti was constructed by Pio Piacentini (living) and it is the first important edifice from an artistic point of view that has been erected at Rome since 1870. As it was to receive only paintings and statuary — Piacentini believed that the exposition of architecture and applied art should be kept separate — a plot of ground 1,420 yards by 5,250 yards was placed at the disposition of the architect. Piacentini's palace, built with the financial concurrence of the government and amid successive hostilities, was opened in 1883 with a grand exhibition of the fine arts.

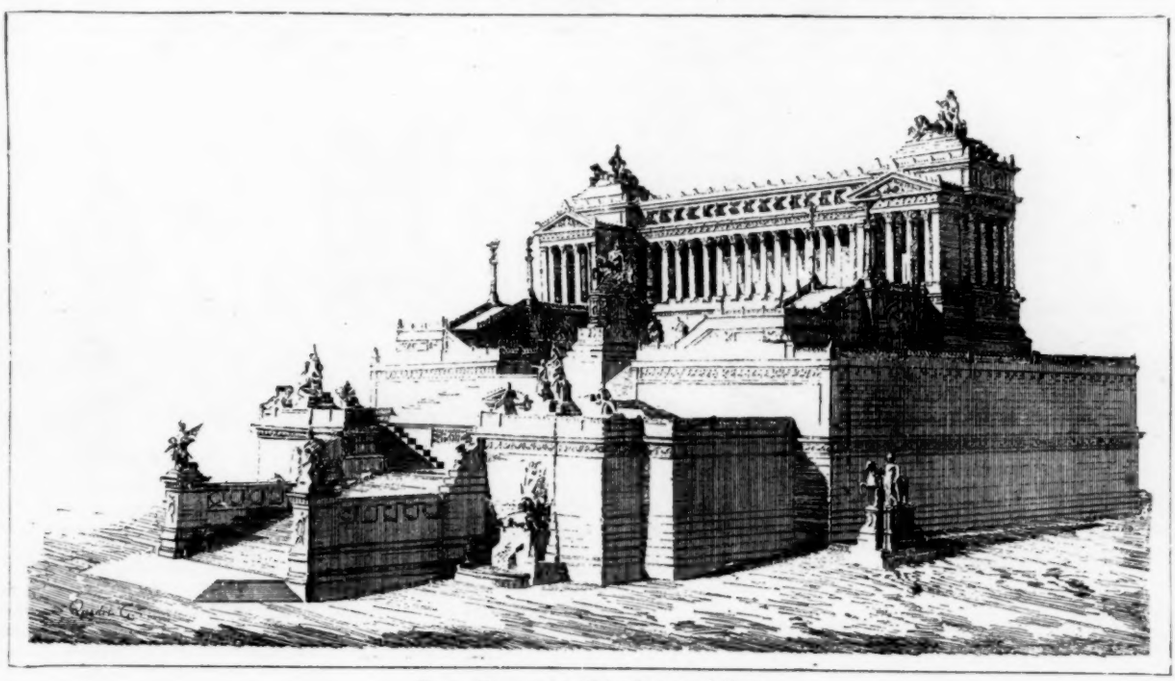


Fig. 9. Monument to Victor Emmanuel, Rome.

Naples must also be included among the cities in which contemporary architectural activity has been especially marked. A great deal of building has been done along the bay, on the Corso Victor Emmanuel, in the new Amadeo quarter, and in the other new quarters, as on the Vomero. But, even in Naples, a city of poets, architecture is too subservient to speculation to be able to soar freely into the realm of art. A grand gallery has recently been constructed here named from

[1] From the French of Alfredo Melani, in Planat's *Encyclopédie de l'Architecture et de la Construction.* Continued from No. 839, page 53.

Umberto I; though on a smaller scale than that at Milan, it nevertheless resembles the latter in several points. The greatest length of the Neapolitan gallery is 153 yards; the height is 82 feet, in five stories. It is the most remarkable of the recent monumental structures of Naples and it cannot be compared with the T-shaped gallery of the museum, which is nothing more than a mere shadow of a gallery. We will say nothing of the immense works of extension and sanitation in which a great number of engineers are employed and which in their *ensemble* constitute the most notable undertaking of the kind in Italy during the present century.

Other works might be mentioned, such as the Massimo Theatre of Palermo, constructed after the plan of G. B. F. Basile (living); the hospital of San Andrea in Carignano at Genoa, designed by the architect Parodi; the monumental cemetery of Milan, by Carlo Maciacchini (living); and the Savings Bank of Bologna, by Guiseppe Mengoni, architect of the covered market at Florence, in which the art of combining iron with stone is left in a problematical state. Mention might also be made of the Duomo of Lonigo, by Giacomo Franco (living) in the Lombard style of the churches of Verona (Figure 10); and returning again to Antonelli, we might cite his cupola of San Gaudenzio at Novara, in the Roman architectural style, but with the Antonellian forms of the Mole of Turin, although the cupola of Novara does not quite reach 400 feet in elevation.

Fig. 10. Cathedral of Lonigo.

As long as architecture in Italy or elsewhere develops as at present, between the imitation of the antique and the adoption of forms imposed by speculation, so long will it remain what it is now, namely, a scientific and economic problem, and, in the domain of art, a mere question of taste.

Alfredo Melani.

The Pont d'Arcole, Paris. — Like its older neighbor, the Pont Neuf, the Arcole Bridge connecting the Place de l'Hôtel de Ville with the Flower Quay is again showing signs of instability. Traffic over the bridge was suspended this morning owing to a fissure in the iron supports which were put in place about three years ago, when the construction was also found lacking in solidity. The Pont d'Arcole was built in the Restoration days, when it was called the Hôtel de Ville Bridge. From its central way may be obtained one of the finest views of riverside Paris. — *London Daily Telegraph.*

BALTIMORE

PROMINENT BUILDINGS OF 1891.

LARGE and conspicuous buildings in a decidedly larger proportion were either completed or to be seen under construction during the last year than has been noted for some years past in Baltimore. Among the more important of these of sufficient interest to attract attention are undoubtedly the two big club-houses, much the biggest things of the kind in the city, and, we believe, with one exception on a much smaller scale, the only social club-buildings originally designed for the purpose, the others being only metamorphosed dwellings, not without their own attractions on that account.

The Phœnix Club, without owing any results to very imposing dimensions, costly material or elaborate detail, shows a decidedly effective scheme, both exterior and interior, from simply good architectural treatment. It is happily located, facing the parks of Eutaw Place, and its three-story façade of brownstone and brick has such disposition and proportion of openings and character of detail as to unmistakably suggest its real purposes, while the arrangement of the interior is apparently very appropriate and convenient for the special uses of such a building, the two principal pieces being a large ball-room and a banqueting-hall, around which the other rooms are well grouped and balanced. The main staircase, on the transverse axis of the building, does not seem to assume sufficient importance in the whole scheme, either in dimensions or detail, and the colored glass used generally in the windows throughout is decidedly below the average of what one would expect to find there in these days of possible good things in that line. The walls are still in the white, waiting decoration, and the whole interior may be largely made or marred by what the future has in store for it in that way. It is to be hoped that the glass will not suggest the keynote of the scheme for either form or color, but that its own opposite qualities may be so emphasized by refined and artistic work as to necessitate its exchange for something better.

The new Maryland Club produces an impression different from that of the Phœnix. In its conspicuous long, low, rock-faced white marble façades it is much more pretentious and self-asserting, much less architectural and refined, and tells no story of its purpose, quite

diverse being the impressions it has produced as to what nature of building it represents. The interior seems fairly well disposed for the accommodation of a social club; here the bigness of the rooms and the solidity and massiveness of the detail are noticeable, continuing the impression produced by the exterior, and both probably meeting with much popular approval. It is not, however, as we noted before, what one expected or hoped to see as the new home for the old Maryland Club, one of the oldest in America, and the calamity of a lost opportunity in the manner of placing the building upon the lot is the more to be deplored and the more evident now that the work is completed. Less money might readily have been spent on the building itself and every advantage gained by utilizing the whole of the lot and placing the building in the centre, surrounded by ornamental shrubbery, instead of thrusting it upon the narrow sidewalks of the two streets, with only a west and north front of architectural treatment, while a vacant lot is reserved on the south side for some future comparatively small building.

The design for the new Hebrew synagogue on Madison Avenue expresses an evident intention, in the assumption of a certain architectural style — as fitting the purpose from historical association — more or less successful in achievement. The point in view was evidently the Oriental Romanesque, for want of a better name. The result is a very good bit of round-arch, modern architecture, simple, strong and sincere in treatment, both in mass and detail, with apparent restraints imposed by dimensions of the lot, questions of utility and economy of expenditure.

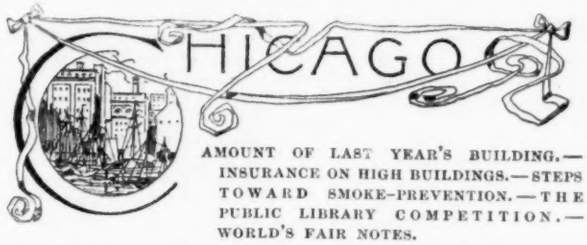
The most conspicuous features of the exterior, the two tall, slender towers that rise from the principal façade, are nicely treated in themselves if one could definitely decide just what purpose shafts of that character suggest. Their outlines hardly recall the more familiar form of minaret of the Eastern temple and mosque, while we cannot escape the impression of ventilation or the "power-house" which their shape and position will thrust upon us. The coarse, cold and colorless aspect of the gray stone in this building, and its surroundings of utterly commonplace and architecturally barren rows of houses closely crowding upon it, are elements antagonistic to the effects that might have been attained in the design. The interior shows a very simple scheme — a square auditorium, with an octagonal lantern rising in the centre over four large, round arches supported on four sturdy columns — all in plaster, the only noticeable details being the capitals, cornice and arch mouldings, with the balustrade of a gallery at one end and the pulpit and organ screen at the other, all quietly treated in a sort of Classic Romanesque. The management of the octagon growing out of the square above the four big arches is not a happy solution of a difficult question, and the opening into the lantern being abruptly closed with a flat plaster ceiling just above the line of the main roof, while on the exterior it is conspicuously crowned by a large, tile-covered dome, produces an unpleasant surprise. The window-glass, which assumes so prominent a place in the interior effect, is most unfortunate in both form and color, and hardly worthy of comment being presumably temporary, and yet sufficiently elaborate to suggest that it may be intended as permanent.

Another conspicuous building is the six-story apartment-house, "The Arundel," on the corner of Charles Street and Mt. Royal Avenue. New in two senses, not only that it is just completed and occupied, but also that it is the first building of the kind in the city so arranged, where one portion is divided into a number of carefully studied "French flats," each a complete dwelling in itself, while the other portion is disposed of in a still larger number of small "bachelor suites"; other buildings of a similar nature, heretofore existing, being either alterations of old houses or new erections on such a contracted scale as to give great dissatisfaction, and to be regarded as only "makeshifts" in that style of living. The arrangement and planning of the "Arundel" is apparently satisfactory and meeting with popular approval, every suite being occupied, it is said, and the larger portion having been rented in advance before the walls of the structure were far out of the ground. The rather simple design of the two façades can certainly not be classed as new in the sense of any striking originality, being in the modern and modified Italian Renaissance so generally and naturally in vogue at present, of which we have seen some examples much better and many much worse than this. The apparent aim was to obtain by simple and inexpensive means a successful treatment of plain wall-surfaces, merely by the disposition of the openings and solids, and a scheme of flat color. The walls are of cream-colored stone and buff brick, with a pattern design in pale red showing through the sixth story and the frieze; and a wide bracketed cornice, Classically treated, surmounts the whole, around both façades, one of one hundred, and one of sixty feet. This building, from its prominent position, attracts a certain amount of attention, and those of the public whose tastes have a preference for simplicity and repose are favorably impressed; those who demand more ornamentation of surface and florid treatment generally give adverse criticism.

The entire block of the lately opened portion of Cathedral Street, between Saratoga and Mulberry, is now occupied by two large buildings, one as yet incomplete, both prominent from their size, location and purposes. The new Odd Fellows' Hall can be adequately described as a four-story brick structure between a basement and attic, pierced by some fifty window-openings and two doorways on the two façades on the streets. It is apparently an excellent piece of brick construction. We are told that a large amount of ornamentation was omitted from the original design to curtail the cost, and we judge that the building has probably gained by the change, the only ornamental features now appearing being some stone and copper work about the two entrances, and the details of a flat, projecting cornice, under the eaves of a low-pitched slate roof. Having reached the roof-line, timidity in seizing an opportunity, by making the cornice double its present projection, lost the chance of gaining a deep line of shadow and giving a point of interest to the building which it otherwise totally lacks.

Adjoining this is the new Calvert Hall school-building, which certainly possesses the merit of being among the few granite-faced buildings in the city. The appreciation of it as an object of architectural beauty its designers no doubt think now is a matter regulated by the fickle standard of taste. There is, however, one conspicuous point not to be overlooked, that is the stone gentleman standing between a corbelled stone bracket and canopy well up on the principal corner of the building, and benignly regarding the Cathedral opposite. Not being familiar with the standard of human proportions from which this figure was made, we are unable to say if it is of natural or colossal size. Neither are we able to state at this moment just who the gentleman is, as we were rather under the impression it was the portrait of a well-known historical character whom one would naturally associate with Calvert Hall, but we are told that it is quite another personage, and there is certainly nothing about the gentleman himself to tell his story. This being the case, and as he may possibly have been imported from that prolific studio, "the Stock," it might have been well, for symmetry, to have placed him at the four corners, following the same artistic inspiration that located the four uniform ladies and the four identical lions on the bridges not far off. We doubt, however, the benefit to the public in the way of art education, of putting so conspicuously before them these most difficult studies in human and animal anatomy, at least until the new standards of proportion and general treatment have become more generally adopted and understood.

These half-dozen examples are among the more prominent buildings of the last twelve months. A half-dozen more still more important are under way, notably the great "Equitable" office-building; the "Fidelity and Trust Company"; the "Record"; and the building on the site of the old Law Offices. The usual number of unnoteworthy dwelling-houses have been erected, few calling for architectural comment, an exception possibly being the house for the president of the Woman's College on St. Paul Street, from the office of McKim, Mead & White, showing many of the usual characteristics one is now led to expect in their designs for that class of work, — classical, Italian, architectural — in this example not of particular interest, and cold and gloomy in color.



AMOUNT OF LAST YEAR'S BUILDING. — INSURANCE ON HIGH BUILDINGS. — STEPS TOWARD SMOKE-PREVENTION. — THE PUBLIC LIBRARY COMPETITION. — WORLD'S FAIR NOTES.

LOOKING back upon the year that has just passed, it seems to have been one of more than moderate activity among architects. Of course, the permits for and outlay on the World's Fair structures bring up the figures found in building items higher than they have been in preceding years. Still, this would naturally only affect the south side of the city, yet the other portions present a very good showing, the west side being the only division in which a less amount of building has been done than in former years. Approximately, the amount of money used in building operations in 1891 is represented by the figures $54,010,200, while in 1890 the amount thus expended was only $47,373,209. In 1889, $31,516,000 covered the amount invested in such interests. The permits of 1891 number 11,476, the structures erected covering 280,614 feet of frontage. This represents a solid frontage of fifty-four miles, or over four miles in excess of last year.

We realize, although we write a different figure at the head of our letters, bills, checks, etc., that no very marked change has taken place in our way of living and thinking, and that the same old questions that were vexing us in 1891 are still open for discussion in 1892. Among others, the one so important to the architectural interests of Chicago — of high buildings — is slowly and tediously being agitated. A conclusion is no nearer being reached, apparently, than at the time of the writing of last month's letter. At present, it is the fire-insurance companies which have delivered a blow to the towering structures, and a blow which looks as if, in the future, it might be more likely to put a stop to the erection of such buildings than any number of objections raised as to their desirability. At a special meeting of the Chicago Fire Underwriters' Association this action against high buildings was taken. The insurance premiums on such constructions were then so increased as to make it almost impossible to carry protection against losses incurred by fire. So far, the action does not apply to office-buildings,

but to those merely in which merchandise has been stored. The Secretary of the Association says: "I am informed by the officials of the Insurance Patrol that the losses by fire in Chicago this year will amount to $3,000,000, which is more than those of any other year in the history of the city except that of the great fire. So heavy has been the loss all over the United States, that fifty fire-insurance companies have been forced out of the business. We propose to stop this as much as lies in our power, and to that end it has been decided to increase insurance rates. At the rates proposed, it would cost two dollars and fifty cents for one hundred dollars on the tenth story of a building. The insurance on a building of such a height, valued at five hundred thousand dollars, would be at a cost of $10,200 a year. The chief of the Fire Department says he cannot throw an effective stream over eighty-five feet. We have further recommended to make no allowance for so-called fireproof construction in buildings where merchandise is stored. Hitherto, in elevator-shafts we have allowed for fireproof lining and for self-closing doors, but will not in the future. Furthermore, we will charge for the absence of these alleged safeties. By taking this stand, the Underwriters' Association believes that it is subserving the best interests of all. The merchant cannot cover his stock by insurance in such building. No company can or will carry them, and many of the big dealers in Chicago are walking about to-day half protected. These new rates only affect buildings not already rated."

As this rate of insurance is not for high office-buildings, those structures erected for that purpose will be unaffected by it; but, should they also have placed upon them a similar rate of insurance, it would undoubtedly soon undermine their profits as investments, and, consequently, their usefulness to their owners.

With the advent of the new year the smoky atmosphere of our city does not look any brighter, and one realizes that, no matter how much fine work is put on our buildings, both on the interior as well as exterior, the effect is to a great extent lost because of this heavy, sooty cloud that rests on everything. The Society for the Prevention of Smoke in Chicago has been incorporated, and it now remains to be seen how much this hopeful association can accomplish. To the general public, the plan does not seem as if it could have any practical result. The incorporators are men appointed by the representatives of the nineteen clubs of Chicago at a recent meeting of the Union League Club. The original number of the men appointed was seven, but of this number, two having resigned, five became the working number of the incorporators. These men have now become the directors of the organization, the outline of whose policy is as follows: After the first meeting, at which the election of officers will be attended to, rooms will be obtained as permanent headquarters of the association. The important officers will be secretary, engineer and attorney. The duties of the different officers are defined as follows:

"The secretary will become the bureau of information and do the work of the ordinary secretary. The engineer will be the practical man of the society, some one who is thoroughly qualified to speak and act in this much discussed problem in Chicago. The attorney is to give advice and assist in prosecutions." The plan of work of the society further states: "We propose to cover two sides, prevention and punishment. We will prepare tables showing for instance the prominent houses and great factories of the city, giving the name of the smoke-consuming device used by each; how many boilers are in service in each; the mode of firing whether good, bad or indifferent, and the number of their chimneys making smoke, whether black, medium, little or none. This list we will present to those having smoking chimneys and let them investigate for themselves as to what smoke-eating device they prefer. We will also send our engineer to assist them in their inquiries. We will favor no devices. We will give all inventors an equal show. They will be judged by the workings of their inventions. We know that there are now inventions that will absolutely prevent smoke with proper firing. The firing can be made and kept proper, if firemen or engineers are held under close inspection."

One of the members of the association still further says, voicing the opinion of the Advisory Committee on the subject of coal, "Some manufacturers have obtained the impression that the society will oppose the burning of bituminous coal, which, as every one knows, is cheaper than the anthracite coal. As a matter of fact bituminous coal can be used with proper appliances, and can be made to yield as little smoke as anthracite. The Society has no wish to discriminate against any kind of coal, or to antagonize any manufacturer. It wishes, on the contrary, to assist every one in finding the best and cheapest way to burn bituminous and other coals so as to reduce to a minimum the amount of smoke which is produced. It wishes the coöperation of manufacturers in securing this result. We have no axes to grind and no private interests to serve. We believe that smoke can be largely abolished in Chicago at a slight increase of expense to the people who cause the smoke, and in most cases there will be no increase of expense.

"Our aim is to show people as far as possible how to prevent smoke, for we think that ninety-nine furnace owners out of a hundred would gladly do away with smoke if they saw their way clear to do it. We think we can help them to see the way."

One of the most interesting architectural events of the month has unquestionably been the public exhibition of the drawings in the City-Hall, in connection with the competition for the Public Library, and whatever faults may be found with the building-committee in other directions, certainly in giving outsiders a view of the drawings they are deserving of thanks and praise. But little has previously been said in these letters relative to this very important building, so that now it may not be out of place to give a general outline of this project.

The location selected for this library was originally government property, situated but a few blocks from old Fort Dearborn, facing what is now Michigan Avenue. While only a small city block in extent it was known under the high-sounding title of Dearborn Park although never laid out or utilized for anything but a base-ball field, and general playground for all the gamins of the vicinity. It is bounded on the north by Randolph Street and on the south by Washington, thus bringing it quite within the wholesale district of the city, but a certain disadvantage of this seems to be partially compensated for by its comparatively central location and ease of access by the west and north sides. Moreover, if the Lake Front question should ever be settled with the Illinois Central Railroad, what is now a barren waste with a background of car-sheds and rows of cars, it is hoped will become a part of the park system, and be a bright and green spot on the opposite side of the street, since at this point the much talked of park on the Lake Front is supposed to commence.

After considerable and lengthy negotiations this park was obtained as the library site, upon the condition that a certain amount of space in this building should be for fifty years placed at the disposal of the war veterans for a memorial hall, etc.

Upon the completion of these negotiations and the passage by the legislature of an act levying additional taxes, something like a year ago, a building-committee was appointed, composed exclusively of members of the Library Board, none of whom, so far as is known, had ever been called into consultation as special experts either in general architecture or more particularly in library construction. Nor have these gentlemen so far as can be learned ever asked the aid or assistance of any librarian experts, although there is at least one person in the city whose opinion has the greatest weight not only here, but also in other cities, and whose hearty indorsement of plans would most materially enhance their value in the public estimation.

Instead of asking any expert advice, however, they determined to crystalize their own valuable wisdom, not hitherto recognized by an unappreciative public and display here the technical knowledge gathered in their various walks of life, which are not intimately connected with architecture or library construction. However, a little drudgery in the way of drawing lines being necessary, they hired a gentleman whose aid they designated in their report as "the most competent professional assistance." To be sure this person signs himself as an architect on the blue prints now exhibited with the plans, but certainly he is not distinguished enough to be a member of the A. I. A., nor even enough to be in the list of architects in the last *City Directory*.

For nearly six months the brilliant ideas were being gathered together and during this whole lengthy period the most profound secrecy was preserved, except when occasionally the public was regaled by a short newspaper interview with some of the committee, which told what an extraordinary and satisfactory building Chicago was going to have, together with other equally valuable and useful information.

Finally the plans were completed to the perfect satisfaction of the committee, and five firms of architects, three in this city and two in the East, were invited to furnish, for the sum of one thousand dollars each, competitive drawings for the exterior; and other architects desiring to take their chances without pay were at liberty to do so. Now for the first time those long-studied plans were shown to the public. As usual, however, the general public was at this stage of the building but slightly interested, and the daily papers politely repeated in quotation-marks the nice things that had been said about them, wisely refraining from committing themselves too much on a technical subject, where they had had no expert advice. Architects, however, have not hesitated to express themselves to each other most strongly about these abominable plans, and also if rumor be correct, one of the prominent Eastern firms went so far as to express this idea to the committee by politely returning the one thousand dollar check, for the reason that they did not approve the plan and did not wish to have even the possibility of their name being connected with such a piece of work.

Assuming for the moment, as the honorable committee appear to think, that an architect can have no conception of the working department of a library, and consequently is not capable of criticising that portion, we might even bring these parties to believe that a few of the simplest everyday things may be within his comprehension, as at any rate the public is willing to accept his judgment.

In this case the merest glance will bring out enough to make one wonder what a careful study would do. The entrance is extremely poor and unstudied, and under no circumstance could ever be either convenient or architecturally fine, since it is crowded by the grand staircase. People of the nineteenth century only take monumental staircases in homœopathic doses, preferring to inconvenience themselves by going around each side and hunting for the elevator as in this case they are obliged to do. Only two of these conveniences are now indicated, while the present library generally has three running. Moreover, if a party loses one, by the pleasant arrangement here in vogue it becomes necessary for him to cross the entire wide entrance

to catch the second one, going in behind the other side of the stairs to do so. Again the great staircase, for which the building seems principally planned, lands at the main floor, two stories above the entrance, upon a ridiculously small place scarcely worthy of the name of platform, it being barely half the width of the staircase itself, and even there one is to be confronted by a pier instead of doors. Another pleasant feature is that the assistant-librarian seems to be confined in a completely dark room so far as any direct outside light is concerned, while in another place, stairs are run down across windows so that the ladies' toilet-room is placed in the dark and that without the ventilation-shaft required by law. Several other defects are apparent at a glance which most "competent professional" gentlemen usually avoid. As for the working arrangements of the library proper, no architect may venture to criticise, but one could freely say that it would be a frightful blow to this architect's bump of conceit should the librarians of the country rise up *en masse* and declare this particular set of plans perfection. However, as far as known, these gentlemen have not rushed into print to assure the public of this fact, and there is a vague impression that the learned building-committee is not longing for a full expression of opinion from that source any more than from the architects.

Twelve sets of drawings are now on exhibition, but the display is certainly not one to be praised. The programme required, it is understood, that the drawings should be in the Classical style. If so, that was rather indefinite, but, at any rate, it seems to have been conceived by most of the designers as a species of the most uninteresting and poorest Italian Renaissance. The wisdom of binding the architects down to one style, and that by no means a favorite in Chicago, would be questionable. Certainly, with the most careful school training, failures are dismally frequent in this chosen style, and it is at once painfully evident that very few of the designers here have anything more than the most superficial knowledge of the "Classics," and accordingly the result is, as a whole, inartistic, if not positively bad, while none of the designs rise above mediocrity. And this is what the President, in his last annual report, loftily and positively said: "It is designed to construct the exterior of the building so that it shall be an honor to the city, ethically as well as architecturally, without profusion of meaningless ornament on the one hand, or commonplace simplicity upon the other, but aiming to convey exteriorly that idea of dignity and repose that should mark its use and completeness."

To your correspondent, it was not exactly clear what this meant at the time it was published, but it sounded "powerful," so he waited for the coming of this "ethical honor" to the city, and is now no wiser than he was before. The character of this speech and that of the designs is somewhat similar, both being full of a certain pretentiousness that quickly is reduced to nothingness before the clear gaze of common-sense.

Even when designs are not thoroughly satisfactory, when the authors have evidently done their best to fulfil disagreeable requirements, a competition is interesting; but, when competitors deliberately resort to trickery, it becomes simply exasperating. Certain designs in this competition should, in justice to the others, without any question be at once thrown out as not fulfilling the required conditions. Foregrounds, backgrounds and shading are expressly forbidden, yet certain designers have overreached the other competitors, enhancing the effect of their building by the use of these forbidden accessories. They have evidently hoped to be allowed to remain in the race, because all such additions were in very light lining. Again, in certain places where the floor cannot but pass before windows and disfigure the whole design, the existence of the floors is entirely ignored, and large, magnificent panes of glass are shown with nothing to mar their shiny expanse. Such things cannot be ignored in the actual building, and would, of course, produce an entirely different effect from that shown in the drawings. It would appear as if the Board had endeavored to place all upon the same footing, the general demands of the programme, except that they were far too excessive to permit of any general competition, being in the right direction; but how they can justly allow these parties to go rough-shod over their requirements, when one competitor has already been thrown out because he made some elaborate changes, is beyond ordinary comprehension. To consider the merits and demerits of each set of drawings would be out of place, but it may be said that in architectural circles there is much speculation as to what the outcome will be. Most professional men seem to be of the opinion that, having gone through the form of a competition and satisfied the dear public, the man having the greatest "pull" will now be selected, and will execute the building quite regardless of what is now exhibited. To commence over again fairly and squarely, and acknowledge themselves or their pet plan in the wrong, would probably be expecting an impossibility. Such a terrible fall of dignity would be too much. However, the power of the daily papers, if by any improbable chance one or more should take up the matter with vigor, might call a halt, and at least demand that the uninfluenced and unbiased opinion of librarians and architects be given to the public. Of course, what would be most desired by many would be an entirely new competition of both plans and elevations, with drawings much less expensive and elaborate than those now shown, so that the profession generally could take part. Two points would especially have to be insisted on: viz, that all drawings be rendered precisely alike, and that the decision be made by a committee composed entirely of experts, or of one where experts are the majority. Under such conditions, the city might possibly get a building approaching the ideal the President appears to have set up for himself, but as it is, the present display, commencing with the plans, would go to show that, unless something be done quickly, Chicago will probably soon have a public library of which one cannot even say, as of that in Boston, that it is a fine-looking building.

While bemoaning our prospective public building one must not overlook one of the existing ones, the post-office, now calling for its annual tribute, as some recent settlements and cracks have brought forth the usual cry of dismay from the occupants. Cracks and uneven floors and bent sashes are the features of the ruin which is to have a hundred and fifty thousand dollars soon dropped into it by Uncle Sam, while Congress is waiting to take action on a new building.

Among items of news from the World's Fair those connected with the electrical exhibit seem to be about the most prominent this month. One interesting feature will be a system demonstrating the European idea of a long-distance telephone. A large multi-phase dynamo is being built on the five-wire system and will also be among the exhibits from Europe. A fifteen-hundred horse-power direct-current dynamo and a one thousand horse-power motor will be some of the features of a German firm's exhibit, while still other European firms will be represented by a new street-car motor for conduit operation, a number of storage-battery systems and a model light-house. Probably two aluminium firms will make an extensive exhibition of aluminium bronze ware and ornamental aluminium, the process of the manufacture of both being part of the exhibit.

Herr Wermuth, the German Imperial Commissioner, has notified the Director General that a Nuremberg firm asks for space on the shore on which to exhibit one of their ground-glass reflectors. This light will somewhat resemble the one at the Frankfort Exhibition. That was a ground-glass parabolic mirror six feet in diameter. The mirror was placed upon a revolving pedestal, the lamp being fixed in the centre of the circle made by the mirror in its revolutions. This light was a double-carbon one and required ten horse-powers to work it. Its capacity was supposed to be twenty-five thousand candle-power.

It is reported that Mr. Edison is hard at work on something for the Fair which will surpass all his previous successful effort.

In his December report Professor Barrett stated to the Director-General that after he had set aside space for aisles, lavatories, cloak-rooms, restaurants and elevators, there would remain available for exhibition purposes two hundred and seven thousand square feet. Of that twenty thousand have been given to Germany and twenty thousand to England by the Director-General; twenty thousand will go to France and from ten to twenty thousand more to the remainder of Europe. Application from firms in our own country has been made for space amounting to over two hundred thousand square feet which would indicate a lack of fifty thousand square feet already in the room needed for exhibits.

GOVERNMENTAL COMPETITIONS. — GOVERNMENTAL SUBSIDIES TO ART SOCIETIES. — SIR HENRY PARKES AS A DISCREDITED PATRON OF FINE ART.

SYDNEY, N. S. W.

A COMPETITION previously referred to in these letters for a large lunatic asylum at Goulburn, near Sydney, has, during an excessively dull season, occupied the time and attention of, I suppose, two-thirds of the architects practising in Australia. The time for sending in the drawings was, some time back, extended to December 1, but it is now announced, just at the last moment, that a further extension of one month has been allowed. Architects will know how grossly unfair such a proceeding is; it is a rank injustice to those who relied upon the Government's keeping faith with them, and can only benefit the few by whom the strings are pulled.

In fact the series of Government competitions which was inaugurated with such a fanfare of trumpets, and from which we were to gain so much seems at the very outset to be calculated only to arouse rancour and spite in a profession of which, hitherto, brotherly love has not been a distinguishing feature. The project must very shortly be altogether abandoned unless competitors in the future can be assured of the absolute impartiality of those at the head of affairs. As things now stand it seems mere waste of time to compete against men endowed with little conscience and considerable influence. The appointment of a third adjudicator in these competitions who must practically be a nominee of the Government architect's is another rock upon which the profession is (as I have before pointed out) very likely to split.

It is a pity that anything should occur to nullify the result of good intentions; but competitions, I suppose, will always be unsatisfactory; at any rate our Government competitions must certainly be so, unless some radical reforms are established.

There is a very evident desire that the State should, in a measure, foster art in this colony, and in pursuance of this object £500 have been for some time voted yearly as a subsidy to our local Art Society; and, in addition, the trustees of the National Gallery set aside annually a considerable sum for the purchase of pictures by local artists. This year the trustees went farther and offered to purchase — if the quality of the work warranted it — twelve water-color paintings illustrative of New South Wales scenery, at prices not exceeding £75 each. This competition has just taken place, and out of the fifty drawings sent in, eight have been purchased for the gallery in accordance with the conditions. A competition for architectural draughtsmen has also been arranged by the trustees, so that art cannot complain of neglect as far as the Government is concerned.

An "Australian Academy of Arts" has been established here during the last few weeks for the purpose, so the promoters aver, of supplying a long-felt want.

The Art Society before referred to is in a flourishing condition, but confines itself to the exhibition of oil and water-color paintings, while architecture, sculpture and the allied arts remain unnoticed. The new society with the sonorous title is to rectify this, and, though at present it only consists of a few dissatisfied artists, a couple of architects, a sculptor and a decorator or two, it intends to institute sweeping reforms in our art-world, if it does not die of inanition in the meanwhile.

Mr. Varney Parkes, the son of Sir Henry Parkes, late Premier of New South Wales, has been appointed supervising architect (under Mr. Raht) for the new building of the Equitable Life Assurance Company of New York, which is to be begun immediately. Mr. Parkes's principal qualification seems to be that he is the son of his father: the work he has carried out here certainly does not justify the appointment.

Sir Henry Parkes himself has taken considerable interest in art matters during his various terms of office, his latest act in that direction being to order four statues of prominent Australians from Mr. Thomas Woolner, the eminent English sculptor. The cost of these statues was to be £3,000 each. The order was given a few hours only before Sir Henry resigned, and New South Wales would have been asked to pay this £12,000 for the encouragement of art if the order had not been countermanded by the new government when it came into power. Another act authorized by Parkes at the same time was the expenditure of £11,500 on a colossal statue of Captain Phillip, the first Governor of this territory. This statue was originally estimated to cost £3,000, and that sum was actually voted for it some two years ago. The extra amount was granted by the late Premier on his own authority, and we would probably never have heard anything about it till the sculptor presented his bill if the rule of this autocratic patron of the fine arts had not been brought to an abrupt conclusion.

LETTER FROM SAN FRANCISCO.

THE ARCHITECTURAL CHARACTER OF WOODEN BUILDINGS IN THE CITY. — THE NEW YORK MUTUAL LIFE COMPANY'S NEW BUILDING. — PROSPECTIVE NEW BUILDINGS.

FOUR-FIFTHS of the city of San Francisco, is built of wood, and it is both well and ill that such is the case; well first because, almost without exception, the architecture is bad, and we feel happy in the belief that, when a few generations have come and gone, these night-mare creations will have returned to the dust from whence they came, and the oblivion to which they belong; and glad also that the names of their originators will be breathed no more abroad in the land; and that the finger of scorn, that now is ever active, will no longer be raised in derision against them.

Again, since a time seems to have come when all sorts and conditions of men build houses — a state of things that probably never existed before in the same degree — and admitting it to be a fact that lack of opportunity in the past has left undeveloped a high appreciation of art and architecture in such people, we are glad, now that such time has come when all may build, that such uneducated taste has chosen to express itself in a material that will not last.

We are mere experimentalists building as it were mud-houses, and as the sculptor experiments in clay, discarding many a model before producing that which he considers worthy to be wrought in stone, so with our house building we are glad that in this period of experimenting we have chosen an impermanent material.

But as we have said in the beginning, we are also sorry, sorry indeed, when we look around at this wooden architecture, for then are we convinced of the justice of the apostle's accusation when he said "all men are liars," for there is scarcely a house in all San Francisco that is not more or less of a lie, on the very face of it, — most particularly on the face of it. These fronts, as they are called, are designed essentially for stone, although wood is the material used.

In order to have avoided this calamity that has befallen our city, only one alternative would appear to have been possible; namely, to have built our common structures without any architectural pretensions whatsoever, expending all our efforts on those of more permanent character, and, in the case of the wooden buildings, simply allowing them to evolve naturally according to the rules that govern good carpentry. This might have given us wooden buildings such as we find in Chester, England, and on the continent of Europe, in Holland, France and elsewhere with something local added.

A lay friend of mine contrasts these fronts, as they are appropriately named, to pieces of moulding of various section and height, placed alongside one another, some back and some forward of the rest; and, indeed, I think the comparison is a good one, for these buildings are all moulding in front, and at the side, with no attempt at concealment, is a blank wall. One feels almost inclined to wish, in viewing these creations, that nature had given to their creators only basalt to work in, so that the character of endurance might have been forced upon them. But, after all, it is neither the frivolities of to-day nor the temples of the Egyptians that we want, but the happy medium, in which the fanciful is earnestly interwoven with that which may endure.

But, if it be true that we cannot boast of being able to produce such masterpieces of architecture as have been created throughout the centuries, nor exult in that unanimity of purpose that was the soul of mediæval times, we can, at least, feel proud in the possession of that energy and elasticity of character which enables us to be impressed by new and better ideas, and gives us the impetus to carry them into effect. In 1880, San Francisco expended in building less than two million dollars: for last year, the records show about four times that amount, viz, seven millions. By most, such an expenditure in rebuilding a city will be admitted as an unqualified advantage, and I recognize it almost as such, for it gives our architects plenty of opportunities for experimenting. But, at the same time, I cannot help but feel that it is ridiculous when one considers that many a man builds and rebuilds several houses on the same site in a single lifetime, and, in secret, I must say that I have a longing for those times of the Romans, when they boasted not so much of their many buildings, but in the thought that they builded for eternity.

In the centre of the mercantile part of the city, the New York Mutual Life is putting in the foundation for its new office-building. Around this mud-hole the pioneer lingers in contemplation: "Sir, I remember sea-going vessels anchoring just about here. The six or seven blocks in front of us was then the open bay." "Indeed? wonderful!" "Well, now when did they begin to build substantial blocks in this part of the city?" "About '63." "I suppose the building that they have just taken down was one of the oldest?" "Oh, no, sir; there have been two brick buildings on this site since I remember."

Then your informant, digressing from the subject, commences a story about how the contractors for the first building put up a "job" on Uncle Sam, and appropriated some of the concrete materials intended for the United States Mint, and used them to form the cellar floor. As such information profiteth not, we suddenly remember an appointment.

This foundation is a block seaward of the old shore line. The building is to be eight stories in height, which is twice as high as any structure hitherto erected on piles in this city.

The architect seems to be a little nervous about the carrying-capacity of his foundation, and, so to make sure, he is crowding the piles pretty close over the whole area. About one-third of the area, I should say, is so included. The piles are Oregon pine-tree tops about forty feet long, but even they do not reach solid ground.

This building will be the fourth in the city constructed after the modern manner of steel frame and hollow-tile interior. The design is Italian Renaissance, and the materials of the shell are to be granite as a base and brick and terra-cotta above. I trust that it may deserve to stand more than a decade or two, as in the case of its predecessor, and that in the years to come, when we are gray-headed, it will not be in the power of friend or foe to boast that the effort of our youth has been swept away and twice replaced within a single life.

Generally speaking, building is quiet just now, as is to be expected during the rainy season, and, although there are some new and important buildings progressing on paper, such as Trinity Church, to cost $100,000, and the French Hospital, to cost two or three times that amount, there is no particular stir in the architectural world; and, as to prognosticating, those who are born growlers see in the signs of the times all sorts of evils ahead, while our real-estate friends, running to the other extreme, picture the development of Market Street at a rate only heard of in magic.

There is certainly plenty of room for improvement, for there are probably few more ragged main throughfares in the world than this same street, and even at the very centre, where property is worth $4,000 a foot, we find everything from a ten-story building down to one of a single story, with a sign-board on the top of it about the same height as the building; only there are scores of the latter, and their brethren of two and three stories, to the one ten stories in height. But we prefer to take a middle course, and assume that, as we have steadily advanced in the last decade, so we will continue to do, or, at all events, decline but slightly, and so feel assured that, if slowly yet surely, Market Street will become the wonder that we all wish it to be.

The Cathedral of Mexico. — The great cathedral in the City of Mexico is the largest in America, and cost nearly $2,000,000. It was commenced by the Spaniards in 1573, on the site of the old Aztec temple, or pyramid, and finished in 1667. — *Improvement Record.*

COMPARATIVE MUNICIPAL BUILDING LAWS.—IV.

[*Note:*—In these tables bracketed letters invariably refer to preceding passages in the same column.]

Minimum Thickness of Masonry Walls[1]—External—Dwelling-House Class.

[[1] See Vol. XXXIII, p. 150 "Terms Defined."]
[[2] See Vol. XXXIV, p. 11 "Footing Courses."]
[[3] See Vol. XXXIV, p. 12 "Methods of Measuring Heights."]

Boston:—(Brick Buildings, Dwellings, Tenement and Lodging Houses). (*External and Party Walls.*)

Foundations.			Maximum Height of Wall.		Superstructure.		
Uncoursed Rubble.	Brick in Cement.	Block Stone Horizontal Courses.			To top of 2d Floor.	To top of Upper Floor.	To top of Wall.
22½″	16″	18″	35′	30′ B	8″	8″	8″
30″	20″	24″	60′ A	60′	12″	12″	12″
35″	24″	28″	75′	70′	16″ C	12″	12″
	28″	32″	90′	80′	20″	16″	12″ D
	32″	36″	105′	100′	24″	16″	16″

Exceeding one hundred (100) feet, the additional thickness to be determined by the Inspector.

[*Notes to Boston laws.*]
A For every fifteen (15) feet additional height of building, the thickness of the Foundation increased four (4) inches.
B Maximum width of building being 20′ and maximum depth of building forty (40) feet.
C Or to a height of twenty (20) feet.
D If the upper story does not exceed ten (10) feet in height.

Baltimore:—(Not regulated).

Brooklyn:—(Brick and Stone Buildings). *External and Party Walls.*

Cellar Wall.		Maximum.			Superstructure.		
Brick.	Stone.	Height of Wall.	Width of Building.	Depth of Building.	1st Story.	Side-walls.	Re-mainder.
		35′	20′	45′	12″	8″	8″
		Un-limited.	Un-limited.	Un-limited.	12″	12″	12″
16″	20″	45′ to 55′					
		More than 55′			16″		12″
20″	24″	38′[2]			12″		

[*Note to Brooklyn laws.*]
[2] From level of sidewalk.

Charleston:—(Brick and Stone Buildings), *Outer Walls.*

Height of Wall.	1st Story.	2d Story.	3d Story.	4th Story.
Two stories.	14″	9″		
Three stories.	14″	14″	9″	
Four or more stories.	14″	14″	14″	9″

Chicago:—

Height of Wall.	Basement.	1st Story.	2d Story.	3d Story.	4th Story.
Basement and two stories.	12″	8″ E	8″		
Basement and three stories.	16″	12″	12″	8″	
Basement and more than three stories.	16″ E	16″	12″	12″	12′

[*Note to Chicago laws.*]
E Four inches thicker, when the basement and first story or the first story is used as a store or shop, and the first story is not more than 30 inches above the grade of sidewalk.

Cincinnati:— }
Cleveland:— }

Foundation.	Maximum		Superstructure.							
	Height of Wall.	Length[1] of Wall.	1st Story.	2d Story.	3d Story.	4th Story.	5th Story.	6th Story.	Intermediate Stories.	Upper Story and Above.
13″	26′ F	37′	9″						9″	9″
17″	26′ F	Unlimited.	13″						13″	9″
17″	36′	Unlimited.	13″						13″	9″
17″	48′	50′	13″						13″	9″
21″	48′	Unlimited.	17″						13″	9″
21″	60′	50′	17″						13″	9″
21″	60′	Unlimited.	17″	17″					13″	13″
21″	72′	50′	17″	17″					13″	13″
21″	72′	Unlimited.	17″	17″	17″				13″	13″
21″	84′	50′	17″	17″	17″				13″	13″
25″	84′	Unlimited.	21″	17″	17″	17″			13″	13″
25″	100′	50′	21″	17″	17″	17″	17″		13′	13″
25″	100′	Unlimited.	21″	21″	17″	17″	17″	17″	13″	13″

[*Note to Cincinnati and Cleveland laws.*]
F For Cleveland 24′.

Denver:—

Foundations.	Maximum Height of Wall.		Height of Building.	Basement.	1st Story.	2d Story.	3d Story.	4th Story.	5th Story.	6th Story.
17″	35′	18′	1 story.	13″	8″					
17″	35′	25′	2 stories.	13″	13″ H	8″				
21″ G	35′	40′	3 stories.	17″	13″	13″	13″			
21″	50′	60′	4 stories.	22″	17″	13″	13″	13″		
25″	65′		5 stories.	22″	17″	17″	13″	13″	13″	
29″	80′	80′	6 stories.	26″	22″	22″	17″	13″	13″	13″

Exceeding eighty (80) feet in height the additional thickness shall be determined by the Inspector.

[*Notes to Denver laws.*]
G Increased 4″ for each additional 15′ of height.
H To the top of the second floor.

Detroit:

Foundation, Basement or Cellar.	Height of Wall.	1st St'y.	2d St'y.	3d St'y.	4th St'y.	5th St'y.	6th St'y.	7th St'y.	8th St'y.	9th St'y.	10th St'y.
16″	1, 2, 3, or 4 stories.	12″	12″	12″	12″						
20″	5 stories.	16″	12″	12″	12″	12″					
20″	6 stories.	16″	16″	12″	12″	12″	12″				
24″	7 stories.	20″	16″	16″	12″	12″	12″	12″			
24″	8 stories.	20″	20″	16″	16″	12″	12″	12″	12″		
28″	9 stories.	24″	20″	20″	16″	16″	12″	12″	12″	12″	
28″	10 stories.	24″	24″	20″	20″	16″	16″	12″	12″	12″	12″

District of Columbia:—

Foundation or Cellar.	Maximum.		1st Story.	Above 1st Story.	
	Height.	Width.			
13″	35′	25′	9″	9″	
	35′	Unlimited.	13″ I	13″	I to the square thereof.
13″	45′	"	13″ J	13″ J	J front and rear walls.
18″	55′	"	18″	13″	

Thickness for greater heights determined by the Inspector of Buildings.
Walls of sub-cellars not less than eighteen (18) inches thick.

Kansas City:—

Foundation Walls. K		Maximum			To top of joists of the floor of							
		Wall										
Brick in Cement.	Stone.	Height.	Height.	Depth of Building.	2d Story.	3d Story.	4th Story.	5th Story.	6th Story.	7th Story.	8th Story.	Remainder.
14″	18″	25′	26′	50′	13″							9″
14″	18″		26′	Unlimited.	13″							13″
16″	20″	35′	36′	50′	13″	13″						9″
16″	20″		36′	Unlimited.	13″	13″						13″
			48′	50′	17″	13″	13″					9″
			48′	Unlimited.	17″							13″
20″	26″	60′	60′	"	17″	17″						13″
24″	30″	75′	72′	60′	17″	17″	17″					13″
			72′	Unlimited.	21″	17″	17″	17″				13″
			80′	60′	21″	21″	17″	17″	17″			13″
28″	34″	90′	80′	Unlimited. }	26″	21″	21″	17″	17″	17″		13″
			100′	60′ }								
32″	38″	105′	100′	Unlimited.	26″	26″	21″	21″	17″	17″	17″	13″

For walls of greater height, the thickness is determined by the Superintendent of Buildings.

[*Note to Kansas City laws.*]
K If set at a depth of more than twelve (12) feet below the grade of street, for each and every eight (8) feet or part of eight (8) feet additional depth, the thickness to be increased by four (4) inches.

Louisville:—

Footings.	Height of Wall.	Basement.	1st Story.	2d Story.	3d Story.	4th Story.
24½″	Basement and two stories.	12½″ L	12½″	12½″		
29″	Basement and three stories.	17″	12½″	12½″	12½″	
33½″	Basement and four stories.	21½″ M	17″	17″ M	12½″	12½″

Four inches in thickness added to thickness given above, for each additional story above four stories high.

[*Note to Louisville laws.*]
L is four and a half inches more and M four and a half inches less, *when the building is used for shop or store in the First Story or Basement and First Story.*

Memphis:—

Footings.		Height of Wall.	Basement.	1st Story.	2d Story.	3d Story.	4th Story.	5th Story.	6th Story.	7th Story.	8th Story.	9th Story.	10th Story.
Width.	Depth.												
26″	13″	Basement and 1 story.	13″	13″									
36″	18″	Basement and 2 stor's.	18″	13″	13″								
45″	22½″	Basement and 3 stor's.	22½″	18″	13″	13″							
54″	27″	Basement and 4 stor's.	27″	22½″	18″	13″	13″						
63″	31½″	Basement and 5 stor's.	31½″	27″	22½″	18″	13″	13″					
72″	36″	Basement and 6 stor's.	36″	31½″	27″	22½″	18″	13″	13″				
81″	40½″	Basement and 7 stor's.	40½″	36″	31½″	27″	22½″	18″	13″	13″			
90″	45″	Basement and 8 stor's.	45″	40½″	36″	31½″	27″	22½″	18″	13″	13″		
99″	49½″	Basement and 9 stor's.	49½″	45″	40½″	36″	31½″	27″	22½″	18″	13″	13″	
108″	54″	Basement and 10 sto's.	54″	49½″	45″	40½″	36″	31½″	27″	22½″	18″	13″	13″

Grade line story may be 20′ in height.
Each 15′ in height above that story to count as one story.

Milwaukee:—

Height of Wall.	Basement.	1st Story.	2d Story.	3d Story.	4th Story.	5th Story.	6th Story.	7th Story.	8th Story.	9th Story.	10th Story.	11th Story.	12th Story.
One story.	12″	8″											
Two stories.	12″ SQ	12″	8″										
Three stories.	16″	12″	12″	8″									
Four stories.	16″ SQ	16″	12″	12″	12″ P								
Five stories.	20″	16″	16″ P	12″	12″	12″							
Six stories.	20″ N	16″ NQ	16″	16″	12″	12″	12″						
Seven stories.	24″	20″	16″ Q	16″	16″	12″	12″	12″					
Eight stories.	24″	20″ Q	20″	16″ Q	16″	16″	12″	12″	12″				
Nine stories.	24″ N	20″ NQ	20″	20″	16″ Q	16″	16″	12″	12″	12″			
Ten stories.	28″	24″	20″ NQ	20″	20″	16″ Q	16″	16″	12″	12″	12″		
Eleven stories.	28″	24″	24″	20″ NQ	20″	20″	20″ PR	16″	16″	12″	12″	12″	
Twelve stories.	32″	28″	24″	24″	20″ NQ	20″	20″	20″ PR	16″	16″	12″	12″	12″

For buildings designed to be used for business in the basement or first story, with the first floor not more than 30 inches above the grade of the sidewalk and the depth not exceeding 60 feet, N = 4 inches more, P = 4 inches less and the other walls the same as in the preceding Table.

For buildings designed to be used for business in the basement and first story, or in the first story and exceeding 60 feet in depth, Q = 4 inches more and R = 4 inches less and the other walls the same as in the Table above.

Minneapolis:—

Height of Wall. (Maximum length 60′.) s	Basement.	1st Story.	2d Story.	3d Story.	4th Story.	5th Story.	6th Story.	7th Story.	8th Story.	9th Story.	10th Story.	11th Story.	12th Story.
One story.	12″	8″											
Two stories.	16″	12″	8″										
Three stories.	16″	12″	12″	8″									
Four stories.	16″ T	16″	12″	12″	12″								
Five stories.	20″	16″	16″	12″	12″	12″							
Six stories.	20″	16″ T	16″	16″	12″	12″	12″						
Seven stories.	24″	20″	16″ T	16″	16″	12″	12″	12″					
Eight stories.	24″	20″ T	20″	16″ T	16″	16″	12″	12″	12″				
Nine stories.	24″	20″ T	20″	20″	16″ T	16″	16″	12″	12″	12″			
Ten stories.	28″	24″	20″ T	20″	20″	16″ T	16″	16″	12″	12″	12″		
Eleven stories.	28″	24″	24″	20″ T	20″	20″	20″ U	16″	16″	12″	12″	12″	
Twelve stories.	32″	28″	24″	24″	20″ T	20″	20″	20″ U	16″	16″	12″	12″	12″

[*Note to Minneapolis laws.*]

s, Walls more than 60′ long not to have more than the *two* upper stories 12″ thick.

For buildings designed to be used for business in the first story, or in the basement and first story T = 4″ more and U = 4″ less and the other walls the same as in the above Table.

Nashville:—

Height of Wall.	Basement.	1st Story.	2d Story.	3d Story.	4th Story.
Basement and two stories.	12″	12″	8″		
Basement and three stories.	16″ V	16″	12″	8″	
Basement and four stories.	16″ V	16″	12″	12″	12″

[*Note to Nashville laws.*]

V *For buildings designed to be used for business in the first floor and basement* V = 4 inches thicker and the other walls the same as in the Table.

New Orleans:— (Subject to approval of City Surveyor).

Newark:—

Width of Footings under w		Foundation		Maximum Height of Wall.	To 15′ above curb level. x	To 20′ above curb level. x	To 30′ above curb level. x	Remainder.
Stone.	Brick.	Stone.	Brick.					
28″	24″	16″	12″	25′	8″	8″		8″
32″	28″	20″ Y	16″ Z	35′	12″	8″		8″
32″	28″	20″	16″	45′	12″	12″	12″	8″
32″	28″	20″	16″	55′	12″	12″	12″	12″
36″	32″	24″	20″	over 55′	16″	16″	12″	12″

[*Notes to Newark laws.*]

w, The thickness of footing to be one-third the width; when of concrete not less than 12″.

x, Or to the next tier of beams above that height.

Under a dwelling with the maximum width of 22′ and maximum depth of 45′, Y = 16″ and Z = 12″.

New York:—

Footings. a		Foundation Walls. a		Maximum.		Basement.	1st Story.	2d Story.	To the Height of						Remainder.
Stone.	Brick.	Stone.	Brick.	Height.	Width of Building.				15′ c	20′ c	25′ c	60′ c	70′ c	90′ c	
32″	28″	20″	16″	15′	18′	8″ b	8″ b								8″
32″	28″	20″	16″	30′	20′	12″	8″								12″ d
36″	32″	24″	20″	50′	Unlimited.	12″	12″								12″ d
36″	32″	24″	20″	60′	(High stoop).	16″	12″	12″							12″ d
36″	32″	24″	20″	60′	(Low stoop).	16″	16″	12″							12″ d
36″	32″	24″	20″	75′					16″	16″	16″				12″ d
40″	36″	28″	24″	85′					20″	16″	16″	16″			12″ d
44″	40″	32″	28″	100′						24″	20″	20″	20″		16″
48″	44″	36″	32″	115′					28″	24″	24″	24″	20″	20″	16″

Walls more than 115′ high, to have the upper 115′ as above, and below such wall, and above the curb level, increased 4″ in thickness for each 15′ or part thereof, by which the whole wall exceeds 115′.

[*Notes to New York laws.*]

a, When the wall extends more than 10′ below the curb level, for each 10′ or part of 10′ below that depth, increase each such 10′ or part of 10′ by 4″ in thickness.

b, Horizontal measurement of 8″ bearing walls not to exceed 25′.

c, Or to the tier of beams nearest to that height.

d, A 12″ wall shall not have greater vertical height than 50′.

Omaha:—

Height of Wall.	Basement.	1st Story.	2d Story.	3d Story.	Upper Stories.
Basement and two stories.	12″	12″	8″		
Basement and three stories.	16″	12″	12″	8″ e	
Basement and four stories or more.	16″ e	16″	12″	12″	12″

For buildings designed to be used as stores or shops in the first story or in the basement and first story when less than 45′ deep e = 4″ thicker.

Philadelphia:—

Cellar or Foundation.	Maximum Height of Wall.	1st Story. f	Remainder.
16″	35′	9″	9″
18″	45′	13″	13″
20″	55′	18″	13″
24″ f	65′	22″	17″
28″ f			

In buildings of greater height, the thickness is to be determined by the Board of Inspectors.

[*Note to Philadelphia laws.*]

f, Front walls = 28″.

Pittsburgh—:

Cellar or Foundation.	Maximum.		First Floor.		2d Floor.	Remainder.	
	Height of wall.	Width of bldg.	Front and Rear.	Side Walls.		Front.	Side.
16″	35′	16′	9″ f			9″ f	
9″	26′	24′				9″	9″
18″	25′	25′	13″	9″		13″	9″
18″	36′		13″	13″	13″	9″	9″
18″	45′	25′	13″ f			13″	
20″	55′	28′	18″ f			13″ f	
24″	65′		22″ f			17″ f	
28″ f							

[*Note to Pittsburgh laws.*]

f Front Wall. In walls of greater height the thickness is to be determined by the Inspector.

Providence:—

Foundation.		Maximum Height of Wall.	1st Story.	To Top of 2d Story.	Remainder.
Stone.	Brick.				
16″	16″	35′	12″		12″
18″	16″	55′	16″		12″
20″	20″	More than 55′	16″	16″	12″

St. Louis:— (Dwellings and Tenements).

Foundations.	Height of Wall.	1st Story.	2d Story.	3d Story.	4th Story.
18″	One story.	9″			
18″	Two stories.	9″	9″		
21″	Three stories.	13″	13″	9″	
24″	Four stories.	17″	13″	13″	9″

San Francisco:— (Dwelling-houses, Stables and Sheds).

Footing.	Foundations. g	Height of Wall.	1st Story.	2d Story.	3d Story.
j	16″	Two stories (or less).	12″ h	8″ i	
j	20″	Three stories (or less).	16″	12″	8″ i

[*Notes to San Francisco laws.*]

g, Foundation walls below the basement floor beams shall be 4″ thicker than the walls next above them. Walls extending more than 16′ below the curb level, shall be increased 4″ in thickness for each 5′ below that depth.

h, Shall not exceed 10′ clear height.

i, Shall not exceed 8′ clear height.

j, Width of footing course, to be twice that of the wall resting upon it and if of stone not less than 12″.

Wilmington:—

Foundation or Cellar.	Height of Wall.	1st Story.	2d Story.	3d Story.	4th Story.
13″	One story.	9″			
13″	Two stories.	9″	9″		
17″	Three stories. k	13″	9″	9″	
17″	Four Stories. l	13″	13″	9″	9″

[*Notes to Wilmington laws.*]

k, 40′ in height above the curb line and the building more than 18′ wide.

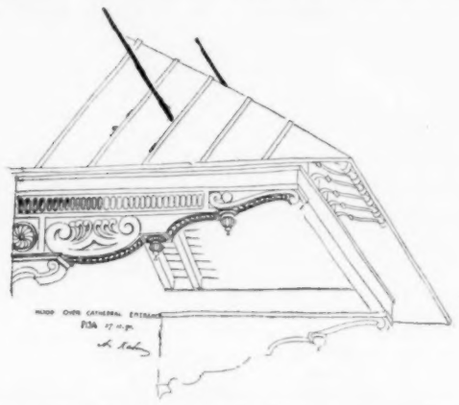
l, 48′ in height above the curb line and the building more than 18′ wide.

All buildings of greater height shall have thickness of walls determined by the Inspector.

Compiled by H. A. PHILLIPS.

[To be continued.]

FOUNDATIONS AT THE COLUMBIAN EXHIBITION.[1]



AS chief engineer of the World's Columbian Exposition, it was one of my duties to design and devise the foundations for buildings, and determine the strength and mode of construction of floors for the various buildings. The execution of every engineering project involves, right from the start, the solution of two problems; the achievement of the object by satisfying all physical and mechanical requirements, combined with the least necessary expenditure of money. It is the province of the engineer to determine how much of material and labor, and what kinds of each, must be employed to accomplish the desired end, and what the proper economy shall be in each individual case. His knowledge and experience will guide him to determine these points, according to the circumstances governing the case, the object of the work, and the means at his disposal.

The World's Columbian Exposition, as is well known, will be at Jackson Park, one of the public parks of this city, the use of which was granted under the express condition, that all buildings erected there must be removed after the Exposition closes, and the park restored to its original condition. This means, in other words, that the buildings will be in actual use for six months only, and then removed, being temporary structures in the strictest sense of the word. This fact naturally must be considered in the plans devised, as after six months' use, the bulk of the material must go to waste. The vast area to be covered by buildings (over 100 acres) required more care, with reference to economy, than is necessary in ordinary sized buildings, as any needless expense multiplies itself so enormously in those extraordinarily large surfaces.

The natural formation at Jackson Park before the grading was done, was mostly low ground from + 0.5 feet to + 11 feet above city datum; the average for about 300 acres was + 3.5 feet. The southern and the eastern parts were the lowest, the western part being the highest ground. City datum is the low-water line of 1847, and the stage of the water in the lake for the last year was about one foot above datum. The highest stage ever observed for the last fifty years was four feet above datum, except occasional tidal waves.

By excavations from the high ground, and dredging of lagoons, material has been obtained to fill up the low grounds, so that the grade under buildings is at least five feet above datum, and the ground outside of buildings six feet above datum, with the exception of the terraces around the buildings, and the lake shore drive, which are from ten feet to twelve feet above datum. The material of the fill is sand throughout. Borings in various parts of the grounds show the formation to be very uniform, as follows: About five feet to eight feet sand; four feet to ten feet quicksand; six feet to ten feet soft clay; six feet to ten feet clay; and then hardpan. The average depth below surface of the hard-pan is from twenty-six feet to thirty-six feet. An exception to this is to be found in the higher locations, where the top layer of sand has a greater depth, and in the northwest corner of the Agricultural Building, and the southern half of the Manufacturers' and Liberal Arts' Building, where deep mud-holes prevail, hard-pan being thirty feet to forty-five feet below the surface.

I had first intended to have pile foundations under all buildings, and piles driven for the floor supports. Before this was adopted, however, test piles were driven in different locations, partly to hard-pan and partly to a lesser depth, and heavily loaded with sand. At the same time platforms of three-inch planks were constructed, placed in different locations, on top of the sand, and loaded uniformly with pig-iron, about two and one-fourth tons per square foot. These platforms were loaded gradually, and the settling carefully noted under each load. The loads remained for several days and were then transferred to other platforms. It was found that under the maximum loading the settling was very small, about three-eighths inches, and very uniform, and that after this settling had once taken place, the increase of load up to two and one-fourth tons per square foot, caused no perceptible increase in settlement.

Platforms loaded on top of sand filling, over the mud-holes above referred to, sank from one foot to three feet under a load of one and one-half tons per square foot, and kept sinking the longer the load remained on. It was thereupon determined to use pile foundations in these locations, so proportioned, that under a maximum load from buildings or from floor-loads, the pressure upon the ground would not exceed one and one-fourth tons per square foot.

These platform foundations consist of three-inch pine or hemlock planks, with blocking on top, to distribute the pressure from loads uniformly over all the planks, and to furnish support for the posts, which carry the caps supporting the floor joists and posts of the buildings. The blocking was to be well spiked to platform planks and posts, and the caps and sills drift-bolted. The general floor loads for the various buildings were adopted as follows:

	Pounds per sq. ft.
Fisheries Building	100
Manufactures and Liberal Arts Building	100
Agricultural Building	100
Machinery Building	200
Electricity Building	100
Mines and Mining Building	150
Machinery Annex	200
Horticultural Building	100
Women's Building	100
Transportation Building	150
Galleries	80

These are general floor-loads only, intended for the aisles in the building, and for the lighter exhibits of each branch. Where heavy exhibits, machinery, or tracks were to be loaded, the supports and floors to be reinforced as required, when the weight and character of the exhibits, and their exact location in the buildings, will be known.

In proportioning the sizes of foundations and floors, to resist the maximum strains from above loads, I have recommended to adopt the following unit strains: For bearing of vertical posts upon underlying blocking (head or end of fibre upon transverse fibre) 600 pounds per square inch.

Tension in extreme fibre in caps and joists, 1,500 pounds per square inch.

Notices appeared in the daily press injurious to the interests of the Exposition, as well as to myself, claiming that the foundations of buildings were too weak, and had to be reconstructed at great extra expense. Such statements were eagerly taken up by papers unfriendly to the enterprise, and enlarged upon in every conceivable manner.

I have abstained from entering into any controversy, believing that the daily newspapers are not the place to settle such questions. I hold that such professional men as compose our engineering societies are the best and most competent judges in such matters, and that it is my duty, as an engineer, to lay before them for their discussion such information and reasoning as caused me to adopt the course I did, and which I am ready to defend.

Having for the last twenty-five years been engaged in the building of bridges, trestles, roofs and other structures of steel and iron, as well as of timber; and having seen the time when wooden bridges were used almost exclusively on the railroads of this country, I may claim to know something of the material used, from my own observations. Railroad bridges and trestles are subjected to the severest strains possible, more so than any other kind of construction. The maximum load for which they are proportioned, is sure to pass over them many times each day, sometimes many times each hour; the speed with which these loads pass over the structure is so great, that the effect is vastly greater than it would be from a static load. Professor Weyrauch has demonstrated by experiments, that a rapidly applied load, quickly removed, has double the effect of a static load. Consider in connection with the load and speed, the unavoidable imperfections in the track and rolling-stock, and it will be conceded that the utmost care in the selection of material, and in the framing and building up of the same must be exercised, and the largest practical factor-of-safety used in proportioning the members of such structures, particularly such as receive a direct shock from the passing loads, as the lower chords of bridges, when supporting floor-beams and track-stringers, and the floor-beams and stringers themselves. If the parts mentioned are of wood, as in Howe-truss bridges and trestlework, two more factors require due consideration. While iron and steel members are the strongest when new, the reverse is true of timber as generally used in large structures. The timber is more or less green or unseasoned, and consequently not as strong in the first period of its actual use, as it is a year or two after it has been seasoned in the open air. (I will show later from experiments by Professor Lanza what the relative strengths of green and seasoned timbers are.) And yet these structures must be strong enough the first day after their completion, to do their duty.

The second most important point to be considered is that wood is a perishable material; its exposure, alternately, to the influences of the sun's rays and to moisture from rain and snow causes it to crack and rot, and so materially weakens its strength, until in a comparatively short time, from seven to ten years, if unprotected from the above-mentioned agencies, it becomes entirely unfit for use, and must be replaced with new parts.

While it is easy to protect metal parts of structures against destruction from corrosion by properly painting them, this remedy will not apply to timber. New timber, if painted, will be destroyed quickly by rot, as the coat of paint prevents the evaporation of the moisture contained in the wood-fibre from its growth; and, if painted later, when the timber has been exposed, rot has usually

[1] A paper by A. Gottlieb, read before the Western Society of Engineers, November 4, 1891.

already set in, particularly in joints, between keys and sticks. There is but one way to preserve timber, and that is by seasoning it either in the air or by steaming, and preventing the moisture so eliminated from reëntering again. This can be obtained either by covering the structures, so at to exclude the sun and moisture, or by treating the wood by some preserving process. The principle involved in all wood-preserving processes is, first, the seasoning of the timber by steaming, thereby removing the moisture from the crevices, and then filling the crevices by some substance which will prevent atmospheric moisture from reëntering.

I had occasion to examine wooden railroad bridges, covered on top and sides, which had been in actual use for more than twenty years without having a single member replaced by a new one, and where the timbers were sound and perfect. Another remarkable fact I will mention in connection with these old covered bridges, that the lower chords, having been proportioned for the lighter loads customary in those days, were strained more than 2,000 pounds per square inch, under our modern rolling loads, without any allowance for impact, and stood all this without apparent injury. The ultimate resistance of white pine and spruce against tearing, as given by various authors, is 10,000 pounds to 13,000 pounds per square inch. Professor Rankine, in his "*Applied Mechanics*," gives it as 12,400 pounds.

Considering the two characteristics of timber above mentioned, it was customary to adopt as a working-strain for tension members, and extreme fibre strains in beams, 1,000 pounds per square inch, or use a factor-of-safety of ten. If the increment of stress caused by the impact of a moving train is taken into account, that strain is probably increased to 1,500 pounds per square inch. Thousands and thousands of such bridges were built, and did excellent service for a quarter of a century; and although our railroads, with their increased traffic and heavy rolling-stock, have replaced most of the old wooden bridges with modern iron or steel structures, still I venture to say there is scarcely a road in this country that has not one or more of the old structures yet in actual daily use, and many members of our society will bear me out in that.

The tests by which the tensile resistance of woods were determined were, of course, made on small specimens, as it is impracticable and difficult to test large-sized pieces of timber for tension. Necessarily, the results must be larger than if derived from tests of full-sized pieces, as the small pieces do not contain as many imperfections as always occur in larger sizes. This was one of the reasons why, in practice, such a large factor-of-safety was adopted. Later and recent tests to determine the modulus of rupture and modulus of elasticity, by loading beams with transverse loads, have been made by Professor Thurston, Laslett, Colonel Rodman and others, mostly, also, with small-sized pieces. On full-sized beams, valuable tests were made by Professor Lanza of the Massachusetts Institute of Technology, and also by a member of our own society, Mr. Onward Bates. I shall proceed to review the results of some of their tests, and their application to the case I treat upon.

The mean moduli of rupture of spruce beams, as determined by various authors, is as follows:

	Pounds per sq. in.
Hatfield	9,900
Rankine	11,100
Laslett	9,045
Trautwine	8,100
Rodman	6,168

Colonel Rodman's tests were made with larger sizes; hence the smaller results than the others.

From tests made by Professor Lanza on full-sized joists of spruce from 2 inches by 12 inches and 15 feet length and less, loaded in the middle and at other points, the modulus of rupture varies from 2,828 pounds to 7,626 pounds per square inch, with an average of 5,046 pounds, derived from sixty-eight experiments. The average modulus of elasticity was 1,332,451 pounds. Four tests were made with seasoned sticks; two of them had been seasoned for four years on the wharf, and showed moduli of rupture of 8,748 pounds and 7,562 pounds, and two were seasoned with steam-heat in the laboratory for six months, and gave moduli of 7,448 pounds and 7,211 pounds, or about 45 per cent larger than the average modulus for unseasoned timber. According to Professor Lanza, about the same modulus of rupture should be used for white pine as for spruce. In another table, Professor Lanza gives the results of tests with beams varying in size from 4 inches by 12 inches to 6 inches by 12 inches, all 20 feet long, in time-tests, where the beams remained under the loads for some time, and while so loaded were seasoned by steam-heat in the laboratory. Of six beams, five were green timber at the beginning of the experiment, while the sixth piece had been seasoned on the wharf for six months. The average modulus of rupture for the five pieces was 6,337 pounds, while the modulus for the sixth piece was 8,547 pounds, or about 35 per cent larger than the green pieces. In another time-test with spruce beams, all 18 feet long, seasoned for six months in the laboratory, not loaded during seasoning, the average modulus of rupture was 7,300 pounds per square inch; modulus of elasticity, 1,600,000. All these moduli of rupture are smaller than those obtained by other authorities from tests with smaller pieces, but they are more reliable; besides, they prove that seasoned timber will stand more strain than green timber, from 30 to 45 per cent, according to circumstances. Commenting upon the results obtained from his experiments, Professor Lanza correctly remarks that, while it was necessary to use larger factors-of-safety when the moduli of rupture were determined from tests with smaller pieces, it will be sufficient for most timber constructions, except in factories, to use a factor of four. For breaking-strains of beams, he also states, most properly, it is better engineering to determine as the safe load of a timber beam the load that will not deflect it more than a certain fraction of its span, say about $\frac{1}{300}$ to $\frac{1}{400}$ of its length.

Mr. Onward Bates, engineer of the bridges of the C. M. & St. P. R. R., made a series of tests with wooden track-stringers, in order, as he states, to determine their strength under nearly as possible the same conditions as when in use in the bridges. By this Mr. Bates means, of course, the mode of loading, without considering the effect of the momentum of a running train. The tests were made with wooden stringers, partly new, partly taken from existing bridges and trestles, after having been in use for several years. The beams were supported at both ends, and a load of pressure applied in the middle of the span until the timber broke. Of forty test-pieces, fourteen were new timber, not used before, and twenty-six were stringers taken from existing bridges, were they were used from 3½ to 8½ years, in the average of 6.2 years each. In his brief review of tests, Mr. Bates remarks that stringers which have been long in use are, as a rule, badly season-cracked along the middle of the length. He arrives at the following conclusions:

1. Green timber is not as strong as after it has seasoned.

2. Age and use do not weaken the timber. It preserves its strength until weakened by decay.

Knots do weaken the timber seriously, both in reducing the effective section of the beam and in causing the fibre to be curly and cross-grained.

4. While age does not weaken the timber itself, it weakens it by season-cracking.

Mr. Bates finds, from the forty tests of pine stringers, the average modulus of rupture to be 3,906 pounds per square inch (against 5,045 pounds by Professor Lanza's experiments on sixty-eight pieces of spruce, and 4,451 pounds on thirty-seven pieces of Western pine), all green timber; and a modulus of elasticity of 1,123,090 (against 1,332,451 of Professor Lanza from green timber). In concluding his paper (contained in the *Transactions* of the American Society of Civil Engineers of 1890), Mr. Bates remarks that his paper contains nothing about the fibre-stress which should be permitted. Given the loads and strength of material, the engineer who builds a bridge must decide the amount he will strain the latter.

I would add to this that, if the structure to be built is not a railroad bridge, the fibre-stress to be permitted will also be determined by the engineer, according to the use and purpose the structure is intended for.

From the standard plans of wooden trestles, published in connection with Mr. Bates's paper, and the locomotive diagram contained in one of the bridge specifications of the C. M. & St. P. R. R., showing 72,000 pounds on three pairs of drivers with 6-foot wheel base, I compute that Mr. Bates uses a fibre-strain of 888 pounds per square inch in track-stringers (including dead load, but without considering the impact), which, under a train moving with a speed of 20 to 40 miles per hour, will increase that strain to from 1,100 pounds to 1,332 pounds (25 to 50 per cent), and that the deflection under the static load of 16-foot track-stringers will be .3 inch, using the modulus of elasticity, as determined by his experiments. As to the conclusions arrived at by Mr. Bates, I will say the following: Of the forty pieces tested, twenty-six were old timbers having been exposed to the weather and to heavy strains from running trains for 6.2 years on an average, some of them even showed already signs of decay, most of them were badly season-cracked, as Mr. Bates calls it. I venture to say that those cracks were caused as much, if not more, by the heavy strains to which those timbers were constantly subjected for so many years, as to the seasoning agencies. It must be clear that such timbers are not fair samples to determine either the strength or the elasticity of seasoned timber, not used before testing, and to furnish a reliable guide for future constructions. The test results of the experiments themselves bear out the correctness of this statement. While Mr. Bates acknowledges by his first conclusion that "green timber is not as strong as after it is seasoned," the results of his tests do not warrant such a statement if he considers the twenty-six old pieces as equivalent to "seasoned timber." I find that the average modulus of rupture of the fourteen new sticks is 3,960 pounds, while of the twenty-six old pieces the average was only 3,874 pounds. I also hold that the loading of the old stringers with a heavy centre load was more injurious to them than it would have been even to green timber, for timber, at the best, is not as homogeneous a mass as metals are, and the severe cracking in the centre, which most of the old sticks showed to considerable extent, did certainly not require as much pressure to increase the cracks and cause the pieces to fail sooner than they would have if new, or seasoned in the ordinary way, without being exposed to heavy load and the influence of the weather. In order to determine the strength of our merchantable pine timber as we obtain it from our lumber merchants, I had thirty-three pieces furnished to me by one of the lumber yards of this city, and tested in the Government testing-machine in the Watertown Arsenal.

The pieces were 3 inches by 3 inches pine, with small knots in them, and were cut from 3 by 12, 3 by 14, 3 by 6 and 6 by 8 timbers by the lumber men without any special directions from me, selected

from the stock on hand without any particular care. The test-pieces were turned down in the middle to a diameter of one inch. The first nineteen pieces were from green lumber sawed this year; while the last fourteen pieces were from yard-seasoned material. The ultimate resistance in the nineteen green pieces was from 5,270 pounds to 9,660 pounds per square inch, with the exception of two pieces, which were defective; average for all nineteen pieces, 6,681 pounds per square inch. If the two defective pieces are omitted, the average is 7,289 pounds. For the seasoned pieces, the ultimate resistance varied from 6,640 pounds to 10,210 pounds; one piece defective, average, 7,720 pounds per square inch. If the one defective piece is omitted, the average is 7,994 pounds. At the same time, I obtained from the test records of the Arsenal an abstract of tests made in 1883 with pine blocks tested with pressure across the fibre. The indentation produced at the surface of the timber with a pressure of:

846 lb.	per	square inch	was 0.01 in.
1,000 "	"	"	0.02 "
1,077 "	"	"	0.03 "
1,121 "	"	"	0.04 "
1,153 "	"	"	0.05 "

From which it will be seen that a pressure of 600 pounds per square inch would produce an indentation on the blocks under the posts of the foundation of less than $\frac{1}{100}$ inch. It is needless for me to say anything more on this point.

Coming back to the statement of Professor Lanza, that it is better engineering to proportion floor-beams with reference to their deflection than to the ultimate strength, I have computed the deflection of a 2-inch by 12-inch joist, 14 feet between supports, if loaded so as to produce a fibre-strain of 1,500 pounds per square inch, using the modulus of elasticity of Professor Lanza, 1,332,451 for green timber, and find the deflection to be 0.63 inch, equal to $\frac{1}{21\frac{1}{5}}$ of the length, with the modulus as found for material seasoned without being subjected to loads, being 1,600,000, the deflection would be 0.45 inch, equal to $\frac{1}{31\frac{1}{9}}$ of the length.

Most of the spans of joists in the Exposition Building are from 11 feet 6 inches to 12 feet 6 inches length; some few exceptions are over 14 feet length.

In recapitulating, I will briefly summarize the result of the various tests and the conclusions I have arrived at:

1. That the use of spread foundations upon the sandy bottom with clay substrata, as adopted, was warranted by the tests made with loaded platforms.

2. That the adoption of a strain of 600 pounds per square inch for pressure of posts of foundations upon the blocking timbers, producing an indentation of less than $\frac{1}{100}$ inches would be justified even for permanent structures.

3. That the timber in floor-joists and caps of posts, under the circumstances mentioned, must be considered as timbers seasoned, at the time when they will be called upon to do service; and seasoned without being subjected to loading.

4. That by using a working strain of 1,500 pounds per square inch in the parts above named, if the test results of Professor Lanza for seasoned timber are accepted, a factor-of-safety from $4\frac{8}{10}$ to $5\frac{8}{10}$ is obtained; that if the results of the Watertown Arsenal are accepted, the factor-of-safety obtained from the fourteen seasoned specimens show a factor-of-safety of $5\frac{1}{10}$. If the test results as given by Trautwine, Rankine, Hatfield and Laslett are accepted the factor-of-safety would be still larger.

I will not omit stating that the question has been raised, whether such materials as has been specified in the specifications could be obtained in such large quantities as the immense buildings will require, and considering the time in which it will have to be furnished. I do not believe the point well taken. The specifications require sound white pine, free from wind shakes, rot and other defects impairing the strength of the timber, that only small and sound knots be accepted, and that small sap angles will be allowed in sizes over twelve inches. Such material has been growing for centuries, is growing to-day, and will in the future. A little care in selecting the material will furnish it; but if it should have been found impossible, considering the shortness of time, the remedy would be simple, and has been adopted to my own knowledge often enough with steel or iron. If the material specified could not be obtained in quality, the contractor was allowed to substitute other material, increasing at his own expense the quantity to compensate for the deficiency in quality.

At the time of my resignation it had been ordered, without my consent, to increase the size of timbers in foundations and floors to such an extent as to reduce the pressure of posts upon blocking from 600 pounds per square inch to 400 pounds; and the fibre-strain of joists and caps from 1,500 pounds to 1,200 pounds per square inch; the foundations were reinforced as it was stated. It will not be necessary for me here to elaborate upon the fact, that in trying to solve the problem before me, I did not consider how to reinforce anything, but to find what is right, necessary and sufficient under the conditions governing the case. Any structure, even the present floors, can be reinforced by adding material, according to the simple rule that five is more than four and six is more than five.

In conclusion, I will state that, as far as I know, an engineer had never before to solve a problem of this character, under the peculiar circumstances I had to deal with in this case, and perhaps no one ever will again. Buildings covering under their roofs hundreds of acres, to be used for six months only, and then be doomed to destruction; buildings erected from one and a half to two years ahead of their use; an immense expenditure for a short temporary use of the buildings erected. That under such circumstances proper judgment ought to be exercised to combine the necessary strength, with the important fact of permissible economy, is evident, as well as the fact that ordinary practice will not apply in this case. Whether I have properly judged in dealing with this problem as I did, and which I have tried to explain clearly and without bias in this paper, I leave to your discussion and to the profession at large.

EXTRACT FROM REPORT OF TESTS, 1883.

These specimens were taken from a tree 20.08 in. in diameter which had fifty-one heart rings and nineteen sap rings. It grew in drift soil in Brookline, Mass.

Marks.	Direction of Loading.	Loads for Indentations of											
		.01 in.	.02 in.	.03 in.	.04 in.	.05 in.	.06 in.	.07 in.	.08 in.	.09 in.	.10 in.	.15 in.	.20 in.
le	"	2,100	2,500	2,670	2,780	2,860	2,970	3,020	3,070	3,150	3,190	3,5 0	3,920
le	"	1,410	2,450	2,960	3,070	3,190	3,270	3,330	3,060	3,390	3,420	3,800	3,900

NOTE: — Upper line: effect on specimen, sheared fibres. Lower line: effect on specimen, sheared fibres split at end.

These specimens were indented perpendicular to the grain by a cast-iron plunger, which covered the width of the specimen 1.575 in. and 1.575 of the length, the indented section = 2.48 square inches.

Report of Mechanical Tests made at Watertown Arsenal, Mass., October 24, 1891, for A. Gottlieb & Co., Chicago, Ill.

FORM OF SPECIMENS.

Test No.	Marks.	Diameter.	Sectional Area.	Tensile Strength.	
				Total Pounds.	Pounds per Square Inch.
			sq. in.		
7919	No. 1 3×14	1.00	.785	6,680	8,510
7920	" 2 3×14	.99	.770	4,450	5,780
7921	" 3 3×12	1.00	.785	5,340	6,800
7922	" 4 3×12	1.00	.785	6,310	8,040
7923	" 5 3×14	.99	.770	6,130	7,960
7924	" 6 3×14	.99	.770	5,890	7,650
7925	" 7 3×12	1.00	.785	5,910	7,530
7926	" 8 3×14	1.00	.785	4,140	5,270
7927	" 9 6×6	1.00	.785	1,830	2,330
7928	" 10 3×12	1.00	.785	554	710
7929	" 11 6×18	1 00	.785	5,580	7.110
7930	" 12 3×6	1.02	.817	7,340	8,980
7931	" 13 3×14	1.02	.817	7,895	9,660
7932	" 14 3×12	1.00	.785	4,985	6,350
7933	" 15 3×14	1.01	.801	4,790	5,980
7934	" 16 3×14	1.01	.801	6,385	7,970
7935	" 17 3×14	1.01	.801	5,670	7,080
7936	" 18 3×14	1.00	.785	4,930	6,280
7937	" 19 3×14	1.01	.801	5,580	6,970
7938	" 20 3×14	1.00	.785	7,090	9,030
7939	" 21 3×14	1.01	.801	6,610	8,250
7940	" 22 3×14	1.00	.785	7,320	9,320
7941	" 23 3×14	1.01	.801	5,980	7,470
7942	" 24 3×12	1.01	.801	5,320	6,640
7943	" 25 3×14	1.01	.801	6,015	7,510
7944	" 26 3×12	.99	.770	5,230	6,790
7945	" 27 3×14	1.00	.785	5,410	6,890
7946	" 28 3×14	1.02	.817	5,980	7,330
7947	" 29 3×14	1.00	.785	6,040	7,690
7948	" 30 3×12	1 00	.785	5,490	6,990
7949	" 31 3×14	1.02	.817	8,010	9,800
7950	" 32 3×14	.99	.770	3,270	4,250
7951	" 33 3×14	1.01	.801	8,180	10,210

No. 9, was a defective specimen; cross-grained.
No. 11, fractured obliquely.
No. 32, heated at centre when turned.
Correct: J. E. HOWARD.

A. L. VARNEY,
Captain Ordnance Department U. S. A.
Commanding.

(Copy)

SOCIETIES

AMERICAN INSTITUTE OF ARCHITECTS. — DIRECTORS' MEETING.

AT a meeting of the Board of Directors of the American Institute of Architects held at the office of the Institute, No. 18 Broadway, New York, on January 9, 1892, there were present: President Kendall, Messrs. Hunt, McLaughlin, Eames, Carlin, Stone, Jenney, Illsley, Hardenburgh, Ferry, Mason and Adler.

It was decided after thorough discussion that the next convention be held at Chicago, at a time to be hereafter fixed in consultation between the Executive Committee of the Institute and the officers of the Chicago Chapter.

A number of communications relating to the organization and maintenance of State chapters were received, and a very full discussion of the subject had. It was decided that inasmuch as the Board of Directors could not, without previous amendment of the Constitution and By-Laws, change the relations of the Institute to its Chapters, State or local, the Secretary was instructed to prepare a synopsis of the various communications received upon the subject by the Directors, and of the discussion had in this meeting, and transmit the same to all of the members of the Institute with a list of questions called up by the discussion, which questions when answered by the Fellows of the Institute, would enable the Board of

Directors to formulate a policy and prepare the necessary amendments to Constitution and By-Laws for submission to the Institute at its next convention.

The following were named as the Executive Committee for the ensuing year: President Kendall, Treasurer Treat and Secretary Adler as *ex officio* members, and Messrs. Hunt, Carlin, Stone and Ferry appointed by the President.

The following were appointed members of the Committee on Education: Prof. Wm. R. Ware, Prof. N. C. Ricker, Prof. F. W. Chandler, Prof. C. Francis Osborne and Prof. Lang.

Committee on Uniform Contract was appointed, consisting of Alfred Stone, S. A. Treat and D. Adler.

Committee to formulate a Code for Competitions: Messrs. Hunt, Stone, Illsley, Burnham.

Permission was granted, upon application, for the formation of new Chapters in Brooklyn, N. Y., Denver, Colo., Worcester, Mass., Tacoma, Wash., Iowa and Minnesota.

Action upon the proposed Architectural Congress in 1893 was postponed, as the committee appointed to investigate and report upon the matter asked for more time.

The Secretary was instructed to reissue to all Fellows of the Institute the circular relating to the proposed bill on Reforms in Architectural Practice in connection with Government Buildings, and transmit copies of the same and of Mr. Windrim's proposed bill.

The following resolution was passed:

Resolved, That the Board of Directors of the American Institute of Architects hereby endorse the efforts made by the architectural societies in the various States of the Union to place the practice of the profession of architecture on a footing similar to that enjoyed by the professions of medicine, pharmacy and the law, and that the various Chapters of the Institute be requested to do all in their power to further the passage of the legislative enactments to that effect.

The Secretary was instructed to prepare a synopsis of the minutes of this meeting, and transmit copies of the same to the various architectural journals.

The Illustrations

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

HOUSE OF RODNEY A. WARD, ESQ., NO. 319 GARFIELD PLACE, BROOKLYN, N. Y. MR. C. P. H. GILBERT, ARCHITECT, NEW YORK, N. Y. — HOUSES, NOS. 321–323, MR. G. P. CHAPELLE, ARCHITECT, NEW YORK, N. Y.

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

IMPROVEMENTS TO FARMHOUSE OF MR. WILDER, ORANGE CO., N. Y. MR. E. G. W. DIETRICH, ARCHITECT.

DAY-SCHOOL BUILDING, SEATTLE, WASH. MR. JOHN PARKINSON, ARCHITECT.

This building, of brick and stone, and containing sixteen rooms, will be finished April 1, at a cost of $60,000.

MONTICELLO FEMALE SEMINARY. MR. T. C. LINK, ARCHITECT, ST. LOUIS, MO.

COTTAGES AT MINNETONKA LAKE, WIS. MR. HARRY W. JONES, ARCHITECT, MINNEAPOLIS, MINN.

[**Additional Illustrations in the International Edition.**]

GLOUCESTER CATHEDRAL FROM THE CLOISTER GARTH.

GLOUCESTER CATHEDRAL: INTERIOR OF THE CHOIR.

GLOUCESTER CATHEDRAL: THE PLAN.

This and the other plates illustrating this cathedral are copied from the *Builder*.

PRIVATE DWELLING-HOUSE ON THE RUE FORTUNY, PARIS, FRANCE. M. P. GOUNY, ARCHITECT.

This plate is copied from *La Semaine des Constructeurs*.

SOME OF THE TOWERS AND SPIRES OF LONDON DESIGNED BY SIR CHRISTOPHER WREN.

This plate is copied from *Specialties*.

THE CATHEDRAL AT FÜNFKIRCHEN, HUNGARY.

These illustrations are copied from *Zeitschrift für Bildende Kunst*.

DETAILS FOR THE NEW COURT OF APPEAL, PARIS, FRANCE. M. DAUMET, ARCHITECT.

These details are reproduced from the pages of *La Construction Moderne*.

MUNICIPAL BUILDINGS, BOMBAY, INDIA.

This illustration is copied from the *Australasian Builder*.

HOTEL AT SCHEVENINGEN, HOLLAND. MR. T. W. ALDWINCKLE, ARCHITECT.

This plate is copied from *Building News*.

NEW WROUGHT-IRON GATES IN THE ROYAL PALACE, BERLIN, PRUSSIA.

These illustrations are copied from *Deutsche Bauzeitung*.

DETAIL OF THE ENTRANCE TO LA TOUR HEURTAUT, CHATEAU D'AMBOISE.

This illustration is copied from *L'Encyclopédie d'Architecture*.

PARK GATE FOR A HUNTING-LODGE AT CASSEL. PROF. C. SCHICK, ARCHITECT.

This plate is copied from *Architektonische Rundschau*.

"REVERIE." AFTER A PAINTING BY H. SCHNEIDER.

In Munich the business of art, and especially of painting, is studied with an attention which is not surpassed in Paris. The city has, in consequence, relations with most parts of the world, and pictures are produced every year to suit all tastes and all markets. English painters care only for English patronage, but abroad, and especially in Munich, much is done to attract foreigners. One consequence is that inspiration is drawn from other sources besides those which are local. The picture which, by Doctor Albut's courtesy, we reproduce is an example of our theory. In England figures that wear Classic costumes are identified with the names of one or two painters, and it becomes a sort of poaching affair for another to attempt the treatment of that class of subject. If a picture of the kind can find its way into an exhibition, visitors pass by it as if they were afraid their admiration would be construed into aiding and abetting a wrong-doer.

THE CATHEDRAL, LAUSANNE, SWITZERLAND.

It would be interesting to be able to measure the extent of Prout's power in enabling people to recognize the picturesque in building. If we may judge by the experience of some individuals he was not less influential than Sir Walter Scott as a revealer of the magic that belongs to ancient work, and in associating his own peculiarities with it. So well has he identified his manner of representation with his subjects that for many a traveller an old building or a Continental town becomes attractive in proportion as it appears to recall some of Prout's drawings. It was fortunate that Samuel Prout began his career as a draughtsman under excellent guidance. He was employed when very young by John Britton in preparing drawings of buildings. At first he appears to have been overwhelmed by the magnitude of his task, and was prepared to abandon his engagement. But with Britton's aid he discovered a method which could be followed as well as the skill to identify the parts of a building that were characteristic. When Prout started there was a preference for smoothness. In many French as in English representations the buildings appear as if they were cast, and it was necessary to infer that they were formed of stone. Prout, on the contrary, was as much impressed by the work of the masons as if he believed with the poet that "*des Maurers Wandeln es gleicht dem Leben*," and wished to record something of the contest between masonry and time. The effect of the new treatment on minds that were receptive of impressions may be judged by Mr. Ruskin's experience. When speaking of a little drawing of an English cottage by Prout, which was in the parlor at Herne Hill, he says:

"It taught me generally to like ruggedness and the conditions of joint in moulding, and fitting of stones in walls which were most weather-worn, and like the grey dykes of a Cumberland hillside. This predilection — passion, I might more truly call it — holds me yet so strongly that I can never quite justly conceive the satisfaction of the original builders, each of the most delicate edifice, in seeing its comely stones well set together. Giotto's Tower and the subtly cyclopean walls of early Verona have, indeed, chastised the prejudice out of me as regards work in marble enriched with mosaics and fine sculpture; but I had almost rather see Furness or Fountains Abbey showed in grass-grown heaps by their brook sides than in the first glow and close setting of their fresh-hewn sandstone."

Remembering how much he owes to Prout's representations of buildings, Mr. Ruskin was justified when he said that there is no stone-drawing, no vitality of architecture, like what is to be found in them. There was another quality possessed by Prout which enabled him to do justice to architectural works. That was his appreciation of size, by which he was enabled not only to represent a whole building or a group of buildings with due vigor, but to suggest greatness by means of a part. The drawing we reproduce this week is an example. It is felt at the first glance that the building, from what we see of it, must be extensive. This is not a common power, for too many drawings of parts of buildings suggest that the rest is of no value; they do not excite the slightest curiosity about what is not shown, and the part we see suffers in consequence. On this subject, which is of importance, a passage by Mr. Ruskin is worth attention. He says:

"Prout was, and he remains, the only one of our artists who entirely showed Turner's sense of magnitude, as the sign of past human effort or of natural force, and I must be so far tedious as to explain this metaphysical point at some length. Of all forms of artistic susceptibility, reverent perception of true magnitude is the rarest. No general conclusion has become more clear to my experience than this — strange as it may seem at first statement — that a painter's mind, typically, recognizes no charm in physical vastness

and will, if it must choose between two evils, by preference work on a reduced rather than on an enlarged scale, and for subject paint miniature rather than mass. Human form is always given by the great masters either of the natural size, or somewhat less (unless under fixed conditions of distance which require perspective enlargement) and no sort or shadow of pleasure is ever taken by the strongest designers in bulk of matter. Veronese never paints shafts of pillars more than two feet in diameter, or thereabouts, and only from fifteen to twenty feet in height."

The series of plates by Prout, which will appear in *The American Architect* will enable our readers to realize all the characteristics of an English artist who has more interest for architects than all those who used oils or water-colors. All the drawings will afford valuable lessons to those who have to draw or to design buildings. By aid of a talent that was like an instinct, Prout was always able to seize on those features in a building which impart character to it, and he cared more for architectural effect than for archæological details. His drawings denote selection and thought, and beside them photographic representations appear lifeless and commonplace, and on account of its personal character Prout's work can never be superseded. The Cathedral of Lausanne is a work of the thirteenth century, and is about 350 feet in length. It stands on a lofty terrace, but the approaches are not worthy of the building. The interior as a whole is more pleasing than the exterior, about which there are not many parts equal to that selected by the artist.

TRELOYHAN, ST. IVES, CORNWALL. MR. SYLVANUS TREVAIL, C. C., ARCHITECT, TRURO.

THIS residence, on a beautiful site adjoining the Tregenna Castle grounds overlooks the magnificent St. Ives Bay, with distant views of the Godrevy Lighthouse, the Atlantic Ocean and many scores of miles of coast and inland scenery.

RULES GOVERNING THE USE OF CRUDE PETROLEUM FUEL.

THE matter of the adoption of crude petroleum for fuel recently came up before the Chicago Fire Underwriters' Association for consideration. A set of rules to be observed by persons using crude petroleum for fuel was submitted to the Association by Superintendent Bowden, and after some discussion adopted. The rules as adopted after amending are as follows:

Vault to be located so that the oil it contains can burn out without endangering property, and have capacity sufficient to hold twice the entire quantity of oil the tanks within can contain.

Location of vault to be left to the approval of the superintendent of surveys. Distance from any property to be regulated by size of tanks.

Vault to be underground, built of brick, sides and ends to be at least sixteen inches thick, and to be made water tight with hydraulic cement; bottom to be water-tight, concrete, dished toward centre, and inclined to one end so as to drain all overflow or seepage to that end, said incline to be to the end opposite to that from which the tank is to be tapped; top to be supported with heavy iron I-beams, with arches of solid brick sprung from one beam to its neighbors, and to have at least twelve inches of dirt over the masonry.

Vault to be accessible by one or more large man-holes, which, when not in use, are to be kept locked by a large padlock of three or more tumblers, key to be held by some responsible party.

A trough must run from one end of the vault to the other directly under each tank, and in the same direction as the tank or tanks.

The vault shall be air-tight as near as possible, and must have two ventilating-pipes of iron of four inches inside diameter, both inlet and outlet pipe to reach within six inches of the bottom of the vault, the outlet ventilating-pipe to rise above the surface eight feet, the inlet ventilating pipe to rise above the surface six feet.

Siphon to be arranged so as to carry out any seepage or leakage into the vault, and discharge same upon the ground, where its burning would not endanger surrounding property.

Tank to be of boiler-iron or steel at least three-sixteenths of an inch in thickness, to be cold riveted, rivets to be not less than three-eighths of an inch in diameter and not over one inch apart between centres; the entire outer surface of tank to have two good coats of coal tar or mineral paint before the tank is placed in position.

No tank shall be over eight feet in diameter by twenty-five feet in length, nor shall any vault have over two tanks.

When tank is set, the bottom of the tank must be three inches above the concrete floor of the vault, and must be in saddles of masonry not less than twelve inches in thickness, built from the concrete floor of the vault, said saddles not to be more than three feet apart between centres, and laid in hydraulic cement with an opening through the centre for drainage.

Tank must incline one inch per ten feet in length toward the end from which it is to be tapped, said incline of the tank to be opposite to the incline of the bottom of the vault.

The filling-pipe, man-hole, tell-tale or indicator, pump-supply connection, steam connection, overflow-pipes, and ventilating-pipes where they connect with tank, must be made petroleum-tight by the use of litharge and glycerine cement.

Flanges to make tank three-quarters of an inch in thickness, to be rivetted on the inside, so as to furnish a satisfactory joint where connections are made, must be used.

Filling-pipe connection must have gas-tight valve between the tank and hose-coupling, which must be kept closed and locked unless the tank is being filled. Each tank must have ventilating-pipes at least one and one-half inches in diameter, one of which must connect with one end of the top of the tank and be in the form of an inverted "J," a union to be placed in pipe just below the bend, within which shall be placed a diaphragm of fine wire gauze; the other ventilating-pipe must be at the other end of the top of the tank, and must be conducted to the inside of the smoke-stack, or into the open air at least ten feet above the surface, so that all the gases that form in the tank will be constantly discharged.

Tank must have indicator to show height of oil in tank at all times, said indicator to be so arranged as to allow no escapement of gases from tank.

All pipes leading from the tank to the pump or place of burning must incline toward the tank and have a fall of at least two feet from bottom of stand-pipe to top of storage-tank, and must be so constructed that the feed-pipe from stand-pipe to burners shall be entirely above burners, so that no pockets of oil can be formed in any one of the pipes between the main tank, stand-pipe, oil-pump, or place of burning.

All systems of burning oil for fuel shall use pumps and stand-pipe, which shall be within the fire-room; the capacity of the stand-pipe shall not exceed twenty gallons, and the overflow-pipe shall have one and one-half times the inside diameter of the oil-pump suction-pipe. All systems to be so piped and constructed that all oil in the pipes and system shall automatically drain to the main tank when the pump is stopped and cut off from oil-supply. Pipe must be located outside of boiler-house.

All systems shall have twin pumps so that each one can be used independently of the other.

All pipes within the building shall be placed in plain sight where possible; otherwise shall be placed within a box with movable top, said box filled with dry sand.

The oil-pipes and steam-pipes between the supply-tank and oil-pumps shall parallel each other and be placed in the same box.

CARE OF AUTOMATIC SPRINKLERS.

CHARLES SQUIRES, manager of the inspection department of the Chicago Fire Underwriter's Association, has issued a circular on the care of automatic sprinklers and calling attention to some points important to those occupying the premises in which systems are located. Defects arising after the installation and acceptance of equipments are liable to prove of considerable importance and in all cases necessitate the withdrawal of the allowance until remedied. The suggestions are as follows:

1. At the approach of and during cold weather every precaution should be taken against any part of the system, tank or connections freezing. This is a serious matter, as a touch of frost would not only render the system inoperative but would also — unless instantly discovered — cause great water damage.

2. Care should be taken to prevent tenants or employés from bronzing, painting, calcimining or whitewashing sprinklers or valves. If this is done it will necessitate the immediate removal of sprinklers so rendered inoperative. Painted sprinklers will in no case be allowed to be cleaned and replaced. The replacing of cleaned, calcimined or whitewashed sprinklers will depend on the judgment of the inspector.

3. No platforms, decks, racks, scaffolding or partitions should be erected without first conferring with us, as many times it necessitates a change in the piping which could be avoided were we consulted.

4. The electric alarms in connection with the sprinkler system should be frequently tested and examined. The usual trouble when alarms are out of order will be found to exist in the batteries; either the solution has evaporated or the zinc sticks have been eaten away. If the trouble is not there it is probable a wire is broken.

5. If the primary water-supply is from an air-pressure tank, a pressure of between seventy and seventy-five pounds should be maintained at all times. Never let it fall below seventy pounds. Engineers should be instructed to keep the water out of the glass gauge on the tank and keep the gauge shut off, then an accident to the gauge would not waste the pressure and flood the premises with water; if the supply is from a gravity tank the engineer should pump into the tank once every week to replace what water has evaporated, and should take especial pains to see that the steam circulation or other arrangement for heating tank is in order; if at any time fire accident necessitates the breaking of the straps on the gate-valves they should be replaced when the system is again in order.

6. See that the signs on the outside of building over the steamer connections are always conspicuously in place.

7. Do not use the sprinkler piping as a convenient depository for tin cans, coal hods, chair frames, clothing or surplus stock; or for any purpose whatever except that for which it is intended.

8. Each and every tenant, occupant or employé should familiarize himself with the system sufficiently to know what action to take in case of fire or accident.

MOSAICS FOR THE DOME OF ST. PAUL'S. — The mosaics of the prophets for the eight spandrels of the inner dome of St. Paul's Cathedral, London, have reached England from Venice and been placed. The designs are English, but the mosaics came from the glass factories founded by the late Doctor Salviati on the Island of Burano, once a famous hive of the industry and now again celebrated. The late Alfred Stevens of London (not the Belgian painter of the same name) designed the figures of Isaiah, Jeremiah, Ezekiel and Daniel. The Apostles St. Matthew and St. John are by Mr. G. F. Watts; St. Luke and St. Mark were designed by Mr. Britten. These figures are very large and suggest Michael Angelo; they are translated into colors and furnished with gold backgrounds. The murkiness of London, the corrosive action of its atmosphere, and the deposit of soot make brilliant mosaics the only adornment for walls and domes which overcome the wretched light and admit of a reasonable degree of permanence. — *New York Times.*

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.*]

A QUESTION OF COMMISSION.

New York, N. Y., January 6, 1892.

To the Editors of the American Architect: —

Dear Sirs, — In designing a house, five sets of plans were made, with elevations for three of them. The plans were all different, and drawn to an eighth scale. What would be the proper charge to make for such service. Yours truly,

A. B. Smith.

[Charge a fair price for the time occupied in making the plans not used. — Eds. American Architect.]

THE CARNEGIE LIBRARY COMPETITION.

Pittsburgh, Pa., January 22, 1892.

To the Editors of the American Architect: —

Dear Sirs, — Possibly you have not as yet received a list of the architects whose designs were selected by the Carnegie Library Commission, and I give below the names as they were published by the Pittsburgh papers: the six designs next best to that of Longfellow, Alden & Harlow under specifications, each author receiving $2,000: Frank Irving Cooper, Pittsburgh; W. S. Fraser, Pittsburgh; Kreis & Richards, New York; George R. Mann, St. Louis; Shepley, Rutan & Coolidge, Boston; James T. Stein, Pittsburgh.

Very truly yours, C.

NOTES & CLIPPINGS

Cement Mortars. — In a recent article in the *Revue de Génie Militaire*, M. R. Feret remarks that in making cement mortar the sand is usually measured whilst the cement is weighed. This plan has many advantages in practice, as the cement is received in bags or barrels ready weighed, whilst it would be difficult to weigh the sand. Nevertheless, the amount of sand determined in this way is somewhat variable, as it will be more if measured in a small number of large measures, than in a greater number of smaller ones. Moreover, the quantity contained in a given measure varies with the dampness of the sand. If but slightly damp, the amount of sand in a measure will be decreased, as much as 20 per cent in cases, when compared with the same sand measured dry. If, however, the sand is still further wetted, the reverse takes place, and the measure even contains still more sand than if measured dry, as the water brings about a compacting of the particles. The voids in a mass of sand vary with the regularity of the sizes of the grains. Were these perfectly uniform the voids in a mass of coarse sand would be of exactly the same volume as in a similar mass of fine sand; but as in practice the grains never are uniform, each particular sand has a certain percentage of voids peculiar to itself which one cannot do more than fill, no matter how large a proportion of cement is added in making the mortar. From the fact that natural sands are not uniform, it follows that the many researches on the influence of the size of grain on the strength of a mortar, have little practical bearing, as in such experiments the size of the grains is carefully calibrated by only using such as pass through one particular mesh and are arrested by a second finer mesh. The grains are thus rendered uniform in size and no longer correspond to natural sands. To further investigate the subject M Feret has prepared artificial sands out of crushed quartzite The sand as received from the crusher was graded into three degrees of fineness. The first consisted of such grains as would pass through a sieve containing four meshes to the square centimetre, and were retained on a sieve of thirty-six meshes per square centimetre. The second consisted of grains passing through a sieve of thirty-six meshes per square centimetre and retained in one of a much finer mesh, whilst the third consisted of the grains passing this last sieve. Measured dry, each of these samples had practically the same specific weight, No 2 being slightly the lightest. Mixed in various proportions it was found the mixture having the highest specific weight was one consisting of six parts of the first sand and four of the third. This weighed 1,686 kilogrammes per cubic metre, or 30 per cent more than No 2. — *Engineering.*

The Uses of Burnt-clay Mortar in Italy. — The United States Consul at Catania, in his last report, says that visitors to Catania invariably notice and remark on the peculiar soft pink color of all the unpainted buildings. This coloring is the result of using cement or mortar of proved value, found in the vicinity, and which is nothing more nor less than burnt clay. In the frequent eruptions of Mount Etna in times past, great beds of clay were covered and buried from twenty to two hundred feet by the lava streams, with the result, when the eruption happened in the dry season, of burning and converting these clay beds into a fine red gravel or powder. These deposits are mined, and are considered very valuable. The material, mixed with a little lime and the usual amount of water, forms a mortar or cement considered superior to any other cement for building purposes, and has been used in Catania to the exclusion of all other materials for many centuries. Every building in Catania is constructed of lava liberally cemented with this mortar. In building, small irregular stones are used, just as they happen to come, and a smooth surface is afterwards given by a thin coating of mortar inside and out, which can then be divided by a trowel to imitate blocks of stone, if desired. This burnt clay, with lime, makes a very strong and adhesive mortar; no other material would hold together the large four and six story apartment-houses, which are built entirely of small irregular stones. It also has unequalled wearing and resisting power, as the extensive harbor breakwater proves. This breakwater was built some ten years ago, and extends for three quarters of a mile out into the sea, and is said to be as good to-day as when first built. It is composed entirely of lava, and for a foot below watermark to a sufficient height to protect the shipping, of huge blocks of small lava rubble liberally cemented with the mortar. The constant wear and tear of the sea for ten years has only damaged the cement in insignificant places, and probably only where there happened to be an air-space between the mortar and stones caused by faulty construction of the blocks. Consul Heath adds that the more he looks into the matter the more he is convinced of the value of this mortar as an economical substitute for all the high-priced hydraulic cements now used, and that it might well be adopted in other countries besides Italy. — *Journal of the Society of Arts.*

TRADE SURVEYS

The controlling motive that will underlie the business of 1892, be it great or small, will be to let demand control supply, rather than to rashly crowd production upon the markets of the country, regardless of conditions. Producing interests are everywhere endeavoring to find evidences as to probable requirements for the coming season. Middlemen are everywhere watching for signs by which to regulate their conduct. Financial interests are watching the initial movements of trade with unusual interest. Whether this is to be a year of extraordinary investments is a thing they would like to know. There is an underlying inclination to invest money in all directions. There is a feeling that an upward tendency in prices, as well as a higher range of values in real estate, in railway and other corporations, and in values of all kinds, is likely to take place. At the same time, there is a stronger conservative spirit visible in all channels of activity to-day than a year ago. The dangers of undue activity and undue speculation are apparent. The insurance interests, for example, recognize that they must reorganize their methods, take fewer extreme risks, cut down commissions and retrench wherever they can. The extraordinary fire-losses of last year are necessitating a different management and a retracing of steps, which competition has generated and stimulated. The cotton interests of the South find themselves face to face with problems never anticipated, at least, in the acute form in which they are presented. A diversification of crops is recognized to be their only salvation, and Georgia planters are already taking steps to go largely into the culture of tobacco. Mississippi and Louisiana planters and cultivators are also seeking an outlet in new directions. The cultivation of sugar will be very greatly stimulated. In the region of country west of the Mississippi the same tendency is apparent; that is, of seeking new sources of wealth through a diversification of crops. But the lumber, mining, manufacturing and lesser interests are assisting in that work, and, therefore, a more rapid growth of population and wealth is likely to take place in that region than in the Gulf States. Investors are recognizing this fact, and for this reason larger land operations are reported, and more companies are being organized for various commercial and manufacturing purposes. In fact, the drift of enterprise and capital is to the farther West, where land is cheaper, and where markets are likely to develop faster and absorb products of all kinds of industry faster than in the States east of the Mississippi, which are so much nearer Eastern sources of manufacturing supplies. This explains a fact which has been noted for a year or so past; namely, the relative decrease of interest in Southern as compared to Southwestern States. The railway managers throughout the Southwest recognize this increasing interest in that region, and are doing all they can to take advantage of it. In the South, land has doubled in values in many sections within two years. Towns have been boomed, and a multitude of enterprises have been projected and have absorbed capital, many of them without the possibility of a return to investors. Moneyed men in Eastern cities who have been looking for a general expansion of values for years are now more willing than they ever have been to take chances in the sections under development by new railway construction. Within two weeks past, railroads ranging from one hundred to three hundred and more miles in length have been projected: one in Alabama, to be 341 miles long, running from Florence to Mobile; another in Arkansas, 300 miles, to run from the northern boundary of the State to the southern; another in Georgia, to be constructed from Macon to Savannah; another in Iowa, to cross the State; another in Minnesota of considerable length, and one very important enterprise between Ogden, Utah, and San Francisco, by which the present route will be shortened 143 miles. Besides these, there are important railway enterprises in the State of Washington which are stimulated by the rapid development of that section of the country. In addition to these, there are a multitude of smaller railway enterprises, most of them endorsed and backed up by existing railway corporations able to do the work projected. These are only a few of the most recent evidences of reviving railway activity. Within the past thirty days, steps have been taken for the organization of concerns to manufacture railway cars, railway equipments, lake craft and building material. In addition to these, large contracts have been placed in two or three weeks for steel bridges, turn-tables, structural iron-work and general bridge-work. Evidences are not wanting of a genuine revival in the industries, but, at the same time, it is not necessary to look far to find many symptoms of weakness. Those who take a hopeful view of the situation regard these weaknesses as incident to the very rapid development of the country during the past two or three years. Much new enterprise has been entered upon without careful calculation; a vast amount of capital has been invested on what might be called a risk. The present dulness is simply the settling down and the shaking-together of the new productive agencies. It is not believed that there is an oversupply in any direction, but a vast amount of capacity has been added, and there must be a harmony, and there must be a sort of knitting-together accomplished, before the producing-interests can feel safe and secure.

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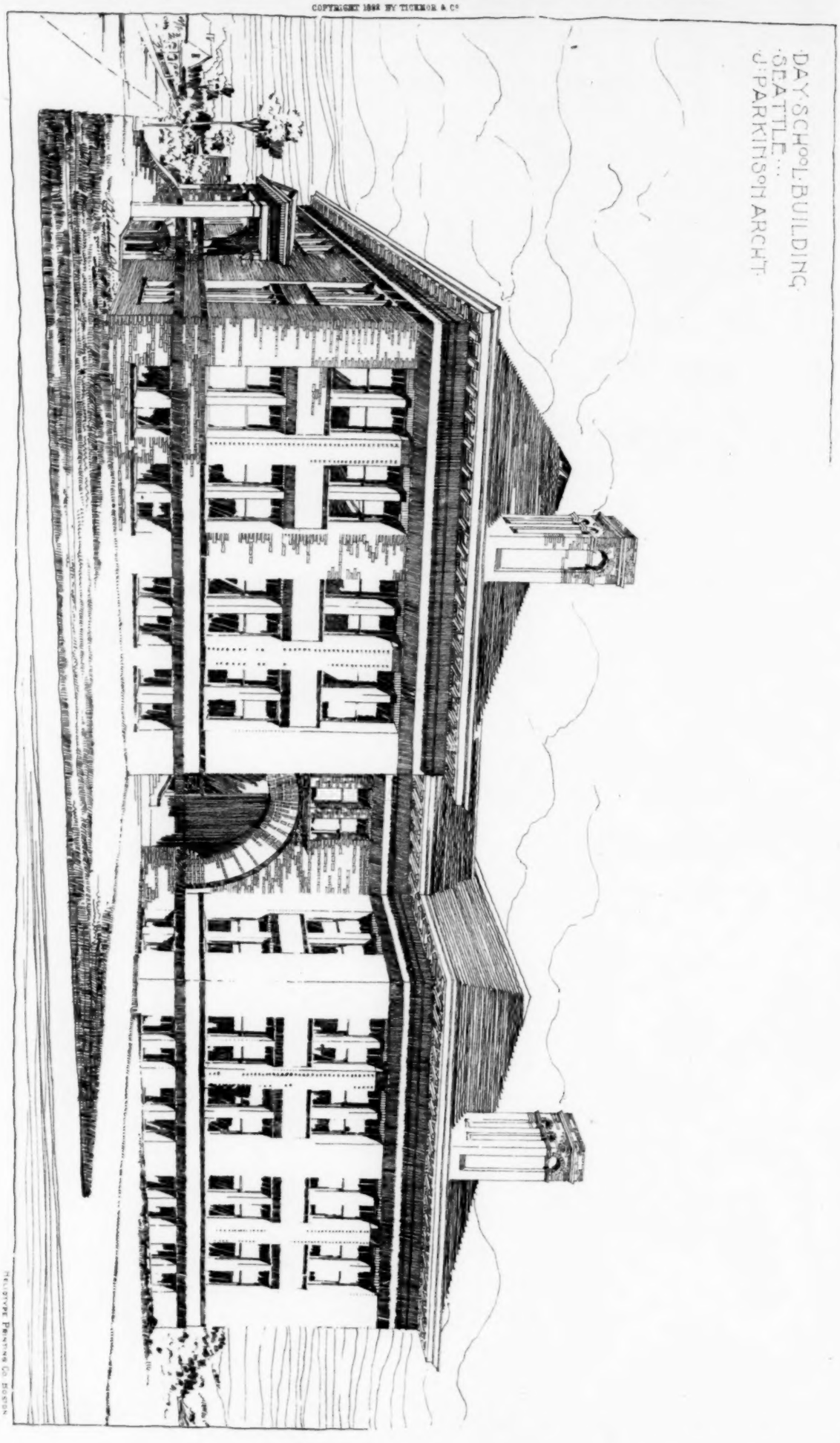

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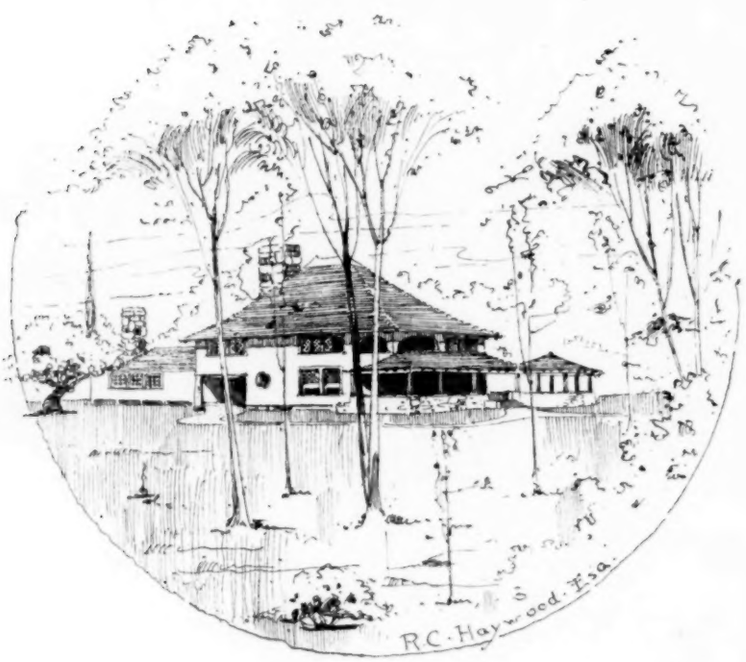

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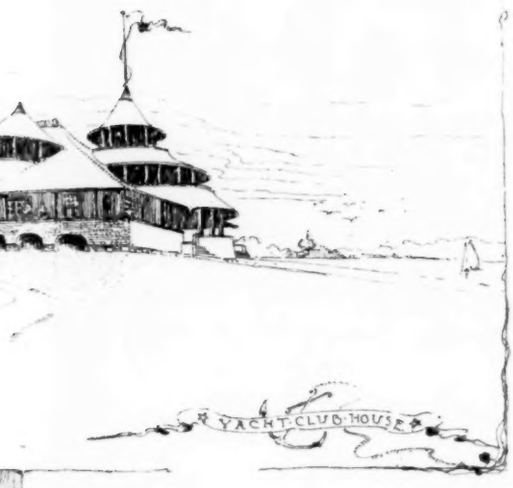

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