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MORE and more frequent gleams of common-sense are appearing in the discussion of protected steel construction. Hitherto, this discussion has consisted mainly in essays by one expert, announcing his discovery that steel-frame buildings will last only fifteen years, followed by essays by another expert, announcing his discovery that they will last a thousand years. A few weeks ago the results of the tests at the Boston Insurance Experiment Station were made public, showing that cement in contact with steel protected it from rust, while, if voids were left between the cement or concrete and the metal, rusting took place. This was a definite discovery, of great importance, and it has been followed by another observation, by Mr. Maximilian Toch, a distinguished chemist, to the effect that the chemical composition of cements has an important influence upon their action on steel, those containing only oxides, silicates and aluminates of lime protecting it, while those which contain sulphites and sulphates corrode it. Every architect knows that plaster of Paris, which is a sulphate of lime, and the mortars containing it corrode iron lath; and the point of Mr. Toch's observation is that some Portland cements also contain either sulphite or sulphate of lime. The slag cements, which are coming rapidly into use, may contain these compounds, and some of the foreign cements are said to contain plaster of Paris in considerable proportion. Cements of this sort may be expected to act upon steel; and the architects would be glad to learn from the chemists what brands of Portland cement are free from injurious ingredients, or how the latter can be detected in an unfamiliar brand.

IT is reported, we hope with truth, that Mayor Collins is considering the appointment of a professional architect as Commissioner of Buildings for Boston. The law requires that the incumbent of that office shall be either an architect, engineer or builder. Of the qualifications of engineers for its duties we have not a very high opinion, nor have the engineers themselves. Valuable as their services are in the work in which they are trained, very few engineers possess the familiarity with the details of the construction, fitting, finishing and decorating of dwelling-houses, offices and mercantile buildings which are absolutely necessary to enable an official to judge of all the consequences and relations of the orders which he issues, or the permissions which he gives. Builders, in their own field, know these details, but their field is limited. A man who has spent the greater part of his life in executing or supervising masonwork is a good judge of the kind of work with which he is familiar, but rarely has more than a very superficial knowledge of any other, and is even less qualified to pass upon novelties, or difficult problems in construction. The only available candidates who are trained to consider all portions of a given construction are the architects, and it is also the architects alone who are sufficiently familiar with foreign or unusual materials or systems of construction to be able to judge im-

partially of devices which may be locally unfamiliar. For the Building Commissioner of a great city this last is a very necessary qualification, and the progress of the art of construction in this country has undoubtedly been hindered by the conservatism of people in authority, who have found it easier to reject proposed innovations than to judge of their merits.

ONE of the New York papers has a very sensible and timely article on the danger to the city of the congestion of business interests to which the filling of lower Broadway with "sky-scrapers" has so much contributed. Long ago, it was predicted, by a man of great experience in real-estate matters, that the rapid-transit lines in New York would tend to concentrate business. When the only communication was by means of omnibuses or horse-cars, a merchant living, let us say, on Fifty-seventh Street, if he had to hire a new store, would choose one on Franklin Street, rather than on Barclay Street, because the saving of time in traversing twice a day the extra distance between his store and his house would reach very appreciable proportions in the course of a year. For that reason, the dry-goods trade, then, as now, one of the great interests in New York, was gradually creeping up-town, to keep pace with the shifting of the residential quarter. With the construction of four elevated railways this tendency ceased. It was a matter of only about a minute's time whether the merchant left the train at Franklin Street or at Barclay Street; and the advantage of being in the heart of the "dry-goods district," instead of at the upper edge, more than counterbalanced this small loss. As time went on, this tendency became more pronounced. If it made practically no difference in the time required to reach it, an office in Wall Street was preferable to one farther up-town, and, to meet the demand for accommodation in this locality, buildings were carried up to enormous heights. The *Evening Post* thinks that this tendency is to be deplored for many reasons. Artistically, the appearance of the lower part of New York is ruined by the mixture of huge, sprouting masses of brickwork, alternating with more modest structures; and the recent device, of covering the blank walls of the sky-scrapers with advertisements, painted in letters thirty feet high, does not add to the æsthetic impression. As a matter of public hygiene, the darkening of the streets and the concentration of the wind, by the rows of lofty structures, is already a serious matter; while it is more than doubtful whether the accumulation of cash and evidences of property, to the extent of thousands of millions of dollars, within an area of a few acres about Wall and Broad Streets, would be advantageous in case of war, riot or other great calamity.

THE *Evening Post* thinks that the new Commission which Mayor Low so earnestly advocates, for studying the whole problem of the convenient, wholesome and beautiful development of New York, might with advantage consider the question of establishing other centres of business, not only for the convenience of the public, which will soon find, even with rapid-transit, Wall Street far away, but for preventing the congestion of traffic at certain points inevitable under present conditions. Certainly, no inquiry could be more valuable, and we might suggest, as the most obvious method of securing the carrying out of whatever plan the Commission might recommend, that the power of establishing rules for limiting the height of buildings should be placed in its hands. It is too late now to pull down the sky-scrapers by public authority, although we are disposed to believe that the next generation will see many of them voluntarily reduced in height by their owners; but it is not too late to impose general restrictions on future construction; and Mayor Low's Commission could not do better than to take up the matter seriously. Nowhere in the United States is there anything like an intelligent plan of restriction. The Boston and Chicago ordinances, limiting the height of buildings to one hundred and twenty-five feet, are simply hasty concessions to popular sentiment, in which the limit was pitched upon at random, without any inquiry into the number of stories that it would properly accommodate, or any conception of the possibility, by a regulation more detailed, and more carefully drawn, of increasing immensely its value. In Boston,

the difficulties incident to the application of an unintelligent statute have been multiplied by the adoption of special restrictions, even more hasty and ill-considered, which bid fair, not only to make the principal public places of the city ridiculous, but to involve the taxpayers in damages amounting to millions of dollars.

THE Brooklyn Institute of Arts and Sciences has issued another of the remarkable monographs by Prof. W. H. Goodyear on the refinements of Italian architecture, the present one being devoted mainly to the Church of St. Mark, at Venice. Our readers are familiar with Professor Goodyear's previous writings, showing the variations from symmetry and rectangularity of plan in the Cathedrals of Siena and Pisa, and the variations from the vertical of the walls and piers of various buildings of the Middle Ages, and of the Renaissance, including the front of Notre Dame, in Paris; and the present work confirms in the most interesting manner these observations. Professor Goodyear begins his essay by quoting from the Diary of John Evelyn, who was a member, with Sir Christopher Wren, of the Commission appointed to inspect the old Gothic Cathedral of St. Paul, in London, just before it was destroyed by the fire of 1666. Evelyn says that the Commissioners had the "uprights" plumbed in several places, and found "the maine building to recede outwards." The Commissioners discussed this phenomenon, and two of them were of opinion that the church "had been so built *ab origine*, for an effect in perspective, in regard of the height"; but Wren and Evelyn were "quite of another judgment."

MANY years ago, Professor Goodyear noted this passage, in relation to certain piers in St. Mark's, which also "recede outwards," and are cased with marble in a way which shows that the casing, which is ancient, was cut to fit the inclination of the piers, and that, as no movement has taken place since the application of the casing, the joints of which are still perfect, it is a fair inference that none had taken place previously, and that the piers were built with the same inclination that they now show. It was not until long afterwards that Professor Goodyear was able to study more in detail these strange variations, and to obtain evidence as to whether they were accidental or not; and the remarkable papers which he is now publishing give the results of his investigations. We cannot attempt to present even the briefest abstract of his conclusions, and we hope that our professional readers will obtain for themselves, from the Macmillan Company, the official publishers for the Brooklyn Institute, the papers in question, assuring them that they are never likely to find technical papers more deeply interesting and inspiring; but it may be worth while to summarize them by saying that he has proved beyond question that many of the churches in Italy, dating from St. Mark's down to the Renaissance, and some, at least, in France, were purposely built with walls and piers inclined, sometimes outward and sometimes inward, but always in conformity with some rule, established, presumably, by the architect. Ever since the first discovery of these eccentricities, they have been treated with contemptuous incredulity by critics, nearly all of whom have pronounced them to be the result of "settlement," or "thrust"; and Professor Goodyear shows an almost touching earnestness in proving, over and over again, beyond the slightest shadow of doubt, that they could not come from either thrust or settlement; but the most unanswerable argument of all against this convenient theory is to be found in the fact that not all, or even the greater part, of the mediæval churches of Italy show such variations, the rule having been, apparently, in the Middle Ages, as now, to build walls and piers straight, plumb and symmetrical, and the leaning piers, columns and walls being found principally in the buildings designed and carried out by the greatest artists of their time. During the Renaissance, when the passion for picturesqueness had been nearly extinguished by the new rage for classical formality, the occasional exceptions to the rule of verticality are all the more conspicuous; and it is remarkable that at S. Giorgio Maggiore, in Venice, one of the most beautiful of the works of Palladio, who was conspicuous as a purist among the Renaissance architects, but was a great artist also, the nave piers spread ten inches in a height of thirty feet. Besides this actual spread, the flat pilasters which face the nave piers are diminished, and are made with a strong entasis from front to back, the lines being practically parallel to the profile of the engaged column which stands near, but a little behind them. The effect of this

is to increase still more the width of the nave at the springing of the transverse arches, and it is hardly possible to doubt that it was all done with deliberate intention, to give that sense of openness and space at the springing of the vault which the mediæval architects sought mainly by the inclination of the piers. That this effect was designed by Palladio, and was not the result of carelessness, or thrust, is demonstrated by the fact that the inclination is uniform, and that it occurs in pilasters which range with the others, but are attached to cross-walls, in which anything like thrust is out of the question. It is curious that in the aisles of the same church, which have groups of pilasters on each side, the pilasters on the side next the nave, although they show the same strong entasis, are set vertically, while the corresponding ones on the other side lean backwards more than five inches in a height of twenty feet, the aisle wall thus leaning outward, as it does in St. Mark's, and in other mediæval churches possessing these artistic refinements.

WE will not attempt to follow Professor Goodyear in his description of the variations in St. Mark's. That they were made for an artistic purpose there can be no question, and they probably contribute, in some way which we are, as yet, too dull to understand, to the charm of that incomparable building. Meanwhile, the professional man, in preparing the revision of his ideas of architectural propriety which he sees to be inevitable, will undoubtedly recall other instances where the accepted notions have been called in question. Professor Goodyear, to our mind, gives us the key to the whole question in saying that the essence of these refinements "may probably lie in the feeling which leads us to prefer a free-hand drawing to a mechanically executed architectural elevation." More than this, every architect knows how much more satisfactory his first free-hand sketch of a building or a detail is than his subsequent geometrical drawings, and the labor which he goes through in trying to infuse into the stiffness and dryness of the latter some of the ease and charm which came so naturally in the sketch. We must remember that the mediæval architects were assiduous sketchers and modellers from nature, and hard precision would be likely to offend them even more than it does us; so that the greatest of them seem to have had the courage to do what no modern dares to attempt, and build, so to speak, in free hand. It is common to say, in discussing the mediæval refinements, that no modern workmen could comprehend or carry out such refinements, even if the architect were to require them. With this view we do not wholly agree. It is much easier than most people imagine for a mason to give a certain batter to a wall, or to lay a string-course, or cornice, with a given "crown"; and, being constantly occupied with their work, the more observant of them gain an æsthetic, as well as a mechanical, comprehension of it which would enable them to understand more than might be supposed of an architect's ideas. Professor Ware relates a story of an old plasterer of his acquaintance, who, in discussing matters of his trade, said that he had noticed that if a long moulded cornice were run perfectly level, it always looked as if it sagged down in the middle. This is precisely the observation which led the Greeks to arch slightly upward the horizontal lines of their temples, so that to this old plasterer the discoveries of Penrose, which met with incredulity among the learned, would have seemed perfectly natural and intelligible. In the same way, in other points of construction; a stonemason, who has noticed that his pretty daughter does not part her hair exactly in the middle, because it makes her look too prim, can easily understand why, in some of the Italian and French churches, the aisle vaults spring from a lower level on one side than on the other, apparently for no other purpose than to avoid the stiffness of symmetry; or why, in mediæval stonework, the vertical joints of alternate courses do not come exactly over each other if it can be avoided; and would probably appreciate without much difficulty, if they were once explained to him, even the beautiful waves in the pavement of St. Mark's. If, therefore, the architects will take courage to build with picturesque refinements, there is little danger that the workmen will not soon learn to understand them. We still have a remnant of the mediæval tradition in the office rule that a semicircular arch should always be struck from a centre above the springing-line; and it would not be a very long step further to give a slight entasis to the piers supporting it. If this pleased the moderns as it pleased Palladio, other refinements might follow, until architecture, purely as an art, began again to have the interest which it possessed for our predecessors of the Middle Ages.

THE PASSING OF NATURAL-ROCK CEMENT.

PERHAPS there is nothing in commercial history more pathetic than the circumstances attending the passing away of a once great industry. The resultant loss to employes and investors, the inevitable paralysis stealthily creeping in where all was once cheerful activity, the sharp contrast of an inaction which hints unmistakably of a destiny of silence and desolation, which no man's hand can stay, all this combines to suggest something humanly tragic, something like the death-struggle of a beneficent giant.

For more than half a century the Empire State could boast of no prouder industry than the manufacture of natural-rock cement. The enterprise has made of comparatively unproductive Ulster one of the foremost counties in the State. To-day, the business interests of a large area, including the Rosendale cement district, are ruined, or hopelessly injured, and half a score of once prosperous villages are partially deserted. The Louisville cement belt is, also, undergoing a like exodus of laborers to new fields of work. Curiously enough, the great shortage in Portland-cement of last year, amounting, as it did, to a veritable cement famine, and causing the postponement of many important building-operations, failed to check the rapid decrease in the demand for natural cement. The casual observer, aware of the fact that we have never been engaged in such gigantic feats of engineering and architecture as at the present time, is naturally puzzled to account for the abandonment of this long stable commodity. The reasons are many and interesting; but, doubtless, the primal factor to blame has been the heterogeneous character of all natural cements. It is well known to cement-men that natural plants turn out a product that varies very perceptibly from day to day, and that the quality of rock in the same quarry frequently differs in its chemical constituents. As the manufacture is now conducted, however, every pound of this variable "raw" material is subjected to the same treatment, and no intelligent effort toward dealing with constantly changing conditions has ever been made. The method of calcination in a natural plant, after half a century of experience, is still astonishingly crude; and, although there is practically no limit to the opportunities for research in the way of subjecting different strata of rock to varying degrees of heat, no absolutely reliable data have been obtained. Nor is it at all certain that the ordinary vertical kiln now in use will ever produce a high-testing cement. According to the accepted mode of calcination, what is not left to chance and a favorable wind is merely the result of guesswork, notwithstanding the fact that consequences, more or less disastrous, attend the varying degrees of both underburning and overburning. Our present methods of testing cements, under the most favorable circumstances, leave much to be desired. Every chemist knows that the compounds formed during the hardening process are radically affected by variations in the raw materials, or in the burning, and that synthetic work is very difficult. He must be guided by the most painstaking operations, and possess some natural adaptability for the work. The temperature and quality of the water used in mixing, the temperature of the testing-room itself — for natural cement is almost human in its sensitiveness to heat and cold — are matters of extreme importance, and quite too trivial to merit the consideration of the individual who usually has charge of the test-making in a "natural plant." His ideas of chemistry, if he has any at all, are apt to be of the vaguest sort, and he is remunerated in accordance with what he knows about the matter. Nine times out of ten, the sum of his knowledge does not exceed the hazy notion that natural cement carries from twenty to thirty per cent of silica, thirty to sixty per cent of lime, anywhere from two to forty per cent of magnesia, more or less aluminium, some iron, and, occasionally, a bit of "any old thing," and there it ends. He deems his duty well performed when he has hurried his briquettes along at a rate so rapid as to approximate a blow, or, when he feels less energetic, so slow as to approximate a continued stress, each method giving different results. The superintendent of a natural-cement plant is also apt to be an amateur chemist. He sometimes keeps a brave show of text-books neatly arranged above his desk while matters are running smoothly, but, when the opposite is the case, and he is constrained to consult those same volumes, he throws them all into a corner, with an outburst of wild wrath. Between these worthies, the product is blithely hurried away to market, and later, when subjected to a systematic testing, it is found wanting, and "turned down," to the dumfounding of the two amateurs.

It will readily be seen that such hit-or-miss treatment could have only one result, and it is small wonder if engineers and architects have learned to distrust and avoid natural cement. It has frequently been argued that an elaboration of the process of manufacture would so increase the cost as to eliminate natural cement from the market altogether, and, doubtless, at this late day, there is some truth in this. If the standard had been raised in time, however, and the same intelligent research which has made Portland an invincible rival had been employed in the case of natural cement, many a prosperous year would still remain to the latter. But there has been no such research, and the result of this neglect has been an ever-widening difference in the quality of the two cements. So generally is this difference appreciated that our surprise is no longer aroused when we hear the builder of an 8' x 10' cistern anxiously questioning the mason whom he employs as to whether he thinks "natural would do."

It is to be regretted that the only remedy which seems to have suggested itself to manufacturers has been a strenuous desire to "do" each other, and so escape the embarrassment of a plethora.

In the stress of this congenial pursuit, they have lost sight of the fact that there is always a market with a superior price for a truly meritorious article. With the proverbial "nine points of possession" in their favor, they have been satisfied to rest supinely indifferent toward the betterment of their product, while the American makers of Portland were steadily forging a chain of successes, and anchoring it to the bed-rock of fortunate early failures, from which they had learned to be proficient. The governing factor of the situation has not been the unprecedentedly low price of Portland in 1901, as manufacturers assert. It has never been a difference in price, but a difference in quality. The difference between the price of gray lime and the price of natural cement was even greater in the days when natural cement sold at more than three dollars a barrel, yet the lower price did not retain the market for gray lime, by any means. In the evolution of an article of manufacture, price has seldom a predominant part. The "fittest" survives; but there has never been a legitimate reason why natural cement should not have held its own all along the line, all things being equal. That the contrary has been the case is undoubtedly true, and manufacturers have only themselves to blame. It is also true that it is characteristic of the American that "the best is never too good" for him, and our engineers and architects are no exception to the rule; they, consequently, recommend Portland because they know that nothing is left to chance in its manufacture, and because it is always safe to recommend the best. Every cement-expert is aware of the fact that the best brands of natural do not equal in strength or durability the most ordinary Portland; every builder knows that the use of Portland is sufficiently economical to offset the difference in the matter of price; every dealer knows that natural cement to be good *must be fresh*, and that Portland improves with age; every mason knows that freezing injures concrete or mortar made with natural, while Portland may be mixed and used in freezing weather without damage from cold, or even extreme changes of temperature.

If the former high price of Portland did not hinder its triumphal march, certainly the low price of 1901 did not fail to hasten its progress. In January, 1902, the better grades of Portland sold in the Lehigh Valley at less than a dollar per barrel, in bulk at mill. Production at the cost of fifty cents per barrel is plainly in sight, with mills of a later equipment; in fact, this figure has already been closely approximated. On the other hand, as the quarries of the natural-cement districts become deeper, the cost of bringing the rock to the surface seriously increases the cost of production. From this it will be seen that not only is the difference in the quality of the two cements growing wider, but the respective costs are growing closer together.

In 1890, the output of Portland was 335,500 barrels; in 1901, it reached the tremendous figure of 12,711,225 barrels. These figures are of themselves an epitome of the entire cement situation, yet Portland-manufacturers believe the output of this year will exceed 14,000,000 barrels and that these figures give but a hint of the progress which will be made during the next ten years. The enormously increased demand of the year just completed has, despite recent heavy imports, created a shortage which manufacturers have been unable to prevent.

Few people realize the close connection between the Portland-cement business and the iron and steel business. There is now an established certainty that these two industries will move forward hand-in-hand, in every great building-enterprise. In "armored" concrete (Portland-cement reinforced by metal rods) we have a building-material which will defy destruction. It is safe to prophesy that the Campanile of concrete-steel construction will not crumble. There is little doubt that we are opening on an era which will be known to subsequent industrial history as the "Concrete-steel Age." Already present-day builders are combining the two materials with results undreamed of less than a decade ago. We have bridges of concrete-steel construction, conduits for electric-railways, the combined curb and gutter, sewers, sidewalks and entire buildings. The city of the coming era will be almost solidly constructed of this absolutely fireproof "armored" concrete, a marvel of ventilation and sanitation, and the annual loss of life and valuable property in densely populated centres will become an obsolete horror. The surfaces of the model concrete-steel city will be sufficiently impervious as to be quickly and easily cleansed, and the dangers from bacteria will be reduced to a minimum. The building of hollow concrete blocks will be warm in winter, cool in summer, and impregnable to the rodent tribe, or other household pests. Nor need we consider the general use of concrete from its utilitarian side alone: we may confidently look forward to a revolution in our present styles of architecture. Very likely we shall see much in the way of the Moresque, or Spanish Renaissance, for the reason that these and kindred styles of architecture will lend themselves more readily to the use of this plastic material.

The great ease with which Portland-cement is utilized in architectural detail has been demonstrated beyond all doubt, and much will also be accomplished toward gratifying the most critical artistic sense. With the casting of statuary and bas-reliefs, indistinguishable from the most exquisite carving, with arcades and porticos of Ionic or Corinthian columns, windows with foliations, floors of cement or mosaic — surely, all these new concrete wonders, at a moderate cost, too, should do much for the Home Beautiful!

Though little has been accomplished in the way of coloring Portland-cement it is known that the range of tints obtainable without introducing deleterious elements is no mean one, especially the more desirable tints of gray, buff and terra-cotta.

We may look for a marked change in our present mode of burial also. The City of the Dead will cease to be a menace to the living. The concrete sarcophagus, or mausoleum of monolithic construction, in which the dead may be hermetically sealed, is already within the reach of the most ordinary.

So it is that we see the sturdy old industry of natural-cement making failing and dying, because, like Antæus, son of Earth, it has been compelled to wrestle for supremacy on a plane too far above its native level. And Portland, a Hercules born of man's indomitable ingenuity, holds out to posterity benefits beyond all reckoning.

F. H. DOREMUS.

UNIFORM SPECIFICATIONS FOR PAINTING.

IN the issue of *The Painters' Magazine* for July, 1901, there was an editorial calling attention to the fact that numerous complaints had been made at different master-painters' conventions that the average painting specification was so loosely drawn, or so impracticable or unintelligible, that loopholes were left for unscrupulous painters to do inferior work to that intended and still keep within the letter of the specifications. This fact deterred many of the best painters from bidding in the architects' offices. A suggestion was made to the National Association of Master House Painters and Decorators that a form of specifications might be prepared, sufficiently elastic to cover all classes and grades of work, yet so definite as to prevent any misunderstanding as to what was required.

It was believed that if a satisfactory form of specification could be secured, that it would be adopted by the American Institute of Architects, if brought before that body, and eventually would be used by all the best members of the profession. A committee was appointed at the meeting of the Executive Board, the following month, but no report was made at the Pittsburgh Convention of the Association in February, 1902.

At the Convention held in Richmond in February of this year, the Committee presented a report that was very thoroughly discussed. They said:—

"The Committee would suggest the following form of specification blank. These forms are to be printed with blank spaces, in each of which a number will appear, printed in very small type and preferably in red. These numbers will refer to a key, which will give the different methods, materials or number of coats which the architects may, at their pleasure, decide to be proper for the job in question. The choice of materials will thus be left to the architect, as it would be impossible to secure the cooperation of the architects in obtaining the adoption of any specification form which would prescribe absolutely for them, and leave them no opportunity to pick and choose methods and materials as well as effects. Your Committee believe that if painting specifications can be written so as to avoid ambiguity of meaning, and so that they will exactly express what the architect wants in terms that can neither be misunderstood nor twisted to cover a grade of work inferior to that which the architect had in mind, that a great benefit will accrue to all honorable master-painters."

The specification form suggested, after various modifications in the original report had been made, reads as follows:—

PAINTING SPECIFICATIONS.

Scaffolding, Etc.—The painter is to provide all the scaffolding, staging, etc., which may be necessary for the proper execution and completion of his work. He is to be responsible for any accidents due to defects in the same or caused by his negligence. He is to prosecute his work with an adequate force of competent mechanics and to avoid all unnecessary delays. On completion of his work he must leave everything clean and neat. He will not be held responsible for delays caused by strikes, fires or accidents, not caused by his negligence.

Workmanship.—These specifications call for a thorough and workmanlike job. All materials and labor must be the best of their respective kinds, and everything needed to complete the work must be furnished, whether the same has been distinctly specified or not. All coats of paint must be well brushed out.

Putty.—All nail-holes, cracks, defects, etc., must be thoroughly filled with pure putty after priming, made only from the best-grade bolted whiting and pure raw linseed-oil, and free from all adulterations. The addition of pure white-lead to the putty will be permitted, if the judgment of the painter dictates its use.

All knots and sappy places to be covered with grain-alcohol shellac.

Removing Old Paint.—All loose scale and cracking paint must be thoroughly scraped from the surface, and all rough places smoothed down with sandpaper. If the paint is badly alligatored or fissured, or if it clings in spots, while in other places it scales readily, all the paint must be completely burned off or cleaned to the bare wood by means of a paint remover. If the latter is employed, the alkali must afterward be neutralized in vinegar or mild acetic-acid, and thoroughly washed.

[NOTE.—The architect should provide that the carpenter shall leave his work smooth and in good condition for painting.]

EXTERIOR PAINTED WOODWORK.

All exterior woodwork (except) to be primed as soon as practical after being erected with (1) and to have

Letters indicate different methods for filling-in numbered blanks.
(1) A. — Pure white-lead.

(2) additional coats of (3) in the following colors (4):—

Thinners.—Pure raw linseed-oil only (5) will be permitted for thinning the paint, with such proportion of pure turpentine as the judgment of the painter may determine, and only just so much of the best liquid dryers as may be absolutely necessary.

Time between Coats.—No subsequent coat of paint shall be applied on top of the paint already on until the under coats shall be dry.

Stained Shingles.—The shingles on shall be dipped for not less than two-thirds their length in (6) before they are put on, and shall receive one additional coat of the same material, applied with a brush, after the work of the carpenters has been completed and the scaffolding has been removed.

Sanding.—The following work to be sanded coats.

IRONWORK.

Structural Iron.—All rust and mill scale to be thoroughly removed from ironwork by means of steel-wire brushes. All structural ironwork must be primed before it is erected, and all sides and ends must be thoroughly coated. The priming to be done with (7)

The priming coat is to be followed by (8) subsequent coats of (9)

Galvanized Iron.—Before priming all galvanized ironwork is to be washed with a strong solution of common soda, or is to be washed with dilute muriatic or acetic acid, and then to be thoroughly rinsed with clear water and allowed to become perfectly dry.

To be primed with (10) and to have additional coats of (3)

INTERIOR PAINTED WOODWORK.

Flat Finish.—All interior woodwork except doors, in the following rooms: to be primed with pure white-lead and linseed-oil to have (11) additional coats of (12) To be tinted as directed by the architect, it being understood that not more than tints will be used in each room.

[NOTE.—If the panels are to be painted a different tint from the stiling, or if the mouldings are to be of a different color from the base-board, these facts should be specified.]

NOTE 2.—For a gloss finish add varnish to the last coat.]

Enamel Finish.—First coat: white-lead mixed with turpentine and linseed-oil, equal proportions.

Second coat: white shellac, grain-alcohol.

Third coat: white-lead mixed in pure turpentine.

Fourth coat: two parts of lead, one part zinc, mixed in turpentine.

(2) For cheap work, one additional coat; for ordinarily good work, two additional coats; for the best work, three additional coats.

[NOTE.—This coats of paint, well brushed out, are more durable than heavy coats, and are not so liable to crack.]

(3) A. — Pure white-lead.

(4) If the architect cannot specify the colors to be used, he should say how many colors, and whether the mouldings are to be picked out, so as to give some idea of the quantity of work required.

(5) The architect may specify any manufactured or prepared oil by name, if he desires to use it, but unless distinctly called for in the specifications, the substitution of such an oil, or of adulterated oil, should be absolutely forbidden.

(6) A. — Any special brand of shingle-stain, naming the number intended to be used. An allowance should be made if a more expensive color is used than the one specified.

B. — Pure colors in oil, thinned with pure raw linseed-oil to the required consistency for dipping.

(7) A. — Pure red-lead, mixed to the proper consistency with pure raw linseed-oil and about one gill of the best japan drier to the gallon of oil.

[NOTE.—Some authorities contend that no driers should be used with pure red-lead.]

B. — Prince's Mineral Brown, thinned with pure raw linseed-oil and the necessary pure japan driers.

C. — (Name of brand) graphite paint, thinned with pure linseed-oil and the best japan driers as required.

D. — Such special iron paint or preservative coating as the architect may select.

(8) The best practice calls for the use of two additional coats of paint or preservative coating on all structural ironwork.

(9) A. — Pure red-lead and pure raw linseed-oil, the second coat to be tinted with not more than six ounces of pure lampblack to twenty pounds of red-lead; the last coat to be the pure color. The painter will not be allowed to apply the third coat until the second coat has been examined and passed upon by the superintendent in charge of the works.

[NOTE.—The object of tinting the second coat with lampblack is to make sure that every portion of the ironwork gets the number of coats called for.]

B. — Pure white-lead and pure linseed-oil, tinted as the architect may direct.

[NOTE.—This is for work exposed to view, where the color of red-lead or graphite might be objectionable.]

C. — Prince's Mineral Brown and pure linseed-oil.

D. — (Name of brand) graphite paint and pure linseed-oil.

E. — Such special iron paint or preservative, or such mixed paint as the architect may select.

(10) A. — Pure red-lead mixed with pure raw linseed-oil.

B. — Prince's Mineral Brown and pure raw linseed-oil.

C. — Equal parts by measure of dry red-lead and mineral-brown, ground together dry and mixed by hand with equal parts of pure raw linseed-oil and pure turpentine.

(11) For cheap work, one coat; for better grades, specify from two to four additional coats; for the best work, to be sandpapered smooth between coats.

(12) A. — Three additional coats pure white-lead, each additional coat to be allowed to become dry and sandpapered smooth before the succeeding coat is applied. Final coat to be pure French zinc-white, ground in bleached linseed-oil, and thinned with pure turpentine.

[NOTE.—This gives a very white job of a velvety texture.]

B. — Pure white-lead, the last coat to be thinned with pure turpentine only.

[NOTE.—This is for a white job. If tinting is desired, add the words "and tinted as directed."]

C. — (For dark colors only.) The second coat to be pure white-lead, tinted with lampblack to a lead color, and the final coats to be pure colors in oil, thinned with pure turpentine and just enough linseed-oil to act as a binder.

Fifth coat: lead and zinc, equal proportions, mixed in turpentine.
Sixth coat: pure zinc and turpentine with small proportions of white varnish.

Seventh coat: pure zinc thinned in white varnish.

Eighth coat: flowing coat of white-enamel finishing varnish, full body.

Rub between coats with curled-hair or 00 sandpaper. After allowing three days to harden, rub to a dull, even finish with pumice-stone and water.

[NOTES.—If a high polish is desired, specify after the pumice-stone, "rub to a high polish with rottenstone and water."

It is essential that the portions of the building to be enamelled should be closed to all persons except those employed on the work. Mantels, tiling, etc., should be completed and the flooring given at least one scouring.

Finishing hardware should be left off until the enamelling is completed.]

Graining.—To have three coats of ground, then to be grained and to have (18) coats of (20) varnish.

EXTERIOR VARNISHED WOODWORK.

All exterior hard woodwork is to be filled with (13) paste filler, well rubbed into the grain of the wood. This is to be followed by (14) coats of (15) exterior varnish, which is to be rubbed with curled hair or sandpaper between coats, to cut the gloss. The last coat to be left with full gloss.

[NOTE.—The durability of exterior varnish is impaired by rubbing on the last coat.]

EXTERIOR HARD WOODWORK (ANTIQUE EFFECT).

The following exterior woodwork is to be stained with an approved acid or pigment stain, and to be given two coats of boiled linseed-oil, well rubbed into the grain of the wood.

[NOTE.—A better result is obtained by applying the linseed-oil hot.]

INTERIOR VARNISHED WOODWORK.

Open-grained Wood.—All interior trim in the following rooms: to be filled with (13) paste filler, well rubbed into the grain of the wood and then to be cleaned off the surface with burlap or excelsior. This is to be followed by (14) coats of (16) rubbed with curled hair or sandpaper between coats to cut the gloss, and the last coat to be (17)

Close-grained Wood.—All interior trim in the following rooms: to have one coat of (18), which is to be sandpapered or smoothed with steel shavings after it has become thoroughly dry, to be followed by (14) coats of (16) (17)

Painting Back of Trim.—The back of all trim, wainscots and other interior finish which comes in contact with brickwork or masonry, is to be painted before it is put up with one heavy coat of paint mixed with pure raw linseed-oil.

Staining.—All interior trim in the following rooms: to be stained to such color as may be directed by the architect. To be finished as directed under the specifications for (open close) grained wood.

[NOTE.—In the case of oak, or other open-grained woods the stain may be mixed with the paste filler if the desired results can be so obtained.]

Wiped Stain.—Interior trim in the following rooms: is to be stained on the bare wood, with a stain composed of pure colors in oil, of such shades as the architect may direct, thinned with pure raw linseed-oil to the consistency of a thin paint. After this has become partially dry, it is to be wiped off with rags, and the wood is then to be finished as directed for close-grained woods.

One Coat Stain Finish.—All the interior trim in the following rooms is to be finished with one coat made by taking pure colors in oil, to the shade selected by the architect, thinned with mineral-oil and as much liquid driers as may be necessary. This is to be applied as a paint and to be well rubbed into the wood with a rag.

[NOTE.—This finish is particularly applicable to chestnut.]

Waxed Finish.—(Plain oak, quartered-oak, ash, Circassian walnut, California redwood, etc. Medium grade.)

(13) Name of selected brand may be inserted, or the words "best quality mineral base, paste filler," would indicate a good job.

(14) Not less than two coats, preferably four coats.

(15) A.—Elastic gum durable exterior varnish, guaranteed free from benzine or rosin.

B.—The name of such brand as the architect may select.

(16) A.—Best quality pure kauri gum, linseed-oil and turpentine varnish.

B.—Name of selected brand of varnish.

C.—Bleached (or orange, where dark color is not objectionable, shellac, cut with grain-alcohol, sandpapered with the grain between coats, and last coat to be (17).

(17) A.—Left with full gloss (cheapest finish).

B.—Rubbed to an eggshell gloss.

C.—Rubbed to a dull finish.

D.—Rubbed to a polish (the most expensive finish).

[NOTE.—Where expense is an object and a high gloss not desirable, the last coat may be specified to be a varnish drying with a dull lustre.]

(18) A.—Pure grain-alcohol shellac.

B.—Best quality liquid filler, made with a pigment base and thinned with turpentine.

C.—A brand of liquid filler may be designated by name.

To be stained as desired and to receive one coat of oil, one coat of pure grain-alcohol shellac and to be waxed in the best manner. After applying wax it must be rubbed thoroughly hard and dry with hard bristle brushes to a dull polish.

(Same woods. First class.)

To be stained as desired and to receive two coats of oil, one coat of pure grain-alcohol shellac and to be waxed in the best manner. After applying wax it must be rubbed thoroughly hard and dry with hard bristle brushes to a dull polish.

[NOTE.—The above applies to Flemish, weathered, Mission, golden or antique oaks, or any wood finished with open pores and wax finished.

[NOTE 2.—California redwood should receive one additional coat of shellac.]

Floors (Waxed).—To have one coat of shellac (or paste filler if open-grained wood) and then waxed to a smooth finish with weighted brushes.

Varnish Finish.—Floors in the following rooms: to be filled with paste filler, and to have (19) additional coats of (20) floor-varnish.

Painted Floors.—Floors in the following rooms: to have three coats of (12 B. or C.) This is to be followed by two coats of (20) floor-varnish.

[NOTE.—Thin coats are absolutely essential.]

PLASTERED WALLS.

To have four (or more) coats of pure white-lead and linseed-oil to tints as directed.

[NOTE.—For new walls a wash of brown sugar and vinegar or acetic-acid is desirable for neutralizing the alkali.

Distemper Colors.—To have a coat of approved size and to be tinted in colors, as directed.

TINWORK.

All tinwork, as soon as proved tight, to be primed with one coat of mineral-brown and linseed-oil and to have one additional coat on completion of the building.

BRICKWORK.

To have three (or more) coats of colors to suit the architect.

[NOTE.—The same specification applies to stone or stucco.]

At the conclusion of the discussion a motion was adopted that the amended specifications be referred back to the Committee, and that they be discussed by the local associations. The Committee will then make such modifications as may seem necessary and report back to the midsummer meeting of the Executive Board of the National Association; after which the revised specifications will probably be presented to the American Institute of Architects, with the suggestion that a joint committee of the two bodies shall take up the question and report back any modifications they may deem necessary.

The Committee having the matter in charge would be very glad to receive any suggestions from architects with reference to these specifications. Any communications should be addressed to the Chairman, Mr. Edward Hurst Brown, care of *The Painters' Magazine*, 100 William Street, New York City.

THE AMERICAN WESTINGHOUSE WORKS.

It is sixteen years, says a correspondent of the Glasgow *Herald*, since George Westinghouse decided to "play electricity for all it was worth." The Westinghouse Electric Company at East Pittsburgh is the greatest plant in America. The Westinghouse works at Old Trafford, near Manchester, is the greatest plant in England. East Pittsburgh is to-day the mart for ideas in electrical work. And here is a point which shows the type of man who directs these businesses. There are thousands of inventions, good in theory, which won't bear practical test. Most manufacturers being satisfied that an idea, however ingenious, is useless, would thank the inventor and say good-day. Mr. Westinghouse, with the intuition of genius, often buys a patent that has been condemned. He has a body of men who do nothing but experiment. He takes an unworkable patent to a man. "The idea in this thing is all right, only it won't work in practice. I want you to put it right." And it has to be done.

We all know the name of Nikola Tesla, whom some in the scientific world regard as an electrical mountebank. Mr. Westinghouse cut through the flamboyant imaginativeness of Nikola Tesla and got down to the bed-rock of his theories. He saw that Nikola Tesla, behind all his firework talk, had brains. Patents of Nikola Tesla's, regarded by many men as waste paper, Mr. Westinghouse bought. He handed over the ideas to sound, level-headed electricians with the order, "Make them practicable." It was from the scoffed-at electrician that came the germ of the fundamental patents of the distinctive Westinghouse electrical apparatus in induction-motors, and the use of alternating high-tension currents. At Niagara are several 100,000-volt transformers, turning the mighty falls into commercial value.

George Westinghouse, like all Americans, is always enthusiastic about something. He took up the Nerst electric-lamp, which was

(19) From two to four.

(20) Best quality, or name of brand.

[NOTE.—The use of shellac is not recommended on floors, except under wax.]

nothing but a laboratory device, and made it practicable. He took to the making of steam-engines. He made the little steamer "Turbina" that slices through the sea at thirty-eight miles an hour. Natural-gas was found accidentally on his works. He started making gas-engines. He has two in his power-house, one of 750 horsepower. George Westinghouse is a believer in gas. He says that the economies which must result from the distribution of power by means of gas generated at central points, and conveyed in pipes along the lines of railroad for the operation of engines and electric generators, would justify the expenditure of large capital necessary for such installation in connection with the electric equipment of railways, particularly on metropolitan and suburban lines. You see from this something of the energy, the tirelessness, of a typical American at work.

The management of a great American business concern is carried to its finest point in these mammoth shops at East Pittsburgh. Take that great aisle. There was being built a generator 45 feet high, intended for the New York Rapid Transit Company, a great wheel, sister of the pyramids in size and generating an electric current sufficient to drive 600 street-cars. It was the biggest thing of the kind ever made. It was being tested and would then be sent in sections to New York. No railway truck could carry it, no tunnel could let it pass through. But the sections were as big as possible and made within 1½ inch of the largest tunnel aperture.

The whole floor was of steel with thousands of bolt-holes. There were the colossal cranes: they were not swinging work to the machines. The work was so big that in all cases the machines had to be swung to the work. Everything was driven electrically. Some of the "tools," as big as a cottage, were "self-contained": within the frame they carried a motor and it simply needed the fixing of a button to set the thing working.

I went among these "tools." They were all busy with an intelligence that made the layman wonder. Six or seven big "tools" were thundering and cutting, and not a man near. "Haven't you a man to look after these?" I asked. "Oh, yes," was the reply, "but I suppose he is busy just now doing something else." Throughout the works were 1,750 "machine-tools," from delicate watchmaker appliances, turning out jewelled bearings for sensitive measuring instruments, to making the framework of electric-cars weighing fifty tons.

To the first glance everything seems confusion. But look at the door at one end of the shop, and you see rough, ungainly parts being brought in. Look at the other and you see finished machines being packed on railway trucks and despatched to their destination. The whole thing is clockwork. The scheme is one of dates. An order comes into the main office. It is handed on to the twelve men in the production department. Every section of the works is informed of what is required, not simultaneously, but at proportionate dates, sometimes six months from one to the other. Every day's work is arranged to a nicety, so that the men working in the middle of the shop won't get a pile of stuff ready and block the way long before the appliances are wanted.

The making of parts is specialized. Often a workman does not know what he is really making. But he delivers on a certain day, and on that certain day another department is just ready to receive and advance the work another stage. Such an immensity of work is done that it takes fully six months for a motor to pass through all its stages in that quarter-of-a-mile-long shop. But each day from that one aisle there leave sixty 200 horse-power motors for street-cars.

"The work of our designers is to simplify," I was told. "Electric appliances are not becoming more complex, but more simple."

That explains largely why of the 6,000 employes on this plant 1,200 are girls. It explains also how a man who was a clerk six months ago is now working in an electric shop; how, when a man is dismissed from watching a machine that punches holes, he is soon expert enough to look after a machine that cuts a groove. The standardization of parts and the devoting of years to making the same small thing have the effect of converting men into machines and the machines into intelligent workers. You get men who work like lightning, but there is little of the artisan about them.

Yet there is room for brains. A man who can devise an improvement in a machine which will reduce cost and produce more, he is the man worth anything. The American workman knows this. He has largely got rid of the old-fashioned idea that he is doing an ill turn by displacing labor. He is doing a good turn for himself, and this is the thing that counts. An employer thinks little of a man who has no suggestions. The management are all eyes for the clever man or boy. There is no room for grumbling that a man does not get a chance. If a man misses chances in America, he lacks the brains. All this is understood. When an American workman sees another do something ingenious he is positive he can do it also. Anyway, he tries. If he fails he knows the reason.

Specially did I inquire into the conditions of labor in the Westinghouse Electric Company. I saw that the secret of the enormous output was due to three things, standardization, labor-saving machinery, enthusiasm of the men. There were a good many Englishmen employed. In regard to them it was the same story I had heard elsewhere. On their first coming they were slow. They were jacks-of-all-trades in electricity and master of none. But when they dropped into American ways of focussing all their energies on one thing they were able not only to hold their own, but often to beat the Americans.

One of the most interesting of men is Mr. Philip Lange, the manager of the works, who began, as most managers do in the States, at the bottom. He is a German, but with all the phlegmatic Teutonism soaked out of him, a man all nervous vitality, whose fingers are ever on the twitch, whose round gray eyes are ever on fire, but on whose features are the taut lines of years of anxiety.

We discussed the problem of labor, how most could be got out of a man, and how was he entitled to be paid in these days of commercial warfare?

Fifteen years ago Mr. Lange began grappling with the capital and labor issues. As far as the Westinghouse firm is concerned, he thinks he has solved the riddle.

At first all the Westinghouse workers were paid day wages. He came to the conclusion that men, assured of a certain wage, were not putting forth all their energies. Then the piecework system was adopted. That didn't satisfy him. Men produced a little more, but not much. He decided that there was "old soldiering," men were not earning all they could by piece, but "ca'd canny," because they were suspicious that if they earned high wages the piece price would be cut, and they would be coaxed into still more hustle, which would mean still another cut. Then he adopted the premium plan. He called all the men together and said that on the basis of their piecework they would get the same pay for the same amount of work, but if they could do in eight, or seven, or six hours what had previously taken them ten hours to do, then for all they made in the remaining two, three or four hours, to make up the ten-hour day, they would get half and the company would get half. This was, in all truth, a premium on hustling.

Many of the workers hung back because they were suspicious of its being a scheme to see exactly what could be got out of men, and then cut their wages so that they would have to keep up a greater strain of energy to earn what they had previously earned with comparative ease. Mr. Lange, however, made a bargain. He gave a definite undertaking that he would not cut for a year, and there should be no cutting then if trade continued good. He talked business and not philanthropy. He wanted to make more money for the company; he wanted to produce things cheaply, which he could by obtaining several hours at half the previous rates; he wanted to get all the work he could out of the men, and for the men to benefit in their week's earnings for the same number of hours' work, without a dread that it would be said they were making too much.

For six years now the scheme had been in operation in all the machine-shops. It has worked admirably. With a smile Mr. Lange told me that most of the piecework formerly done in ten hours is now done in seven, and in some cases the time had been cut down to even four hours. Yet, for the four hours' work the man gets the pay he formerly got for the full ten hours' work; turning out twice and a half as much as formerly, he gets nearly twice as much in wages.

"The other day a foreman came to me and said that one of his men was earning too much. He was making sixty-three cents (2s. 7½d.) an hour, while three men alongside him doing the same work were making thirty-four cents (1s. 5d.) an hour. Now, that is a tremendous wage for a mechanic, 24s. a day. I wouldn't listen to the talk about cutting his wages. If I had done so the confidence the men now have in me would be gone. It is their present confidence that makes them press every nerve into the service. And what reason have I to complain? Would that we had hundreds of men earning sixty-three cents an hour. I see that under my fifty per cent premium arrangement the more they earn for themselves the more they earn for the firm, and the men see that the more they turn out for the firm the better it is for themselves."

"And what use do they make of their high wages; do they save?" I asked.

Mr. Lange smiled, and then he laughed. "When an English or German workman comes to this country and brings his wife with him he will have a banking-account in six months, and own his own house within the year. But if he comes here and marries an American girl, why, he'll never know what a banking-account looks like."

RETEMPERING CEMENT-MORTAR.

IN construction of the Manhattan Railway Company's power-station at Seventy-fourth Street and East River, New York City, during the past two years, about forty thousand barrels of cement were used, all of which was carefully inspected, over 3,500 briquettes being made and broken. In the course of this work several special investigations were made, which are described in a paper by Mr. Thomas S. Clark, resident-engineer in charge of construction of the power-station, printed in *Cement and Engineering News* for October, from which the following paragraphs have been taken:—

"It is to be regretted that the practice of retempering Rosendale cement-mortar after it has lain in the masons' tubs over the noon-hour is a frequent practice by builders in New York City. It is not a question whether a wall built with retempered Rosendale cement-mortar will fail or not, but it is a question of getting the best wall for the money expended. To prove to the satisfaction of all concerned that Rosendale cement-mortar is injured by retempering after sixty minutes the experiments shown in the table were made. All briquettes in like sets of same brand were made from the same bag of cement and their treatment was exactly the same, except the retempering, which was done at the end of the hour, and enough water

added, as in practice, to bring the mass back to its original consistency.

EFFECT OF RETEMPERING ROSENDALE CEMENT-MORTARS.

Hours in Air.	Age in Days.	Tensile Strength.		Remarks.
		Aver. No. of Tests.	Lbs. per Sq. In.	
		Neat cement; water, 28 per cent. ¹		
3	1	43	139	Not retempered.
3	1	13	27	Retempered after 60 minutes.
24	7	27	166	Not retempered.
24	7	20	64	Retempered after 60 minutes.
24	14	20	180	Not tempered.
24	14	7	80	Retempered after 60 minutes.
24	28	6	219	Not retempered.
24	28	6	94	Retempered after 60 minutes.
24	56	5	322	Not retempered.
24	56	3	180	Retempered after 60 minutes.
		1 cement, 3 sand mortar; water, 14 per cent.		
24	28	5	39	Not retempered.
24	28	5	31	Retempered after 60 minutes.
24	56	5	73	Not retempered.
24	56	5	59	Retempered after 60 minutes.
24	112	5	113	Not retempered.
24	112	5	56	Retempered after 60 minutes.

¹ Per cent of water given is the initial wetting.

"The same disastrous results were obtained even when the cement was moistened every fifteen minutes of the hour. Contractors have argued that if a little fresh cement is added the mortar is as good as it was originally. It is quite true that the strength is increased, but the old mortar must be considered as almost inert material. It cannot be supposed that the fresh cement has any life-giving effect upon the particles of the old cement which has passed through the first stages of set. Builders may be able to point to walls where this practice was in vogue, but there is no question that the wall built where it was not allowed is the better wall, will endure longer and stand more shock. With several brands of Portland-cement under the same treatment the machine used failed to show any injury done.

"As with Rosendale cement, there must be a limit where retempered Portland will fail, and we are inclined to believe that it is somewhere within the second hour of standing. That the retempered Portland did not fail may be explained by the fact that the time of active set of Rosendale is shorter than that of Portland. The safest rule is to allow no retempering under any circumstances.

"It is safe to assume that concrete a little too wet is oftentimes better than that which is too dry, especially when laid in warm weather, but when forced to lay Portland concrete in freezing temperatures the least possible water used the better.

"In order to determine roughly the relation between the tensile-strength of neat cement, cement-mortar, stone and cinder concrete and its so-called modulus of rupture when acting as a beam under a concentrated centre load, briquettes and beams were made, the latter with rectangular cross-section, using the same cement and aggregate for like sets and subjecting them to exactly the same treatment. After breaking the briquettes by direct tension, and the beams by cross-bending, it was found that the substances mentioned showed, on a fair average, that the modulus of rupture of cross-breaking was about one and one-half times greater than the strength in direct tension.

"The fracture in the beams often showed the place of rupture passed directly through the stones of the aggregate, so the strength of the stone was largely a factor of the strength of the beam."

COAL-STRIKE REPORT.

THE New York Tribune publishes the following digest of the Coal Strike Commission's Report:—

WHAT THE MINERS GET.

An increase of ten per cent in wages to contract-miners, from November 1, 1902, and during the life of the award [three years].

An increase of ten per cent in wages to water-hoisting engineers for the same period.

An increase of ten per cent in wages to other engineers, pumpmen and firemen, from November 1, 1902, to April 1, 1903, and five per cent thereafter during the life of the award.

An increase of ten per cent in the wages of all company men and other employés.

Company men and other employés not specifically provided for to be paid on the basis of a nine-hour working-day.

Engineers, firemen and pumpmen to work in eight-hour shifts instead of twelve-hour shifts.

Engineers and pumpmen to be relieved on Sundays without loss of pay.

Local boards of arbitration for the settlement of disputes in individual collieries.

A sliding scale, by which the miners' wages are increased one per cent for every ten per cent increase in price of coal.

Check weighmen to be employed at the collieries by the miners at their own expense.

Uniform distribution of mine cars among the miners.

Any increase in the size of mine car or topping to be accompanied by proportionate increase in rate paid per car.

WHAT THE OPERATORS GET.

No specific recognition of the United Mine Workers.

The present methods of payment for coal mined shall continue unless changed by mutual agreement.

Concerted effort on the part of the mine-workers to limit output, except by agreement with operators, forbidden.

Work not to be suspended pending settlement of matters referred to arbitration boards.

No discrimination against non-union men.

Boycott and violence condemned.

Demand that coal mined be paid for by weight refused.

Interposition of the State militia in the coal-regions to preserve peace justified.



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

[CORRECTION:—By error the title of the Church of St. Rose of Lima, New York, in our last issue was printed as the "Church of St. Mary of Lima."]

MEMORIAL ALTAR AND REREDOS: ST. LUKE'S CHURCH, GERMANTOWN, PA. MR. GEORGE T. PEARSON, ARCHITECT, PHILADELPHIA, PA.

A COMPETITIVE DESIGN FOR THE STATE OF RHODE ISLAND SANATORIUM FOR CONSUMPTIVES. MR. CALVIN KIESSLING, ARCHITECT, BOSTON, MASS.

HOUSE OF ISAAC T. STARR, ESQ., WYNCOTE, PA. MR. ADIN B. LACEY, ARCHITECT, PHILADELPHIA, PA.

CONGREGATIONAL CHURCH, MAPLE HILL, KAN. MESSRS. ROOT & SIEMENS, ARCHITECTS, KANSAS CITY, MO.

Additional Illustrations in the International Edition.

ENTRANCE FRONT: HOUSE OF ISAAC T. STARR, ESQ., WYNCOTE, PA. MR. ADIN B. LACEY, ARCHITECT, PHILADELPHIA, PA.

HOUSE AT EDGEWATER, ILL. MESSRS. CHURCH & JOHNSON, ARCHITECTS, CHICAGO, ILL.

CHURCH OF SAN MERCURIALE, FORLI, ITALY.

THE CAMPANILE AND THE PIAZZA DEI SIGNORI, VERONA, ITALY.

NOLLENDORFPLATZ STATION: ELECTRIC ELEVATED AND UNDERGROUND RAILWAY, BERLIN, PRUSSIA. HERREN CREMER & WOLFFENSTEIN, ARCHITECTS.

This and the following plate are copied from *Blätter für Architektur*.

THE BÜLOWSTRASSE STATION: ELECTRIC ELEVATED AND UNDERGROUND RAILWAY, BERLIN, PRUSSIA. HERR BRUNO MÜHRING, ARCHITECT.



[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 PREDICTION: THE WHISPERING GALLERY AT WASHINGTON.

CAMBRIDGE, MASS., March 6, 1903,

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—In regard to the matter of "echo" which you mention, I have just had a rather curious experience which may interest you. You may have heard of the rather famous "whispering gallery" in the old House of Representatives, now the Hall of Statues in the Capitol at Washington. The other day after a public lecture a gentleman told me that the "whispering gallery" property of the hall had disappeared in the process of renovating the room, though the Superintendent of the building took every effort to reproduce the old ceiling as accurately as possible. I was sorry that it had gone, for some few years ago I cited it as an illustration of whispering galleries in my article on that subject in the "American Dictionary of

Architecture." In that article I made mention of the fact that the ceiling was smooth, but painted to represent panelling, and said that had that panelling been in relief, instead of merely painted, there would have been no whispering gallery worthy of mention.

When in Washington during the Christmas recess I went to the Capitol, in order to see what might have inadvertently destroyed the property of the room, and found that in copying the old ceiling they had copied the panelling in relief, with the result predicted. A number of persons have said since the "whispering gallery" disappeared that in view of the care with which the old ceiling was reproduced in the new the incident is a disproof of the possibility of predicting acoustical effects. It rather pleases me that, as a matter of fact, this result was predicted. It illustrates rather than slight architectural variations are of perfectly definite and of considerable acoustical importance.

Very truly yours, WALLACE C. SABINE.



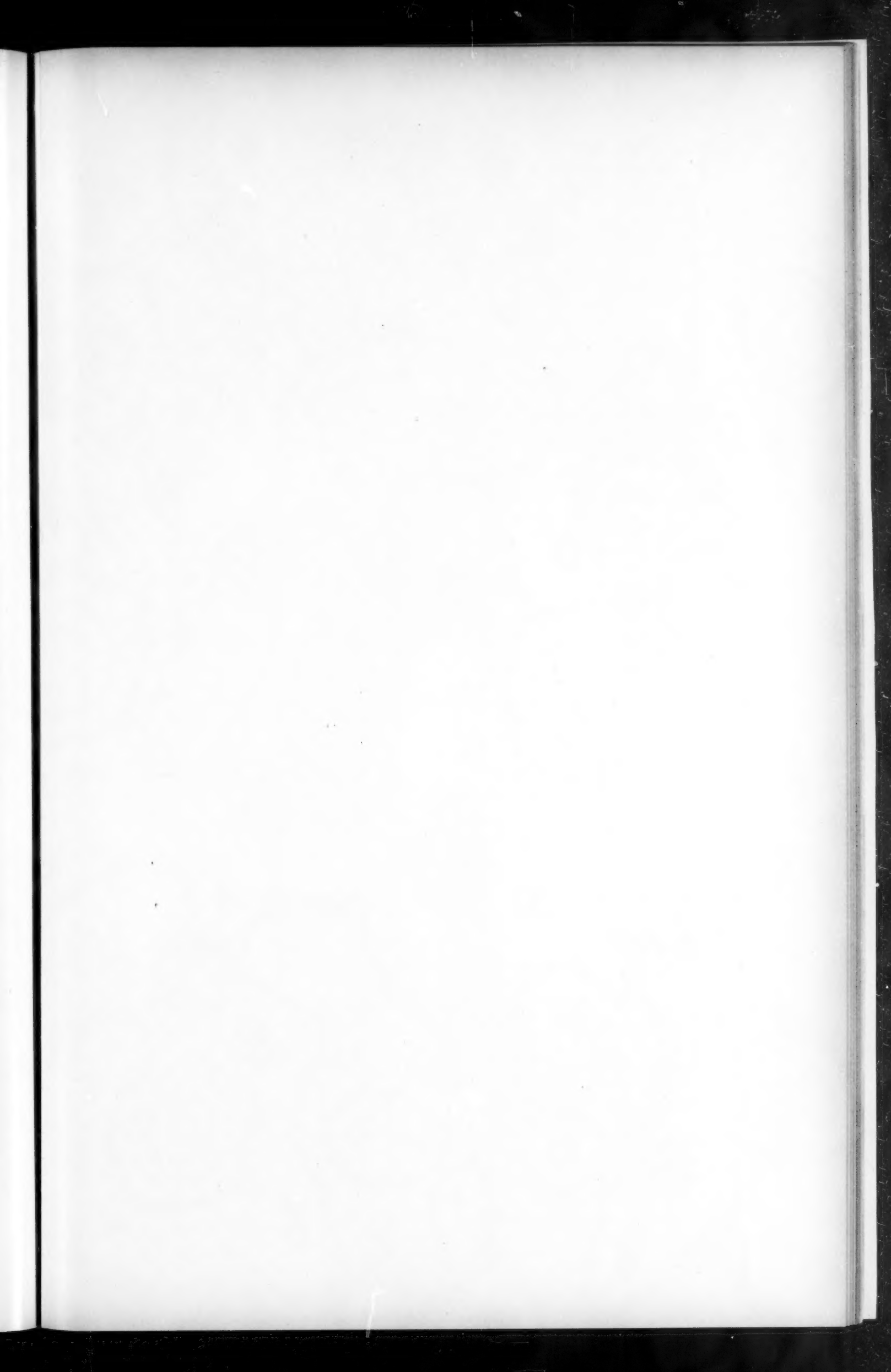
ST. MARGARET'S, WESTMINSTER. — No truth is more certain than that the surest way to dwarf a really large building is to remove from it all standards by which its size may be estimated, and plant it alone with a free space all round it. We all know how much smaller St. Peter's appears than St. Paul's from this very cause. The magnificent piazza in which it stands, and the accurate proportion of its colonnades and other adjuncts, all tend to bring down its size and diminish its effect. Now, at Westminster, St. Margaret's just supplies what St. Peter's at Rome wants. We see a very large building with a lofty tower dwarfed into insignificance by the side of the Abbey, and we almost unconsciously grasp the dimensions of the building, and have a feeling of its magnitude which would be lost if this standard were removed. We may add that St. Margaret's has become more than ever essential now that the Palace of Westminster, with its lofty towers, has been erected in such close proximity to the Abbey. The dignity of the older building suffers grievously in all distant views from its aspiring neighbor. Remove St. Margaret's and the nearer view would almost equally suffer. — *The Architect.*

OPEN-AIR PULPITS. — "I know little about Nonconformist architecture," says Harry Hems in the *Building News*, "but think the assumption that no Dissenting chapels in this country possess exterior pulpits is correct. The only modern instance of such a pulpit attached to a church in England, until the other day, was, I believe, that at St. Mary's, Whitechapel, E. A second, however, was dedicated early this month (October) outside St. James's Church, Piccadilly, W. The most perfect example of a fifteenth-century exterior pulpit may be seen in the first court of Magdalen College, Oxford. It was incorporated into that building by Waynflete, when he erected the present college (1473-81) upon the site of the Hospital of St. John, parts of the latter, the pulpit and its surroundings among the rest, being preserved *in situ*. The lovely old "Reader's Pulpit" at Shrewsbury Abbey (A. D. 1350-60) is often cited as an external one; but it was not originally so, as it was built within the refectory, and has simply been rendered external by the destruction of its immediate surroundings. It stood, when erected, much as does the well-known Early English one in the refectory at Chester Cathedral, which is adjacent to the fabric, and is entered from the cloisters. There is no actual access to it from the refectory itself. Entry is gained from a room behind. There is another of the same date, but much more ornate, at Beaulieu, in Hampshire. There is a pulpit outside the cathedral at St. Dié, in France, but it is within the cloisters. At the Cathedral of Notre Dame at St. Lo, in Normandy, there is an exterior pulpit upon the north side, and at Vitre (Ille-et-Vilaine), France, at the Church of Notre Dame, is one of the finest exterior pulpits in existence. It is carried up from the ground by a tall base and shaft, and is well carved, surmounted by a tall and very beautiful spiral canopy. There is an external pulpit projecting from the north wall of the choir of Vienna Cathedral, from which, it is said, St. John Capistran preached the crusade in 1451. Several instances occur of external pulpits in Germany, both outside churches, upon the edge of churchyards, and isolated in cemeteries. One of the latter occurs at Mainbernheim, in Bavaria, a cemetery cloistered all around, even as is the never-to-be-forgotten Campo Santo at Pisa. This pulpit is of Renaissance character. The stone sounding-board is supported by massive columns, and all is capped by an ogee-roof, on the top of which is a weather-vane. It is approached by a winding staircase. At Aschaffenberg, the minster church has a parapet of open stonework running around its yard. At one corner this is made to project upon a semicircular corbel, and hence a pulpit is formed that thoroughly commands the ground (perhaps 12 feet) below. The same sort of arrangement may be seen at Bamberg, in Bavaria. In the interesting town of Schwäbisch-Gmünd, Würtemberg, in the principal church are the burial-places of the two illustrious architects, Henry and Peter von Arler, who built Milan and Prague cathedrals. A quaint building there is Salvator's Kirche, the lower part of which probably dates from Pagan times. Indeed, it is simply an excavation made in the actual limestone rock, a kind of grotto, with a chapel above. The latter appears to be of fifteenth-century date. Near its altar is a doorway, giving access to an external pulpit, which is carried up outside, from the same level as is the floor of the lower chapel, by a tall circular column. The pulpit itself is octagonal, and has figures carved in panels upon each cant. While on the subject of pulpits, it may be interesting to add the oldest oak one is probably that at Fulbourne, a village not far from Cam-

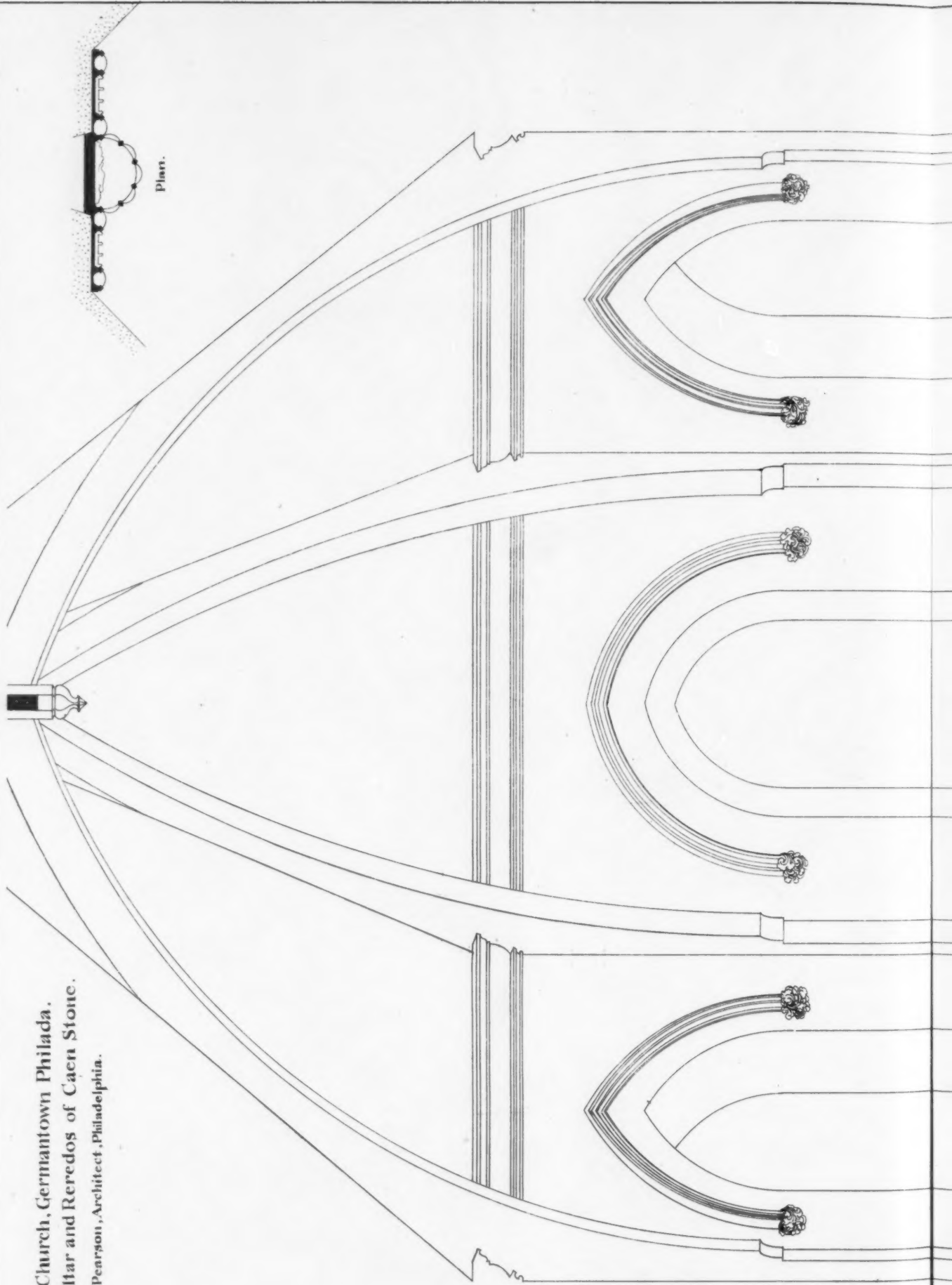
bridge. It dates from A. D. 1350. The pulpit at Mellor, in Derbyshire, has its body cut out of one solid butt of oak. Five of its sides are ornamented with sunk tracery, and it claims to having been made in A. D. 1330-40; but I am inclined to think it is not of quite so early a date."

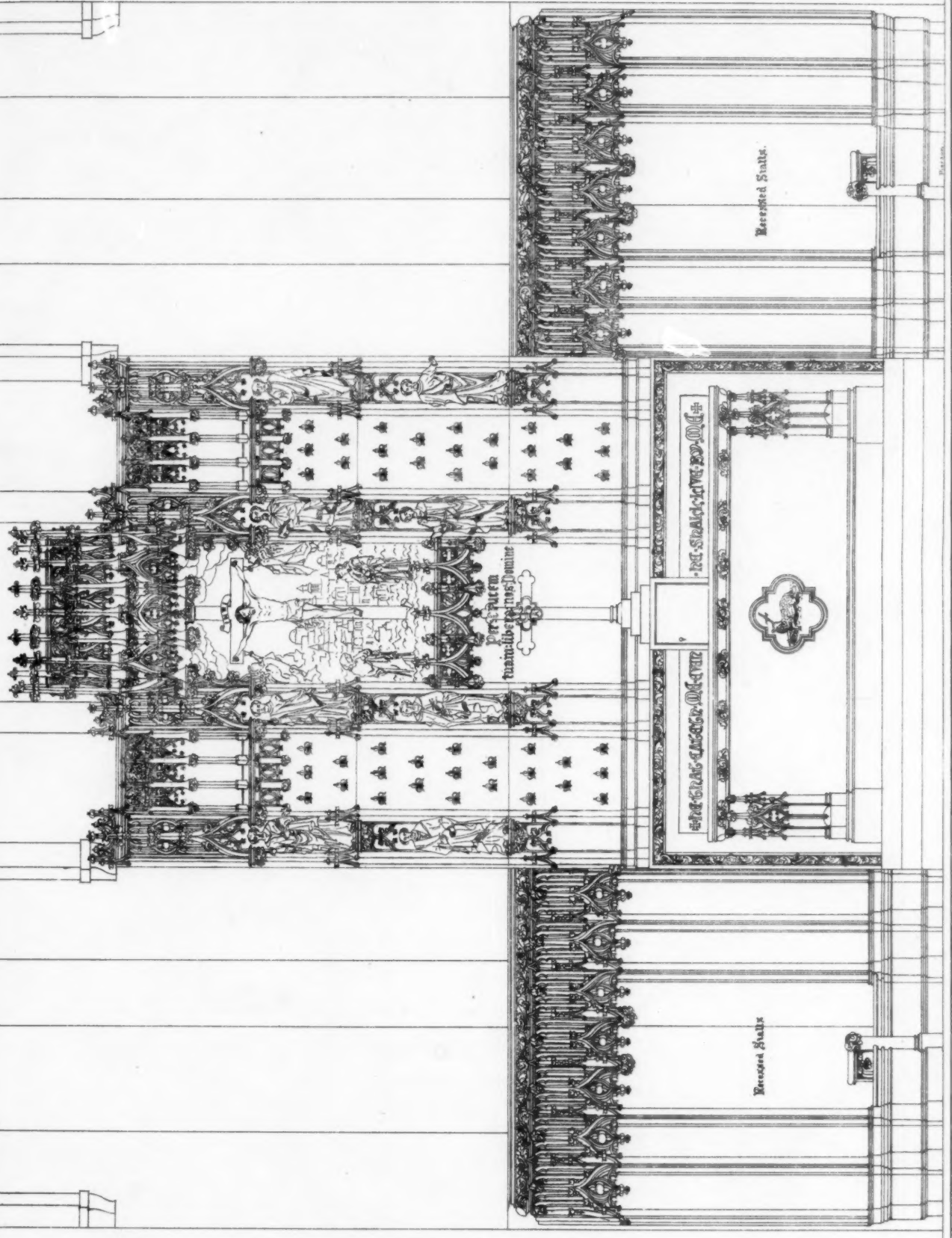
FRENCH FURNITURE. — An enterprising proprietor of one of those enormous "universal bazaars" in Paris, from which Zola drew his "Bonheur des Dames," has offered a prize for such designs in furniture and house decoration as shall best typify and reflect the civilization of the Third Republic. His astute proposal has drawn attention not only to the importance of his own establishment, but to what he no doubt considers the secondary question of whether such designs are possible at all, and what the "Style Troisième République" may fairly be considered to be. There is, of course, no shadow of doubt that the cafés of Montmartre and the studios of the Quartier Latin have long ago composed their answers to a challenge so seductively held out. They will create you a style as lightheartedly as they will destroy a government, and with just as little compunction about the ultimate verities involved. In reality, our enterprising bazaar-keeper of Montmartre is not so original as may be imagined. For some years a perfect contagion of eccentricity has raged across the Continent under the name of "l'art nouveau." The year just closing has seen several exhibitions inspired by this same repudiation of everything traditional. In Venice, in Berlin and in Munich what are called "secession" galleries have been filled with skillful monstrosities. At Turin the same tendency was everywhere observable. Artists have wandered off in debaucheries of meaningless decoration; jewellers have twisted gold and enamel and precious stones into the newest deformities of an extravagant impropriety. For very many years France was the centre of the artistic light of Europe. In many ways she must be still. But a deathblow was dealt to more than monarchy by the events of 1789. Throughout the eighteenth century French art, fostered by the centralizing influences of the "Grand Monarque," gradually increased in the varied power of its expression. At the death of Louis XIV two styles, associated with the names of his immediate successors, were logically and beautifully developed, which have been the joy of collectors ever since. They inherited the rich harvest of the sixteenth century, of a renaissance which took its whole departure from the central principle of the rehabilitation of the individual. Temples were forgotten, for houses had to be built. Artists turned from monumental work to lavish a divine ingenuity on the production and decoration of objects in which the personal motive was predominant. The château called into harmonious service all the larger arts; furniture became the epitome of all the lesser. On such foundations worked the men who made the eighteenth-century furniture of France, whose names were Jean Lamour, Cafferi, Boulle, Charles Cressent, Pasener, Gouthiere, whose collaborators were Watteau, Fragonard, Boucher, Natoire, Van Loo, Hoet, Van Sapeydonck. You may see as fine specimens of their work as exist anywhere in the Jones Collection at the South Kensington Museum or in the Wallace Collection, of Hertford House. Everywhere reigns good breeding. Not a trick of fashionable coquetry is lost, or of that "sweet disorder in the dress, kindling in clothes a wantonness," which is as far from grossness as it is different from modesty. The artists had an exquisite tact, a happy license, an attractive piquancy in days when convention had a greater influence on life and conduct than it ever had before or since. "Better die than be ungraceful," was their motto, and in it is all the charm of a gallant, careless, aristocratic age that has passed away forever. It bloomed the fairer because it was on the verge of the abyss. The guillotine cut off at a stroke the old traditions of spacious luxury for which the exquisite furniture of Louis XV and XVI had been created. — *London Telegraph.*

THE FLOATING BRIDGE AT LYNN, MASS. — For the first time in one hundred years, except when undergoing repairs, the famous floating bridge of Lynn is reported dangerous, and is officially closed by the Board of Public Works, although the sign to that effect does not prevent a number of teams passing over it every day. Part of the railing of the bridge has given way, and the top layer of planking is worn through. There is no danger of any team breaking through, as the bridge is 17 feet thick, but it will need extensive repairs to put it in good condition. This old bridge will probably be given up in a few years, as there is a movement on foot in the Lynn City Council to seek the aid of the County Commissioners in constructing a new bridge on a solid foundation of piles, instead of spending more money in the expensive resurfacing that the city has been obliged to provide every three years. Floating Bridge was built because it was thought that the pond was practically bottomless, and, until a few years ago, no one believed that a bridge of any other character was practical. Some years ago, Hon. Josiah C. Bennett, of Lynn, who was interested in the construction of a North Shore highway, had soundings made to prove that a bridge of modern construction could be erected at a moderate cost, with the result that a new bridge running parallel to the old floater, and providing for a double-track road, has been constructed. The County Commissioners will be asked to build the new bridge, or assist the city of Lynn in erecting one to replace the present floating one. Originally 5 feet and 6 inches thick, the old structure has received so many additional layers of 3-inch planks that it is now more than 17 feet thick, and so waterlogged that light teams passing over will sink it so that water overflows the planking. An exceedingly difficult undertaking to tear all these layers of planking apart is looked forward to. Floating Bridge was built in 1802 by Captain Moses Brown for the Salem Turnpike & Chelsea Bridge Company. It is 511 feet long. The original structure consisted of five layers of pine timber, laid at right angles to each other, and secured together by 3-inch tree-nails. It was made in three sections, and floated out on the pond and joined together. It is the only structure of its kind in the world and is valued as a local curiosity. Its passing will be regretted. — *Boston Transcript.*



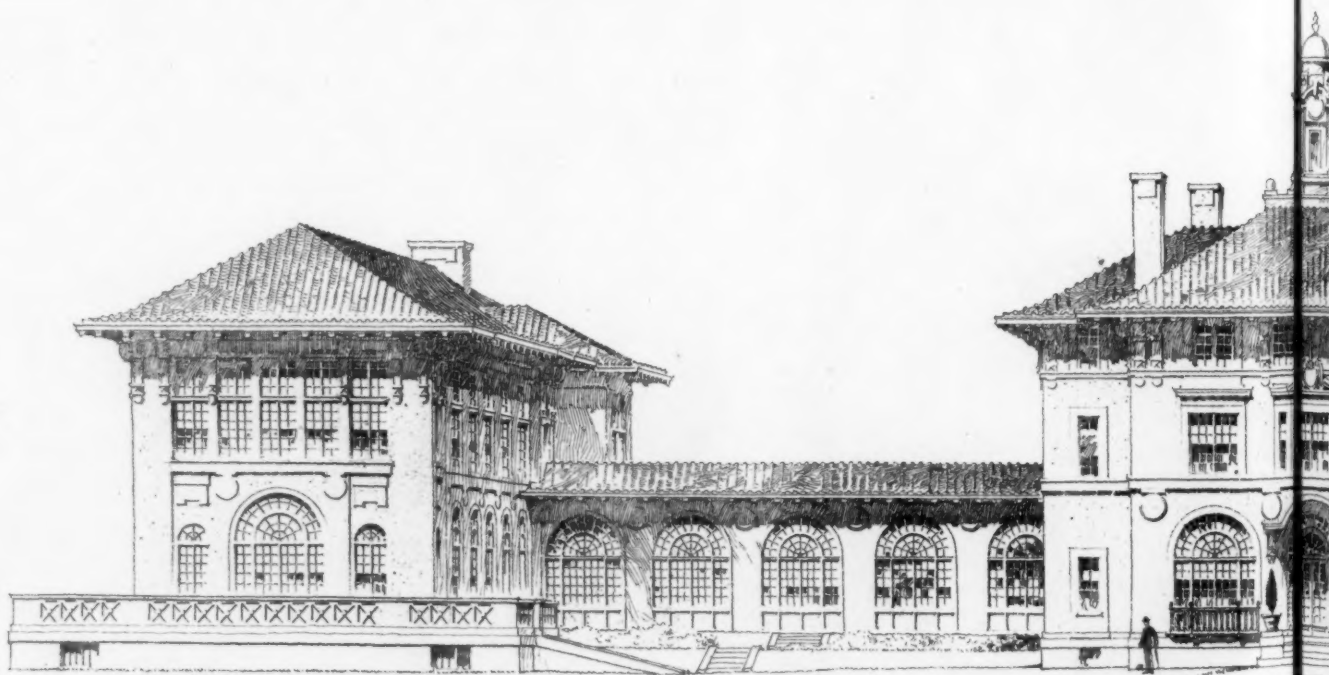
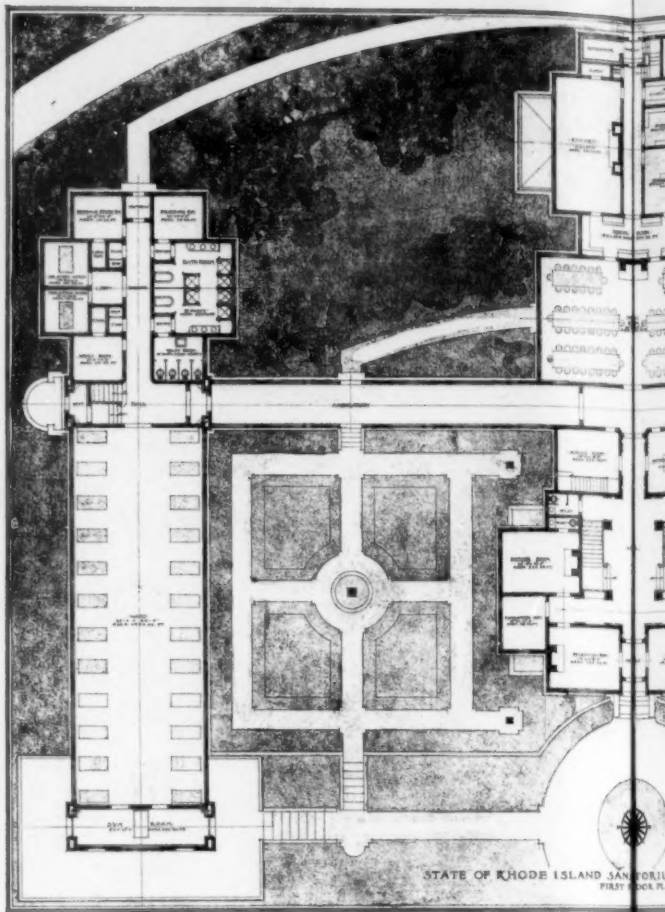
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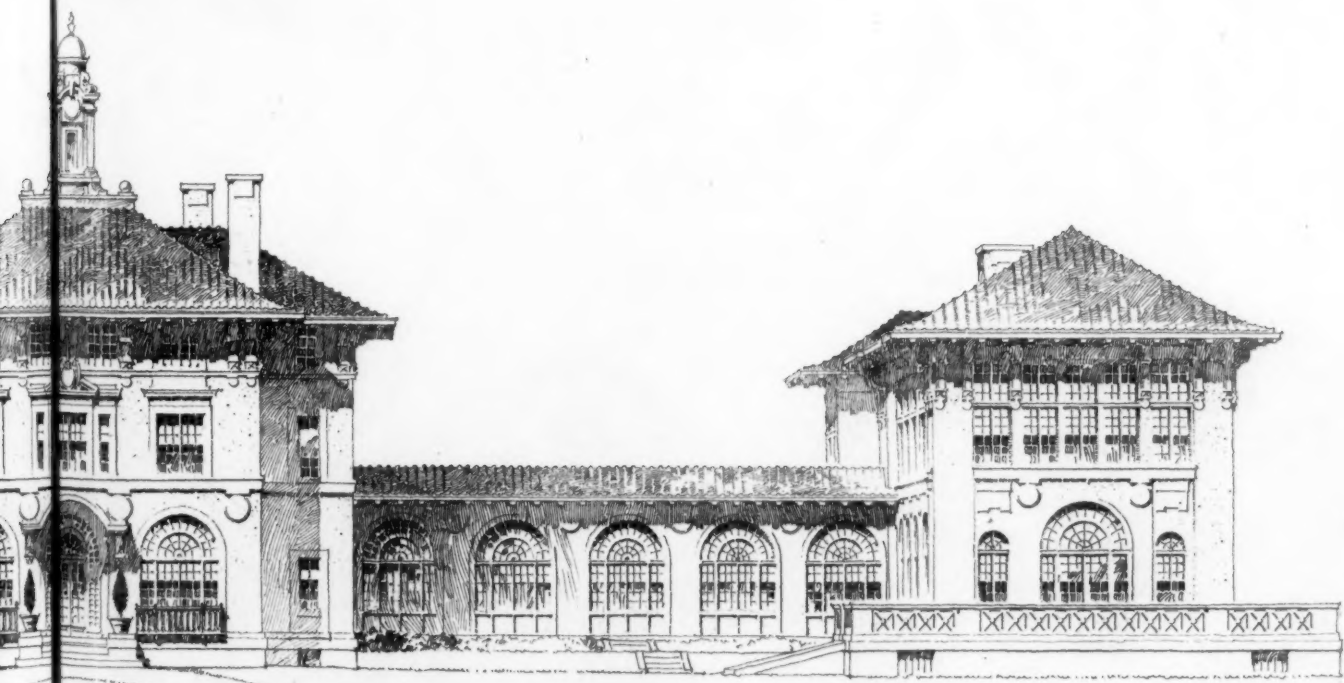
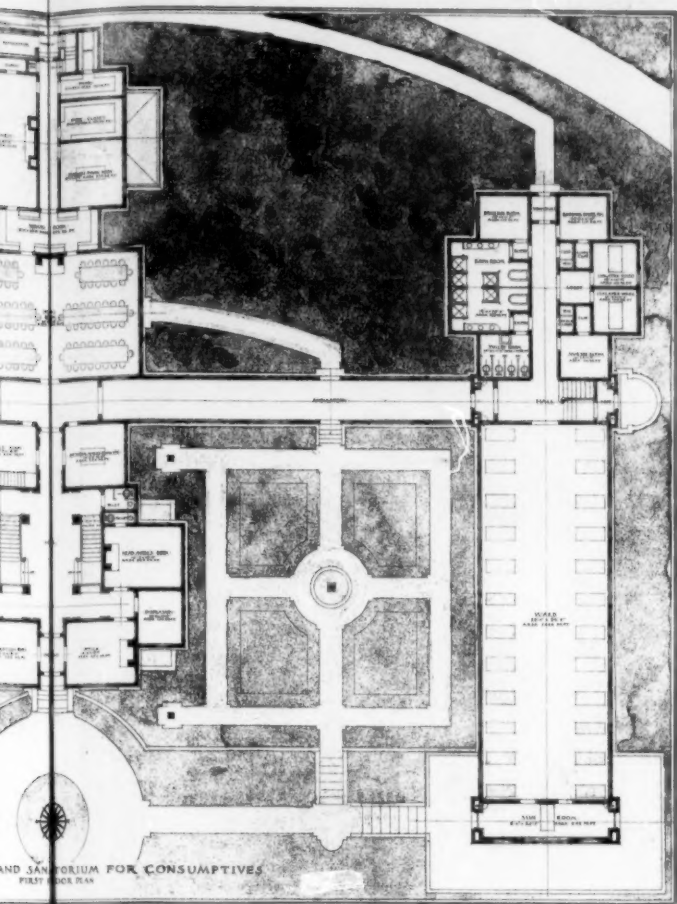
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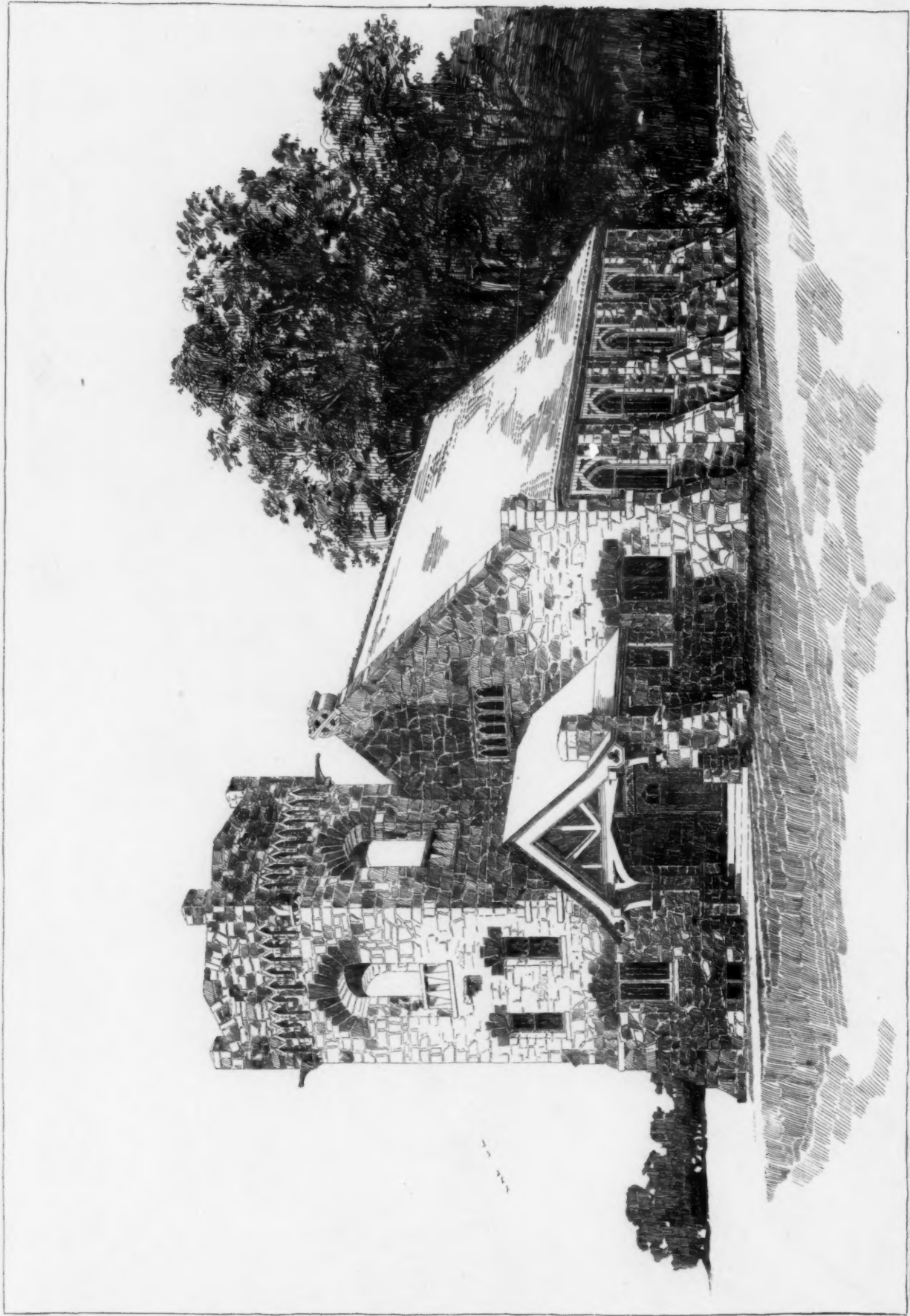
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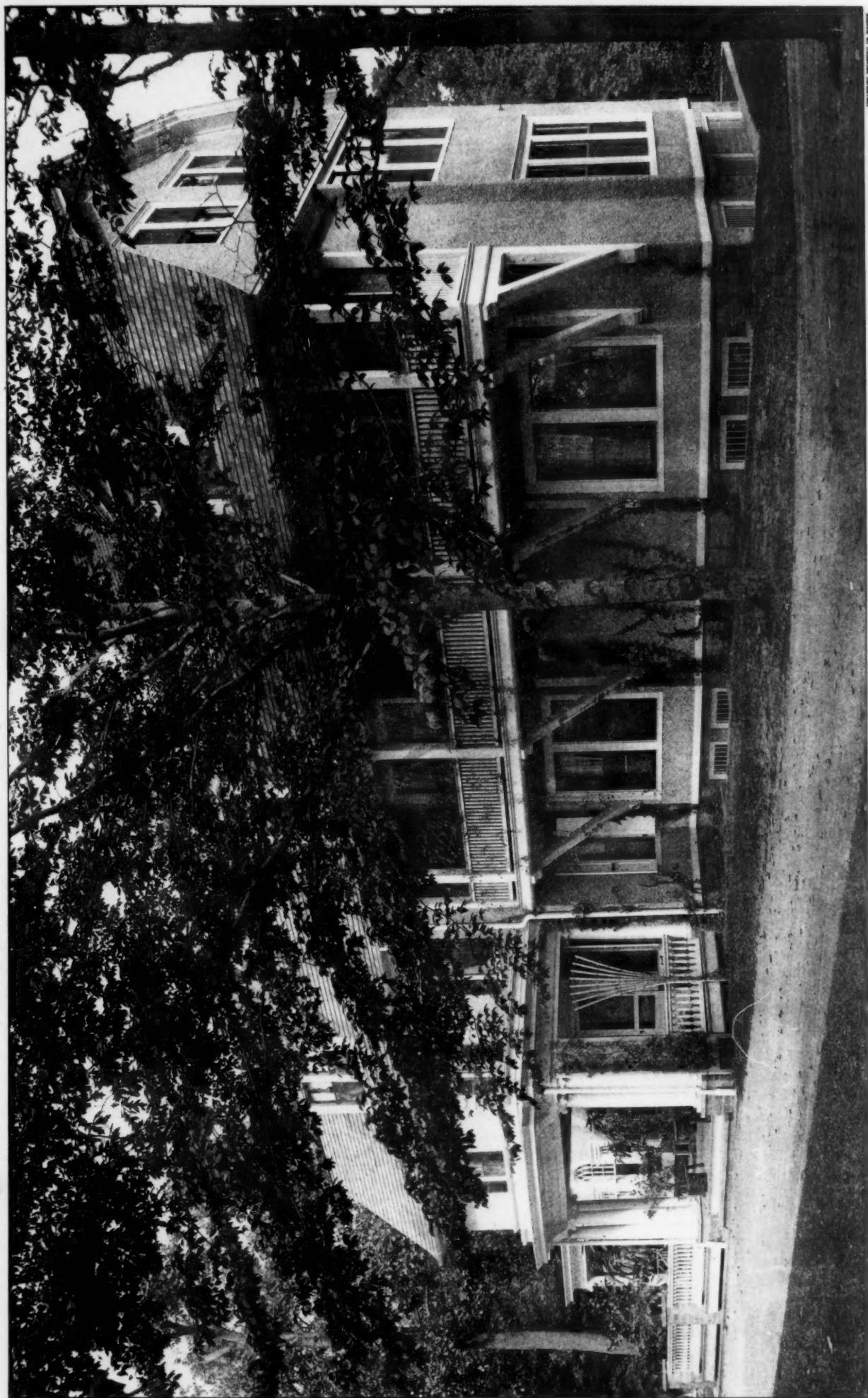




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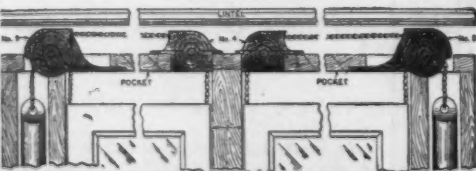
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CODE OF PRACTICE FOR SUB-ESTIMATING AND SUB-CONTRACTING

Adopted by the Master Builders' Association of the City of Boston, Aug. 2, 1894.

ARTICLE I.

Obligation of Principal Contractor to Sub-Contractor.

A principal contractor is under obligation to treat upon an equal basis all estimates which he "receives" prior to putting in his own bid. Estimates must be considered as "received" when they come into a principal contractor's possession, either by his direct solicitation or by being accepted by him. The opening of a bid, knowing it to be such, constitutes receipt of the same.

A principal contractor is under no obligation to use a bid which he has not solicited, accepted, or received, but if he does not wish to use the estimate of a sub-bidder he should decline it, if proffered personally, or should return it unopened if sent to him by mail or otherwise. The retention of a bid should be construed as a receipt of the same.

A principal contractor, when making up his estimate, is not entitled to receive bids from sub-contractors if he is at the same time making himself their competitor by figuring their portion of the contemplated work. It is legitimate for a principal contractor to figure all portions of work, depending upon no one for what are usually known as sub-estimates, but it is not legitimate for him to receive bids from others for sub-work if he is himself figuring those portions independently.

ARTICLE II.

Award of Sub-Contracts.

The principal contractor having been awarded a general contract should immediately award the sub-contracts to the lowest bidder in each branch.

ARTICLE III.

Penalty for not Awarding Contract to Lowest Sub-Bidder.

A principal contractor failing to award a sub-contract to the lowest sub-bidder to whom he is under obligation as previously provided should be liable to pay damages to the said lowest bidder, in amount not less than ten per cent of the amount of the estimate.

Payment of such damages will not relieve the principal contractor from liability to discipline under provisions of Article X of the By-Laws of this Association.

ARTICLE V.

Payments to Sub-Contractors.

Unless the contracts made with sub-contractors otherwise provide, payments during the progress of the work should be made by the principal contractor to the sub-contractors upon the same basis of payment, in relation to amount of work performed, as is prescribed in the contract made by the principal contractor with the owner.

Final payment to a sub-contractor should be considered as due at the expiration of thirty days after the completion of his work and its approval by the architect or owner, unless otherwise provided by the sub-contract or agreement.

ARTICLE VII.

Obligation of Sub-Contractor to Principal Contractor.

Should a sub-contractor refuse to contract at the amount of the estimate he has given to a principal contractor who has used the said estimate in good faith, he then should be liable to the said principal contractor for damages in amount not less than the difference between the amount of the estimate which was submitted by him and the amount at which the principal contractor may be obliged to contract the work.

Payment of such damages will not relieve the sub-contractor from liability to discipline under provisions of Article X of the By-Laws of this Association.

ARTICLE X.

Bids to Architects or Owners.

When bids for separate departments of work on a building are solicited by the architect or the owner, they should be submitted with the understanding that they are direct estimates, for which direct contracts are to be made by the owner with the lowest bidder, and no other disposition of such bids should be permitted without consent of the bidder submitting the same.

Sub-bids should be given only to the principal contractors who are estimating the work in question, and should not be left with architects or owners for the inspection and information of principal contractors. Sub-contractors must understand that bids thus left with architects or owners are in great danger of losing their confidential character, and that if they so leave them they cannot claim protection or redress under the first article of this Code.

SUGGESTIONS.

Members of this Association having sub-contracts to let, or material to buy, should, as far as may be consistent with business principles, deal only with members of the Association, or at all events give their fellow-members an opportunity to compete, and then give them the preference, other things being equal.

All bidders should take cognizance of the danger they may be subjected to through the practice, so prevalent in some architects' offices, of making change in plans or specifications, or in both, during the progress of estimating. Correction of this pernicious practice can only be obtained through refusal by contractors to estimate under such conditions.

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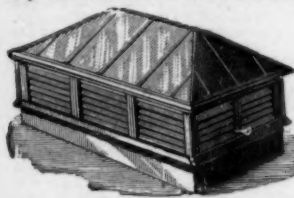
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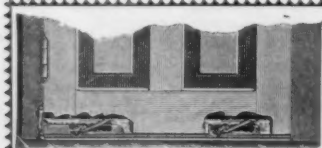
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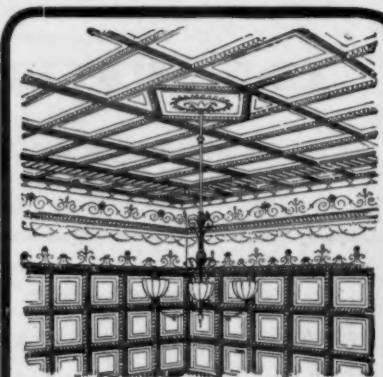
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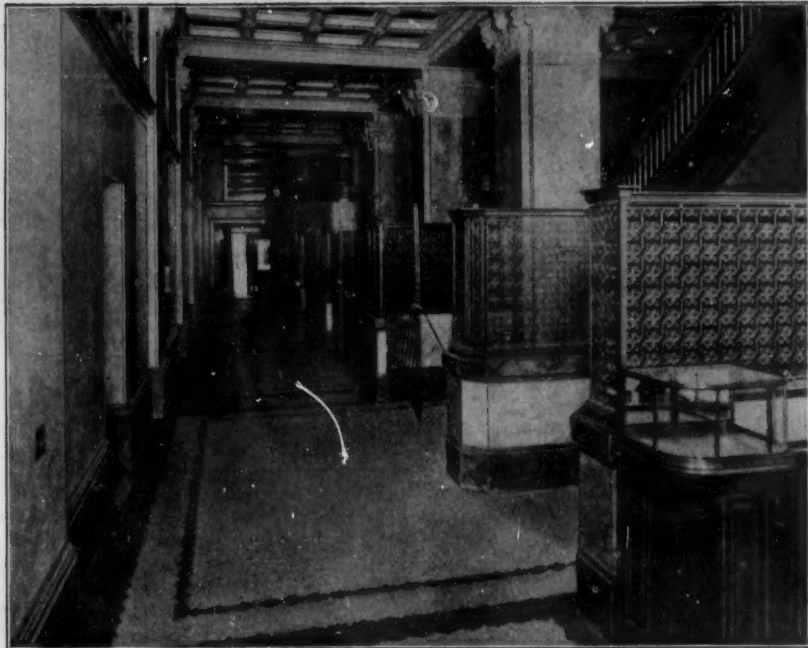
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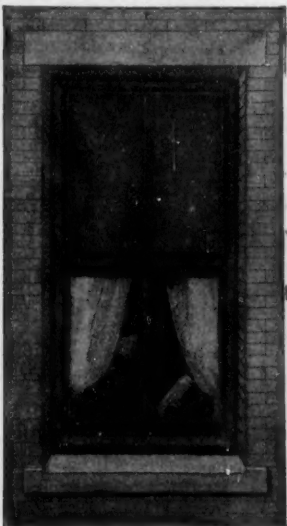
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(Advance Rumors Continued.)

have been selected as architects of the gymnasium for the State Normal School, to cost \$60,000.

Clarkburg, W. Va.—It is stated that a Y. M. C. A. building will be erected on Pike St. Cost, \$90,000.

Cleveland, O.—Plans have been drawn by W. Hopkinson, 50 Euclid Ave., for a six-story apartment-house to be erected at Euclid Ave. and Doan St. Cost, \$190,000.

Concord, Mass.—Contracts have been awarded for the work of building the new dormitory and dining-hall at the Middlesex School. Both buildings will be three stories high, and constructed of wood. The plans were drawn by Charles K. Cummings, of Boston, and the builders are O. A. Dodge & Co., who will have the assistance of French & Bryant, engineers. The landscape plans will be by the Messrs. Olmsted, of Brookline.

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

Concord, N. H.—It is stated that a bill has been signed by the Governor appropriating \$20,000 for the completion of the shore boulevard.

Council Bluffs, Ia.—The Woman's Christian Association will erect a four-story brick hospital at 6th Ave. and 10th St. Estimated cost, \$60,000.

Denver, Col.—John Huddart, 42 Bank Block, has made plans for an \$80,000 apartment-house to be erected at 13th Ave. and Corona St., for Wm. Mahar.

Mareen & Norton, Equitable Building, has prepared plans for a five-story office-building to be erected at 1784 Broadway for D. C. Dodge. Cost, \$85,000.

E. P. Varian, 413 Tabor Block, has prepared plans for a three-story brick and stone Nurses' Home, to be erected on 17th and Washington Sts., to cost \$35,000.

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

Des Moines, Ia.—Smith & Gage, architects, have drawn plans for the finishing of the library quarters and art school of Des Moines public library. Bids will be taken during the next three weeks. Cost, about \$50,000.

Hallett & Rawson have plans for a church for the Christian Science congregation, to be 62' x 110'; cost, \$30,000. It will be of buff and gray pressed brick and Bedford stone.

Smith & Gage, architects, are preparing plans for a fireproof opera-house to be erected on the river front, between Locust and Grand Aves. It will contain a modern café, store-rooms and offices. Cost, \$100,000.

Detroit, Mich.—Mason & Hill have prepared plans for a \$50,000 residence for John E. Ford.

Donaldson & Meier are letting contracts for Simon J. Murphy's office-building, which will be 100' x 139', and thirteen stories high.

Stevens & Blume are preparing plans for an apartment of six flats to be built on Jefferson Ave., near Elmwood Ave.; cost, \$20,000.

Louis Kemper is preparing plans for several residences to cost about \$15,000 each for Hugo Scherer, to be built at Grosse Point and facing Lake St. Clair.

Dover, N. H.—The late Arloeh Wentworth, of Swampscott, Mass., has bequeathed \$100,000 to the Wentworth Home for the Aged in this town. He also leaves a similar sum for founding a hospital here to be called the Wentworth Hospital.

Dublin, Tex.—A \$5,000 city-hall and fire-station will be erected here, two stories, 40' x 30'.

Duluth, Minn.—Plans by J. J. Wagensein, 401 Providence Building, have been accepted for a five-story hotel to be erected at 1st St. and 5th Ave. W. for Albert C. and E. Ribeneck; probable cost, \$100,000.

Falmouth, Mass.—It is said that \$50,000 has been appropriated to macadamize certain roads in this town.

Fort Madison, Ia.—Plans are being prepared for a hospital for the State prison; cost, \$30,000.

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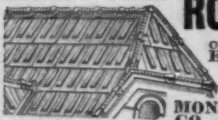
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BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

Grinnell, Ia.—The plans of Brainerd, Leeds & Russell, of Boston, Mass., have been accepted for the Iowa College chapel. Approximate cost, \$35,000.

Hanover, Ind.—Patton & Miller, Chicago, Ill., will furnish plans for the Hendricks Memorial Library for Hanover College. Cost, \$25,000.

Harrisburg, Pa.—It is stated that John Misher will erect a theatre on N. 2d St., to cost \$135,000.

Huron, S. D.—The Masonic Temple Association has been organized and plans have been secured for a modern building. Contracts will be let at once. Cost, about \$40,000.

Irrington, Ind.—Plans have been prepared for a new fire-house.

Jamaica, L. I., N. Y.—Nicholas W. Hausman has furnished the plans for the Mary Immaculate Hospital, to be erected at Shelton Ave. and Ray St., by the Sisters of St. Dominic, at a cost of \$75,000.

Jamestown, N. D.—M. E. Beebe, architect, of Fargo, has plans for a three-story brick and stone hospital for the State institution here; cost, \$45,000.

Kalispe, Mont.—The Fire Department is discussing better fire protection and erection of a new fire-house.

Lansing, Mich.—A site is soon to be selected for a new engine-house.

Lebanon, Ind.—The Centenary Methodist Church Society will build a \$30,000 edifice in the near future.

Logansport, Ind.—The Broadway Methodist Episcopal congregation has decided to erect a church to cost \$20,000.

Louisville, Ky.—The Young Men's Hebrew Association contemplate the erection of a hospital, to cost \$50,000.

Milwaukee, Wis.—Pawling & Harnischfeger will establish a factory at 38th and National Aves., for the manufacture of electric cranes; cost, \$75,000. It is reported that a \$100,000 bond issue will be asked for to purchase new apparatus and build engine-houses.

Natchez, Miss.—Clark & Gardner will build a \$65,000 opera-house.

New Albany, Ind.—The Methodist Episcopal Society will erect an edifice, to cost from \$25,000 to \$30,000.

New Castle, Ind.—The County Comrs. are considering the erection of a \$25,000 addition to the court-house.

New Orleans, La.—It is stated that the Baldwin Tourton Theatrical Co. will erect a theatre here to cost \$250,000.

New York, N. Y.—A federation of the art societies of New York City is about to take place. It is planned to raise \$3,000,000 and to erect a building in the central part of the metropolis. It is hoped that the city will cooperate to the extent of giving a site.

Oshkosh, Wis.—Architects will be asked to submit plans for a \$25,000 school-building for the 13th Ward.

The Union Club expects to erect a \$50,000 club-house. Col. S. W. Hollister, sec'y.

Peoria, Ill.—The American Spirits Manufacturing Co. will rebuild the Madigan & Walsh cooperage plant in this city. It will be completed in June. Three hundred more men will be employed.

Philadelphia, Pa.—Cope & Stewardson, 320 Walnut St., are drawing plans for the Wharton School of Finance and Economy for the University of Pennsylvania to cost \$250,000.

Pittsburgh, Pa.—Bids are being received for new engine-house at Centre Ave. and Devillers St., to cost \$25,000.



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BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

Quincy, Ill.—Plans have been completed by Harvey Chatten for a \$40,000 school.

Redwood City, Cal.—Plans have been submitted to the County Supervisors for a \$200,000 court-house.

Richmond, S. I., N. Y.—Kosville Hook-and-ladder Co. has purchased site for a fire-house to be built at once.

San Francisco, Cal.—The Golden Gate Commandery of Knights Templars is about to erect a hall to cost \$100,000. E. J. Vogel, Clans & Spreckels Building, has prepared the plans.

The plans of Newton J. Thorp have been selected for the eight-story hotel to be erected at Sutter and Mason Sts., for E. B. Hindes, at a cost of \$175,000.

Schenectady, N. Y.—The City Council has authorized the issue of \$140,000 bonds for schools in Brandywine Ave. and E. Liberty St.

Sheridan, Wyo.—It is stated that a court-house will be erected here at a cost of \$50,000.

Sioux City, Ia.—The Cudahy Packing Co. has under contemplation extensive plans for the improvement of its plant. The plans provide for an immense new storage house, a new canning department and possibly a new beef house. The estimated cost of the improvements is \$250,000.

G. W. Burkhead, architect, is preparing plans for a \$20,000 addition to the Woodbury County court-house in this city.

St. Paul, Minn.—The Bethel Trustees propose to secure pledges for equipping a building suitable for their work. Kenneth Clark, president. The amount required will be about \$20,000.

Suffield, Conn.—A new fire-department building will be erected here.

Syracuse, N. Y.—The expenditure of \$10,000 has been authorized for rebuilding a fire-engine house of engine company No. 3.

Tekoa, Wash.—The Washington Liquor Co., of Spokane, will erect a \$30,000 brick block here, three-story.

Virginia, Minn.—It is stated that a high school will be erected here, to cost \$50,000.

Waco, Tex.—The Sisters of Charity will erect a \$50,000 hospital here.

Wahpeton, N. D.—A bill has passed the legislature establishing a State Scientific School. A building will be erected at once at a cost of \$30,000.

Washington, D. C.—Plans have been accepted for the building for the Episcopal Eye, Ear and Throat Hospital; cost, \$70,000.

It is stated the Pennsylvania R. R. Co. is having plans prepared for a union station to be erected at Massachusetts Ave. and N. Capitol St. Estimated cost, \$4,000,000.

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

Whitewater, Wis.—The Catholics propose to erect a \$40,000 school. Rev. M. E. Downs, pastor.

CLUB-HOUSES.

New York, N. Y.—E. Broadway, nr. Scammel St., five-sty' bk. club-house, 25' x 71' 8", plastic slate roof; \$35,000; o., Young Mens Benevolent Assoc., 311 E. Broadway; a., Sass & Smalheiser, 23 Park Row.

HOTELS.

New York, N. Y.—W. Forty-seventh St., Nos. 145-151, two 9½-sty' bk. & st. hotels, 40' x 89', plastic slate roof; \$350,000; o. & b., Solomon Wolff, 3 Broadway; a., G. F. Pelham, 503 Fifth Ave.

West St., cor. 10th St., three-sty' bk. hotel, 44' 8" x 90' & 44' 1", tar & slag roof; \$20,000; o., Albert Adler, 406 West St.; a., Chas. Stegmayer, 306 E. 82d St.

W. Forty-third St., Nos. 153-155, twelve-sty' bk. & st. hotel, 40' x 85', plastic slate roof; \$180,000; o., estate Ogden Goslet, 9 W. 17th St.; a., Hugo Kafka, 99 Nassau St.

HOUSES.

New York, N. Y.—Park Ave., cor. 186th St., 7 two-sty' bk. dwell., 20' x 52'; \$62,000; o., Frederick M. Mellert, 1692 Monroes Ave.; a., W. C. Dickerson, 3d Ave. & 149th St.

One Hundred and Third St., nr. 1st Ave., three-sty' bk. stable & dwell., 50' x 59' 8"; \$18,000; o., Bruck & Schulman, 338 E. 103d St.; a., Alfred E. Badt, 1 Union Sq. W.

Fifty-third St., nr. 5th Ave., five-sty' & base. bk. & st. dwell., 23' x 80' 2", slate & tile roof; \$50,000; o., Florence C. Eno Graves, Waldorf-Astoria Hotel; a., C. P. H. Gilbert, 1123 Broadway.

Twelfth St., nr. Avenue D, Unionport, two-sty' fr. dwell., 20' x 55'; \$6,000; o., Christian Vondran, 672 E. 147th St.; a., Bronx Architectural Co., 3307 Third Ave.

TENEMENT-HOUSES.

New York, N. Y.—E. Sixth St., Nos. 202-204, six-sty' bk. tenement & stores, 45' x 84' & 35' 6"; \$35,000; o., Wm. Schulmann, 91 Essex St.; a., Bernstein & Bernstein, 111 Broadway.

One Hundred and Fourth St., nr. Central Park West, six-sty' bk. tenement, 50' x 87' 11"; \$55,000; o. & b., Leon A. Liebeskind, 36 W. 115th St.; a., Geo. F. Pelham, 503 Fifth Ave.

Essex St., nr. Broome St., six-sty' bk. tenement & store, 43' 8" x 74' 7"; \$35,000; o., Mandel & Maran, 235 Henry St.; a., Horenburger & Straub, 122 Bowery.

Forest Ave., nr. 165th St., 2 five-sty' bk. tenements, 37' 6" x 125'; \$70,000; o., Zimmerman & Flood, 1033 E. 156th St.; a., Harry T. Howell, 138th St. & 3d Ave.

Leroy St., Nos. 22-24, six-sty' bk. tenement, 48' 8"

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(Tenement-Houses Continued.)

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COMPETITIONS.

BUILDINGS.

[At Yankton, Redfield, Gary and Sioux Falls, S. D.]
The State Board of Charities and Corrections invites the submission of sketches, until April 9 for the following buildings: Hospital building for the asylum at Yankton, to cost \$30,000; custodial building for the Northern Hospital at Redfield, to cost \$45,000; a main building for the school for blind, at Gary, to cost \$10,000. Information can be secured from the officials of the different institutions. Proposals will also be received for furnishing working plans and specifications for the extending of one cell hall at the penitentiary at Sioux Falls, to cost \$20,000. 1422

PROPOSALS.

BUILDING, ETC.

[At Fort Worden and Fort Casey, Wash.]
Office of Constructing Quartermaster, Fort Townsend, Wash. Sealed proposals will be received here until April 8 for the construction, plumbing, heating and electric wiring of the following named buildings at both Fort Worden and Fort Casey, Wash.: One single barrack, two sets lieut.'s double quarters, one non-com. officer's quarters. Full information will be furnished upon application at this office. Plans and specifications may also be seen at the Depot Quartermaster's Office, San Francisco, Cal., Portland, Ore., and Spokane, Wash. GEO. H. PEN-ROSE, Quartermaster, U. S. Army. 1422

STOREHOUSES.

[At San Francisco, Cal.]
Bids are wanted April 6 for constructing 2 storehouses at the Presidio of San Francisco. C. F. MILLER, Ch. Q. M. 1422

RETAINING WALLS.

[At Cincinnati, O.]
Bids are wanted April 6 for building retaining walls at the 22d Dist. Chase and Lincoln Schools. JACOB E. CORMANY, Chmn. Bldg. Com. 1422

ELECTRIC LIGHTING SYSTEM.

[At Fort Pickens, Fla.]
Bids are wanted April 4 for constructing electric lighting system at this post. Address W. E. COLE, Q. M., Fort Barrancas, Fla. 1422

COURT-HOUSE.

[At Webster, S. D.]
Bids will be received by William Egeland, auditor of Day County, S. D., at Webster, until April 7th, 1903, for the erection of a court-house building in accordance with plans and specifications, as furnished by Kinney & Detweiler, architects. Plans and specifications will be on file with the county auditor; also at the office of the architects, 909 Northwestern Building, Minneapolis, Minn., after March 12th, 1903. WILLIAM EGELAND, Auditor of Day County, S. D. 1422

EXTENSION OF WATER AND SEWER MAINS.

[At Fort Ethan Allen, Vt.]
Office Constructing Q. M., Burlington, Vt. Sealed proposals will be received until April 6, 1903, for extending water and sewer mains at Fort Ethan Allen, Vt. Information furnished on application. CAPTAIN T. B. LAMOREUX, Q. M. 1422

CEMENT, ETC.

[At Fort Wadsworth, N. Y.]
U. S. Engineer Office, Army Building, New York. Sealed proposals for furnishing and delivering cement and broken stone at Fort Wadsworth, N. Y., will be received here until April 6, 1903. Information on application. W. L. MARSHALL, Major, Engrs. 1422

PROPOSALS.

LIBRARY.

[At Eau Claire, Wis.]
Bids are wanted April 6 for erecting a library. Patton & Miller, architects, Chicago, Ill. F. H. L. COTTON, Chmn. Bldg. Com. 1422

POWER HOUSE.

[At Fort Rosecrans, Cal.]
Bids are wanted April 8 for constructing a power-house. CAPT. EDGAR JADWIN, Corps Engrs., U. S. A., Los Angeles, Cal. 1422

COURT-HOUSE.

[At Wray, Col.]
Bids will be received by the Bd. of Co. Comrs. for furnishing material and erecting a court-house. W. D. MCGINNIS, Co. Clk. 1422

HEATING AND PLUMBING.

[At Centerville, Ia.]
Bids are wanted April 9 for heating and plumbing the new court-house. J. F. PARKS, Co. Aud. 1422

GATES, ETC.

[At Nashville, Tenn.]
U. S. Engineer Office, Nashville, Tenn. Sealed proposals for construction, delivery, etc., of 4 pairs steel lock gates, filling valves, etc., for locks A and No. 1 Cumberland River, will be received here until April 23, 1903. Information furnished on application. M. B. ADAMS, Lieut. Col., Engrs. 1423

BUILDING MATERIAL.

[At Pineridge, S. D.]
Bids are wanted April 15 for furnishing and delivering a quantity of building material at the Pineridge Agency. Address JOHN R. BRENNAN, U. S. Indian Agent. 1423

SCHOOL.

[At Reedsburg, Wis.]
The Board of Education of the City of Reedsburg, Wis., will receive sealed proposals for the erection of a brick school-house according to plans and specifications prepared by Omeyer & Thori, architects, St. Paul, until April 20, 1903. On and after April 1, 1903, a copy of said plans and specifications may be seen at the office of said clerk in Reedsburg, the Builders' Exchange, Chicago, the Builders' Exchange, Milwaukee, the German American Bank, La Crosse, and the office of Omeyer & Thori, St. Paul. At the same time and place mentioned above proposals will be received for the necessary plumbing of said building, subject to all the foregoing conditions. JOHN D. DEVOR, Clerk. J. H. HOSLER, President. 1423

WHARF.

[At Great Diamond Island, Me.]
Office of the Constructing Quartermaster, 185 Middle St., Portland, Me. Sealed proposals for furnishing all labor and material in the construction of a steel or stone wharf at Fort McKinley, Great Diamond Island, Me., will be received at this office until April 13, 1903. Information, specifications, plans and blanks on application. CAPT. A. W. YATES, Quartermaster, U. S. A. 1423

HOSPITAL.

[At Fort Greble, R. I.]
Office Constructing Quartermaster, 269 Thames St., Newport, R. I. Sealed proposals will be received here until April 15, 1903, for constructing, plumbing, heating and wiring 12-bed hospital, Fort Greble, R. I. Proposals invited for both brick and frame structures. Information furnished on application. CAPT. THOMAS H. SLAVENS, Qr. Mr. 1423

PAPER PULP PLANT.

[At Seven Islands, Que.]
Proposals will be received at the office of George F. Hardy, architect and engineer, 309 Broadway, New York City, for furnishing material and labor required for the construction of a plant for the manufacture of paper pulp at Seven Islands, Que., for the North Shore Power Railway & Navigation Co. Full information may be obtained upon application at the above office or at the Company's office, No. 7 W. 22d St., New York. 1423

PROPOSALS.

WALKS AND PAVEMENTS.

[At Fort Riley, Kan.]
Sealed proposals will be received here until April 6, 1903, for construction of vitrified brick walks and pavements. Information furnished upon application. CAPTAIN G. O. CRESS, Q. M. 1422

SUPERSTRUCTURE.

[At Louisville, Ky.]
Bids will be received by Murphy Bros., architects, 205 Fifth Ave., until April 4, for superstructure work or completion of the County Jail, which will cost about \$160,000. 1422

HOTEL ANNEX.

[At Dayton, O.]
Bids are wanted April 1 for constructing a \$300,000 ten-story annex to Hotel Algonquin. C. I. William, architect, Callahan Building. 1422

COTTAGES.

[At Columbus, O.]
Bids will be received April 3 by the Board of Trustees of the Ohio Hospital for Epileptics for furnishing material and erecting cottages "A" to "F" inclusive, and farmhouse at the Ohio Hospital for Epileptics. Frank L. Packard, architect. A. P. OHLMACHER, M. D., Sec'y. 1422

ROADS.

[At Fort Caswell, N. C.]
Sealed proposals will be received here until April 6, 1903, for constructing roads, Fort Caswell, N. C. Information furnished on application. PHILIP YOST, A. A. Q. M. 1422

SCHOOL.

[At Cleveland, O.]
Bids are wanted April 6 for furnishing material and erecting a school on Mill St., including ventilating, heating, plumbing, sewers, gas-fitting, fireproofing, cement floors, electric wiring, iron and steel work, etc. STARR CADWALLADER, School Dir. Bd. of Educ. 1422

COURT-HOUSE.

[At Corsicana, Tex.]
Bids are wanted April 15 for erecting a three-story brick and granite court-house in this city, to cost about \$130,000. J. E. Flanders, archt., Dallas. 1423

RIPRAP.

[At Occoquan Creek, Va.]
U. S. Engineer Office, 2001 I St., N. W., Washington, D. C. Sealed proposals for furnishing and placing riprap stone in dikes in Occoquan Creek, Va., will be received here until April 14, 1903. Information furnished on application. CHAS. J. ALLEN, Lt. Col., Engrs. 1423

PAVING BRICK.

[At Traverse City, Mich.]
Sealed proposals will be received at the City Clerk's office until April 15, 1903, for furnishing to the City of Traverse City, Mich., 8,800 square yards of paving brick and about 1,200 cubic yards of crushed stone. Specifications on file in the office of the City Clerk, Traverse City, Mich., and at the engineer's office at Bay City, Mich. Bloomfield & McCloy, engineers. CHAS. M. BEERS, City Clerk. 1423

CEMENT.

[At Marquette, Mich.]
U. S. Engineer Office, Duluth, Minn. Sealed proposals for furnishing 6,000 barrels Portland cement for concrete superstructure to breakwater at Marquette, Mich., will be received here until April 11, 1903. Information on application. D. D. GAILLARD, Capt., Engrs. 1423

PUMPS, CONDENSER, ETC.

[At Xenia, O.]
Bids will be received April 9 by the Trustees of Ohio Soldiers' and Sailors' Orphans' Home for furnishing, erecting and installing hot water circulating pumps, condenser, expansion tank, vacuum pumps, pipe and fittings, pipe covering, etc. ORIN C. BAKER, Financial Officer. 1422



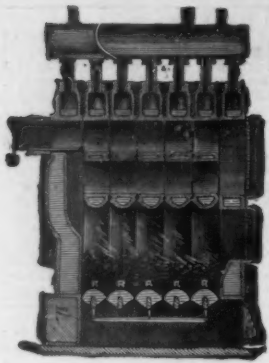
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