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A SERIOUS accident occurred last week at Madison, Wisconsin, where the roof and south wall of a wing now being added to the State Capitol fell in without warning, burying nearly thirty men in the ruins. Four of the men were killed instantly, and about eighteen more were fatally, or very seriously injured. No reasonable clue is given in the published accounts to the cause of the collapse, but there seems to be some ground for supposing that the roof failed first, since one of the men who was brought out of the ruins unhurt explained his escape by saying that while at his work, in the basement of the structure, he happened to look up through the hatchway through which materials were hoisted to the roof, and as he did so, seeing the roof move, he leaped under the hoisting-machine, just in time to avoid the shower of timbers and bricks which buried the men working beside him. The contractors for the building profess, probably with sincerity, complete ignorance of the cause of the catastrophe, and an investigation is to be held under the direction of the State authorities, who can, if they really wish, easily discover the origin of an event which, it is safe to say, would not have occurred without an adequate cause.

A LARGE frame building in Buffalo, New York, fell a few days after the catastrophe at Madison, with consequences nearly as fatal, four men being killed outright, and seven others badly hurt. According to some of the daily papers, the structure "collapsed like a balloon," or, as others say, "the supports all gave way at once;" just as if spruce timbers, properly proportioned to their work, were liable to unaccountable attacks of temporary weakness; but a glimpse of an explanation is to be found in a remark that the frame was not braced, although the roof had been put on. With ordinary balloon frames of the cheapest kind, although bracing is dispensed with, the studs are usually boarded in, so as to form a box, before the rafters are set in place; but it is conceivable that a reckless builder might put a bulky roof on top of the unbraced and bare studding, and in such a case nothing more than a high wind would be needed to lay the whole flat on the ground.

A PIECE of unjustifiable carelessness nearly caused the death of two men in Philadelphia a few days ago. Several workmen were employed in taking down the front of a building in the older part of the city, and in removing the wall, instead of lowering the bricks on the outside as fast as they were dislodged, piled them upon the floor behind them. As Philadelphia bricks weigh about five pounds apiece, it did not take long to accumulate a weight of some tons on the middle of the frail beams, which, after supporting it as long as they could, at last gave way, precipitating the whole mass, and the men with it, from the third story to the basement. Fortunately, although two of the men were slightly hurt, no one suffered seriously, and the effect of the crash will be, we hope, only to warn others against similar thoughtlessness. It is by no means uncommon to see masons load the staging planks beside them, or rather, permit their helpers to load them, to the very verge of their strength; and every few weeks even this limit is passed, and one or two victims are sacrificed as a lesson to their fellows.

ANOTHER case in which the New York elevated railways are concerned was decided a few days ago in that city. A certain lawyer bought not long ago an estate on the southeast corner of Greenwich and Rector Streets, by which the elevated tracks run, and in a few weeks after making his purchase brought a suit to restrain by injunction the operation of the road in front of his property. In petitioning for the aid of the court the plaintiff represented that so far as Rector Street was concerned, the fee of the land had never passed to the city, and as no proceedings had been taken by the railroad company to ascertain the real ownership of the land, its occupation of the street was unauthorized, and injurious to his rights, while Greenwich Street, although city property, was so obstructed by the elevated tracks as to have lost a part of its character as a public street, to the further detriment of the rights and privileges belonging to him as owner of the abutting estate. The council for the defendant corporations answered that as the plaintiff was not the owner of the premises at the time when the road was built, and the damages, if any, were sustained, he was not entitled to recover compensation, and, moreover, that as the present corporations only operated the road which was built by another company, they were not liable for the deeds of their predecessors.

THIS plea was at once set aside by the judge, on the ground that the plaintiff did not ask for compensation for the building of the road, but for relief from the injury caused him by the running of trains over it, and reimbursement of the loss which he had sustained in this way since he became the proprietor of the estate. There could be no doubt that an action of this kind could be maintained, and the question was whether the plaintiff actually possessed such rights in the streets bordering on his premises as would entitle him to prevent their use by the railroad companies. This question had been decided by the State Court of Appeals in the case of Story against the New York Elevated Railroad Company, in which it was held that the operation of such a railway to a certain extent impeded the ordinary use of the street, and obstructed light and air, and so far abridged the privileges of abutting owners which were involved in the maintenance of the street as a public way. The fee of Greenwich Street was conveyed to the city in 1761, on the condition that the property conveyed should be held by the city as a public street forever; and the city accepted the conveyance subject to this condition, which, in the opinion of the judge, gave the owners of the adjoining property the right to have the street forever kept open, or to receive compensation for the damage which they might suffer by reason of obstructions placed in it without their consent. It would be within the province of the court to estimate the value of the plaintiff's rights in the street, and to provide in the judgment that if the defendants should pay to the plaintiff the sum so assessed, the injunction asked for by the plaintiff should be denied; but as in the opinion of the judge this would be a favor to the defendants, for which they had not asked, he concluded simply to order judgment for the plaintiff, that, as he requested, the defendants should be enjoined and restrained from further use of his property in Greenwich and Rector Streets, and should pay him damages for their previous use of it at the rate of five hundred dollars a year from the time the plaintiff became owner of the property until the entry of the judgment. In order, however, to avoid needless annoyance to the railroad companies and the public, it was further directed that the injunction should not issue for six months, so as to give the defendants time to acquire the plaintiff's property, or in some way to come to an agreement with him.

A SUIT, somewhat similar in its character to the Elevated Railroad cases, has been brought against the great East River suspension bridge, or rather, against the Mayor, Aldermen, and Commonalty of the cities of New York and Brooklyn, which own the bridge, to recover compensation for the damage caused by it to the business of a certain warehouse man of Brooklyn, who finds that the larger class of ships is prevented from reaching his warehouses, and desires to have it enjoined and abolished as an unlawful nuisance. It is well

known that very large ships cannot pass under the Brooklyn bridge without sending down the upper portion of their masts, and according to the counsel for the plaintiff, about two-fifths of the tonnage entering the port of New York is thus prevented from going above the bridge. That this constitutes an obstruction to navigation sufficiently serious to demand recognition from the courts seems obvious enough, and a decision of the Supreme Court of the United States, which declared a certain bridge over the Ohio River to be such an obstruction, although only seven steamboats out of the two hundred and thirty on the river had smoke-stacks high enough to touch it, certainly confirms this position; but the plaintiff's representations as to the amount of the injury done him appear to have lost a good deal of their force by reason of the circumstance that the main cables of the bridge were put in place several years ago, without any opposition or remonstrance from him, and that, furthermore, although the obstruction remained unchanged during the long period devoted to the completion of the bridge and its approaches, no notice was taken of it until many millions of dollars had been spent upon it, and it was thrown open to public use.

THE Cape Cod Ship-Canal Company has been passing through a trying experience, and it is quite possible that the sufferings which it has undergone may have so reduced its strength that it will succumb to them, and expire quietly, without an attempt to rally. After a series of ostensible attempts at surveying a canal across the Massachusetts promontory, which were, as it is said, merely pretences, devised as a cover for attacks upon the pockets of credulous investors, a new company applied for and obtained a charter last year, under restrictions which were intended by their severity to exclude speculators. Among other things the company was obliged to deposit two hundred and fifty thousand dollars with the State treasurer as a guaranty of its intention to carry on the work to completion; and a proviso was added, that unless twenty-five thousand dollars should have been actually expended upon the canal work before the twenty-sixth day of October, in addition to the deposit of the guaranty fund, the charter should expire on that day. The new company was very slow in getting its affairs arranged, and although the guaranty money was duly deposited, and on the appointed day in October more than four hundred and fifty men were at work on the excavation, there appeared to be some question as to whether the requisite twenty-five thousand dollars' worth of work had been done, and the enemies of the enterprise, of whom the chief is of course the railroad company whose line is intercepted by the canal, promptly challenged the validity of the charter.

THE investigation following, which took place before the Railroad Commissioners, revealed some rather unpleasant traits of human nature. As the forfeiture of the charter was an object much desired by certain persons, a party of experts was sent to the scene of operations on the day fixed for the decision, and the amount of excavation measured, the materials on hand noted, and estimates privately made on which to base a challenge of the charter. The testimony gathered in this way by the experts does not seem, on comparison of their results, to cast much credit on their powers of computation. One of them, who took the trouble to apply a tape-line to the excavation, came to the conclusion that about sixty-three or sixty-four thousand cubic yards of material had been taken out, and that the value of this work, together with that of piles driven and timber on the ground, would amount to something like sixteen thousand dollars. The other, who appears to have measured by his "eye," instead of the more troublesome, but more accurate tape, "judged" that about ten thousand yards of excavation had been done, and concluded that the total cost of the operations should be fairly estimated at about four thousand dollars.

THIS discrepancy, amounting to three hundred per cent, between the valuations of two experts, sent to the spot on the same duty, and in the interest of the same parties, seems to have invited further inquiry, and on pressing the point a little, certain papers were produced, and identified by the second expert as having been written by him, in one of which, sent from the scene of the canal operations, on the evening of the day on which his investigation took place, to the engineer of the Canal Company, he informed the engineer that he "was in possession of the necessary facts, figures and measurements" needed to make up the estimate of the expenditure incurred by the company. "These," he was kind enough to say to his correspondent, he "would hold till he heard from him," requesting him, however, to reply within three days. In order to facilitate the process of arriving at a satisfactory private understanding with the engineer, he was also good enough to draw up an explicit proposition, ready for immediate acceptance, under which he was to be associated with the contractor already entrusted with the work, and a new contract made with the firm for all the excavation, at forty cents per cubic yard, or about twice the proper price; and in return for this favor he promised to "assist," probably out of the wealth of information gathered by the use of his "eye," "in showing the amount expended to date for the purpose of saving the charter." This alluring offer does not seem to have been warmly received by the engineer of the company, and the elastic expert was obliged to carry his valuable testimony to the opposing party.

THE *Fireman's Journal* gives a table, prepared with considerable labor, showing the number of towns in each State, containing more than fifteen hundred inhabitants, which are provided with apparatus for extinguishing fires, and, to compare with this, the number of towns of similar population which are destitute of such protection. As might be supposed, the table shows that the Southern towns are much less generally furnished with fire-engines than those of the North, but this is sufficiently explained, perhaps, by the large territory and scattered population of most places in the South. The most instructive comparison is that between the Eastern and Western portions of the country north of Mason and Dixon's line, and this indicates that the citizens of the new towns of the far West are much more energetic in adopting measures for protecting their property than their Eastern brethren. As an illustration of this, the States and Territories of Nevada, Oregon, Dakota, Idaho, Montana and Washington contain twenty-nine towns of more than fifteen hundred inhabitants, and of these every one has its fire-department, with apparatus for use; while in Massachusetts, out of two hundred and sixty-one similar towns, only one hundred and sixty-four, or about three-fifths, are so provided, and in Pennsylvania and Connecticut the proportion is even less. These are the worst of the Northern States, the ratio of protected towns rising in New York to about two-thirds of the whole number, in New Jersey, Wisconsin and Michigan, to about three-fourths, and in Minnesota, Nebraska, New Hampshire and Ohio to four-fifths or more. The Dominion of Canada, which we are disposed to consider a place of rather primitive manners, is far in advance of us in this respect, the whole Dominion, out of one hundred and sixteen towns of fifteen hundred inhabitants, having but one without a fire-department.

IT is rather difficult, in the midst of so much conflicting testimony, to learn the exact truth about the timber supply of the United States. Not long ago a report, written, we believe, by a Canadian official, announced that at the present rate of consumption the pine lumber of the United States would be exhausted in something more than seven years. As a similar report published last year by a United States official set the limit at eleven years, it would appear either that one of the writers made a mistake of three years, or that a new and extensive demand for the timber had recently sprung up; but a third report, or rather an address, just delivered before the American Forestry Congress at St. Paul, Minnesota, by Dr. George B. Loring, United States Commissioner of Agriculture, indicates that there must have been something wrong about the estimates of both the official gentlemen who prophesied before him. According to Dr. Loring, the danger that the timber product of the United States will be exhausted is much more remote than the speculating holders of forest land would have us believe. Not only, as he says, is the planting of pine trees, and the production of lumber, rapidly increasing in the Eastern States, but even in the forest States of the Northwest so much attention is now paid to replanting the cleared districts that, notwithstanding the enormous consumption, the acreage of woodland steadily increases, and twenty-five years hence the new crop of cultivated forest trees will be, he thinks, more valuable than the original growth. In other States, which were at the time of their settlement by the whites nearly destitute of woodland, great progress has been made in tree-cultivation, and in Minnesota alone nearly forty thousand acres were planted with forest trees last year; while even in Nebraska there are now more than one hundred and seven thousand acres of cultivated forest.

STRAINS IN FRAMED STRUCTURES.[1]

PROFESSOR Du Bois is one of the earlier American workers in the science of graphical statics, a knowledge of which was largely imparted to American architects and engineers by his "*Graphical Statics.*" He now publishes a larger work, having the same objective application, and intended to fully explain the principal methods in use for obtaining the strains in bridge and roof trusses; to compare these methods, showing their relative practical value; to elucidate the proper modes of application to the different type forms of trusses, and to furnish practical information concerning the best methods of computing the sectional dimensions of members required to resist these strains, as well as to explain the usual modes of connecting these members at the joints.

The author appears to be one of the first American writers to appreciate the fact that the following are at least of equal importance.

1. Finding maximum strains in truss members.
2. Determination of sectional dimensions of members, with due regard to economy of material and labor.
3. Arranging the joints or connections so as to obtain maximum strength at least cost.

Most writers stop with the first, coolly telling the student that they will teach him the theory, and that he must get a position in a bridge-works to get the practical knowledge he wants, and to learn how to use the theory. But bridge-building establishments are not educational or philanthropical institutions, and are not likely to employ raw graduates, filled with theories, so long as men possessing a practical knowledge of the subject can be obtained.

The volume, which is a goodly quarto containing nearly 400 pages, illustrated by nearly 300 engravings, besides several folded plates representing the actual working-drawings of a bridge, and is neatly and strongly bound, is divided into two parts, theoretical and practical. An introduction contains the necessary definitions, as well as a statement of the principles of equilibrium of forces and moments on which all methods of obtaining strains in trusses are necessarily based.

Four modes of procedure are given, stated to comprise all that are in use.

1. Resolution of forces; graphical; analytical.
2. Method of moments; analytical; graphical.

A series of axioms or postulates, relating to the manner in which strains act in the members, calls the attention of the reader to some points which are quite essential, though usually omitted. The signs adopted by the author to indicate compression and tension are the reverse of those used by Ritter, Burr, and Landsberg. This change makes no material difference and possesses no evident advantage.

Bow's system of notation is used, though less simple than the one employed by Professor Du Bois in his "*Graphical Statics*," Plate II of Appendix, in which the space above the truss is termed X, that below it Y. The system would be further improved by numbering the triangles of the truss in order, instead of lettering them.

The graphic method by resolution of forces is practically identical with the English method of reciprocals, though less fully developed than in Clarke's "*Principles of Graphic Statics.*"

The check on its accuracy by symmetry of the strain diagram, fails when either truss diagram or the loading is unsymmetrical. A better check is to commence the strain diagram at each end of load line, working toward the centre of truss from each end. If the work is correct, the line joining the two portions of the strain diagram will be parallel to the corresponding line of the truss diagram.

The method of analytical resolution of forces is sometimes termed trigonometrical, because the formulæ contain functions of the angle of inclination of the piece from a vertical. It is merely the analytical expression of the graphical method, being based on the same law of equilibrium of forces at an apex. The application clearly demonstrates the great inferiority of this method to the graphical for obtaining strains in roof-trusses, requiring much more labor and involving greater liability to errors, which are less easily detected. The inclinations of the members can be measured from the truss diagram with accuracy sufficient for practical purposes.

The analytical method of moments is that widely known as Ritter's Method of Static Moments, and a very full development of the system with numerous applications to nearly all forms of framed structures, may be found in Ritter's "*Iron Roofs and Bridges*" (English translation by H. R. Sankey, 1879). The limiting condition of its applicability, that not more than three pieces be cut by any section, in which the strains are really unknown, corresponds to that of the first method, that not more than two unknown strains can be found by means of the force polygon for any apex.

The term "sign" is here misapplied to the lever arm of a strain; it properly indicates the direction of rotation produced by the moment considered.

The rule on page 27, for determining the nature of the strain acting on a piece, is not clearly expressed and would certainly perplex the student at first. The author evidently considers the truss as lying in a horizontal plane, with the observer standing on the end of the cut piece considered. If the truss be erected in place and be in a vertical plane, the axis of the observer would then be horizontal and at right angles to the plane of the truss.

The nature of this strain may also be found by assuming that the strain acting in the cut piece considered, and producing equilibrium in left-hand part of truss, always acts from right towards left side of the line of section. Then write out equation of equilibrium of moments for the piece, prefixing to each moment its proper sign of plus or minus, according as it tends to produce positive or negative rotation. Reduce this equation to its simplest form, having symbol of required strain on left-hand side, with plus sign; its amount will be found on right side, preceded by the sign correctly indicating whether the strain be compression or tension.

The time required for application of this method to a given truss can be greatly reduced by measuring the required lengths of lever arms on a correct truss diagram, instead of finding them by calculation; also, by performing the necessary computations for simplifying the equations of moments with a good slide-rule, or four-place logarithms.

The graphic method of moments is merely an application of Culmann's principle. The bending moments and shears acting at any point of the length of the truss are found graphically, and the actual strains in chords and web members are found from these by simple computations.

The application of the four methods conclusively proves that the first graphical method is best adapted to obtain the strains in a roof-truss, because requiring a very small amount of computation, besides being controlled by a system of checks on its accuracy. Ritter's method of moments is next best, especially if lengths of lever arms are measured on a truss diagram. These two methods are perfectly general, being applicable to all forms of trusses and modes of loading, even by inclined forces. The other methods are sometimes of great value in obtaining strains in members of bridge-trusses, especially when the chords are parallel.

In Chapter I of Section II the general subject of roof-trusses is considered. No explanations are here given of the proper method of estimating the loads on a roof-truss, a very essential point. Two formulæ are provided for finding the wind-pressure normal to the roof-surface, with a table computed from Hutton's formula, for angles of inclination varying by differences of five degrees, but without suggesting any method of interpolation for intermediate angles. Hutton's formula is empirical, deduced from experiments made in 1786, 1787 and 1788, with a whirling-machine.[2]

This formula is evidently incorrect, yet is the one most commonly employed by English and American constructors, merely because this subject has been neglected by scientists until very recently.

A second formula is proposed for the same purpose, but the discrepancies between the two are certainly very remarkable. Assuming that the maximum wind-pressure on a plane surface perpendicular to its direction is 50 pounds per square foot, and performing the necessary computations, we obtain the following results.

Angle of inclination: degrees,	5	10	15	20	25	30	35	40
Hutton's formula: nor. press. lbs.,	6.5	12.1	17.5	22.9	28.1	33.1	37.6	41.7
Second formula: nor. press. lbs.,	.4	1.5	3.4	5.9	8.9	12.5	16.5	20.7
Degrees,	45	50	55	60	65	70	80	90
Nor. press. lbs.,	45.1	47.6	49.5	50.0	50.7	51.5	50.5	50.0
Nor. press. lbs.,	25.0	29.4	33.6	37.5	41.1	44.2	48.5	50.0

No mention is here made of the proper amount to be allowed for the weight of snow, though two authorities are quoted on page 263, as recommending 12 and 30 pounds per square foot. Nor is anything said of the manner in which this snow-load per square foot is affected by varying the angle of inclination of the roof. It is plainly evident that the actual maximum snow-load would also vary with the latitude of the locality, being greatest in the Northern States, a moderate amount in the Middle States, while it should be entirely omitted in the Southernmost States. Data could be obtained from the Signal Service Bureau, on which to base an approximate formula for the proper amount of snow-load, varying with latitude.

The author assumes that the maximum wind-pressure may act on a roof at the same time that it supports a maximum snow-load; but it is scarcely possible for snow to remain on the windward side of a roof, exposed to the action of a hurricane having a velocity of over 140 miles per hour, according to the author's formula. This assumption involves an excess of material in principals and tie-beams that would hardly be tolerated in bridge-building. If the maximum weight of snow were to remain on the leeward side of the roof, as assumed by the author, its weight would partly counterbalance the action of the wind, lessening the distortion of the truss, and the

[1] *The Strains in Framed Structures*, with numerous practical applications to Cranes; Bridge, Roof and Suspension Trusses; Braced Arches; Pivot and Draw Spans; Continuous Girders, etc. Also, Determination of Dimensions and Designing of Details; Specifications and Contracts; Complete Designs and Working-Drawings. By A. Jay Du Bois, C. E., Ph. D. John Wiley & Sons, New York: 1883. Price $10.

[2] *Hutton's Tracts on Math. and Phil. Subjects.* Vol. III, London: 1812.

strains in the diagonals and verticals would actually be less than if the snow were omitted.

Our author directs the reactions at ends of truss to be found by calculation, ignoring the beautiful application of the equilibrium polygon, discovered by Major J. R. Willett, of Chicago, applicable to any truss and any mode of loading. (*American Architect*, Vol. III, pp. 30, 41, 55.)

Two cases are considered.

1. Truss anchored at ends to each wall.
2. Truss having expansion-rollers under one end.

It is evident that the entire vertical component of the reaction at either end must be supplied at that end alone, by the upward pressure or assistance of the wall. Consequently, only its horizontal component is capable of transmission through the truss to the other wall. In case of a large church with high walls, not stiffened by transverse partitions, and exposed to the action of the wind, this pressure would act on the wall as well as the roof. Even if the truss were anchored to each wall, if the overturning moment of the wind-pressure on the wall just equals the moment of stability of the wall, the horizontal component of the reaction at windward end of the truss must be entirely resisted by the leeward wall, just as if rollers were placed under the windward end of the truss. For simplicity, the frictional stability of the wall is neglected, as well as the stiffening caused by the rafters and boarding of the roof. If the wind-pressure on the wall be now increased, it appears that one-half the total additional pressure on one bay of the wall would also be transmitted through the truss to the leeward wall. This increase of pressure might be supposed to continue until the total overturning moment of the wind equalled the moments of stability of both walls, when the building would be on the point of falling.

Hence, it becomes evident that the two cases considered are not always sufficient, and that the wrought-iron tie-rod of a truss might even be subjected to compression, causing the collapse of the truss and fall of the roof, when apparently safe.

Some plates of truss and strain diagrams, copied from Bow's "*Economics of Construction*," are then added without explanation.

Nothing is said of the mode of dimensioning the members of roof-trusses, other than the system afterwards given for bridge-trusses, nor are there any descriptions or illustrations of the joints of roof-trusses, which are usually quite different from those of bridge-trusses.

To architects, the chapter on roof-trusses would be the most interesting and useful portion of the book, were not the mode of treatment employed so defective and incomplete. It may be possible, but it is not very probable, that a student could learn to correctly design and detail roof-trusses from the data and explanations to be found in this work. Professor Greene's little book "*Roof-Trusses*" is a much better presentation of the subject, though limited to the use of a single method.

The subject of bridge-trusses is next considered, with the usual explanations, and a discussion of the modes of distribution of the load, which produce maximum strains in the upper and lower chords, and in the web members.

Chapters IV and V are devoted to a consideration of the principal type forms of bridge-trusses, with applications of one of the four methods, Ritter's method being principally employed. Some types are new to works of this kind. The Fink truss differs from those given by Trautwine, Wood and Shreve in having alternate verticals only half as long as the intermediate ones. In the truncated bow-string truss, the panel lengths are sometimes diminished from the middle towards both ends, as in the Randolph Street bridge, at Chicago.

The author arranges the principal types in the following order, from best to poorest: Pratt, Post, Kellogg, Baltimore Bridge Co., Fink, Bollman.

Some interesting sketches of forms of beams of uniform strength are added, as well as two very valuable tables, not often found in American works, and similar to those in Brandt's "*Eisen-Constructionen*," Reuleaux's "*Constructeur*," Clarke's "*Graphic Statics*," "*Ingenieur's Taschenbuch*," etc.

The first table contains sketches of most common forms of section of beams and columns, with formulæ for their sectional areas, moments of inertia, and distances from neutral axes to most distant fibres of the sections. The value of this table is increased by the fact that the more recent formulæ for wrought-iron columns and struts contain the radius of gyration of the cross-section, equal to the square root of the quotient of its moment of inertia by its area.

The theory of flexure is applied to beams supported and loaded in various ways, and the special formulæ and results obtained are arranged in a second table of even greater value. This contains a sketch illustrating the mode of support and of the loading, the general equation for bending moment, equation of elastic line, breaking load, and relative strength of beam, with a diagram showing the manner in which the values of the bending moments vary from end to end of the beam. This table comprises just the data required in practice, very conveniently arranged for convenient reference and comparison.

In Chapter IV is to be found a general graphical method for obtaining the numerical value of the moment of inertia of any given cross-section, as well as the position of its centre of gravity. The reader should remember that the sections shown are at right angles with their actual positions, being rotated ninety degrees to the left. The method here given is theoretically correct, but quite complex in application, and there is considerable liability to error in computing the radius of gyration of each slice or lamina of the section. Practically, the much simpler process usually found in works on graphic statics will be found preferable, since the results obtained closely approximate the true values, if the method be properly applied. The laminæ should be taken as thin as possible, the equilibrium curve substituted for the polygon first obtained, and the area between this curve and its end tangents may then be readily found by means of a good planimeter (Clarke's "*Principles of Graphic Statics*," p. 112).

Part II of this work is devoted to explanations of the proper methods of computing the sectional dimensions of truss members from the strains acting upon them, with an examination of the different modes in which the members of trusses are connected together, which is supplemented by lists of the elementary parts of bridges, and a complete design of a given bridge, comprising all necessary papers and drawings.

Dead loads and wind pressures are first considered, especially for bridges, with tables of amounts of live and dead loads, weights of roof coverings, of trusses and bridges of various spans, with formulæ for approximate weights of trusses by Trautwine, Stoney, Rankine and Unwin.

Buck's method of making allowance for weights of the members themselves, by increasing their sections, appears to be new, and will be found very valuable in practice, because it is so easily applied.

The author very properly remarks that the determination of sectional dimensions of pieces is of equal importance with finding the strains acting on them, though this is usually ignored by most writers. Valuable data have been collected from various authorities, and a very convenient table of maximum permissible strains in compression, tension, and shear is given from members of wrought-iron bridge-trusses.

The formulæ for hollow cylindrical columns of cast and wrought iron are of the form known as Gordon's, though containing numerical coefficients differing materially from those given by Wood, Trautwine, Rankine, etc. The formulæ for "Square," "Phœnix," "American" and "Common" (I) columns are identical with Whittemore's (Trautwine's "*Civil Engineer's Pocket-Book*," p. 233).

The formula for latticed wrought-iron columns is considerably different from those proposed by Professor Burr (*Papers P. E. Sci. Soc.* II, No. 5).

The mode of application of these formulæ is not explained, though this is likely to perplex the student at first.

The author appears to entirely ignore the great progress made during the past five years in the study and use of wrought-iron columns and struts, and their appropriate formulæ, for no mention is made of the following, or any use made of the valuable results obtained:—

The very valuable experiments made by Bouscaren on different types of wrought-iron columns and bridge struts of full size (*American Architect*, Vol. XI, p. 114).

The excellent series of formulæ deduced from the results of the preceding experiments by Professor Burr (*Papers P. E. Sci. Soc.* II, 2.)

Experiments on full-size Phœnix columns by United States testing-machine, at cost of Clarke, Reeves & Co., and discussions of these experiments (*Trans. Am. Soc. Civ. Eng.*, February and March, 1882).

Experiments on wrought-iron and steel by United States Board.

The Rational Formulæ for Bridge Struts and Columns, deduced by original investigations, by Professor Robinson (Van Nostrand's *Scientific Series*).

It must certainly be presumed that the author is well acquainted with all these results, and it is rather surprising that they are not used in the work. It is evident that the treatment of the subject of columns is defective, being at least five years behind the best American practice, a grave fault in a text-book.

Chapter III comprises examples of the mode of computing dimensions of floor-beams, their flanges, webs, and riveting; suspenders; eye-bars or links, and diameters of pins.

It is stated that steel pins should have about four-fifths the sectional area, or seven-eighths the diameter of those of wrought-iron for similar strains, making them rather larger than is usual in practice (Carnegie's "*Pocket-Book*," p. 236).

Tables for diameters of pins, thickness of end bearings, as well as for rivets, are added from Carnegie's "*Pocket-Book*." The rules for riveting are from Rankine's "*Applied Mechanics*," p. 299. No mention is made of steel rivets, or of the common practice of diminishing the spacing of rivets from middle to ends of built beams, a point of considerable importance (Burr's "*Stresses*," p. 309).

Chapter IV contains numerous illustrations of the joints of bridge-trusses used by the best bridge-building establishments. It is abundantly illustrated by geometrical and by several isometrical views of joints, and is simply indispensable to the student and bridge-engineer, forming one of the most valuable features of the book, far more valuable than anything heretofore published on this subject.

In Chapter V is to be found a detailed explanation of the routine method pursued in designing a bridge, making out the strain-sheet, bill of materials, estimate, shipping bill, and full general and detail drawings. The system is applied to an actual example, with a full and complete set of papers and drawings, and its importance to the student can hardly be over-estimated, since it gives a full description of the routine methods for saving labor and insuring accuracy, actually employed in a first-class bridge-works, a kind of information which has rarely been accessible to persons not actually employed in such establishments.

The last chapter contains forms of advertisement for proposals, proposal and bond, contract and specifications, with a general specification for bridges of wood, wrought-iron and steel. This general specification largely embodies the practical data and formulæ previously given, in a condensed form and arranged for easy reference, as well as to prevent omissions in writing out specifications. It is really a condensed treatise on bridge construction, and well repays close study.

Much may also be learned from it in regard to the proper mode of inspecting and testing the materials supplied by the contractor.

In conclusion, we may say that the work cannot be recommended as being likely to give all the information required by the architect for designing roof-trusses, though much of the data given for dimensioning bridge-trusses is equally applicable to roof-trusses; but the modes of connecting the truss members are essentially different in roofs and bridges. Still the great quantity of valuable data, formulæ, tables and general information contained in the work will be worth to the architect many times its cost for general purposes.

But it will be found indispensable to the bridge engineer, to the student desirous of mastering the details of bridge construction, and to the architect, who may be called on to construct trusses of forms similar to those of bridges, since, in spite of the defects here noted, it is undoubtedly the most valuable work on bridge construction ever published in this country. It is to be hoped that its defects may be remedied in a second edition.

RECENT BOOKS ON ART.

STATUE of MICHEL ANGELO by OTTAVIANI
MUNICH ART EXHIBITION ROME.

THE attention of art students should be called, I think, to a series of small handbooks now publishing in French by Quantin, of Paris. It is ultimately to consist of one hundred volumes, published at a uniform and very cheap rate, is called the *Bibliothèque de l'Enseignment des Beaux-Arts*, is issued under the patronage of the Administration des Beaux-Arts and numbers amid its authors most of the many well-known names in French criticism. It is to embrace a certain number of the "general treatises" dealing with the different arts in a cursory but comprehensive way, and a larger number of volumes devoted each to some special craft or subdivision of a craft. The volumes thus far published vary in value, but taken together amply justify one in praising the series as a whole.

Among the latest are two on engraving—one, "*La Gravure*," by Vicomte Henri Delaborde, which is a history of the art, and the other, "*Les Procédés de la Gravure*," which is a technical treatise and is written by Alfred de Lostalot, editor of the *Gazette des Beaux-Arts*. Strangely enough these volumes, which from the character of their authors we might have expected to be very good, are much the poorest thus far issued. If none of their companions had been more successful the series would not have been worth our notice. To begin with, a subject which is and must be one and indivisible has been arbitrarily cut in two. It is impossible, especially in books intended, as are these, for beginners, to discuss the history of engraving without referring to its processes; impossible to describe its processes without citing the facts of its history. In their desire not to encroach upon one another's ground the authors have made their several volumes fragmentary, disjointed, and, I should think, almost useless to the youthful scholar; but besides this, the volume of M. de Lostalot, who by the nature of his main occupation in life should be thoroughly familiar with the processes of engraving, is so confused, so injudicious in arrangement and often so mistaken in matters of fact as well as of taste that we marvel at its issue from a French press. It is particularly lacking in the qualities so constantly found in French criticism that we grow to believe them a necessary factor therein, grow to expect them on every occasion as we do not in critical works in other languages — in the qualities of clear vision, logical reasoning, and precise, definite, systematic presentation. Nor is Delaborde's history of the art much better in arrangement or in judgment. The engravings are necessarily poor in all the volumes — it would not be easily possible to give good cuts, even of mechanical sorts, in any profusion at the price of four francs for a bound volume. In most of the books the poor pictures do not greatly trouble us — we accept them for what they are, as signs merely and rough symbols of the works discussed. But when it is a fine *engraving* that the very poor engraving pretends to show, the discrepancy afflicts us more.

It is a pleasure to turn from these unsuccessful volumes to the others thus far issued, all of which merit praise, but of only two of which, the latest and I think the best, I have space here to speak. One of these is the sketch of English painting by M. Chesneau. It is of peculiar interest to American readers, for these are usually not very well acquainted with its products themselves, and can turn to no complete and systematic account of it in their own language. Even had such been now written for us by an Englishman it would most likely be less satisfactory than the present volume; for as English critics show themselves in their many more fragmentary essays on the subject, they write usually from a very narrow standpoint, are insular, and not cosmopolitan in their taste, and are either unable or unwilling to judge native products by any extraneous standards. English critics have found much to object to in M. Chesneau's criticism, but it is not by that proved less true or less valuable. The author wrote some years ago a similar treatise in another form which was much more condemnatory of the school than this later volume, but even this — the fruit of many years of study and of a keen and, it seems to me, just and impartial taste — is not flattering enough to suit the English view of English art. It is therefore, I repeat, a very valuable contribution to our knowledge of the subject, correcting and modifying the exaggerated idea about English painting, past and present, which we derive from English writers — doing for us what we must do for ourselves when we first see the works of the school after having read about them in the pages of a Ruskin or even of a Hamerton.

The reader who goes to London with M. Chesnau to guide his anticipations will have a far less frightful disenchantment in prospect than he who goes filled with a memory of these panegyrists. He brings no violently French prejudices to his task and can appreciate the good he finds whether it is of the sort to which he has been used at home or not. But he speaks from the point of view of a Continental critic, which is, I need hardly say, almost antipodal to the point of view of his British brother. That is, he looks at art from an artistic — a pictorial and technical — standpoint and not from a literary, moral or sentimental one. He ranks first the qualities which the typical English critic ranks last or ignores entirely, so it is not strange if his verdicts, general and particular, should often be a reversal of those we have been used to reading. His sketch is of necessity brief, but it is well ordered, clear, and comprehensive. With great good taste he speaks in detail of the most typical personalities on his list and passes over with briefer mention those which may be as well known to local fame but are intrinsically less important. The really great men of past days — such as Reynolds and Gainsborough — he praises as they deserve, and his analysis of such a man as Hogarth is as acute as instructive. To Blake I think he hardly does the justice he might in even the few lines he devotes to him. But this would have been too much to expect from any Frenchman, however acute, however catholic. A German critic would do better here, and it would be interesting to have the verdict of such a one to set against the over-praise recently bestowed upon Blake by his own countrymen. The recent school is wisely judged and not without sympathy and admiration; and a final chapter speaks of caricature and the work of the latest school of illustrators, lauding Miss Greenaway, Caldecott, and the rest in a way that must satisfy even their English admirers. It is a pity, I think, this little book cannot be translated into English. I am told that so little interest is taken here in English art that it would not be worth a translator's while to undertake the task; but if this is so it speaks badly for the status of our art students and amateurs.

The other volume to which I have referred is a History of Tapestry by one of the best known and best equipped of French critics—M. Eugène Müntz. Nothing could be clearer, saner, more complete and satisfactory than this little treatise, which should find good audience in this country now that so many examples of ancient tapestries are being yearly brought here and exhibited in various places. M. Müntz is a little hampered at the outset of his task, for the early history of tapestry — which is the art of *hand weaving* in colors, and is distinct on the one side from embroidery and on the other from the mechanical work of the loom — is so closely bound up with these two allied branches that it was difficult for him to speak of it clearly without trespassing on ground that is to be occupied by other writers in forthcoming volumes of the series. In his desire to avoid this trespass and yet speak of ancient works which we know through written descriptions only, and which *may* have been tapestries but cannot be proved to have been such, M. Müntz is sometimes a little fragmentary, and, what is always disagreeable to the reader, a little apologetic in his style; but after the first chapter, when he stands on the proven ground of his own special branch, no one could be more clear and delightful. The illustrations, too, are less inadequate than in any of the other books. While full of enthusiasm for his subject M. Müntz does not fall into the error so dangerous to writers on special and limited topics. He does not unduly exaggerate its relative importance or admire indiscriminately all its essays, or judge them from the point of view of the antiquary or collector rather than of the art-critic. That the works of a certain period are rare is no merit in his eyes—it is beauty alone for which he looks. And his estimate of the beauty of the products of different lands and different times is regulated by a keen sense of the requirements of this especial art and not by any general reputation gained perhaps in quite other branches. He is not constrained, for example, by the fame of Raphael and of his thrice-celebrated cartoons to give the

tapestries woven therefrom the highest place among their fellows. He criticises them very justly and shows why and how they are inferior *as tapestries* to many earlier and many later works. Nor does the vogue of the French factories in the last century lead him to undue praise of what was really a decadent phase of the art. And, best of all, he is unsparing in his condemnation of the present products of the state factories in their inane attempts to achieve the results of pictorial methods instead of those equally artistic and equally splendid results which are proper to the tapestry-maker's art and to it alone.

The historical paragraphs of his book are as interesting as the critical, and not only give us instructive glimpses both into the ways and manners of the artisans of different periods, but show in a way that will, I am sure, surprise most of his readers, the immense extent to which the art was practised in mediæval and Renaissance days, the high esteem in which it was held, and the way it stood actually side by side with the painter's art in the judgment of purchasers and artists. The facts and figures and lists he gives are of extreme interest, and should attract to the volume those who wish to get a fresh glimpse at the civilization, the tastes and the manners of past epochs, as well as those who are specially concerned with the art of which he treats. Constant and useful reference is made on almost every page to authorities who will carry the reader farther than M. Müntz can take him in this little book. And another source of surprise, perhaps, will be the knowle lge here gained of the immense number of books that have already been written in French on this one subject — a subject which we might suppose, too, of not the most general interest. It is only one sign of the richness of the French in critical writers, and of the vastness of the public to which these can safely appeal. Contrasted with the poverty of English-speaking countries in both these respects the difference is enormous. No reader of this book who remarks the profusion of the references and quotations will doubt that to know this or any other branch of art or archæology, it is to-day as necessary for the student to acquaint himself with the French language as it is for the budding theologian to study German. And the mass of critical art-writing annually published in Paris is in no greater contrast with the amount of that published in London, than is its quality with the quality of the latter. Mr. Bouton is the agent for these useful little books in New York. It is to be wished that they might be more widely offered for sale, and more widely read, than has yet been the case.

M. G. van Rensselaer.

MR. BOYLE'S INDIAN GROUP.

It is not very often that one feels called upon to direct, however modestly, the attention of any but the most limited and local of publics to such works of art as the average private patron is accustomed to select as a monument of his generosity and public spirit on the one hand and of his fostering care for the arts on the other.

The public places of American cities have, for the most part, a sorry tale to tell of the treatment to which they have been subjected by this class of eminently respectable and well-meaning persons, and here in Philadelphia the evil has grown so great that instead of a society for promoting the erection of memorials, like that in Boston, there is actually a systematic effort making to remove the eye-sores, in the form of fountains chiefly, erected at considerable expense by those kindly but misguided spirits of another age, who, for all their good intentions, do not seem to have been exactly commissioned by it as apostles to our own.

Occasionally, however, this irresponsible kind of liberality is more fortunate, and of this happier choice Mr. Boyle's group is certainly an admirable example. The group is of bronze, and is destined for Lincoln Park, Chicago. It is the gift of Mr. Ryerson, a gentleman sensible enough to give the commission to a young and, at the time, comparatively unknown artist whose only claim was that he had done good work. Not much of a claim, you will say, and about the last to be recognized in the giving of commissions, but as I said before, this is an exceptional case.

The group, as it stands, is not only by all odds the strongest piece of modelling that has ever been done in Philadelphia, it is, in my opinion, the first instance of a successful grappling with the Indian question in American art. The Indian who is here presented is not the theatrical figure who has paraded so long in his wretched toggery of wampum and war-paint, but neither is he the ignoble and skulking creature which just at present it is the fashion, in certain very influential quarters, to make him out to be.

So essentially modern is the work throughout; so free is it from the conventionalities and make-believe classicalities which have done duty in sculpture so long after being rejected by the painters, that perhaps the first strong impression which the observer receives is that of humble and faithful study of nature; of fidelity, in even the smallest details, to well chosen, but by no means exceptional models.

The principal figures might be, and probably are, thoroughly honest portraits — neither more nor less, (they do not seem to be less and we are fast learning to feel that it is not possible for them to be more,) — but in the dignity of its conception and the masterly way in which it has been worked out, the group stands for much more than this: it stands for, and embodies, the idea of the race and its experience. Its attitude is that of expectancy — it is hardly one of welcome on the part of the man at least, though there is neither fear nor defiance in his face, and he carries no weapon more formidable than a pipe, and though the woman's look is kindly and hospitable; but the man's face is full of distrust, and it is evident enough that the visitor who is approaching is white and that he is not much of a stranger any more. The contrast of the masculine with the feminine attributes, is admirably preserved throughout and makes one of the principal charms of the composition. The woman's figure has a soft and clinging quality with all its evidences of ungentle experience, while the man, peace-pipe or not, is unmistakably alert and on his guard.

The weak points of the work, if one can be ungracious enough to note them, are undoubtedly to be found in the dog and the papoose. The faults of these are insignificant, perhaps, but one cannot help regretting that the baby was not made a little more interesting, and the unity of the impression certainly suffers from the fact that the dog, more vigilant even than his master, is not looking in the direction from which the stranger is evidently coming.

The height of the principal figure is six feet eight inches, and that of the group is seven feet eight inches. It is to rest on a granite pedestal about ten feet high in the die of which are to be set four bas-reliefs, also in bronze, illustrative of Indian life and customs. These bas-reliefs are still in the sculptor's hands, but one, "The Corn Dance," is already cast and is certainly a very spirited performance. If the three others are as good as this the whole will form an extremely interesting series.

L. W. Miller.

THE ILLUSTRATIONS.

HOUSE ON A TWENTY-FOOT LOT, CINCINNATI, O. MR. CHARLES CRAPSEY, ARCHITECT, CINCINNATI, O.

THIS dwelling has just been completed for Mr. Joseph C. Harrell. The lot is on Ninth Street near Mound Street, and is 20 feet front by 100 feet deep to a 15-foot alley. The front is laid up with Zanesville red pressed-brick with black mortar, sunk joints. The inside is finished in white-pine, varnished. The total cost is $6,800.

A BRONZE GROUP OF INDIANS, FOR LINCOLN PARK, CHICAGO. MR. JOHN BOYLE, SCULPTOR, PHILADELPHIA, PA. DRAWN BY MR. JOSEPH PENNEL.

See the preceding article.

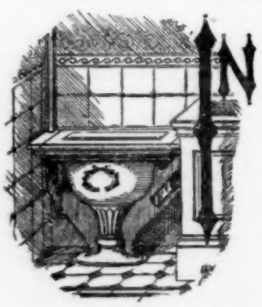
THE U. S. COURT-HOUSE, MINNEAPOLIS, MINN. MR. JAMES G. HILL, ARCHITECT, LATE SUPERVISING ARCHITECT OF THE TREASURY DEPARTMENT.

OFFICES AND KEEPER'S LODGE, ALBANY CEMETERY, ALBANY, N. Y. MR. R. W. GIBSON, ARCHITECT, ALBANY, N. Y.

THE SNEER BUILDING, DES MOINES, IO. MESSRS. FOSTER & LIEBBE, ARCHITECTS, DES MOINES, IO.

SANITARY PLUMBING.[1] — IX.

THE "SELF-SEALING" CLOSET. — GENERAL CONSIDERATIONS.

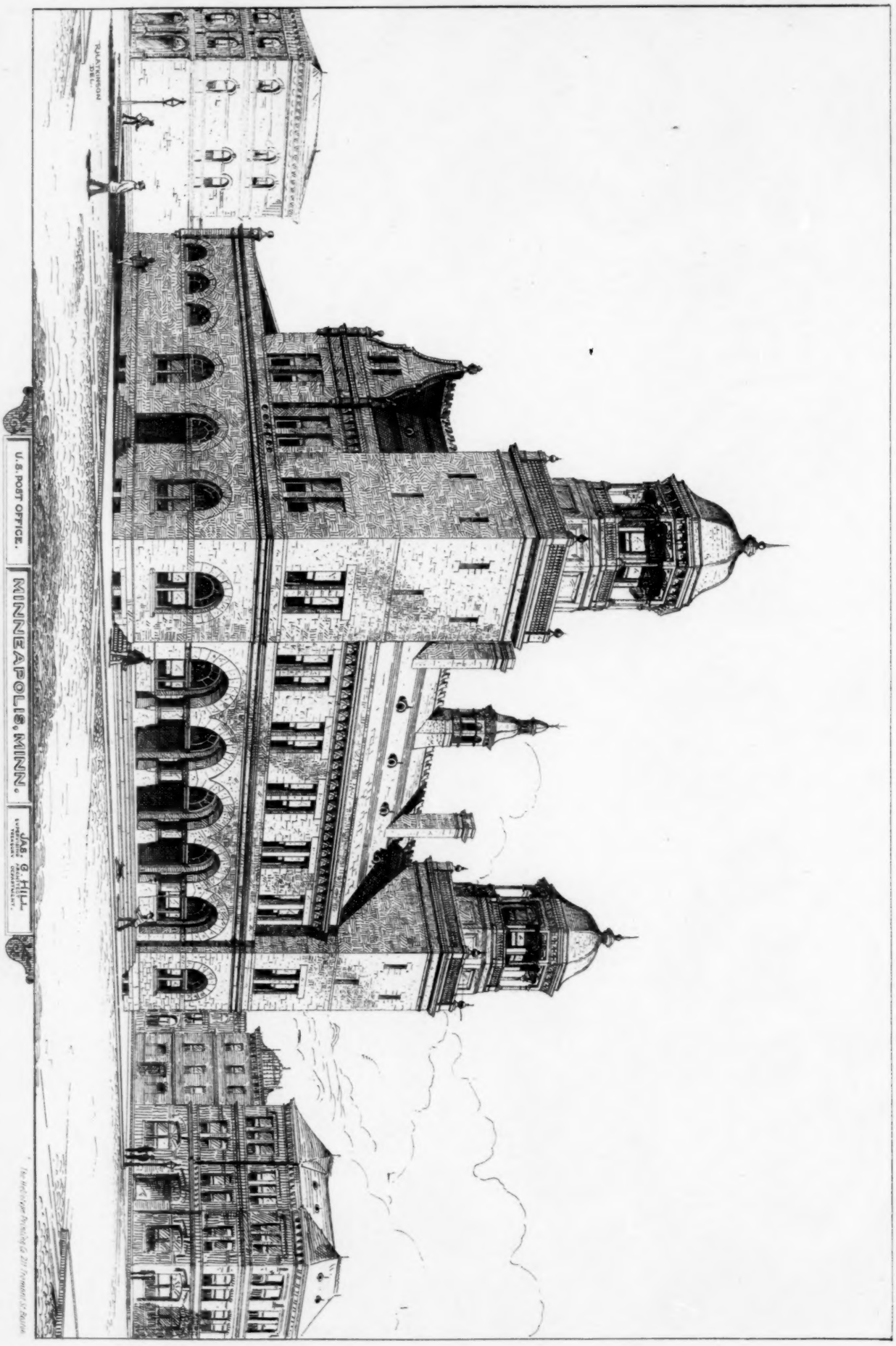


ORDER (1) to secure a rigid, safe and durable *connection* with the supply and waste pipes, we cannot rely upon a material so brittle and treacherous as earthenware, or anything resembling it. The joints have to be screwed together with strong bolts, under powerful leverage, and with no delicate hand, if we wish to obtain a permanent tightness which shall withstand the jarring and shrinkage of the joists and the pressure of the water.

A plumber is always fearful of breaking the flanges of crockery in screwing up the joints, and the result is they are never as tight as they should be. Metal alone has the strength requisite for this purpose, and the metal at the joints should be firmly connected with the body. The water-closet should therefore be framed in iron. Properly arranged, this form of construction does not greatly increase the cost of manufacture, as will be seen.

(2) To secure *noiselessness* is a more difficult problem. How shall a stream of water be brought to bear upon the standing water and

[1] Continued from page 225, No. 411.

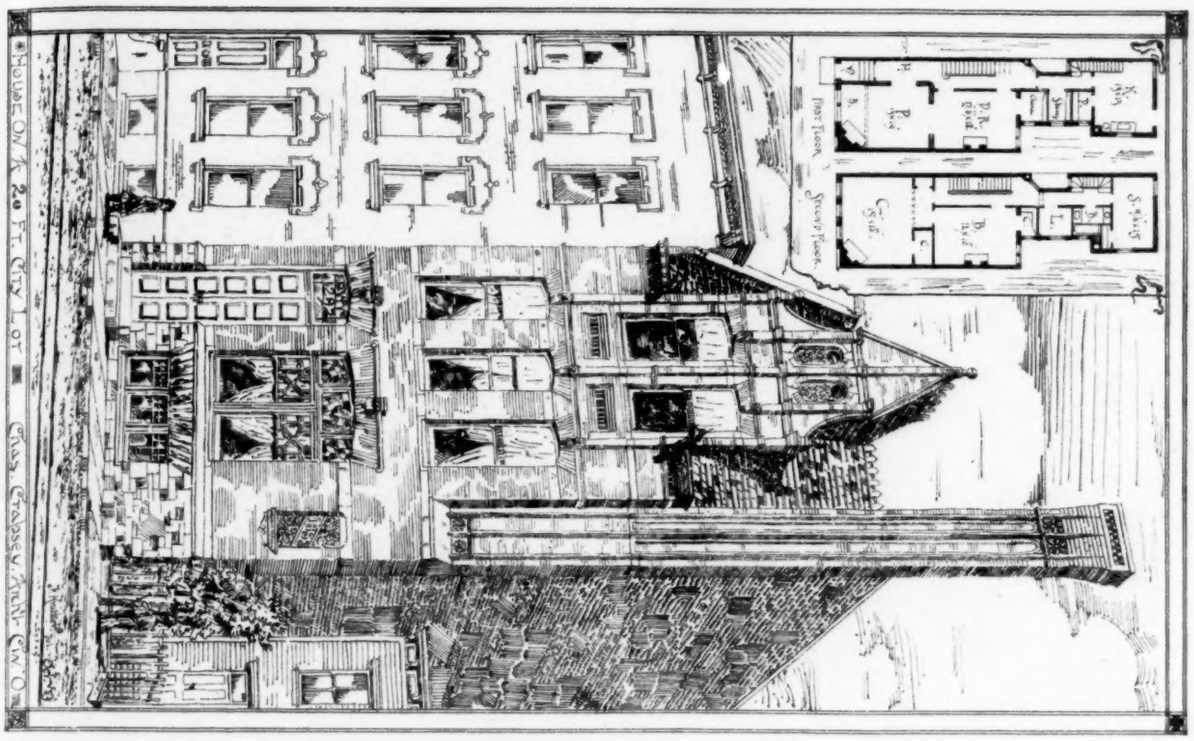


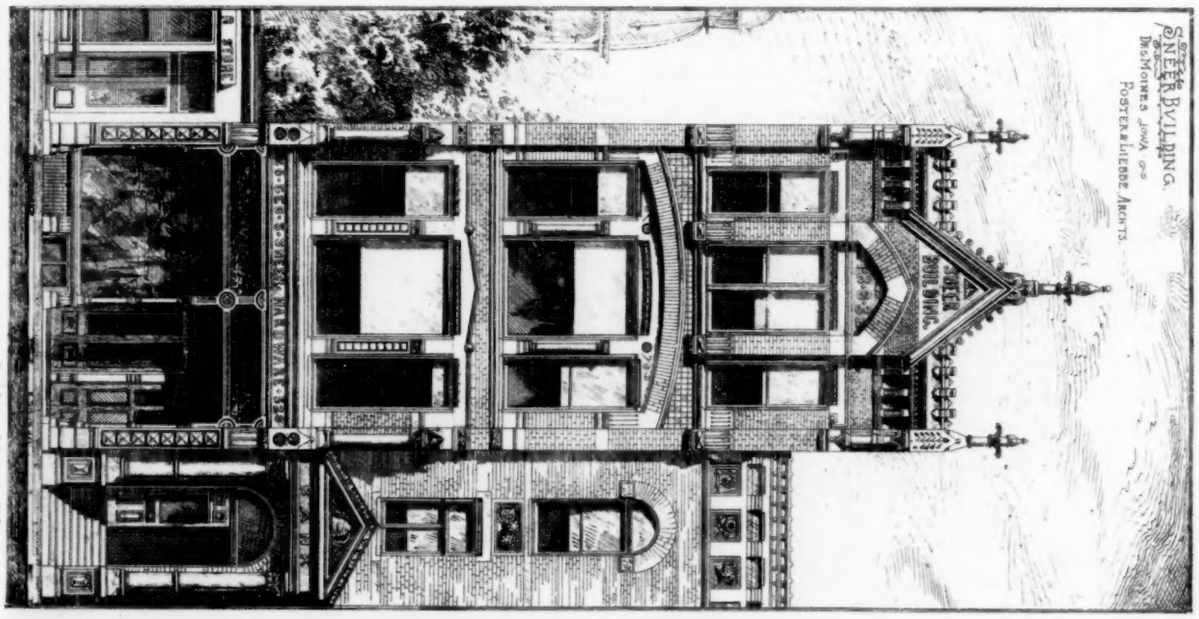
DESIGN FOR OFFICES AND KEEPER'S RESIDENCE, ALBANY CEMETERY. ROBERT W. GIBSON, ARCHT. ALBANY, N.Y.

INDIAN GROUP. FOR
LINCOLN PARK.
CHICAGO. ILL.

JOHN BOYLE.
SCULPTOR.

The Heliotype Printing Co. 211 Tremont St. Boston.





waste matters in the bowl and trap, and with the unbroken power given by its descent from the cistern, so as to eject them forcibly, suddenly and completely into the waste-pipe, and yet without noise?

It is evident that the water must serve as its own sound-deadener, since we have no valve, plunger or other moving part in the closet to assist us. A stream of water may be rendered noiseless, however rapid and powerful its movement, by properly directing it into a body of water larger than itself, provided the point of entrance be below the surface. The flushing stream must therefore enter the water-closet below the normal level of its standing water.

It is not sufficient to do this in the manner that is employed in the "trap-jet" closets, for the jet in these at once throws the standing water out of its way, and then makes an uproar even more appalling than the ordinary flushing stream. In these "trap-jet" closets, the water used for cleansing the upper part of the bowl, when used in combination with the jet in the trap, is not only insufficient to keep the lower jet covered, but makes a noise of itself after the usual manner with hopper-closets; so that the two together render the "trap-jet," as heretofore made, the most clamorous of all water-closets.

The upper flushing stream should furnish a body of water nicely calculated to keep the lower stream just covered, and should itself be noiseless. The former result is easily obtained by simply adjusting the size of the upper and lower flushing openings with reference to each other; the latter, by constructing a special pocket or water-chamber, into which the upper stream may be projected before it enters the bowl. Theoretically, all noise of the flushing is by this means obviated; practically, a slight sound is still perceptible. To render this inaudible, a further precaution must be taken. With earthenware closets, the seat and cover have to be supported independently of the bowl, which is not strong enough itself to do the work with safety. A clear space is required between the bowl and the wood-work. Hence, especially when, as is now quite customary, the water-closet is set "open;" that is, without casing on the sides and front, the cover cannot serve as a sound-deadener, because it cannot be fitted closely to the bowl. By encasing the closet, however, in an iron frame, the seat and cover may be fitted closely to its top, and be made tight enough to quite obscure what little noise is made by the submerged flushing streams. A small glass panel may be framed in the wooden cover, if desired, to enable the effect of the flushing to be seen when the cover is closed.

(3) *To avoid wastefulness of water*, it is necessary that the flushing stream should encounter no obstruction of any kind in its passage from the cistern to the water which is to be removed from the closet, so that its full power shall be reserved for ejecting the wastes. Every drop of water should be brought to bear upon them in such a manner as to produce the most powerful effect; for what is lost in power must be compensated for in volume. In the pan, valve and plunger closets, the power is destroyed by the obstructions which distinguish them. In the hopper-closets, much of it is uselessly spent in dashing against the sides of the bowl and trap in a haphazard and unscientific manner.

(4) The interior surface of the bowl and trap should constitute the whole interior surface of the water-closet. There should be *no waste space* between or outside of them. To obtain this desideratum, we are forced to adopt the simplest possible form of the short-hopper, only enlarging the bottom of the bowl to embrace a greater body of standing water, and raising the outlet of the trap high enough to retain such a body in the bowl. This is the simplest and indeed the only method.

(5) The *delay* occasioned by the water falling from the cistern to the closet may be avoided either by having the supply-valve at the bottom instead of at the top of the supply-pipe, or by so constructing this pipe that the water shall be held or hung in it below the valve, as far down as to the water-closet, by the pressure of the atmosphere.

(6) *Spattering* can be avoided by introducing the upper flushing water in a smooth sheet of equal thickness all around the rim of the bowl, released from pressure, and directing the lower flushing water towards the outlet of the trap.

(7) *Accessibility and visibility* of all parts of the bowl and trap are to be obtained partly by the adoption of the simple hopper form, and partly by the use of transparent glass for the material of the trap.

(8) A proper *material* is found in glass framed in iron, with an intermediate layer of some water-proof binding material. Glass does not craze or discolor when used for water-closets. Its texture is uniform throughout, and it may be manufactured with unvarying accuracy of form, because it is blown and cooled in a mould, and is not subjected to the warping and modifying influences which earthenware must undergo in baking and glazing.

(9) To provide a rigid frame for the *protection* of the fragile parts, so that, in transportation, as well as in usage, it shall be safe, it is necessary to use an iron frame.

(10) To make the closet *self-sealing*, it is necessary to provide a reservoir which shall yield its water-supply instantly when, and only when, the water in the trap falls to a determined point immediately above the dip. A datum in the problem is that such an automatic supply-reservoir shall not add to the expense or complexity of the closet. It is no solution to add to the trap a small reservoir provided with ball-cock and float, and having its normal water-level corresponding with that of the trap. Such methods have been tried, but have failed on account of their complexity and expense, and their liability to become clogged by the wastes in the trap, or corroded through disuse of their machinery. A suitable reservoir is to be found for this purpose in a part of the water-closet apparatus which already exists. The supply-pipe in the best modern sanitary closets has a considerable holding capacity, it having been enlarged to avoid friction and yield a large volume of water in a short time. Its size may, of course, be further increased, where a still greater capacity is desired, without detriment to the working of the closet. How shall this pipe be formed and connected with the closet in order to regulate its supply as required?

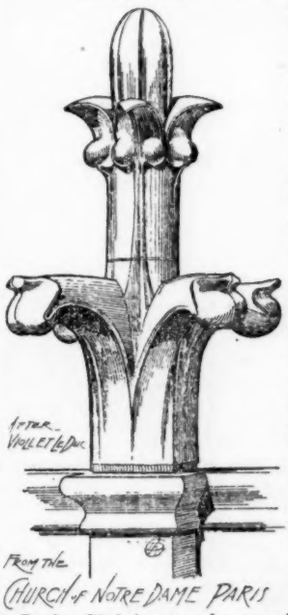
It is well known that Nature "abhors a vacuum," to the extent of resisting a pressure of a column of water thirty-three feet high, and this principle is illustrated by the familiar experiment of the inverted bottle filled with water and retaining its contents, open-mouthed, so long as the mouth stands immersed in a bowl of water. The water is sustained by atmospheric pressure, and appears to hang in the bottle. Our supply-pipe may be used as an inverted bottle, and the water-closet and its contents as the bowl of water. The cistern-valve, without air-pipe, takes the place of the closed end of the bottle. When the supply-pipe is filled with water, it will allow its contents to escape only when the valve is lifted or the water in the closet falls below its mouth.

The manner in which the valve should be formed and operated under this heavy atmospheric pressure, and the method of connecting the pipe with the water-closet, are matters of detail, and will be explained hereafter.

(11) To enable the closet to be *emptied* with ease when desired, it is necessary that the removal of the water from the bowl, trap, and supply-pipe should be automatic, and the only way to accomplish this is to provide a direct passage for it into the soil-pipe. The passage should be so arranged that it cannot, under any circumstances, serve also as an inlet for sewer-gas.

(12) To avoid the *expense* involved by the attempt to bake large and irregular pieces of earthenware, and the *inaccuracy* of form necessarily resulting therefrom, the best method is to do away with earthenware altogether, and to adopt materials and a form of construction much better fitted for our purpose.

LECTURES ON ARCHITECTURE.[1] — VI.



BUT when the nature of religious worship was changed by the increasing prevalence of Christianity, the portico and exterior colonnade were no longer the principal object in a building. The horizontal line was therefore lost sight of as the fundamental idea, and until a new one developed itself, every attempt to adapt the old style to new circumstances produced only contradiction and confusion.

By degrees, however, this new idea did at length arise, and with it a new style of architecture came into being. As processions had been the characteristic of the Egyptian worship, and popular gathering round the temple and under the shelter of colonnades was the chief object in the Grecian, so Christianity introduced a wholly new practice, not without its symbolism and mystery also: that of collecting a whole assembled congregation under one roof. It was a remarkable peculiarity, full of deep meaning and pregnant with important architectural results.

In the *Christian* temples, says Dr. Whewell, the worshippers were to be *within* the walls, and the edifice was hence calculated for an interior spectator. It is remarkable how necessarily this will be seen, on a little consideration, to change the whole character of the building. A temple, or a series of temples, intended to be seen from without, and formed on the Grecian model, would have a line of entablature which would have a natural and congruous reference to the horizontal line on which they stand, and it would not happen, in any common point of view, that this reference would be interrupted or obscure. The temple would then be seen as a whole, and the entablature of one or two sides, supported by well-formed pillars, would be simply beautiful. But for buildings to be seen from within, the case is wholly different. To extend them by an extension of horizontal lines of entablature resting on columns, would produce an interior space without grace, dignity, convenience, or the possibility of being lighted from without. When such buildings were to be made spacious and splendid, the height was increased, at least in proportion to the other dimensions, and probably even more, and windows, one range over another, were inserted in order to light this space. The area was covered with a series of vaults, one to each window or group of windows, and the intersections or groining of such vaulting

[1] Extracts from a lecture by the late Mr. Arthur Gilman, delivered before the Lowell Institute, Boston, in the winter of 1844–45. Continued from page 210, No. 410.

of necessity led to pointed arches, vertical lines, and other Gothic features. But it may further be noticed that, even without taking into account the consequences of stone vaulting in the roof, the interior views of large churches necessarily introduced the idea of a style of building which had reference to vertical lines. How strongly, and indeed exclusively, these predominate in a true Gothic building may be seen from the drawing before you. Now the interior view of any building occupies the whole of one field of view, and not a small fraction of it only, like a temple seen from a distance. Hence it is that the horizontal lines are displaced and overmatched by the perspective; the sides, however long the building may be, are reduced to narrow strips, in the eye of a person looking along the edifice, and the two perpendicular lines which bound the end and divide it from the sides are, in reality, the master lines of the whole scene, which control and regulate all the rest. All the horizontal lines of the sides are stopped or bent when they come to these vertical boundaries, while the spaces on either side of them, that is, on both the sides and the end of the interior, are made up of forms and combinations altogether at variance with the horizontal line. The style of the building, therefore, which is to be viewed on the inside, will only be reduced to harmony and consistency when the principal lines and members of the architecture submit to be regulated by these necessary and irresistible forms.

I have previously adverted to the fact, also, that Gothic architecture seems designed to carry the mind upwards by the perpendicular direction and tapering forms of all its principal members. No one can be at a loss to account for the origin of this idea. With Christianity, observes the anonymous writer before quoted, there came also into religion another idea, that of elevation. If permanence and immutability were the character of the Egyptian system, and symmetry and rationalism those of the Grecian, elevation is also the peculiar idea of Christianity. It raised man from the ground, lifted up his nature to a communion with the Deity, and led up his eye in constant hope to another world and a heaven above him; it roused his intellect and sublimed his affections, filled the whole sphere of his vision with grand and aspiring spectacles, shook off the chains of the slave, dignified the helplessness of woman, fractured the barriers of castes which had kept their subjects in a state of perpetual degradation, and introduced into the whole nature of man a tone of noble and lofty thought, which it imparted freely to all. And there is nothing fanciful or arbitrary in asserting a close connection between the moral and spiritual elevation of the Christian doctrines, and the physical forms in which the idea soon became embodied. If, indeed, we cannot express the former without using words derived from the latter — if we cannot witness goodness and power without both thoughts and gestures which mount upwards, we may be sure that there is a close and indissoluble connection between the two, and that such thoughts as lift themselves up from earth to heaven will embody themselves in structures which exhibit a similar analogy.

Upon these two new ideas combined arose, then, the system of Gothic architecture: the system of the vertical line and of the pointed arch. The vertical line was its primary idea, and the necessity of an inclosed roof was the circumstance which developed it, with all its more important consequences. Its first movement is to be traced in the piling up of range upon range of columns and circular arches, in the structure of towers, and in the unnecessary elevation — unnecessary so far as mere ordinary utility was concerned — which was given to the interior of the Lombardic and Norman churches. The second may be seen in the attempt to bind two or three stories of arches together, by one shaft or slender column running up through them all, and projected so far from the face of them as to form the prominent and leading lines in the building. On the exterior the same kind of effect was produced by the buttresses, or masses of masonry projecting from the walls. But the fundamental idea of elevation once introduced, it soon became necessary to remodel all the parts of the building, to bring them into accordance with it, and it was in the delicate perception of this accordance, and the skill with which it was effected that we must look for the spirit from which the perfection of Gothic architecture really emanated. The exterior of the roof or ceiling was probably the first part which required to be adjusted to the new type. A ceiling either flat and horizontal, or circular and barrel-shaped, was felt to be inconsistent with the primary idea of elevation, for either of them compelled the eye to depart from its ascending line and move in an opposite direction, and perhaps, of the two, the circular arch was the most inconsistent, because it is not content, like the flat roof, with abruptly cutting short the ascending line. The heavy and oppressive effect of a semi-circular ceiling, too, belonged to a more dark and massive style than the one which was earnestly struggling its way into being.

How, then, was the necessity of an inclosed ceiling to be reconciled with the preservation of the ascending line, and made to harmonize with the sentiment of such a mode of construction? There was one way, and one only, and it is exhibited in the figure of an equilateral triangle, placed on the summit of the parallelogram which is enclosed by the walls. Though sadly disfigured by the lowering of such roofs, during centuries of subsequent alterations and repairs, *all* the Gothic edifices, when first erected, were covered with such roofs as these. The figure formed by them is as peculiarly Gothic as the truncated triangle is Egyptian, and the depressed triangle and horizontal parallelogram are Grecian. It everywhere occurs in the roofs and gables, or shoots up into a still sharper form in the pinnacles and spires. The arch, which is measured by it, and is called from hence the equilateral arch, forms the opening of the doors and windows, of the vaulted roofs and ceilings, and, in short, is repeated in every part of the structure. And of the several varieties of the Gothic arch, it is justly considered the most appropriate and most beautiful.

The ascending vertical line being once taken as the leading feature, it will be evident that all the other parts of the structure required to be modified into accordance with it. The whole general outline of the Gothic building accordingly became changed. Instead of running along the ground, it rose up into towers terminating in pinnacles, or in the symmetrical figure of the tapering spire. Its parts, instead of being arranged in regular correspondence, as they had been in the classical styles of architecture, were now clustered in groups of projections, thrown out in apparent disorder from the main fabric, and even studiously diversified in their arrangement, that the eye, instead of indulging the Greek taste for reference and comparison, might be prevented from any lateral or horizontal movement, and be carried constantly upwards. The true Gothic taste abhorred those features which the mistaken "modern Gothic" scarcely ever dispenses with — a centre and two wings. It never placed the spectator in any one point, as did Grecian art, but allowed him to move about the whole edifice, making every place a centre from which the eye could rise to some lofty point which would still throw all the parts into the Gothic figure of the elevated triangle. Thus life, power and energy became the natural associations with this style, while a wonderful variety of detail was introduced without at all destroying its harmony, because all of them, however distinct, were originally included or implied in the one fundamental figure.

The style of the pointed arch, on its introduction into Europe, does not appear to have been accompanied by those peculiar features which were its invariable accessories in after time — its light, clustered pillars, its profusion of ornamental mouldings, and gracefully sculptured tracery; these resulted, subsequently, from its adoption, as the forms of ornament most congruous to the nature of the style.

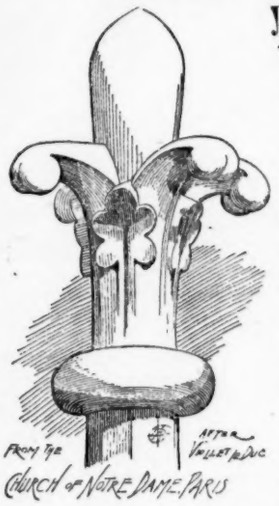
ARCHITECTURAL MONOTONY OF PARIS.

THE fixed perspective of Paris neither elongates nor contracts with any change of atmosphere, so that the apparent distance from one point to another remains always the same. Reduced to the simplest elements the street architecture of Paris consists of two parallel lines, which to the eye appear to gradually converge. In sunshine and shade the sides of the street approach in an unvarying ratio; a cloud goes over, and the lines do not soften; brilliant light succeeds, and is merely light — no effect accompanies it. The architecture conquers, and is always architecture; it resists the sun, the air, the rain, being without expression. The geometry of street can never be forgotten. Moving along it you have merely advanced so far along a perspective, between the two lines which tutors rule to teach drawing. By-and-by when you reach the other end and look back the perspective is accurately reversed. This is now the large end of the street, and that which has been left the small. The houses seen from this end present precisely the same façade as they did at starting, so that were it not for the sense of weariness from walking it would be easy to imagine that no movement had taken place. Each house is exactly the same height as the next, the windows are of the same pattern, the wooden outer blinds the same shape; the line of the level roof runs along straight and unbroken, the chimneys are either invisible or insignificant. Nothing projects, no bow-window, balcony or gable; the surface is as flat as well can be. From parapet to basement the wall descends plumb, and the glance slips along it unchecked. Each house is exactly the same color as the next, — white; the wooden outer blinds are all the same color, a dull gray; in the windows there are no visible red, or green, or tapestry curtains, mere sashes. There are no flowers in the windows to catch the sunlight. The upper stories have the air of being uninhabited, as the windows have no curtains whatever, and the wooden blinds are frequently closed. The flat vertical surfaces, one on each side of the street, each white and gray, extend onward and approach in mathematical ratio. That is a Parisian street.

Go on now to the next street, and you find precisely the same conditions repeated — the streets that cross are similar, those that radiate the same. Some are short, others long, some wide, some narrow; they are all geometry and white paint. The vast avenues, a rifle-shot across, such as the Avenue de l'Opéra, differ only in width and in the height of the houses. The monotony of these gigantic houses is too great to be expressed. Then across the end of the avenue they throw some immense façade — some public building, an

opera-house, a palace, a ministry, anything will do — in order that you shall see nothing but Paris. Weary of the gigantic monotony of the gigantic houses, exactly alike, your eye shall not catch a glimpse of some distant cloud rising like a snowy mountain (as Japanese artists show the top of Fusiyama); you shall not see the breadth of the sky, nor even any steeple, tower, dome or gable; you shall see nothing but Paris; the avenue is wide enough for the Grand Army to march down, but the exit to the eye is blocked by this immense meaningless façade drawn across it. No doubt it is executed in the "highest style;" in effect it appears a repetition of windows, columns and door-ways exactly alike, all quite meaningless, for the columns support nothing, like the fronts sold in boxes of children's toy bricks. Perhaps on the roof there is some gilding, which seems to be perpetually asking itself the question why it is there. These façades, of which there are so many, vary in detail; in effect they are all the same, an utter weariness to the eye. Every fresh day's research into the city brings increasing disappointments, a sense of the childish, of feebleness and weakness exhibited in public, as if they had built in sugar for the top of a cake. The level ground will not permit of any advantage of view; there are none of those sudden views so common and so striking in English towns. Everything is planed, smoothed and set to an oppressive regularity.—*Pall Mall Gazette.*

LUMINOUS PAINTS AND COLORS.



THE luminous calcic sulphide (also called sulphide of calcium) now obtainable in the market, has a yellowish-white tint, which considerably limits its direct application as a paint. On the other hand, the calcic sulphide, or the luminous paint obtained therefrom, loses its luminous property, if it is directly mixed with the ordinary commercial paints. An invention recently patented by Gustav Schatte, of Dresden, Saxony, has for its object to produce durable white or colored paints, containing a luminous substance, which causes them to shine in the dark, without changing or neutralizing in daylight the tint of the coloring substance or substances contained in such paints. For this purpose Zanzibar or Cowrie-copal is melted over a charcoal fire; 15 parts of this melted mass are dissolved in 60 parts of French turpentine, and the resulting mixture is filtered, whereupon 25 parts of pure linseed oil are added, which linseed oil has been previously boiled and allowed to cool a little. The lake varnish thus obtained is carefully treated in a paint-mill with granite rollers and worked into a luminous paint by one of the processes hereinafter described. Iron rollers capable of giving off under great pressure small particles of iron, which might affect the luminous power, should not be used. Lake varnish as obtained in commerce contains nearly always lead or manganese, which would destroy the luminous power of the calcic sulphide. A pure white luminous paint is produced by mixing 40 parts of lake varnish, obtained as described, with 6 parts of prepared baric sulphate, 6 parts of prepared calcic carbonate, 12 parts of prepared zinc-sulphide, white, and 36 parts of calcic sulphide in a luminous condition, in an oil vessel and therein worked into a coarse emulsion which is then ground fine between the rollers. To produce a red luminous paint 50 parts of said lake varnish are mixed with 8 parts of prepared baric sulphate, 2 parts of prepared madder lake, 6 parts of prepared realgar (diarsenious disulphide) and 34 parts of calcic sulphide in a luminous condition, and the mixture worked in the same way as described for the white color. To produce a luminous orange color, 46 parts of prepared lake varnish are mixed with 17.5 parts of prepared baric sulphate, 1 part of prepared Indian yellow (*jaune indien*), 1.5 parts of prepared madder lake, and 35 parts of calcic sulphide in a luminous condition. To produce a luminous yellow color or paint, 48 parts of prepared lake varnish are mixed with 10 parts of prepared baric sulphate, 8 parts of prepared baric chromate, and 34 parts of calcic sulphide in a luminous condition. To produce a luminous green color or paint, 48 parts of prepared lake varnish are mixed with 10 parts of prepared baric sulphate, 8 parts of chrome oxide green and 34 parts of calcic sulphide in a luminous condition. A luminous blue color is produced with 42 parts of prepared lake varnish, 10.2 parts of prepared baric sulphate, 6.4 parts of ultramarine blue, 5.4 parts of cobalt blue, and 36 parts of calcic sulphide in a luminous condition. A luminous violet is produced with 42 parts of prepared lake varnish, 10.2 parts of prepared baric sulphate, 2.8 parts of ultramarine violet, 9 parts of cobaltous arseniate, and 36 parts of calcic sulphide in a luminous condition. A luminous gray color or paint is produced with 45 parts of prepared lake varnish, 6 parts of prepared baric sulphate, 6 parts of prepared calcic carbonate, 0.5 parts of ultramarine blue, 6.5 parts of zinc sulphide, gray, and 36 parts of calcic sulphide in a luminous condition. A yellowish brown paint is obtained with 48 parts of prepared lake varnish, 10 parts of prepared baric sulphide, 8 parts of orpiment, and 34 parts of calcic sulphide in a luminous condition. Luminous colors for artists may be manufactured, if in the mixture previously described the respective parts of lake varnish are replaced by the same quantities of pure East Indian poppy-oil, and the product is then finely ground and prepared. Luminous colors for oil-printing may be produced by using, instead of the above mentioned parts of lake varnish, the same quantities of pure linseed oil won by presses only, and thickened by boiling. All the paints described may be made into luminous colors suitable for making colored paper and other purposes if the lake varnish is omitted, and the thus won dry luminous colors are ground or mixed with water, and some binding substance free from acids. They may also be made into luminous wax colors for casting on hollow glass-ware and similar objects, if, instead of the lake varnish composed as described, ten per cent more of cera-japonica and the fourth part of the latter quantity of *oleum olivarum alb.*, is used, or into colors for painting on porcelain. The color is painted on porcelain, and then incinerated with the exclusion of air. The paints may also be treated with soluble glass (potash and soda-water glass).—*The Building News.*

THE TRADE IN BUILDING MATERIALS.

WE take the following from *Bradstreet's:* A survey of the amount of building going on in our chief cities and throughout the country induces the belief that the scale of operations for 1883 will prove larger than it has been for years. The applications for building permits — some of these, however, being merely extensions and improvements — made at the Building Bureau of New York City in the first six months of this year amounted to $30,000,000, and although all authorizations are not at once acted on, the new buildings in progress, with those continued from last year, or commenced in this under previous permits, represent figures equal to two-thirds of the above amount. In New England and the Northwestern sections of the country building is particularly active. In our great commercial cities the present year will be distinguished by the massive and costly structures commenced or completed. In New York the chief activity is in apartment-houses on an unprecedented scale, some of the blocks approximating, with cost of land, to half a million dollars; a number of costly churches are also going up, while of commercial buildings of a more than ordinarily imposing character — buildings indicative not only of the growing wealth of the business community, but of advancing taste as respects embellishments and conveniences — there has been a fair quota. Large structures suitable for their purpose are on all hands found to be the most paying, and the confidence of capital in satisfactory returns from these is leading to increasing investments.

This country has the advantage of great capability in producing varieties of building materials, but the contiguity of the British Provinces leads to such importations as freestone and laths, and in cements, a comparatively new industry in this country, a considerable importation takes place from England and the Continent, which has reached so far this year to about 150,000 barrels. Scotch freestone for basements and trimmings is being imported on an increasing scale. On the other hand, we export our bluestone to Canada, Cuba, Mexico and South America, its especial qualities recommending it for flagging and lower courses of buildings. The bluestone, granite and marble of New England handled in this city are chiefly brought here by water. All over the country cost of transport necessarily governs to a great extent the selection of stone for building, though with certain important edifices distance is allowed to offer no impediment to the conveyance of huge quantities of New England stone to remote Western cities.

The business in granite, owing to the larger scale on which buildings are now constructed, increases year by year in this section, Maine, which may be regarded as a granite State throughout its length and breadth, supplying the larger proportion. The price of ordinary granite ranges from 75 cents to $1 per square foot; but superior qualities, which allow of a fine polish, present an attractive surface, and are not liable to become discolored, will realize as much as $10 per foot. Notwithstanding the costliness of granite, entire buildings in different parts of the country continue to be erected of this material. The stone is cut and fashioned at the quarries according to the architectural drawings, and thus, on arrival, has only to be set in place. So with a great portion of the freestone used here. The most extensive employment of Maine granite in this country has been in the construction of the piers and approaches of the East River Bridge. There is extreme competition among the granite quarrymen, and owing to the abundance and variety of the stone, new specimens are being continually brought to market, but it is difficult to place any new description. The brownstone with which New York is supplied, only obtainable from beds of limited location in Paterson, N. J., and Portland, Conn., is, as a consequence, well controlled by the quarry owners. Their

sales are chiefly in New York, Brooklyn and Boston. The stone goes no farther than Pennsylvania.

Bluestone has been employed for flagging and building purposes for half a century, but its extensive use has been more recent. Previous to the adoption here of the North River stone the quarries on the Connecticut River were chiefly drawn on for New York flagging. Pennsylvania supplies New York with a moderate proportion. This stone, which is extensively used for trimmings for buildings, for water tables, lower sills, lintels, large platforms, and for rubbing and polishing, goes to all parts of the country. The cost of the rough-quarried stone handled here does not exceed $3,000,000 per annum, but the labor expended in shaping it, with cost of freight, brings this amount up to $9,000,000. The figures given for freestone (brown) by qualified estimators closely approximate to the above. Cost of labor in cutting and dressing both bluestone and freestone has been greatly reduced of late years by the powerful iron planers employed for these purposes. The marble used in this section, a good part of it employed in interiors for mantels, is from Vermont, which supplies every desirable quality and color. Limestone from Ohio, Indiana, and even more distant States, is also furnished. An important contribution to our building materials is in Portland stone from Kentucky, of similar quality to the famous English stone of that name.

Artificial building stones have come into prominence of late in the way of concrete blocks, tiles, etc. Of these, terra-cotta, both for purposes of ornament and utility, is the most prominent, being widely used for architectural trimmings, carved mouldings, bands, cornices and for porches. It is found suitable for substantial work in which strength and durability are primarily essential. Terra-cotta has served in an important degree to aid the present general adoption of brick in structures by affording effectual contrast and aiding in picturesque design. The brick trade of New York is enormous. The supply is chiefly obtained from North River establishments, which furnish every desirable variety of texture, form and color. The number handled in New York alone may be put at from 700,000,000 to 800,000,000 per annum. The average cost, estimated by the carload, is $6 to $7. The cost is affected not only by the activity of building, but also by the favorable character or otherwise of the season for the manufacturer. Enamelled bricks for lining interiors and for floorings are extensively imported and to some extent manufactured in this country. Some new buildings contain several hundred thousand. Construction iron enters more largely than ever into our buildings, and ranks essentially, though not nominally, under building materials. Estimates for the quantities required are obtained by architects or contractors direct from the iron founders, whose works are on a large scale. Iron has found uses in building never dreamed of in the old timber days, being adapted for beams and girders, pillars, stairways, balustrades, floorings and landings, and for first stories of store frontages. Omitting from the present notice other building materials, we may mention that 150,000,000 laths are sold in this market annually, half the amount coming from St. John's, N. B. Of lime, 1,500,000 barrels are placed each year on the New York market. In Portland cement, both in foreign and home manufacture, an increasing business is being done. The sixteen cement manufacturers of Rosendale, Ulster County, N. Y., alone supply 1,600,000 barrels per annum. There are about the same number of manufacturers in Louisville, Ky., and in Pennsylvania.

CLAY ROOFING-TILE.

Washington, D. C., November 9, 1883.

To the Editors of the American Architect: —

Dear Sirs, — My attention has been called to an error in my letter to you on strength of hollow sheathing tiles, as printed in your No. 409, page 202. The paragraph, "No. 1 burnt 2″ clay broke at 2394 pounds," should read: No. 1 burnt clay broke at 3294 pounds.

Very respectfully, your obedient servant,
M. C. Meigs, Bt. Major Gen., U. S. Army, Retired.

AN APPEAL FOR A CHANGE.

Woodbury, N. J., November 10, 1883.

To the Editors of the American Architect: —

Gentlemen, — Your blank for renewal received. Permit me to make complaint in regard to plans and perspective views of private residences all during the entire year having been of the same general style — the "Old English." I have built fifty-one houses, and I am now tired of the one general Old or New English style. My architects are sick of them, for a time at least. Can't you give us Italian, French, American, New England, or once in a while give us a change, or *must* we all build English?

Respectfully, G. G. G.

[While we are very far from agreeing with our correspondent's classification of all the designs which have been published in the *American Architect* during the past year, we will do what we can to make his fifty-second house different from its fifty-one predecessors by publishing this appeal. Although our advice is not asked, we will take it upon us to say that the best thing that can happen to "my architects" who "are so sick of" copying the designs of more able men is, that their sickness may prove so nearly mortal that they will find the only hope of prolonging their pitiful existences lies in abandoning their profession [save the mark], and allowing our correspondent, "G. G. G." to employ an architect who is capable of devising a French, or an Italian building once out of every fifty-one times, even if he cannot produce that, to the layman, *rara avis*, an *American* design. — Eds. American Architect.]

BOOKS.

Jacksonville, Ill., November 5, 1883.

To the Editors of the American Architect: —

Dear Sirs, — I have been a reader and admirer of your journal for over two years and now wish to ask my first favor of you.

Please give me through your columns, the name of some good work or works on building stones. I want to post myself more thoroughly on the nature, strength, durability, appearance and manner of working the various building stones of this country. Please also name the best work on ventilation, and heating by steam or hot air.

Very truly yours, Dan. E. Parson.

[Information concerning American building stones is not very accessible so far as we know, and unless the report of Dr. Hawes, which was in preparation for the Tenth Census, has been completed and published since his death we do not believe there is any comprehensive and reliable body of information yet published. A series of papers now publishing in the *Builder* [Holyoke, Mass.,] is of some interest and practical value. *Box on Heat* is a standard authority on heating and ventilation. Mr. R. C. Briggs's treatise on *Steam-Heating* published by Van Nostrand & Co., is brief, cheap, and reliable. — Eds. American Architect.]

THE OWNERSHIP OF DRAWINGS.

Pittsburgh, Pa., November 10, 1883.

To the Editors of the American Architect: —

Dear Sirs, — Will you please give me information in the following case: —

A client employs an architect to prepare a set of plans for alterations and additions to his house for a given sum; can the client claim the drawings as his property, if he decides not to build, or are they the property of the architect?

Yours respectfully, M.

[The rule adopted by the profession, and generally accepted by the public, is that drawings, as instruments of service, are the property of the architect. If, however, the agreement was that plans only should be prepared, for a given sum, we should certainly say that this implied that the plans were to be delivered, whether they were carried into execution or not. It often happens, especially in case of alterations, that the proprietor prefers to have his plans made long beforehand, so that he can compare them at his leisure with the actual building, and accustom himself gradually to the new scheme; and if this idea had been in his mind when he made the contract with his architect for drawings, it would seem to him very hard to be refused the possession of them. It is unlikely that an honorable client would take advantage of having the custody of the drawings to deprive the architect who made them of the right to supervise the carrying of them into execution, but if there were any danger of this, the architect could do something to protect himself by copyrighting them. — Eds. American Architect.]

NOTES AND CLIPPINGS.

The Rebuilding of the Temple. — A gentleman named Durgin belonging in York, Me., a stone-mason, left this city on the eleven o'clock train to-day for Boston, where he will join a party of twelve other men bound for the city of Jerusalem. The party goes to help rebuild the Temple. This man from York is prompted by a sense of duty, and takes his family, personal effects and tools. — *Portsmouth (N. H.) Times.*

Buried Trees in Washington. — A most remarkable discovery was made by the workmen engaged in digging the foundation for the new Casino building on Connecticut Avenue, near Seventeenth Street, yesterday. In the north-west section of the foundation an excavation was dug twenty-three feet below the surface and through a bank of solid red and black clay twelve feet in thickness for the purpose of constructing a lowering stage. At this great depth and below the solid twelve-foot mass of clay a dense forest and thick growth of plants were found. The formation of the trees is perfect. They resemble ash, cedar, and poplar, and it has probably been thousands of years since they saw the light of day before. The wonderful sight of a subterranean forest so far below the surface was witnessed by hundreds of people yesterday, and many specimens of the trees and grass were carried away as curiosities. One piece of wood and clump of grass were sent to the White House. — *Washington Republican.*

Steam *vs.* Water-Power. — The minimum capacity and height of fall of some of the leading water-powers of the United States are as follows: —

Holyoke, fifty feet, 17,000 horse-power.
Cohoes, No. 3, one hundred and five feet, 14,000 horse-power.
Lewiston, fifty feet, 11,000 horse-power.
Lowell, thirty-five feet, 10,000 horse-power.
Lawrence, twenty-eight feet, 10,000 horse-power.
Turners Falls, thirty-five feet, 10,000 horse-power.
Manchester, fifty-two feet, 10,000 horse-power.
Paterson, thirty-five feet, 1,100 horse-power.
Passaic, N. J., twenty-two feet, 900 horse-power.
Birmingham, twenty-two feet, 1,000 horse-power.

Fall River, with at least 500,000 more cotton spindles than any other town or city in the United States, is operated wholly by steam-power. Manufacturers have been heard to say that they would not move across the street for the sake of substituting water for steam, considering the irregularity of most water-powers. A more moderate statement is that of the manager of a prominent woollen mill on the sea-board, whom the writer asked if it would not be cheaper to run his mill by steam than by water. The answer was, "For a mill located as mine is, steam is the cheaper. I use half anthracite screenings and half culm coal from Nova Scotia. The average cost of both kinds of fuel landed on our wharf is $3.25 per ton, and at that figure steam is cheaper than water." — *Textile Gazette.*

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.]

287,790. AUXILIARY SAW-HANDLE. — Elias C. Atkins, Indianapolis, Ind.

287,791. WINDOW-VENTILATOR. — Jonathan Badger, New York, N. Y.

287,802. ELEVATOR. — George W. Clayton, Cleveland, O.

287,809. SCREW-DRIVER.— Washington Devereux, Bloomsburg, Pa.

287,811. CLEANING SEWERS. — Jas. T. Dougine, Chicago, Ill.

287,816. SHUTTER BOWER AND FASTENER. — Jas. V. Fort, Philadelphia, Pa.

287,847. TRY-SQUARE AND BEVEL. — Jacob K. Minich, North Hampton, Ohio.

287,848. WINDOW-VENTILATOR. —Christine F. Müller, Cologne, Germany.

287,856. FIRE-ESCAPE. — William C. Parsels, Ellenville, N. Y.

287,889. FIRE-ESCAPE. — Henry Small, Hartford, Conn.

287,898. APPARATUS FOR MOISTENING AIR IN BUILDINGS. — George D. Bancroft, Springfield, Mass.

287,899. PIPE-CUTTER. — Eldridge F. Barnes, New Haven, Conn.

287,906. WINDOW-SHUTTER. — Charles T. Cochel, Uniontown, Md.

287,910. FIRE-ESCAPE. — Jeffrey M. Davis, Youngstown, O.

287,929. LIGHTNING-ROD COUPLING. — William Hewitt, London, Ontario, Can.

287,940. FIRE-ESCAPE. — Abijah Johnson, Denver, Col.

287,941. HYDRAULIC PORTLAND CEMENT. — William Jones, San Francisco, Cal.

287,942. MINERAL PAINTING PROCESS. — Adolph Keim, Munich, Bavaria, Germany.

287,959. SAFETY-ELEVATOR. — John T. Pine, New York, N. Y.

287,998. AUTOMATIC SELF-SETTING WRENCH. — Benjamin F. Bennett, Lockport, N. Y.

288,004. VENTILATOR. — William P. Buchan, Glasgow, County of Lanark, Scotland.

288,028. DOOR-CHECK.—Joseph A. Coultaus, Brooklyn, N. Y.

288,041. SELF-CLOSING HATCHWAY. — Thomas E. Elliott, Norfolk, Va.

288,045-047. HANDLE FOR FILES AND OTHER TOOLS. — Josiah F. French, Philadelphia, Pa.

288,059. AUTOMATIC FIRE-EXTINGUISHER. — Chas. L. Horack, Brooklyn, N. Y.

288,072. HOUSE. —Frederick W. Lawrence, Brooklyn, N. Y.

288,078. FIRE-ESCAPE.—Henry W. Littlefield, Philadelphia, Pa.

288,095. COMBINED NUT AND PIPE WRENCH. — Jos. G. Moomy, Erie, Pa.

288,098. WRENCH.—Charles H. Myers, Phelps, N. Y.

288,113. AUTOMATIC ELEVATOR-GUARD. — Robert P. Rankin, Clayton, Ind.

288,117. FIRE-ESCAPE. — James Reidy, Pittsfield Mass.

288,122. FIRE-ESCAPE. — Charles J. Savitz, Allentown, Pa.

288,131. FIRE-ESCAPE. — Joseph B. Smith, North Buffalo, Pa.

288,149. FIRE-ESCAPE. — Charles A. Youngman, Louisville, Ky.

288,155. FIRE-ESCAPE. — William H. Barnes, Independence, Kan.

288,163. COMBINED COMPASSES AND CALIPERS. — George P. Conant, Geneva Lake, Wis.

288,179. DOOR-SECURER. — Christopher Leaming, Newhall, Cal.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — Since our last report twenty-six permits have been granted, the more important of which are the following: —

Frederick Keller, 2 two-st'y brick buildings, and two-st'y brick stable in rear, w s Castle St., n of Orleans St.

Jacob Smith, three-st'y brick building, w s Mount St., s of Saratoga St.

McCoy & Sorter, 2 two-st'y brick buildings, n s Windsor Mill Road, e of Gilmor St.

John W. Albaugh, two-st'y brick stable, in rear e s Madison Ave., between Presstman & Bloom Sts.

Otto Brezanger, two-st'y brick building, 24′ x 50′, e s China Alley, s of Hamburg St.

Henry Westphal, 5 two-st'y brick buildings, e s Central Ave., commencing n e cor. Oliver St.

John Fox, 4 three-st'y brick buildings, w s Pennsylvania Ave., n of Pitcher St.

Louis Eimer & Son, two-st'y brick stable and 2 three-st'y back buildings, e s Norris Alley, n of Lanvale St.

John Bien, two-st'y brick stable, e s Madeira Alley, n of McElderry St.

H. O. Wilbur, three-st'y brick building, w s Charles St., between Cross and West Sts.

D. & C. Streett, two-st'y brick stable, n w cor. Forrest and Hiller Sts.

John F. Carter, two st'y brick stable in rear e s Townsend St., between Carey and Calhoun Sts.

Boston.

BUILDING PERMITS. — *Brick.* — *Boston St.*, near Clapp St., Ward 20, for Thomas Rice, 6 dwells., 20′ x 35′, two-st'y mansard.

Albany St., near East Concord St., Ward 18, for Trustees Homœopathic Hospital, boiler-house and laundry, 43′ x 43′, two-st'y pitch.

Harrison Ave. Ex., near Essex St., Ward 10, for Albert R. Whittier, mercantile, 16′ and 20′ x 56′, one-st'y flat; H. J. Bartlett, owner.

Commercial St., Nos. 436 *and* 438, cor. Greenough Ave., Ward 6, for Wm. H. Smith, dwell. and store, 25′ x 45′, four-st'y flat; Thomas R. White, builder.

Wood. — *Athens St., No.* 199, Ward 13, for M. F. Gavin, 2 dwells., 16′ 6″ x 49′, three-st'y flat; P. F. Hanlon, builder.

West Eagle St., near Brooks St., Ward 1, for Issac Pratt, Jr., 2 dwells., 15′ x 17′ and 20′ x 32′, three-st'y flat; Asa Mitchell, builder.

Parker St., No. 671, cor. Gurney St., Ward 22, for Sylvester L. Ward, dwell., 26′ x 43′, three-st'y hip; Samuel Rantin, builder.

Forest St., rear, near Adams St., Ward 24, Edwin E. Stetson, greenhouse, 13′ x 81′, one-st'y pitch; Henry Gordon, builder.

North Harvard St., nearly opposite Smith St., Ward 25, for James H. Edwards, dwell. and store, 19′ 6″ x 33′, two-st'y pitch; Northey, builder.

Market St., near Cambridge St., Ward 25, for John W. Gardner, restaurant, 15′ x 25′, one story pitch; Edward Dennison, builder.

Everett St., near Beacon St., Ward 25, for James Dolan, 2 dwells., 18′ x 28′, two-st'y pitch; Chris. Leake, builder.

Sparhawk St., near Sparhawk Ave., Ward 25, for Mrs. Rhoda J. Hatch, dwell., 32′ x 34′, two-st'y hip; Samuel N. Davenport, builder.

Walden St., cor. Arklow St., Ward 22, for Patrick Regan, dwell., 23′ x 33′, two-st'y pitch; Thomas Clure, builder.

Hyde Park Ave., near Neponset St., Ward 23, for Alexander Rogers, dwell., 21′ and 27′ x 30′, two-st'y pitch; Alex. Rogers, builder.

Boylston Ave., near Green St., Ward 23, for John Kelley, dwell., 16′ x 22′ and 21′ x 31′, two-st'y pitch.

Cranford St., near Elm Hill Ave., Ward 21, for H. A. Wood and J. F. Wetherbee, dwell., 28′ x 39′, two-st'y pitch; dwell., 25′ and 28′ x 48′; Wood & Wetherbee, builders.

Hancock St., near Prospect Ave., Ward 23, for Chauncy Hancock and John E. Blakemore, 2 dwells., 20′ and 28′ x 48′, two-st'y pitch; Alexander Rogers, builder.

Green St., cor. Oakdale St., Ward 23, for Thomas Decatur, dwell. and stores, 43′ x 70′, three-st'y flat.

Townsend St., rear, near Walnut Ave., Ward 21, for Mary E. Morse, stable, 31′ x 46′, one-st'y pitch; Valentine Bock, builder.

Allston St., near Sharp St., Ward 24, for Geo. A. Noyes, 2 dwells., 23′ 6″ and 26′ x 36′, two-st'y hip; Noyes Bros., builders.

Selden St., near Milton Ave., Ward 24, for Charles L. Welden, dwell., 24′ 4″ and 29′ 10′ x 32′, two-st'y hip; Charles L. Welden, builder.

Washington St., near Green St., Ward 22, for James Dowling, dwell., 22′ 6″ x 39′ 6″, three-st'y pitch; McDonald & Tobin, builders.

Copeland Pl., No. 3, Ward 21, for John M. Way, dwell., 24′ 2″ x 40′, two-st'y pitch; Gilbert & White, builders.

Warren St., cor. Zeigler St., Ward 21, for Amelia Milton Atty, stores, 45′ x 85′, one-st'y flat; Thomas S. Tobin, builder.

Carruth St., cor. Fairfax St., Ward 24, for H. S. Carruth, dwell., 33′ x 34′, two-st'y hip; F. M. Severance, builder.

Coolidge Ave., near Warren Ave., Ward 24, for M. Foster Sweetser, dwell., 27′ 3″ x 45′, two-st'y pitch; John H. Burt & Co., builders.

Warren Ave., near Water St., Ward 5, for Joseph A. Wellington, 2 buildings, storage of coal, 32′ x 115′; Isaac McLean, builder.

Charles River Ave., Nos. 39 *and* 41, Ward 5, for Joseph A. Wellington, building, storage of coal, 50′ x 100′; Isaac McLean, builder.

Ruggles St., No. 216, near Tremont St., Ward 22, for Mrs. Jas. B. Page, dwell., 19′ x 20′ and 22′ x 32′ three-st'y flat; Valentine Bock, builder.

Longwood Ave., near Bumstead Lane, for James McCormick, stable, 35′ x 58′ 8″, two-st'y flat.

Brooklyn.

HOUSES. — Three residences, 25′ x 80′, are to be built of brick, with terra-cotta finish, for Mr. Jno. W. Mason, on Hicks St., at a cost of about $80,000, from design of Mr. M. W. Morris, of New York.

BUILDING PERMITS. — *Bushwick Ave.*, e s, 60′ n Varet St., 2 three-st'y frame double tenements, tin roofs; cost, each, $4,500; owner, Leopold Michel, Ewen St., cor. Meserole St.; architect, T. Engelhardt.

Hart St., s s, 150′ w Stuyvesant Ave., two-and-one-half-st'y frame tenement, tin roof; cost, $3,500; owner, W. O. Schmitthenner, on premises; architect, F. Engelhardt; builder, Herr.

Evergreen Ave., e s, 20′ n e Himrod St., four buildings, also, *Evergreen Ave.*, w s, 20′ s w Harmon St., four buildings; two-st'y frame tenements, tin roofs; cost, each, $1,500; owners, architects and builders, Cozine & Gascoin, 307 Evergreen Ave.

Evergreen Ave., n e cor. Himrod St., also *Evergreen Ave.*, s w cor. Harmon St., 2 three-st'y frame stores and tenements, tin roofs; cost, each, $2,500; owners, etc., same as last.

Nineteenth St., No. 145, n s, about 250′ e Third Ave., three-st'y frame double tenement, tin roof; cost, $3,000; owner, Adeline Jacklitsch, 133 Nineteenth St.; architect, W. H. Wirth; builder, J. R. Greene.

Flatbush Ave., n e cor. Park Pl., one-st'y brick store or stores, gravel roofs; cost, $3,500; owner, H. Blattmacher, Park Pl., cor. Carlton Ave.; builder, O. B. Sheldon.

Greene Ave., s s, 225′ w Lewis Ave., 2 three-st'y brick buildings, tin roofs; cost, $6,500; owner, Paul O. Grening, 420 Gates Ave.

Park Ave., No. 832, s s, 100′ w Sumner Ave., three-st'y frame double tenement, tin roof; cost, $4,600; owner, Herman Schade, Beaver St.; architect, T. Engelhardt; builder, J. Rueger.

Sackett St., No. 326, s s, 250′ w Smith St., five-st'y brick tenement, tin roof; cost, $8,000; owner, H. W. Stearns, 392 Court St.; architect, T. F. Houghton.

Quincy St., n s, 185′ w Throop Ave., 4 two-st'y stone front dwells., tin roofs; cost, each, $4,000; owner and builder, Jas. W. Stewart, 455 Bedford Ave.; architect, M. Walsh.

Norman Ave., s s, 50′ e Guernsey St., 2 three-st'y frame tenements, gravel roofs; cost, each, $2,500; owner and architect, Stephen M. Randall, 572 Lorimer St.; builders, J. and J. Van Riper and owner.

Chicago.

FLATS. — H. Rhewoldt, architect, planned the three-st'y double flats to be built on Ohio St., near Clark St.; cost, $23,000.

HOUSES. — Mrs. E. Lardner will build a two-st'y brick dwell., 22′ x 50′, on Centre Ave.; cost, $6,000; H. Rhewoldt, architect.

B. W. S. Clark has made plans for dwell. on Washington Ave., Hyde Park, for Mrs. Ware.

H. Rhewoldt, architect, has completed plans for three-st'y dwell., for S. Kohn; cost, $7,500; W. Goldie, contractor.

Same architect made the plans for F. Kollman's three-st'y brick dwell.; cost, $12,000; A. A. Stevens & Co., contractors.

H. Rhewoldt is architect for two-st'y brick dwell., for Mrs. E. Klaner; cost, $11,000; Val. Lund, contractor.

BUILDING PERMITS. — A. Kussman, two-st'y store and dwell., 629 Thirty-first St.; cost; $4,000.

Mrs. V. L. A. Seyer, two-st'y store and dwell., 131 Clybourne Ave.; cost, $3,000; H. Bornhoeft, architect; A. F. Wolf, builder.

J. Wolf, two-st'y store and dwell., 710 Twelfth St.; cost, $3,500; F. Thalman, architect; A. Dressie, builder.

P. L. Auten, three-st'y dwell., 318 South Ashland Ave.; cost, $15,000; architect, L. G. Quackenboss; builders, Geo. Lehman & Co.

Pittsburgh, Cincinnati & St. Louis R. R. Co., freight-depot, Clinton St., cor. Carroll Ave.; cost, $20,000; Geo. Lehman & Co., builders.

B. Loewenthal, four-st'y store, Van Buren St., cor. Canal St.; cost, $15,000.

H. Schmeltekopf, two-st'y dwell., 319 Thirteenth Pl.; cost, $3,500.

E. A. Hess, two-st'y store and dwell., 247 Division St.; cost, $4,500; architect, P. W. Anderson; builder, A. Lindgren.

Echart, Swan & Co., four-st'y flouring-mill, 68 to 72 North Canal St.; cost, $50,000; architect, S. V. Shipman; builder, L. J. Daezling.

P. Kauff, two-st'y stores and dwells., 43 to 47 O'Brion St.; architect, Otto H. Matz; builders, King & Demath.

C. D. Wetherell, 5 two-st'y dwells., 3008 to 3010 Calumet Ave.; cost, $25,000; architect, W. H. Drake; builders, M. P. Seabery & Co.

James C. Gault, 2 three-st'y dwells., 854 and 856 West Washington St; cost, $10,000; architect, W. Zimmerman; builder, S. D. Moore.

E. Olson & Co., 2 three-st'y stores and flats, Cottage Grove Ave.; cost, $10,000; Olson & Co., builders.

S. J. Mix, two-st'y barn, near Polk St.; cost, $5,000; builders, Barney & Rodatz.

A. Chisholm, three-st'y factory, 258 Michigan St.; cost, $8,000; architect, Z. Zarbell; builders, Pratt & Kieterink.

P. F. Weldon, two-st'y dwell., 519 West Taylor St.; cost, $2,600.

P. O. Stensland, three-st'y dwell., 140 Evergreen Ave.; cost, $7,000; architect, C. O. Hanson; builder, J. Olsen.

J. Rogerson, two-st'y dwell., 309 West Monroe St.; cost, $4,000; architect, O. H. Placey; builders, C. Barton & Co.

S. A. & E. F. Newton, four-st'y flats, 121 and 123 Third Ave.; cost, $15,000; architect, J. J. Flanders; builder, Jno. Mountain.

Cincinnati.

BUILDING PERMITS. — Benjamin Rollman, three-st'y brick building, Flint St., near Denman St.; cost, $3,500.

August Suttlemeier, three-st'y brick building, Eighth St., near State St.; cost, $8,000.

John Clark, two-st'y brick building, Sixth St., near Broadway; cost, $3,500.

Matilda Bunch, two-st'y frame building, Beach St., near Locust St., cost, $3,500.

John M. Lane, two-st'y frame building, Carlisle St., near Burnet Ave.; cost, $3,500.

Twelve permits for repairs; cost, $5,000.

Total permits to date, 727.

Total cost to date, $2,529,950.

Detroit.

BUILDING PERMITS. — C. L. Cole, brick house, 48 West Alexandrine Ave.; cost, $6,000.

George Walkins, 2 brick houses, 427 and 429 Third Ave.; cost, $9,000.

Gearing & Co., brick house, 40 Charlotte Ave.; cost, $4,400.

F. Julien & Co., brick store, 335 Franklin St.; cost, $2,700.

Perrin Bros., additions to brick flouring-mill, 236 Gratiot Ave.; cost, $2,500.

New York.

FACTORY. — A two-st'y brick factory, 52′ x 258′ 4″ is to be built by Mr. Richard Walter, on the cor. of Railroad Ave. and One Hundred and Sixty-sixth St., at a cost of $30,000, from designs of Messrs. Thom & Wilson.

HOTEL. — Joseph Fisher, of the Clarendon Hotel, has filed plans in the Buildings Bureau for an eight-st'y hotel on the s e cor. of Broadway and Thirty-eighth St. The plans were drawn by William H. Hume, architect. The estimated cost of the building is $300,000.

RESIDENCES. — Ten four-st'y brownstone dwells., and a five-st'y brick and stone apartment-house, the latter 25′ x 98′ 2″, are to be built on the s w cor. of Seventy-third St. and Ninth Ave., at a cost of about

$250,000, by Messrs. Terence Farley & Son, from designs of Messrs. Thom & Wilson.

For Mr. Chas. Kopp, a three-st'y brownstone house, with 20′ front, is to be built on the n s of One Hundred and Thirty-third St., w of Seventh Ave., from designs of Mr. James Barrett.

TABERNACLE. — "The Gospel Tabernacle" is to be the name of the brick church to be built on Thirty-second St., with a wing on Eighth Ave., for the evangelical work of Rev. A. B. Simpson. It will cost $20,000.

BUILDING PERMITS. — *MacDougal St., No.* 116, five-st'y brick tenement, tin roof; cost, $8,000; owner, Daniel McElroy, 154 East Thirty-eighth St.; architect, James Kyle.

West Thirtieth St., No. 360, four-st'y brick dwell.; tin roof; days' work; owner, Mary A. Tinker; architect, C. H. Tinker.

Broadway, s e cor. Thirty-eighth St., eight-st'y brick and brownstone front hotel, iron roof; cost, $300,000; owner, Joseph Fisher, Clarendon Hotel; architect, Wm. H. Hume.

Fifty-eighth St., n s, 200′ w Eighth Ave., one and part one-and-a-half st'y brick club-house, tin roof; cost, $7,200; owner, Citizens' Bicycle Club, 2 East Sixtieth St.; architect, Geo. M. Huss; builders, C. Callahan, Grissler & Fausel.

Stebbins Ave., e s, 300′ s One Hundred and Sixty-seventh St., three-st'y and basement frame dwe l., tin and shingle roof; cost, $2,996; owner, Lyman Tiffany, 60 Astor House; architect, Henry D. Tiffany; builder, Ed. O'Brien.

Stebbins Ave., e s, 100′ s One Hundred and Sixty-seventh St., three-st'y and basement frame dwell., tin and shingle roof; cost, $2,996; owner, architect and builder, same as last.

Stebbins Ave., e s, 247′ s One Hundred and Sixty-seventh St., three-st'y and basement frame dwell., tin and shingle roof; cost, $2,996; owner, architect and builder, same as last.

Stebbins Ave., e s, 163′ n One Hundred and Sixty-seventh St., three-st'y and basement frame dwell., tin and shingle roof; cost, $2,996; owner, architect and builder, same as last.

Stebbins Ave., e s, 563′ n One Hundred and Sixty-seventh St., three-st'y and basement frame dwell., tin and shingle roof; cost, $2,996; owner, architect and builder, same as last.

One Hundred and Forty-second St., s s, 100′ e Rider Ave., four-st'y frame tenement, gravel roof; cost, $5,000; owner, Mrs. Mary Wilson, 218 West Fourth St.; architect and builder, Geo. T. Campbell, 567 East One Hundred and Forty-third St.

One Hundred and Twenty-fifth St., n s, 400′ w Sixth Ave., 2 two-st'y brick dwells. and stores, tin roofs; cost, about $7,500; owner, John Harney, 277 West One Hundred and Twenty-seventh St.; architect, G. Robinson; builder, John Downey.

First Ave., s w cor. Thirty-ninth St., six-st'y brick factory, slate and tin roof; cost, $50,000; owner, Geo. Ehret, Ninety-second St., between Second and Third Aves.; architects, H. J. Schwarzmann & Co.

Thirty-ninth St., s s, 65′ w First Ave, 2 five-st'y brick tenements, tin roofs; cost, about $14,000; owner and architects, same as last.

West St., Nos. 193 *and* 194, six-st'y brick warehouse, tin roof; cost, $20,000; owners, M. J. & D. F. Mahony, 63 Madison Ave.; architect, Thos. Jackson.

ALTERATIONS. — *Madison Ave., No.* 226, three-st'y brick extension, tin roof; cost, $20,000; owner, Mrs. E. A. Smith, on premises; architect, R. W. Buckley.

Exchange Pl., No. 51, raise one st'y; cost, $5,000; owner, Estate of E. D. Morgan, John T. Terry, exr., 54 Exchange Pl.; builder, Chas. E. Hadden.

Seventh St., No. 198, internal alterations and store front in basement; cost, $3,000; owner, Simon Bing, Jr., 130 East Seventy-fourth St.; architect, Wm. Graul.

Madison Ave., Nos. 612, 614, 616 *and* 618, seven and part eight-st'y brick extension, tin roof; cost, $125,000; owner, Sarah E. L. Taylor, Hotel Branting, architect, James H. Giles.

New Church St., Nos. 58, 60, 62, 64 *and* 66, No. 58 to be raised one-st'y, and a six and part seven st'y extension in rear, fire-proof block roof; cost, $250,000; owner, Am. Bank Note Co., A. G. Goodall, President, 142 Broadway; architects, J. C. Cady & Co.; builders, Sinclair & Wills and E. Snedecker.

Philadelphia.

BUILDING PERMITS. — *Twelfth St.*, n of Columbia Ave., ice-house, 52′ x 65′; Chas. Glass, owner.

Jasper St., cor. Somerset St., addition to ice-house, 23′ x 46′; Jno. Cunningham, contractor.

Frankford Ave., cor. Westmoreland St., one-st'y addition to dry-house, 30′ x 40′; Jno. Cunningham, contractor.

Venango St., e of Marshall St., 5 two-st'y dwells., 16′ x 28′; F. Shoemaker, owner.

Marshall St., s of Venango St., 5 two-st'y dwells., 14′ x 28′; F. Shoemaker, owner.

Gray's Ferry Road, cor. Thirty-fifth St., four-st'y paint-factory, 50′ x 107′; Harrison Bros. & Co.

Herman St., No. 53, three-st'y dwell., 18′ x 46′; Geo. A. Sorber, owner.

Eighteenth St., n of Wharton St., 3 two-st'y dwells., 15′ x 39′; J. A. McGucken, contractor.

Allegheny St., w of Frankford Ave., three-st'y dwell., 18′ x 45′; W. H. Ewing, owner.

Frankford Ave., No. 2829, two-st'y dwell., 19′ x 53′; C. R. Shoemaker, owner.

McClellan St., No. 625, two-st'y dwell., 13′ x 30′; J. S. Baldt & Son.

North Twenty-seventh St., No. 1606, two-st'y store and dwell., 18′ x 30′; E. Schmidt, contractor.

Fairhill St., s of Lehigh Ave., two-st'y dwell., 20′ x 20′; Geo. Grantz, owner.

Delhi St., s of Dauphin St., two-st'y dwell., 16′ x 45′; Chas. O. Kronglowicz, owner.

Twenty-seventh St., s of Clarence St., 2 two-st'y dwells., 13′ x 30′; J. H. Post, owner.

Snyder Ave., w of Seventh St., three-st'y factory, 75′ x 110′; A. M. Greene, owner.

Montgomery St., e of Twenty-third St., 9 three-st'y dwells., 16′ x 50′; Jno. S. Serrill, owner.

Norris St., w of Richmond St., two-st'y planing-mill, 80′ x 90′, and two-st'y stable, 27′ x 31′; Jesse W. Taylor & Sons, owners.

Gordon St., e of Cedar St., shop, 18′ x 49′; H. W. Butterworth, owner.

Eighteenth St., cor. Berks St., 8 three-st'y dwells., 17′ x 60′; J. L. Kates, owner.

Nineteenth St., e s, below Wharton, two-st'y dwell., 16′ x 38′; T. C. O'Rourk, owner.

Third St., n of Huntingdon St., two-st'y smith-shop, 16′ x 45′; M. Branigan, owner.

E St., s of Indiana Ave., two-st'y dwell., 17′ x 44′; J. C. Stackhouse, contractor.

Boynton Lane, s of Wistar St., 2 two-st'y dwells., 16′ x 47′; Jno. Rufe, owner.

North Forty-second St., No. 318, two-st'y dwell., 17′ x 44′; Lewis Smith, contractor.

Sigel St., w of Ninth St., 9 two-st'y dwells., 15′ x 28′; M. McManus, owner.

St. Louis.

BUILDING PERMITS. — Fifty-three permits have been issued since our last report, fourteen of which are for unimportant frame houses. Of the rest, those worth $2,500 and over are as follows: —

Thomas Gugerty, 2 two-st'y brick dwells.; cost, $4,000 each; Thomas Gugerty, contractor.

T. R. Peters, 2 two-st'y brick dwells.; cost, $4,500; A. H. Hageman, contractor.

Chas. Tacke, two-st'y brick dwell.; cost, $5,000; Volke & Tacke, contractors.

L. Gruensfelder, two-st'y brick ice-house; cost, $3,000; Fred Beck, contractor.

Mrs. Schroeder, two-st'y brick dwell.; cost, $2,700; A. Beinke, architect; A. Fennar, contractor.

Laclede Car Manufacturing Co., two-st'y brick car-shop; cost, $2,900; J. I. Wharton, contractor.

C. Von der Ahe, 2 adjacent two-st'y brick dwells.; cost, $7,000; A. Beinke, architect; contract sub-let.

C. Von der Ahe, 2 adjacent two-st'y brick dwells.; cost, $7,000; A. Beinke, architect; contract sub-let.

A. Beinke, 2 adjacent two-st'y brick dwells.; cost, $5,000; A. Beinke, architect; contract sub-let.

C. Jeuhne, two-st'y brick dwell.; cost, $2,800; J. B. Legg, architect; R. F. Parks, contractor.

Washington, D. C.

BUILDING PERMITS. — *Seventeenth St.*, between R and S Sts., three-st'y brick dwell. for W. A. Stewart; cost, $3,500.

W St., between Thirteenth and Fourteenth Sts., n w, two-st'y brick dwell., for A. M. Cowell; cost, $3,500; C. C. Martin, builder.

Stoddert St., West Washington, two-st'y brick dwell. for Mrs. R. B. Tenney; cost, $3,500; Columbus Thomas, builder.

Q St., between Fifteenth and Sixteenth Sts., n w, three-st'y brick dwell., for Jno. P. Lawrence; cost, $7,000; F. F. Schneider, architect; W. P. Liscombe, builder.

Q St., between Seventh and Eighth Sts., n w, one-st'y brick church, for St. James Congregation; cost, $9,000; Henry Congdon, architect.

N St., between Eleventh and Twelfth Sts., n w, 2 two-st'y brick dwells., for N. T. Haller and D. L. Morrison; cost, $9,000; N. T. Haller, builder.

A St., between Seventh and Eighth Sts., n e, two-st'y brick dwell., for J. D. Marx; cost, $3,000.

P St., between Seventeenth and Eighteenth Sts., n w, 4 three-st'y brick dwells., for F. R. Winsor; cost, $28,000.

Sixteenth St., above Rhode Island Ave., three-st'y brick dwell., for J. F. Rodgers; cost, $16,500; Kenderdine & Paret, builders.

General Notes.

BRIDGEPORT, CONN. — Swedish Baptist church, frame, 40′ x 70′; cost, $2,500; Palliser, Palliser & Co., architects.

Block of six brick houses, for Clark Marsh, Esq., cor. East Washington Ave. and William St.; cost, $15,000; Palliser, Palliser & Co., architects.

CHESTER, PA. — Morris Hammill is building a new carriage manufactory, cor. Fifth St. and Concord Ave.

EAST RINDGE, N. H. — Jones M. Wilder is building a large house.

GLEN RIDGE, N. J. — For Mr. Chas. E. Breeden, a $6,500 cottage is to be built from designs of Mr. Chas. D. Marvin, of New York.

HOLYOKE, MASS. — The Whiting Paper Company is to build an addition to No. 1 mill, 50′ x 122′, four stories high above the basement.

JEWETT CITY, CONN. — John F. Slater, of Norwich, Conn., is about to erect a stone building for a public library, from designs of Stephen C. Earle, architect, of Worcester, Mass.

LEBANON, N. H. — The Grand Army men and others are actively at work to raise funds for a memorial hall building in this town.

LEE, MASS. — The Decker Paper Mill, burned a few days since, will be rebuilt, and will be 100′ long and three stories high.

NORTH CONWAY, N. H. — A wooden church, for the Congregational Society, is to be built by Mead, Mason & Co., of Boston, contractors, from drawings by Stephen C. Earle, of Worcester, architect; cost, about $7,000.

STONINGTON, CONN. — Mrs. Potter will have a cottage built here at once, from plans by Palliser, Palliser & Co., architects, Bridgeport, Conn.; cost, $5,000.

WORCESTER, MASS. — C. A. Vaughan has taken the contract for building a frame church for the Swedish M. E. Church Society at Quinsigamond Village; cost, about $5,000; Stephen C. Earle, of Worcester, architect.

Bids and Contracts.

BOSTON, MASS. — The contract for encaustic tiling for the post-office and sub-treasury has been awarded to the American Encaustic Tiling Co., $700; and marble tiling for second, third and fourth stories to Davidson & Sons, $5,095.24.

The contract for marble wainscoting, mantels and hearths for the post-office and court-house has been awarded to C. E. Hall & Co., at their bid of $5,345.

BUFFALO, N. Y. — The following is a synopsis of bids for iron beams, etc., required for the first floor of the extension of the custom-house and post-office, opened November 5, 1883: —

Niagara Bridge Company, $996 (*accepted*).
C. H. Kellogg, $1,064.
Asa Snyder, $1,220.
Blake & Duffy, $1,269.92.
Phœnix Iron Company, $1,380.07.
Haugh, Ketcham & Co., $1,383.34.
T. H. Brooks, $1,094.69.

CHARLESTON, W. VA. — The following is a synopsis of bids for stone and brickwork for approaches for the post-office, court-house, etc.: —

Middleton, Lane & Co., posts, stops and blocks, $1,015; street curbing, $630; brick sidewalks, $96.

William D. Isaacs, posts, stops and blocks, $630; street curbing, $170; brick sidewalks, $130; grading lot, and for roadway, gutter and walks, $2,000; sodding, per superficial yard, 60 c. (*accepted.*)

M. V. Smith & O'Brien, posts, stops and blocks, $710; street curbing, $159.30; brick sidewalks, $143; grading lot, and for roadway, gutter, and walks, $2,200; sodding, per superficial yard, 50 c.

Oman & Stewart, posts, stops and blocks, $1,462; including street curbing and brick sidewalks.

KANSAS CITY, MO. — The contract for slating the roofs of the court-house and post-office has been awarded to T. F. and J. A. Hayden, of St. Louis, the lowest bidders ($1,950).

NEW YORK, N. Y. — The contract for plastering the new building of the Mutual Life Insurance Co., on Nassau St., has been awarded to the Wight Fire-proofing Co., of Chicago.

MONTGOMERY, ALA. — The contract for furnishing heating-apparatus for the court-house, etc., has been awarded to Bartlett, Hayward & Co., at their bid of $7,848.

SANDUSKY, O. — The contract for furnishing the heating-apparatus for the custom-house has been awarded to Samuel I. Pope & Co., Chicago, Ill., the lowest bidders.

TOPEKA, KAN. — The Wight Fire-proofing Co., of Chicago, has secured at $12,000, the contract for fireproofing the new general office of the A. T. & S. F. R. R.

The following is a synopsis of the bids for glass for the court-house and post-office: —

Crystal Plate-Glass Company, $2,050.
E. A. Boyd & Son, foreign glass, $2,217.94 without duty; 2,520.09 with duty.
De Pouw Glass Works, $2,494.
Healy & Millet, $2,406.25.
H. Madden, $3,038.66.
William Glenny, $3,200.

The contract has been awarded to the Crystal Plate-Glass Company, of St. Louis, at their bid of $2,050.

COMPETITION.

MONUMENT. [At Milwaukee, Wis.]

The committee in charge is now prepared to receive designs and proposals for the erection of a granite monument on the lot in Forest Home Cemetery, in memory of the victims of the Newhall House Fire. The cost of the monument must not exceed $3,000, including the lettering on the monument of the names of the victims.

The foundation will be laid even with the surface of the ground, at the expense of the committee.

The monument is to be erected as early as possible in the season of 1884, and designs and proposals should be sent in **not later than the first day of January, 1884.**

The committee reserves the right to reject any or all of the designs or proposals submitted.

Proposals may be sent to, or any further information obtained from, WM. P. McLAREN,
414 Chairman Committee, Milwaukee, Wis.

PROPOSALS.

STONE AND BRICK WORK. [At Peoria, Ill.]

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., November 7, 1883.

Sealed proposals will be received at this office **until 12 M., on the 28th day of November, 1883,** for furnishing the labor and material, stone, bricks, mortar, etc., and building complete, the basement and area walls of post-office, court-house, etc., at Peoria, Ill., in accordance with drawings and specification, copies of which and any additional information may be had on application at this office or the office of the Superintendent. JAS. G. HILL,
412 Supervising Architect.

MANTEL TILES AND FRAMES. [At Boston, Mass.]

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., November 7, 1883.

Sealed proposals will be received at this office **until 12 M., on the 21st day of November, 1883,** for supplying and delivering at the post-office and sub-treasury extension at Boston, Mass., all the "Low's" tiles and brass frames required for mantels, in accordance with drawings, specification and schedules, copies of which and any additional information may be had on application at this office or the office of the Superintendent. JAS. G. HILL,
412 Supervising Architect.

STEAM-HEATING. [At Spencer, Mass.]

The Building Committee of the town of Spencer solicits sealed proposals for furnishing and setting steam-heating apparatus in four school-houses: one of six rooms, and three of four rooms each.

Proposals must specify the size and kind of boilers, length and size of pipes and radiators, and be accompanied by a diagram showing the location of each.

Bids will be opened **Friday, November 23, at 7.30 P. M.**

The Committee reserves the right to reject any or all bids, as may seem for the best interest of the town.

Proposals should be marked "Proposals for Steam-Heating," and be addressed to E. E. STONE, Chairman, Spencer, Mass. 412