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NOTES AND CLIPPINGS. 64

THE signs of settlement, and consequent disintegration, of St. Paul's Cathedral, in London, have again attracted serious attention, and Mr. Somers Clarke, the architect to the Dean and Chapter, has published a long letter, explaining the causes of the trouble, and showing why the underground railways, which it is proposed to construct near the building, are likely to cause its speedy ruin. It appears that the footings of the building rest upon a stratum of clay, from four to six feet thick, under which is a thick bed of wet gravel and sand, below which, again, at a depth of thirty-five or forty feet, is the "London clay," of indefinite depth. In these days, an architect would probably have carried the trenches for so important a structure down to the London clay, but, in Wren's time, there were no caisson foundations, steam-pumps were unknown, and the expense of excavating to the London clay would have been enormous. Moreover, wet sand, if confined, affords a good foundation, and Wren followed the best practice of his time in building on the thin stratum of clay above the sand, spreading the footings so as to distribute the weights over a large surface. The accuracy of his calculations is shown by the fact that the church stood for two hundred years without showing any signs of settlement beyond unimportant compressions under the heaviest portions of the structure. A few years ago, however, the great municipal enterprises of sewerage, with the construction of the underground railways, required the cutting of trenches through the upper clay, into the wet sand beneath, allowing water to escape from the mass of sand. The loss of water, and, probably, of the finer particles of sand, from this stratum allowed it to sink, carrying with it the clay above. Naturally, the water and fine sand were squeezed out by the weight of the cathedral, as soon as an opportunity for escape was afforded them, and the settlements began which have already become so serious. Now, it is intended to carry a deeper and larger excavation than any of the previous ones in the immediate vicinity of the cathedral, and Mr. Somers Clarke warns the public that such an operation, by allowing still freer escape for the sand and water, will, in all probability, produce settlements which will involve the ruin of the building within fifty years. Mr. Somers Clarke thinks, in view of this danger, that no more underground railways or sewers should be built in the neighborhood of the church, but Americans, unaccustomed to see engineering schemes interfered with by æsthetic considerations, will be likely to see in the matter simply a problem in construction, having for its subject the extension of the foundations of the building down to the London clay, where they will be safe from any possible danger of the sort that now threatens them. This would, of course, be an expensive undertaking, but there is nothing impracticable about it, and St. Paul's is, perhaps, better adapted than most buildings of its size for underpinning operations, through the concentration of its weight upon a few immense piers.

WE strongly advise architects, as well as builders who are interested in important structures, to apply for a copy of the new edition of the "*Hand-book of Fire-protection,*" originally compiled for the members of the Underwriters' Bureau of New England by its Manager, Mr. E. U. Crosby. Mr. Crosby is now Secretary and Treasurer of the National Fire-Protection Association, with an office in New York, and has been succeeded as Manager of the New England Underwriters' Bureau by Mr. Henry A. Fiske, and, in the new edition of the book, Mr. Fiske and Mr. Crosby have worked together to bring the matter up to date, adding new subjects, as well as new explanations and descriptions in connection with the old ones. In its present shape, the book, which is in pocket form, is of great interest and value to all connected with building-operations. Most architects receive the successive issues of the Universal Mercantile Schedule, which is, of course, indispensable in its way; but the "*Hand-book*" goes much farther, giving details of nearly every system and material of construction connected with resistance to fire. Of course, architects generally understand the principles of fireproof-construction, but it is often desirable for them also to know what the underwriters will think of certain details of construction, and this information the "*Hand-book*" supplies in an admirable manner, together with details which only an architect of very large experience would be likely to know. For example, every architect knows, in general, that underwriters and inspectors of buildings now accept windows glazed with wired-glass as a substitute for fireproof shutters, but all of them do not know just what frames the underwriters require that it should be set in, and very few of them probably know that the sheets of wired-glass, as sent out from the manufactories, often have the defect that the wire network does not extend to the edge of the sheet, so that, in order to avoid the risk of having the wired portion separate in one piece from the margin, it is necessary to cut away the portions destitute of wire. It would be a serious inconvenience to be obliged, under direction of an insurance-inspector, to have such glass taken out of the frames in a new building, and other sheets inserted, and the prudent architect, acting on this hint, can specify that the contractor shall see that unwired margins are cut away before the frames are set. In connection with many other matters of the sort, this little book makes clear questions which most architects could answer only from the hearsay tradition of the profession, or from their own experience under conditions which the advancing practice of underwriters may have changed and it will save many a small extra to have it at hand.

THE *Deutsche Bauzeitung* quotes from a correspondent of the *Münchener Allgemeine Zeitung*, who does not give his name, an interesting study of the conditions of living in ancient Rome. Statistics show that, in the time of the early Empire, Rome contained forty-six thousand tenement-houses, and only seventeen hundred and ninety-four private residences. The latter were of the most sumptuous description. A palace which, with its out-buildings, covered less than two and one-half acres of ground was reckoned a small affair, and the imperial residences on the Palatine hill were far larger than this. As the growth of Rome was restricted by its enclosing walls, it may be imagined that the space left, after deducting that occupied by the palaces of the nobles, was very inadequate to the needs of a population which was probably not less than two millions, and is believed by some authorities to have reached three millions. The crush in the streets was so great that, under the Emperors, vehicles were only allowed to circulate in them during the early morning hours, and late in the evening. Practically, this regulation only aggravated the crowding, for the absence of any means of conveyance made it necessary for the inhabitants to live close together, independent of the limitations of the fortified walls. The available space being so small, land sold at an enormous price. Julius Cæsar paid about one hundred dollars a square foot for land in the vicinity of the Forum, which he cleared of buildings and presented to the public. Crassus, the richest man of his time, made great profits by purchasing buildings which had fallen down, or were destroyed by fire, clearing away the ruins, and selling the land to builders.

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NATURALLY, the cost of land being so great, speculators were tempted to build very lofty houses, and various imperial edicts are recorded, limiting the height of such structures. The speculators, however, were able to take advantage of the needs of their poor tenants to evade to a certain extent the restrictions, by making the stories so low that a man could not stand upright in them. A large part of the rooms in all tenement-houses were without light or air, so that it is not surprising that their inhabitants spent all the time that they could in the streets. Even for such accommodations as they had, however, they were obliged to pay high prices. The Roman writers complained that rents in the capital were four times as high for the same accommodation as they were in the provincial towns. The price of a tenement fit for respectable people varied from one hundred and fifty dollars a year to twelve hundred or more. Considering the value of money at that time, and the low rates of wages and salaries, this was a heavy tax on a family. The poet Martial, who was the friend of emperors and senators, and, perhaps, the most celebrated wit and diner-out of his time, lived in the tenth story of a tenement-house, and had to climb two hundred steps to his room; and a deposed king of Egypt, who had taken up his residence in Rome, complained that, on account of the expense of rents, he had been obliged to live in a miserable tenement at the top of a high building. To the very poor, the rents of their wretched dwellings were an almost intolerable burden. Even under the Republic the prætor Marcus Cælius Rufus proposed a law suspending rents for a year. The Senate rejected the bill, and the disappointed populace raised a tumult in consequence. The next year, the tribune Publius Cornelius Dolabella repeated the proposition of Cælius, and the excitement was renewed. The rich real-estate owners found means to persuade the other tribune, Trebellius, to refuse his support to the measure of his colleague, and it was defeated, but not until public assemblies had been broken up by force, and fighting had occurred in the streets. A little later, Cæsar, as dictator, ordered that all rents of less than one hundred dollars should be suspended for a year. Cicero, who, although a friend to Cæsar, was also a rich owner of tenement-houses, complained bitterly of this edict, in a letter which is still preserved. Under succeeding reigns, the suspension of rents was frequently decreed, despotism and socialism being always good friends. It is probable that the tenement-house owners raised their rents in ordinary years quite sufficiently to compensate them for the occasional losses which they suffered through the amiable whims of their tyrants, but the abolition of rents was always a popular manœuvre, and, undoubtedly, kept many a man in power who did not deserve it.

ARCHITECTS will be interested to know something of the progress of the new system of cure for consumption, by open-air treatment. Some forty years ago, a German physician, finding that tuberculous patients were benefited by remaining as long as possible in the open air, fitted up an establishment in Silesia where this sort of treatment could be pursued systematically; and, since that time, many hospitals for consumptives have been built, in the Black Forest, in the high mountain region of the Engadine, on the borders of the Italian Lakes, in the pine-forests of western France, and elsewhere, in all of which attempts, more or less successful, have been made to secure thorough ventilation to the bedrooms of the patients, and to encourage them to pass as much time as possible in the open air. The experience accumulated in these establishments has shown more and more the importance, to tuberculous patients, of constant exposure to the air, and, some ten years ago, a hospital was erected in Germany, a portion of which consisted in a wide veranda, upon which the beds of the patients were rolled or carried, so that even the feeblest could breathe the pure out-door air until late in the evening, when the beds were carried back under shelter. It is hardly necessary to say, however, that these establishments could not accommodate a thousandth part of the sufferers from tuberculosis; and it was not until the adoption of the German insurance-laws, some five years ago, that an unexpected impulse was given to the movement which had, until then, been carried on by a few earnest and energetic medical men.

UNDER the present German law, every person whose income is below a certain sum must hold a policy of insurance, not only against death, but against disability from sickness or accident, one-half the premium being paid by the person insured, and the other half by his or her employer. Naturally, under this law the insurance-companies soon began to be called upon for payments on account of disability from sickness, and it was not long before a comparison of their statistics showed that the largest part of their sick payments were made to persons suffering from tubercular disease of the lungs. The obvious inference was that if their tuberculous policy-holders could be cured of a disease which is generally believed to be curable in its early stages, the insurance-companies would be relieved of payments which, in the case of such patients, might often extend over months, or even years; and the managers of the companies began to look for some practicable means of accomplishing this result. They were not long in coming to the conclusion that the open-air treatment promised greater success than any other, and that the results already attained by it warranted extensive experiments on the part of the insurance-companies, as a purely business matter. The companies, therefore, drew up plans for "sanatoria," on the new system, suited to local conditions, obtaining, whenever they could, assistance from the authorities of cities or towns, by offering, in return, to receive a certain number of patients from the public institutions of the city; and a large number of these establishments are already in successful operation. Naturally, the medical men in charge of them compare notes, and the details of the system are being developed not only in Germany, but in other parts of Europe, and in this country, with great rapidity. In general, it has been found that the more profuse the supply of fresh air to the patient the more rapid the improvement in symptoms, and every advance in plan shows an increase in the freedom with which air is allowed to circulate around the patients. The earlier sanatoria, that is, those of two or three years ago, were provided, as a rule, with corridors, or "liegenhallen," often in separate buildings, where patients could lie in bed during the day, protected from the weather only by an awning, or light roof, and returning for the night to their bedrooms, which, while airy and sunny, did not differ greatly from those in any good hospital. Although the results obtained in this way were good, the observant and indefatigable doctors soon thought of something better. While, for a feeble patient, nothing was more beneficial than to lie in bed in the open air, in a favorable climate, those who were in a condition to use their muscles a little were tempted to lie comfortably in the "liegenhallen," or corridors, when they might, with greater advantage to themselves, be expanding their lungs by gentle exercise; and for all the patients, the beneficial effect on the lungs of a perfectly pure and fresh atmosphere was, to a great extent, suspended at night, through the necessity for bringing the patients back to sleep in their rooms, during the hours when respiration is the deepest, and the restorative effect of the atmosphere least interfered with by nervous distractions. For these reasons, the tendency, in the newer places, is to try to secure open balconies in connection with the bedrooms, providing the bedrooms with wide windows opening to the floor, so that the patient's bed can be wheeled directly out on the balcony, and left there, even at night, as long as the weather will permit. In addition to this, it is now considered desirable to have all the bedrooms open from a corridor, amply furnished with windows, so that, by means of open doors, fanlights, and even larger openings, in the wall of the bedroom next the corridor, the air can pass freely across the room at times when the patient cannot be left on a balcony entirely open. Of course, as it is essential to have the bedrooms face south, for the sake of the sunshine, the provision of a balcony outside, the roof or awning of which will not cut off the sun from the room, is a matter which requires some ingenuity in planning, but it has been successfully accomplished on a small scale in this country, as well as in Germany, and the results are so encouraging as to make it probable that the system will, hereafter, be extensively adopted. Taking these sanatoria generally, it is found that where situated, as they should be, on sandy ground, sloping to the south, far from dusty roads, and sheltered from severe north winds, and under efficient medical supervision, to secure cleanliness, proper nourishment, and judicious bathing, they accomplish remarkable results. Especially in those in which the fresh-air treatment is most thoroughly carried out, the patients, as a rule, begin immediately to gain in weight and strength, and a few weeks often effect so great an improvement that the patient can return to duty. Of course, this is only in cases where tuberculosis is not far advanced, and the sanatoria do not usually receive patients who do not seem to the physicians to have at least a chance of complete cure; but sufferers in an advanced stage often show unexpected improvement under the new treatment, and the line between curable and incurable cases is becoming more and more indefinite.

THE AMERICAN VIGNOLA.—I.

PART I.—THE FIVE ORDERS.

A BUILDING is a shelter from rain, sun and wind. This implies a ***Roof***, and ***Walls*** to support it. If the walls entirely enclose the space within, there are *Doorways* for access, and *Windows* for light. Roofs and walls, doors and windows are the essential features of buildings.

Roofs may be flat, sloping or curved. A roof with one slope is called a *Lean-to* (1). When two sloping roofs rest upon parallel walls and lean against one another, they meet in a horizontal *Ridge* at the top, and form a *Gable* (2) at each end. If the walls make a projecting angle, the roofs intersect in an inclined line called a *Hip* (3). If the walls meet in a re-entering angle, the inclined line of intersection is called a *Valley*. Roofs that rise from the same wall in opposite directions form a *Horizontal Valley* (4) at the wall. Circular walls carry conical (5) or domical roofs (5½).

If there is more than one story, the flat roof of the lower story becomes the *Floor* of the story above. If the roof extends beyond the wall that supports it, the projection is called the *Eaves* (6). If the wall also projects, to support the extension of the roof, the projection is called a *Cornice* (7).

Walls are generally made wider just at the bottom, so as to get a better bearing on the ground. This projection is the *Base* (8). A similar projection at the top is called a *Cap*, or, if it projects much, a *Cornice*, as has been said. When the principal member of a cornice projects like a shelf, it is called a *Corona* (9). A low wall is called a *Parapet*. A short piece of wall about as long as it is thick is called a *Post*, and if it supports something, a *Pedestal* (10), and the part between its Cap and Base is then the *Die*. A tall post is called a *Pier* if it is square, and a *Column* (11) if it is round, Caps of piers and columns are called *Capitals*, and the part between the Cap and the Base, the *Shaft*. The flat upper member of a Capital is called the *Abacus*.

A beam that spans the space between two piers or columns, or between a pier or column and a wall, is called an *Architrave*, or *Epistyle*. Above it, between the Architrave and the Cornice, there is generally a little strip of wall called the *Frieze*. Architrave, Frieze and Cornice constitute the *Entablature*. A series of columns is called a *Colonnade* (12). The spaces between piers or columns are sometimes

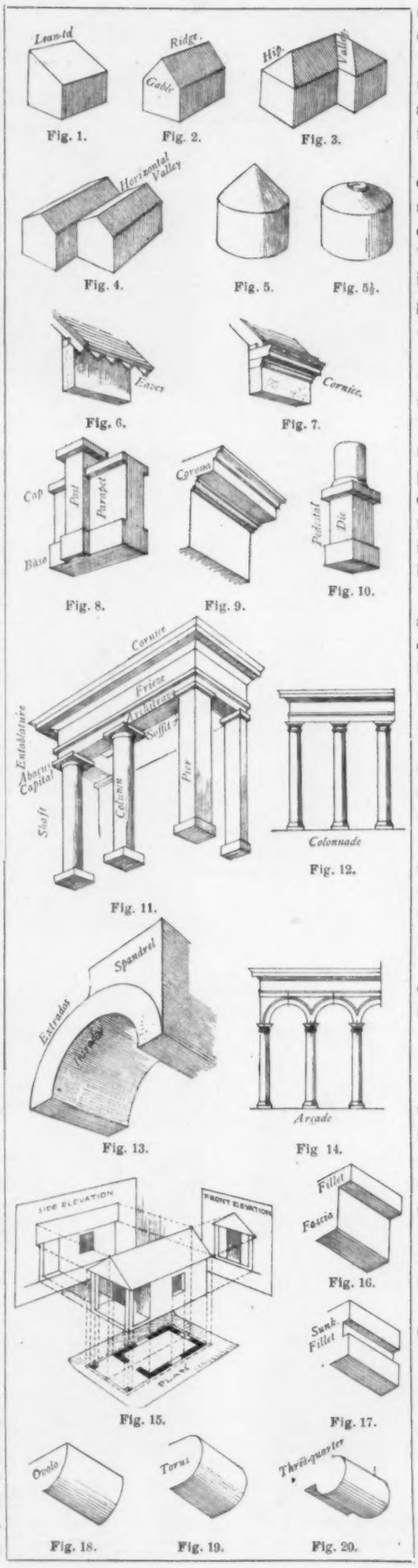


Fig. 1. Fig. 2. Fig. 3. Fig. 4. Fig. 5. Fig. 5½. Fig. 6. Fig. 7. Fig. 8. Fig. 9. Fig. 10. Fig. 11. Fig. 12. Fig. 13. Fig 14. Fig. 15. Fig. 16. Fig. 17. Fig. 18. Fig. 19. Fig. 20.

spanned by *Arches*, a series of which is called an *Arcade* (13).

The space between two walls is sometimes covered by a sort of continuous arch called a *Vault*, instead of by a floor or roof.

The under surface of a beam or architrave is called its *Soffit*, and the same name is used also for the *Intrados*, or under surface of an arch or vault. The upper surface, or back of an arch, is called the *Extrados*, and the triangular space of wall above it is called a *Spandrel* (14).

The Wall, the Pier and the Column, with or without a Pedestal, constitute the chief supporting members; the Frieze and Cornice, with the roof that rests upon them, constitute the chief part of the load they carry. The Architrave, the Arches and the Spandrels form part of the load, relatively to what is below them, but are supporting members relatively to what is above them.

Besides being valuable as a shelter, a building may be in itself a noble and delightful object, and architects are builders who, by giving a building good proportions and fine details, and by employing beautiful materials, make it valuable on its own account, independently of its uses. Their chief instruments in this work are Drawings, both of the whole building and, on a larger scale, of the different features which compose it and of their details, which are often drawn full-size. These drawings comprise Plans, Sections, Elevations and Perspective Views (15). They serve to explain the intention of the architects to their clients and to their workmen.

MOULDINGS.

The simplest decorative details and those which are most universally used in buildings, are called *Mouldings*. Mouldings are plane or cylindrical surfaces, convex, concave, or of double curvature, and they are sometimes plain and sometimes enriched by carving. They are called by various technical names: Greek, Latin, Italian, French and English. The cross section of a moulding is called its *Profile*.

A small plane surface is called a *Band*, *Face* or *Fascia* (16), and if very small a *Fillet*, *Raised* or *Sunk* (17), *Horizontal*, *Vertical* or *Inclined*.

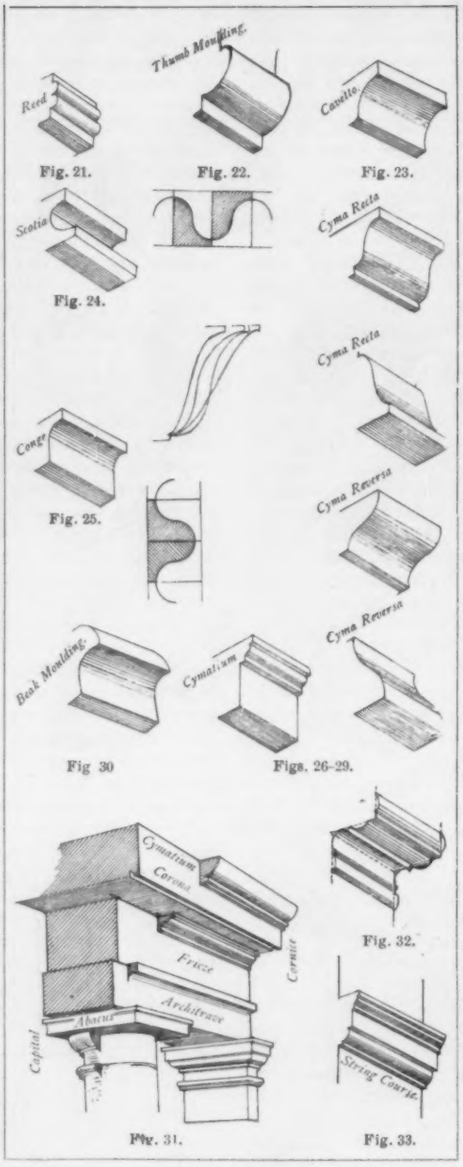
A convex moulding is called an *Ovolo* (18), *Torus* (19), or *Three-quarter Moulding* (20), according to the amount of the curvature of its profile. A small Torus is called a

Bead (21), *Astragal* or *Reed*, and an elliptical one, a *Thumb Moulding* (22). Concave mouldings are in like manner called *Cavetto* (23), *Scotia* (24), or *Three-quarter Hollow*, but the term Scotia (darkness) is often used for any hollow moulding. A Cavetto tangent to a plane surface is called a *Congé* (25).

A moulding with double curvature is called a *Cyma*, or Wave Moulding. If the tangents to the curve at top and bottom (26) are horizontal, as if the profile were cut from a horizontal wavy line, it is called a *Cyma Recta;* if vertical, as if cut from a vertical line (27). a *Cyma Reversa*. The Cyma Recta is sometimes called Cyma Reversa (28), when it is turned upside down. But this leads to confusion. A small Cyma is called a *Cymatium*. A small moulding placed above a Band, or any larger moulding, as a decoration, is also called a *Cymatium* (29), whatever its shape.

When a convex and a concave moulding, instead of being tangent, come together at an angle, they constitute a *Beak Moulding* (30).

Some architectural features, such as Bases, Caps, and Balusters, consist entirely of mouldings. Others consist mainly of plane surfaces, mouldings being employed to mark the boundary between different features, or between different members of the same feature, as between the Architrave and Frieze, or between the Shaft of a column and its Capital. In these cases the mouldings, since they occur on the edges of the stone blocks, indicate, while they conceal, the position of the joints of the masonry. Mouldings are often placed also in the internal angle where two plane surfaces meet, as is the case (31) between the Frieze and the Corona of the Cornice, and under the Abacus of the Capital. When placed upon the external angle formed by two planes, they are, in the Gothic Styles (32), often cut in, so as to lie below the surface of both planes, but in the Classical Styles, they project beyond the plane of one of the surfaces, like a little cornice, as is often seen in the Abacus of a Capital.



Horizontal Mouldings, separating plane surfaces, are called a *String Course* (33).

TABLE OF MOULDINGS.

Plane. — Face, Band, or Fascia. Bevelled or Inclined Face. Fillet, vertical or horizontal, or bevelled, Raised or Sunk.

Convex. — Ovolo, or Quarter Round. Torus, or Half Round. Thumb Moulding, or Elliptical Torus. Three-quarter Round. Bead, Astragal, or Reed. Three-quarter Bead.

Concave. — Cavetto or Quarter Hollow. Congé. Half Hollow. Scotia. Three-quarter Hollow.

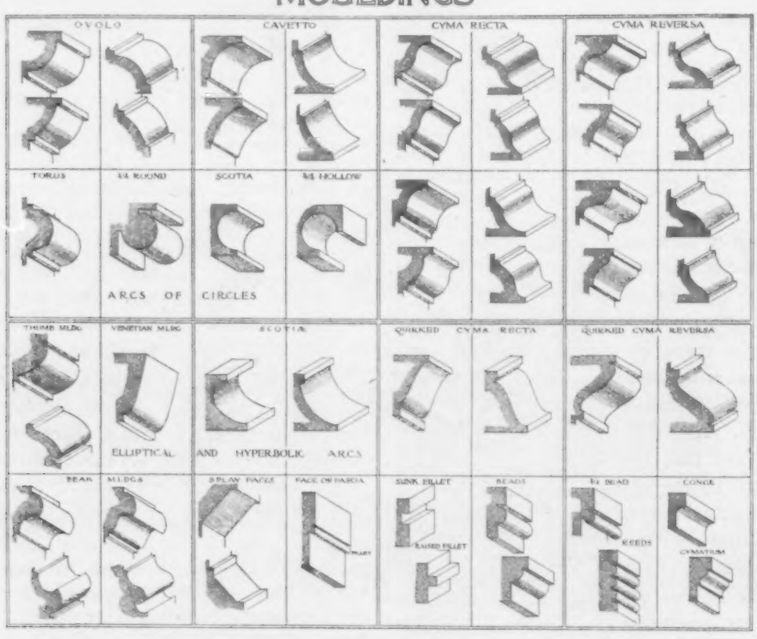
Double Curvature. — Cyma Recta. Cyma Reversa. Cymatium. Beak Moulding.

Besides the differences of size and shape already mentioned, and indicated in the Table, mouldings of the same name differ in the kind of curve they employ. They may be arcs either of circles, ellipses, parabolas or hyperbolas, or of any other curve. The Cymas vary also in the relative size of their concave and convex elements.

W. R. WARE.

[To be continued.]

MOULDINGS



ORNAMENTAL BRIDGES.

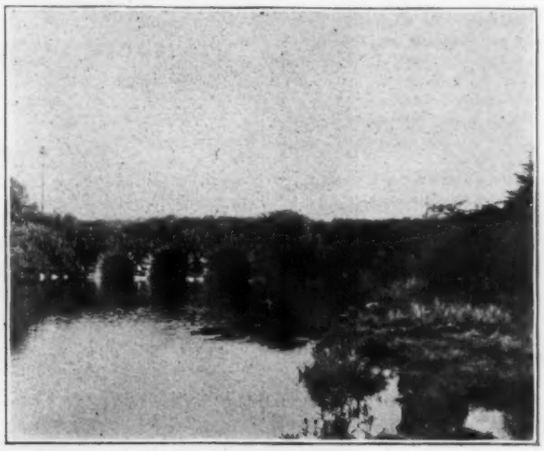
CRITICS tell us that our taste for the beautiful depends largely on our environment. Artistic production is, therefore, characteristic of a people. Those who live in primitive and rustic surroundings, we know, have not the æsthetic taste so highly developed as their more favored brothers in the vicinity of educational and cultured centres.

Boylston Bridge, Boston.

Those who are entrusted with the expenditure of public money are gradually coming to learn that there is economy in building artistic bridges in and about our large cities and centres of population. This will be easily understood when it is remembered that the building of such ornamental structures enhances the value of all the surrounding property. In some cases, however, the building of such artistic designs is well-nigh, if not altogether, impossible. A few of these hindrances may be briefly referred to. The first is a legal restriction. Some special passages of the law may call for a certain type of bridge, leaving in this way no option whatever to the engineer. Another reason may be the absence of suitable material for constructing ornamental work. This, however, is not altogether a hindrance, for bridges even of the rudest type may often be given an ornamental effect without adding greatly to the total expense. Or the location of the bridge may be such that anything of an ornamental character would be entirely out of place. Few, for instance, would consider the building of an ornamental bridge in a rural district that is little frequented by people. But, perhaps the most serious hindrance of all to artistic construction is the financial one.

Franklin Park, Boston.

Riverway, Boston.



Agassiz Bridge, Back Bay Fens, Boston.

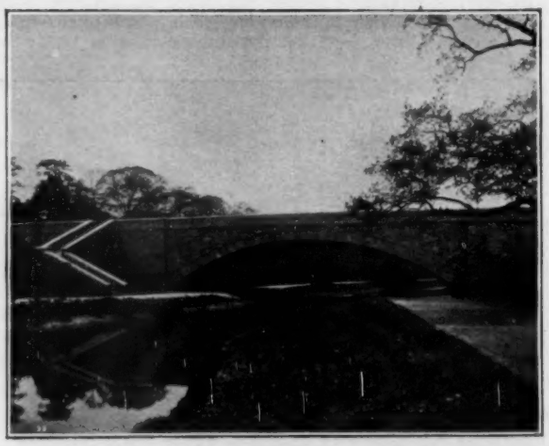
Foot Bridge, Union Park, Chicago.

Wagon Bridge, Garfield Park, Chicago.

The world generally seems to consider American engineers as an extremely practical class of men, whose principal object is to

accomplish certain results with the least expenditure of time and money. This criticism is, to a certain extent, just. The rapid development of our country, the building of long lines of railroads in

Ridge Ave. and Wissahickon Creek.

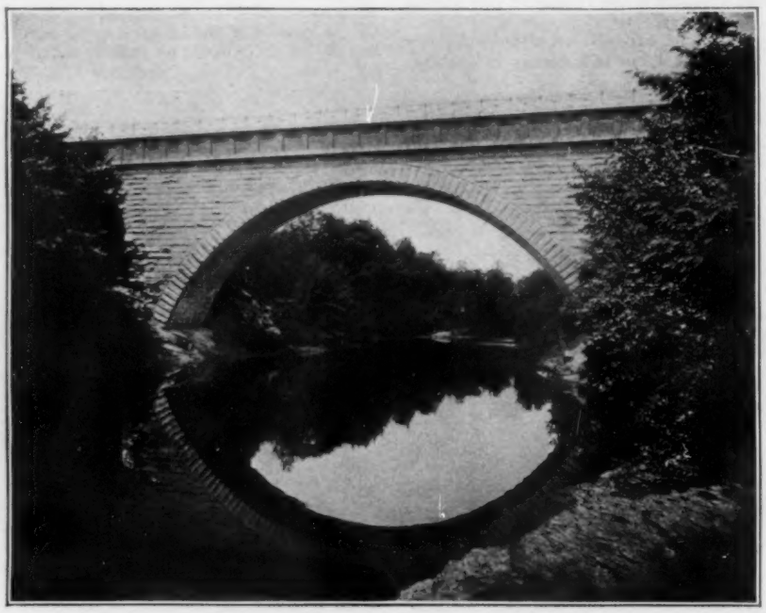


Longwood Bridge, Boston.

a very short space of time, has led to the adoption of the common and rather unsightly form of truss-bridge that can be cheaply made and quickly put together. Unfortunately, this type has become the prevailing one in America, and too often in constructing bridges in and around our large cities the same unsightly forms have been used where other, and more ornamental, types should have been built instead.

In the matter of bridge-construction as in almost every other thing, fashion often influences us to a great degree; and up to the present the prevailing fashion in bridge-construction has been the economical, though unsightly, truss, framed for short spans with parallel chords.

The purpose of the present article is to show a few examples of the higher class of bridge-designs, and to promote, so far as possible, æsthetic taste in bridge-construction.



Echo Bridge, Newton Lower Falls, Mass.

A few of the general principles to be used may be briefly referred to. The first and, perhaps, the most important consideration is to have the bridge symmetrically proportioned. If the conditions will at

Pipe Bridge, St. Louis, Mo., 10′ 8″ x 106′.

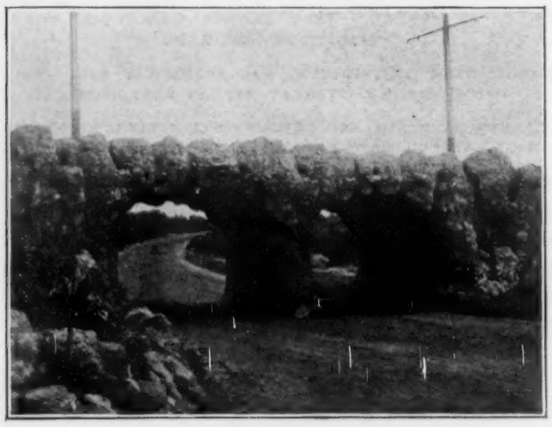
all permit, the general outline on either side of the centre should be the same, or nearly so. It should, at any rate, partake of the same general features in reference to number and length of spans, etc. There is, perhaps, no greater jar to æsthetic feeling in this matter than to see a bridge built in violation of this principle, with, say, a number of large spans at the one side and small spans at the other; or with the principal channel-span considerable out of centre. This principle of symmetry is, perhaps, the first and most essential one in the design of ornamental bridges.

The next principle, also an essential one, is conformity to landscape. How utterly out of place a highly ornamental bridge would appear off in the rough country; or how equally out of place is an unsightly truss-bridge located in a public park among beautiful surroundings. The kind of material used should also conform to the landscape. In a park with rough, rocky surroundings nothing is more suitable to the place than a rockfaced stone arch, while in a public garden surrounded with the work of the landscape-artist we would naturally select a finer class of work. If it be an arch, the stonework should be finely cut, ornamented with frequent cornices and belt-courses on the abutments, and mounted on

Panther Hollow, Pittsburgh, Pa., Span 360′.

either side with a highly ornamental railing. So it will be easily seen that this principle of conformity to landscape is one of the most important in designing ornamental bridges.

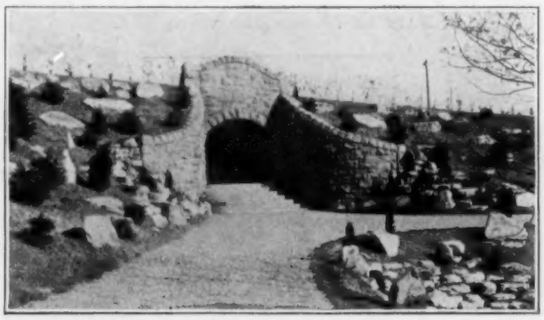
As a general thing, it is better to adhere throughout to one form of material in the construction. Violation of this principle is almost always fatal. There is, perhaps, no more striking example of such violation than is illustrated in one of the Schuylkill-River bridges in



Electric-road Bridge, Ocean Beach, San Francisco, Cal.

Philadelphia, where the river-spans are built of steel of the ordinary parallel-truss type, while the spans at either end, crossing the park driveways, are built of stone arches.

In the construction of the little park-bridge at Madison, N. J., built in 1898, from plans by the writer of this article, the blending of the two classes of material has been so arranged that the general effect does not jar æsthetic feeling. As shown in the *American Architect* for March 30, 1901, the centre-span of 50 feet is constructed of



Highland Park, Pittsburgh, Pa., 12′ Arch over Footway.

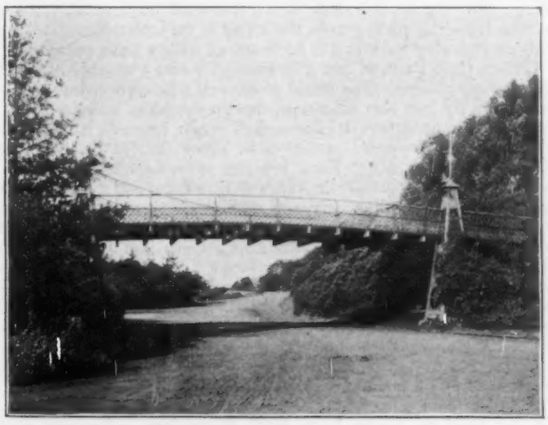
steel, built in the form of a flat arch. The abutments at either end are made of rough-faced stonework, and the steps of concrete. This bridge is located in the City Park and spans two lines of railway. It is surrounded with plants and shrubs, and altogether the general effect is pleasing. A full account of it may be found in the *Engineer*, of London, Eng., also in the *Engineering News*, of New York City, both being published in 1900.

Other principles that should be observed in the design of ornamental bridges are the selecting of proper colors, the producing of

Eden Park, Cincinnati, O., Span 70′; Width 33′; Built, 1895.

shades and shadows, making the relative height of substructure and superstructure to correspond, giving also a suitable thickness to the piers in proportion to their height; making the base and coping courses in proper proportion to the body of the work; giving also a slight camber to the floor to avoid any appearance of sagging in the middle, and numerous other such considerations that will appeal to the engineer in every particular case.

In the matter of general outline, some form of arch will generally



Bridge near old Music-stand, San Francisco, Cal.

produce the most pleasing effect. There are, to be sure, a number of ornamental suspension-bridges throughout the country, but, on account of their lack of rigidity, these are now being used entirely either for light highway travel, where the loads carried are so light in comparison to the weight of the bridge that there is little or no chance for these loads to change the curvature of the cables, or the suspension-bridge may be used to advantage in the case of extremely

Minneapolis, Minn.

heavy structures such as the East-River bridges, or the proposed new one across the North River, where even the weight of several trains is comparatively small in proportion to the weight of the bridge itself. Either of these types, the suspension or the inverted arch, are much more economical of material than any other type, but their cost is usually much greater than the ordinary truss-construction.

Bridge in Lake Park, Milwaukee, Wis.

The best examples of ornamental work are found in the case of small bridges, located generally in and around our large cities. A few of these are shown in the accompanying illustrations, and the merits in each case can be judged by the reader for himself.

In an article on "American Park Bridges," published by the author of this article in the *American Architect*, March 30, 1901, will be found a number of good examples of artistic work. A number of others are presented here.

In Highland Park, Pittsburgh, Pa., is a little 12-foot stone-arch bridge carrying the driveway over a foot-walk underneath. As will be seen from the photograph, the effect is very pleasing. It is built with curved wing-walls and is surmounted with a stone parapet.

Golden Gate Park, in San Francisco, has also a number of bridges of beautiful design. The rustic stone-arch with two spans seems to fit very nicely into the landscape, though doubtless a single span, or three smaller ones, would have looked much better. Another over Alverd Lakelet appears in the view, almost buried in the foliage. Others in Golden Gate Park are the suspension-bridge near the music-stand, the Roman-arch bridge to Strawberry Hill, and another small arch carrying the driveway across a foot-walk that is very highly ornamented on the sides and mounted with an ornamental balustrade. In Forest Park, St. Louis, there is a handsome little three-span stone pipe-bridge, illustrated herewith. In the photograph there will be seen part of the steel-arch bridge on the farther side that must not be confused with the one in the foreground. The former carries a highway, while the latter carries only a water-pipe across the gully. It was built by the Water Department in 1896 at a cost of $10,500. Its length is 106 feet, and the extreme outside width is 10 feet 8 inches.

A good example of artistic steel-construction is to be seen in a bridge built in 1893 in Lake Park, Milwaukee. The span of this bridge is 50 feet, and total length, including the abutments, is 120 feet. It is built with six steel ribs, the outer one being faced with cast-iron panels and the whole being surmounted with an ornamental iron railing. It is covered with an asphalt pavement laid on buckle-plates. The total cost of the whole bridge was $10,800. Another bridge in the same park crossing a ravine through which a foot-path winds is almost buried in the foliage, and in summer-time can hardly be seen. It is a very simple construction, consisting of plate-girders resting on round iron columns. It was built in 1893, and is for foot-travel only.

Echo Bridge, at Newton Lower Falls, Mass., was built by the Boston Water Commission to carry a conduit across the Charles River. It is now surrounded by a branch of the Park System, and is much seen by Boston people, especially in the summer-time.

The long stone-arch bridge bringing the railroad into the city of Minneapolis on a graceful curve is also a very interesting piece of artistic construction. Two illustrations of this are shown, one of a single arch and the other showing a number of arches with the iron truss-bridge in the foreground.

Eden Park, Cincinnati, has a very handsome Melan-arch bridge, having a span of 70 feet and an extreme width of 33 feet. It was built in the summer of 1895, and crosses one of the main drives of the Park. The ornamentation is quite elaborate, even the soffit of the arch being panelled.

The Panther Hollow Bridge, in Highland Park, Pittsburgh, has a 360-foot steel-arch span with four stone-arches of 28-foot span, two at each end. Its total length is 615 feet, and it carries a 40-foot roadway and two 10-foot sidewalks over Panther Hollow, a ravine of about 120 feet in depth. It was built in 1896, and cost about $170,000.

An interesting example of concrete-bridge construction is shown by the Interlachen Bridge at Minneapolis. While the body of this bridge is made of concrete, the face is built to represent coursed stonework. It was built in 1900 for the Board of Park Commissioners of Minneapolis, the contractor being Mr. Wm. S. Hewett, of that city. Perhaps the largest and most interesting example of concrete-bridge construction is that built at Topeka, across the Kansas River. The most valid, and perhaps the only, objection to the bridge is the unsightly break in the grade, occurring at the middle of the centre span. A vertical curve would have presented a much better appearance. It has one span of 125 feet, two spans of 110 feet and two spans of 97½ feet. Its total width is 40 feet, and the cost was $150,000.

Some other interesting examples of concrete-bridge construction are to be found in bridges at Rock Rapids, Iowa, Forest Park, St. Louis, the Vanderbilt estate at Hyde Park-on-the-Hudson, at Detroit, carrying the Michigan Central Railway across the southern Boulevard and several others elsewhere.

In a future article the writer will take up the subject of long-span steel-arch construction and suspension-bridges, and will endeavor there to illustrate some of the best types existing in America to-day.

H. G. Tyrrell, *Civil Engineer.*

ILLUSTRATIONS.

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

BRIDGES IN CENTRAL PARK, NEW YORK, N. Y.

These and the other bridges in this issue are, of course, published in connection with Mr. Tyrrell's paper on "Ornamental Bridges" above.

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NOTES AND CLIPPINGS.

The Petit Palais, Paris. — The Muncipal Council, Paris, as mentioned in a footnote to our last "Letter from Paris," have decided on the use of the smaller Art Palace on the Champs Elysées as an Art Museum for the city, and it will henceforth be known as the "Palais des Beaux-Arts de la Ville de Paris," and will receive the collections of works of art which are at present scattered in various places — at the Hôtel de Ville, in other municipal buildings, and in the Magasins des Beaux-Arts at Auteuil. The "Chef de Service des Beaux-Arts" of the Municipality, who will be charged with the arrangement of the new Art Museum, proposes to supply one thing that is wanting at the Luxembourg, by forming a special architectural gallery, in which, along with the principal architectural drawings executed since 1870, will be placed the models of the Hôtel de Ville, the new Sorbonne, the Vaudeville Theatre, the churches of La Trinité, St. Joseph, and other buildings. The lofty gallery along the principal front will be reserved for sculpture, and will have, as its central object, M. Frémiet's group of St. George and the Dragon. The semi-circular gallery around the central garden, which is top-lighted, will be reserved for paintings, and the outer concentric gallery, lighted from the side, will be devoted to engravings, drawings, and special exhibitions. The rooms in the basement will serve for meetings, and committees, and lectures, and for storing sculpture models and casts, and may also be of use for various temporary exhibitions. Under these circumstances M. Girault's beautiful building will probably prove, to lovers of art, one of the attractive places in Paris. — *The Builder.*

Recent Archæological Discoveries in Asia Minor. — The reports of the important discoveries made by the German explorers, Drs. Belck and Lehmann, among the ruined cities of Asia Minor, especially in Armenia, induced Professor Virchow to ask the Berlin Anthropological Society to send out another expedition. This also will be under the direction of Dr. Belck, who will leave Berlin for Asia Minor about the end of this month. Professor Virchow confidently expects that it will result in new and important disclosures in connection with the Hittites, the locality of their settlements, and the extent of their dominion and influence. He hopes further to obtain some definite proof or disproof of the hypothesis that they formerly occupied the whole of Asia Minor. He is of opinion that, during the most ancient period of their historical existence, the Hittites were certainly in possession of the countries, including Assyria, where cuneiform inscriptions have been found. There is another question, also, to be solved, of considerable importance from the archæological point-of-view, namely, how far the empire of the ancient Chaldees extended to the north, and how far it was influenced from the north. On the advice of Professor Virchow, Dr. Belck will first proceed to Cappadocia, to search there for the former seats of the Armenians. The Professor is convinced that he will find Assyrian and Hittite bilingual inscriptions, cylinders, and other documents. In his opinion the traditions of the Armenians themselves, and the statements of many classical writers, hitherto incorrectly interpreted, clearly prove that the Armenians lived mainly in Cappadocia, from about 1000 B. C. to 600 B. C., their capital being Cæsarea. — *N. Y. Evening Post.*

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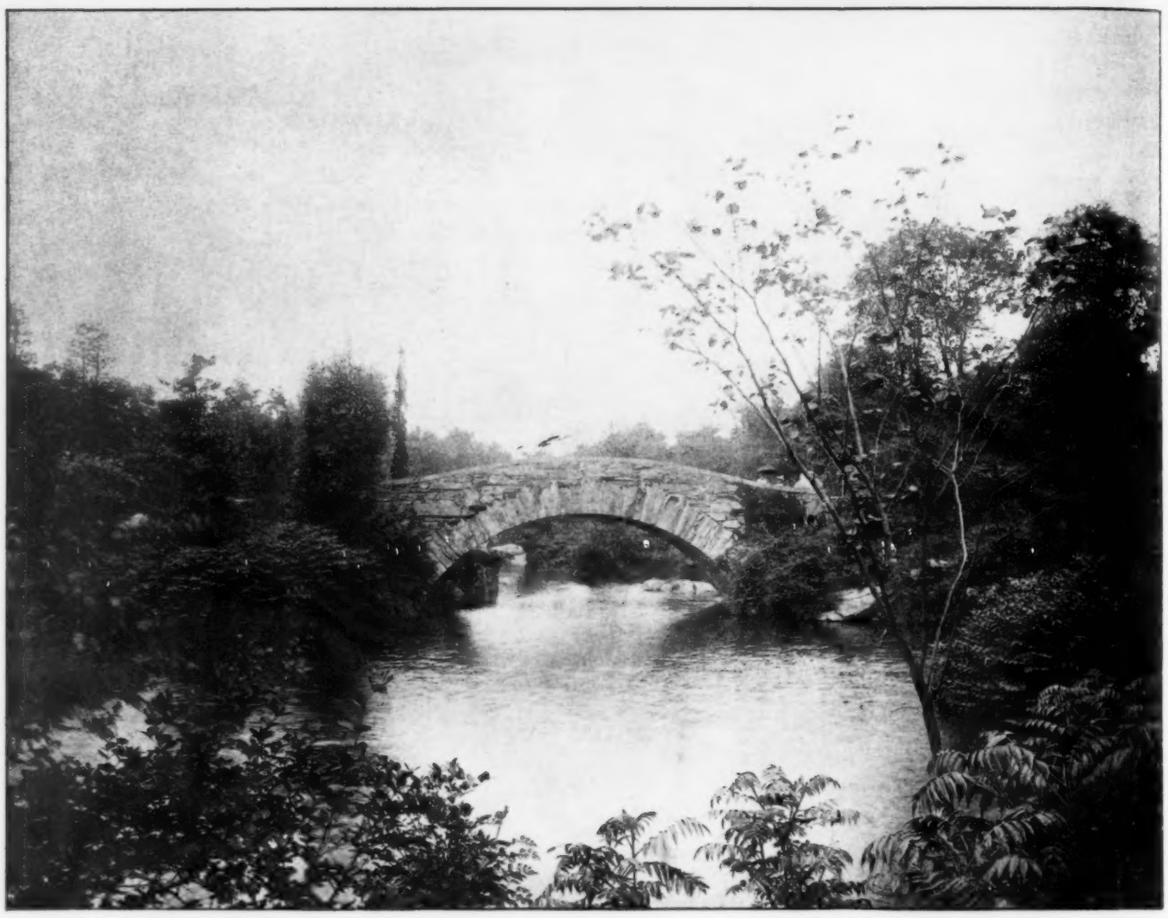

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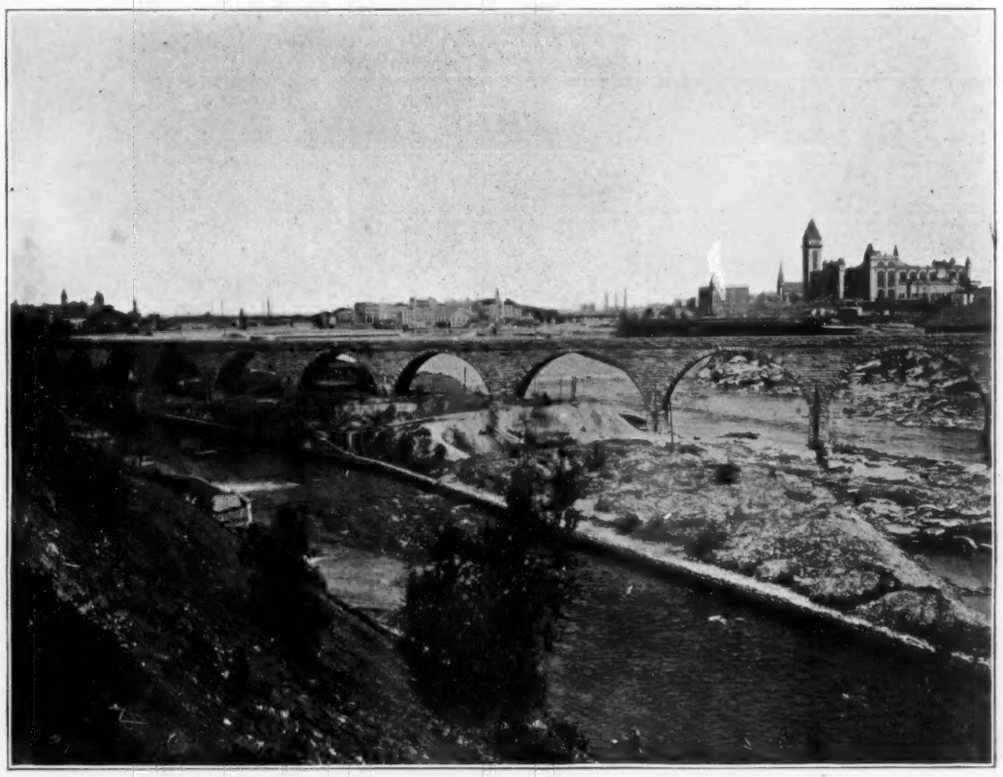

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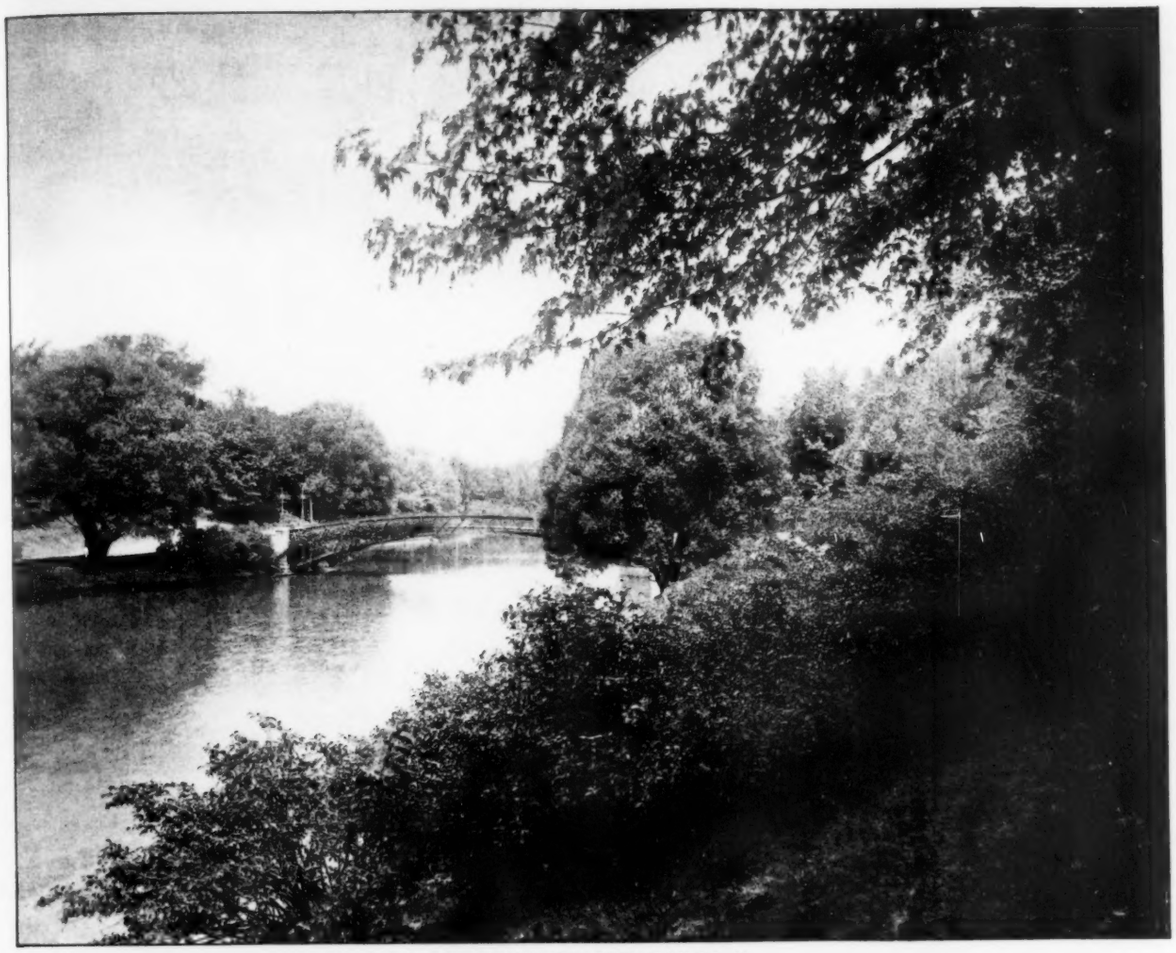

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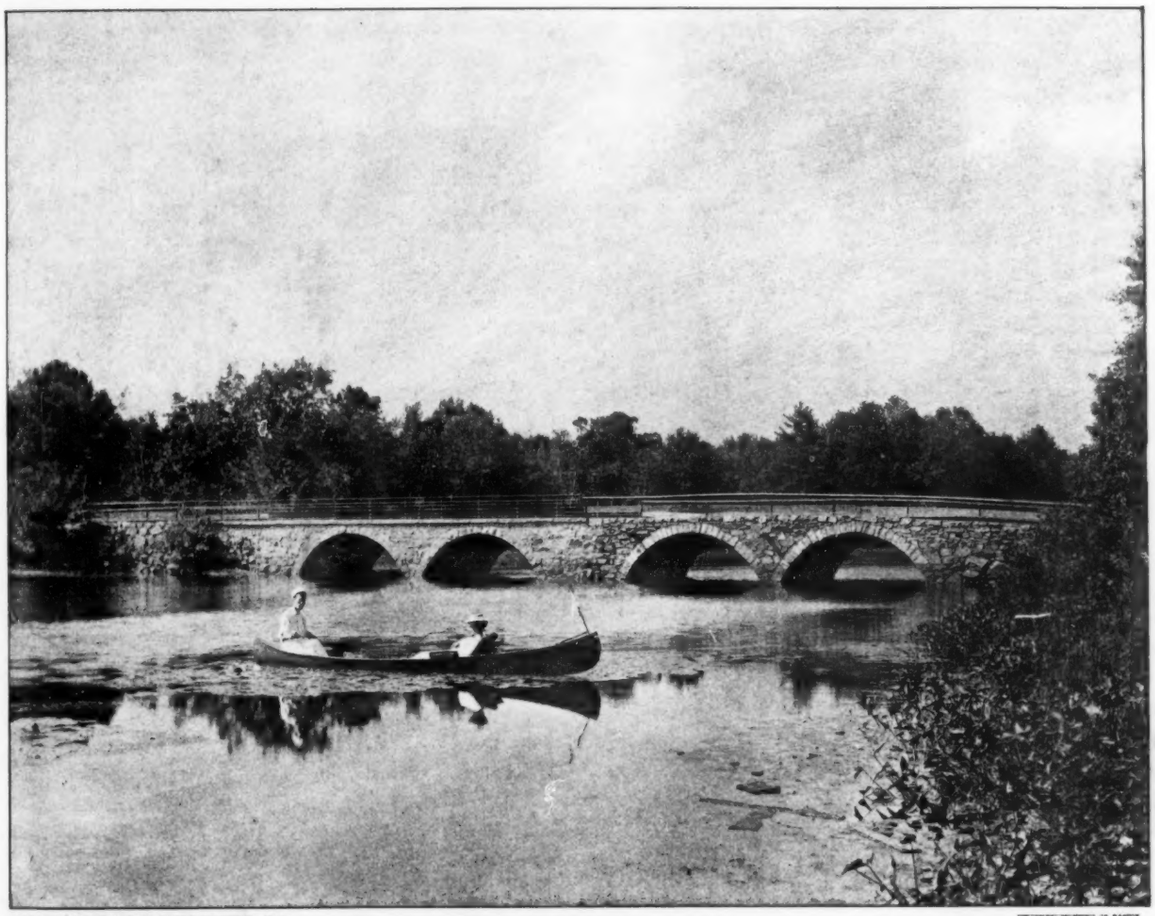

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Carpenters' Hall, Philadelphia, Pa.	" 1770
Independence Hall, Philadelphia, Pa.	" 1729
Faneuil Hall, Boston, Mass.	" 1741

and others.

CHURCHES

King's Chapel, Boston, Mass.	Date 1749
Seventh-day Baptist Church, Newport, R. I.	" 1729
Christ Church, Alexandria, Va.	" 1767
Christ Church, Philadelphia, Pa.	" 1727
St. Paul's Chapel, New York, N. Y.	" 1764
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St. Peter's P. E. Church, Philadelphia, Pa.	" 1758
Gloria Dei Church, Philadelphia, Pa.	" 1700

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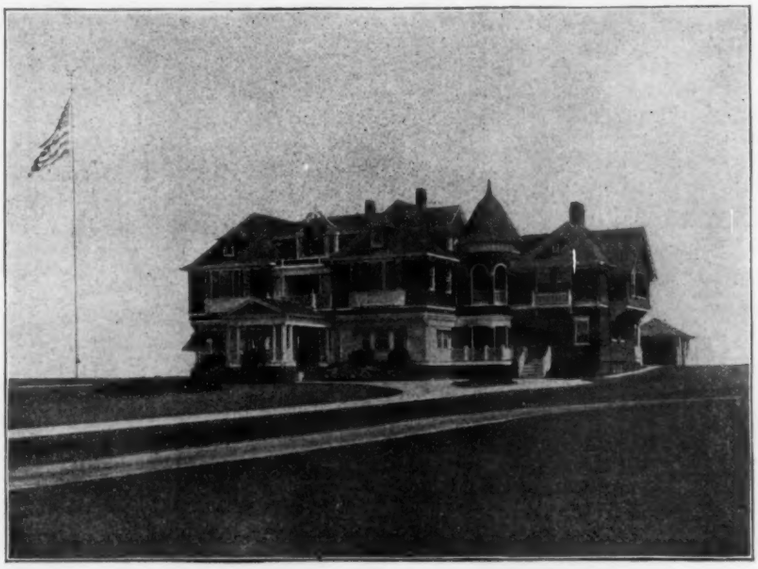

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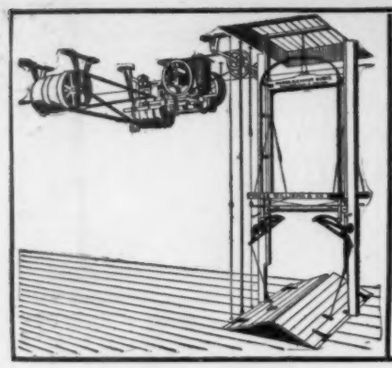

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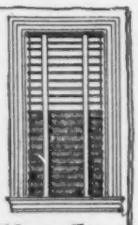

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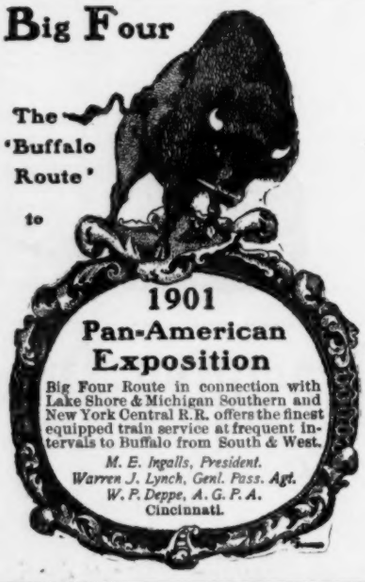

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679,299. Water-Closet Tank. — Wm. S. Cooper, Jr., and John Dorricott, Philadelphia, Pa.
679,324. Wall-Tie. — Thomas J. McCall, Tarentum, Pa.
679,361. Controlling Mechanism for Elevators. — Alfred T. Brown, Cincinnati, O.
679,400. Door Stop and Holder. — Sidney S. Smith, Denmark, Me.
679,427. Vitrified Brick. — Marie J. Magarity, Wilmington, Del.
679,455. Automatic Regulator for Smoke-Preventing Devices. — William J. Creelman, Rochester, N. Y.
679,456. Valve. — Nelson Curtis, Boston, Mass.
679,458. Tubular Bell for Chiming Clocks. — Allen W. Harrington, New York, N. Y.
679,459. Water-Closet. — Rowland C. Johnson and James B. Martin, Brooklyn, N. Y.

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BUILDING PATENTS.

679,464. Sash-Lock. — Henry L. Loomis, Bloomington, Ill.
679,484. Elevator. — Charles L. Startup, Ellenville, N. Y.
679,506. Plumb-Level. — George W. Krabill, Milford, Neb.
679,520. Heater. — Frederick D. Stevens, German Valley, N. J.
679,526. Frost-Guard for Refrigerator-Buildings. — William B. Carnay, Louis Schwarz and Charles Schwarz, Ballston Spa, N. Y.
679,5.2. Steam-Boiler. — George W. Mathews, Chicago, Ill.
679,552. Water-Heater for Range-Boilers. — John J. Cunningham, Toronto, Can.
679,577. Pendulum-Level. — Henry L. Schaffner, Florence, Italy.
679,581. Elevator Safety Appliance. — Wm. R. Weeks, New York, N. Y.
679,614. Safety-Gate for Elevators. — Joseph W. Fleming, Philadelphia, Pa.
679,739. Process of Fireproofing Wood. — Jos. F. Geisler, New York, N. Y.
679,746. Building Construction. — William H. Grueby, Chelsea, Mass.
679,760. Electric-Elevator Controller. — Nils O. Lindstrom, New York, N. Y.
679,776. Building Construction. — John C. Pelton, New York, N. Y.
679,828. Manufacture of Artificial Stone. — Prosper Cabrié, New York, N. Y.
679,847. Automatic Door Opening or Closing Device. — Louis Ives, Dearborn, Mich.
679,860. Fireproof Partition for Buildings. Samuel E. Rabbitt, Washington, D. C.
679,861. Means for Operating Elevator Gates or Doors. — Joseph Rice, Chicago, Ill.
679,882. Washbasin. — William Bunting, Jr., New York, N. Y.
679,905. Door-Check. — Charles H. Ocumpaugh, Rochester, N. Y.
679,912. Ventilating-Skylight. — John F. Preuthus, Philadelphia, Pa.
679,932. Ventilator. — Peter Abrahamson, San Francisco, Cal.
679,952. Door-Closing Apparatus. — John H. Cook, Brooklyn, N. Y.
679,959. Folding Scaffold. — Emilius Enos, Racine, Wis.
679,962. Sliding Door. — John Handschumacher, San Francisco, Cal.
680,015. Adjustable Door-Frame. — John Bachus, Jersey City, N. J.
680,062. Construction of Floors, Partitions, or the Like. — Valentine Moeslein, New York, N. Y.

BUILDING INTELLIGENCE.

(Reported for the American Architect and Building News.)

[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

ADVANCE RUMORS.

Abilene, Tex. — Shurr & Bullhart, Austin, were awarded general contract, at $159,400, for the construction of buildings near here for the Asylum of Epileptics.

Anaconda, Mont. — H. M. Patterson, of Butte, has prepared plans for a hospital for this county. It will be three-story, 48' x 70', costing $18,000.

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BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

Atlanta, Ga.—J. H. Dinwiddie, Equitable Building, is preparing plans for a three-story club-house, 50′ x 190′, to be erected on Auburn Ave. for the Atlanta Athletic Club.

Bellaire, O.—Plans have been completed by Giesey & Faris, Wheeling, W. Va., for the $40,000 city-hall. J. R. Seabrook, president city council.

Boston, Mass.—The stockholders of the Woman's Club-house Corporation have voted to sell their lot at 13-15 Beacon St. and build on some other site. The following committee has been empowered to sell the property for the corporation: Mrs. Mary D. Converse, Mrs. Harriet L. Reed, Miss Helen M. Fogler. They are also empowered to select a new site or sites for the club-house and present them to the stockholders for approval before purchasing.

Frank B. Gilbreth has been awarded the contract to build the brick freight-house on Kneeland and South Sts. for the Boston & Albany R. R. The structure will be 370 feet in length.

Bozeman, Mont.—The citizens of Gallatin County have voted to erect a $30,000 high school. Frank B. Lewis, Chmn. Bd. Trus. County Free High School.

Burlington, Vt.—Press reports state that Andrew Carnegie has offered this city $50,000 for a public library.

Butte, Mont.—H. M. Patterson has prepared plans for a four-story hospital building to be erected on W. Quartz St. for Dr. Murray. It will be 48′ x 100′, of brick and stone; cost, $48,000.

Canton, S. D.—Omeyer & Thori, architects, have completed plans for a college building to be erected for the Augustana College. It will be 58′ x 92′, four stories and basement, brick and stone trimmings for building, and contain gymnasium, assembly-hall, library, kitchen, dining-room and complete boarding college; cost, $25,000.

Catskill, N. Y.—Fred'k N. Dubois, of New York City, is stated to have given the Catskill Y. M. C. A. $25,000. Of this sum $20,000 will be used for the erection of a building.

Cincinnati, O.—Boll & Taylor, 5th and Walnut Sts., have made plans for a combination police station and patrol-house, to be built on McMicken Ave. The structure will be two stories, 38′ x 120′, constructed of brick and stone, with tile roof, and will cost $12,000.

Clarksburg, W.Va.—Plans by E. C. S. Holmboe, of Marietta, O., have been accepted for the $30,000 jail for Harrison County.

Creston, Ia.—Plans by I. P. Hicks, Omaha, have been accepted for the $25,000 three-story pressed brick and stone temple, 55′ x 142′, for the Masonic Temple Association.

Dallas, Tex.—Sanger Bros. will erect a six-story building of brick and stone to cost $176,000.

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

Davenport, Ia.—Louis Strathman has been awarded the contract to erect a parochial school and residence for the sisters of St. Mary's Church; cost, $20,000. Clausen & Burrows, architects.

Duluth, Minn.—The Wolvin Building Co. have been awarded the contract for erecting a six-story $300,000 office-building for the United States Steel Co. Palmer, Hall & Hunt, 307 Lonsdale Building, architects.

East Hampton, Mass.—E. J. Lewis, Boston, has prepared plans for a frame and stone church, 37′ x 104′, for the Philips Episcopal Church Society.

East Orange, N. J.—Oscar S. Teale, 35 Broadway, New York, N. Y., has prepared plans for an addition to the Calvary Methodist Church, to cost about $40,000. Rev. Dr. F. C. Baldwin, pastor.

Escanaba, Mich.—Bonds for $25,000 have been voted for the erection of a city-hall and central fire-station.

Grand Forks, N. D.—Andrew Carnegie offers $20,000 for the erection of a library building, under the usual conditions.

Hazlehurst, Miss.—The plans of J. Rieley Gordon, of Dallas, Tex., have been accepted for a $50,000 court-house for Copiah County.

Homestead, Pa.—F. J. Osterling, 101 *Times* Building, Pittsburgh, has completed plans for the C. M. Schwab Industrial School. The building will be three stories in height, constructed of stone, brick and steel, and will cost $50,000.

Wm. Miller & Sons, of Pittsburgh, have received the contract for erecting the Schwab Manual Training School for $80,000.

Hopkinton, Mass.—A new $20,000 town-hall is to be built. A building committee has been appointed.

Jacksonville, Fla.—The city will rebuild the Central grammar and high school buildings, at a cost of from $25,000 to $30,000. Philip Frioleau, city engineer.

The Seminole Club will erect a $12,000 club-house on Duval and Hogan Sts. J. H. Durker, pres.

Lake Linden, Mich.—Charlton, Gilbert & Demar, Marquette, are preparing plans for a church for St. Joseph's congregation; cost, $150,000.

Langston, Okla. Ter.—The plans of I. H. Bennett, of Guthrie, have been accepted by the Regents of the Langston Agricultural & Normal School for new buildings to be erected this fall costing about $25,000.

Lansdale, Pa.—J. Horace Cook, Philadelphia, has completed plans for a three-story stone and brick school-house, to cost $30,000.

Lawrence, Kan.—The contract for constructing the museum building at the University of Kansas has been awarded to Henry Bennett, of Topeka, for $65,444.

Lincoln, Neb.—Leach & Plym are preparing plans for a two-story brick high school, to cost $25,000.

Memphis, Tenn.—The Memphis Telephone Co. is to erect a three-story brick building to cost about $30,000.

Milwaukee, Wis.—The plans of Buemming & Dick, 1107 Pabst Building, have been accepted for a $55,000 school to be erected on 7th and Prairie Sts., to be used for primary grades and for the deaf.

Minneapolis, Minn.—W. C. Whitney is preparing plans for the Young Women's Christian Association building to be erected on 7th St., between Nicollet and 1st Ave., S. It will be 44′ x 140′, four stories and basement, of pressed brick and stone, gravel roof, with iron beams and columns, gymnasium fittings, restaurant and steam heating; cost, $25,000.

Montevideo, Minn.—The Odd Fellows have voted to erect a $20,000 three-story building, 58′ x 100′.

New Haven, Conn.—Plans are being prepared for a building for the City Missionary Association, to be erected on Orange and Elm Sts., to cost about $36,000.

Newton, Mass.—The plans of Hartwell, Richardson & Driver, Boston, have been accepted for the Mason School in Newton Centre.

New York, N. Y.—Plans have been filed for a one-story brick and stone edifice to be erected at 164 Waverly Pl. for the Abyssinian Baptist Church, to cost $30,000. Architects, Pollard & Steinam, 3 E. 14th St.

Whitney Warren, 3 E. 33d St., has prepared plans for an inn, which John Jacob Astor will erect on the west side of Pelham Parkway, at the junction of Williamsbridge Road. It will be three stories high, of stone and wood, and cover about 35,000 sq. ft. of space. Probable cost, $200,000.

The Trustees of Teachers' College have filed plans with the Department of Buildings, through Architect Edgar A. Josselyn, 3 W. 29th St., for a five-story and basement brick building to be erected in Lawrence St., west of Amsterdam Ave., to be known as the Speyer School, to be erected at an estimated cost of $70,000.

Philadelphia, Pa.—Wilson & Co., Drexel Building, have completed plans for St. Joseph's Academy, to be built at county line and Germantown Ave.

Architect Louis C. Hickman has completed plans for the rebuilding of the Stock Exchange at 3d and Walnut Sts. The first floor will have 12 offices, the second floor will be used for exchange purposes and the third and fourth stories for offices. Contracts will be let separately.

The Pennsylvania Railroad Co. has purchased No. 1503 Filbert St. for $22,000. This and the three adjoining buildings above will give way to their new office-building.

Architect Edw. Hazlehurst is preparing designs for an eight-story apartment-house, to be built at 214-216 S. 12th St.

Contractors Doyle & Doak have signed a $100,000 contract to remodel the Girard Bank Building on 3d St., below Chestnut. Architect, James H. Windrim.

Pittsburgh, Pa.—The Diamond National Bank will erect a $500,000 ten-story brick and stone office-building at the corner of 5th Ave. and Union St.

Harry S. Bair, Standard Building, has prepared plans for a $30,000 police-station to be built on Centre Ave. and Devillier St.

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

Plans are being prepared by Charles Bickel, 5234 Penn Ave., for 30 warehouses for the Pittsburgh Warehouse Terminal Storage Co. Col. J. M. Schoomaker, W. F. Meyers and others, directors.

A new cathedral, costing $50,000, will be erected by the St. Paul's Roman Catholic congregation.

Rhinelander, Wis.—A syndicate of Milwaukee capitalists contemplates erecting a $100,000 sanitarium here. Dr. S. Fichtner, of Milwaukee, is at the head of the syndicate.

Rock Island, Ill.—Collins Bros., 420 Sixteenth St., have received the contract to erect the public library at about $70,000.

Salt Lake City, Utah.—The plans of S. C. Falkinberg, Hammond Building, Detroit, Mich., have been accepted for a $175,000 apartment-house to be erected for Mrs. E. F. Holmes on State and Brigham Sts.

San Antonio, Tex.—The Alamo National Bank has accepted plans by Alfred Giles for its new building, to be five stories high, 76′ x 80′, fireproof construction, and cost $80,000.

San Francisco, Cal.—Report states that the German General Benevolent Society, office at 330 Geary St., have received plans and are considering same for new hospital buildings to be erected on Noe, Castro and Ridley Sts., at a cost of about $250,000. I. Gutte, Chmn. Bldg. Com.

Santa Barbara, Cal.—F. O. Engstrum has received the contract for erecting a high school for $54,000.

Sioux Falls, S. D.—The contract for the erection of the Elks' building was awarded to C. E. Jordan, of this city, at $18,000. Joseph Schwarz, architect.

St. Louis, Mo.—Plans are being prepared by Wm. Levy, 816 Olive St., for a three-story brick and stone residence for Wm. Stix; cost, $50,000.

St. Paul, Minn.—T. Reardon, 767 Temperance St., has been awarded the contract for erecting a new school house in the 8th Ward, at $41,650.

Sturgeon Bay, Wis.—Chandler & Park, Racine, have completed plans for a $35,000 school-house for this place.

Tacoma, Wash.—Jardine, Kent & Jardine, 1162 Broadway, New York, N. Y., have completed plans for the $75,000 Carnegie Library.

Tuscola, Ill.—J. M. Deal, of Lincoln, is preparing plans for a stone church for the Presbyterian congregation, to cost $15,000.

Vicksburg, Miss.—Davis, Larkin & Co., of Chicago, Ill., have received the contract for erecting a city-hall here, for $52,140.

Westerly, R. I.—The Eli Jackman Co., of Gloucester, Mass., have received the contract for erecting a $50,000 high school.

Woonsocket, R. I.—The Council has appropriated $50,000 for schools to be erected in the third and 5th wards.

Worcester, Mass.—The Council has authorized the issue of $95,000 bonds for schools at Northville and on Home and Sever Sts.

APARTMENT-HOUSES.

Brooklyn, N. Y.—*McKibben St.*, nr. Leonard St., 2 five-st'y bk. flats, 52′ 6″ x 87′ 2″, steam heat; $48,000; o., W. Ballelsen and M. Wexler, 172 Boerum St.; a., Sass & Smallheiser, 23 Park Row, N. Y.

Chicago, Ill.—*S. Hamilton Ave., Nos.* 65-67, 3 four-st'y bk. & st. flats, 42′ x 49′; $50,000; o., J. A. Wendell; a., Perley Hale; b., J. P. Parent, 4918 Lowe Ave.

Greenwood Ave., Nos. 6116-18, three-st'y bk. & st. flat, 37′ x 69′; $15,000; o., M. Curran; a., Bishop & Co.; b., J. C. Barrett, 479 E. 61st St.

New York, N. Y.—*E. Seventeenth St., No.* 118, five-st'y & base. bk. & st. flat, 20′ x 69′ 8″; $15,000; o., Samuel Barnett, 1163 Park Ave.; a., Alfred E. Badt, 1 Union Sq. W.

W. Sixty-second St., Nos. 213-215, six-st'y bk. flat, 50′ x 87′; $52,000; o., City and Suburban Homes Co., 281 Fourth Ave.; a., Howells & Stokes, 47 Cedar St.

Oak Terrace, nr. Crimmins Ave., three-st'y bk. flat, 20′ x 25′ x 65′; $10,000; o., Anna M. Schmidt, 352 E. 85th St.; a., Edw. Werz, 1491 Third Ave.

CHURCHES.

Detroit, Mich.—*Fort St. and Summit Ave.*, bk. & st. church, 66′ x 100′, slate roof, steam; $18,000; o., Fort St. Congregational Society, Rev. John F. Berry; a., W. D. Butterfield & Co., 443 Lincoln Ave.

EDUCATIONAL.

Newton, Mass.—*Langley Road*, two-st'y bk. & st. school, 58′ x 96′, pitch roof, steam; $33,000; o., City; P. H. Jackson; a., Walter R. Fordush.

FACTORIES.

Boston, Mass.—*Harrison Ave.*, cor. Malden St., Ward 9, four-st'y bk. factory, 51′ x 67′, flat roof, steam; $20,000; o., John A. Armstrong; a., G. H. Smith, 15 School St.

Chicago, Ill.—*Fortieth St. and Transit Ave.*, five-st'y butterine factory & warehouse, 80′ x 160′; $60,000; o., The Friedman Manufacturing Co.; a., Edgar S. Belden; b., F. M. Garthwait, 315 Chamber of Commerce.

HOSPITALS.

Boston, Mass.—*Allen St.*, Ward 8, three-st'y bk. hospital building, 31′ x 128′, flat roof, steam; $35,000; o., Mass. General Hospital; a., Wheelwright & Haven, 100 Boylston St.

Centre St., nr. Allendale St., Ward 23, 2 two-st'y bk. hospitals, 42′ x 69′ & 39′ x 74′, flat roofs, steam; $80,000; o., Chas. P. Bowditch & Son, Trustee; b., H. P. Cummings & Co.; a., Kendall, Taylor & Stevens.

Lincoln, Neb.—Four-st'y bk. & st. hospital, 56′ x 170′, pitch roof, steam; $50,000; o., Franciscan Sisterhood of Nebraska; b., C. D. Campbell & Bro.; a., James Tyler & Son.

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BUILDING INTELLIGENCE.

HOUSES.

Boston, Mass. — *Brighton St., Nos.* 78 80, Ward 8, 2 four-st'y bk. dwells., 23' x 69', flat roofs, stoves; $14,000; o. & b., A. Shulkin *et al.*, 82 Brighton St.

Spencer St., No. 135, Ward 20, three-st'y fr. dwell., 26' x 45', flat roof, furnace; $4,500; o., Minnie E. M. Newborg; b., John C. Newborg, 23 Learnard St., Dorchester.

Nazeing St., nr. Blue Hill Ave., Ward 20, two-st'y fr. dwell., 31' x 32', pitch roof, hot water; $6,500; o., K. M. Walsh; a., T. Edw. Sheehan, Tremont Building.

Maryland St., nr. Savin Hill Ave., Ward 20, 2 three-st'y fr. dwells., 24' x 42', flat roofs, stoves; $9,000; o. & b., Wm. Douse, 18 Maryland St.

Dorchester Ave., Nos. 1538-1542, 2 three-st'y fr. dwells., 25' x 50', flat roofs, stoves; $9,000; o. & b., P. O'Hearn, 14 Arcadia St.

Francis St., Nos. 62, 66, 72, 80, Ward 19, 4 three-st'y fr. dwells., 26' x 59', pitch roofs, furnaces; $24,000; o. & b., J. C. Spillane, 217 Walnut Ave.

Kempton St., nr. Huntington Ave., Ward 19, 3 three-st'y bk. dwells., 23' x 55', flat roofs, stoves; $15,000; o. & b., B. J. Connelly, 93 Dale St.; a., G. H. Smith, 15 School St.

Norman St., No. 24, Ward 8, three-st'y bk. dwell., 16' x 48', flat roof, stoves; $6,000; o. & b., Jos. Cupinsky and N. Drooker; a., F. A. Noreross, 110 Tremont St.

Humboldt Ave., Nos. 74-76, Ward 21, 2 three-st'y bk. dwells., 23' x 55', flat roofs, hot water; $16,000; o., a. & b., Oscar E. Furber, 3 Elbert St., Roxbury Dist.

Harwood St., nr. Willowwood St., Ward 24, 2½-st'y fr. dwell., 24' x 36', pitch roof, furnace; $4,000; o. & b., A. H. Green, 190 Lauriat Ave., Mattapan.

Lawn St., No. 70, Ward 19, three-st'y fr. dwell., 25' x 50', flat roof, furnace; $4,500; o., Annie O. Reilly; b., Wm. Tobin, 52 Perkins St., Jamaica Plain.

Hewins St., Ward 20, 2½-st'y fr. dwell., 32' x 33', pitch roof, furnace; $5,500; o., Mary S. Powell; a., F. G. Powell, 102 State St.; not let.

Nashua St., Nos. 66-70, Ward 8, 4 three-st'y bk. dwells., 22' x 56', flat roofs, stoves; $20,000; o., Jennie Davis; a., G. H. Smith, 15 School St.; b., B. Davis.

Belden St., nr. Dudley St., Ward 16, 2 three-st'y fr. dwells., 28' x 41', flat roofs, furnaces; $9,000; o., H. D. Trask; a., Bacon & Mears, 27 Kilby St.; b., Jas. E. Wilbur, 299 Norfolk St., Dorchester Dist.

Columbia Road, nr. Boston St., Ward 16, 2½-st'y fr. dwell., 28' x 57', pitch roof, furnace; $7,000; o., M. A. Leary, 116 Boston St.; a., W. H. Smith; b., John K. Martin.

Orchard Ave., nr. Morton St., Ward 23, two st'y fr. dwell., 28' x 34', pitch roof, furnace; $5,000; o., John M. Minton, 2 Hyde Park Ave.; a., J. G. Hutchinson, 3700 Washington St.; b., John K. Martin.

Wenham St., nr. Weld Hill St., Ward 23, three-st'y fr. dwell., 25' x 49', flat roof, furnace; $6,000; o., a. & b., John J. Flynn, 95 Milk St.

Brooklyn, N. Y. — *Lenox Road*, nr. Nostrand Ave., 2½-st'y fr. dwell., 31' x 32', shingle roof; $5,500; o., C. A. Formosa, Pocantico Hills, N. Y.; a., F. Persanowsky, Flatbush Ave. & Avenue G.

Fort Hamilton Ave., nr. 63d St., 4 two-st'y bk. dwells., 20' 3" x 43' & 20' 3" x 51' 9"; $20,000; o., A. Volkert, 87 Harmon St.; a., F. Holmberg, 1153 Myrtle Ave.

E. Nineteenth St., nr. Voorhees Ave., 2½-st'y fr. dwell., 30' 6" x 36'; $6,000; o., D. Heffner, Voorhees Ave. & E. 23d St.; a., A. A. Koch, 1022 Madison St.; b., Foley & Fitzpatrick, E. 14th St.

Ocean Parkway, nr. Avenue O, 2½-st'y fr. dwell., 35' x 45', shingle roof; $10,000; o., Niel P. Nielsen, 208 W. 55th St., N. Y.; a., G. Hitchings, 848 Flatbush Ave.

Thirteenth Ave., cor. 41st St., 29 two-st'y bk. dwells., 18' x 52'; $87,000; o., W. C. Stevenson & Co., 3711 Twelfth Ave.; a., G. Hitchings, 848 Flatbush Ave.

Ocean Ave., nr. Avenue L, 2½-st'y fr. dwell., 23' 6" x 40', shingle roof; $6,000; o., W. H. Money, 194 Broadway, N. Y.; a., H. G. Lamson, 194 Broadway, N. Y.

Cambridge, Mass. — *Dana St., No.* 78, three-st'y fr. dwell., 26' x 56', flat roof, stoves; $6,000; o., Martha Dill; b., C. Leake, 25 Warland St.; a., Geo. Fogerty.

Berkshire St., No. 124, four-st'y bk. & st. dwell., 45' x 53', flat roof, stoves; $25,000; o., Harris Beeman; b., J. Walsh, 515 Saratoga St., East Boston.

Miflin Pl., three-st'y fr. dwell., 25' x 53', flat roof, hot water; $5,000; o., James M. Hilton; b., John E. Mahaffy; a., C. H. McClare.

Chicago, Ill. — *Garfield Boulevard, Nos.* 826 836, three-st'y bk. & st. dwell., 40' x 62'; $48,000; o., James O'Leary; a., Z. T. Davis; b., A. Anderson, 145 La Salle St.

Cortland, N. Y. — 2½-st'y bk., st. & terra-cotta dwell., 60' x 70', tile roof, hot water; $26,000; o., E. H. Brewer; a., Chas. S. Sedgwick, Minneapolis, Minn.

Detroit, Mich. — *Martin Pl.*, 2½-st'y bk. dwell., 30' x 56', slate roof, hot water; $7,500; o., Wm. A. Gorby, 767 Woodward Ave.; a., Joseph E. Mills.

Medford, Mass. — *Summit Road*, 2½-st'y fr. dwell., 26' 6" x 50', pitch roof; $5,800; o., Geo. H. Blanchard; b., J. C. Brown.

Milwaukee, Wis. — *Wahl Ave.*, nr. Bradford St., two-st'y bk. veneered dwell., 39' x 41', pitch roof, hot water; $15,000; o., Fred'k Weinhagen. a., Carl Barkhausen.

Minneapolis, Minn. — *Groveland Ave., No.* 310, 2½-st'y fr. dwell.; $8,000; o., J. F. Denick; b., B. M. Granning; a., E. J. Hodgeson.

Orono, Lake Minnetonka, 2½-st'y fr. dwell., 36' x 49'; $10,000; o., E. L. Carpenter; a., William C. Whitney.

New York, N. Y. — *Ninety-second St.*, nr. Riverside Drive, 5 four-st'y & base. bk. & st. dwells., 20' x 64'; $215,000; o., Egan & Hallecy, 284 Columbus Ave.; a., Janes & Leo, 124 W. 45th St.

Fifty-third St., nr. Madison Ave., 2 five-st'y bk. & st. dwells., 39' 6" & 40' x 80' & 90', gravel roof; $160,000; o., Chas. Buek, 109 W. 42d St.; a., Chas. Brendon, 109 W. 42d St.

Riverside Drive, cor. 89th St., four-st'y & base. bk. & st. dwell., 38' 10" x 70'; $200,000; o., Isaac L. Rice, 100 Broadway; a., Herts & Tallant, 32 E. 28th St.

Clinton Ave., nr. 170th St., 2 two-st'y bk. dwells., 20' x 60' 8"; $11,000; o., McClure & Robinson, 922 Crotona Park South; a., W. C. Dickerson, 3d Ave. & 149th St.

W. Fifty-sixth St., No. 10, five-st'y bk. & st. dwell., 25' x 73' 11", slag & copper roof; $50,000; o., Birdsall Otis Edey, 114 W. 55th St.; a., Warren & Wetmore, 3 E. 33d St.

Eighty-seventh St., nr. 5th Ave., 4½-st'y st. & bk. dwell., 40' x 70', tar & slag roof; $200,000; o., Wm. H. Bolton, 177th St. & Boston Road; a., Janes & Leo, 124 W. 45th St.

Thirty-ninth St., nr. Park Ave., 2 five-st'y bk. & st. dwells., 27' & 28' x 88' 9" & 70' 1", tin & slate roof; $155,000; o., John T. and Jas. A. Farley, 58 W. 72d St. & 303 W. 90th St.; a., Chas. C. Thain, 156 Fifth Ave.

Fifth Ave., nr. 64th St., 2 five-st'y bk. & st. dwells., 69' 9" x 100'; $500,000; o., John T. & James A. Farley, 46th St. & 5th Ave.; a., Warren, Wetmore & Morgan, 3 E. 33d St.

Philadelphia, Pa. — *Green St., No.* 1734, four-st'y bk., st. & terra-cotta dwell., 18' x 85' 4"; $11,000; o., C. O. Beaumont; b., Burd P. Evans; a., Frank R. Watson.

Third St., nr. Wolf St., three-st'y bk. & st. dwell., 40' x 71' 6"; $12,000; o., Rev. B. F. Gallagher, rector of Our Lady of Mount Carmel Church; b., Charles Auchter.

E. Dauphin St., No. 2345, three-st'y bk. dwell., 18' x 76'; $7,000; o., Dr. Henry Fisher; b., W. R. Brown.

Erie Ave., Nos. 1303-25, 11 three-st'y bk. & iron dwells., 15' 6" x 60' 6"; $54,000; o. & b., George A. Bilyeu.

Somerville, Mass. — *Windham Road*, nr. Columbus Ave., 2½-st'y fr. dwell., 26' x 45', pitch roof, furnace; $4,500; o. & b., Sylvester Woods, 69 Joy St.

Waldo St., nr. Highland Ave., 2½-st'y fr. dwell., 25' x 49', pitch roof, furnace; $4,500; o., Amanda J. Higgins; b., O. W. Watson, 50 Banks St.

St. Paul, Minn. — 2½-st'y bk. & st. dwell.; $22,000; o., Jacob Danz; b., Thomas Brady; a., Louis Lockwood.

LIBRARIES.

Dubuque, Ia. — Two-st'y bk. & st. building, fireproof construction, 76' x 132', to be called Carnegie-Stout Free Library; $75,000; a., Wm. G. Williamson, Chicago, Ill.

OFFICE-BUILDINGS.

Detroit, Mich. — *Griswold and State Sts.*, eighteen-st'y steel-fr. bk., st. & terra-cotta office-building, 36' x 57' x 100', comp. roof, steam heating; o., Frank C. Andrews, 1217 Chamber of Commerce Building, and Henry Stephens; a., Mason & Kahn.

New York, N. Y. — *Fifth Ave.*, junc. Broadway, twenty-st'y bk. & st. office-building, 197' 6" on 5th Ave., 214' 6" on Broadway, 85' 10" on 22d St., terra-cotta arches, tile & concrete roof; $1,000,000; o., Cumberland Realty Co., 137 Broadway; a., D. H. Burnham & Co., The Rookery, Chicago, Ill.; b., Geo. A. Fuller Co., 137 Broadway.

Broadway, s e cor. Maiden Lane, eighteen-st'y bk., st. & terra-cotta office-building, 76' 7" & 87' 11" x 110' 11" & 110' 3"; $700,000; o., The Broadway

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STABLES.

Brooklyn, N. Y. — *Avenue Z*, nr. E. 19th St., one-st'y fr. stable, 24' x 80', shingle roof; $2,800; o., G. H. Whitney, E. 19th St. & Jerome Ave.; agent, G. H. Magill, Ocean Ave. & Neck Road.

Stone Ave., cor. Sutter Ave., one-st'y fr. stable, etc., 16' x 22' 6"; $500; o., M. A. Cohn, 550 Stone Ave.; a., C. Infanger, 90 Glen St.

Kouwenhoven Pl., nr. Mill Lane, 1½-st'y fr. stable, etc., 24' x 33'; $800; o., A. C. Grane, 18th & Benson Ave.; a., H. H. Squires, Bath Ave. nr. Bay 19th St.

Detroit, Mich. — *Baltimore Ave.*, two-st'y bk. stable, 40' x 90', comp. roof, steam; $5,000; o., Edwin A. Freer, 12 Baltimore Ave.; a., E. W. Gregory.

New York, N. Y. — *E. Eighty-eighth St., Nos.* 56 60, three-st'y bk. & st. stable, 62' 7" x 100' 8", terra-cotta arches & copper roof; $25,000; o., William B. Leeds, 987 Fifth Ave.; a., Hunt & Hunt, 28 E. 21st St.

One Hundred and Forty-fifth St., nr. 3d Ave., five-st'y bk. & st. stable, 50' x 75', tar & gravel roof; $30,000; o., estate Christian Erdenbrecher, 584 E. 145th St.; a., Wm. H. Rahman, 9 Grand Circle.

Burnside Ave., nr. 179th St., two-st'y fr. stable, 22' 4" x 25' & 17' 10"; $750; o., Robert Arkle, 1984 Burnside Ave.; a., T. W. Ringrose, 142d St. & 3d Ave.

Philadelphia, Pa. — *Croskey and Cambridge Sts.*, two-st'y bk. stable, 30' x 75'; $3,000; o. & b., C. Vogt.

TENEMENT-HOUSES.

Somerville, Mass. — *Gilman St.*, nr. Walnut St., three-st'y fr. flats, 45' x 62', flat roof, furnace; $9,000; o. & b., James T. Wentworth.

THEATRES AND HALLS.

Boston, Mass. — *Monument Sq.*, Ward 5, one-st'y bk. & st. lodge, 38' x 50', flat roof; $35,000; o., Bunker Hill Monument Association; b., Fessenden & Sibley; a., A. H. Vinal.

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Boston, Mass. — *Atlantic Ave.*, nr. Beach St., eight-st'y bk. storehouse, 58' x 113', flat roof, steam; $30,000; o., C. G. Rice; a., W. G. Rantoul, 2A Park St.

New York, N. Y. — *Thirteenth St.*, nr. 9th Ave., six-st'y bk. storage, 73' x 103', tile roof; $125,000; o., John C. Kluber and John P. Ryan, 338 W. 4th St.; a., H. E. Meyen, 456 Willoughby Ave., Brooklyn.

E. Eleventh St., Nos. 45-51, ten-st'y bk., st. & iron store & loft building, 43' 8" x 83'; $500,000; o., Josof Steiner, 217 Mercer St.; a., Geo. H. Van Auken, 30 E. 14th St.

W. Third St., No. 49, six-st'y bk. & st. store & loft building, 25' x 90'; $40,000; o., Geo. H. Pigurvon, 1920½ Park Ave.; a., F. C. Zobel.

MISCELLANEOUS.

Boston, Mass. — *Saratoga St.*, nr. Prescott St., Ward 1, two-st'y engine-house, 45' x 85', pitch roof, steam; $60,000; o., City of Boston; a., John A. Fox, 120 Tremont St.; b., D. H. Jacobs & Son, 166 Devonshire St.

Cambridge, Mass. — *Quincy and Cambridge Sts.*, two-st'y bk. & st. dining-hall; $15,000; o., Harvard University; b., Walter S. Burke, Mass. Hall; a., J. R. Worcester.

Philadelphia, Pa. — *Christian St.*, nr. 23d St., three-st'y armory, dwell. & drill-hall, 76' x 152'; $19,000; o., George C. Thomas; b., Appleton & Burrell; a., Duhring, Okie & Zeigler.

BUILDING INTELLIGENCE.

(*Miscellaneous Continued.*)

St. Paul, Minn. — *Webster St.*, nr. Oneida St., four-st'y & base. fireproof bk. & st. building for brewery, 151' x 164'; $200,000; o., Jacob Schmitt Brewing Co.; c., Lauer Bros.; a., Bernard Barthel, Chicago, Ill.

PROPOSALS.

PUBLIC LIBRARY.

[At St. Cloud, Minn.]

Sealed proposals for the erection of the St. Cloud Public Library will be received **up to noon of September 3d.** Plans and specifications may be seen at the office of the undersigned, and at the office of the architects, Patton & Miller, in Chicago. Bids for the general contract must be accompanied by a certified check for $500. The right is reserved to reject any and all bids. H. C. ERVIN, secretary. 1339

BUILDING.

[At League Island, Pa.]

Sealed proposals, endorsed "Proposals for Fire-proof Shed," will be received at the bureau of yards and docks, Navy Department, Washington, D. C., **until 1 o'clock, September 7, 1901,** for constructing a corrugated galvanized sheet steel building, 34' x 55', at the navy yard, League Island, Pa. Address "Commandant, Naval Station, League Island, Pa." MORDECAI T. ENDICOTT, chief of bureau. 1339

PROPOSALS.

INTERIOR WORK.

[At Topeka, Kan.]

Bids will be received **until September 2** by Geo. A. Clark, Secretary of State, for marble floors and wainscot for both dome and corridors of the State capitol; also for structural and ornamental iron-work; carpentry and finishing of woodwork; heating, etc., according to plans by John F. Stanton, architect. 1339

TEMPLE.

[At Youngstown, O.]

The Odd Fellows' Society will receive bids **until September 10** for the $20,000 three-story pressed-brick and stone temple, 60' x 100', after plans by E. R. Thompson. 1340

Treasury Department, Office Supervising Architect, Washington, D. C., August 19th, 1901. Sealed proposals will be received at this office until 2 o'clock P. M. on the 10th day of September, 1901, and then opened, for the installation of an ash-handling apparatus for the U. S. Custom-house and Post-office at St. Louis, Mo., in accordance with drawings and specification, copies of which may be obtained at this office or at the office of the Custodian, St. Louis, Mo., at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1340

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Washington, D. C., August 20, 1901. Sealed proposals will be received at this office until 2 o'clock P. M. on the 5th day of September, 1901, and then opened, for a heating apparatus for the Surgeon's Quarters at the U. S. Quarantine Station, Reedy Island, Delaware, in accordance with drawing and specification, copies of which will be furnished at the discretion of the Supervising Architect upon application to this office. JAMES KNOX TAYLOR, Supervising Architect. 1340

Treasury Department, Office Supervising Architect, Washington, D. C., August 15th, 1901. Sealed proposals will be received at this office until 2 o'clock P. M. on the 6th day of September, 1901, and then opened, for bulkheading at the U. S. Quarantine Station, Delaware Breakwater, Delaware, in accordance with drawing and specification, copies of which may be had on application to this office, or to the Custodian at the Station. JAMES KNOX TAYLOR, Supervising Architect. 1340

Treasury Department, Office Supervising Architect, Washington, D. C., August 16, 1901. Sealed proposals will be received at this office until 2 o'clock P. M. on the 9th day of September, 1901, and then opened, for Quarters for Crews at the U. S. Quarantine Station, Reedy Island, Delaware, in accordance with drawing and specification which will be furnished at the discretion of the Supervising Architect on application to this office, or to the Custodian of the Station. JAMES KNOX TAYLOR, Supervising Architect. 1340

Treasury Department, Office Supervising Architect, Washington, D. C., August 9, 1901. Sealed proposals will be received at this office until 2 o'clock P. M. on the 16th day of September, 1901, and then opened, for the construction (except heating apparatus, electric wiring and conduits) of the U. S. Post-office at Butte, Montana, in accordance with drawings and specification, copies of which may be had at this office, or at the office of the Postmaster at Butte, Montana, at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1339

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PUMPING-STATION. [At Washington, D. C.]

Sealed proposals will be received at the office of the commissioners of the District of Columbia **until 12 o'clock noon on September 21, 1901**, for constructing a pumping-station building on Trumbull St., northwest, between 1st and 4th Sts., Washington, D. C., for the water department of the District of Columbia. A deposit of $10,000 will be required with each bid as a guarantee that contract will be entered into if awarded. HENRY B. F. MACFARLAND *et al.*, commissioners, D. C. 1339

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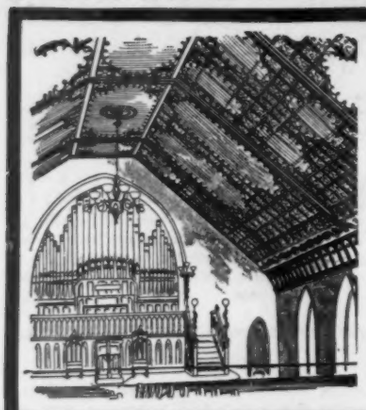

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S. Cabot, Boston

CUTLER PAT. MAILING SYSTEM.
Cutler Mfg. Co., Rochester, N. Y.

DEAFENING QUILT.
Samuel Cabot, Boston, Mass.

DECORATORS.
L. Haberstroh & Son, Boston

DOORS.
Kinnear Mfg. Co., The, Columbus, O.

DOORS (Interior Finish).
Carlisle, Pope & Co., E. A., New York.

DRAUGHTSMAN,
E. Eldon Deane, New York.

ELEVATORS, ETC.
Morse, Williams & Co., Philadelphia.
Whittier Machine Co., Boston

ENGINES (Hot-Air).
Rider-Ericsson Engine Co., New York.

FAUCETS.
Union Brass Works, Boston, Mass.

FILING DEVICES.
Art Metal Construction Co., Jamestown, N. Y.

FILTER.
Loomis-Manning Filter Co., Phila., Pa.
Scaife & Sons, Wm. B., Pittsb'g, Pa.

FIREPROOF DOORS.
Kinnear Mfg. Co., The, Columbus, O.

FIREPROOFING.
Johnson Co., E. V., Chicago, Ill.

FIREPROOF LATHING.
Hayes, Geo., New York

FIREPROOF SHUTTERS.
Kinnear Mfg. Co., The, Columbus, O.

FLOOR POLISH.
Butcher Polish Co., Boston

FLUSHOMETER.
Kenney Co., The, New York

FLUSH-VALVE.
Peck Brothers Co., Chicago, Ill.

GALVANIZED IRON.
American Sheet Steel Co., New York

GATES.
Wm. R. Pitt, New York (mon)

GRATES, ETC.
Wm. H. Jackson & Co., New York

GREASE (Graphite).
Wisconsin Graphite Co., Pittsb'g, Pa