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WE publish in another column a letter explaining the circumstances of the fall of the walls of the Texas State-house, from which it appears that the building which failed was a temporary structure, under the care of a different architect from the designer of the intended permanent building, which is as yet not advanced beyond the excavations. We are glad to know that the architect of the latter edifice does not deserve the aspersions which were certainly implied in our remarks on the subject, and we withdraw them with pleasure, so far as he is concerned.

DR. SEYMOUR HADEN, the most distinguished modern master of the art of etching, intends, as has been already announced, to visit this country next month for a short lecturing tour. It is only a few years since a French critic announced that "a great artist had been discovered in England," and a little later, the publication of a series of matchless landscapes proved the correctness of the Frenchman's judgment. Most persons who interest themselves in matters of art have seen some of Dr. Haden's work, although the prints from his etchings, owing to the resolute conscientiousness with which the plates are destroyed as soon as they show the slightest sign of wear, are difficult to obtain, but every one does not know that the author of these masterly productions has been for a long time, and still is, a surgeon of high reputation and extensive practice, who draws and engraves the natural objects which please him simply as a recreation, and for twenty years never thought of publishing his works, which might still be unknown beyond the circle of his own family and friends if M. Berté had not met accidentally with them. It is pleasant to know that Dr. Haden will lecture on the topic with which his name is usually connected, and it is to be hoped that his visit may serve to revive the efforts of that promising group of American etchers whose work, since the discontinuance of the *American Art Review*, has ceased to be accessible to the general public.

THE New York Board of Health has turned its attention to the wells for water-supply, of which about two thousand are believed to exist in the city. Most of these are pipe-wells, either driven with a mallet or drilled like a shallow Artesian well, and about a thousand of this kind are said to have been sunk within the last three years. Professor Elwyn Waller, of Columbia College, has been engaged in analyzing the water from such of the wells as could be discovered, but as most of them are purposely concealed the analysis can only be taken as an indication of the general quality of the water. According to Professor Waller, this is by no means good. Out of fifty samples analyzed the greater part were pronounced unfit for use, containing large quantities of dissolved minerals as well as organic contamination. In some instances the well-water was found to be more highly charged with salts than that of the ocean itself, and in others the dissolved carbonic acid contained in it was sufficient in amount to corrode the lead pipes

and tanks through which it passed. The largest consumers of well-water are the brewers, who use it for washing and cooling, saving in some cases, besides the five or six thousand dollars a year which the Croton would cost them, a considerable additional sum on account of the coolness of the well-supply, which, being drawn in summer at a temperature twenty-five degrees below that of the Croton, saves the expense of the ice which would otherwise be needed to reduce the Croton to the same point. The manufacturers of cheap mineral waters are said also to take a large part of their supply from wells, and many are in use for furnishing water for hydraulic elevators and similar apparatus. The Board of Health proposes to compel the closing of wells found by analysis to furnish contaminated water, and naturally meets with a good deal of opposition in its investigations.

THE *Sanitary Engineer*, with commendable public spirit, has come to the assistance of the National Board of Health, which, after two years of important services, was rather ignominiously deprived by the last Congress of the means for publishing the information gathered in its name, and proposes hereafter to continue in its own pages the *Bulletin* of the Board, which is no longer to be issued in separate form. In the number for October 12 appears accordingly the regular report of mortality from forty cities of the United States, together with notes from various correspondents of the Board, all of great interest. Although we regret the contemptuous discourtesy with which Government support was withdrawn from a body so useful and deserving, we are not sure that the Board is not to be congratulated on the change, as well as the readers of the *Sanitary Engineer*. So long as the succession of statistical reports is uninterrupted, a matter which is of the greatest importance, there is no harm, but rather an advantage, in having them appear in a form where they can receive freer criticism than would be possible under other circumstances. For instance, the health officers of certain cities, in their anxiety to show a favorable rate of mortality, are apt to add a liberal estimate of the increase of population in their districts to the census returns of 1880, and this practice, which detracts very much from the value of their testimony, is sure to be sharply commented upon under the new arrangement, and perhaps corrected.

ANOTHER "blow-out" occurred last week on the New York side of the Hudson River Tunnel, which has not yet emerged from the treacherous gravel which lines the eastern shore into the silt formation that forms the greater portion of the bed. Taught by previous experience, the engineers of the tunnel carry out the heading in the gravel with extreme caution, and the workmen had ample time, after finding that it was impracticable to stop the entrance of water with the bags of mud provided for the purpose, to make their escape quietly by the air-lock. The manager of the company attributes the accident to the loosening of the ground caused by cutting off the iron piles, about seventy of which, belonging to an old pier, must be removed in order to give passage to the tunnel. The porous mass, disturbed by the movements of the workmen and their tools, would naturally present a less uniform resistance to the compressed air of the tunnel than the same formation in its natural state, and a channel of escape for the air once opened, water would flow in with a rapidity proportioned to the loss of pneumatic pressure. Fortunately, the gravel bank which has put the pneumatic system of subaqueous tunnelling to so severe a test is nearly penetrated, and a few feet more will bring the excavation into a compact, cheese-like mass of silt, whose steady resistance to the air-pressure will enable the work to be carried on with redoubled rapidity.

ON and after April 1, 1883, the manufacture or sale of wall-papers colored with pigments containing arsenic will be prohibited throughout the German Empire, together with that of dress-goods containing similar colors, and toys and food packages decorated with poisonous substances. It is much to be desired that a similar law could be enacted in the various States of this country, and local sanitary associations and boards of health would earn the gratitude of their fellow-citizens by an energetic agitation of the matter. The cases of poisoning by deleterious dyestuffs in clothing are more common than most

persons suppose, but those of obscure disease caused by arsenical wall-papers are probably more common still. There is a popular notion that bright green is the only dangerous color in paper-hangings, and papers containing this color have accordingly a very small sale; but arsenic enters into the composition of brilliant reds and yellows as well as greens, and Paris green and orpiment are mixed with other pigments to form grays, browns and similar tints in which their presence is hardly suspected. Nothing but chemical tests of all the colors in all the wall-papers in his house can, under the present conditions, assure the owner that the health of some member of his family is not being slowly undermined by the inhalation of the particles which are continually brushed or detached from them, and no occasion could be better than the present revival of the fashion of such decorations for the enactment of regulations which might prevent the taste from being in some cases a most pernicious one for those who indulge it.

THE Arc de Triomphe in Paris is to be surmounted with a group of statues by M. Falguière, the most distinguished of the rising generation of French sculptors. It is certain that the original design contemplated an addition of this kind, but the Parisians have become so accustomed to seeing the arch in its present condition that the proposition to complete it according to the original intention did not meet with great favor, and M. Falguière, who has gone to considerable expense in preparing models of the full size for trying the effect, may perhaps even now spend his time and money for nothing; but curiosity is strong in Paris, and the sight of the models will dispose the public to wish for the finished work. The central group is to contain an allegorical figure of France, as a woman standing in a Roman chariot, drawn by four horses abreast, which are led by other female figures representing Progress. In front of the chariot and horses, on the side toward the Tuileries, is another group, representing Liberty overcoming official tyranny, and on the side toward the Bois de Boulogne are two groups illustrating the defence of the country. It is not an easy matter to design a consistent series of statues large enough to cover a space like that of the Arc de l'Etoile, but M. Falguière will probably succeed if success is possible.

In the discussion now going on with regard to the practicability of placing all telegraph and telephone wires underground, it is often asserted that no electric wires are allowed to be carried over the roofs of European cities. To show how groundless this notion is, it may be worth remarking that according to the *Deutsche Bauzeitung* there are now fourteen hundred and fifty miles of telephone wire strung over the city of Berlin by means of standards erected on the roofs of the houses. The burying of telegraph wires in Germany seems to have been applied only to the military lines, and is said to have been effected at great cost, mainly for the sake of concealing their position from the enemy in case of invasion. In fact the problem of removing wires from their inconvenient and dangerous position above the buildings of our large towns seems to have been more earnestly investigated, and more successfully solved, in the United States than in any other country. The various conduit corporations now in process of formation here to lay insulated pipes and rent wires in them to telegraph and telephone companies seem admirably adapted to supply a serious want in the best and most economical way, and if their patented devices for insulation prove satisfactory, they have probably a useful and profitable career before them.

THE sales which the French Government is making of the national bric-à-brac and furniture of all kinds ought to attract more attention among amateurs than they do. Very lately an auction was held in the cour d'honneur of the Palais Royal of objects taken from this and other palaces now become public property, and comprising columns and pilasters, carved panels, capitals, pedestals, doors and dressings, cupboards, book-cases, and many other articles of wood and metal. Among other things a number of the eagles which were used under the Empire to decorate all sorts of places were sold to a junk-dealer for five hundred francs, and the entire proceeds of the sale were only about sixteen thousand francs. Comparing this with the enormous prices obtained at the Hamilton sale, where two small pieces of furniture of French manufacture of the last century brought ninety-four thousand five hundred dollars, it

would seem that purchasers might consult their interest by seeking such articles in the place where they were made rather than in noble and famous collections. Complaint is made in France that the officials of the small country churches sell without scruple the mediæval and Renaissance furnishings stored in their sacristies to bric-à-brac dealers and amateurs, who replace them with tawdry objects of the modern conventional type. In this way the shops of the quais of Paris are constantly replenished with ancient sacerdotal vestments and lace, altar-pieces, holy-water vases, censers and furniture, which are scattered thence all over the world, to the advantage perhaps of art in general, but to the detriment of that of France.

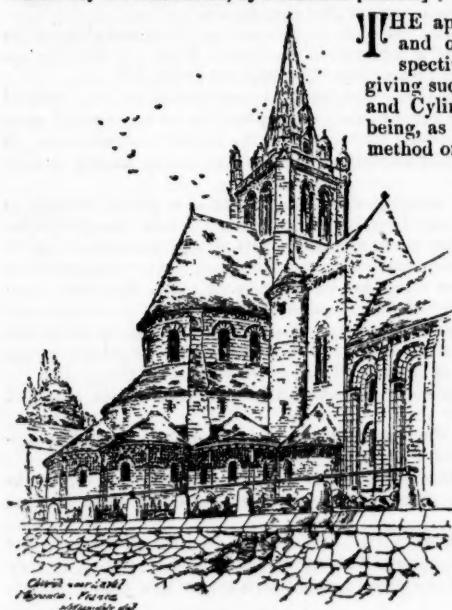
AN interesting point relating to the responsibilities of architects is discussed in *La Semaine des Constructeurs*. As the case is described, a certain contractor for roofing executed five years ago a roof in tiles of the sort called "tuiles Montchanin," which proved to be unfit for their purpose, scaling away in such a manner that the whole roof will soon have to be relaid. The questions asked are, (1) "Who must pay the cost of making good the decayed roof?" and (2) "If the contractor is without resources can the architect be made to pay the expense?" To these questions *La Semaine* replies that in this instance the contractor alone is responsible for the restoration of the roof, under the article 1641 of the Code Civil. The contractor is virtually the vendor of the tiles, and as such is liable for all concealed defects of the articles sold by him which unfit them for their ostensible use, or which so far diminish their value for that use that the purchaser, if he had known of the defects, would either have refused to buy the tiles or would not have given so high a price for them as he did. So far as the architect is concerned, the bad quality of the tiles is not due to any fault of his, and he is in no way responsible for it, although the Montchanin tiles were ordered by his direction. His position is simply that of a purchasing agent for his client, who has been deceived by the specious appearance of the tiles, but nothing more, and his client, as the real purchaser, is the one to seek redress from those who sold him the goods.

THE *Fireman's Journal* gives statistics of losses by fire in the United States and Canada during the past month, from which it appears that although there have been no very remarkable conflagrations, the aggregate of property destroyed is very large. Its own record mentions only those fires in which the loss exceeds ten thousand dollars, but of these there were in September one hundred and twenty-five, which consumed about six and one-quarter million dollars' worth of property. To these should be added the losses by fires omitted in the record, which it estimates at one million three hundred thousand more, making the total cost of the nation's September ash-heap, — to use its own vigorous expression, — seven and one half million dollars. This amount is about twenty-five per cent more than the average of the September loss for the past five years, and the *Journal* remarks that the increase in the number of fires seems to be continuous, partly on account of the natural addition to the volume of combustible property in the country, and partly, perhaps, by reason of the multiplication of hazardous occupations and manufacturing processes. Meanwhile, the rates of insurance continue low, and the total of the year's business seems likely to be very unfavorable to the companies. For the first six months of the present year the losses to the fire underwriters equalled seventy-one per cent of the premium receipts; and as the average cost of carrying on the business is about forty-five per cent of the premium receipts, the net result to the stockholders is a loss equivalent to sixteen per cent of the gross receipts for the year. In former years such deficits have been covered by the income from property held by the companies, but if, as seems probable, the business of the last half of the year is even more disastrous than that of the first, this resource will not serve in all cases, and the weaker companies must succumb. The *Fireman's Journal* very sensibly points out that under present circumstances no decrease in the proportion of losses can be expected, and that the underwriters themselves can alone supply the remedy for the unsatisfactory condition of their business, by modifying rates in proportion to the risk, and thereby making it for the interest of owners to put their buildings in condition to resist fire. As we have repeatedly expressed the same opinion, we need add nothing to the remarks of the *Journal*, except perhaps to say that the underwriters seem slow to profit by them.

PAPERS ON PERSPECTIVE.—XIV.

[THE papers on Perspective printed in these columns during the spring and summer of 1878, came to a somewhat abrupt conclusion. The last of the series which was numbered XIII, and which appeared on the 21st of September of that year, was devoted to the discussion of the phenomena of Curvilinear or Cylindrical Perspective, the kind of drawing which would be made upon the inner surface of a vertical cylinder, the axis of which was occupied by the spectator. This is the kind of perspective employed in making cylindrical panoramas, and, as was pointed out in the text, it is the system which one naturally adopts in sketching from nature. In this case one almost necessarily makes the size of objects in his drawing proportional to their apparent angular dimensions, just as if he were drawing upon a concave surface.]

The previous paper closed with the promise that the next paper should show how drawings in Curvilinear Perspective might be geometrically constructed. The following paper fulfils this promise; Plate XVI illustrating this part of the subject, as Plate XIV did the previous part. There is no Plate XV.¹ This paper will be followed by others upon the perspective of converging and diverging lines, and of shadows cast by artificial light, upon some other systems and methods, including the system of the late M. Adhémar, and upon the interpretation of perspective drawings, or the recovery of the data from which they are constructed, by an inverse process.]



THE application of Plane and of Cylindrical Perspective to the same object giving such different results, and Cylindrical Perspective being, as we have seen, the method one naturally adopts in sketching from nature, it follows that any attempt to apply the principles of Plane Perspective to such sketches must lead to confusion. This attempt is, however, constantly made: artists, in trying to avail themselves of the materials they have collected in their note-books, frequently resorting to the rules of perspective to correct the inconsistencies and errors, and to fill in the

omissions of the originals. The vexation and trouble into which this inevitably brings them—for a drawing made upon a cylinder cannot be treated as if it were made upon a plane—has produced a very general impression among them that the principles of perspective, though true in theory, are, as they say, practically false; that they doubtless work very well for geometrical work, like architectural drawings, but that when applied to nature, to the delineation of real things, even to real buildings, they break down.

284. It is, indeed, plain that such sketches must be interpreted in the light of the system according to which they were made. It is the principles and rules of Curvilinear or Panoramic Perspective that must be called in to complete them by. This being so, it is worth while to inquire on what geometrical principles this system rests, what are its practical methods, and what are its relations to the system of Plane Perspective.

285. If the picture is supposed to be drawn not upon a vertical plane, but upon a vertical cylinder, with the spectator at the centre, or axis, it is plain that, so far as concerns the horizontal dimensions of objects, their perspective representations will be exactly proportionate to their apparent angular dimensions, a given linear measure will correspond to a degree of arc on the horizon, and a given length of horizon in the picture to the whole circumference of 360°. Every part of this horizon will be equally near the station-point, and every point in it may, in turn, be considered as the Centre. We thus entirely avoid those distortions which, in Plane Perspective, necessarily result from the visual rays crossing the plane of the picture at an acute angle, as they must do everywhere except just opposite the station-point. All the rays, at least the rays coming from all points of the horizon, cross the picture at right angles: everything is, so to speak, at the Centre.

286. And just as in Plane Perspective the perspective of a straight line is the line in which the plane of the picture is intersected by a plane of rays passing through the line and also through the eye or station-point; and just as the trace of every system of planes is the intersection of the plane of the picture by a plane passing through the eye parallel to the other planes of the system; so now the perspectives of lines, and the traces of systems of planes, are the lines in which these planes of rays intersect the cylinder on which the picture is to be drawn. This, which has already been illustrated in Figures 66 and 67, Plate XIV, is more fully set forth in Figure 71, Plate XVI. Here S, in plan and elevation, represents the station-

point in the axis of the cylinder of the picture. If, now, a, b, c , and d , in the elevation, are parallel horizontal lines, shown in plan at L, the plane of rays lying between them and the eye will cut the cylinder A at a', b', c' , and d' , the line of intersection being an ellipse, or, at c' , a circle. If the cylinder is turned a quarter round, as at B, these lines of intersection will appear as semi-ellipses at b'' and d'' ; the semi-circle c' , however, appears still as a straight line at c'' , while the line a' , lying at an angle of 45°, appears as a semi-circle at a'' .

In like manner the line at e , at right angles to these lines, and shown in plan at R, gives the semi-circle e'' in A and the line e' in B.

287. If now the cylinder is developed, these lines of intersection will appear as in Figure 72. The circle of the horizon at c'' will become a straight line: the vanishing points v^a and v^b , and v^c , will appear at V^L and V^R , V^L and V^R , 90° apart; while the semi-ellipses $a'' b'' d'' e''$ will be developed as the curves $a''' b''' d''' e'''$, parallel to the horizon at their highest point, representing the point where a, b, d , and e are nearest the eye, and converging towards their vanishing points, as parallel lines ought to do. The height of the lines a''' and e''' , representing a and e , which lay 45° above the horizon, is equal to the radius of the cylinder. If the secant planes, $a' b' d'$, Figure 71, had been carried entirely across the cylinder, forming whole ellipses, as shown by the dotted lines, these curves would be continued beyond the point V^L on the opposite side of the horizon, as far as the point V^R , which is, of course, the same point as V^L , being 360° distant from it.

288. These curves, always concave towards the horizon, with points of contrary flexure where they cross it, and points of maximum curvature where they are at their greatest distance from it, are what are called in geometry sine-curves, or cosine-curves, and are similar to those obtained by the projection of a regular spiral. It will be observed that the angles at which they cross the horizon are the same as those in Figure 71, A, and measure the angular distance of the lines represented above the horizon at their nearest point. The maximum distance of the perspective of each line from the horizon is proportional to the tangent of this angle.

289. The perspectives of vertical lines and the traces of vertical planes are of course vertical, and these lines are straight, being elements of the cylinder, and they remain straight when the cylinder is developed. The perspectives of inclined lines and the traces of inclined planes are sine-curves, since they too are the lines in which the cylinder is cut by planes; but their vanishing points, instead of being upon the horizon are above and below it, as, for example, V^N and V^S in Figure 72. But they are all parallel to the picture at the point where they are nearest to it and to the eye, half way between their vanishing points, and there have their real inclination.

290. It is a property of a system of sine-curves,—that is to say, a series of curves crossing the horizon at the same point, like the perspectives of a system of parallel lines,—that vertical lines drawn across them are divided proportionally to the maximum heights of the curves, and that for each vertical line the tangents to the curves, at the points of intersection, meet at the same point on the horizon. It is necessary, then, to construct only one line of such a system, by developing the line of intersection. The position of any other line, of which the angular distance above the horizon, and consequently the maximum height is known, may be found at any point by drawing a vertical line, and its direction at that point may be found by drawing a tangent. In this respect a number of sine-curves drawn between the same two points are analogous to a number of ellipses with the same major axis (265), as illustrated in Figure 48, Plate X.

291. In Figure 73, for example, the distances cut off by the curves upon h are proportional to those cut off upon tt , as may be seen at $t' t'$, and the tangents at the points of intersection all meet at V^L . These tangent lines lie in a plane tangent to the cylinder, before it is rolled out flat, along the line tt . This relation is shown in Figure 71, Plan, from which it is clear that these tangent lines are the perspectives upon the plane $p p$, regarded as a plane of the picture, tangent to the cylinder at the point t , of the same lines whose perspectives are given upon the cylinder by the curves. Of course they meet at a point. This point, V^L , is then the vanishing point in Plane Perspective of the same lines whose vanishing point is found in Curvilinear Perspective at V^L . The plan in Figure 66, Plate XIV, exhibits similar relations.

292. These considerations make it practicable not only to draw all these curves without difficulty when one of them has once been constructed, but in practice to dispense with all but one entirely, treating each separate portion of a panoramic picture as if it were drawn on a vertical plane tangent to the cylinder in that place.

This is illustrated in Figure 74, a , where we see, as in Figure 66, an object L R, the station-point at S, and, between them, both a cylinder and a plane of projection. The object not being very large, its picture on the cylinder will not differ perceptibly from its picture upon the plane; and the latter, being easier to draw, may be substituted for the other, using V^L for V^L , and V^R for V^R .

293. Figure 74, b , shows that, in laying out a panorama, it is not necessary to draw even a single sine-curve, the points V^L and V^R being ascertained directly from V^L and V^R , in accordance with the following rule:—

Given the Horizon, the vertical line of tangency, and the vanish-

¹ Plate XV and the appropriate text will be included in the monograph on perspective which is to be published this fall in book-form.

ing points on the cylinder, set off below the Horizon, on the vertical line of tangency, the radius of the cylinder; with this radius describe an arc tangent to the Horizon; on this arc, lay off, right and left, the distances of V_C^R and V_C^L ; prolong the radii through the extreme points thus attained, and the points where they strike the Horizon will be the vanishing points required, V_R^R and V_R^L , on the Horizon of the tangent plane. The rest of the construction can then take place as in Plane Perspective.

This rule explains itself if we observe that Figure 74, *b*, is the same as Figure 74, *a*, with the two parts brought together.

295. Figure 75, which is taken from the etching of Greenwich Hospital, in Turner's "Liber Studiorum," further illustrates the occurrence of curved lines in sketching from nature, when every object is drawn of just the shape and relative size that it presents to the eye; that is, in proportion to its angular dimensions.

296. In a drawing upon a vertical cylinder, although the horizontal dimensions are proportional to the angular dimensions of the objects represented, vertical dimensions are proportional to the tangents as upon a plane. If it were practicable to draw upon a spherical surface, this would not be so, the linear dimensions in every direction being made proportional to the angular dimensions. The employment of a horizontal cylinder to draw upon, or in, would, of course, effect this for vertical dimensions. This is practicable for isolated objects, and the result may sometimes be seen in sketches of lofty buildings or towers. The curvature of the lines and the apparent convexity of the object, making the tower look as if it were strutting or leaning over backwards, are, however, quite as offensive as in the case of horizontal lines. But here, as in the case of the street shown in Figure 69, these defects disappear when the object is of irregular outline; and this method has the advantage, of course, of giving the actual aspect of a tower or spire from a given point, with its foreshortening and altered outline, better than the other. Figure 76 illustrates this, showing at A a view of the spire of the Central Church in Boston, taken from a photograph, and consequently drawn on the principles of Plane Perspective. At B is a sketch of the same spire, taken at a corresponding distance, drawn upon the surface of a horizontal cylinder with a revolving camera obscura.

GIRDERS.—III.

II.—TO DETERMINE STIFFNESS OF GIRDER AND AREA FOR RESISTING SHEAR.



HAVING obtained the bending moment and shear which act at any point of the girder and are caused by its load, also knowing the material of which it is to be composed, we have next:

1. To determine the minimum stiffness required at that point of the length of the girder, to safely resist the bending moment.
2. To determine the additional area which must be added to the cross-section, for the purpose of safely resisting the shear.

The stiffness of the girder

will evidently depend on the following conditions:

1. On the material of which it is composed. This element is provided for by assigning suitable values to the constants in the formulae which are employed.
2. On the horizontal breadth of the section, with which it directly varies.
3. On the vertical depth of the section, varying directly as the cube of this.

If the sections of all girders were solid and rectangular, the ordinary formulae for beams of rectangular section could be used, and the required dimensions of the cross section quickly obtained; but it is rare that such simple forms are used, excepting for wooden girders, and the sections are often quite complex, so that some more indirect method of expressing and obtaining the stiffness required, must be adopted.

It has been demonstrated that this stiffness depends directly on the value of the "moment of inertia" of the cross section of the girder, and that this is true for any form of section and any material. (Wood's Resistance of Materials, edition of 1875, p. 104.) This moment of inertia is represented by the symbol I , and its numerical value may be obtained for any given section, as follows:

Suppose that a horizontal line is drawn in the plane of the section, through its centre of gravity. Take any minute fibre or small area of the section, find its area and multiply this area by the square of the distance between its centre and the horizontal line previously drawn. Do this for all the fibres of the section and take the sum of all these products, without reference to the position of the fibres above or below the horizontal line. The sum of the products will be the required moment of inertia of the section. This method is here given rather as a definition of the meaning of the moment of inertia of a section, than for practical use.

The numerical value of the moment of inertia of a given section may be more readily found by one of the following methods:

1. By formulae which are given for the more common and simpler sections, in the various pocket and text books.
2. By means of the calculus, by integrating the general equation and obtaining formulae for special sections. This can only be applied to very simple forms of section, without great difficulty.
3. By the graphical method, which is applicable to any form of section, is perfectly general, easy of application to any special case, and requires no extended knowledge of the higher mathematics. It will therefore be fully explained, as it is less widely known than it deserves.

When a bending moment acts at any point of a girder, it tends to bend the girder in the direction of its action, so that the girder becomes curved, usually being concave on its upper, and convex on its lower side. On the concave side the fibres are compressed or shortened, while they are extended on the convex side. Between these will be found a layer of fibres which are unchanged in length, and which are usually called the neutral plane or axis. It is generally true, and is always assumed that this neutral layer of fibres passes through the centre of gravity of any cross section of the girder.

If the bending moment be sufficiently great the girder may fail in either of two ways:

1. By breaking; the upper fibres crushing or the lower ones rupturing, when the girder suddenly gives way.
2. By bending; when the girder may be in no danger of breaking, but deflects so much as to crack the plastering or to become very unsightly.

Hence two different series of formulae become necessary, for breaking and for bending, both of which must be applied to any particular case, and the safest result taken as the true one.

I.—BREAKING.

The general formula usually employed is that given in Wood's Resistance of Materials, edition of 1875, p. 175.

$$\Sigma Px = \frac{R}{d'} I \quad (1.)$$

In this formula:

ΣPx = the bending moment in inch-lbs.

R = modulus of rupture = strain in lbs. per square inch on those fibres most distant from the neutral axis, on that side which first gives way.

I = moment of inertia of the section.

d' = distance from the neutral axis, or the horizontal drawn through the centre of gravity of the section, to the most distant fibres, in inches.

This formula requires considerable modification to adapt it to the form in which the bending moments have been obtained.

Let M = bending moment in foot-tons. Then $\Sigma Px = 24000 M$.

For a square bar supported at each end, with load concentrated at the centre between supports, the general formula becomes:

(Wood's Resistance of Materials, p. 154.)

$$\frac{PL}{4} = \frac{1}{6} Rbd^2 \quad (2.)$$

Here, P = centre breaking load in lbs.

R = modulus of rupture in lbs.

b = breadth of the bar in inches.

d = depth of bar in inches.

Suppose the bar to be one inch square and one foot in clear length between the supports.

Let B = the centre breaking load of such a bar, in tons.

Let L' = clear length of the bar in feet, = 1 foot.

Then $P = 2000 B$, and $L = 12 L'$.

Substituting these values in formula 2, we obtain $R = 36000 B$.

Substituting the values of ΣPx and R in the general formula 1, and reducing, we have:

$$I = \frac{M d'}{15 B} \quad (3.)$$

Let f = a factor of safety.

Inserting this factor f in the general formula 3, we finally obtain:

$$I = \frac{M d' f}{15 B} \quad (4.)$$

This is the required general formula for breaking, for determining the value of I , or stiffness, when M is given. It is perfectly gen-

eral, and is applicable to any form of section and any arrangement of the loading.

In this formula B = coefficient for breaking for the material = the centre load in net tons which will just break a bar one inch square and one foot in clear length between supports. Values of B will be given for the different materials.

II. — BENDING.

Two general formulæ are usually given for bending. (Wood, Resistance of Materials, pp. 113, 114.)

1. Load concentrated at centre of the girder.

$$\Delta = \frac{W L^3}{48 E I} = \text{maximum deflection in inches.} \quad (5.)$$

2. Load uniformly distributed.

$$\Delta = \frac{5 W L^3}{384 E I} = \text{maximum deflection in inches.} \quad (6.)$$

Notation employed in these formulæ is as follows:

Δ = maximum deflection of girder in inches.

W = total load on the girder in lbs.

L = clear length of girder in inches.

E = modulus of elasticity of the material in lbs.

The term "modulus of elasticity" can be defined in two ways.

1. It is the ratio between the strain (compression or tension), on a bar one inch square, and its shortening or elongation per inch in length.

2. It equals that tensile strain in lbs. which would theoretically stretch a bar one inch square to just double its original length, neglecting changes in cross section and breakage.

These formulæ can also be put in a more convenient form:

Let r = the maximum permissible deflection of the girder, per foot of its length.

Let L' = clear length of girder in feet.

Let W' = load on girder in net tons.

Let E' = modulus of elasticity, expressed in net tons, or the coefficient for bending.

Evidently, $\Delta = r L'$; $L = 12 L'$; $E = 2000 E'$; $W = 2000 W'$.

According to Wood, p. 154, the bending moment at centre of girder in inch-lbs., will be:

$\frac{1}{4} W L$, for a load concentrated at the centre.

$\frac{1}{8} W L$, for a load uniformly distributed.

Let M = the same bending moments expressed in foot-tons.

Then $\frac{1}{4} W L = 24000 M$, and $W L = 96000 M$, for concentrated load.

And $\frac{1}{8} W L = 24000 M$, and $W L = 192000 M$, for uniform load.

Substituting these values of Δ , L , W , and E in the general formulæ 5 and 6, reducing and omitting accents, we finally obtain the following general formulæ:

$$I = 144 \frac{M L}{E r}, \text{ for concentrated load.} \quad (7.)$$

$$I = 180 \frac{M L}{E r}, \text{ for uniform load.} \quad (8.)$$

Values of E will be given for the different materials, but they can be readily obtained by dividing the values of the modulus of elasticity, given in the text-books, by 2000.

Since any mode of arranging the loading must be intermediate in its effect, between an equal load concentrated at the centre and one uniformly distributed, the two general formulæ just obtained will give the two limiting values of I , between which the true value lies, approaching either limit as the mode of loading approaches that corresponding to the limit.

Formulæ have been obtained for some of these intermediate forms of loading, but they are few, complex, and can usually only be applied by those who have a full theoretical knowledge of the entire subject. Therefore, it will usually be preferable to apply the two general formulæ for bending here given, and then select a value of I between the two limiting values obtained, and which is judged to most nearly correspond to the mode of arrangement of the loading. But it will always be perfectly safe to take the larger of the two values obtained, though this will occasion the use sometimes of a little more material than is absolutely necessary.

III. — SHEARING.

Since the shearing strain acts at right angles to the girder the additional area required to safely resist it will vary directly as the shear itself.

Let A = this additional area in square inches.

Let S = coefficient for shearing, for the material, being the ultimate resistance to transverse shearing of a bar one inch square in net tons.

Let f = a factor of safety.

Let W' = the shear in net tons, acting at the section considered.

$$\text{Then } A = \frac{W' f}{S}, \text{ the required general formula.} \quad (9.)$$

Having solved the second portion of the proposed problem, we may pass to the third.

TABLE OF COEFFICIENTS FOR DIFFERENT MATERIALS.

Material.	S.	E.	B.
Ash, white,	3.14	807.	.302
Beech,	2.61	676.	.250
Cherry,	1.47	615.	.325

Material.	S.	E.	B.
Chestnut,	.77	516.	.261
Hemlock,	1.38	829.	.198
Maple,	3.13	1112.	.272
Oak, red,	—	1075.	.285
Oak, white,	2.21	750.	.296
Pine, Georgia,	—	1274.	.425
Pine, pitch,	—	813.	.278
Pine, red,	.33	781.	.228
Pine, white,	1.24	858.	.219
Pine, yellow,	2.17	925.	.250
Spruce,	1.63	783.	.245
Sycamore,	—	519.	.259
Walnut, black,	2.36	842.	.375
Iron, average cast,	11.00	7835.	1.037
Iron, best cast,	14.10	11450.	1.250
Iron, common wrought,	—	11000.	1.100
Iron, average wrought,	22.50	12443.	1.199
Iron, best wrought,	—	14250.	1.300
Steel, cast,	45.67	14331.	2.240

ARCHITECTURAL FRENZY IN THE NEW WORLD.



ON this side of the Atlantic the miscellaneous Anglo-Saxon writer of our latter part of the nineteenth century has been pleased from time to time to run amuck upon architectural questions in a most peculiar way; not at all in an unintellectual or inartistic way, but in a way which might be called, if we were so minded, by any one of half-a-dozen handy phrases suggestive of lightheadedness. Fun has of course been the principal weapon in his hand; and sometimes very good fun it has been of its kind, hitting hard and straight at the mark; but inasmuch as

the mark has been quite as often a delusion as not, and still oftener at least a whimsey, it cannot be said that the practical result has been worthy of the expenditure of so large an amount of wit. Architects as a rule do not trouble themselves to read with any marked attention such disquisitions concerning their business. The public at large also, who are the employers of the architects, are still less disposed to flounder through the obscurities of the argument. Practical men perform their practical work in the old way; and, from the brilliant transcendentalism of Mr. Ruskin to the prosaic infatuation of the inventor of the "Inspired Mason" in the *Quarterly*, the assault has entirely failed, and the design of our buildings is very much what it would have been if Grub Street had left it alone.

It need scarcely be observed, however, that the fever of hypercriticism is a contagious disease; and accordingly no one need be surprised to find the *North American Review* publishing a lengthy and excited article in which an American writer denounces American architecture in the same style of rhetoric with which we are familiar in England. The writer is Mr. Clarence Cook, and such of our readers as have returned from their holiday in a sufficiently pleasant humor may have enjoyed not a little the racy extract which we reprinted last week from this gentleman's essay. Those who have not yet read it we recommend to do so without further loss of time, for the lesson it teaches is indeed instructive as well as amusing.

It will thus be seen that in the United States, as in England, the architect is easily proved to be a sad blockhead, and his work very sorry stuff. The leading point in the American reviewer's argument is, as many might suppose, although many might not, a reference to the superior genius of antiquity. This artifice is pretty much exhausted in England; but it is new in America, and very properly may prove highly attractive there. On this side the ocean, not only have we ceased to hark back to Greece and Rome, or even to new-born Italy, but our own stately monks and saintly freemasons of the Middle Ages—if stately and saintly they really were—we have at length in some degree consigned to the same limbo of exhausted fashion; and what we have come to fancy now more than all else is the higgledy-piggledy of the Stuarts. Now if it happens that there is Stuart architecture of as veritable a kind on the other side as there is on this, it is plain without explanation that such art must happily combine in that part of the world the two great critical virtues of antiquity and fashion. That is to say, when we in England go back to the invasion of Norman William and his rowdy followers, the corresponding reference in America is to the grim and sober-sided people who "came over in the *Mayflower*," seeking refuge, it will be remembered, in the wilderness from the theological discipline of King Charles of jovial but disreputable memory; and so we may expect to find the architecture of the Pilgrim Fathers to be authen-

tie "Queen Anne." Not only so, but when the old Hollanders built New Amsterdam — the city which some of our readers may require to be told is now called New York — it must be equally true that their architectural style would be of very much the same type. Accordingly, when Mr. Clarence Cook conceives the happy thought of appealing to "the handsome houses in Gloucester, Hingham, Cambridge, and other Massachusetts towns, the houses that made old New York so dignified a city, and those that still give to little Newport an air of consequence," he is not only in the fairest possible manner putting Knickerbocker in the place of William the Conqueror, but he is at the same time accepting for Queen Anne here Queen Anne there — a proceeding which is doubly convenient, interesting, and authoritative. But the transatlantic critic is far too acute to stop here, as an Englishman might do — at least, any other Englishman than such a one as the discoverer of the Inspired Mason. Those delightful examples of antique art, he says, "were the work of simple 'builders,' who knew their trade and never cared to give themselves a finer name." Very likely they were; and what then? The conclusion is obvious. "Where architects abound," he continues, "the art of building always deteriorates. Did architects design the houses of Venice? Architects may have designed the bad ones, but never the good ones. As soon as architects got themselves fairly established in Venice, her shabby days began." With all respect for the humor of Mr. Clarence Cook, we are bound to suggest that he is here drawing upon his imagination for his facts. If he merely intends to assert that the work of the Renaissance in Venice is inferior to the pre-Raphaelite work, that is a matter of opinion which for a good many years has been held to be beyond the range of profitable argument, people of different artistic proclivities being entitled so far to agree, or disagree, to differ. But our critic goes on to illustrate his meaning a little further: "Consider the cottages of England, the chalets of Switzerland; is it not evident that they are the spontaneous outgrowth of a general good taste" and so on? Consider, of course, the lilies of the field, how they grow; they toil not, neither do they spin; yet Solomon in all his glory is not arrayed like one of these. "Every old church in England looks built by the same hands that built the old houses that nestle about it." A pretty fancy, we grant, especially for an American; a tender thought, by no means to be discouraged or disparaged; or we might be obliged to urge the reflection that three score years and ten would have to be repeated in some instances a good many times before the same hands that had begun their work upon a village church of the twelfth or thirteenth, or even the fifteenth century, could have finished it upon the poor slap-dashed dwellings that are rickety and old in the eighteen hundred and eighties, after an existence of scarcely a century and a half. The identification is in truth no more than a recognition of the fact that distance still lends enchantment to the view; once beyond the limits of substantial common sense, and it matters not whether the quaintness of such old houses be that of a hundred years or that of a thousand. But whether this is sound criticism, or even intelligent archæology, is quite another question. "It is to architects," continues the new apostle at any rate, "that we owe all the ugly building that offends us;" and this is the proposition which he wishes to demonstrate by such reasoning. It is true that it could scarcely be demonstrated by any other.

After our own manner, but with a freedom of personal animadversion which no Englishman could hope to emulate, and which is therefore all the more refreshing, Mr. Clarence Cook, having thus laid down the law, proceeds to exemplify its operation by describing the actual specimens of architectural art which claim to be most popular in his great country. "A builder," he observes, more in sorrow, but a good deal in anger, "must call himself an architect before he can be employed in any important work to-day. The man — I forget his name —" (what a pity he forgets his name!) "who built Mr. A. T. Stewart's house and iron shop, and many a structure beside, was called an architect." Architects also — with forgotten names — have built certain churches about Boston; "and another architect built the church in that Back Bay quarter, dedicated, we suppose, to some female saint, since it has for emblem on the top the completest Saratoga trunk" — and so on; a Saratoga trunk being, it is to be supposed, the very large travelling box, and nothing else, in which an American fine lady takes her dresses to the famous springs. Still another architect has built "the Art Museum, so finikin fine," which is adorned with "heads of great men looking out of portholes in the most shipwrecked fashion, a senseless treatment borrowed from that overdone Pavian Certosa." "Borrowing, borrowing everywhere!" is the Carlylese cry of the critic, "an original motive almost impossible to find;" and now there follows at last this suggestive reflection: — "For the people at large have no ideas on the subject; the 'builders' have been snubbed into taking a back seat and keeping it; and in architecture, as in all our fine arts, notably in the art of painting, the field has fallen into the possession of a set of clever, accomplished, but over-cultivated young men, who have come back from French and English studios, offices, and pedestrian trips, with a plenty of 'material' in their sketch-books," which, in short, although all very well in its way, is of no use in America. But why of no use in America?

Mr. Clarence Cook, whether in affectation or in reality, seems to be only playing the part, after all, of one of those growing patriots who are to be met with in every land, and whose simple and easy function it is to cry up the imaginary excellence of the "good old

times." Fancy this old-maidish whim having at length got so far as to insist upon the worship of such an idol as the architecture of the godly men who "came over in the Mayflower!" Fancy the churches of all America tied down forever to the pattern of the conventicles in which Cotton Mather expounded the mysteries of witchcraft! We venture to express the hope that American architects will pay no attention to Mr. Clarence Cook; that the clever and accomplished young men who have gone home from French studios and English offices, with "a plenty of material," will by no means consent to imitate the barren work of primitive Yankee builders, but go on their way rejoicing in the fact that they are doing good work for their country, and better and better every day. — *The Architect.*

LIGHTNING CONDUCTORS.



A COPY of rules for the erection of lightning conductors, based upon the recently-published report of the Lightning Rod Conference, has, with the accompanying covering letter, been recently issued by the Explosive Department of the Home Office to the occupiers of all factories and magazines for explosives, and to those local and police authorities upon whom devolves the inspection of stores of explosives:

HOME OFFICE, WHITEHALL, LONDON,
September 1, 1882.

Sir, — The accompanying code of rules for the erection of lightning conductors has been abstracted (nearly verbatim) from the recently-published report of the Lightning Rod Conference. This Conference was assembled at the instance of the Meteorological Society, and included delegates from that body as well as from the Royal Institute of British Architects, the Society of Telegraph Engineers and of Electricians, and the Physical Society. There were also attached to it two distinguished scientific men. Permission to print and circulate this abstract has been courteously accorded by Mr. G. J. Symons, F. R. S., President of the Meteorological Society, who acted as secretary to the Conference and editor of the report. The carefully-considered opinions of such a representative body of scientific men, based upon a mass of practical as well as theoretical evidence, cannot fail to command the very attentive consideration of all persons specially interested in the subject of lightning conductors. Among those who are so interested may be specially named the occupiers of factories and magazines for explosives. On these grounds, and in view of the fact that the report as a whole may not have come under your notice or be readily accessible to you, I venture to forward a copy of these rules, and to accompany the same with the expression of a hope that you will give them the consideration to which they are entitled, and will take such steps as may seem expedient to you in regard to bringing your system of lightning conductors as far as practicable into conformity with the principles therein enumerated. These principles should, I consider, guide this Department in forming an opinion as to the efficiency, or otherwise, of the lightning conductors which may come under our official observation. I have the honor to be, your obedient servant,

V. D. MAJENDIE, Colonel,
H. M. Chief Inspector of Explosives.

The following are the rules referred to in the above letter: —

1. *Material of Rod.* — Copper, weighing not less than 6 oz. per foot run, the electrical conductivity of which is not less than 90 per cent of that of pure copper, either in the form of rod, tape, or rope of stout wires, no individual wire being less than No. 12 B. W. G. (.109"). Iron may be used, but should not weigh less than 2½ lbs. per foot run.

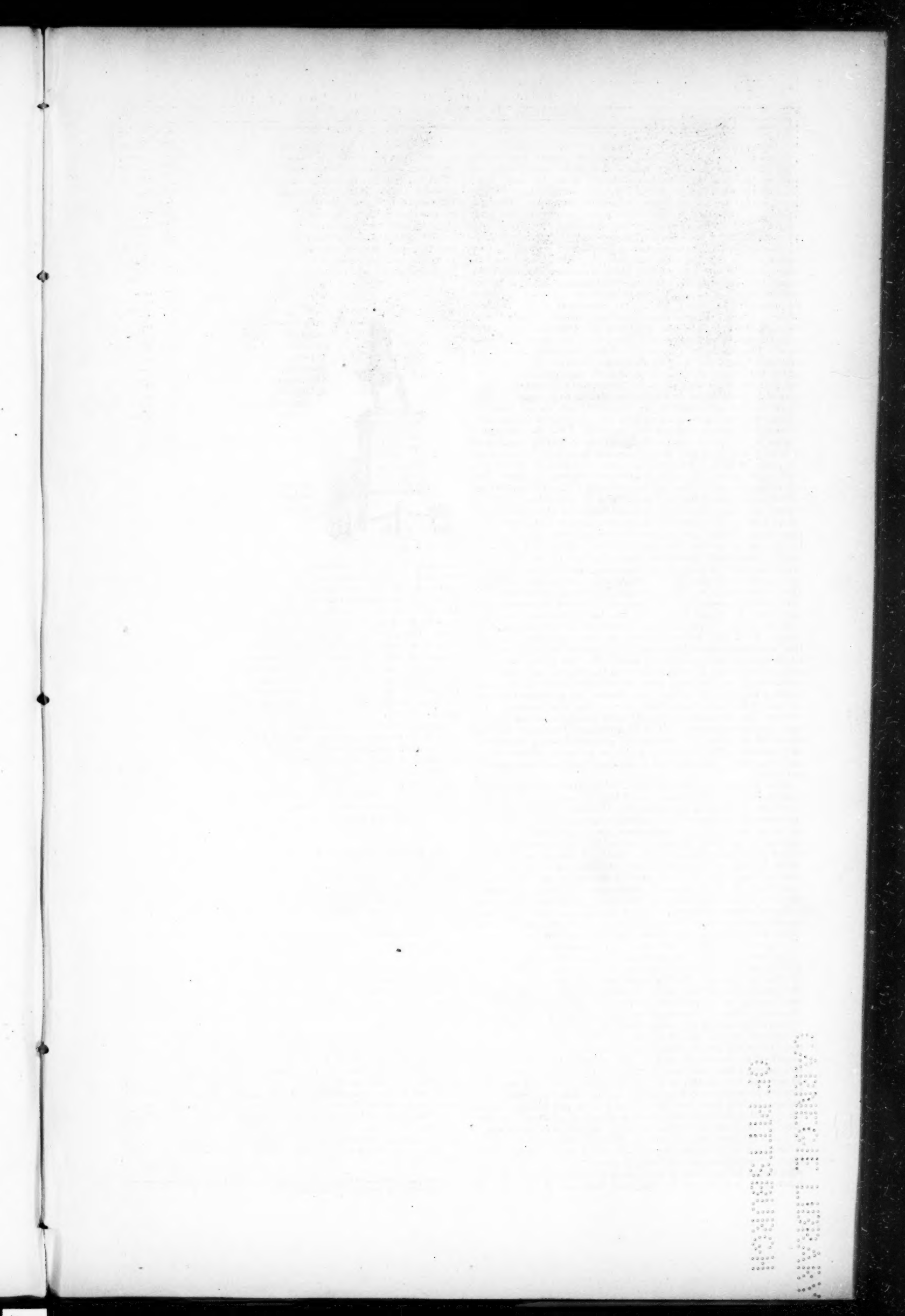
2. *Joints.* — Every joint, besides being well cleaned and screwed, scarfed, or riveted, should be thoroughly soldered.

3. *Form of Points.* — The point of the upper terminal¹ of the conductor should not have a sharper angle than 90°. A foot below the extreme point a copper ring should be screwed and soldered on to the upper terminal, in which ring should be fixed three or four sharp copper points, each about six inches long. It is desirable that these points should be so platinized, gilded or nickel-plated, as to resist oxidation.

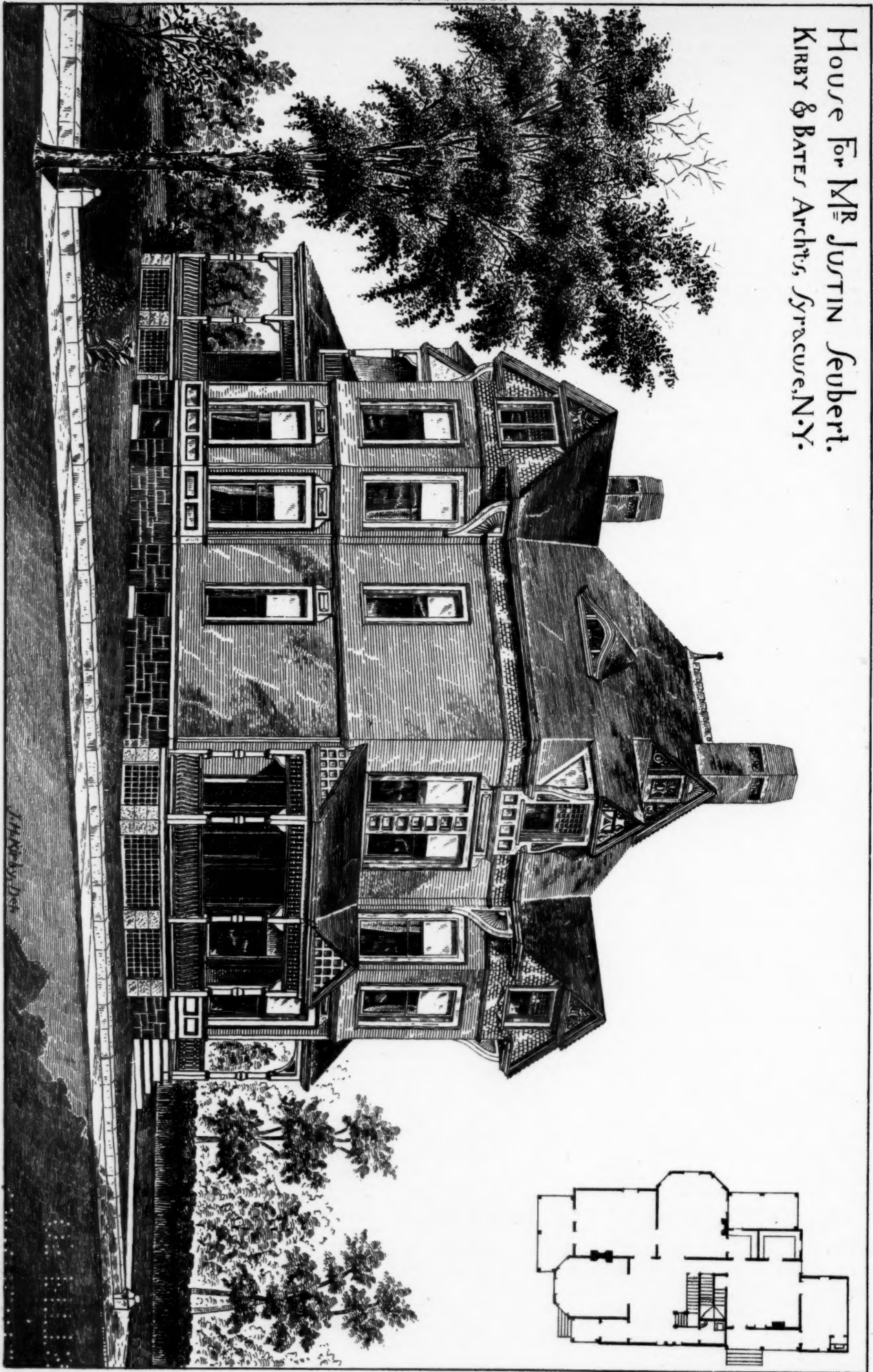
4. *Number and Height of Upper Terminals.* — The number of conductors or upper terminals required will depend upon the size of the building, the material of which it is constructed, and the comparative height above ground of the several parts. No general rule can be given for this, except that it may be assumed that the space protected by the conductor is, as a rule, a cone, the radius of whose base is equal to the height of the conductor from the ground.

5. *Curvature.* — The rod should not be bent abruptly round sharp corners. In no case should the length of a curve be more than half as long again as its cord. A hole should be drilled in string-courses or other projecting masonry, when possible, to allow the rod to pass freely through it.

¹ The upper terminal is that portion of the conductor which is between the top of the edifice and the point of the conductor.



House for Mr. Justin Leubert.
Kirby & Bates Archts, Syracuse, N.Y.



Engraved by F. W. C. Co. 27 Tremont St. Boston.

FIG. 66

PLATE XIV. CURVILINEAR PERSPECTIVE.

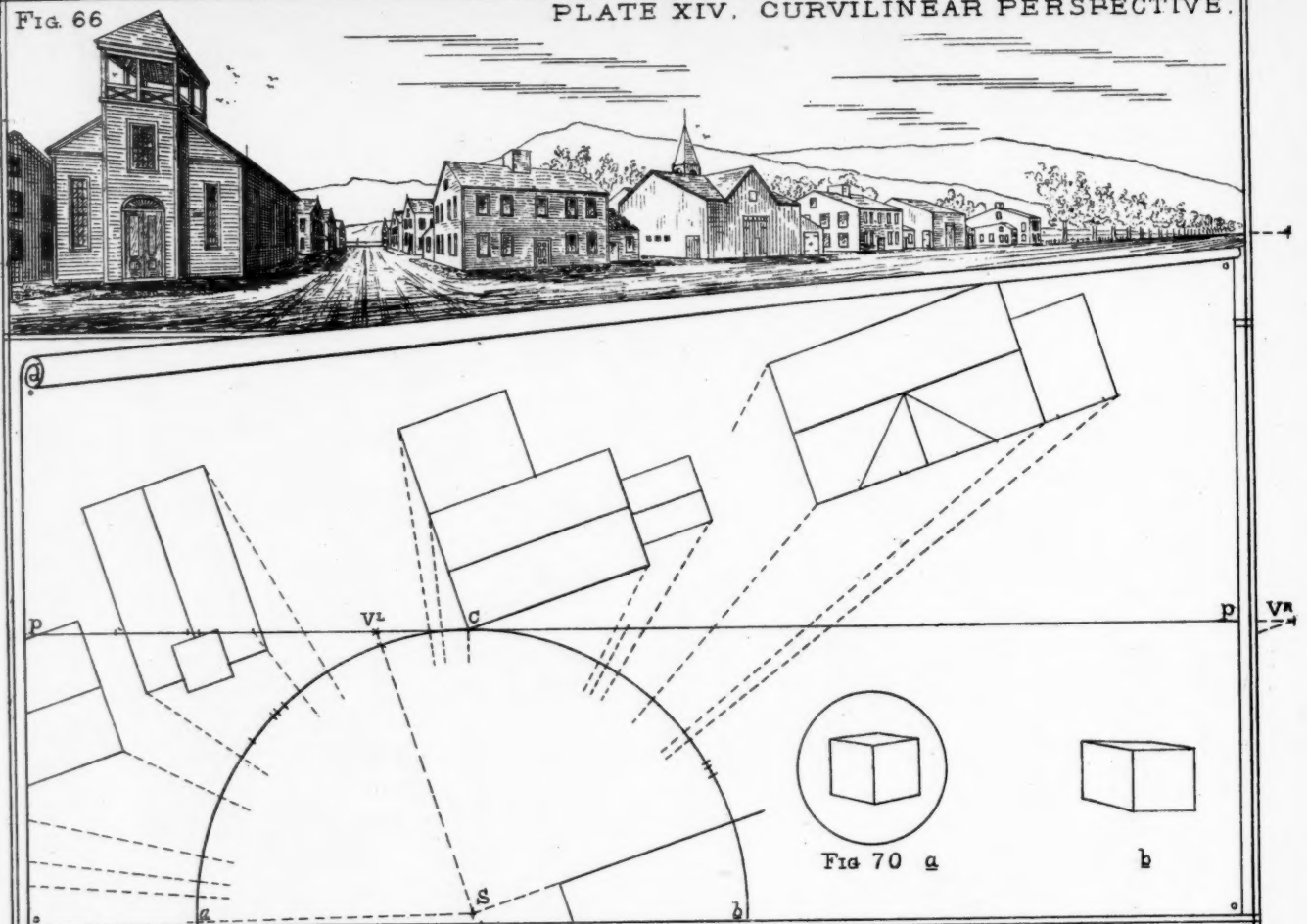


FIG. 67



FIG. 68

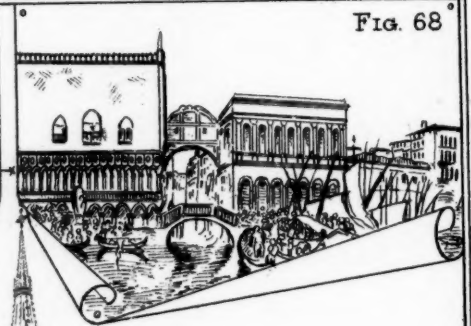
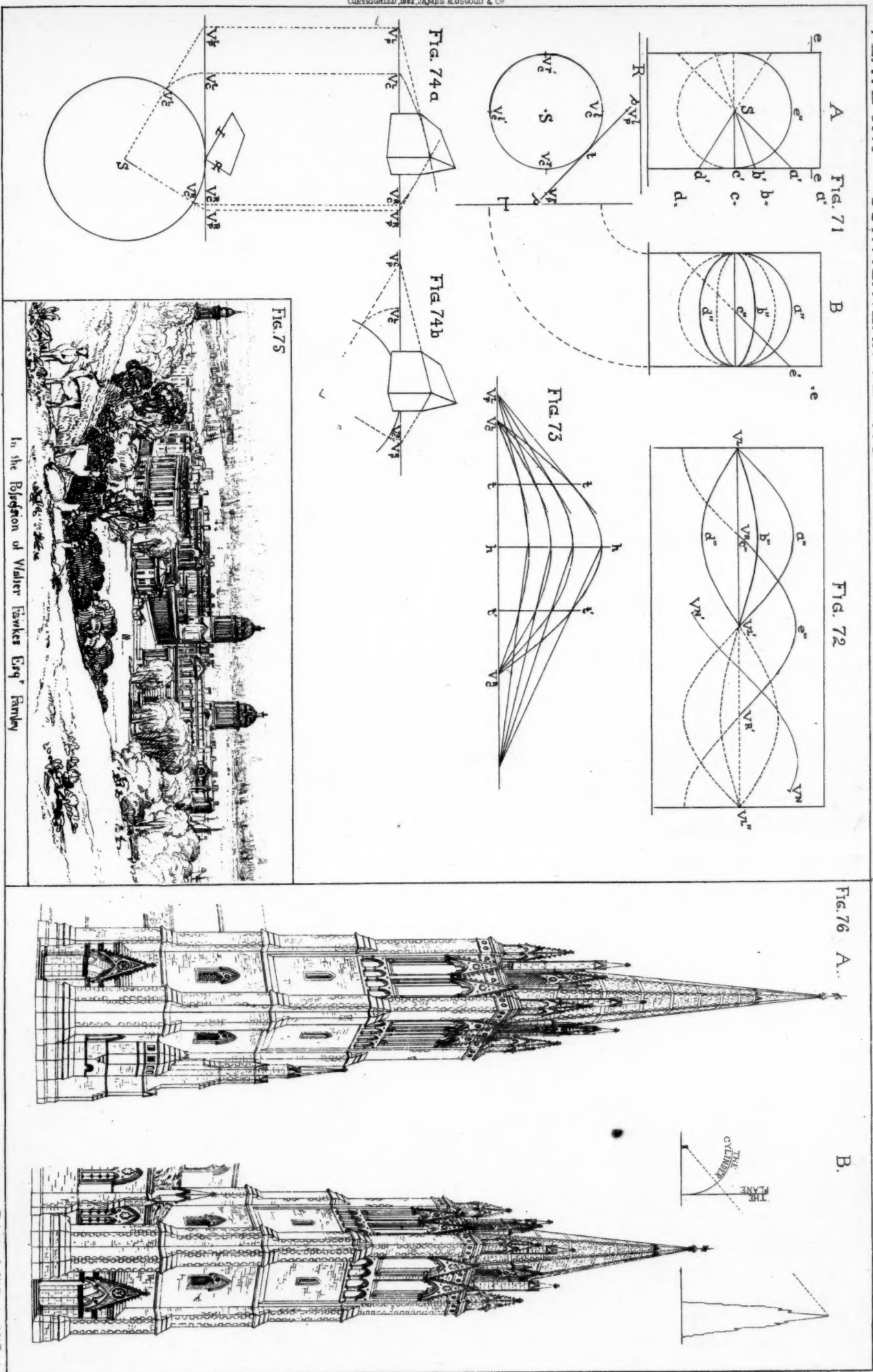


FIG. 69 (COPIED FROM HERDMAN'S CURVILINEAR PERSPECTIVE.)



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PLATE XVI CURVILINEAR PERSPECTIVE.



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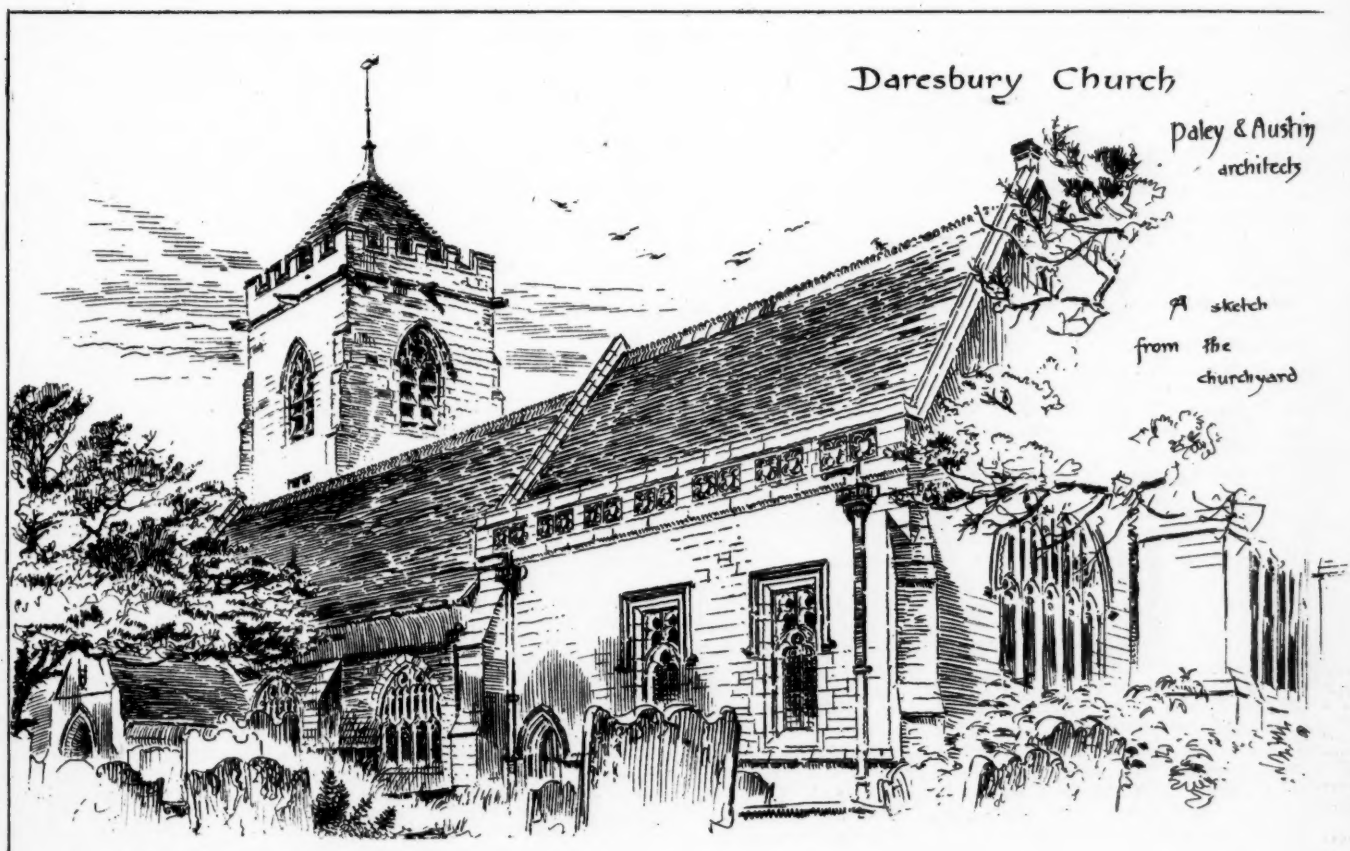
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A Seaside Cottage

Designed by "Naia"
for the British Architect Art Club.



Daresbury Church

Paley & Austin
architects

A sketch
from the
churchyard

6. *Insulators.*—The conductor should not be kept from the building by glass or other insulators, but attached to it by fastenings of the same metal as the conductor itself is composed of.

7. *Fixing.*—Conductors should preferentially be taken down the side of the building which is most exposed to rain. They should be held firmly, but the holdfasts should not be driven in so tightly as to pinch the conductor or prevent contraction and expansion due to change of temperature.

8. *Other Metal Work.*—All metallic spouts, gutter, iron doors, and other masses of metal about the building should be electrically connected with the conductor.

9. *Earth Connection.*—It is most desirable that, whenever possible, the lower extremity of the conductor should be buried in permanently damp soil. Hence proximity to rain-water pipes and to drains or other water is desirable. It is a very good plan to bifurcate the conductor close below the surface of the ground, and to adopt two of the following methods for securing the escape of the lightning into the earth: (1) A strip of copper tape may be led from the bottom of the rod to a gas or water main (not merely to a leaden pipe), if such exist near enough, and be soldered to it; (2) a tape may be soldered to a sheet of copper, 3' x 3' x $\frac{1}{16}$ " thick, buried in permanently wet earth and surrounded by cinders or coke; (3) many yards of copper tape may be laid in a trench filled with coke, having not less than 18 square feet of copper exposed.

10. *Protection from Theft, etc.*—In case where there is any likelihood of the copper being stolen or injured it should be protected by being enclosed in an iron gas-pipe, reaching 10 feet (if there is room) above ground and some distance into the ground.

11. *Painting.*—Iron conductors, galvanized or not, should be painted. It is optional with copper ones.

12. *Inspection.*—When the conductor is finally fixed it should in all cases be examined and tested by a qualified person, and this should be done in the case of new buildings after all work on them is finished.

Periodical examination and testing, should opportunities offer, are also very desirable, especially when iron earth connections are employed.

THE ILLUSTRATIONS.

WE reproduce from Part IV of "Rambling Sketches," full particulars concerning which publication can be found elsewhere in this paper, these two sketches:—

RAMBLING SKETCHES, BY MR. T. RAFFLES DAVISON. DARESBURY CHURCH.—A SEASIDE COTTAGE.

There was an ecclesiastical structure at Daresbury in the fifteenth century, for in the year 1448 Richard Baynster, variously described as of Chester and of Hesketh, in Lancashire, and Thomas Walton, of Westminster, were convicted of stealing from it a missal and some silver plate. Baynster is styled a "gentleman" and his confederate a "yoman." They were not vulgar thieves, but mediæval kleptomaniacs, with a special fondness for church plate. They were also men of some learning, for to escape the gallows they pleaded "benefit of clergy," and that custom, so curiously evidencing the regard in which our ancestors held learning, even when dissociated from good manners, was apparently the means of saving their lives. The present church of Daresbury, with the exception of the tower, is a restoration by Messrs. Paley and Austin, and was erected chiefly at the expense of Sir G. Greenall and Mr. W. E. Jones. The architecture of the original building was pointed. There were modern windows, and the south aisle was rebuilt in 1773. The present structure has an exceedingly picturesque appearance.

DIAGRAMS ILLUSTRATING CURVILINEAR PERSPECTIVE.—PLATES XIV, XVI.

HOUSE FOR JUSTIN SEUBERT, ESQ., SYRACUSE, N. Y. MESSRS. KIRBY & BATES, ARCHITECTS, SYRACUSE, N. Y.

COLOGNE CATHEDRAL.—Permission has been obtained from the German Emperor for the opening of another Cologne Cathedral lottery to raise money with which to purchase the houses at present incumbering the cathedral square. It is the intention to demolish these houses in order to afford a free, open space of proper and worthy size for the cathedral.

WOOD STAINING.—A novel system of staining wood has been introduced that has the merit of simplicity and cheapness. The wood having been carefully planed and finished, it is given two thin coats of sizing. This is prepared by adding to glue a small quantity of albumen and alum. When this is dry and hard, the design is painted or stencilled upon the wood, the intention being to produce a pattern, one part of which shall be of the natural color of the wood, the stencil or the design selected representing the white parts only. For instance, if the finished work is to show white figures on a dark ground the white parts only must appear to the stencil. When the sizing is dry the pattern is painted on in Canada balsam or Brunswick black. When the balsam is hard and dry the whole surface is washed with a sponge and hot water. This will remove the sizing from all those parts of the wood not protected by the hard balsam, which resists the warm water. When the wood is dry the exposed parts are stained in imitation of walnut or other dark woods. When the staining is finished the balsam is removed by brushing it with turpentine, leaving the pattern or design in the natural color of the wood on the dark, stained ground. The finished work is said to resemble closely inlaid wood. — *Exchange.*

THE TENACITY OF INDIAN CUSTOMS.

Three Irish Crosses



Glencolumbkille
Co. Donegal

MR. FRANK H. CUSHING has finished the work at Washington upon which he has been engaged since his visit to Boston with his Zuñi Indians last spring, and has now returned to Zuñi, where he will pursue his investigations for at least three years more. Mr. Cushing, with his young wife, was warmly welcomed to Fort Wingate, near Zuñi, by his friends there, and on his journey westward he was

received with exceptional distinction and courtesy. While at Washington, in midsummer, the two Indians who remained with him to assist him in his work at the Bureau of Ethnology — Pa-lo-wah-ti-wa, the governor, and Nai-iu-tchi, the senior Priest of the Bow — were overcome by malaria from the Potomac marshes in the neighborhood of their lodgings, and Mr. Cushing took them to his old home in New York State, where they speedily recovered.

This New York visit of Mr. Cushing's was signalized by a most interesting experience and a discovery of much ethnological importance. Many readers of the *American Architect* will doubtless remember an article on opportunities for ethnological study afforded young students by our native eastern Indian tribes, printed April 29, 1882. It was occasioned by our meeting a New England Indian on the train at Norwich, while on the way to New York, and Mr. Cushing said: "Wherever there was a remnant of an aboriginal tribe, even though its habits of life might have become radically changed and the purity of its blood destroyed by commingling with other races, there was a promising field for ethnological work, provided its language be kept alive." I remember that he also said that an earnest student might go into any one of the five nations of the Iroquois, and, by adopting methods similar to those which he has pursued at Zuñi, would gain information which would surprise ethnologists, who supposed that all had been learned that was worth knowing about these much-studied Indians. Afterwards at Washington, at the meeting of the National Academy, I heard Major Powell make some enthusiastic remarks on the true methods of ethnological study, at the close of a paper on Zuñi mythology as reflected in their sociology, read by Mr. Cushing. Major Powell took the same ground as to the value of studying any of the small Indian tribes of the East, despised and neglected as they might be, surrounded and apparently overwhelmed by our busy civilization. I had written the article for the *American Architect*, giving Mr. Cushing's views, only a few days before, and it was gratifying to hear the most eminent ethnologist of our country so thoroughly coincide with the ideas of his young disciple.

These have been verified in a striking manner by Mr. Cushing's visit to a New York tribe, whose name is here withheld for obvious reasons of courtesy, although his experiences may be recounted without a breach of confidence. The Indians in question have been in close contact with the whites for more than three generations. So much have they been changed (apparently) by the contact, that few implements or articles of clothing, and no dwellings like those found by the early French missionaries among their ancestors, appear amongst them to-day. They have on their reservation churches of various Christian denominations, school-houses, and other public buildings. Some of them, notably their chiefs and sachems, are thoroughly educated. They number about five hundred. Of this number between three and four hundred speak English very well; some of them admirably. The leaders among them are in every sense progressive farmers, using the steam threshing-machine, the automatic binder-reapers, etc. The resemblance ceases here. Every member of the tribe speaks perfectly the original tongue; the original Gentile, phratral and governmental institutions exist perfectly; the original folk-lore and myths are scarcely broken, although slightly modified.

Most marvellous, however, is the discovery made by Mr. Cushing in relation to their religious practices, beliefs and observances. This was through his position as a Zuñi. "I went there," he writes, "as a Zuñi, with Pa-lo-wah-ti-wa and Nai-iu-tchi; like them I was arrayed in the native costume, ornaments, and significant decorations of the Zuñi. We arrived at the reservation late in the afternoon. We were received by one of the sub-chiefs, and by him immediately directed to one of the grand sachems. Within three hours a council of more than three hundred was assembled with the setting of the sun, in the tribal council-house. Meanwhile, some of the sachems and elders entertained us; after liberally feasting us, conversational speeches of mutual congratulation and inquiry were made by both the elders and ourselves. I was studiously addressed as the Zuñi: the expression being 'you three western brothers,' notwithstanding the fact that some of the Indians remembered me as a

boy who had purchased baskets and bows from them in the neighboring towns. After congratulatory speeches, inquiries were made relative to our Gentile standing, during which I discovered two new Gentile names — those for the hawk and the bear. This was followed by a guarded inquiry about our songs, sacred dance institutions, and mystic medicine practices. Imagine my surprise on learning that the sacred war-dance, the sacred incantation-dances for rain, etc., and above all the medicine ceremonials of an *esoteric* institution still existed among these copper-colored Yankees. A discussion of dance (kâ-kâ) paraphernalia called out the enthusiasm of the elders and sachems. A sub-chief was despatched. He immediately returned with a medicine mask used in secret ceremonials for the exorcism of disease, identical in function with those used in the kâ-kâ-thal-nâ ceremonials of the Zuñis, although made of wood, and differing, of course, in appearance. These things are jealously guarded from the most intimate American friends of the tribe, are trusted and venerated with almost Zuñi faith, and are used with ancient song and ritual almost as elaborate as are those of the Zuñis. During the night we were entertained by exhibitions of the ancient dances. A white witness of their popular war-dances given at fairs was present through his relationship to me (my father), and pronounced not only the dances he had never seen before, but also even the war-dances performed, as totally new to him, and as different in every respect from the popular exhibitions in question. You see how true it is, that even a people now clad in American garments welcome my adoption of the Indian regalia and life, lay their secrets at my feet in reply to my Indian speeches, and unveil the mystic symbols of three silent generations. And that is what I believed would be the case could even the most unrepresentative speaker of any Indian tongue be properly approached."

This account of Mr. Cushing's is certainly a remarkable demonstration of inherent secretiveness of Indian character, as well as of its conservatism and tenacity of ancient institutions.

One of Mr. Cushing's old friends in New Mexico welcomed his return with a charming tribute in the shape of a poem with one of the most characteristic phases of Zuñi character — their religious steadfastness — as a theme, embodying the stability of their institutions and the devoutness of their faith; also the policy of the early Jesuits and Franciscans in introducing saintly feasts on old Pagan days. Its truthfulness of sentiment and fidelity to scientific traditional and historic fact, make it worthy of reproduction here:

THE PAGAN MARTYRS.

I.

Down from the shady pines of Zuñi Mountains,
By lower hills where stunted cedars grow,
Across the sunny vale where Nutria's fountains
Make green the fields that toiling Indians sow,
And on, o'er sage-grown waste, through gloomy cañyons,
Past ruined towns that fell when Rome was young,
I travelled all the day with my companions
Till length'ning shadows o'er our path were flung.

II.

At length arose to view the lofty mesa
Whereon the ruins of Old Zuñi stand;
Along its beetling front you still may trace a
Pathway to the summit of the table-land;
With reeling head and trembling limbs you'll scale it,
And gasping at the top you'll ask in dread,
If once the Spanish soldier dared assail it
Mid deadly missiles rained upon his head.

III.

"Is this some vast dun rock of lava lifting
Its rugged mass above the withered plain,
Unchanged where restless sands are ever drifting
And restless winds assault its front in vain,
Or is it some enormous ant-hill builded
By giant insects of the mythic days
The Indians tell of, that we now see gilded
By the last touches of the sunset rays?"

IV.

"T is the strange home where dwells the race of Zuñi,
As we approach it, mark its walls that rise
In terraced heights; its bristling ladders soon ye
Will see revealed against the evening skies."
Our guide thus answered. Daylight waned. We entered
And soon were mingled with the dusky throng
That toward a low and mystic chamber centered
To hear the pagan priests intone their song.

V.

Yes, solemn priests who pray in tongue archaic
The laymen know not: learned priests who hold
A law as ancient as the code Mosaic,
A cult, as that of Baal or Indra, old,
Here in these days when timid adoration
To one far God, with silent doubt contends
And spoken unbelief — in this wise nation —
The pagan priest his blazing altar tends.

VI.

And oh! Have none, with valiant Paul's devotion,
The joyful Tidings hither dared to bring,
In all these ages since, across the ocean,
Came the first vessels of the Spanish king?
Aye, long ere Plymouth's forests heard the singing
Of Pilgrim voices lifted to the Lord,
The Spaniard sought the "Seven Cities" bringing
The Cross; but bringing, too, alas! the Sword.

VII.

Then came the sorrowful and weary ages.
Though History hold his Vandal deed a crime,
'T is well, perhaps, the *Gringo* burned the pages
That bore the annals of that fearful time.
Though still so many records of the errors
Of Spanish rule remain, they've not sufficed
To tell an hundredth part of all the terrors
Wrought in the honor of the peaceful Christ.

VIII.

Scourged to the portals of the gloomy mission,
Whose slanting walls now crumble to decay,
Came these reluctant children of Perdition,
With sullen hearts to kneel but not to pray;
For what, to them, the Deity supernal,
Who loved, they heard, their cruel masters well —
Shared with such monsters for a life eternal,
His promised Paradise were worse than Hell.

IX.

So, not for images with pallid faces
Would Zuñi's sons their swarthy gods despite
Nor take the proffered bargain which replaces,
With feast of saint, a day of pagan rite —
(Such saint as they of Acoma believe in;
For there the Indian sings his song of praise,
Where the fair statue of the Royal Stephen
Supplants the war-god of the ancient days).

X.

Though well they knew the doom of death was meted
To him who in idolatry was found,
They oft, in stealth, to deserts far retreated,
Or met in nature's temples underground;
And there they taught their children tales of wonder
And all the secrets of the priestly line;
On high Toyálaní, the Mount of Thunder,
They laid the gifts at Ahayuta's shrine.

XI.

But Faith, long-suffering, is at last victorious;
And praise, to-day, the old-time gods they sing,
No more in trembling, but with voice uproarious,
Safe 'neath the shelter of the Eagle's wing.
Bright are the fires in the *estufas* lowly,
Quenched are the tapers in the Christian fane,
Where now the stranger spoils the altar holy,
No longer guarded by the arms of Spain.

XII.

"Thou stiff-neck'd generation, self-deceiving,
May Heav'n enlighten thee!" — my reader prays.
"Punish their obstinacy, unbelieving!" —
Thus ran the orders of viceregal days.
Ah, had the persecutor been the heathen
And he who died for faith the Christian been,
In lauding orders of that time had we then,
Some other word than "obstinacy" seen!

XIII.

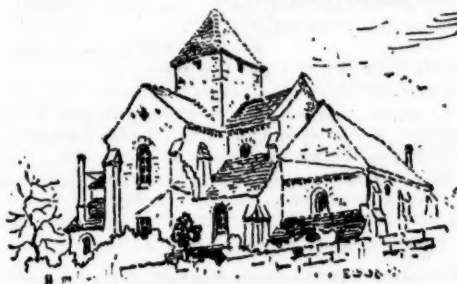
Oh, Christian sage! Oh, maiden tender-hearted,
Whose eyes are streaming in the silent room,
O'er the sad page that tells of saints departed —
Of Alban's fate — Lorenzo's fiery doom!
Have ye but words of doubting for the story,
Have ye but scornful glances for the plaint
Of him who sings the pagan martyr's glory,
Who sings the sorrows of the savage saint?

It would be strange if anybody should attain a position so conspicuous as Mr. Cushing's and escape calumny, and, indeed, it has not been his fate. Ever since his return to Washington attempts have been made to discredit the sincerity of the object of his visit to Boston, and statements to this effect have been repeated so persistently that many have given them credence. It has been asserted on authority of Pedro Pino, the aged Zuñi who was left in Washington at the time of the Boston trip by reason of his illness, that Mr. Cushing was a liar, that the Zuñis knew nothing of "the water from ocean of the sunrise;" that they took their gourds along to drink from, but that Cushing made them go to the ocean and sacrifice, chant, and pray; made them take the water therefrom and throw it away; that the Zuñis had no religion, and that the fine speeches Cushing had made were of his own invention, and much similar stuff. Now Pedro Pino is over eighty years old and little better than an imbecile, therefore had he really said what has been ascribed to him it would have no weight whatever. It is also to be borne in mind

that Pedro Pino's questioners could have no knowledge of Zúñi language; that, on the other hand, his knowledge of Spanish is by no means profound, and that is the only other tongue he speaks. Therefore it would be the easiest thing in the world for an "interpreter" to misinterpret his meaning. Moreover, Pedro Pino has himself characterized the stock of tales which the Zúñis always have at ready command for the benefit of outside questioners into their national or personal affairs as "lies for strangers." Therefore it may be seen that evidence resting upon such a flimsy fabric of fact has an exceedingly unsubstantial basis. Imagine for an instant that eminent scientists like Professor Baird and Major Powell of Washington, Professor Putnam of Cambridge, and Professor Morse of Salem, and historical scholars of the rank of Francis Parkman and Edward E. Hale,—all of whom have the most implicit confidence in Mr. Cushing—could be thus hoodwinked, and to imagine an adequate motive to induce Mr. Cushing to make the attempt, and thereby to account for the privations and suffering he has undergone in the pursuit of his work, would require a credulity monumental in degree.

SYLVESTER BAXTER.

A FOOLISH SPECIMEN OF COMBUSTIBLE ARCHITECTURE.



UPON one of the principal streets of a certain city which need not be named a building is in process of construction apparently intended to be used for office purposes, as it is divided on each floor into

small rooms, many of which are to be heated by steam radiators, and have no outlet for ventilation except the doors and windows. The placing of these steam-pipes has made excellent quarters for the nurseries of rats, but comfortable quarters are elsewhere provided for this purpose, perhaps in a more complete way, as will presently be described.

This building has a very solid stone front of excellent design and a very heavy side-wall of brick. It is on a corner. Consideration has been given to the danger of fire, and every top floor is laid upon a thick bed of mortar. It would be probable that all the furniture of an office would be consumed without any danger of the fire passing downward through this floor, whatever it might do elsewhere. In solidity of wall and safety of floor, of its kind, the construction leaves nothing to be desired. The hollow spaces between the floor and the ceiling on each story would not be a matter of any great moment except for the passage of steam-pipes (not sufficiently guarded) and for other reasons now to be given.

The inside walls of this building are plastered upon lath nailed to studding about 2" x 3", and the studding is set a little away from the walls and farther away from the chimneys. This makes the interior structure a separate combustible building of wood, presenting a wooden surface next to the wall which screens it, of sawed stuff showing the largest possible number of corners ready to catch fire. There is no cut-off and no break from cellar to attic in the space between this wooden building and the stone and brick screen by which it (this wooden building) is protected from water, and although the roof of the building is flat, the attic ceiling is hung several feet away from it, making an admirable combustible space to which a fire may be carried from the cellar or from any floor, between the wooden building and the incombustible screen, and where it may do its utmost work of destruction well out of the reach of the firemen.

There are a few fireplaces in the building, and where they are the chimney is wider than throughout the rest of its course. Over each fireplace, therefore, on one side, and screened by a vertical furring, is the best possible warm wooden chamber for the nurseries of rats; and as the building is not far from the wharf they will doubtless find their way to these warm and comfortable quarters as soon as the carpenters have left the premises. Quite recently the wharf rats took advantage of similar quarters which had been provided in a building not far from the one described herein, where they used the waste with which oily machinery had been wiped for their nests, and when this building burned the loss was about half a million dollars, with a narrow escape from serious loss of life.

Being intended for offices, the building now under consideration will doubtless be finished in hard wood. This will require frequent cleaning and oiling; and the incendiary rags which are commonly used for these purposes will be taken by the rats into their nurseries, and used as they customarily are, to make their nests. All the conditions will then be present (as they are in most of what purport to be stone churches) for the incendiary rat or the treacherous steam-pipe to set the building on fire.

Not long since one section of the building in part occupied by the undersigned was set on fire by a rat's nest in a coal-hole under a

stairway next to a room in which the finish had lately been oiled. It passed from the second floor nearly to the roof behind the furrings on a party-wall, and was put out by the use of a chemical engine.

An expenditure of one hundred dollars or less, at the present time, would remedy all the defects in this building. Cut-offs of brick or of mortar could be carried around each floor and around each chimney, by which the circulation of flame and of vermin would be wholly stopped; and the fire might then be retarded in the room or upon the floor where it occurred, if it ever occurred, until the firemen could put it out.

This is now the state of the question: so far as the firemen and the fire engineers are concerned, it is held to be their business only to put out a fire, not to prevent one by criticising construction; and in some cases where they have gone beyond their function they have been rebuked for interference with what was none of their business.

It is the business of the inspector of buildings to attempt to prevent fires so far as the present statute gives him authority. The present building act of the city in question actually requires, in some of its provisions, unfit and dangerous methods, and totally neglects many of the principal causes of danger, like those described above.

It is the function of the underwriter to bet on the chances of bad construction; and the range of stakes or premiums under such bets or policies having become unprofitable of late, a heavy rise in the rates is now being enforced as a matter of necessity.

It might be the function of a citizen to designate this particular building and to point out its faults; but in so doing it is alleged that he may render himself liable in damages both to the owner of the building and to the architect, inasmuch as the building is constructed within the limits of the law.

Two questions arise: First, how can the present method of combustible architecture be rendered a disgrace to the architect? Second, how shall loss by fire be made to fall upon the owner who neglects or is ignorant of the simple methods of assuring comparative safety?

E. A.

THE ARC DE TRIOMPHE, PARIS.



FOR some three months past English tourists and provincial visitors have been surprised to find the Arc de Triomphe de l'Etoile surmounted by a huge scaffolding of irregular shape and rough construction which effectually destroyed the beauty and symmetry of the magnificent pile at the top of

the Champs Elysées. The ordinary guide-book being silent on the subject of this enormous excrescence, travellers have had to question the guardian at

the bottom of the stairs, who must since last June have given many thousand answers to the question: "What are they building at the top of the Arc de Triomphe?" The unfortunate man who has thus been interrogated from morning till night by visitors from every clime and with every known kind of foreign accent, is himself rather vague on the subject, and usually only volunteers the information that "They are putting up a group of statuary." The fact is that the scheme, often proposed since the erection of the gigantic archway, of surmounting it with an allegorical group is at last being carried into execution, and the work in its elementary stage is fast approaching completion. When first erected the triumphal arch, with its rich bas-reliefs and bold groups of statuary commemorative of the glories of the first empire, was intended to form the basis for a crowning decoration of sculptor's work. The fact is proved by the "turtle's back" platform which has all along spoiled the outline of the magnificent parapet running round the top of the erection. Various designs were offered during the first half of the century, but most were rejected on account of their absurdity or want of striking effect. One sculptor wanted to surmount the arch with a bronze eagle of gigantic dimensions, using the platform as a perch. Another genius more patriotic wished to see a huge "France" sitting on a lion, receiving the submission of the other four great powers, including of course "perfidious Albion." This plan was discarded, possibly because, even in the pages of French historians, no occasion could be found on which England had to bow down to her amiable and glory-loving neighbor.

M. Falguière, it is who has at last prevailed upon the authorities to allow his design to grace the Arc de Triomphe. As far as one can judge from its at present unfinished state, the group will turn out a decided success, and an important addition to the many beauties of the capital. The difficulties of the task were obvious, for it must be remembered that, in addition to the twelve roads leading directly to the Arc de Triomphe and each offering a different point of aspect, the huge pile can be seen from almost any spot in the western environs of Paris. A group had to be imagined, therefore,

which would look well from every point of the compass—a consideration of infinitely more importance than the choice of a subject. Whether M. Fagniere has been successful in forming a striking and harmonious outline for his group will not be quite evident until all the scaffolding has been removed; but at present there is no reason to doubt this. The design itself consists of a female figure of France standing erect in a Roman chariot and holding a half-furled flag in her left hand. Four horses abreast, majestically throwing out their fore legs toward the front corners of the arc, draw the car, each outside pair being led by a female figure of Progress. In the foreground is a group representing Liberty overcoming Official Tyranny, the back of the platform facing the Avenue de la Grande Armée being occupied by two allegorical group of figures illustrating the defence of the country. These latter are not yet commenced. The figures now erected are of course only the models serving to show the general design of the artist, which, if accepted, will be definitely carried out in bronze. The cost of the temporary erection—about £2,000—is very low, and the economy with which the group is being constructed reflects great credit on the ingenuity of the artist. Horses, figures and chariot are, in fact, simply made of old planks of wood nailed together, the intervening spaces being filled in with wire netting, and the whole covered with coarse canvas steeped in liquid plaster, and subsequently painted brown to represent new bronze. Anything cheaper than this it would be impossible to devise; yet the effect is very good, and the model will fully answer its purpose. Thirty-five workmen are employed by M. Fagniere, who would have completed his gigantic task some weeks ago but for the stormy, wet weather which at times made work at such an altitude not only difficult but very dangerous. When fully exposed to view the group will doubtless encounter much opposition, especially from old Parisians, who love their great monument for its own sake, and are not unnaturally averse to what they term an innovation. It is certain, however, that the arch when designed early in this century was intended to receive a final crown of statuary.—*London Telegraph*.

SIXTEENTH ANNUAL CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS.

THE final programme has been issued by the committee of arrangements for the Sixteenth Annual Convention of the American Institute of Architects, to be held in the city of Cincinnati on the 25th and 26th inst.

The opening address will be delivered by Col. George Ward Nichols, of Cincinnati, after which will follow the report of Board of Trustees, by Mr. A. J. Bloor, Secretary; reports of the Treasurer, Mr. O. P. Hatfield, and of the Committee on Publication and the Committee on Education. A paper will be read from the San Francisco Chapter. The foregoing, together with the election of officers, will probably take up all the time allowed for the morning, afternoon and evening sessions of the first day.

On the morning of the second day there will be a paper from Mr. H. G. Knapp, of New York, subject, "Originality of Design," and a paper from Mr. A. C. Nash, of Cincinnati, and a report from the Special Committee on "The Duties and Obligations of an Architect toward his Client."

Directly after lunch (which will be furnished at the Gibson House by the Cincinnati Chapter) visitors will take carriages and will visit the suburbs of the city, stopping at some of the finest dwellings. All visitors are requested to be on hand on the first day, and to report at once to the Committee of Arrangements at the Gibson House. Reports coming in from all over the country justify the expectation of a large attendance. From Chicago alone fifteen to twenty and perhaps more are expected.

THE TEXAS STATE CAPITOL.

ATLANTA, GA., October 5, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Messrs. Editors,—Please give in your valuable paper the name of the architect of the Capitol Building of Texas, spoken of in your editorial of September 30, 1882, and oblige

Yours respectfully, A. C. BRUCE, Architect.

DETROIT, MICH., October 2, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Sir,—From your reference to the "Capitol" of the State of Texas, in No. 353, September 30, one might infer that the building referred to was the permanent building which is to be constructed from the plans of E. E. Myers, architect, of Detroit, Michigan. The excavation for the foundation of this building is not completed, and the foundations have yet to be laid.

The building referred to in the New Orleans *Picayune*, from which you quote, was being built for use as a temporary Capitol from plans furnished by R. E. Ruffini, architect, Austin, Texas, and the immediate cause of the building giving way was the failure of the contractor to put a column in the masonry which the specifications called for, and his neglecting to execute work as required by them.

The enclosed article from the Galveston *News* of September 28 will help you to correct the false impression you received from the article in the *Picayune*, and relieve the architect of the permanent

State Capitol from any responsibility for the failure of the temporary building.

I regret that you have not had the privilege, as I have, of seeing the plans for the permanent building. The last thing one would think of in examining them would be of the possibility of the walls being too weak, or the building ever being damaged by anything less than such an earthquake as is described in the "Tale of the Wonderful One-Hoss Shay." . . . "when Lisbon town saw the earth open and gulp her down."

In the competition, plans were submitted by many architects. The commissioners employed Napoleon Le Brun, architect, of New York, as an expert, and acting upon his recommendation, adopted the plan of E. E. Myers, of Detroit, architect of the State Capitol of Michigan.

The State of Texas paid as a premium seventeen hundred dollars, and in addition a liberal sum for the plans, details and specifications which have been furnished by the architect, and are as complete and perfect as could possibly be required or desired for such a building.

From the enclosed copy of specification and a sketch of the exterior, you can readily gain a correct idea of the proposed work. Excepting the Capitol at Washington, the building will be one of the largest, if not the largest public building in the country.

Respectfully yours,

S. E. LORING.

ATLANTA, GA., October 4, 1882.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—In your last issue "Professor (?) Moser of Atlanta" is mentioned as the expert adviser in connection with the Texas State-House competition a year or so ago. I had nothing whatever to do with that transaction, either as adviser or competitor. If I remember aright, Mr. Le Brun was the expert adviser on that occasion.

Very respectfully,

JOHN MOSER.

NOTES AND CLIPPINGS.

NEW USE FOR LUMINOUS PAINT.—Supt. Kimball of the life-saving service is experimenting with luminous paint upon the tally boards used on the sea coast, which contain instructions to wrecked vessels how to co-operate with life-saving crews on shore. The tally boards are attached to a rope, which is fired across the wrecked vessel's rigging from a mortar. If the experiments are successful all of the boards will be lettered with luminous paint, which can be used as well at night as during the day.

JEFFERSON'S SAW-MILL.—The following story is told of President Jefferson, and it has a good point in it: Jefferson was a great man, but he was far from practical in some things. When he was in France he was very much struck with the utility of windmills. He thought they were wonderful institutions, and cost so little to run. He owned a large quantity of timber on a mountain much higher than Monticello, about a mile off. He purchased in France a windmill and the machinery for a saw-mill at the cost of \$13,000, and had it taken to the top of the mountain. He had for a neighbor a bluff old fellow named Cole. One day Cole came to see him, and Jefferson took him up to where he was having the mill built. It was as much as they could do to climb the steep ascent. When Cole recovered the breath he had lost getting up the mountain, he said, "Mr. Jefferson, you have a splendid saw-mill, and it is in a splendid place to catch the wind, but how are you going to get the logs up here to saw from?" The author of the "Declaration of Independence" started like a man suddenly awakened from a delightful dream, and quickly said, "Hey, Cole, how? What?" And then, relapsing into abstraction, led the way down the mountain toward Monticello. The windmill was never completed, and years after the machinery was sold for old iron.—*Timber Trades Journal*.

STABLE HINTS.—The following admonitions, taken from *Whip and Spur*, may be useful to architects, both as lovers of horses and as the frequent designers of their homes: 1. Let your stable be well drained and sufficiently lighted. The vapors from a damp, putrid floor, and the sudden change from darkness to light, will almost to a certainty cause blindness. 2. Let the floor of the stalls be quite flat and level. Standing on a sloping place is very painful, and causes lameness by straining the ligaments and membranes. It also produces grease and sore heels. 3. Every stall should be at least six feet wide and nine feet long. This will enable the horse to turn round without bruising himself, and to lie down and stretch himself with comfort. 4. Let the stalls be separated by partitions, not by bars. They prevent the horses from fighting and kicking each other. 5. Let proper openings be made just under the ceiling to permit the hot, foul air to escape, and proper openings at the bottom of the wall to admit fresh air. Impure and confined air will cause broken wind. 6. The fresh air should enter through a number of small holes, rather than a large hole, such as an open window. That prevents draughts, which cause chills and coughs. 7. The temperature of a stable should be that of a sitting-room or parlor; not over seventy degrees in summer nor under forty-five degrees in winter. Hot, close or foul stables will bring on glanders or inflammation, while a very cold or damp one may cause an incurable cough, or disease of the lung. 8. Do not keep the hay over the manger. The steam and breath of the animal make it both unpleasant and unwholesome. If the hay must be kept over the horse, the ceiling between should be of plaster. This will in some measure prevent vapors from passing up to the food. 9. Have no opening into the manger from the hay-loft. Dust is very often thrown into the horse's eyes when fed in this way, and thus blindness is begun. The breath ascends directly to the food through the opening, which at the same time pours a continual draught down on the horse's head, thus causing chills, as well as bad food.

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.]

BUILDING PATENTS.

[Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.]

265,581. STONE-LATHE. — Ethan R. Cheney, Chelsea, Mass.
265,601. APPARATUS FOR STEAM-HEATING. — William E. Haxton, Kewanee, Ill.
265,629. WATER-ELEVATOR. — John Patten, San Francisco, Cal.
265,630. APPARATUS FOR RAISING WATER THROUGH SIPHON-PIPES. — John Patten, San Francisco, Cal.
265,633. AUTOMATIC REGULATOR FOR FURNACES. — Wm. E. Puffer, Brooklyn, N. Y.
265,636. VENTILATOR. — Rufus S. Read, Philadelphia, Pa.
265,647. PROSCENIUM-OPENING FOR THEATRES. — De Witt C. Waugh, Cincinnati, O.
265,653. STATIONARY WASH-BOWLS. — William Blackwood, Jr., Detroit, Mich.
265,675-676. FIRE-EXTINGUISHER. — Isidor Kitzee, Cincinnati, O.
265,678. FIRE-ESCAPE. — Gustav Kosmak, New York, N. Y.
265,697. STEAM-HEATING APPARATUS. — Eugene F. Osborne, St. Paul, Minn.
265,709. WATER-CLOSET TANK OR CISTERN. — Samuel F. Sniffen, New York, N. Y.
265,712. SCREW-DRIVER. — James Swan, Seymour, Conn.
265,716. DRAIN-TILE. — James Taylor, New Lexington, O.
265,744. PANTOGRAPH. — John G. Braastad, St. Paul, Minn.
265,772. SHUTTER-WORKER. — Russell G. Dudley, Jersey City, N. J.
265,802. COMBINED HEATER AND VENTILATOR. — Mathias Heckel, St. Louis, Mo.
265,814. VENTILATOR OR CHIMNEY-CAP. — John H. Irwin, Morton, Pa.
265,827. AUTOMATIC FIRE-EXTINGUISHER. — John and William Kane, Philadelphia, Pa.
265,834. FIRE-PLATE FRAME. — John J. Lebeau and Charles L. Shadon, Cincinnati, O.
265,877. FIRE ESCAPE. — Charles E. Seabury, Stony Brook, N. Y.
265,881. FIRE-ESCAPE. — George W. Smith, Harlanburg, Pa.
265,888. SASH-CORD GUIDE. — Alexander B. Tadlock, Knoxville, Tenn.
265,919-921. PNEUMATIC DOOR-CHECK AND CLOSER. — Gilbert R. Elliott, Boston, Mass.
265,924-925. CATCH FOR LATCH-BOLTS. — Martin M. Henry, Ladoga, Ind.

SUMMARY OF THE WEEK.

Baltimore.

CHURCH. — All Saints' Episcopal, s e cor. Monroe and Baltimore Sts., stone, style Gothic, seating capacity, 400; cost, \$16,000; C. E. Cassell, architect.
BUILDING PERMITS. — Since our last report twenty-six permits have been granted, the more important of which are the following: —
David F. Seltzer, three-sty brick building, Chester St., between Baltimore and Hampstead Sts.
Thomas Findley, two-sty brick stable, in rear of s w cor. Townsend St. and Vincent Alley.
J. M. Getz, two-sty brick stable, in rear of 133 Valley St., between John and Biddle Sts.
Wm. or Sarah Devier, 2 three-sty brick buildings, n e cor. Fayette and Bond Sts., and 4 three-sty brick buildings, s e Bond St., in rear of above.
S. R. Robinson, three-sty brick building, w s Gilmore St., n of Edmondson Ave.
John Holland, two-sty brick stable, in rear of 182 and 184 East St., between Hillen and Front Sts.
E. J. McMullen, 3 three-sty brick buildings, s w cor. Sewell St. and Argyle Ave.
E. J. McMullen, 2 three-sty brick buildings, s e cor. Sewell St. and Argyle Ave.
Boston Fear, 5 three-sty brick buildings, Lorman St., between Fulton Ave. and Bruce Alley.
Boston Fear and Alex. Horner, 3 three-sty brick buildings, w s Mount St., s of Presman St.
Albert J. Renft, three-sty brick building, 16' x 25', Lemon St., between Scott and Bartlett Sts.
Wm. C. Hoover, two-sty brick building, s w cor. Monument and Cannon Sts.
L. Turnbull, 5 two-sty brick buildings, Rutter Alley, between Townsend and Lanvale Sts.
Chas. Reinmertz, two-sty brick building, Hamburg St., between Leadbeall and Bevan Sts.

Brooklyn.

BUILDING PERMITS. — Pulaski St., n s, about 250' e Lewis Ave., one-sty brick engine-house; cost, \$3,000; owner, H. Schermann, Pulaski St.; architect, Chas. Stoll.
Cumberland St., No. 385, e s, three-sty brick apartment house; cost, \$13,500; owner, Mrs. Sarah King, on premises; architect, M. Thomas; builders, Wright & Brock.
Bushwick Ave., No. 279, s s, 50' w Boerum St., three-sty frame tenement; cost, \$4,900; owner, Louise Cronenweth, 190 Boerum St.; architect, F. Sauter; builders, Wm. Bayer & M. Metzger.
Vernon Ave., n s, 200' w Thompsons Ave., 5 two-sty brick dwellings; cost, each, \$4,200; owner and builder, J. Cregier, 709 Greene Ave.

Greene Ave., n s, 125' w Marcy Ave., two-and-one-half-sty brownstone dwell.; cost, \$3,200; owner, Mrs. M. Boone, Willoughby Ave., near Broadway; builder, Geo. F. Chapman.

Henry St., n w cor. Luquer St., 3 two-sty brick dwellings; total cost, \$7,000; owner, Robert Topping, 389 Franklin Ave.; builders, Cardwell & Hawkins.

Lexington Ave., n s, 70' e Nostrand Ave., 2 four-sty brownstone tenements; cost, each, \$15,000; owner, W. J. Northridge, 66 Myrtle Ave.; architect and carpenter, R. Van Brunt; mason, P. Burns.

North Eighth St., n e cor. Sixth St., one-sty brick factory; cost, \$6,000; owners, Holliday & Sons, on premises; architect, E. F. Gaylor; mason, James Rodwell.

South Third St., s w cor. Eleventh St., two-sty brick church; cost, \$10,000; owners, Trustees Zion African M. E. Church; architect, Ernest Dennis; builders, James Rodwell and C. L. Johnson.

South Third St., s w cor. Eleventh St., three-sty brick church parsonage; cost, about \$3,000; owner, etc., same as last.

Thompkins Ave., No. 491, e s, 22' n Decatur St., three-sty brownstone store and dwell.; cost, \$5,500; owner, J. D. Sullivan, 9 Decatur St.

Broadway, n s, 43' e Kosciuszko St., three-sty brick store and dwell.; cost, \$5,200; owner, M. J. Hutchins, 469 Henry St.; architect, etc., G. H. Bohanna; mason, John Lambert.

Hart St., s s, 300' e Thompsons Ave., 3 two-and-one-half-sty brownstone dwellings; cost, each, \$4,000; owner, etc., John K. Bulmer, 213 Adelphi St.

Pacific St., n s, 180' e Kingston Ave., two-sty brick dwell.; cost, \$5,000; owner, Frederick Hillerman, 629 De Kalb Ave., architect, J. W. Heustis; builders, Jas. Ashfield & Son, and Thos. Chaffers.

Hoyt St., w s, 65' n Carroll St., 2 three-sty brick dwellings; cost, \$5,000; owner and builder, Chester Bedell, 337 Smith St.; architect and carpenter, Theo. Pearson; mason, W. L. Kountree.

Fulton St., n w cor. Spencer Pl., 7 four-sty brownstone tenements; cost, total, \$65,000; owner, A. T. Lum, 118 East Eighty-ninth St., New York; architect, A. Hill.

Stuyvesant Ave., s s, 20' s Macon St., 4 two-sty brownstone dwellings; cost, each, \$2,500; owner, W. R. Wasson, 484 Macon St.; builders, C. Baur and Jno. Dhuy.

Eckford St., w s, 255' s Norman Ave., 2 three-sty frame tenements, cost, \$8,400; owner, Philemon Walker, 132 Eckford St.; architect, F. Weber; builders, Pat. Newman and Thomas Kepple.

Utica Ave., extending from Pacific St. to Dean St., 13 three-sty brick dwellings; cost, each, \$3,000; owner, E. W. Perry, 189 Broadway, New York; architect, Amzi Hill; builders, W. S. Montgomery, and E. K. Hoffes.

Third Ave., n e cor. Tenth St., four-sty brick tenement; cost, \$11,500; owner, W. Gochler, 971 Bergen St.; architects, etc., Gihren & Liebrand; masons, P. Kelly & Son.

Atlantic Ave., n s, 90' e Clinton St., four-sty brick and brownstone flat; cost, \$14,000; owner, J. J. Kierman, First Pl.; architect, A. Paul; builders, F. Kelley and M. H. Murphy.

Flatbush Ave., s w cor. Livingston St., five-sty brick store and tenement; cost, \$10,000; owner, J. E. Colyer, 42 Flatbush Ave.; architect, R. B. Eastman; builders, J. Thatcher & G. B. Colyer.

North Seventh St., s s, about 300' w Union Ave., one-sty frame storage; cost, \$7,000; owner, A. B. Ansbacher, 40 John St., New York; architect, Th. Engelhardt; builder, O. H. Doolittle.

Park Ave., w s, 200' e Thompsons Ave., 2 three-sty brick tenements; cost, \$5,000 each; owner and builder, Valentin Bruchhausen, cor. Agate and Mauler Sts.; architect, A. Herbert.

Bond St., w s, 180' n Wyckoff St., four-sty brick tenement; cost, \$8,800; owner and architect, G. F. Bolen, 162 Atlantic Ave.; builders, Hart & Boyd.

Seventeenth St., n s, 75' e Eighth Ave., 3 three-sty brick tenements; cost, \$5,000 each; owner, etc., Henry E. Wells, 619 Carlton Ave.

Floyd St., s s, 325' e Summer Ave., three-sty frame tenement; cost, \$4,000; owner, Caspar Goemann, Ellery St., near Thompsons Ave.; builders, George Straub and John Rueger.

ALTERATIONS. — Essex St., Nos. 132 and 134, repair damage by fire, walls, etc.; cost, \$3,000; owner, architect and builder, W. J. Gessner, 1722 Madison Ave.

Greene St., Nos. 42 to 50; cost, \$6,000; owner, Daniel S. Appleton, 3 University Pl.; architect, William E. Worthen.

Boston.

BUILDING PERMITS. — Brick. — Commonwealth Ave., Nos. 334 and 336, for Vinal & Dodge, 2 two-sty and mansard dwellings, 24' x 54'; Vinal & Dodge, builders.

Commonwealth Ave., Nos. 320-326, Ward 11, for Geo. Wheatland, Jr., 3 two-sty and mansard dwellings, 24' x 54'; Vinal & Dodge, builders.

Newbury St., No. 253, Ward 11, for Prescott C. Hall, three-sty mansard dwell., 24' x 54'; Silas W. Merrill & Son, builders.

Newbury St., Nos. 255-257, Ward 11, for Herbert Nash, trustee, 2 three-sty and mansard dwellings, 24' x 54'; S. W. Merrill & Son, builders.

Farnham St., near Gerard St., Ward 20, for O. H. Drisko & Co., two-sty engine-house, 20' x 50'; O. H. Drisko & Co., builders.

Beacon St., No. 244, Ward 11, for T. Dennie Boardman, four-sty dwell., 26' x 44'; ell, 20' x 33'.

Beacon St., No. 451, for Clarence A. Dow, three-sty and Mansard dwell., 20' 6" x 61' 6"; Weston & Shepard, builders.

Wood. — Brooks St., near Falcon St., Ward 1, for Joseph W. Ordway, dwell. and store, 22' x 28'; Hamilton & Park, builders.

Edgewood St., near Southwood St., Ward 21, for Geo. H. Smith, two-sty stable, 30' x 60'; A. D. Gould, builder.

Elm St., No. 51, Ward 3, for F. S. Atkins, two-sty dwell., 20' 7" x 34'.

Longwood Ave., No. 120, rear of, for F. Krim, two-sty stable and wagon-shed, 16' x 46'; Jacob Luippold, builder.

West Sixth St., No. 92, Ward 13, for Michael Giblin, three-sty dwell., 22' x 40'; Patrick F. Hanlon, builder.

Medford St., nearly opposite North Mead St., Ward 4, for H. Wood, Son & Co., storage and manufacturing, 25' x 46'; Ira Hammond, builder.

Milton Ave., near Prospect St., Ward 20, for Alexander McKay, two-sty dwell., 20' and 26' x 27' 2"; Alexander McKay, builder.

Vernon St., No. 125, Ward 19, for Geo. Leuth, dwell., 22' x 27'; James Jackson, builder.

Adams St., near Butler St., Ward 24, for James Pope, 2 two-sty dwellings, 23' 6" and 29' x 30'; ell, 16' x 24'; James Pope, builder.

Melville Ave., cor. Alton St., Ward 24, for Arthur H. Vinal, two-sty dwell., 33' x 43' 6"; Arthur H. Vinal, builder.

Lester Pl., near Centre St., Ward 26, for Cyrus W. Cole, 2 two-sty dwellings, 18' 2" x 30'.

Evans St., near Dover St., Ward 24, for Walter M. Donnelly, two-sty mansard dwell., 22' x 30'; Walter W. Donnelly, builder.

Gurney St., near Parker St., Ward 22, for Samuel Rantin, two-sty carpenter-shop, 30' x 40'; Samuel Rantin, builder.

Chicago.

BUILDING PERMITS. — Clara B. Hansbrough, three-sty and basement, brick dwell., 18' x 88', 3027 Michigan Ave.; cost, \$9,000.

Wm. Westlake, 5 two-sty and cellar brick dwellings, 44' x 100', 3704 to 3712 Forest Ave.; cost, \$20,000.

Scott & Gage, two-sty and basement brick dwell., 21' x 44', 450 Wentworth St.; cost, \$4,000.

H. M. Hooker, three-sty brick flats, 62' x 72', 732 to 736 West Jackson St.; cost, \$25,000.

C. Brown, two-sty brick dwell., 22' x 50', Warren Ave., near Kedzie St.; cost, \$2,500.

Dr. E. J. Ogden, one-sty addition to 1636 Michigan Ave., 23' x 40'; cost, \$2,500.

Talbot & Halberg, two-sty and basement brick dwellings, 45' x 74', 188 to 202 Goethe St.; cost, \$20,000.

L. G. Halberg, architect; Lund & Gilbert, builders. James Willard, two-sty brick dwell., 21' x 46', 431 Kendall St.; cost, \$3,500.

S. F. Wolff, four-sty and basement stores and flats, 50' x 100', corner Goethe and Sedgwick Sts.; cost, \$25,000.

John Dieden, three-sty and cellar flats, 50' x 61', 364 and 366 Wells St.; cost, \$15,000.

V. Kontuck, two-sty and basement brick store and dwell., 23' x 76', 614 West Eighteenth St.; cost, \$4,800.

Wilson, Straight, three-sty and basement brick dwell., 48' x 83', 1432 and 1434 Michigan Ave.; cost, \$30,000. Cass Chapman, architect.

Chr. Rhoder, two-sty brick dwell., 22' x 46', 246 Vine St.; cost, \$2,500.

William Wilson, three-sty brick dwell., 20' x 58', 3843 Johnson St.; cost, \$3,500.

Herman Hayes, three-sty brick dwell., 21' x 37', 335 Dayton St.; cost, \$3,200.

J. M. Allen, one-sty cottage, 20' x 34', Wood St. and Webster Ave.; cost, \$3,200.

George Sunderland, two-sty and basement brick dwell., 23' x 80', Forest Ave., near Thirty-seventh St.; cost, \$6,000.

Hannah Busby, five-sty and basement office-building and stores, 58' x 76', 51 and 55 Dearborn St.; cost, \$60,000; Palmer & Spinning, architects; Chas. Busby, contractor.

J. H. Wood, two-sty and attic brick dwell., 26' x 65', 721 West Adams St.; cost, \$9,000.

Thos. Jones and Wm. Grace, 6 three-sty and basement brick dwellings, 60' x 150', 98 to 108 Aberdeen St.; cost, \$20,000.

F. S. Baird, 6 two-sty and basement brick dwellings, 40' x 120', 773 to 783 Walnut St.; cost, \$15,000.

L. Wickersham, three-sty and basement brick store and dwell., 24' x 100', 239 Larrabee St.; cost, \$11,000.

W. Deyo, two-sty and basement brick store and dwell., 25' x 66', 340 West Indiana St.; cost, \$4,500.

M. D. McFadden, three-sty and basement brick dwell., 42' x 50', 185 Rush St.; cost, \$15,000; Cobb & Frost, architects.

M. Foote, 5 three-sty and basement brick dwellings, 33' x 100', 296 to 302 Illinois St.; cost, \$20,000.

Mortimer, Tapper & Co., nine-sty and basement brick office-building, 44' x 78', 187 and 191 La Salle St.; cost, \$100,000; Burnham & Root, architects.

W. W. Evans, two-sty and basement brick dwell., 18' x 65', 562 West Washington St.; cost, \$5,000.

H. Hoepe, two-sty and basement brick dwell., 22' x 56', 730 Wood St.; cost, \$4,000.

Cincinnati.

BRICK. — During the past week there has been a rise of \$1 per thousand in the price of brick in this market. The price now is \$2.50 delivered.

APARTMENT-HOUSES. — Hubert Heuck is building a building on Vine St., near Thirteenth St., for stores and flats, 90' on Vine St., 45' deep, four-sty, pressed brick front; cost, about \$15,000; Geo. W. Rapp, architect.

BUILDING PERMITS. — W. H. Harrison, 7 three-sty brick dwellings and stores, n e cor. McMillan St. and Gilbert Ave.; cost, \$25,000; Samuel Hannaford, architect.

Max A. Fox, two-sty brick dwell., Chase St., near Dalton Ave.; cost, \$2,500.

Herman Lackman, 5 three-sty brick dwellings, Lower River Road, near Railroad; cost, \$15,000.

Seven permits for repairs; cost, \$6,500.

New York.

STORES. — A store, 75' x 120', is to be built on Fifteenth St., on the lot now being cleared, adjoining Tiffany's. It is to be built of brick, with Ohio stone finish. The Van Buren estate are the owners.

Bids are being received for the store to be built on Fifth Ave., between Fifty-ninth and Sixtieth Sts., for Messrs. Park & Tilford.

HOUSE. — For Mrs. Robert M. Reynolds, a house, 18' x 54', is to be built, of brick, with brownstone finish, on the south side of Ninety-third St., 175' w of Eighth Ave., from designs of Messrs. D. & J. Jardine.

BUILDING PERMITS. — Second St., No. 217, five-sty brick store and tenement; cost, \$9,000; owner, Henry Bessler, 718 Fifth St.; architect, F. W. Klem; builder, P. Schauf.

Seventh Ave., w s, 29' 11" n One Hundred and

Twenty-seventh St., 3 five-sty brownstone tenements; cost, each, \$20,000; owner and architect, same as last.

One Hundred and Twenty-sixth St., s s, 210' w Third Ave., five-sty brick tenement; cost, \$15,000; owner, Isaac E. Wright, 1933 Madison Ave.; architects, Thom & Wilson; built by days work.

One Hundred and Twenty-eighth St., s s, 228' e Seventh Ave., 3 four-sty brownstone flats; cost, total, \$90,000; owner and builder, John B. Davis, 236 East One Hundred and Twenty-sixth St.; architect, W. H. Hume.

One Hundred and Thirty-first St., s s, 250' e Twelfth Ave., 3 four-sty brick tenements; cost, each, \$11,000; owner, Charles Borncamp, 170 Robbins Ave.; architect, J. Barrett.

Fourth Ave., e s, 24' n One Hundred and Twenty-seventh St., 3 four-sty brick flats; cost, each, \$18,000; owner, Lawrence Weiher, New Rochelle; architect, Chas. Baxter.

Tenth Ave., w s, 75' s Two Hundred and Fourteenth St., two-sty frame dwell.; cost, \$3,500; owner, Bernard Fellman, 500 Broome St.; builder, G. W. Varian.

Melrose Ave., s s cor. One Hundred and Sixty-second St., two-sty frame dwell.; cost, \$3,000; owner, Mrs. Eliza Rogers, One Hundred Sixty-second St., bet. Courtland and Elton Aves.; architect, M. J. Garvin; builders, F. Garvin & Son.

Southern Boulevard, n w cor. Thompson St., 2 two-sty frame dwell.; cost, each, estimated, \$3,750; owner and architect, James H. Whitelegge, Fordham, N. Y.; builders, Mr. Hargraves, and Joyce & Carpenter.

One Hundred and Thirty-fourth St., n s, 175' e Lincoln Ave., three-sty brick factory; cost, \$5,500; owner, I. E. Baker, 220 East One Hundred and Twenty-fourth St.; architect, Theo. E. Thomson.

Eighth St., Nos. 423 and 425, between Ave. D and East River, four-sty brick factory, tin roof; cost, \$10,000; owner, John Roach, foot Ninth St., East River; builders, R. Shapter and Guy Culgin.

West Thirty-first St., Nos. 244, 246 and 248, 3 five-sty brownstone tenements, tin roof; cost, each, \$17,000; owner, John Smith, 242 West Thirty-first St.; architect, Wm. Kuhles.

East Forty-fourth St., Nos. 6 and 8, 2 four-sty brownstone dwell., tin roof; cost, \$33,000 and \$40,000; owner, Charles Buck, 63 East Forty-first St.; architects and builders, C. Buck & Co.

Forty-seventh St., s s, 100' e Ninth Ave., 13 five-sty brick and brownstone tenements, tin roof; cost, each, \$18,000; owner, Frederick Schuck, 616 East Eighty-fifth St.; builder, J. Brandt.

West Fifty-fifth St., No. 44, five-sty brownstone tenement, tin roof; cost, \$17,000; owner, architect and builder, Wm. Rankin, 306 West Forty-seventh St.

Fifty-eighth St., s s, 250' e Second Ave., 3 five-sty brick tenements, tin roof; cost, each, \$18,000; owner, James Meagher, 282 East One Hundred and Twenty-sixth St.; architects, Babcock & McAvoy.

Tenth Ave., Nos. 522, 524 and 526, 3 five-sty brick tenements, tin roof; cost, each, \$8,500; owner, John Totten, 417 West Forty-sixth St.; architect, C. F. Riddler, Jr.

First Ave., s s cor. Seventy-fourth St., five-sty brick factory, tin roof; cost, \$30,000; owner, John W. Love, 6 Livingston St.; builders, Robert L. Daragh & Co.

Fourth Ave., No. 1250, four-sty brownstone tenement, tin roof; cost, \$13,000; owner, Mrs. Mary A. Foley, on premises; architect and builder, James Judge.

One Hundred and Twenty-fifth St., s s, 90' e Fourth Ave., four-sty brick stores, hall and lodge rooms, tin roof; cost, \$45,000; owner, J. M. Horton Ice Cream Co., 305 Fourth Ave.; architect, R. Rosenstock.

East Eighty-sixth St., No. 103, three-sty brick dwell., tin roof; cost, \$5,000; owner, Moritz Bauer, 207 East Fifty-fifth St.; architect, Paul F. Schoen.

Sixty-fifth St., s s, about 50' w Twelfth Ave., two-sty brick office, slate and tin roof; cost, \$20,000; owner, N. Y. C. & H. R. R. Co.; builder, Joseph Richardson.

Tenth Ave., s w cor. One Hundred and Twenty-fifth St., 5 four-sty brick tenements, tin roof; cost, each, \$14,000; owner, John F. Dunker, 170 Robbins Ave.; architect, James Barrett.

Seventh Ave., s w cor. One Hundred and Twenty-eighth St., 4 five-sty brownstone flats, tin roof; cost, each, \$11,500 and \$14,000; owner, P. Whelan, One Hundred and Thirty-eighth St. and Southern Boulevard; architect, J. F. Burrows.

One Hundred and Twenty-eighth St., s s, 85' w Seventh Ave., 2 three-sty brick dwell., tin roof; cost, \$9,500; owner, P. Whelan, One Hundred and Thirty-eighth St. and Southern Boulevard; architect, J. F. Burrows.

One Hundred and Forty-third St., s s, 445' e Willis Ave., 2 two-sty frame dwell., tin roof; cost, each, \$3,000; owner, H. V. Morrison, Willis Ave., between One Hundred and Forty-second and One Hundred and Forty-third Sts.; architect, R. Rosenstock.

One Hundred and Fifty-ninth St., s s, 200' e Courtland Ave., two-sty frame tenement, tin roof; cost, \$2,500; owner, Rudolph Elsiele, Courtland Ave., cor. One Hundred and Sixtieth St.; architect, J. C. Stiehler; builder, John Freese.

Courtland Ave., e s, 25' n One Hundred and Fifty-seventh St., three-sty frame dwell., tin roof; cost, \$3,500; owner, Peter Helfferich, 314 West Thirty-ninth St.

Philadelphia.

BUILDING PERMITS.—*Palmer St.*, s w cor. Norris St., 2 three-sty dwell., 14' x 28'; Jno. Kuntz, contractor.

Westmoreland St., cor. Frankford Road, two-sty store and drying-room, 30' x 50'; Jno. Cunningham, contractor.

Ninth St., n w cor. Dickinson St., 6 two-sty dwell., 16' x 42'; Jas. McCall, contractor.

Front St., s s, e of Norris St., 2 three-sty store and dwell., 16' x 49'; Geo. Kessler, contractor.

Warneck St., No. 1221, three-sty dwell., 16' x 44'; C. Wilkie, contractor.

Reed St., Nos. 1826 to 1830, 8 three-sty dwell., 16' x 44'; Jos. Stuckey, contractor.

Fifth St., n of Lehigh Ave., three-sty dwell., 18' x 58'; Shogog & Quigley, contractors.

Paul St., No. 4741, two-sty foundry, 50' x 59'; Jas. Comly, owner.

Susquehanna Ave., n s, w of Twenty-ninth St., 2 two-sty dwell., 16' x 44'; Shultz & Gorman, contractors.

Ann St., n e s, w of Frankford Creek, 2 two-sty dwell., 16' x 28'; D. D. Glenn, contractor.

Queen Lane, n e s, e of Thirty-fifth St., two-sty dwell., 17' x 48'; C. C. Linnahan, contractor.

Palmer St., No. 1313, two-sty stable, 24' x 50'; W. H. Rookstool.

Thompson St., n e cor. Palmer St., two-sty store and dwell., 17' x 48'; C. G. Harris, contractor.

Irvine St., n s, rear 3928 Locust St., two-sty stable, 22' x 40'; J. H. Crofode, owner.

North Fifth St., No. 22, five-sty store, 31' x 90'; Henry R. Coulomb, contractor.

James Ave., s e s, between Ridge Ave. and Houghton St., two-sty dwell., 20' x 50'; S. Yardley, contractor.

Eighth St., n e cor. Willow St., four-sty factory, 60' x 125'; Jas. Keely, contractor.

Richmond St., n e cor. Leopard St., three-sty factory, 41' x 98'; Jno. S. Steel, contractor.

Adams St., No. 5321, three-sty dwell., 18' x 45', and one-sty stable, 18' x 22'; W. B. Dewees, owner.

Randolph St., w s, n of Thompson St., 6 three-sty dwell., 16' x 39'; Geo. Snyder, contractor.

Wakefield St., No. 4630, two-sty engine-house, 30' x 35'; Jno. C. Miller, owner.

ALTERATIONS AND ADDITIONS.—*Sixty-fifth St.*, w s, near Pike and Haddington Sts., three-sty addition to dwell. and back building, and two-sty stable, 22' x 26' and 20' x 46'; Lewis Havens, contractor.

South Broad St., No. 256, second-sty addition to hall, 22' x 44'; F. Thron, owner.

Green St., n e cor. Tulpehocken St., one-sty addition to building, 48' x 68'; Geo. Hearst, contractor.

Powder Mill Lane, cor. Frick's Creek, fifth sty addition to factory, 43' x 110'; J. P. Betts.

Clarence St., No. 2064, second sty addition to store and dwell., 18' x 28'; Jas. Hague, owner.

Second St., No. 727, two-sty back building, 14' x 34'; Chas. O'Kronglowicz, contractor.

Wallace St., No. 923, three-sty front building, 16' x 28'; H. W. Vankirk, contractor.

St. Louis.

BUILDING PERMITS.—Twenty-five permits have been issued since our last report, of which eleven are for unimportant frame houses; of the rest those worth \$2,500 and over are as follows:—

Peter Reuber, two-sty brick store and dwell.; cost, \$4,000; F. Mueller, contractor.

J. G. Moser, two-sty brick dwell.; cost, \$8,000; E. Jungensfeld, architect; Charles Wehking, contractor.

H. Schulte, two-sty brick dwell.; cost, \$2,500; C. F. May, architect.

J. Johnson, three-sty brick dwell.; cost, \$5,500; J. A. Conlon, architect and contractor.

J. Johnson, three-sty brick dwell.; cost, \$5,000; T. Manning, contractor.

Dixon & Young, one-sty brick storehouse; cost, \$4,290; C. Aufderheide, contractor.

Mrs. Kate Bergman, two-sty brick dwell.; cost, \$2,800; H. R. Becker, contractor.

Emile Karst, two-sty brick dwell.; cost, \$4,500; Strimple, contractor.

Washington.

BUILDING PERMITS.—The following are the permits issued since last report:—

Joseph Anthony, 2 two-sty brick dwell., 12' x 28'; alley bet. L and M Sts., and Fourth and Fifth Sts., n w; cost, \$1,000.

Thomas Broderick, two-sty and basement brick dwell., 20' x 32'; R St., bet. Twenty-first and Twenty-second Sts., n w; cost, \$2,800.

John T. Cole, two-sty and basement brick dwell., 20' x 34'; M St., near Fifth St., n w; cost, \$3,000.

H. C. Espey, two-sty brick dwell., 21' x 29'; Third St., and I and K Sts., n w; cost, \$2,000.

M. G. Emery, three-sty and basement brick dwell., 24' x 71'; M St., bet. Fourteenth and Fifteenth Sts., n w; cost, \$10,000.

Adolph Ecard, two-sty and basement brick dwell., 22' x 33'; N. H. Ave., bet. M and N Sts., n w; cost, \$4,500.

John Grinder, 2 two-sty brick dwell., 14' x 30', D St., bet. First and Second Sts.; n e; cost, \$2,000.

D. B. Groff, 6 two-sty brick dwell., 15' x 32', cor. Seventh and A Sts., n e; cost, \$12,000.

Hugh McCaffrey, 2 three-sty and cellar brick dwell., 19' 6" x 28', Corcoran St., bet. Fourteenth and Fifteenth Sts., n w; cost, \$5,000.

Thos. McLaughlin, two-sty brick dwell. and cellar, 24' x 36', N St., near Thirteenth St., n w; cost, \$4,000.

Ed. Temple, three-sty and basement brick dwell., 22' x 24', cor. K and Ninth Sts., s w; cost, \$5,500.

Mrs. M. S. Wynne, 3 three-sty brick dwell. and basement, 16' x 36', cor. O and Fifteenth Sts., n w; cost, \$7,500.

The annual report ending June, 30, 1882, shows that 1,731 permits have been issued at an estimate value of \$2,498,968, which includes 560 new brick buildings at an estimated value of \$1,828,443, but does not include house built by the United States or the District governments.

General Notes.

BATH, ME.—The preparation of the foundation for the buildings of the Bath Ship-Building Company is progressing.

DULUTH, MINN.—T. H. Pressnall, dwelling house cost, \$3,500; D. S. Hopkins, architect, Grand Rapids, Mich.

EDGEWOOD, GA.—Frame residence for Geo. Colquith, also one for Mr. McBride.

FAYETTE, MASS.—A new four-sty factory, 168' x 191', is to be built by Messrs. Mawhinney & Co., proprietors of the old shoe factory with which it is connected.

PITTSBURGH, PA.—The plans for a new four-sty

building, 60' x 90', for the Y. M. C. Association, at the cor. of Penn Ave. and Seventh St., have been adopted. James Loughlin, Jr., and Mr. Thomas J. Gillespie were chosen members of the building committee. About \$70,000 has been raised, but \$3,000 more is needed.

SACCARAPPA, ME.—The corner-stone of the new Odd Fellows' Hall at Saccarappa was laid last week. South Framingham, Mass. — A new brick block, which will contain a hall for public uses, will be built at once.

WATERLOO, IA.—Residence for G. H. Whitney, wood frame with brick veneer; cost, \$12,000; Snider & McKay, builders; Josselyn & Taylor, of Des Moines, architects.

WATERVILLE, ME.—At a meeting of the trustees of Colby University it was decided to erect a new building for the Waterville Classical Institute; the cost to be from \$35,000 to \$40,000.

WEST UNION, IA.—Two-sty school-house is building of brick, from plans by Josselyn & Taylor, of Des Moines; cost, \$12,500; Ogsbury & Winrott, contractors.

YONKERS, N. Y.—A stone and wood house is to be built for Mr. F. N. Bangs; from designs of Mr. H. N. Marshall, of N. Y.

A residence is to be built on Broadway, for Mr. Geo. Preene; from designs of Messrs. Stillman & Farnsworth, of N. Y.

PROPOSALS.

SEWERS, WATER-PIPES, ETC. [At Lake View, Ill.]

The Town of Lake View invites proposals for furnishing of the materials and the construction of sixteen hundred (1,600) feet of one-foot pipe sewer; three thousand (3,000) feet of two (2) feet brick sewer; three thousand nine hundred and twenty (3,920) feet of three (3) feet brick sewer; one thousand three hundred and twenty (1,320) feet of four (4) feet brick sewer; and one thousand seven hundred (1,700) feet of five (5) feet brick sewer, in accordance with plans and specifications on file in the office of the Town Engineer, Room 6, 69 Dearborn St.

And also proposals to furnish materials and lay water-pipes in the town of Lake View, in accordance with the ordinance of said town, which requires said pipes to be laid five and one-half (5½) feet deep and sheet piling to be at the expense of the contractor, and the pipes to be insured for six months by the contractor.

The Town Board will open bids at a meeting to be held at 2 o'clock, P. M., October 25, at the town-hall, in said town.

The work will be paid for out of the proceeds of special assessments for that purpose.

The Town Board reserves the right to reject any or all bids.

Sealed bids are to be left with the Supervisor, Town Clerk, or presented at the open board meeting, each bid to be accompanied with a certified check of three hundred dollars, payable to the order of George W. Parkes, Treasurer, to be returned if bids are not accepted, and to the accepted bidder when the contract is signed and bond accepted.

GEORGE W. PARKES, Supervisor.

ROOM 12, 155 LA SALLE ST. 356

LOCKS AND LOCK-GATES. [At Chicago, Ill.]

OFFICE OF THE DEPARTMENT OF PUBLIC WORKS, CHICAGO, October 16, 1882.

Sealed proposals will be received by the Department of Public Works at their office until 11 A. M., Thursday, October 26, 1882, for the construction of a lock, with the necessary cribs, docking, gates and appurtenances, to be placed in the channel of the Illinois & Michigan Canal, near Ashland Ave., in the city of Chicago, according to plans and specifications on file in said office.

Proposals must be addressed to the Department of Public Works, indorsed "Proposals for Canal Lock," and be accompanied with \$500 in money, or a certified check for the same amount on some responsible bank doing business in the city of Chicago, and made payable to the Commissioner of Public Works.

The Commissioner of Public Works reserves the right to reject any or all bids. No proposal will be accepted unless the party offering it shall give evidence satisfactory to the Commissioner of Public Works of his ability and integrity, and that he has sufficient pecuniary resources to fulfil the contract promptly, in accordance with the specifications thereof, if awarded to him. Companies or firms bidding will give the individual names as well as the name of the firm.

DEWITT C. CREGIER, Commissioner of Public Works.

SEA WALL. [New York Harbor.]

U. S. ENGINEER OFFICE, Room 59 Army Building, Corner Houston and Greene Sts., NEW YORK CITY, October 10, 1882.

Sealed proposals, in duplicate, will be received at this office till 12 M., Wednesday, November 22, 1882, for furnishing materials and labor for the construction of a granite sea wall on Governor's Island, New York Harbor. Appropriation, \$39,000.

For information, blank forms, etc., apply at this office.

G. L. GILLESPIE, Major of Engineers.

BREAKWATER. [At Buffalo, N. Y.]

UNITED STATES ENGINEER OFFICE, Oswego, N. Y., October 2, 1882.

Sealed proposals for the extension of the Buffalo breakwater will be received at the U. S. Engineer Office, Oswego, N. Y., until 11 o'clock, A. M., on Wednesday, November 8, 1882.

Proposals must be made in triplicate. Specifications, blank forms, and instructions to bidders may be had on application to this office.

WALTER MCFARLAND, Major of Engineers

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