PRICE 15 CENTS.

5-5-94072

SEPTEMBER 8, 1894.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. XLV. * REGULAR EDITION * NO. 976.

ARCHITECTURE

ENGINEERING

DECORATION

CONSTRUCTION

211 TREMONT ST.

BOSTON MASS.

CONTENTS.

ILLUSTRATIONS.

Additional Illustrations in the International Edition.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XLV. Copyright, 1894, by the AMERICAN ARCHITECT AND BUILDING NEWS COMPANY, Boston, Mass. No 976.

Entered at the Post-Office at Boston as second-class matter.

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THE remarkable experiments carried out two or three years ago by the Massachusetts State Board of Health, which resulted not only in identifying, in the most satisfactory manner, the microbe of nitrification, whose existence was not even dreamed of fifteen years ago, but in collecting a great deal of information in regard to its habits, has already borne fruit. Some months ago, Mr. Sidney Lowcock, of Birmingham, read before the English Institute of Civil Engineers an interesting paper, describing the application by him of the results of the Massachusetts experiments to the purification of sewage. It was ascertained by the Massachusetts Board that the nitrifying microbe, contrary to the ordinary idea, does not live exclusively in loam, but prefers to cluster on particles of gravel, the gelatinous masses which it forms rapidly spreading over the surfaces of the particles, after a colony has once been established. In pursuance, apparently, of this idea, Mr. Lowcock arranged a sand and pebble filter, with air-pipes laid among the pebbles, so that air could be blown through them. By supplying oxygen in this way, the pebbles, after a colony of bacteria had established itself, soon became covered with them, and the efficiency of so large a number, in purifying water charged with nitrogenous matter, was very great. As all sewage contains isolated specimens of the microbe, all that was necessary was to allow sewage to run through the filter. At first, it ran through unchanged, but with the lodgment and multiplication of the wonderful little creatures, it became purer, until, in about a month, the pebbles became completely covered, and the purifying power was at its height. When this point was reached, Mr. Lowcock found that three hundred and fifty thousand gallons of city sewage per day could be treated on an acre of land, and that the effluent would be practically pure. This extraordinary efficiency, it is obvious, would make it easy for inland towns to secure purification by filtration, without the serious outlay for filtration-beds and service which has hitherto been necessary, and it is to be hoped that the knowledge of the new system may be disseminated as rapidly and as widely as possible.

THE new Attorney-General of Illinois has already acquired fame for his zeal in overhauling people who ignore or evade the laws; and, among other things, he has turned his inquiring eyes upon the high buildings in Chicago. It seems that a large part of these are owned by corporations which, as he thinks, have no right to hold such property. In Illinois, as elsewhere, the statutes forbid corporations from dealing in real-estate, the law looking with disfavor on the accumulation of landed property in corporate hands. Nevertheless, corporations formed for the purpose of carrying on other business are allowed to hold such real-estate as may be necessary for their business; and it is said that the companies which own the "sky-scrapers" have taken advantage of the statute provision permitting the erection by corporations of buildings "devoted to the arts," or to be used for safe-deposit purposes, to construct enormous blocks, in some portion of which is to be found an opera-house, or a concert-hall, or a safe-deposit vault of some sort, while the rest is devoted to offices, which are rented, the rents furnishing funds to pay interest on a large capitalization in stock and bonds. Although, strictly, there seems to have been some evasion of the law, it is a very innocent one, as the buildings do no one any harm, and, without the help of the concentrated capital of a corporation, they could hardly have been built. The investigation has, however, brought out the curious fact that a considerable proportion of these huge structures are on leased land. The practice of ground-renting land, singularly enough, appears to be more general in the West than in the East, but, independent of the other disadvantages of building on leased ground, it is notorious that buildings held on such tenure are not usually constructed in such a way as to leave much of value for the owner of the soil when the term of the lease expires; and the "sky-scrapers," of all buildings, ought to be most solidly designed.

MR. A. B. CROSS, one of the oldest architects in the West, died a few days ago in Kansas City. Mr. Cross was born in New Jersey, but settled in St. Louis nearly fifty years ago, and was for a time associated with Mr. Thomas Walsh. Afterward, he went to St. Paul, but soon returned to Missouri, and, after a short stay in St. Louis, came to Kansas City. Here he had lived for thirty-six years, during which the town had grown from an insignificant settlement to a great city. He was much employed, on important work, and was for many years conspicuous in the profession in the West.

THE death of Dr. Arnold Bürkli-Zeigler, one of the greatest engineers in Switzerland, should not pass unnoticed, especially as the deceased was closely connected with architects, and for many years held an important place in the direction of the *Schweizerische Bauzeitung*, one of the best of the Continental architectural periodicals. Arnold Bürkil was born in Zurich in 1833, and had almost always lived in that beautiful city, for which, through the systems of water-supply and drainage which he devised and carried out, and the water-front park, which was also designed and carried into execution by him, he did perhaps more than any other citizen had ever done. Bürkli studied his profession in his native city, and, at the age of nineteen, entered the service of the Cantonal department of highway and hydraulic engineering; but, a year later, he took a position as engineer on the new Zurich-Winterthur railway. After the conclusion of his work on the railway, he went to Berlin, where he spent a year and a half in the Bauakademie, or Building School; and then took a tour of study and investigations through Belgium, England and France. In 1860, he was appointed chief of the City Department of Roads and Bridges, and retained that post to the end of his life. His activity and knowledge made him prominent among professional men, not only in Switzerland, but, to a certain extent, throughout the civilized world. He was for sixteen years President of the Swiss Society of Engineers and Architects, and prominent in other professional associations.

IT is curious to find that the question of the value of slow-burning wooden construction in comparison with construction of properly protected iron has assumed serious proportions in Germany, as with us. It will be remembered that some months ago, the great "Hansa House," in Antwerp, a structure dating from the middle of the sixteenth century, was burned, with a loss of nearly a million dollars. Professor Max Möller, of the Technical High School at Brunswick, recently visited the ruins, which are not yet cleared away, and writes to the *Deutsche Bauzeitung* his observations. In the court-yards of the great building were erected, some nine years ago, immense "silos," or tanks, of iron plates riveted together like huge boilers, and

intended to hold grain. Although surrounded by a vast mass of blazing wooden flooring, these silos resisted the fire very well, and still stand like towers among the ruins, only the upper plates being wrinkled by the heat. As might be expected, however, the grain stored in them was completely ruined, first by roasting, and then by soaking with water; and Professor Möller says that if they had been surrounded with a protecting brick wall, they would probably not only have escaped injury themselves, but would have preserved their contents uninjured. In giving his reasons for this conclusion, and remarking that many warehouses are now in process of erection in the various German and Dutch ports, in which vast quantities of valuable goods will be stored, he observes that the fire-insurance companies stand in the way of improvement in their construction, by condemning indiscriminately all iron structural work, and advocating the use of wood alone for timbering and flooring, without trying to ascertain the reasons why the earlier iron buildings have failed to resist fire. The consequence of this is, as he says, that only half measures are taken in warehouse construction, instead of adopting boldly the system now recognized as the best and most efficient of all, consisting in the protection of all structural ironwork, and the shutting-off of each story from the rest by waterproof and fireproof floors, and smoke-proof doors between it and the enclosed staircase.

SOME of the most extraordinary agricultural experiments ever undertaken, considered both practically and scientifically, are described in *Le Génie Civil*. Every one who has ever owned a lawn knows that to plough the ground at intervals, and raise a crop of certain vegetables, improves the subsequent growth of grass; and a drive through the suburbs of any large city will show lawns undergoing this treatment, sometimes with a crop of potatoes, sometimes with beans, according to the notions of the owners, or their gardeners. The process by which this alternation of crops improves the soil has never been very clearly explained. Most people suppose that the repeated digging up of the earth, to plant the potatoes, and harvest the crop, is the secret of the success of the treatment, but chemists have fancied for many years that, in such rotations of crops, one set of plants might have the power of absorbing nitrogen from the atmosphere, and conveying it to the soil. With this idea, a long series of experiments was carried out, fifty years ago, by the greatest chemists in Europe, who analyzed various plants, the air in which they grew, and the soil, before they were planted, during their growth, and afterwards, and came to the unanimous conclusion that the absorption and storage of nitrogen by growing plants was an impossibility.

FOR all this, farmers continued to observe that certain plants, particularly of the leguminous tribe, such as clover, lucerne, sainfoin, and some others, instead of exhausting the soil, seemed to enrich it, so that, even after the leaves and stems had been cut and carried away, the roots alone, left in the ground, sensibly increased its fertility. Analysis showed that these roots contained a considerable quantity of nitrogen. If, according to Boussingault, Lawes, Gilbert and others, it was impossible that this nitrogen should be derived from the atmosphere, it must be drawn from nitrogenous matters in the soil. The inference would be, in this case, that nitrogenous manures would be beneficial to crops requiring so much nitrogen for their growth; yet it is well known to farmers that these plants not only derive no benefit from nitrogenous fertilizers, but are injured by them, while, although, through the nitrogen contained in their roots, they improve the soil greatly for succeeding crops of other plants, they injure it for themselves; and leguminous crops, cultivated too long in the same ground, become sickly. It was not until a few years ago that science and observation were reconciled, by the persistent investigations of MM. Hellriegel and Willfarth, who demonstrated beyond question the fact that the leguminosæ do, in growing, absorb large quantities of nitrogen from the air, but with the singular condition, that the absorption of nitrogen begins only with the appearance of a diseased state, which is marked by the development of tubercles, about the size of a millet-seed, on the roots, and is, apparently, caused by minute animals, which are always found in the tubercles, and seem to give the plant the nitrogen-absorbing power. Further investigations showed that the young, healthy plants lived on the nitrogen already contained in the soil, and that it was not until this was exhausted, and the plants began to suffer, that the nitrogen-absorbing excrescences made their appearance; and proved, also, that the tiny inhabitants of the tubercles were, as a rule, confined to one species of plant, the acacia microbe, for example, refusing to live on the bean, or the clover microbe on the lentil.

IT is evident that a plant capable of absorbing nitrogen, which is a costly, as well as indispensable adjunct to farming, and of storing it up in the soil for its master's profit, is a valuable possession; and, as only diseased plants have that property, it is obvious that it is desirable to spread the nitrogen-storing disease. With this view, several skilful farmers in France and Germany have, within the past two or three years, been trying experiments, by "vaccinating," as they say, fields of leguminous plants, by sprinkling them with earth in which tuberculous plants have been growing, or water in which they have been soaked; and the results have been extraordinary. Analysis has shown that a single crop of tuberculous leguminosæ, if the tops are ploughed in, adds to the soil from five to twelve thousand pounds of nitrogen, worth from eighteen to forty-five dollars, to the acre; and even when the tops are cut and carried away, there is enough nitrogen left in the roots to ensure a good crop of cereals on the same ground the next season, without other fertilizer. In 1890, a tract of old, peaty soil was "vaccinated" with a ton and a half to the acre of earth from a diseased field. Besides this, five hundred and twenty pounds to the acre of scoriæ from a dephosphorating furnace were spread over the ground, and about a thousand pounds to the acre of kainite, but very little nitrogenous manure. The tract was then sown with clover, which produced nearly three tons of hay to the acre. The next year, a virgin peaty soil was treated with half a ton to the acre of sand, from a field which had borne a crop of "serradelle," a small leguminous plant, unknown to us. This sand was harrowed in. No other manure of any kind was put on. The ground was sown with winter rye. In May, thirty-five pounds to the acre of serradelle seed was sown among the rye. The rye produced a good crop, and, after the harvest, the serradelle, which had absorbed and fixed about sixty pounds to the acre of atmospheric nitrogen, was ploughed in, as green manure. The next year, the land was planted with potatoes, and similar potatoes were planted in neighboring fields, which had not had the new treatment, but were simply enriched with barn-yard manure. At the harvest, the yield from the vaccinated fields, which had received no other manure, was from twenty-eight to sixty-two per cent greater than from the manured fields, according to the variety planted. The most surprising result from the treatment appears, however, to have been obtained in Prussia, where a tract newly brought under cultivation was divided, and part vaccinated with earth from a lupin field. The whole was then sown with lupins; and the yield from the vaccinated portion was five and one-half times as great as that from the other portion, for equal areas.

THE programme of competition for designs for the buildings for the Paris Exhibition of 1900 has been issued. The competition is restricted to French architects, and the designs must be submitted by December 15, next. The programme gives the surface to be covered to accommodate the different groups of objects exhibited, the whole amounting to three hundred and ninety-two square metres, or about one hundred acres. Of the eighteen groups into which the exhibition is to be divided, the largest is that of "works of art," which will, according to the programme, require fifty thousand square metres, or about thirteen acres. Threads and Fabrics come next, with fifty-five thousand; and Civil Engineering third, with forty-four thousand. Instruments and Processes of Science and Art, and Mechanical Processes and Material, have two separate buildings, aggregating only forty-nine thousand square metres, which seems small in comparison with the mighty Liberal Arts Building at Chicago. The subsidiary buildings, of which there will probably be a large number, are not included in the list.

IT is interesting to learn that the place of M. Edmond Guillaume, as architect to the Palaces of the Louvre and the Tuileries, has been filled by the appointment of M. Paul Blondel. M. Blondel, it is hardly necessary to say, was a winner of the Prize of Rome, and, as such, entitled, by French usage, to the first right to Government appointments of the sort.

PARIS

THE COMPETITIONS FOR THE PRIX DE ROME. — JUSTIFICATION OF THE METHODS ON WHICH THESE TRIALS ARE CONDUCTED. — THE RESULTS THIS YEAR. — THE LATE EDMOND GUILLAUME.

AFTER the annual Salons, the chief interest to Parisian lovers of art centres on the struggle for the several Prix de Rome. It is the last struggle, the last effort before the vacations, all the more interesting because one wonders each year whether any one having real talent is to be thus discovered. But each year, or nearly so, there is found only the same sort of good work that shows that the pupil has profited by his master's lessons, but discloses never a glimmer of true originality. And because of this, numerous critics are prolific of lamentation, and profit by the occasion to demonstrate once more the absolute inutility of the École des Beaux-Arts and, even, its baneful influence. Resting their case on what they are pleased to call the results, they accuse it of not giving any real freedom to the natural inclinations of the artists, of hampering their struggle after the new and unpublished, of drawing them — always by well-trodden paths — over the sacred road of academic routine. And, very naïvely, they cite in support of their contention the names of certain modern artists who have known how to free themselves from the formulas of the School, and have been obliged to forget the instruction they had received and the methods they had learned before they could recover their own personality, and give free rein to their imagination, or pursue their own manner of interpreting nature.

Is this method of judging or, rather, of condemning the École des Beaux-Arts a just one? We answer yes, if at the École one is taught a trade. We answer no, if one there learns the elements and the bases of an art to which one can later give a personal imprint only by using these basic elements in a special and personal manner. But the elements themselves are immutable. Before one can read he has to learn the alphabet, before he can write he must know his letters and the value and significance of words, and be exercised in the use of phrases. Later, with the same words, with the same tongue, which are so expressionless when used by an ordinary man, the real artist evokes personal sensations; he becomes a literateur, poet, orator. It is not the School that makes the artist, it but gives him the means of becoming one. It gives him the instrument; he has to apply the mechanism; he has to draw from it the sounds and produce the impressions.

The École des Beaux-Arts furnishes the instrument, the mechanical and scientific side of the art. And in spite of all the new and subtile theories of the so-called reformers, the practical side cannot be neglected. Drawing is the base of both painting and sculpture; it is, according to the expressive saying of Ingres, "*la probité de l'art.*" Well, at the School one learns, or ought to learn, to draw. Drawing is the instrument, color is the expression, and by color there is no need to understand red, green, yellow, blue, etc., a charcoal drawing has "color" when it is the work of an artist. I feel, then, that the real need is to ask these scholars who are leaving the École des Beaux-Arts to prove that they know how to use the instrument with which they have been furnished, that they know how to draw a nude male or female figure without anatomical fault: that is the main thing. The matter of "movement" has its importance; the matter of "expression" is, for the moment, quite a secondary affair. It will come later, it must come, if one is to be truly an artist, but it is not necessary that it should show itself quite so soon. Unless it is innate, when it is the possession of genius, personal expression is formed little by little, by observation, by thinking, by the study of life in its joys and in its griefs. Can one properly demand that an artist as he leaves the School should show the full measure of his talent? He would then have nothing more to learn, and, in that case, art would be a mere trade. The fact is quite otherwise. The way opens before him, unknown to us the public, foreseen only dimly by him. Most often he discovers the right path only after many experiments, many blunders, many struggles. In such event the School teaching seems, to superficial observers, to have been forgotten or even despised because all trace of it seems to have been lost. But it is there, all the same, at the foundation of his efforts; it has been the point of departure, far removed it may be, but from which the start must be made. Beneath the decorative treatment, attractive because of its lightness and apparent simplification, one can still discern the scrupulously-exact draughtsmanship which forms the indispensable point of departure. This is the reason why the programmes for the Prix de Rome are drawn from Classic and Ancient History.

I do not defend the practice which its detractors consider a mere matter of routine. I merely explain it, and I really believe it has not the serious defects that are ascribed to it. It is asserted that the imagination of the competitors is not stimulated, while the interpretation of human feelings is often made unduly difficult. These programmes are called "cold," and I feel that they are. But the real question is to decide whether it is really useful to excite the imagination of the contestants. One does not seek to stimulate an artist's imagination; it creates its own excitement. It may be excited, it is true, but involuntarily — by a word or a suggestion of ours, which the artist seizes on without stopping to ask our leave. A programme may inspire the artist's feelings, but it may inspire it quite outside the principal subject demanded, and if this secondary inspiration is worth more than that indicated by the programme itself, the artist will find himself placed *hors concours*, in spite of its good qualities. This would be an injustice from the point-of-view of sheer art, and this is why the competition for the Prix de Rome, which is really a school competition, had logically to be judged according to the school standard in drawing, modelling and movement.

The subject of the competition in painting this year was "Judith presenting the head of Holofernes to the inhabitants of Bethulia." It is a fine programme when considered from the standpoint I have indicated. To demand that a pupil graduating from the École should express the sentiments that agitate the bosom of Judith would be audacity itself; but to require him to show this subject in a painting well-drawn, the figure clad in raiment which the epoch allows to be reduced to the least possible quantity, so that the anatomy of the figures can be well shown, is to allow him to prove his talent for composition and the *mise en scène*, and is entirely proper.

The competitors this year clearly proved that this was all that could be expected from them. They have enabled the jury and the public to foresee that here were men likely to become real artists without affording them the possibility of giving their definite names.

The First Prize was won by M. Leroux, a pupil of Bonnat, and the Second First Grand Prize was carried off by M. Dechenaud, pupil of MM. Boulanger, Lefebvre and Benjamin Constant, and next in rank came M. Laparra, pupil of Boulanger and Robert Fleury, and M. Benner, pupil of Jules Lefebvre, Benjamin Constant, Henner and Robert Fleury.

The competition in sculpture equally supported the arguments I have advanced. Here, too, the competitors showed the good qualities of pupils — a great accuracy in the method of holding the modelling-tool, and a real knowledge of the muscles of the human body, but in all cases there was a lack of sentiment and expression. They were given for their subject "Achilles, inflamed with anger at the death of Patroclus, begins to put on the armor which his mother, Thetis, brings him."

This programme, too, lends itself to a fine movement of anger and does not preclude a certain air of grandeur. The danger in it, and it is one which most of the aspirants have not known how to avoid, is the temptation it offers for exaggerating the movement, and representing Achilles in the guise of a demoniac, or one disguised in liquor, well-built, of course. The First Grand Prize, M. Roux, pupil of Cavelier and Barrias, exhibited individual qualities. The other prizes were obtained by M. Champeil, pupil of Thomas and Gauthier and by M. Boucher, pupil of Falguière and Mercié.

With architecture, it is not the same as with painting and sculpture: it is a more positive art and one forced to conform itself to practical exigencies, one before which fancy and imagination must bow. The architect, in place of learning first of all his trade, like the painter, pursues at the École studies which develop his taste and imagination. Practice comes later to put a curb upon the unrealizable offsprings of his imagination. Hence, they give to the architectural competitors for the Prix de Rome programmes for grand works in which they can give free rein to their artistic temperament without having to concern themselves with anything else than composition. The matter of cost does not concern them at all, and the necessities of construction are often treated in the most cavalier fashion. It must, nevertheless, be acknowledged that for some time past the programmes have been growing more and more modern. The one this year was a "Central School of Art and Manufacture" which had to provide two great divisions: that for the sciences subdivided into three sections corresponding to the three years of the curriculum, while the other division provided for a military school with its gymnasium, riding-school, parade-ground, etc.

Almost all the competitors arranged the three sections of the division of Arts and Sciences about three sides of the grand central court, and provided at the rear the space and buildings needed for military exercise. The First Grand Prize was carried off by M. Recoura, pupil of Pascal, the second by M. Patouillard, pupil of Ginain, and the third by M. Hérand, pupil of Raulin.

A former Grand Prix de Rome, M. Edmond Guillaume, died recently, in July. He was born in 1826, and entered the École des Beaux-Arts in 1845, in the atelier Lebas, obtaining, in 1855, the Second Grand Prize with his scheme for a conservatory of music and declamation. In the following year, he secured the Grand Prize with his design for an Embassy at Constantinople. After his return from Rome, Guillaume became architect of the Archives Nationales, and between 1876–78 built the great building on the Rue des Archives. He replaced Questel as architect of the palace at Versailles, and amongst the work there restored the hall of the Jeu de Paume. At the death of Lefuel, he was appointed architect to the Louvre and Tuileries, and to him is owed the decoration of the hall of modern French masters, the halls for the Collection Dieulafoy, and the Daru staircase, the mosaic ceiling of which excited such lively

controversy. He also created the new garden which occupies the site of the Tuileries. In collaboration with the sculptor, Doublemart, he gained the competition for a monument in commemoration of the defence of Paris, erected on the Place Clichy, and he and the sculptor, Cugnot, designed the commemoration column at Callao, Peru. With M. Renaud, he rebuilt the Hôtel de Ville at Cambrai, while individually, he designed a number of tombs, hôtels and houses. While professor of the Theory of Architecture at the École des Beaux-Arts, he published several works.

Taken all-in all he was a most amiable artist, and much respected by his confréres in the Société Centrale des Architectes Français, which he joined in 1866.

SPECIFICATION WRITING.[1] — II.

BRICKLAYER. — [REFER TO GENERAL CLAUSES.]

Who supplies scaffold? who furnishes water?

Bricks: — For cellar, piers, facing, backing, footings.

What kind and color? any particular make? how laid? what kind of mortar? If for footings, width, number of courses; what racking?

Bonding: — Old English? Flemish? behind facing? every fifth course headers?

Moulded-bricks: — Make, color, kind. Catalogue number. Specify all inside and outside returns. Any lead-covering on moulded-bricks?

Building in blocks, strips, frames.

Levelling for joists, sills, frames, heads, plates.

Chases for pipes, flues, posts.

Arches: — Flat, semicircular, arch-head, elliptical, segmental.

Bricks ground or moulded?

Mortar: — Cement? — what kind? with sand? what proportion?

Cement tests: — Boiling, tensile, compression — what fineness? what mesh?

Lime-mortar: — What lime, if any preference? what sand? what proportion?

Colored mortar: — What color? any particular make of color?

Trimmer hearths. Ash-pits. Foundation for range. Bricking of heater.

Fireplaces: — Backs and sides; what kind? state price; any dampers?

Inside hearths; what kind? specify round hole and plate.

Outside hearth; what kind? name price. Omit place in other trade?

Brick finish on face of chimney breast? what brick?

Any porch-piers? columns? any special chimneys? any brick-pavements?

Walls to be built from outside scaffold or overhead from trestles?

Clean walls; oil walls?

Cisterns: — Brick? cemented? man-holes, covers; padlocks? guarantee tightness.

Any fireproofing: — Hollow tile? porous terra-cotta? brick arches?

Specify sizes.

Any damp-proofing: — Inside furring bricks?

Any damp-proof under walls — asphalt? slate in cement?

Terra-cotta: — Name of maker; specify parts to be terra-cotta. Specify straightness, color, even shade, square joints.

Modelling. Omit? name price?

Old material: — Clean and pile? use headers and bats? to be contractor's? owner's? reused, or carted away?

Wet bricks before using; how?

Any joist-hangers or sockets? if so, notify bricklayer to build in.

Underpinning, see "Mason."

MOSAIC FLOORS AND WAINSCOT. — [REFER TO GENERAL CLAUSES.]

Name price per foot.

Specify kind and pattern.

Marble wainscot? floors? kind? thickness? finish?

Other marble-work, if any.

Tile hearths? facings? Name price per foot set. Floors, wainscot — mosaic?

CEMENT FLOORS AND PAVEMENTS.

Specify method; thickness; who fills to cement level?

Name kind: — Granolithic? metallithic? any other make? require guarantee.

CARPENTER. — [REFER TO GENERAL CLAUSES.]

Does carpenter superintend work? give sizes, heights, etc., from drawings.

Who supplies scaffold for mason? for bricklayer? centres for arches? strips for furring? blocks for finish?

Joists: — Kind, sizes, backing and lining, where used? Porch?

Framing-hangers, double-trimmers, headers, double under partitions.

Framing for hearths, flues, stairways, lifts, skylights.

Bridging, kind; how often? what sizes?

Any hangers or sockets? what kind? whose make?

Joists adzed for tile-floor or mosaic?

Floor cut-in for tile-flooring or mosaic?

Girders: — Kind, sizes; bolted or spiked? framed level? or under joists? cleated?

Mill-construction: — Sizes of beams, material, plank floor, splined.

Top floor: under-flooring specification.

Posts: — Rough? turned? What kind? any bolsters? any brackets or struts?

Studs: — Material, sizes, double at corners? at openings? Pockets for sliding-doors, line them?

Studs at corners of building: — Material, sizes, braced, what kind? Heads to partitions? Sizes.

Sill: — Sizes, material, bed in mortar; bolted to wall?

Girts: — Sizes, material; let into studs?

Plate: — Sizes, material.

Sheathing: — Material, thickness; surfaced? matched? laid diagonally?

Sheathing-paper: — Kind, trade, thickness.

Rafters: — Sizes, material, framing. Outlookers? rafter-ends cut to shape?

Trusses: — Describe fully with all rods, bolts, plates, shoes, etc.

Purlins, valley-rafters, hips: — Sizes, materials.

Roof-covering: — Sheathing, same as above. Paper: kind, trade-thickness. Shingles: lengths, widths, weathering, quality; trade-terms? shapes?

Gutter-strips: — Size; iron-brackets screwed on?

Eaves-troughs: — See "Tinner."

Rough framing for cupolas, ventilators, trap-doors, cellarways, stair-horsings, porch-floors: sizes, material.

Rough doors: — Cellarway, trap-doors, thickness; dressed? matched? battened? hinged? fastenings.

Flooring: — Material, quality, thickness.

Kind: combsawed? blind-nailed? face-nailed? width; matched? scraped? planed-off all over? joints struck? put down after plastering; screwed-down over pipes and wires.

Rough floor under: kind, thickness, diagonal?

Ceilings: — Walls, lined? air-shafts, well-holes, elevator-shafts, dumb-waiter shafts, lined or cased? material; quality; beaded? matched? moulded? panelled?

Stalls: — Material; posts, turned? material. Loose boxes? standing stalls? wood-carpet? parquetry?

MILLWORK (IN CARPENTER).

Cupolas, ventilators. Mouldings, posts, caps, louvres, finials, rails, balusters, cornices.

Box-frames: — plank-front? reveal; solid-heads? jib-heads? yellow-pine sills, parting-strips, sash-beads; veneers on box-faces?

Twin frames; triple frames: double-hung weights?

Outside shutters? outside blinds? thickness, material, hinges, all hardware.

Inside blinds? thickness, material, panelled? rolling-slats? hinges; all hardware.

Rolling-blinds? kind, material; look out for pockets.

Casement-frames: — Thickness; moulded? transoms?

Sash: — Sizes, material; any jib-head sash?

How hung: with hinges? lead-weights? iron-weights? sash-balances? brass tape? bronze-chain? cords?

How fastened? look out for right kind.

Fly-screens: — What make? special? thickness, kind of wire.

Inside-sills: — Kind, material; moulded?

Aprons: — Kind, material; moulded?

Architraves, plain? with band? with cap? Material: any variation through building?

Washboards, sizes, size of cap. Sub, sizes, if any. Material: any variation through building?

Jamb-casings, head linings: material, plain? moulded?

Rebate-strips? sizes, material.

Boards for pipes: — Material; moulded?

Casing over chases for pipes: — Panelled? screwed; brass-screws?

Shelving: — Material.

Pin-rails: — Material; hooks? wooden pins?

Dressers: — Pantry: with glass doors? panelled doors? hardware; material.

Kitchen: Material, hardware; drawers? cupboards under?

Drain-boards: — Material.

Porches: — Describe fully: mouldings? turnings? brackets? carving? lump sum? name carver? omit? contractor to supply material for carving?

Front-door: — Frame: size, material; panelled-jambs? Transom? moulded? transom sash: thickness, pivotted? hinged? fixed? all hardware.

Doors: thickness, material, moulded? panelled? with glass? double? single? Dutch? [if Dutch, look out]. All hardware? If hardwood, veneered.

Vestibule-doors: — Side-lights? fixed? sash? thickness. Transom, moulded? Transom sash: thickness, pivotted? hinged? fixed? all hardware.

Doors: thickness, material; same as front door? for glass? all hardware. If hardwood, veneered.

Inside-doors hung: — Thickness, material, number of panels; moulded? all hardware.

Closet-doors, same? all hardware. If hardwood, veneered.

Sliding-doors: — Thickness, material, number of panels; double or single? astragal or rebate joint? with edge strips? all hardware. If hardwood, veneered.

Doors to water-closets: — Slat? panelled? short? spring-hinges? all hardware.

Doors to shower-baths: — Slat? panelled? short? spring-hinges? all hardware; material.

Wainscot: — Thickness; mouldings? panels? note carving, if any.

Outside-steps: — Framing, material, moulding, setting.

Cornices, Pediments: — Material, quality, mouldings, brackets; any carving? lump sum? omit?

Stairways: — Back stairs: treads, nosed, risers, string, housings; open string? rail, balusters, posts, mouldings.

Main stairs: lump sum? without horses? without finishing?

Water-troughs: — Material, ploughed-joints? white-leaded? straining-rods?

Feed-bins: — Material; zinc-lined?

Mantels: — Price fixed? omitted?

Elevator-screens: — Material.

Dumb-waiters: — Kind, make; price allowed? omitted?

Sliding sash-partitions. Pulpits. Altars. Altar-rails. Pews.

[1] A lecture delivered before the Architectural Department of the University of Pennsylvania, by Mr. T. Roney Williamson, architect. Continued from No. 975, page 81.

Benches. Vestment-lockers. Choir-lockers. Reredos. Hotel-counters. Desks. Bank-partitions. Bank-counters. Counters. Store-fixtures. Show-cases. Bookcases. China-closets. Harness-closets. Picture-mouldings. Ceiling-beams. Panelling. Does carpenter close-in openings with muslin in cold weather before glazing?

PLUMBER. — [REFER TO GENERAL CLAUSES.]

Permits. Sewer-connections. Board of Health rules.

Drain-pipe: — Jointing, cement, sizes, kind; for soil; for rain-conductors.

Is drainage to city sewer? well? flush-tank? who digs? where?

Is drainage Waring's system? done by patentee or plumber?

Soil pipe: — Size, weight, trade weight or mark; coated? all fittings; trap, running-trap, clean-out, lead-joints; carry soil-pipes through roof; any anti-siphon pipes? test soil-pipes to three pounds' pressure.

Supply-pipe from main: — Material, size, joints — wiped if lead, screw if iron galvanized; stop-and-waste; pave wash; if lead-pipe, give weight per foot.

Supply-pipes in house: — Sizes, materials, to each fixture; lateral runs below floors; stops-and-wastes on rising branches; tags on faucets; boiler-connection, hot-water supply, proper supports, brass-ferrules for lead connections, wiped-joints on lead-pipe. Pipes exposed? if so, nickel, or bronzed?

Tank: — Wood? cedar, size or number of gallons; number hoops; iron? painted? galvanized? size, number of gallons; overflow; drain, where to? stop on drain-pipe.

Safety tray: — Lead? zinc? number pounds to foot; waste from same to cellar-floor? to outside building?

Waste-pipes: — Material, sizes; when exposed, nickel-plated brass? lead? give weight; galvanized-iron? cast-iron coated? give trade weight; carry waste through roof, anti-siphon pipes? does waste join soil-pipe? any grease-traps? — brick or at fixture? does waste run separate to well? to sewer?

Traps: — On all fixtures; what kind — "Bennor?" "Cudell?" "Puro?" "Bower?" brass? lead?

Fixtures: — Give catalogue page and numbers if possible, and how many of each.

Water-closets: — Include seat and lid? cistern? marble under water-closet?

Bath-tub: — Cased? splashboard? what kind? marble under? what waste? what faucets? sprinkler? silver or nickel?

Washstands: — Iron? marble? exposed? apron, brackets or legs? bowl — oval? round? size; decorated? plain? waste fixture, what kind — silver-plated? nickel? faucets — what make, silver or nickel?

Hip bath? — What kind? silver or nickel trimmings?

Shower-bath: — What kind? silver or nickel trimmings?

Pantry-sink: — Porcelain? copper? enamelled-iron? exposed? kind of faucets; make; silver? nickel? brass?

Kitchen sink: — Size, kind, make, legs? brackets? back? faucets, kind, make; brass?

Stationary wash-trays: — What kind — soapstone? enamelled-iron? porcelain? wood? indurated-fibre? with lids? what wood? what faucets — brass?

Urinals: — What kind? make? with marble or slate backs, floors, sides? Automatic, or with faucets? Waste from floors.

Slop-sinks: — Galvanized? painted? enamelled? porcelain?

Any marble or slate enclosures for water-closets? marble floors?

Do washstands stand in rows? marble tops jointed or in one?

Are shower-baths enclosed in marble or slate partitions?

Circulating-boiler: — What make? self-cleaning? on stand? on wall? waste; sediment-cock; galvanized-iron? copper? copper connections? galvanized-iron connections?

Range: — Stationary; who sets? portable? slate-bottom? slate-hearth? zinc-hearth? plate-warmers?

Hotel-fixtures: — Broilers, boilers, steam-cookers, plate-washers, mangle, washing-machines, hot-tables?

Gas piping: — Permits. Comply with Gas Company's rules and regulations. Test system. Cap outlets. Pipe to grade to meter connection; stop-and-waste. No drops in pipe to outlets. No cutting of joists at greater distance than one foot from bearing. Measure for all outlets to centre of ceilings or heights and position on walls. No pipe smaller than one-half of an inch. Specify sizes of mains and branches. Are pipes to be exposed?

Any hot-water heaters: — Who supplies? who connects — heater-contractor? or plumber?

Any stable? bell-traps, stalls, gutters.

Hydrants with stop-and-waste below frost?

TINNER. — [REFER TO GENERAL CLAUSES.]

Roofing: — Flat-joint? standing-groove? cleated? tinned nails.

Quality of tin, branded? IC? IX? painted? what kind of paint? paper under, what quality and make, trade thickness.

Flashings: continuous, width; broken? sizes, around chimneys, nailed? bonnetted?

Around skylights, carried-up under galvanized-iron or under sashes, if wood.

Trap-doors, up rim, tacked to top edge, over scuttle down sides of rim.

Gutter-strips: Twenty-inch tin, same quality as roof, brought once over edge of strip, tacked, paper under, same as roofing. Cut for rain-conductors.

Eaves-troughs: Quality tin? bead-edges? hung level? hung with grade? kind of hangers.

Rain-conductors: kind, size, quality, trade thickness, connect with gutters, wire-balls; do conductors connect with terra-cotta pipe or discharge on ground? proper shoes.

Heat-boxes: — Quality tin, bright tin, cleated, stayed, sizes, collars for registers, for heater-pipes, for radiator-boxes, asbestos-paper around studs, wire-lathing over boxes, dampers, boxes double?

Registers: — Does tinner supply or does plasterer or heater-contractor? kind, sizes.

Tin shingles: — Any particular make? painted two coats when on.

PLASTERER. — [REFER TO GENERAL CLAUSES.]

Lathing: — White-pine? spruce? hemlock? free from bark, sap. Wire-lathing? — stiffened?

Other lathings: Dovetail iron? expanded metal? Are outside walls stripped? Wire-lathing over heat-boxes, or does tinner do this?

Mortar: — Lime, any make?

Sand, for brown coat? bar — ? road? creek? bank — ? screening?

Hair, cow's hair, fresh. Run mortar two weeks before using.

Kind of plastering: — Two coat? slip coat? three coat? with scratch coat, brown coat and finish coat? white coat? white sand. Sand float? white sand? Lath and brown coat cellar ceiling

Plastering free from cracks, blisters, wind, marks of float. Must stop, or is heat provided in cold weather? Who provides heat? does plasterer set registers? crocks for stove-pipes with caps and setting.

Ornamental-plastering: — Cornices — enriched? centre-pieces? panels? moulded? enriched? coved ceilings? Arches or arch moulds? soffits?

Patent-plasters: — What kind? make? guarantee.

Fire-protection: — Over beams, over columns, woodwork, what kind?

GALVANIZED-IRON. — [REFER TO GENERAL CLAUSES.]

Cornices, crestings, finials. Weight of iron or No. guage; painted before setting inside and outside. What paint?

Skylights: — Hyatt's patent? ventilating? condensing? glass? does painter supply? ventilators, attachments for handling, rods, levers, cams, shafts, cog-connections. Show shapes on drawings; flat? pitched one way? hipped? gabled?

ROOFER. — [REFER TO GENERAL CLAUSES.]

Tin-roof, under "Tinner."

Slate: — Quality, quarry, sizes, color, grade, weathering. Tinned-nails, two to each slate, double at eaves, blind hips and ridges, cemented? snow-guards? — wire, at each joint, or other form of guard?

Tiles: — Kind, quality, bedded in hair-mortar? copper-nails? copper-wire? pattern, shapes, color. Any conical roofs? special tiles. Tile-crestings, hip-rolls.

Tin-shingles: — Make. See "Tinner."

IRON-WORKER. — [REFER TO GENERAL CLAUSES.]

Stirrups, joist-sockets, bolts, rods, washers, shoes for trusses, upset ends, anchor rods and plates, straining-rods, bearing bars for openings. Iron carpet-strips, iron-bricks for screwing onto. Manhole rims and caps, cellar-gratings, window-bars, grilles, painted; patent process?

Store-gratings, galvanized? with hasps? padlocks?

Pavement hoist doors, cellarway doors, with glass? brass-hinges?

Archimedean-lifts for cellar-doors?

Iron-stairs: Rails, posts, iron-treads, risers, rubber-tops? marble or slate treads and risers? in cut stone?

Steel-beams: — Lengths, widths, weight, angle-plates, connections, bolts, rivets, for floors, to have bearing-plates, painted before setting.

Columns, cast: — thickness, bore for test, planed tops, bottoms, caps, bases — loose? drilled for bolts.

Columns, wrought: — kind, make, length, required strength.

Brackets, struts, wrought? cast? for bolts? cornice-rods.

Clean-out doors. Ash-pit doors.

Fireproof-doors, vault-doors, no burglar-proof, — give all dimensions, thicknesses, fastening.

Iron-shutters: — lugs for hinges? built-in? open from inside? open from outside?

Wrought window-frames? sash? sills outside? heads outside?

Iron-trusses refer to details, separate specifications. For trusses, contractor submit drawings.

Chimney-stack cap — cast-iron? wrought-iron? bolted? Expansion-bolts. Fire-escapes? Iron-gates, railings. Harness-hooks.

Feed-boxes, steel-wrought? cast-iron?

Iron-mangers: cast? wrought?

Water-troughs: This specified elsewhere.

Stall-guards: wire galvanized? cast-iron? wrought-iron?

Heavy-wrought strap-hinges, special?

PAINTER, GLAZIER. — [REFER TO GENERAL CLAUSES.]

Old work: — Burn off? wash off? sandpaper? Putty-stopping nail holes, cracks. Shellac stopping knots, sap.

Painting: — To sandpaper woodwork. Priming. Three coats paint. How many colors tints?

What kind of paint: Mixed or ground? what lead? any zinc? what colors? any make? all paint to have white-lead body? any ready-mixed paints? what make?

Ironwork painted? how many coats?

China gloss-painting? how many coats?

Enamel-paints: on tub? on walls?

Paint to be gloss finish? paint to be dull finish? painter to protect floors, stonework, etc. while painting.

Natural-wood: — Varnish: Any particular make? how many coats? Rub each coat.

Finish: Full gloss? dull polish? egg-shell finish? floors varnished? or wax finished?

Stained: What color? Putty-stopping, colored to match wood.

Shingles stained: What make of stain? what color and number?

Porch floors painted? Porch ceilings painted or varnished? Walls or ceilings painted? sized? how many coats? colors?

Glazing: — Any floor-lights? rough-plate? how thick? Any skylight glass? rough-plate? how thick? In galvanized-iron specification?

Plate-glass, specify windows, American? French?

American cylinder-glass, double strength, what grade? single

strength. Chances crystal sheet? French crystal? Ground-glass? Obscured glass? Glazed-doors — specify. Inside-windows.

Stained-glass? leaded? specify price per foot? omit? lump sum?

HEATER. — [REFER TO GENERAL CLAUSES.]

Hot-air: — Name make of heater; bricked in? who does it? Portable? Specify size or make contractor guarantee and leave size to him.

Cold-air duct: brick? wood? terra-cotta pipe? from separate opening? if so, see that it shows on plan: from cellar-window? see that carpenter boxes in and sets sash. Does carpenter make box?

Bright tin-pipes to flues: Size, or leave to contractor if he guarantees. Dampers.

Registers if not, where, tin flues if not, who.

If contactor guarantees, have flue sizes approved by him.

Heater should have shaking-grate, Mershon or approved, automatic-damper, water-tank.

All wrought-steel? All cast-iron? no combination. Galvanized-iron smoke-pipe, give thickness in trade term.

Hot-air and steam combined: — Name make. All other specification like hot-air, for hot-air, and steam, for steam. Galvanized smoke-pipe, give thickness trade term.

Steam: — Name heater, or contractor guarantee. Cast-iron sectional? wrought-iron? bricked in or not? Automatic-damper, shaking-grate, safety-valve, steam-gauge, water-gauges. Blow-off cock, into cellar? into well? not permitted in sewer.

Direct? what make of radiator? automatic air-valves nickel? wood-handle nickel-plated valves? Jenkins Bros.? nickel-bushings in floors. Radiators bronzed? painted? pipes bronzed? painted?

Direct-indirect? same specification as direct, but specify, radiator to be box-radiator, or "direct-indirect" — and specify, galvanized-casings to outside air, through walls, provide gratings, or from cellar on first floor. If from cellar, provide cold-air ducts from cellar window, galvanized-iron, say twenty-two gauge.

Indirect: Name radiator; air-valves automatic, brass-seat valves? Jenkins Bros.? radiators hung from joists? on proper irons?

Cold-air supply: galvanized-iron, name thickness, flat-ducts, curved angles, duct to open through wall; if so, see that opening is shown on plan. Radiator-boxes, same galvanized-iron, put together with bolts, or pins, to come down, roofs of boxes, pine, tin-covered.

Does contractor provide flues? registers? or are they in other trades? if so, what trades?

Guaranty invariable. Written, sealed, to seventy degrees in zero weather, — also against water-hammer in pipes, not over ten pounds of steam to be necessary to heat.

Or does contractor provide specifications with bid under same guaranty. Any hot-water heaters? coil?

Large plants, with extended work, fans, pressure or exhaust, special expert specifications.

Steam-heat from power-boilers, reducing-valves, to heat system, return-pipes to tank and pumps.

Power-boilers: horizontal? tubular? upright? steel? Harrison safety? Babcock & Wilcox, safety? All to be tested to carry one hundred pounds, special work more. Boiler Insurance Company's certificate to be delivered to owner.

Engines: Take specifications and guaranty from bidders. Refer to experts.

ELECTRICAL WORK. — [REFER TO GENERAL CLAUSES.]

Special specifications: — Refer to Underwriters' Association. Make contracts subject to inspection approval of Association and observance of all rules of Insurance Company.

Dynamos: — Special specification.

Call-bells, annunciators, buttons, pulls, batteries, wire insulated, run in tin tubes. Kind of buttons, as to finish. Pull at front door to match furniture. Annunciator to have names of rooms, etc.

Hotel annunciator: Take maker's specification.

Lifts: — Hydraulic? electric? direct steam? city water pressure hydraulic? name maker; Ellithorpe safety-cushion? other safety-brakes? Does contractor furnish car? Own design? Your design? Gas to car? electricity to car? annunciator and buttons. Does contractor furnish?

Electric-stop and start, safety? method of control, rope? winch? lever? guides, wood? iron? machinery, take maker's specification. Refer to expert. Guaranty to cover speed, and durability. Require insurance and inspection from insurance company.

Hand hoists: — Require specifications from makers. Guides at back? at all corners? at two corners? friction and ratchet safety-brakes, hatchway-doors? automatic-bars? brake and rope through stories.

Carriage-hoists: — Same. Friction automatic safety-brakes, brake and rope on band wheel.

Pavement-hoists: — Take maker's specifications, generally winch-hoists, chain-cables.

RUSTLESS COATING FOR IRON AND STEEL.

At the meeting of the American Society of Mechanical Engineers, lately held at Montreal, Mr. M. P. Wood read a paper entitled "Rustless Coating for Iron and Steel." It treated of tinning and enamelling metals, lacquering, and other preservative methods. After describing the various processes, and their applicability to certain conditions, Mr. Wood concluded in a series of negations that would have caused the little, quarrelsome, English poet of the eighteenth century to die of envy. He said, in respect to Japanese lacquer:

"The adaptableness of this natural vegetable product to the preservation of metallic surfaces, as well as those of wood, paper, and other fibrous bodies, has never received the attention of engineers that the industrial importance of this method of coating and protecting surfaces demands. The general idea that its application is one of art, and is only adaptable to bric-à-brac, is wholly erroneous. The Japanese use it for an infinite variety of purposes — acid tanks, coating the keels of ships, highly-finished coach and decorative panels, and articles for domestic use, resisting hot water, soap and alkaline solutions. It may be truly said that were it not for the bamboo and lacquer trees, life for the Japanese would hardly be worth living. There is no reason why the lacquer tree should not thrive in this country. Its sap, which is used as the material for all lacquer-work, is a natural essence, and vastly superior to any varnishes used here. Unlike even copal, which is an artificial mixture of resin, fatty oils and turpentine, Japanese lacquer is a ready-made product of nature that hardens into a mirror-like smoothness, never splits nor cracks, and is of great durability. The art lacquer-work of Japan is essentially individual, and ought not to be treated as an undistinguishable whole. The superiority of the art-work is due not only to the special merit of the material, but also to the care and skill shown by the Japanese in the manipulation of it.

"There is as wide a distinction between the ordinary lacquer tray, or cabinet of commerce, and the exquisite lacs of the great Japanese artists, as between a theatrical poster and a canvas of Raphael. Each of the great masters of lacquer has created a style of his own, and has founded a school of which the traditions have been kept alive by his successors for centuries. At the Centennial Exhibition of 1876, in the Japanese department, there were exhibited plates, pans, etc., evidently of a common quality of lacquer used by sailors and others for domestic purposes; also some samples of a finer grade in trays and cabinet-work that had been sunk in the sea over fifty years, and though covered with barnacles and other marine growths, were practically unharmed, so perfectly had they been protected by the lacquer. It seems almost incredible that so valuable an article that can be produced as cheaply as maple sap has remained comparatively unknown in this country and Europe, at least so far as applying it to the palpable protective purpose that nature evidently designed it to be used for."

His negations were stated thus:

"In conclusion, the whole question of how best to protect iron and steel from corrosion in all the varying conditions that the wants and usages of to-day demand, seems to resolve itself into a category of 'Don'ts,' as the best method of answering it, to wit:

"Don't use anything but common iron.

"Don't have any scale on that.

"Don't use anything but the best iron and steel.

"Don't polish those.

"Don't paint it with anything but pure linseed oil and oxide of lead or graphite paints.

"Don't let the air get to it if it is damp.

"Don't keep it from the air if the air is pure and dry.

"Don't let sea air, sea water, acidulated or sulphurous, ammonial or other fumes and liquids have access to it.

"Don't think it unnecessary to protect it in any case, because swords, armor, and other bright articles of iron and steel have been found uninjured by rust after an exposure of over five hundred years with no other protection than that afforded by the closed room in which they were placed.

"Don't think your own product would not, under the same conditions, last as long as the piece of iron that was walled into one of the burial chambers of the Pyramid three thousand years ago.

"Don't put it in any location where it cannot be inspected and its true condition ascertained at any time, by anybody, your successor in the trust not excepted.

"Don't think that magnetic oxide, electroplating, enamelling, or any other method of protection will take the place of constant inspection, even if the coating is fired on by a Columbiad.

"Don't imagine because Cleopatra's Needle has had to have a coating of wax to protect it, that it is not a good material to apply to other substances than granite.

"Don't let the cost and interest accounts be the governing factors in the case of protecting any metal superstructure on whose continuity and strength human life and safety depend. The old story of 'For want of a nail the shoe was cast, the horse disabled, a battle and kingdom lost,' finds too many parallels in the engineering practice of to-day, until in some cases we seem to need protection from the engineer quite as much as from the decay of the materials in which he experiments.

"Don't imagine that Macaulay's New Zealander, who has sketched the ruins of England's power and greatness, and has come to the New World to see how we have fared from the gnawing teeth of time, will not recognize amidst the ruins of our Statue of Liberty, Brooklyn Bridge, and other monuments of our progress, the ominous streaks and stains due to the corrosion, not only of iron and steel, but that of the better class of metals, and will exclaim: 'We are wiser in our generation, and fear not and can control these forces that, like the Arch, slumber not nor sleep.'"

In the discussion, one member stated that, for tanks and outdoor use, a solution of asphalte in bisulphide of carbon known as "P. and B." paint had given the best results; attention was also called to a paper by W. Thomson, read before the English Society of Chemical Industry. It was there stated that a good plan for protection was to connect structures by wire with a ball of zinc buried in moist ground, by which the destructive effects of electrolytic action were transferred to an outside body.

SOCIETIES

T-SQUARE CLUB OF PHILADELPHIA.

THE following Resolutions were adopted at a special meeting of the T-Square Club held Friday, August 31, 1894:

Whereas, it has pleased God in His infinite wisdom to remove from amongst us our friend, John Lambert Moss, and

Whereas, we feel that some expression of our sorrow, and appreciation of his large-heartedness and geniality will be meet and proper at this time,

Be it Resolved, that we, the members of the T-Square Club, do sincerely mourn his loss, and that we, while bowing to the dispensation of the Divine Will, feel that his life has been a sun set in noonday, that his future promised much, and that his premature end has robbed us of a fellow-member whom we felt it a privilege to know, and whose considerate and unselfish nature had won for him many friends.

Therefore, be it Resolved, that a copy of these resolutions be sent to his bereaved family, and that they be published in the daily and architectural papers.

THE TEXAS STATE ASSOCIATION OF ARCHITECTS.

THE Texas State Association of Architects held its election of officers at Waco, Texas, on August 6, resulting in the following:

Nathaniel Tobey, Galveston, *President;* C. A. Gill, Dallas, *First Vice-President;* Sam P. Herbert, Waco, *Second Vice-President;* J. Riely Gordon, San Antonio, *Secretary;* A. A. Messer, Fort Worth, *Treasurer;* Alfred Mueller, Galveston, *Chairman Executive Committee;* J. S. Moad, Dallas, M. R. Sanguinet, Fort Worth, A. N. Dawson, Fort Worth, P. S. Rabitt, Galveston, *Executive Committee.*

THE ILLUSTRATIONS

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

ENTRANCE TO THE STARKWEATHER HOUSE, PAWTUCKET, R. I.

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

HOUSE FOR MRS. NELLIE J. MORRISON, CAMBRIDGE, MASS. MR. C. H. McCLARE, ARCHITECT, CAMBRIDGE, MASS.

STABLE FOR W. S. JOHNSON, ESQ., WARWICK, N. Y. MR. E. G. W. DIETRICH, ARCHITECT, NEW YORK, N. Y.

COMPETITIVE DESIGN FOR THE Y. M. C. A. BUILDING, TROY, N. Y. MR. F. R. COMSTOCK, ARCHITECT, HARTFORD, CONN.

CENTRAL FALLS SCHOOL, GREAT FALLS, MONTANA. MR. JOHN LAVALLE, ARCHITECT, BOSTON, MASS.

COMPETITIVE DESIGN FOR AN OHIO CHURCH. MR. W. S. DUTTON, ARCHITECT, CLEVELAND, OHIO.

COMPETITIVE DESIGN FOR THE LITHGOW PUBLIC LIBRARY, AUGUSTA, ME. MESSRS. PAULSEN & LAVALLE, ARCHITECTS, BOSTON, MASS.

[Additional Illustrations in the International Edition.]

ENTRANCE ROTUNDA OF THE AGRICULTURE BUILDING, WORLD'S COLUMBIAN EXHIBITION, CHICAGO, ILL. MESSRS. MCKIM, MEAD & WHITE, ARCHITECTS, NEW YORK, N. Y.

[Gelatine Print.]

WEST FRONT OF THE ELECTRICITY BUILDING, MESSRS. VAN BRUNT & HOWE, ARCHITECTS, KANSAS CITY, MO., AND NORTH FRONT OF THE ADMINISTRATION BUILDING, MR. R. M. HUNT, ARCHITECT, NEW YORK, N. Y. WORLD'S COLUMBIAN EXHIBITION, CHICAGO, ILL.

[Gelatine Print.]

Note: — The unusual pressure brought upon the Custom-house officials by the passage of the new tariff law has prevented us from freeing our usual consignment of imported prints in season for use with this week's issue.

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.*]

THE DECAY OF SPRUCE BEAMS IN BRICK WALLS.

HARTFORD, CONN., August, 29, 1894.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Under ordinary conditions, how long will it be before the ends of partly-seasoned, large size, spruce joists decay, when laid solid in outside brick walls? L.

[EVERYTHING depends upon the amount of seasoning, the character of the brick walls, — whether they are porous, so as to admit air, or hard, so as to keep it out; the character of the mortar, — whether of lime, which has a preservative effect, and, by its shrinkage, gives room for air to enter around the ends of the joists, or of cement, which does not shrink, and naturally contains in combination a large amount of water; whether the wall is damp or dry when the timbers are built in; whether the joists are left open and unpainted, so that air circulates freely about them, or are painted or varnished, or enclosed by floors and ceilings; whether the floors are made more airtight by paper, or matching, or both, and whether the ceiling is of lime mortar, which is very porous, or of adamant or other plaster-of-Paris cements, which are very impervious, and contain a great deal of loosely-combined water; whether the air in the rooms is frequently changed, dry and warm, or close and warm, or close and cold; whether the timber was inspected when put in, etc. Thousands of large, spruce timbers are built close into brick walls, and remain free from decay indefinitely; but, especially for a floor over a cellar, the modern practice is to leave a little space around them. — EDS. AMERICAN ARCHITECT.]

EXHIBITIONS

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

CINCINNATI, O. — *Special Exhibition of Paintings:* at the Art Museum, during September.

NEW YORK, N. Y. — *Second Annual Summer Exhibition of American Paintings:* at the Fifth Avenue Art Galleries.

Twenty-sixth Annual Spring Exhibition: at the Metropolitan Museum of Art, opened May 8.

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

NOTES AND CLIPPINGS

ST. CLEMENT DANES, LONDON. — It is not often that the dingy tranquillity of the Church of St. Clement Danes is disturbed, as recently by a fashionable marriage. Indeed, it would be difficult to name a church that more people pass and fewer enter, and it cannot be said that at any period of its existence it has been a fashionable place of worship. It seems, however, to have usually possessed a sort of grave respectability, and to have had sufficiently wealthy citizens interested in its welfare to be repaired at considerable cost early in the seventeenth century, and entirely rebuilt a little later in its present form, under the direction of Sir Christopher Wren, the actual architect being Edward Pierce, while the steeple and portico were designed by Gibbs. The building which it replaced must have contained work as old as any then existing in London; for the foundation is of great antiquity, perhaps nearly as old as that of St. Ethelburga herself, and the precise reason why the patron saint of iron-workers and wool-combers became associated with the Danes is lost in the mists of antiquity. According to one story, a number of Danes, who, in the reign of King Ethelred, sacked and burned the monastery of Chertsey, were put to death in the churchyard of St. Clement's Church, which thereafter was known as St. Clement Danes. According to another tradition, the name came not from the Danes that died, but from the Danes that lived around it. For there was a time when the Danes, who, whichever story may be true, were seemingly not regarded altogether in the light of social acquisitions in England, were ordered peremptorily to leave the country, except such as might be married to English wives; while those who had so far naturalized themselves were forced to live between Westminster and Ludgate, and formed a colony on the river-bank near the Essex Street of to-day. Be this as it may, St. Clement's churchyard was held to be an appropriate resting-place for the body of King Harold, natural son of Canute, which after his brief reign found a temporary resting-place at Westminster until it was torn up, beheaded, and cast into the Thames by the orders of Hardicanute, his legitimate half-brother. Rescued from the river by a fisherman, it was finally buried in the churchyard of St. Clement Danes. Curiously enough, many hundred years later the church is again found associated with royalty under a cloud, for in 1725 Dr. Gibson, then Bishop of London, had removed from it a picture which formed the altar-piece, and contained recognizable portraits of the pretender's wife and family. Situated almost in the heart of literary London, it contains few, if any,

memorials of writers among the worthy citizens whose virtues are recorded on its monuments. Two of Dryden's friends — Thomas Otway and Nat Lee — occupying nameless graves in or near the church, represent the Bohemians of their day; one of them died starving, the other drunk. Dryden himself was "of the parish of St. Clement Danes," and is so recorded in the register of his marriage at St. Swithin's by London Stone. Bunyan once lived opposite, somewhere very near where the business is carried on with which to day's bridegroom is associated. Dr. Johnson had a sitting in pew No. 18, and worshipped devoutly therein, taking Boswell with him to church there on Good Friday, 1773, and recording in his diary that he put two shillings in the plate on Easter Sunday, 1779. — *St James's Gazette.*

The Constable Lesdiguieres and the Devil. — According to a legend current in the country around Grenoble, the ancient wall surrounding the park of M. Casimir-Perier's superb Château de Vizille in that district was built by the devil. No one knows exactly how old this wall is, but it is generally believed to date back to the time of the first proprietor of Vizille, the High Constable de Lesdiguières. The latter was very anxious to protect his grounds from trespassers, but lacked the money requisite to inclose it. On learning this, the Evil One visited him and offered to build the wall providing Lesdiguières would assign to him his soul after death. "How long will it take to build?" he inquired. "Oh, only two or three minutes," replied the Prince of Darkness. "You can't do it," retorted Lesdiguières; and on the devil asserting once more his power to do it within that time, the Constable made the following proposition: "I will saddle my mare, Bradamante, and will mount her at this point. I will then put the spurs to her, and at the same moment you shall begin to build the wall. If I can escape on horseback before the property is entirely walled in, I retain the right to dispose of my soul as I see fit. Otherwise, it belongs to you." Satan consented to this, and on the following day the trial was made. Lesdiguières got on his horse, and at the same moment two gangs of imps began to raise the stone wall that surrounds the property. They were in such a hurry, however, that when it came to joining the two ends of the wall they found they had carried one end past the other, leaving a space of about a yard in between. They had just begun to repair this error when Lesdiguières dashed through the opening thus left, not so fast, however, but that the tail of his horse got stuck in the masonry. Without hesitating a moment, the rider drew his sword and cut the tail off, leaving it sticking in the wall, and there, according to tradition, it remains to day, its place being marked by a queer and unaccountable patch of plaster in the otherwise solid bit of masonry that joins the two ends of the wall. Lesdiguieres accordingly got his wall and saved his soul, at the expense, it is true, of Bradamante's caudal appendage. — *N. Y. Tribune.*

Geological Formation controls the Character of adjacent Cities. — The great fire, after all, did less for London by far than our happy isolation in a basin of brick earth. Egyptian Thebes, of the hundred gates, was built from the hard, red sandstone of the Nile and the still harder and redder granite of Syene. Periclean Athens was built from the marble of Pentelicus, in which Phidias could carve out with freer hand the living sculptures of the Parthenon. Modern Paris has its soft, white stone, exactly adapted to the florid needs of the meretricious Parisian decorative instinct. In Britain itself, Aberdeen has its appropriate cold, gray granite; Edinburgh is piled up from its own solid hills, Oxford has its oölite, and Bath its near quarries of facile freestone. But London, better placed, lies in the midst of a great bed of clay, beautifully designed by Providence to supply the commercially-minded London builder with abundant store of bad brick and coarse stucco. On this apt material, ready formed to his hand, the jerry architect has seized with sound business instinct, and raised aloft to heaven a great commercial city in the truest spirit of modern competition. Hence the distinguishing beauties of white-painted Belgravia and dusky-yellow Paddington; hence the long, straight lines of mansions almost as good as solid stone in the abyss of Bayswater; hence, also, the æsthetic reaction to sound, red brick in penitent South Kensington. Each is beautiful in its kind, from Bedford Park to untouched Stoke Newington, and each is notable alike for its wealth of individual fancy, its quaintness of expression, its local appropriateness, its strong sense of color, and its luxurious outgrowth of spontaneous ornament. The merchant princes of Mayfair, we all know, hold their court in palaces which shine with the Hymettian beams and Orient ivory; the thanes of Belgravia dwell in lordly halls which bring a blush into the cheeks of Venetian Foscari and Florentine Strozzi. — *Grant Allen in The Fortnightly Review.*

Smothered in Quicksand. — Arthur A. Williams, thirty-eight years old, met his death at Orange, Mass., early in August, by a peculiar accident. Soon after midnight, one of the large mains in front of the house of James Gavin burst and tore a hole in the road about six feet deep and ten feet square. Gavin, hearing the rushing waters, went out in the dark to learn the cause, and fell into the big hole and was nearly strangled with the quicksand. Williams, who lived in the same house, went to the rescue of Gavin, and succeeded in assisting him out, only to fall in himself an instant later, and before he could get out or assistance could reach him he was smothered. There was a pressure of one hundred forty-five pounds to the inch on the water.— *Exchange.*

Oriental Discoveries at Oaxaca, Mex. — In one of the oldest ruins in the State of Oaxaca, Mexico, a number of very rare and interesting images, found in metal, have been uncovered. The images represent people of Oriental appearance and dress, as well as priests in their robes of sacrifice. They bear hieroglyphics of an unknown character, and are elaborately wrought, with fine art lines shown in every curve. The images found thus far are of gold, either wholly or in part, and are coated with some unknown enamel, which has preserved them from all harm in the many years they have been buried in the soil. — *Philadelphia Press.*

Photographing the Earthquake. — An Italian seismologist has devised a method by which an earthquake shock is made to light an electric lamp for a quarter of a second, causing the face of a chronometer to be photographed, and thus registering the precise time at which the shock occurred. — *Invention.*

Ratio between Cost and Accidental Death. — According to M. Eiffel, the cost of lives of any great engineering work can be estimated, at least, as accurately as the cost in money. "It has been found," he says, "by statistical observation that in engineering enterprises one man is killed for every 1,000,000*f.* spent on the work. If you have to build a bridge at a cost of 100,000,000*f.*, you know that you will kill one hundred workmen." This statement, while rather an ingenious one, is not, it is stated, borne out by facts. Take the Eiffel Tower, for example. Six and a half millions' worth cost only four lives. The Forth Bridge, on the other hand, a contemporary points out, cost 45,000,000*f.*, while the lives of fifty-five men were sacrificed in connection with its construction. — *Boston Transcript.*

The Parliament House at Berlin. — The new German Imperial House of Parliament is to be opened by the Emperor with great pomp in October next. It has taken ten years to build, and cost about thirty million marks. It stands on the Königsplatz, opposite the Grand General Staff, and is a mixture of all conceivable styles, looking more like one of the nondescript blocks in the Chicago Exhibition than a building consonant with the general architectural character of the German capital. It is a floridly massive but fearfully mongrel pile. Bismarck helped to lay the foundation stone, and in all probability he will figure among the crowd of German sovereigns who are to surround the Emperor at the opening ceremony. His own statue, subscribed for by the whole nation, is to be erected opposite the main entrance. Then he and all his admirers will be happy forever after. — *Cincinnati Commercial-Gazette.*

To Discover Flaws in Iron and Steel. — An apparatus for discovering internal flaws in iron and steel is described in *Industries and Iron.* It is electrical, and consists of a small pneumatic tapper worked by the hand, with which the sample of steel or iron is tapped all over. With the tapper is connected a telephone with a microphone interposed in the circuit. One operator is required to apply the tapper, and the other to listen through the telephone to the sounds produced. Both are in electrical communication, but in separate apartments, so that the direct sounds of the taps may not interrupt the listener, whose duty it is to detect flaws. In applying the system, one operator places the telephone to his ear, and while the sounds produced by the taps are normal he does nothing. Directly a false sound, which is distinguishable from the normal sound, is heard, he signals for the spot to be marked, and by this means is able, not only to detect a flaw, but to fix its locality. — *Nature.*

A Latin Inscription. — Two well-dressed men on a tour strolled in the vicinity of a handsome, new structure. "Wonder what this is?" queried one, casting his eyes about. "Ah, there is an inscription on the wall! Latin. Funny place to put it! I'm so short-sighted, can't quite make it out. 'Post Nobils.' Let's see! I've forgotten most of my Latin. What do you make of it?" The other, who was equally short-sighted, adjusted his eye-glasses, critically surveyed the inscription, and returned, "Hum! 'Post' means 'after,' of course; but 'nobils' gets away with me. Nobis, nobils, no — I declare I shall have to give it up. Let's inquire." Thereupon they sought out the intelligent custodian of the building and put their question. "What does that inscription mean?" The man repeated after them in a pitying tone, "It means just exactly what it says, and a fine into the bargain if you go to posting any bills round this place!" And the two short-sighted sightseers who had forgotten their Latin retired, looking reproachfully at each other. — *The Churchman.*

Carrara Marble Quarries. — The marble quarries, which are 400 or 500 in number, are situated far above the town, in the midst of the grandest and most savage scenery, says the English *Illustrated Magazine.* The soft, aërial hues which distance lends to the mountains disappear on nearer approach The great peaks stand up against the sky in fantastic forms. No trees or verdure clothe their naked sides, no flowers grow, no water flows to fertilize that soil. The 6,000 quarrymen who are busy here appear as ants crawling on the vast hillsides. The marble is quarried by dynamite. Every moment explosions rend the air, and huge fragments fly up as if expelled from a volcano. Often the mine has to be placed in the perpendicular face of a precipice. Then the workman is lowered by a rope and hangs suspended, "like the samphire gatherer, 'twixt earth and heaven. A dreadful trade!" About 160,000 tons of marble are annually exported, of which most goes to America. The quantity is inexhaustible. The entire mass of the Monte Sagro, 5,600 feet high, which dominates Carrara, is solid marble. One of the most famous quarries is in the valley of the Polraccio. From this were extracted, in Roman times, the 1,700 tons of marble that served for the construction of Trajan's column at Rome. Here Donatello got the block which he carved into his "St. George," and Michael Angelo the one for his "Moses." From here, also, came the huge block mentioned in the memoirs of Benvenuto Cellini, which served for the colossal Neptune of Ammanati in the middle of the fountain of the Piazzi della Signoria at Florence. Unlike the miner, who burrows underground, he works in a blinding glare of light. The fierce heat of the Italian sun beats upon him in summer. The cold blast of the tramontana, rushing from the gorges of the Appenines, chills him in winter. Constantly exposed to danger, seeing his companions killed and wounded by his side, trained to rapid action, and with every faculty of mind and body on the alert, accustomed to dominate the rude forces of nature — he has developed into an independent and powerful type of man.

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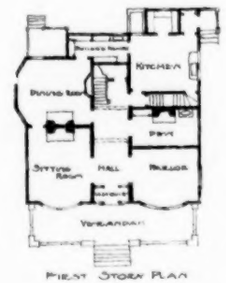
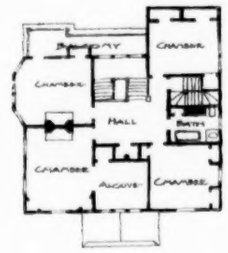


First Story Plan



Second Story Plan

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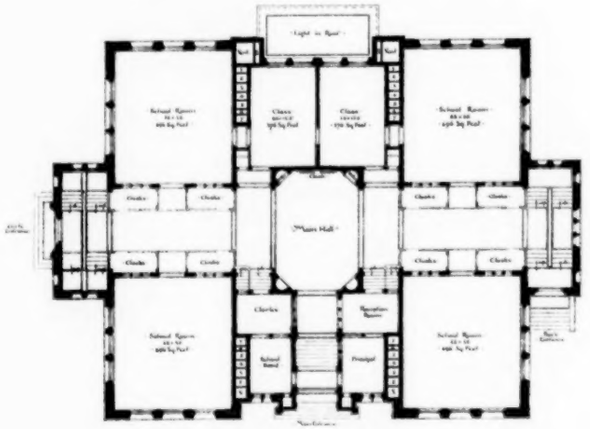

Perspective View from North West
showing Proposed Building
and Suggestions for Future Extensions

JOHN LAVALLE, Architect.

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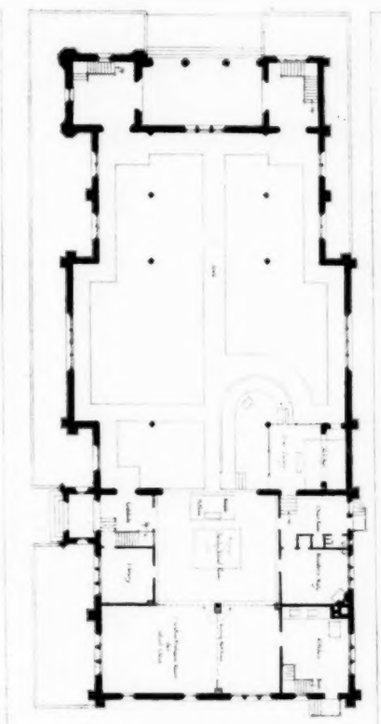

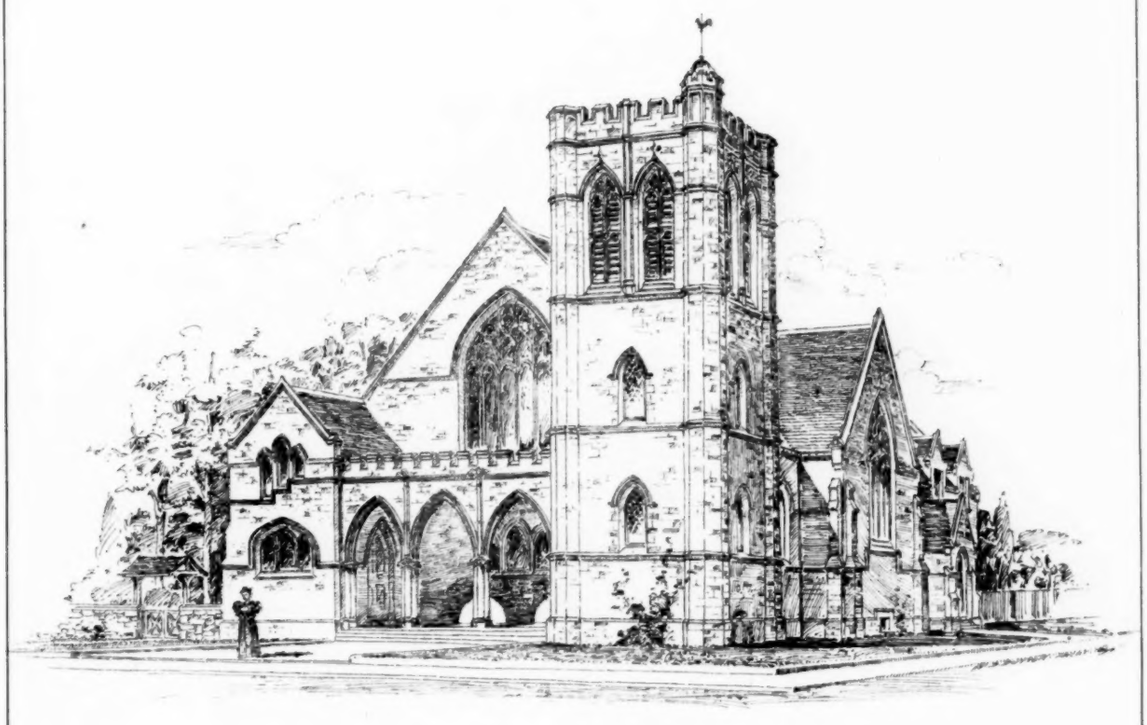

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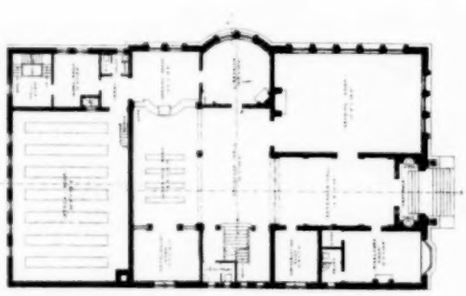
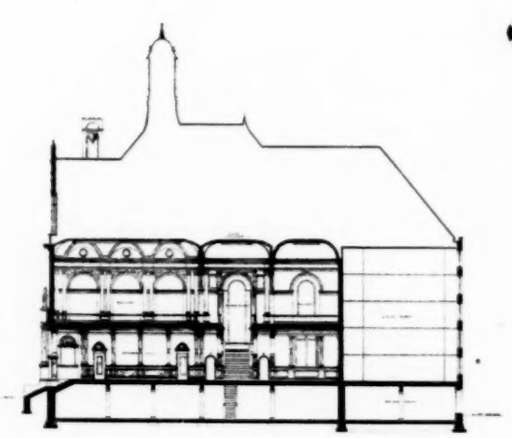


FIRST FLOOR PLAN



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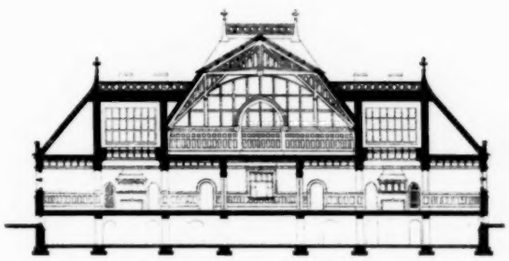

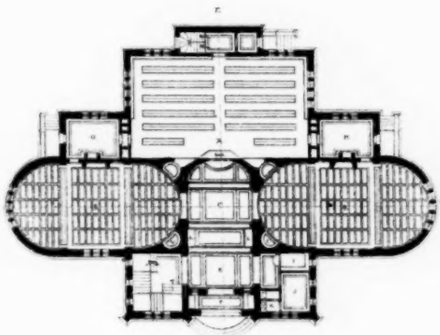

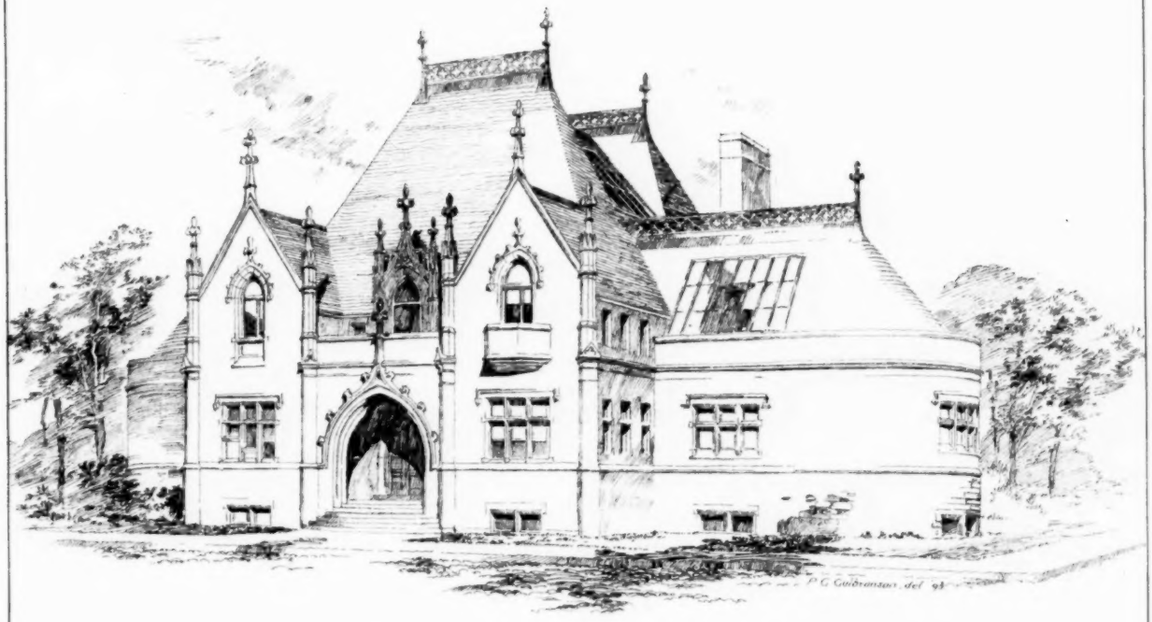

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