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IT is our sad duty to chronicle the death of another architect of more than ordinary capacity and distinction, — Mr. William M. Woollett, of Albany. The name of Woollett has long been known throughout the upper part of New York State in connection with professional matters, the father of our deceased friend having been employed, if we are not mistaken, as architect or superintendent of construction upon the Delavan House, as well as other important buildings, twenty or thirty years ago. The son's work was for the most part of a different character, his taste inclining him to the study of problems more modest but perhaps of greater artistic interest. The book which he published not long before his death, entitled "Old Homes Made New," well illustrates the success which had attended his efforts in a special branch, and in itself forms an interesting contribution to the literature of our art. For years devoted to the best interests of the profession, setting always an example not only of honorable practice but of praiseworthy ambition; his loss will be regretted by many.

A LIVELY discussion is going on in New York, preliminary to a final decision as to the location of the buildings for the World's Fair of 1883. One hearing has been given to parties interested, and several new sites have been suggested. As might be supposed, the persons interested in particular sites do not at the hearings confine themselves to setting forth the advantages of their own land, but dwell with considerable emphasis on the demerits of rival situations. One of the tracts most recently proposed, that at Fleetwood Park, was denounced by the attorney for the Fort Washington site as "beating the world for mosquitoes," besides having a bad reputation for malaria. As to the mosquitoes, we are inclined to think that none of the sites, unless those on the very highest land, will be quite free from annoyance; but the danger from malaria is a very real and threatening one, and it is not too much to say that the selec- of a district as bad as many which lie about the upper end of the island would be fatal to the success of the fair. We have General di Cesnola's testimony that all the employés of the Art Museum, which is situated in the very midst of the contending locations for the Exhibition, have suffered from malarial fever, and a soil naturally bad would have its dangerous qualities intensified by the excavation and general upturning incidental to the construction of the buildings.

A PROPOSITION has been made, which meets with much favor in New York, that all the larger buildings to be erected for the Exhibition of 1883 should be of a permanent character, and so arranged that they may be utilized after the exhibition is over for various purposes of health and recreation. It certainly seems wasteful to build structures so substantial and attractive as those used for such occasions are now expected to be, and at the end of six months abandon them; and it is easy to believe that with due skill in planning the exhibition halls can be so arranged as to serve admirably for a grand series of winter gardens; but the main consideration in this case would be the expense of the ground, for it is hardly to be supposed that the proprietors of the land would be willing to grant the use of it indefinitely without the payment of rent, and the rent of so large a tract in the restricted area of Manhattan Island would necessarily be a considerable sum. The conditions in New York, where all the territory between the rivers, will at the present rate of increase be solidly built up within twenty-five or thirty years, are very different from those that exist in London, which is free to spread in all directions, and has already so vast an area that a very slight increase in the radius of the circle which bounds its populous region gives a large additional territory. It is not difficult near a city of this kind, to find a Sydenham, where land is, and for many years will continue to be, cheap, so that gigantic conservatories, "sanitariums" or crystal palaces may rest there quietly; but New York real estate owners recollect so well how land which fifteen years ago was as wild and deserted as any part of Manhattan Island now is, changed hands less than ten years afterwards at prices which would very nearly cover the lots with silver dollars, and see so clearly the rapid diminution of available territory within the city limits, that few of them are likely to be willing to make such contracts as would be necessary.

AN application was lately made by certain associations to the railroad commissioners of Massachusetts, to have a location assigned them for railway lines across the city of Boston, under the general railroad law of the State, which provides that a given number of persons may, under certain restrictions, build a railroad between any two points in the State, and that if they cannot agree with town or city officers as to the location of the line, the commissioners shall fix the route. As the commissioners have full control over grade crossings, it was presumed that if they granted a location for any line, they would direct that it should be built throughout above the general surface, constituting, therefore, an elevated road, and by this process the applicants hoped to be authorized to build such a road without the necessity for obtaining a special charter from the Legislature. The decision of the commissioners has now been rendered, and while it confirms the position of the applicants, that the general law does not discriminate between city and country as to the right of any party to construct roads for which they are willing to pay, it does, however, imply that ground appropriated to one public use, as in the case of streets, shall not be appropriated by a private corporation for building its lines without the consent of the people to whom such streets belong, or a special act of the Legislature. If the petitioners desired to build a railroad through the city in any direction, condemning and paying for the necessary land, the Board would grant a route, and authorize them to *cross* the streets, but not run lengthwise through them. This seems to us in every way reasonable and just. While there is much to be said in favor of constructing rapid transit lines along the streets, especially where these are of such width as in many parts of Boston, no one will desire to see the right to occupy them given away to all comers without legislative sanction at least, if not with the consent of the city authorities, and still less would fair-minded men wish to have such privileges given to any corporation except on condition of equitable compensation for whatever injury might be done to private interests. We are much inclined to believe that the rapid transit problem in Boston and its suburbs can be solved in some less costly and cumbrous way than it has been in New York, and desirable as is the end to be attained, there will be no reason to regret the appearance of difficulties which may give occasion and leisure for mature consideration.

IT would seem to be quite time that Cincinnati had not only a Museum, but an Academy of Fine Arts, to judge by the report of a directors' meeting recently held at the University of Cincinnati, in which it appeared that one hundred and seventy-five applicants for instruction in the School of Design connected with the University had just been turned away because the school was full. We are glad to see that it was decided to employ another teacher, to make room for some of the disappointed ones, but we hope that the benevolence of Cincinnati's wise and liberal citizens will not weary until all those who desire instruction in art are enabled to obtain it. So rare and precious is a popular inclination toward the things of the intellect and imagination, such as we seem to be witnessing in the pleasant metropolis of Ohio, that no effort can be considered too great which may serve to encourage and perpetuate

the impulse. New York and Boston have led the way in the establishment of noble collections of fine art, but they must look to their laurels, or their young western competitor will surpass them by sheer force of enthusiasm and ambition. Wealth has done much, and could do much more for them, but its best efforts are feeble unless seconded by popular interest, such interest as we hope to see increase in each one, as it grows in resources, stimulated by generous rivalry, and arousing other cities to join the friendly contest. We are told sometimes by thoughtful critics that the civilized world is on the verge of a great artistic movement. Why may not Cincinnati lead that movement; or if not Cincinnati, why not New York or Boston? It is worth an effort to be at the head of it, whenever it comes, for the city and the generation in which a new and great school of art shall originate, will be, for that reason alone, immortal.

A recent fire in Brooklyn, which destroyed the factory of the Ansonia Clock Company, together with a great stock of materials and goods, and thousands of costly tools belonging to the individual workmen, should serve as a fresh reminder of the hazards to which such establishments are continually liable. The origin of the conflagration is uncertain, but may be attributed either to the spontaneous kindling of oily rags, or to the accidental escape and ignition of the naphtha vapor which was used for lighting the building. The loss to the owners was covered by insurance, but it is none the less paid for by the community at large, while the poor workmen have lost both tools and employment. It seems as if some regular inspection might be made of such establishments, on behalf of the underwriters, if not by the proprietors on their own. The Yale Lock Company carry out an admirable system, under which every part of the corporation's premises is visited once a week by a competent man, who is furnished with a printed schedule of instructions, calling his attention to all the various points, the hose connections, fire-buckets, lanterns, stove-pipes and flues, steam-pipes, dark corners and spaces under work-benches where waste rags and other material are liable to be thrown, the chimneys, and even the yards, and accompanied by a blank report, which he is obliged to fill out and submit, containing specific statements of the regulations which he has found to be properly complied with, and those of which he may have discovered violations, with mention of any matters which seemed to him to need attention, and such suggestions as he may desire to make for the better protection of the property. Some such system is much needed in many of our best equipped buildings, where, through mere neglect, combustible rubbish is allowed to accumulate around steam pipes and flues, however carefully these may have been arranged, while the fire-buckets are left empty, or are carried away for other uses, and hose remains for years tightly coiled and hung on wooden pins, until it becomes so cracked or adherent as to be practically useless.

Mr. J. Russell Forbes, a well-known archæologist, has interested himself in the study of that mysterious structure in Newport, known as the "Old Stone Mill." Our readers will recollect the two theories recently advanced concerning this building, one, by Mr. George C. Mason, Jr., regarding it as a veritable stone mill, erected by Governor Benedict Arnold after the pattern of one still existing at Leamington, England, which he had probably seen; the other, by the late Mr. Hatfield, considering it to have been the detached baptistery of a rude Norman or Romanesque church, the main body of which had either never been built, or had wholly disappeared. This latter explanation Mr. Forbes considers quite untenable, and certainly it rests on a very slender basis of evidence. To the other theory he objects that although Governor Arnold mentions the edifice as "his stone mill," there is no record whatever of its erection, which is the more singular as the history of all the other early buildings is well-known, and a mill, in particular, was considered so important a work that at the completion of a certain wooden one near Newport there were public rejoicings, and the owner was presented by the town with a mile of the neighboring beach as a reward for his energy. The Leamington mill, moreover, was not only very dissimilar from the Newport tower, but was a freak of Inigo Jones, very ill-adapted to serve as a model for utilitarian colonists.

These arguments are certainly forcible, and Mr. Forbes's own explanation is well-considered and scientific. As history throws no light upon the subject, he discusses the internal evidence with discrimination, though we are unable to judge of the accuracy of his observations. Contrary to the received opinion, that the masonry of the tower is similar to that of other old colonial buildings, Governor Arnold's house especially, he asserts that it is of quite a different character. The Governor's house is now destroyed, but the contemporaneous structures show masonry of the same kind of stone, to be sure, but with brick in the window jambs, and mortar of different composition. The account says that hair is found in the mortar of the true colonial masonry, but this is perhaps a fancy of the reporter. However that may be, the mortar of the "old mill" contains no hair, but is made of burnt shells and sand from the beach, with such stone as lay ready at hand. The piers, curiously enough, stand true to the points of the compass, and just above the arches are visible the large square holes where heavy timbers were inserted to support the first floor. Above this are the two flues, the fire-place, and a window opposite, looking toward the sea, with loopholes here and there, now bricked up. Over the main room are seen the insertions of the joists which carried the flat roof, or platform, reached from the main floor by permanent stairs, the trace of which is still visible on the walls. This appears to Mr. Forbes to indicate that the tower was built as a citadel, containing accommodations for a permanent habitation, but guarded against surprise by being raised above the ground on piers, and approached only by a ladder which was drawn up except when in use. Its elevated situation, and the platform and parapet on top, denote that it was intended as a watch tower, from which sentinels could command the neighboring country and coast, while a light placed in the single window looking seaward would serve as a beacon to approaching vessels in windy nights when torches could not be kept burning in the open air above. All this is perfectly in accordance with the usual practice of the Norse rovers in their descents upon foreign coasts, and Mr. Forbes thinks that the character of the masonry, the double flue, and other features, are distinctively Norman. All this seems to us very interesting, and we would suggest that the new Archæological Institute might do worse than to make this building the subject of a thorough investigation.

Sir Edmund Beckett, in his useful, though rather reckless "Book on Building," set an example which has been followed, *more Britannorum*, by a succession of attacks in the public prints upon architects as a class, some of them simply foolish, like the famous review article on the "art-workman," others ignorant and ridiculous, and a few scurrilous. Of the last class is an article in a late issue of the *British Quarterly Review*, which created the sensation which it was intended to produce, and has brought out some replies, particularly one in the *Architect* by Mr. T. Roger Smith, a well-known and able architect and writer. With his refutation of the ridiculous assertions and insinuations of the article we need not concern ourselves, but he mentions incidentally some interesting facts concerning what might be called the family affairs of the profession in England. Referring to the foolish, but venerable charge that architects as a class do not make their own designs, he quotes the example of Mr. George Edmund Street, the architect of the enormous pile of buildings for the London Law Courts, and of innumerable other buildings. Notwithstanding that Mr. Street is, as Mr. Smith calls him, "probably the busiest architect of the present day," it seems that he has found time to prepare all the vast variety of working and detail drawings for the Law Courts with his own hand, besides doing almost the same with all his other work. Considering that for the construction of the Grand Opéra at Paris more than thirty thousand drawings were made — and the number for the Law Courts, a much larger and more complex building, could not have been much inferior — it will be seen that Mr. Street, at least, is not one of those architects of the reviewer's ideal, derived, probably, from a perusal of "Martin Chuzzlewit," who owe their fame to the labors of those oppressed geniuses, their draughtsmen. Mr. Smith refers, with none too much severity, to the insinuation of the *British Quarterly* that architects habitually receive "sly percentages," at the expense of those who trust them, and says that in his personal practice of over twenty-five years, only twice has such a bribe been offered or suggested to him, and although he has been arbitrator or witness in very many cases in which architects were concerned, he has "never yet heard proof given, or even the charge seriously made, that an architect had received one."

VAULTS.[1] — IV.

FAN-TRACERY VAULTING.

THIS is a variety of solid vaulting occurring very frequently in the later period of Gothic architecture, especially in England. Just preceding it we find the same forms in rib-vaulting; but in the fan-tracery vaults there are no constructive ribs. The surfaces are covered over with mullions and tracery-bars enclosing panels, but these are merely ornamental. We cannot here give any illustrations showing the architectural effect of these elaborately finished ceilings, but must confine ourselves to indicating the forms in which they occur. The great examples, such as Henry the Seventh's Chapel, in Westminster Abbey, King's College Chapel, Cambridge, St. George's Chapel, Windsor, etc., are doubtless familiar to our readers.

There are two kinds of fan-tracery vaults, viz.: Pyramidoidal, and Conoidal.

I. PYRAMIDOIDAL. — A space or compartment may be covered, or partly so, by two halves of an inverted concave pyramidoid, set

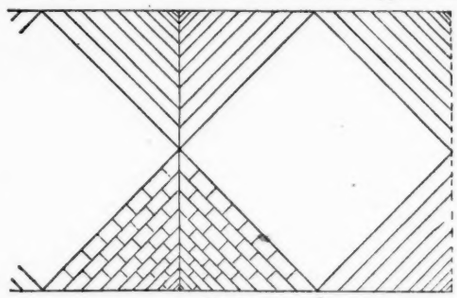


Fig. 39.

opposite to each other so that their bases come into contact on the ridge. The bases may be square, hexagonal, or octagonal; or, indeed, theoretically, may have any number of sides. So far as examples are concerned we might confine our attention to the octagonal, as it is almost the only one in use, and even that is not common. We will, however, take a look at the possible forms, if only for the purpose of showing the objections to them, and thus, perhaps, getting at the reason why they were not used.

a. Base square. If the two halves of a concave pyramidoid with square base be set opposite each other so that their *sides* touch on the ridge, the space is entirely covered, and we have simply ordinary quadripartite vaulting. But if the bases touch each other at the corners, as in Figure 39, only half the space is covered. The portion of the ceiling thus left vacant is called the ridge-lozenge. To

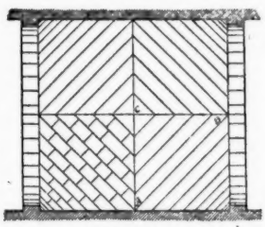


Fig. 40.

complete the structure this must be filled by a flat vault, slabs of stone, ribs and panels, or some other device, as it is the key of the vault. The great size of the ridge-lozenge is a serious objection in this case, and probably accounts for the rejection of the form.

Here, if a digression may be allowed, it may be interesting to consider, for a moment, what might have been done, and to wonder why it was not. If the surfaces of the pyramidoids in Figure 39 be

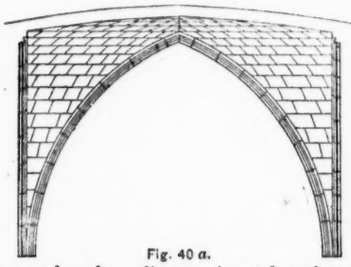


Fig. 40 *a.*

portions of a cylinder whose diameter is not less than the diagonal of the square space to be covered, they may be continued beyond the line A B in Figure 40, to the centre C, thus obliterating the ridge-lozenge and forming a domical vault covering the entire space. The same form may be obtained by the intersection of two equal cylindrical or pointed vaults whose axes are the diagonals of the compartment. Two of the groin-lines run transversely from wall to wall, the others are against the walls. They intersect, not at the ridge, but at the springing. If the surfaces are cylindrical the groin-lines will be of elliptical curvature, which, æsthetically, might be objected

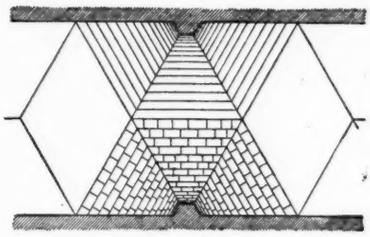


Fig. 41.

to, as they necessarily form a pointed arch, and pointed elliptical arches are not agreeable to the eyes of some persons. By making the groin-lines circular, however, the surfaces would become elliptical, which would be unobjectionable. The introduction of a cross-arch, or band, would take away the unpleasant effect of a groin *line*

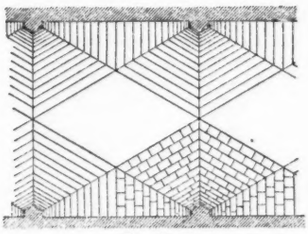


Fig. 42.

running transversely. Thus we should have a form of vault, shown in the section (Fig. 40 *a*), which would be of easy construction, and well adapted for receiving the ornamental treatment characteristic of fan-tracery vaulting; and one which would readily have yielded to the modification required by the preference for the depressed, or

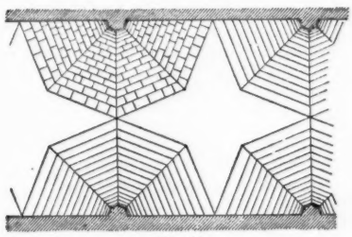


Fig. 43.

Tudor, arch prevailing in the sixteenth century. It seems strange that it was not adopted, for this very form is found in rib-vaulting of the fifteenth century, (See Fig. 104 hereafter), and must have been familiar to the designers of fan-tracery vaults.

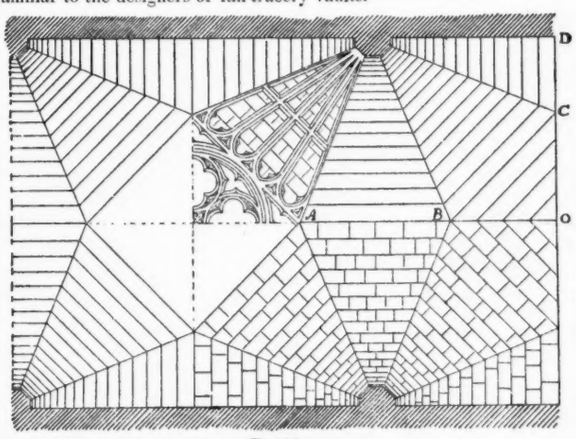


Fig. 44.

b. Base hexagonal. The halves may meet by the sides (Fig. 41), or the points (Fig. 42). In either case the ridge-lozenge occupies one-third of the space.

c. Base octagonal. The halves may meet by points (Fig. 43), leaving a star-shaped ridge-lozenge which occupies about three-tenths of the space; or by sides (Fig. 44), which leaves a square ridge-

[1] These papers, by Professor Charles Babcock of Cornell University, will be printed in monthly parts.

lozenge that covers only about one-sixth. This latter is a practicable form.

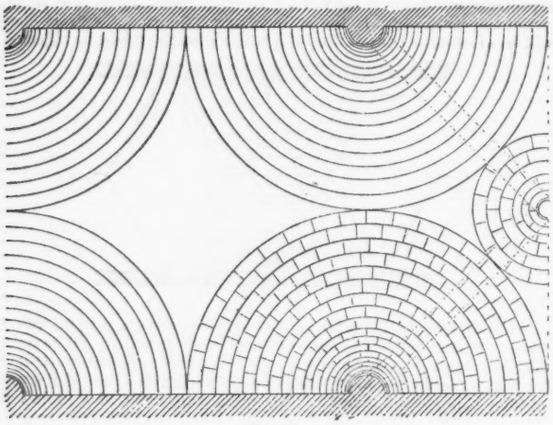


Fig. 45.

If those surfaces of the pyramidoids whose axes are oblique to the compartment be continued on to the centre, as in the right-hand end of Figure 44, the ridge-lozenge will be obliterated and the construc-

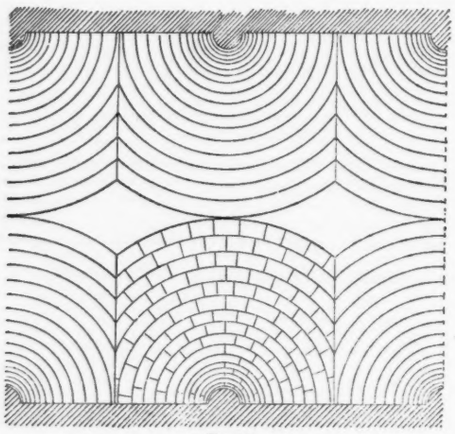


Fig. 46.

tion simplified, while the ornamentation may be precisely the same as if the ridge-lozenge were retained. The ridges of such a vault would be level from A to B, and from C to D, rising from B and C to O. The form is common in rib-vaulting. (See Fig. 105 hereafter).

II. Conoidal.

a. For covering a square space. The half conoids have their

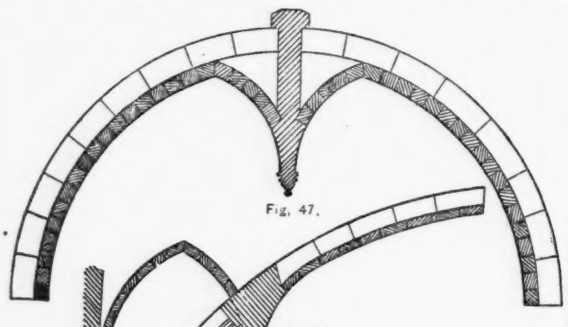


Fig. 47.

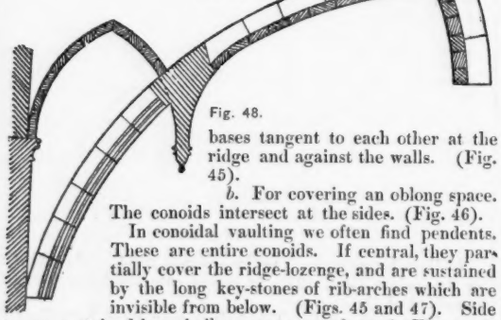


Fig. 48.

bases tangent to each other at the ridge and against the walls. (Fig. 45).

b. For covering an oblong space. The conoids intersect at the sides. (Fig. 46).

In conoidal vaulting we often find pendents. These are entire conoids. If central, they partially cover the ridge-lozenge, and are sustained by the long key-stones of rib-arches which are invisible from below. (Figs. 45 and 47). Side pendents are sustained in a similar manner, as shown in Figure 48, the lower part of the arch being visible. The pyramidoids and conoids are sometimes called pendentives.

THE STRENGTH OF YELLOW PINE.[1]

In a paper read at the Saratoga meeting of the American Association for the advancement of Science the writer presented the result of a series of experiments on the strength of timber, in which were given several unusual figures.[2]

To determine how far these results were due to peculiarities of the selected samples supplied from the Navy Yard, and to determine to what extent size affects the resistance, a more extended series of transverse tests were made, and the results of experiments upon yellow pine, of the ordinary market qualities and of various dimensions, are now presented below, as determined in the Mechanical Laboratory of the Stevens Institute of Technology.

In the paper referred to, the modulus of elasticity was given for yellow pine at an extraordinarily high figure. It will be observed that the best wood here described gives also very high values of E, and a comparison of the pieces of the first with these test specimens shows the selected Navy Yard specimen to have been of better material than either of the latter.

Samples marked F_1, F_2, F_3, were from the same plank—a piece of yellow pine cut in Georgia, April, 1879, and tested after several months of seasoning, when it had become thoroughly dry. The three specimens were considered good material. F_3 was not straight-grained and broke obliquely, giving a much lower modulus of elasticity, as well as of rupture, than its companion specimens.

Samples B_1, B_2, B_3, were cut from a stick ten inches square in section, which had been lying under cover, seasoning, nine or ten years.

Numbers 1 to 12, inclusive, were small sticks sawn out of the middle of a plank, originally four inches thick, one foot wide, and twenty-four feet long. A stick was first cut three inches square and twenty-four feet long, which was then cut into strips of varying smaller dimensions. The wood was selected from lumber-yard stock, and was considered to be fairly representative of average timber. It was cut in Florida, in October, 1879, and reached Hoboken in January, 1880.

Specimens 1 to 8, inclusive, were too green for use in construction; Nos. 9, 10 and 11 were kiln-dried 56 hours, at a temperature of 130 degrees Fahr.; No. 12 was dried 12 hours, at 210 degrees Fahr., at which temperature the pitch exuded from the wood quite freely. Still another specimen, not here recorded, was heated 1½ hours at 420 degrees F., and was somewhat charred. Under test it gave a modulus of rupture, $R = 9000$.

In the table containing a *résumé* of results is also given the figures obtained in the earlier experiments on selected Navy Yard material, marked J, and those of a sample K, tested by another observer.[3]

Specimens A, A_1, were picked up in a work-shop, and used simply to determine specific gravity; they were probably not the best Southern long-leaved pine, such as it was intended that the samples tested should be.

These figures differ little from those obtained by calculation from the smaller deflections and loads. It was observed that this modulus sometimes decreases with increase of spring, and sometimes increases. As a general rule, the maximum figure was given at one-third, rarely at one-half, and about as often at the beginning of the test. The latter case occurred most frequently with the unseasoned timber.

The following table contains the values of the moduli of Rupture and of Elasticity deduced from the whole series of experiments:

TABLE I.

STRENGTH OF YELLOW PINE TIMBER.

Condition.	No. of Test Piece	Dimensions. l = distance between supports.			$R = \frac{3}{2}\frac{W\,l}{b\,d^2}$	$E = \frac{W\,l^3}{4\,\Delta\,b\,d^3}$	Weight per cub. ft.	Spec. Grav.
		l ins.	b ins.	d ins.			Pounds	
Very dry.	F_1	54	2.939	2.946	12,700	.....	41.03	0.66
	F_2	54	2.972	3.008	12,050	1,962,000	45.72	0.73
	F_3	54	3.016	3.000	9,850	1,825,000	40.27	0.64
Old and thoroughly seasoned.	B_1	54	3.046	3.036	13,850	2,178,000	48.89	0.78
	B_2	54	3.016	3.050	13,710	1,949,000	47.14	0.75
	B_3	54	3.012	3.017	14,780	2,193,000	46.38	0.74
Too green for use.	1	40	1.285	1 315	12,150	2,171,000	52.85	0.84
	2	40	1.285	1.295	12,530	1,796,000	62.85	1.006
	3	40	1.285	1.295	10,810	1,953,000	.....	.....
	4	40	1.270	1.287	11,350	.....	.....	.....
	5	54	2.930	2.930	10,790	2,427,000	.....	.....
	6	54	2.925	2.925	10,940	2,231,000	.....	.....
	7	24	3.06	0.70	12,000	.....	.....	.....
	8	24½	3.032	0.675	.....	2,279,000	.....	.....
	8a	40	3.032	0.675	13,240	2,086,000	.....	.....
Kiln-dried 56 hours at 130° F.	9	54	2.885	2.875	12,100	.....	.....	.....
	10	40	1.240	1.275	17,260	2,564,000	.....	.....
	11	40	1.244	1.274	14,560	2,543,000	54.845	0.88
12 hs. at 210° F.	12	40	1.229	1.242	13,870	2,489,000	51.857	0.83
	K	40	1.23	1.23	14,054	1,892,510	37.72	0.60
	J	54	3.0	3.0	16,740	3,534,727	47.95	0.77
	A	.....	.....	.....	.....	.....	39.64	0.63
	A_1	.....	.....	.....	.....	.....	39.50	0.63
Sapw'd frm	F_3	.....	.....	.....	.....	.....	35.96	0.57
Average	.....	.....	.....	.....	.....	2,239,000	.....	.....

[1] Presented to the American Association for Advancement of Science, Aug., 1880, by Prof. R. H. Thurston.

[2] Among these were several due to printers' errors, which, owing to the illness of the writer, were not corrected in proof. The tenacity of yellow pine, for example, was made 2070.2 when it should have been given at 20.702.

[3] *Van Nostrand's Magazine*, Feb., 1880, p. 166.

Calculating $E = \frac{W l^3}{4 A b d^3}$ for heavy loads and considerable deflections, the following figures were obtained for this *pseudo*-modulus:

TABLE II.

VALUES OF E AT ONE-THIRD TO ONE-HALF TOTAL LOAD.

No.	E.	No.	E.	No.	E.
F_3	2,136,000	1	2,055,000	7	.....
F_5	1,689,000	2	1,776,000	8	2,086,000
B_1	2,394,000	3	2,032,000	9	2,251,000
B_2	2,334,000	4	.....	10	2,869,000
B_3	2,489,000	5	2,272,000	11	2,574,000
		6	2,231,000	12	2,380,000
Average					2,098,000

On the whole it may apparently be taken as practically true that the deflection is very nearly proportional to the load, far beyond customary limits of strain, and that the modulus is consequently very nearly constant for all moderate deflections.

Thus, from the test of B_1, we obtained

TABLE III.

W.	E.	W.	E.	W.	E.
50	2,178,000	450	2,288,000	1050	2,363,000
150	2,249,000	650	2,327,000	1250	2,381,000
250	2,259,000	850	2,350,000	1450	2,394,000
				4750	Broke.
Average					2,309,888

When light loads, as one-fourth or even one-eighth the maximum, were imposed for a considerable time, as ten or twenty minutes, the deflection gradually and constantly increased, and on removal of the weight steadily decreased, returning nearly to the original set. Heavy loads, long applied, produced fracture of pieces, the companions to which resisted considerably more when the load was steadily increased up to the moment of fracture. The maximum permanent load was apparently something less than one-third and probably greater than one-half the maximum load which could be sustained under ordinary test.

In concluding this series of experiments upon pine timber, a set of four yellow pine beams of large section was tested to determine the value of the modulus of Elasticity in large timbers, such are used in heavy work, and also to ascertain whether experiments upon small sticks, such as are usually tested, may be relied upon to give correct values of this coefficient.

The following figures were obtained:

TABLE IV.

ELASTICITY OF YELLOW PINE TIMBER.

Size. Inches. b.	d.	l.	Weight. Lbs. per cu. ft.	Spec. Grav.	Maximum load. P.	Maximum deflection. Δ	$E = \frac{P_1 l^3}{4 \Delta b d^3}$ Average.
6.187	8.5	144	40.13	0.64	5460	0.7652	110,247(1)
6.75	8.	200	41.2	0.66	5813	3.8946	895,629
6.875	8.25	150 to 200	.....	.....	1850 to 5900	0.1875 to 2.29	1,768,070(2)
6.75	8.375	480	45.27	0.72	650	3.234	.....
Average of all experiments							1,387,156

(1) Average of trials at l = 150 to 200.
(2) Average of trials at l = 150 to 200, and beams in different positions.

In this table b, d and l are the dimensions of the cross-section of the beam and the length between supports. In some cases a beam is credited with an average value of E, it having been tested first on its edge and then on its side. Column l gives the distance between the supports. Wt is the weight of the wood; P is the maximum load in pounds; Δ, the maximum deflection in inches; and E is the coefficient of elasticity.

Nos. 1 and 2 of this lot were of poor quality; the latter, particularly, was somewhat shaky, yet it fairly represents much of the timber which finds its way into important constructions.

The latest work on the strength of timbers which has been consulted by the writer* gives the following values for $E_1 = \frac{W l^3}{16 \Delta b d^3}$ from which we obtain the proper moduli, $E = \frac{W l^3}{4 \Delta b d^3}$, as given beside them.

TABLE V.

STRENGTH AND ELASTICITY OF PINE TIMBER.

Wood.	Wt.	Spec. Grav.	$R = \frac{3}{2} \frac{l W}{b d^2}$†	$R = \frac{l W}{4 b d^2}$	$E = \frac{W l^3}{16 b \Delta d^3}$*	$E = \frac{W l^3}{4 \Delta b d^3}$†
Pitch Pine	39.37	0.63	14,088	2348	755,240	3,020,960
Dantzic Fir	36.37	0.58	13,806	2301	579,190	2,310,760
Can. Spruce	30.25	0.48	10,544	1759	771,800	3,087,200
" R. Pine	34.56	0.55	10,290	1715	588,900	2,355,600
" Y. Pine	34.87	0.56	8,454	1409	621,050	2,484,200

* Laslett on Timber and Timber Trees. London, 1875.
† Calculated from Laslett's Values.

From the whole series of experiments, of which the briefest possible statement of the results obtained is here given, the conclusion may be drawn that:

The elasticity of yellow pine timber as used in construction is very variable, the modulus varying from one to three millions, the average being about two millions in small sections, and a little above one and a half millions in large timber (Tables I, IV, V).

The highest values are as often given by green as by seasoned timber, and that, under sixteen square inches section and fifty-four inches length, at least, the magnitude of the modulus of elasticity is independent of the size of the piece (Table I).

The density of the wood does not determine the modulus; since the figure varies sometimes directly and sometimes inversely with the density, even where the wood is as nearly as possible in the same condition as to seasoning.

A high modulus usually accompanies high tenacity and great transverse strength, but it is not invariably the fact that maximum ultimate strength is accompanied by initial stiffness (Table I).

The *pseudo* moduli, determined by taking considerable deflections, are usually not greatly different from those determined from small deflections and light loads. The values of these moduli often decrease with increase in deflection (Table III).

An inspection of the woods tested plainly indicates, in the opinion of the writer, that the density of the pines is so considerably modified by the amount of pitch contained in the sap-channels that it cannot be regarded as indicative of the strength of the timber. Where quite free from sap the wood usually exhibits increase of strength and elastic resistance to deflection, with increase of density.

The strength of timber, otherwise similar, is greatly affected by its structure, and the resistance offered to stresses applied transversely is greatest when the sections of the timber taken transversely exhibit most nearly vertical lines of grain.

The modulus of rupture by transverse stress varies, for yellow pine from $R = \frac{3}{2} \frac{W l}{b d^2} = 10{,}000$ to 17,000, the highest values being usually obtained from well-seasoned wood. An average value may be taken as $R = 13{,}000$ for good timber, which in the formula $W = C \frac{b d^2}{l}$ gives $C = 866$ pounds, or, practically, $W = 9000 \frac{b d^2}{l}$, for good yellow pine.

The modulus of rupture varies as irregularly, and with as little regard to size or density of the material as does the coefficient for elasticity.

In the use of such materials, the only safe course for the designing and constructing engineer is evidently to adopt a moderate value of the modulus in proportioning his work, and by careful inspection and test to secure the rejection of all material which is not of good quality.

As has been seen, careful inspection may sometimes lead to the selection of material — like the Navy Yard stock here described — twenty-five per cent superior to the average of good timber, and fifty per cent more valuable than the lower grades such as are often sold in our markets.

BRIDGE DISASTERS IN AMERICA.[1] — II.

IT has been said that we know what one square inch of iron will hold. Like the question of loads, above examined, this is a matter which has been settled, at any rate within very narrow limits, by the experience of years of both European and American engineers. A bar of the best wrought-iron, one inch square, will not break under a tensile strain of less than 60,000 lbs. Only a small part of this, however, is to be used in practice. A bar or beam may be loaded with a greater weight, applied as a permanent or dead load, than would be safe as a moving or rolling weight. A load may be brought upon any material in an easy and gradual manner so as not to damage it, while the same load could not be suddenly and violently applied without injury. The margin for safety should be greater with a material liable to contain hidden defects than with one which is not so; and it should be greater for any member of a bridge which is subjected to several different kinds of strain than for one which has to resist only a single form of strain. Respect also should be had to the frequency with which any part is subjected to strain from a moving load, as this will manifestly influence its power of endurance. The rule in structures having so important an office to perform as railroad or highway bridges, should be, in all cases, absolute safety under all conditions.

The British Board of Trade fixes the greatest strain that shall come upon the material in a wrought-iron bridge, from the combined weight of the bridge and load, at 5 tons per square inch of the net section of the metal. The French practice allows $3\frac{3}{5}$ tons per square inch of the gross section of the metal, which, considering the amount taken out by rivet holes, is substantially the same as the English allowance. The report of the American Society above referred to recommends 10,000 lbs. per inch as the maximum for wrought-iron in tension in railroad bridges. For highway bridges, which are not subjected to such severe treatment, a unit strain of 15,000 lbs. per square inch is often allowed. A very common clause in a specification is that the *Factor of Safety* shall be four, five or six, as the case may be, meaning by this that the actual load shall not exceed one-fourth, one-fifth, or one-sixth part of the breaking load. It is a little unfortunate that this term, "factor of safety," has found its way into use just as it has, for it by no means indicates what is intended, or

[1] Portions of a paper by Prof. G. L. Vose, published by the *Railroad Gazette*.

what it is supposed to. The true margin for safety is not the difference between the working strain and the breaking strain, but between the working strain and that strain which will in any way unfit the material for use. Now any material is unfitted for use when it is so far distorted by overstraining that it cannot recover, or, technically speaking, when its elastic limit has been exceeded. The elastic limit of the best grades of iron is just about one-half the breaking weight, or from 25,000 to 30,000 lbs. per square inch; so that the working strain of 10,000 lbs. per inch gives a factor of safety of two and a half or three, instead of six. If the ratio between the elastic limit and the breaking weight, *i. e.*, if the *quality* of the iron were always the same, it might make no difference how we used our factor; but some iron is hard and brittle, while other iron is soft and ductile. A high breaking strength may be due to the toughness of the iron, or to the hardness of the iron. A soft and ductile iron will stretch more or less before breaking, while a hard iron will often snap short off without warning, and at the same time both may have the same breaking strength. A tough and ductile iron should bend double when cold without showing any signs of fracture, and should stretch fifteen per cent of its length before breaking; but much of the iron used in bridges, although it may hold 50,000 lbs. per inch before failing, will not bend over 90 degrees without cracking, and has an elastic limit as low as 18,000 lbs. It is thus full as important to specify that an iron should have a high elastic limit, as that it should have a high breaking weight. A specification, therefore, which allowed no material to be strained by more than 10,000 lbs. per inch, and no iron to be used with a less elastic limit than 25,000 lbs., would at the same time agree with the standard requirement both in England and in the United States, and would also secure a good quality of iron. . . .

We often hear it argued that a bridge must be safe since it has been submitted to a heavy load and did not break down. Such a test means absolutely nothing. It does not even show that the bridge will bear the same load again; much less does it show that it has the proper margin for safety. It simply shows that it did not break down at that time. Every rotten, worn-out and defective bridge that ever fell has been submitted to exactly that test. More than this, it has repeatedly happened that a heavy train has passed over a bridge in apparent safety, while a much lighter one, passing directly afterward, has gone through. In all such cases the structure has been weak and defective, and finally some heavy load passes over and cripples the bridge, so that the next load produces a disaster.

It is very common upon the completion of a bridge to do what is termed testing it. The common practice in England is to load each track with as many engines and tenders as the bridge will hold, and to measure the corresponding deflection. The proof-load varies from one and a half tons per foot on the shorter bridges to one ton per foot upon longer ones; but when the span exceeds 150 feet in length the load is made somewhat less. In France, the government rules for testing wrought-iron railway bridges are as follows: bridges under 66 feet span are loaded with a dead load of one and a half tons per running foot, while bridges over 66 feet span are loaded with 1 2-10 tons per foot. Besides the above proof, by dead weight, a train composed of two engines, each with its tender weighing at least 60 tons, and wagons each loaded with 12 tons, in sufficient number to cover one span, are run over the bridge at speeds from 12 to 22 miles an hour. A second trial is made with speeds from 25 to 43 miles an hour, with two engines, each with its tender weighing 35 tons, and wagons as in ordinary passenger trains, enough to cover one span. On double-track bridges two trains are made to cross, at first in parallel and then in opposite directions, so that the trains may meet at the centre.

Owing to the lack of any public supervision in the United States, no general method for testing either railroad or highway bridges exists. In some cases it is done, in some cases it is not. Bridges made by our first-class firms, under the direction of engineers, are tested in substantially the same manner as in Europe; but upon many of our smaller railroads, which cannot afford to keep an engineer, and generally in the case of highway bridges, no test is made in many instances for very obvious reasons. In one case of wretchedly cheap and unsafe highway bridge which came recently under the writer's notice, the County Commissioners, in order to quiet an impression which had arisen that the bridge was not altogether sound, tested a span 122 feet long with a load *estimated* to weigh 58,600 lbs., or 480 lbs. per running foot for a double roadway. The commissioners remarked that they considered this a satisfactory test, as it was not probable that a greater weight than this would ever be applied to the bridge; and added that the test was made merely to satisfy the public that the bridge was abundantly safe for all practical uses. The public would, no doubt, have been satisfied that the Ashtabula bridge was abundantly safe for all practical uses had it stood on that bridge in the morning and seen a heavy freight train go over it; and yet that very bridge broke down directly afterward under a passenger train. Now, according to the common notion that was a good bridge in the morning, and a very bad bridge, or rather no bridge at all, in the evening. The question for the public is: When did it cease to be a good bridge and begin to be a bad one? A test like the one referred to above can do no more than illustrate the ignorance or lack of honesty of those who make it, or those who are satisfied with it. Such a test might come within a dozen pounds of breaking the bridge down and no one would be the wiser.

For the test of a bridge to be in any way satisfactory, we must know just what effect such test has had upon the structure. We do not find this out by simply standing near and noting that the bridge did not break down. We must, in the first place, compute the strains which the load throws upon each part of the bridge, and see that no member is over-strained. We must next measure precisely the amount by which the bridge is depressed under the load, and also how far the work recovers from such depression when the load is removed. A locomotive, when first run on to a bridge, will produce a certain depression — first, by the closing up and stretching of the joints, and secondly by the elongation and compression of the material. If the load is left on for a considerable time the depression will be seen to have slightly increased; but after a longer time it will cease, the bridge having adapted itself to the new conditions imposed upon it. When the load is removed, the work will recover its first position, less a small amount, termed the permanent *set*. So long as the load is kept within the proper limits this permanent set is not increased by any number of subsequent applications of the force that produced it, and no harm is done; but when the load is so great that each application of the force increases the set, we have passed the elastic limit, and failure is only a question of time. It is important therefore to put the load on a second time, and to be sure that the bridge does not go below the point reached at first. In some cases a second application of the load has appeared to increase the permanent depression; but it is quite likely that in such instances the time during which the load was applied at first was too short for the full effect to show itself. Ample time, too, should be allowed for the material to recover after the removal of the load. Mr. Stoney states that the set of wrought-iron relaxes to a considerable extent, even after the lapse of several days after the load has been removed.

In view of the preceding, what shall we say of a bridge company that deliberately builds a bridge in the middle of a large town, where it will be subjected to heavy teaming, and, owing to its peculiar location, to heavy crowds, and warrants to the town that it shall hold a ton to the running foot, when the very simplest computation shows beyond any chance of dispute that such a load will strain the iron to 40,000 lbs. per square inch? We are to say either that such a company is so ignorant that it does not know the difference between a good bridge and a bad one, or else so wicked as to knowingly subject the public to a wretchedly unsafe bridge.

The case referred to is not an imaginary one, but exists to-day in the main street of a large New England town. The joints in that bridge which will safely hold but 20,000 lbs. will be required to hold 60,000 lbs. under a load of one ton per lineal foot, which the builders have warranted the bridge to carry safely. The case was so bad that, after a lengthy controversy, the town officers called a commission, and had a thorough expert examination of the bridge. The commission reported as follows: first, "The bridge in its present condition might carry with tolerable safety the ordinary daily traffic to which it is now subjected;" second, "If a span of this bridge should at any time be subjected to a closely-packed mass of people on the clean bridge, or a loosely-packed crowd on top of a heavy accumulation of ice or snow, it would in either of these cases be in imminent danger of falling, and would be so over-strained as to unfit it for even moderate service;" third, "If the span should have a heavy accumulation of ice or snow on it, and in that condition be subjected to a close-packed mass of people, it would certainly fall." The commission further reported that the bridge at one place had a factor of safety of only $1\frac{15}{100}$; and as this factor refers to the breaking weight, and not to the elastic limit, the real factor would be about *one-half;* or, in other words, half the load which is at any time liable to come upon the bridge will strain it beyond the elastic limit, while $1\frac{15}{100}$ times the load will break it down.

Notwithstanding all this, and in the face of this report, the president of the bridge company came out with the statement in the papers that he "pronounced the bridge perfectly safe." Thus we actually have the president of a bridge company in this country stating plainly that a factor of $1\frac{15}{100}$, referred to the breaking weight, makes a bridge "perfectly safe"; for he very wisely made not the slightest attempt to disprove any of the conclusions of the commission; and this company has built hundreds of highway bridges all over the United States, and is building them to-day wherever it can find town or county officers ignorant enough or wicked enough to buy them.

It might be supposed that under the above condemnation the authorities controlling the bridge would have taken some steps to prevent the coming disaster. They did, however, nothing of the kind; but allowed the public to travel over it for more than a year, at the most fearful risk, until public indignation became so strong that a special town-meeting was called, and a committee appointed to remove the old bridge and to build a new one. This is only one of many cases just as bad which happen to be within the writer's knowledge.

The Ashtabula bridge, it is stated in the Ohio report above referred to, had factors — we can hardly call them factors of safety — in some parts as low as $1\frac{6}{10}$ and $1\frac{2}{10}$, such factors referring to breaking weight; and even these factors were obtained by assuming the load as at rest, and making no allowance for the jar and shock from a railway train in motion. Well may the commissioners say as they do at the end of their report: "The bridge was liable to go down at any time during the last ten or eleven years, under the loads that might at any time be brought upon it in the ordinary course of the

company's business, and it is most remarkable that it did not sooner occur."

One point always brought forth when an iron bridge breaks down, is the supposed deterioration of iron under repeated straining, and we are gravely told that after a while all iron loses its fibre and becomes crystalline. This is one of the "mysteries" which some persons conjure up at tolerably regular intervals to cover their ignorance. It is perfectly well known by engineers the world over, that with good iron properly used, nothing of the kind ever takes place. This matter used to be a favorite bone of contention among engineers, but it has long since been laid upon the shelf. No engineer at the present day ever thinks of it. We have only to allow the proper margin for safety, as our first-class builders all do, and this antiquated objection at once vanishes. The examples of the long duration of iron in large bridges are numerous and conclusive. The Niagara Falls railroad suspension bridge was carefully inspected after 22 years of continued use under frequent and heavy trains, and not only was it impossible to detect by the severest tests any deterioration of the wire in the cables, but a piece of it being thrown upon the floor curled up showing the old "kink" which the iron had when made. The Menai suspension bridge, in which 1,000 tons of iron have hung suspended across an opening of nearly 600 feet for 55 years, shows no depreciation that the most rigid inspection could detect. Iron rods recently taken from an old wooden bridge after 60 years of use have been carefully tested, and found to have lost nothing either of the original breaking strength or of the original elasticity.

The question is frequently asked, does not extreme cold weaken iron bridges. To this may be replied that no iron bridge made by a reliable company has ever shown the slightest indication of anything of the kind, though they have been used for many years in Russia, Norway, Sweden and Canada; and nothing that we know in regard to iron gives us any reason to suppose that anything of the kind ever will happen. But here again the whole question turns upon the quality of the iron. Iron containing phosphorus is "cold-short," or brittle, when cold, and will break quicker under repeated and sudden shocks in cold weather than when it is warm. It is a well-known fact that a good many more rails break upon New England railroads in winter than in summer. In Scandinavia this is not the case, simply because the iron used in that country is of the best quality. In the words of Mr. Sandberg, the great Swedish authority on iron, "Rails made of suitable iron with a proper section will not break in winter. In Scandinavia, with a climate more severe than in America, no accident has occurred from broken rails. But a very small part of the rails shipped to America will stand the proper tests. Iron highly impregnated with phosphorus, or cold-short iron, is utterly unfit for railroad purposes in countries subject to great and sudden changes of temperature." An immense number of experiments upon all sorts of iron show conclusively that cold has no effect whatever upon the strength of good iron. The securing such iron is a matter to which the utmost attention is paid by our first-class bridge-building firms; but it is a matter to which no attention is paid by the builders of cheap bridges. We might suppose that a person in putting an insufficient amount of iron into a bridge would be careful to get the best quality; but exactly the reverse seems to be the case; on the ground, perhaps, that the less of a bad thing we have the better.

THE ILLUSTRATIONS.

STABLE, WITH DETAILS, CORNWALL, PA. MR. W. BLEDDYN POWELL, ARCHITECT, LEBANON, PA.

THIS stable building was erected some fifteen months ago for the heirs of Robert W. Coleman. The structure is built of local red sandstone, the court-yard walls being of brick laid in cement-mortar. The lumber throughout is seasoned Georgia pine, planed smooth, and hard finished. Underground drainage, pressed brick belt-course and window-heads were required by the drawings, together with interior walls and linings of Philadelphia pressed brick. For the above were substituted surface drainage, stone belt-course and window-heads, and local stock brick were used in walls and linings. The stall fixtures are of wrought and cast iron.

OLD DUTCH HOUSE, NEW YORK, N. Y. SKETCHED BY MR. MAX SCHROFF, ARCHITECT.

SKETCH FOR A HOUSE AT HARTFORD, CONN. MESSRS. KIMBALL & WISEDELL, ARCHITECTS, NEW YORK, N. Y.

THE WORKS OF WILLIAM BLAKE. — II.

IN referring to the "Book of Job" I have touched upon the most perfect product of Blake's long and laborious life. The designs to Blair's "Grave" are wonderfully fine, and I have no doubt would have been somewhat more powerful, if less beautiful, had Blake instead of Schiavonetti etched them. In the "Job" he has done better still, has chosen a style of work in which he especially excelled, has executed it with marvellous perfection, and has certainly rendered his thoughts as no other man could have rendered them for him. Any one plate taken alone is a master-piece. The whole series together, so coherent, so well-sustained, so equal in merit, so on a par, I had almost said, with the work of the poet he interprets, make one of the finest and completest works of imaginative art the world has ever seen. I cannot at all agree with Mr. Rossetti when he says, in the preface to Mr. Gilchrist's "Life," that the small photo-lithographic reproduction of the plates which are given with the second volume are good reproductions, which, in spite of certain imperfections, are "line for line and touch for touch the counterparts of their originals," and may, "on the whole, be safely put forward as giving a very sufficient idea of these, quite complete, indeed, in many of the most essential respects." They are better than nothing, it is true, and better than the two or three plates reproduced in another manner, which are printed with the first volume. To any one who has seen the original plates the reproductions recall them very fairly, though with a sense of all that has been lost in the process. Any one who has never seen the copperplates, however, can get from these illustrations no idea of the wonderful force and beauty of the originals, nor of the perfection of their technical execution. The linear work is absolutely perfect. There is not the suspicion of a dotted or blurred appearance such as we see in the lithographs. In these the sharpness, the definiteness, the vigor of line, has well-nigh disappeared, and the scale is so small, moreover, that the beauty of feature which distinguishes many of the figures cannot be suspected. Whatever may be Blake's defects in technique in some of his works, this Book of Job is free from them. The use of line to express variety and depth of *chiar' oscuro* and such intangible things as flame and vapor and whirlwinds, is audacious and successful beyond parallel. If there are one or two lapses from conventionally correct drawing we feel that they have been deliberately made with the purpose of emphasizing the dominant idea, not that they have been unfelt or disregarded by the artist. The imaginative power which has realized for us so definitely the transcendent visions of the Chaldean shows itself almost equally in every plate of the series. The straightforward *naïveté* of the means employed in its expression recalls the early days of some great school, not the manner usual with an artist who is heir to all the ages and whose mind is impregnated with the manners and the mannerisms of a dozen generations. It is difficult to believe that Blake lived in the age he did and among the men who actually were his contemporaries. It is difficult to believe that England, whose artists have been poorer in deep artistic imagination than those of any other nation, can claim him as her own. It is difficult to realize that Stothard, with his graceful shallowness, was the most popular of his brethren, and that Flaxman was the greatest artist among his living countrymen. There is nothing in modern art to compare for original, daring, unreflective energy with the gesture of the Almighty in Plate 15, "Behold now Behemoth which I made," nothing to equal the rhythmic grace of composition in the last design of the series, nothing to exceed the beauty of the principal figure in Plate 12, "I am young and ye are very old," and, I think, no representation of the Omnipotent in any art whatever, to match for definiteness, and at the same time for supernatural majesty, that of Plate 9, "Then a spirit passed before my face." It is unnecessary to point in detail to all the numbers of this wonderful series, one of the noblest, completest monuments to the imaginative side of an artist's nature that the art of any nation has bequeathed us. Looking at it one feels remorseful for having so much as contrasted its creator with a journeyman of art like Doré. If I did so it was only to emphasize Blake's peculiar kind of power by comparing it with the work, not of those men who have been nearest to him in point of power, but with the most popular and best-known of those who have worked upon subjects similar to his. I may add, in conclusion, that perhaps the most remarkable trait to be found in the art of William Blake is its entire originality, not only in his compositions as such, and the ideas which they express, but also in the types he uses. Beautiful as his figures are, they have no flavor of the beauty to which we have been accustomed in any of the schools of former days. There is no plagiarism, conscious or unconscious, and no eclecticism in his art, which was, if any art has ever been, the characteristic outcome of his own uninfluenced personality.

The most interesting point that is suggested by a study of Blake, is the old question of the rival claims of imagination and technique to be the principal factor in graphic art of the very highest kind. Reading this and all other eulogies of Blake, it may seem at first sight as if the imagination were the one important thing. Here is a man who could not paint at all, in the true sense of the word, who never even attempted it on a large scale; a man, moreover, of variable strength in the narrow sort of work to which he limited himself, a man whose master-piece is contained on some twenty pages a few inches square, done in line work and printed in black and white. Some of his most masterly conceptions are not well executed even, for the confined manner that he chose. Some speak to us with thrilling power and beauty, in spite of color that is ugly and lines that are incorrect. And we rank him for true kind and high grade of artistic imagination with Michael Angelo, and perhaps with no one else.

With such a record as this, what need of technical accomplishment to vie with the great ones of the earth? Is it not a record subversive of all doctrines that claim technical accomplishment as the first thing in the making of an artist? If we think a moment, however, the conclusion to which we must come will be just the reverse of such conclusions as these. The study of Blake must prove, — and prove more forcibly than the study of any other artist, good or bad, — that technique is, after all, very nearly the one thing needful, the one thing without which the very greatest mental endowments are of small profit to the world, small use to art, and the artists that come after. Our first thought, on looking at such a work as the "Job," or such single subjects as "Death's Door," or the "Glad New Day," is one of thankfulness that the world has seen an artist with so great and so artistic an endowment. But as we get to know his work, to appreciate its wonderful depth of meaning and wonderful share of beauty, we are assailed by the thought: What if this man had been a great *painter*, as well as a great imaginative artist? And we are forever after consumed with regret that to him was not given the brush of a Velasquez or a Rubens, nay, of a Giulio, Romano, or of a Bolognese, even. A partially complete training in a painter's trade, a skill such as those possessed who rank as secondary in their art, would have made Blake widely famous for all ages, while with an endowment and an accomplishment like the greatest among painters, it is impossible to say where he might not to-day be placed. It is impossible to say whether any of the names we now rank as first and greatest would have outranked his own. I have said that there is nothing extant in art which for power and artistic excellence of conception surpasses the "Job." I have also said that its execution is admirable *in its way*. But consider a moment what the world would have seen if it had been equally well executed in *another* way. In speaking of the designs to Blair's Grave, Mr. Gilchrist says, "Such designs are in motive, spirit, and manner of embodiment, without parallel, and enlarge the boundaries of art. Such art ranks with that of the greatest eras, is of the same sublime reach and pure quality. What signifies it that these drawings cover but a few inches and are executed in water-colors instead of oils or fresco?" Such words of praise are not a whit too strong, but surely, that signifies much to us which Mr. Gilchrist says signifies not at all. The designs are wonderful as we have them, but let us imagine them differently presented to us. Let us imagine the "Death's Door," or the exquisitely beautiful "Meeting of a Family in Heaven," in great frescoes on a sanctuary wall. Let us imagine that which is, perhaps, the finest of the "Job" series, the "Sons of God shouted for Joy," so displayed in colossal proportions. It is the strongest proof of the unsurpassable *rightness*, artistically speaking, of Blake's conceptions, that we can thus imagine them without the alteration of a line or a detail. The Sons of God is an absolutely perfect composition in the grandest of "grand styles." Raphael him-

self could not improve it in composition, in expressiveness, or in beauty. Let us imagine it painted with Raphael's perfection or with the perfection of some one who, as painter proper, has been even greater than he. Shall we say with Mr. Gilchrist that it matters not *how* Blake has left it to us? Having once become possessed by this idea we can hardly believe, in looking at the "Job" or others of his greatest works, that we are seeing the true originals. We have the same sensation that we get in looking at small prints known to be from greater compositions. We are convinced that we see but a hint of the actual things, are eagerly dissatisfied that we cannot see them as the artist did — in vast frescoes, cool, clear, stately and splendid, or on great canvases, deep, rich and tremendous, with all the grandeur of mighty lines, and all the force of intensest color. Look once more at the "Sons of God." The arrangement is on so grand a scale, is so architectural, indeed, that we can scarcely believe it was intended originally for just this little square of copper, and in some of the other prints the *chiar' oscuro* is so sublime that we doubt whether it could have been thus designed in tiny, rigid lines of black and white, whether it has not rather been translated here from some comprehensive, successful scheme of color. Put these prints beside a set from the Sistine ceiling. Imagine the last-named to be their own originals, and say whether the world would not be the loser. And then say whether it does not matter that Blake was merely a magnificently imaginative artist and was not also a magnificent painter. The difference is only that instead of ranking as he should with Michael Angelo and Orcagna and Tintoret, instead of being one of the glories of the whole world, he is the beloved of a few connoissieurs, the delight of a few students who are willing to go into the by-ways of art for treasure, a king among artists, defrauded forever of his birthright of influence and fame. It is of no avail to preach about and praise him, and call the world blind and stupid because it sees him not. He could have swayed it at his will had he possessed the language of his art. Possessing it not he can only speak, now or ever, to those who so thoroughly understand it and so keenly love its every syllable that they can listen to his small and unimpressive voice, and gather from its so often stammering speech the mighty meanings he intends.

Whether the fault of his technical inefficiency was in him or in his surroundings, does not at all affect the poignancy of our regret that it existed. It matters not to the world whether he was a great potential painter uneducated, dwarfed and stultified, or a half-endowed man, who could never have been a painter under any circumstances whatever. To my mind the former definition seems, however, to suit him best, or at all events to tally best with our sense of the eternal fitness of things. It is distressing to think of a talent such as one imagines his might have been, entirely smothered by the time and circumstances of his life. But it is still more disagreeable to think that nature ever worked so badly as to give an artist such as Blake a maimed right hand and an eye that was blank to the charms and power of color.

M. G. van Rensselaer.

STUDENT LIFE IN A FRENCH ATELIER.

Paris.

Monday began the drawing.[1] Met at 10.30 at the school; rush, heat, and an idea of not knowing exactly what to do. Names called. At the nearest approach to mine I rushed in, got a fair seat and saw a wild-looking cast of enormous proportions, with leaves, bad forms, chipped corners, etc. C. at my side we sailed in, he in crayon, I in pencil, as recommended. 10.30 — 12.30 — then a hot breakfast in a hotter restaurant. 1.30 — 3.30, — drawing. We gave greatest care to "placing" it and getting proportions down fine, and, this *concours* lasting three days of four hours each, spent nearly six hours in charcoal-placing — too long for charcoal. Then finished in pencil; C. in crayon "sauce." We did not get ours finished the last hour and last day, but we were hopeful, I particularly, as I drew the cast just as I saw it, imperfections and all, and made a vigorous pencil drawing, the upper part well finished. They thought I was "all right." I thought their drawing dangerously soft, though I had avoided hard outlines in following the cast. Thursday we went *en loge* with our drawing-boards and all our materials for the *concours*. *Esquisse d'architecture*. Such a hot rabble waiting on the stairs, with water poured on you from above by the fellows "*en loge*" for the *grand prix*. At last in a nasty attic under the roof, with little stalls all along the side of an immense room, for the first time *les Americains* found themselves *en loge* for a twelve hours' sketch; 9 A. M. to 9 P. M., — no going out. The French howled most of the time. These aspirants have been up once or twice before, and consider it highly knowing to be very noisy and very indecent. The first hours are generally spent in rushing about singing and howling at poor Père P., who "runs" the examinations. We were in stalls side by side, each with a Frenchman. Mine was a wild-looking, long-haired, scraggy-bearded, ebonized-finger-nailed boy, who rather looked down on me for never having been *en loge* before. The *projet* was a "*chauffoir*," with *portique*, *buvette*, etc.; but "*buvette*" is not a bar as I thought, but a tap-room. The great thing is to carry a pocket Vignola into these examinations, to crib the "orders" from. Every one does this with great success, it only being necessary to hide it when Père P. comes round to sign your sheet. The guardians are good fellows and make no fuss, and they generally go along ahead with the inkstand and say "*Prenez-garde! Père P.*" But that is not necessary, for when he, the old fossil, starts on his tour, the cry goes up, long and loud, "*Père P.! Cachez vos Vignoles.*" They insult that man abominably and continuously. We eat there. I ate one meal and worked like a dog, finishing at nine by the light of a candle stuck in a bit of wood, and we thought that we had "ragged" things, for certainly we were better prepared than the French, if we did the right thing. How I hate the thought of that hot day under the roof with a window like a coal-hole. I tried to make a straightforward design, but in my hurry at the last left things out, such as windows in my attic, and my section showed no attic. That night we dragged home our stiff legs, oh! so tired. C.'s was very good, W.'s rather brutal, and we thought mine was quite good and Frenchy, with background, etc., thrown in. Friday we ground all day. I found X., who pointed out *bêtises* in my *chauffoir*, and said I needed to do *projets* and sketches *on time*. He said my *dessin* was "*bien dessiné*" and "*moins mal*" than my *chauffoir*, though he said *it* was not bad. But my section gave me away. My *buvette* was not big enough, as I made a kind of bar of it. From all I can learn, in drawing they want the cast interpreted and restored in good firm outline, and you must do that first and then finish and work up what you can, but draw it all carefully first. I drew mine in soft pencil on charcoal paper — which I should not do again. . . .

When these examinations are over, we want to go somewhere and rest, and sketch, and be decently cool; but we don't know where to go. We have been having some fine baths in the Ecole Nationale de Natation, a great bath-house on the Seine, where all the best swimmers in Paris go — mostly English. It is immense; for a franc you get the use of a small amount of bathing-clothes, a *peignoir*, and a nice *cabinet*, and it is "boss," as the American boys say, to lie round in the sun and water. There is lots of fine diving and fancy movements in the gymnastic line, that would amuse any young gymnast. An hour or so there, after an examination, is great and refreshing, as C. would not let us study during the *concours*. C. and I have begun drawing at the school, where there are no end of casts, busts, ornaments — everything one can wish. There is what was once the court of the school now covered in and filled with casts, models, etc., including a full-sized corner of the Parthenon in all its grandeur. Stunning place, and beautifully decorated in Pompeian colors and Greek designs; but for all that it is cold, very cold, and when we finish our bits of ornament, we shall try a room "*chauffé*." Some casts are awfully convenient; you can take down any ornament you please, place it, and draw from it. These Frenchmen give you a chance to do things, if they don't quite appreciate what you do, on all occasions. This drawing keeps me busy till breakfast, and until one I have my boy, S., and talk to him as if I had always found "descriptive" the simplest thing in the world, which is a lie. But I am *plus fort* in that beautiful science now. At one we go out, and spend the rest of the day in the *atelier*, and that makes a good deal of time, as the fellows all work by candle-light, and only leave at dinner-time. About four, we all *cherchons* our *bougies* in iron holders like paper-weights, and then the darkness is relieved by spots of light, till, one by one, the *bougies* are put out and the men go home, with a shake all round. The *patron* is very encouraging toward my little *projet*, and but for an indefinite feeling of newness and desire to do what he wants, I ought to have had it done. . . .

This afternoon I went rummaging round with C. in my favorite Marais, where was once the Swamp of Paris; the palaces and hotels of kings, princes, and swells, and a few Renaissance hotels, now mostly used for shops and schools. Such a change! but I enjoy it, and enjoy the idea of the swells who once lived there. They are mostly of one type, *grande porte d'entrée*, with *concierge*, etc., on one side, and *cuisine* and stables on the ground floor, and magnificence above, all on a square court, with only the great door and small *pièces* (as the French call rooms in general) separating the court from the street. That is the type of a French house for small families. You drive into your *hôtel*, the *porte* closes, and you and your horses are *chez-vous*. I am greatly pleased with the Hôtel de Madame de Sevigné. This has a court surrounded by bas-reliefs by Jean Goujon and other great Renaissance sculptors, of the seasons, etc. And here congregated the wit and talent of her bright reign in Paris. Now, it is a library and Renaissance museum, whence I am driven out on Sundays by a very ferocious *concierge*. I am getting to be an immense guide to Paris, and think of advertising to take ignorant Americans to see the sights; but before that I must see the sewers and the catacombs. One does not do lots of things here because there is so much *fil rouge* or red-tape to be gone through to get tickets, and if you can do it any time, you don't do it. . . .

The other morning we went out to St. Germain-en-Laye, where we had none of us been. The moment we left the train, we felt gay at being in the country once more and coming out of the station, each exclaimed in turn, "By thunder!" for there close by, is the old château in brick and stone, the old château of Francis I, where all the kings of France lived up to Louis XIV, who was born there; so that around the pavilion of Henry IV, the ingenious gardener has cut the box-tops into cradles. We had a stunning French breakfast close by, and then took a walk to the *terrasse* which is justly famous. Imagine a walk and driveway one hundred and fifteen feet wide built out on the very brow of a steep hill overlooking the Seine, and the valley stretching far away to Paris, and this magnificent terrace with its stone wall, and fine rows of old trees backed by the forest, extending for one and a quarter miles, as straight as an arrow. The view is superb, overlooking river and valley all rich in browns and russets and reds, and softened by the haze which even in winter tones French landscapes into pictures; you see Mt. Valerien far away, and sweeping round it the Seine, till it flows past the high brow of the hill where the old aqueduct, the work of kings, stands out against the sky to tell its tale; and then the river seems to flow almost at your feet and to carry on the line of old scows which float lazily along in the afternoon sun; here it makes a big bend and sweeps round the great forest of ten thousand acres, (a neat bit of woods) and on to Rouen. Louis XV, after spending heaps of money here thought it made him "blue" to be so near St. Denis, where his "folks" lay buried like "the Parsees to Baldwin," so he let the unfortunate James II of England, and his beggarly court, stay and die there, and began to build at Versailles, which was then a swamp and sand-hole, and

[1] The first examinations to be passed by an *aspirant* who wishes to enter the Ecole des Beaux-Arts are in free-hand drawing and in architecture.

thousands of men, soldiers of France, died in filling in the swamps and digging ponds. The whole *parterre* is built up on masonry arches. This is what great monarchs can do. We walked in the woods, cut canes, which was against the rules, no doubt; wandering in paths stretching off as far as the eye could reach, and through the crisp, dry leaves, which make such a noise. Think of staying in the house where Louis XIV was born, which is now a hotel, and is at the end of the terrace on the brow of the hill, with such view and air, (and prices)! We dined together at F's, in a little *cabinet particulier* and had a very jolly, interesting day. . . .

Monday night was the reunion of *les anciens de l'atelier X.*, and lots of old, black-bearded men came, and seemed festive and gay, and showed that years had not entirely deprived them of their power of making a big noise and *blaguing nouveaux*. We had a slight supper, and music, all sitting on stools round the long tables, which were pulled together in the middle of the *atelier*. The music consisted of a violin played by ear, a mandolin played without ear, and a banjo, with one string gone, played by C. Immense effect! But loud singing — mostly the *chanson Americaine* — subdued any discordant instrumentation into a general discord, and, after the cakes and wine and burning punch, they called for "*le danse Americain, W., W.*" He modestly declined before so many *anciens*, but they insisted, and put him on the table. Oh, you would have laughed, all of you good people, to have seen me on the tables, dancing jigs before all these Frenchmen. They howled and cried, "*bis, bis, encore*," and pounded, and all. Then they called for a *rapin*. I am not considered a *rapin* — only a *sauvage*, or *Americain*. One unfortunate *rapin* was present, and he a much-despised one, and they didn't treat him very well; threw things at him, made him dance, and then told him he didn't do it right; made him sing, and generally *blagued* him, which I enjoyed, as he is a disagreeable fellow, and finally, at an early hour, all dispersed. . . .

We have a sub-patron now who seems to be a very good fellow, but I do not see how both fellows can work together in all cases, though a *patron* coming in each day is good for the work, and shows that the *patron* is alive to his charge.

Christmas in the *atelier* will be a great time in spite of its being *charrette* week. They have food and drink, and song and dance, and C. is going to bring in his banjo, and we expect to increase our rising reputation as songsters.

Saturday night we had a howl and I introduced a burlesque dance, which excited them beyond control, and they rushed into line and danced in the most regardless manner till they could dance no longer. Oh, they think the *Americains* are *incroyables*, — and they are in most ways. — *Extracts from private letters.*

HOW TO PROTECT COMBUSTIBLE ROOFS.

WASHINGTON, D. C., Oct. 20, 1880.

TO THE EDITOR OF THE AMERICAN ARCHITECT: —

Mr. Atkinson has contributed to your columns very interesting and valuable articles on "slow combustion construction." One feature in these buildings seems to me to be wanting.

The factories he recommends are preferably of one story only, and this, where land is not too valuable, undoubtedly is the safest and the best construction. But this system leads to great horizontal extension, and valuable machinery and material and products are collected in extensive halls, and all are covered and shut in by the same slowly combustible roof.

The flame and heated products of combustion, when a fire breaks out among the inflammable material on the floor, rise to the roof. They find there no outlet, and spread right and left, until the whole wide roof is fired, and, falling in, the whole building and its contents are destroyed, or, before this happens, the heat, confined and concentrated, sets all the contents of the room on fire. This happened lately in the Manhattan Market. The great exhibition held many years since in Reservoir Square, New York, perished wholly in the same way. I remember an earlier example: —

I watched with interest the construction along the water's edge, in Detroit, on the Detroit River, of a great railway depot. It was perhaps 100 or 150 feet wide, and 800 to 1,000 feet in length — a great and not lofty hall. Brick walls supported a wooden roof, which was sheeted with wood and covered with slate laid on one or two inches of plastering-mortar intended to be fire-proof; so it was from the outside; fire-proof paint coated all the wood-work. But fire broke out among the freight alongside the railroad tracks. The smoke and flame could not escape through the roof. Flames and smoke filled the end of the building and drove off the firemen. They rolled along under the roof and involved the destruction of everything within the walls.

Ever since that catastrophe I have been of opinion that while the roof of such a building should be able to resist sparks and flying brands from the outside, it should have, at moderate intervals, spaces easily destroyed by heat or flame, which would give early vent to smoke and fire, and act as chimneys to permit these destructive products of a conflagration to escape into the outer air, and thus to create draughts from all directions towards the burning goods, instead of spreading overhead in confinement and carrying destruction through the whole building. Sky-lights with vertical wooden sashes, glazed with thin glass which will soon break would afford this needed outlet, and would save many buildings now destroyed. Thick glass should not be used; it resists fire too long.

We build large fires on open hearths in costly dwellings. The flame and unhappily the greater part of the heat ascend and escape up the chimney-flue, and the fire does good, instead of harm; is safe, instead of dangerous. But stop up the chimney-flue and how soon are the ceilings and the upper parts of the walls defaced with smoke and heated by contact with heated gases until finally the whole house is destroyed for want of that outlet for the products of combustion, which produces the centripetal draughts of air which prevent the fire on the hearth from spreading itself over the room.

Very respectfully, your obedient servant, M. C. MEIGS.

A CORRECTION.

NEW YORK, Oct. 19, 1880.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Gentlemen, — I have just noticed a slight error in your notes under "Architect's Charges," p. 189 of last Saturday's issue.

I am a member of the Institute's Committee on Publications, but not its Secretary. The duties remaining to the office were kindly undertaken, in addition to his own, by its Chairman, Mr. E. T. Littell, 111 Broadway.

My address since last May has not been 128, but 335 Broadway.

A. J. BLOOR.

ANOTHER CORRECTION.

MR. RICHARD M. HUNT desires us to say that the oriel window published in the *American Architect* for October 23 is not, as stated, from the house of C. Vanderbilt, Esq., but from that building for W. K. Vanderbilt, Esq., after his designs.

LOG CABINS.

WE have received a letter from a correspondent which closes with these words: "It would be a great boon to the South and West if you would publish designs of *artistic* log cabins. Log houses are comfortable: they might also be made pretty."

We can hardly expect that many architects have ever been called on to design a log hut; but should there be any who have done so, or any who have made sketches of those they have come across in this country or abroad in vacation tours, they will be sure of gratifying one person at least by giving us the opportunity of publishing them.

THE AMERICAN ARCHITECT AND BUILDING NEWS COMPETITION.

STEELTON, PA., Oct. 18, 1880.

TO THE EDITOR OF THE AMERICAN ARCHITECT: —

Sir, — Seeing in the programme laid down for the guidance of competitors in the above "competition," that provision shall be made for a resting-place for the "row-boys," I should esteem it a great favor if you would kindly explain the meaning of the term employed, and for what purpose they are used. Having only recently arrived in this country I must plead ignorance to a few of its technicalities.

Yours, J. C. S.

[Row-boys or call-boys are the waiters who are constantly in attendance in the hall to answer the orders of the hotel clerk or the calls of the occupants of the different rooms. A seat is usually provided for them where they sit in a row — hence the name — when unoccupied, opposite the electric, or other, annunciator. EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS.

TERRA-COTTA STABLE DECORATIONS. — The New York *Sun* gives this description of the terra-cotta medallions executed for the stable of Mr. Cornelius Vanderbilt, by E. Kemeys. "Bursting from the wall to the right of the carriage door is the head of a noble stallion. The neck of the beast is arched in a manner that conveys an idea of strong excitement, if not fury, in the brute. His eyes bulge from his head, his nostrils are dilated, the cords of his neck are swollen, his jaws are set. He seems to be tearing his way through the wall toward the other figure on the opposite side of the arch. This other figure is the head and neck of a mare — of a slender-nosed, small-featured, almost deer-like animal. The mare's eyes are on the stallion. She looks at him sideways from under fringed eyelids. Her face expresses mischief, timidity, hesitation. These figures are cast in terra-cotta. So much action, grace and fidelity to nature were never before seen in the architectural ornamentation of a stable. Mr. Kemeys has added the heads of three dogs in terrra-cotta for the medallions between the dormer windows. The central head is as big as half a flour barrel. It is the head of a Siberian blood-hound. The under jaw droops, the tongue lolls out, and the eyes leer. To the left is a mastiff's head, and on the other side the massive face of a bull-dog."

A NEW USE FOR MINERAL WOOL. — Mr. Wentworth Scott recommends the employment of mineral wool as a disinfectant. By impregnating the mineral wool with carbolic acid, thymol or iodine, for instance, and passing a current of air through the mass, which, for such purpose is conveniently contained in a box or case, the opposite sides of which are perforated, the air will then be incapable of communicating disease germs, however foul it may previously have been. If eucalyptus oil or other oderous substance be substituted for the preceding, the wool will impart an agreeable fragrance to the air currents passing through it. The mineral wool may be renewed at any time, even if clogged with much dust and organic matter, by simple baking in a hot oven for a short time, and can then, of course, be charged again. Mr. Scott proposes to use these hygienic screens in connection with the doors and windows of hospitals, schools, public buildings and private dwellings. A form of safety respirator, for the use of nurses and others, on the same principle, is also suggested.

An Incident of Architectural Etiquette. — Amongst the club-houses of Pall Mall there is one which is famous for more reasons than most. Socially it stands pretty much as it ought. Politically it is the very headquarters of a party. Architecturally it is the *chef-d'œuvre* of a distinguished artist. . . . The club committee in question having determined to reconstruct on an enlarged scheme one of their noble apartments, called in, not as our readers might imagine, some leading architect; certainly not any one who might claim an interest in the memory of the great man who designed the building; not even, in this instance, a second-rate practitioner, or a third or fourth rate, or any other rate; not even a "surveyor." A sanitary engineer is consulted for some inscrutable reason, connected possibly with the recondite mysteries of Tobin's pipes, but for the preparation of the plans the person actually consulted is a local builder, and one who, with all his merits, will scarcely venture to call himself, even locally eminent. His name, for instance, is not Cubitt, nor anything within a long way of it. So the plans are prepared, no doubt by one of those practical draughtsmen who work for the building trade in a way so dreadfully practical as to ignore art and science altogether. The builder's name is frankly inscribed on the corner as the responsible author of this effusion of genius; and thus perfected, the shabby sheet of spoilt paper is duly submitted to the enlightened authorities of the club. What takes place in the privacy of the committee-room we are not privileged to know. We hope it may be the case that some great statesman, some great author, or even only some great ass for his pains, turns pale at the sight of the humble name upon the drawing, and exclaims: "Is this how we treat a work of Sir Blank Blank's?" Possibly some less eminent member contents himself with suggesting that he has seen better diagrams upon a schoolmaster's black-board. Perhaps some one no better than the common cynic of the day only shrugs his shoulders, or raises his eyebrows, or blows his nose with disrespectful obtrusiveness. Perhaps, on the contrary — and this seems the more probable hypothesis — the assembled wisdom of the great club cares only to ask what is to be the cost; and, upon the figure being quoted, winces for a moment, but congratulates itself at length upon its prudence in having avoided "those architects," with their extravagant and unsatisfactory ways. So the "job" is ordered to be proceeded with, and everybody is happy. Our informant goes on to tell us that, upon the plan thus hopefully agreed upon being presented to a professional authority for some sort of approval, or what not, this officer so far forgot himself as to express a mild remonstrance to the builder, seeing his name so honestly inscribed upon the corner. The answer is what we wish to direct attention to. "Surely," said this pragmatical official, "*surely* you do not mean to do this in a building of Sir Blank Blank's!" — "I am obliged to do it." — "Why obliged?" — "If I would keep my customers, I must be prepared to do everything they want." — "Who made this drawing?" — "My drawing-clerk." — "Don't you mean to get some one to design the details, the decorations, the mouldings?" — "Certainly not. The last time I introduced an architect he gave the job to another builder — no doubt for a consideration. I'll never do it again; I can't afford it." — *The Architect.*

The National Lincoln Monument for Washington. — From the Washington *Post* we learn that the first bronze statue for the National Lincoln Monument at the capital was to be cast on Wednesday at the bronze foundry of Clark Mills, the sculptor. It is of Secretary Chase, and Mr. Mills has models of statues of Secretaries Stanton and Seward, Bishop Simpson, Henry Ward Beecher, and George H. Stuart ready for casting. The monument is to be erected by the National Lincoln Monument Association, which was formed some years ago, and will be reorganized this winter. Bronze has been supplied by the Government in the shape of condemned cannon. Congress will be asked to appropriate funds for the pedestal, and the other expenses will be met by private subscriptions. The site has not yet been decided upon, but the sculptor will urge the selection of Judiciary Square. The present plan of the monument is as follows: — The main structure will be of granite, in three stories, approached by three steps, each several feet in height. The shaft will have three concave sides. At the base there will be six equestrian statues, each about eighteen feet high, and standing on jutting pedestals. The statues will be of Generals Grant, Sherman, Sheridan, Thomas, Howard and Wadsworth. At the three corners of the second story will be commemorative statues, one of Frederick Douglass, and typical of the results of emancipation; another of Liberty succoring disabled soldiers, and the third of a volunteer or of a naval officer or a sailor. Between these, on the granite sides, will be placed bas-reliefs, the front one representing the firing on Fort Sumter and the others the Senate and House adopting the amendments to the Constitution. Around the third story will be grouped the statues of those prominent in civil positions during the war. At the front will be represented the following members of Lincoln's Cabinet: — Chase, Seward, Stanton, Blair and Welles. On another side will be Simon Cameron, Caleb B. Smith and Edward Bates, all of the Cabinet; Thaddeus Stephens, who is given a place as a friend of Lincoln; Dr. Bellows as founder of the Sanitary Commission, and George H. Stuart, of the Christian Commission Bishop Simpson will represent the pulpit, and Henry Ward Beecher will also have a statue. On the third side there will be an alto-relievo representing the surrender of General Lee, from a description furnished by General Grant. Above will tower allegorical figures of Liberty, Justice and Time, while a seated figure of President Lincoln, twelve feet high, signing the emancipation proclamation, will dominate the whole work. It is intended to have, in all, thirty-six colossal bronze statues, the positions of some of which have not yet been decided upon. Truly a grand idea, but how will it be carried out? A competition of sculptors and architects should be opened for a work of this importance. It should not be given out off-hand to one man.

Large Marble Blocks. — It is reported that marble is now on exhibition at Eureka, Cal., which came from an extensive quarry not twenty miles from the Central Pacific Railroad, and can be sawed out in blocks one hundred feet long.

The Durability of Redwood. — A resident of Humboldt county, California, writes to the San Francisco *Bulletin* as follows: Redwood is lasting, as a general rule, in precise proportion as you get near the butt or base of the tree. Wood which comes from the upper portion of the tree, or top wood, dries very quickly, and is as light when dry as the lightest pine, and is about of the same value for fire-wood, while the butt wood is astonishingly heavy, very difficult to dry; in fact, it will not dry, unless split very fine, and produces more than twice as much heat as the top wood, and lasts more than twice as long. The same will be found true when the wood is burned by nature, for decay is but slow combustion. That quality of the lower portions of these trees, which enables them to absorb and retain moisture, is of great value, as it makes them perfectly safe in case of forest fires. It is next to impossible to burn a sound living redwood tree. It does seem as though the stumps would not rot out. A tree will often cut up into fourteen logs twelve feet in length each — and such trees are not uncommon here — and the first two, and frequently three, butt logs will almost invariably sink when placed in fresh water. This kind of timber when cut into railroad ties will last from twenty to thirty years in the ground. It is generally of a dark red color and extremely heavy and compact. For shingles it is nearer perfection than any other wood that grows. It does not split easily, does not warp, the shingles are as wide as you choose to make them, and are perfectly clear from knots. They last a wonderfully long time, and, best of all, they are absolutely free from pitch and therefore difficult to burn. These butt logs are a great trouble to the lumbermen. Those who are disposed to do the fair thing, leave them in the woods on skids in a sunny place for one and two years, and sometimes longer, to dry, and even then some of them will sink. But those loggers who get pay for the logs when delivered in the stream, get in all the sinkers they can, and the result is, that while some of them gradually work down to tide-water and are buoyed up by lighter logs and thus floated to the mills, others remain imbedded in the bottom of the stream, and become covered with sand and *débris*, and in time permanently raise the bed of the stream. Fresh-water Slough in this county has been nearly spoiled for logging purposes, in this manner. The timber from the top of the tree is very different. In the first place, it will not weigh more than half as much as the lower timber, and it floats high out of the water. The lumber dries out quickly, and I think it within bounds to say that it will not last more than about one-third as long as the butt lumber. Of course no such timber ever ought to be cut into railroad-ties, fence-posts, shingles, or anything else that is to go into the ground or be exposed to the weather, for if it is used for such purposes the most disastrous consequences are certain to follow. If a man shingles his house with shingles composed of a mixture of butt and top stuff, the roof is liable to leak in ten or fifteen years, because of the rotting of the shingles. If he build a fancy fence and uses posts from the top of the tree he may find them rotted off in six or eight years, while the good butt posts would have lasted twenty-five or thirty years. Most people think that redwood is redwood, and that it is all durable, but many have found out their mistake. I have always considered that the millmen were to blame in this matter, for they know all about it and can just as well grade their lumber as not. It would not cost them any more to cut their heavy timber into posts, railroad-ties, shingles, etc., and their light timber into rustic, clapboards, and finishing stuff, than it does to cut it up indiscriminately, as they do now, and in failing to do so, it seems that they can hardly be said to be acting honestly by the people. So far as the color is concerned no deductions can be drawn from that. I saw some magnificent redwood logs at Vance's mill, the other day, over eight feet in diameter, solid, heavy and compact, and of a nearly white color. Some whole trees are that way. As a general thing, however, the timber from the upper portion of the tree is of a lighter color than that from the lower portion.

Cremation in Italy. — The London *News* has the following concerning cremation in Italy: The Italians are resolved to make the system of cremation as perfect as possible. The headquarters of the institution at Milan have recently received a very singular addition. Its customers were confronted with a difficulty which at first had not been anticipated. The difficulty was to know what they were to do with the ashes of their deceased relatives. It seemed improper that ordinary sepulchre should follow so unusual a process as cremation. The management at Milan has at last found its way out of the difficulty. Incineration is, after all, but a revival of an old fashion, and it was only necessary to follow out the usages of its origin in order to cause all difficulty to disappear. The crematory temple at Milan is to have an annex, which will, in fact, be a cemetery. The municipality has already selected its architect and approved the plan which he has furnished. The cemetery, when completed, will differ as widely from an ordinary graveyard as cremation differs from an ordinary sepulchre. It will be an Etruscan building, thirty-six feet high by about twenty feet long, and will be furnished with recesses, 120 in number, according to the present design, in each of which several cinerary urns can be placed. The authorities are so confident of the success of the undertaking that they have ordered vaults or catacombs to be constructed under the nave, and these will become the private property of families.

Indelible India Ink. — Herr Reisenbichler has brought forward a proposal to make indelible India ink. He takes advantage of the fact that glue or gelatine, when mixed with bichromate of potassa and exposed to the light, becomes insoluble, and thus renders India ink, which always contains a little gelatine, indelible. Reisenbichler calls this kind of ink "Harttusche," or hard "India ink." It is made by adding to the common article, when it is being made, about one per cent of very finely powdered bichromate of potash. This must be mixed with the ink in a dry state; otherwise, it is said, the ink could not be ground up easily in water. Those who cannot provide themselves with ink prepared as above in the cake, can use a dilute solution of bichromate of potash in rubbing up the ink; it answers the same purpose, though the ink should be used thick, so that the yellow salt will not spread.

BUILDING INTELLIGENCE.

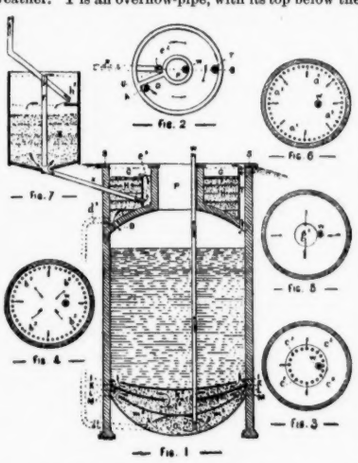
[Reported for The American Architect and Building News].

[*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.*]

231,771. CISTERN-FILTER. — Samuel Day, Ann Arbor, Mich. The invention relates to the construction and composition of the filter so as to secure a more thorough removal of suspended matter than is effected in cistern-filters now used, to eliminate from the water, matters which, being in a liquid or gaseous form, cannot be filtered out, but must be oxidized away. The process of oxidation is carried on during the passage of the water through a porous and aerated filter-bed, the aeration of which takes place during fair weather. The filter-bed in which the oxidation and aeration take place is not constantly submerged, as are those now used, but is open to air-pressure, to the action of light and heat in summer, and to the healthful influence of cold and frost in winter, agencies essential to secure good water. Figure 1 is a vertical section of the filter. It has on its arch a main aerated filter-bed, and on its bottom four more filter-beds. In the main aerated filter-bed H H there are six layers, as follows: first, gravel-stones, or pebbles at the bottom, to allow free drainage; second, a layer of coarse gravel; third, one of finer gravel; fourth, one of sand; fifth, one of coarsely-granulated charcoal and fine sand; sixth, one of small pebbles on top, to keep the charcoal in place and allow it to dry out between showers in fair weather. T is an overflow-pipe, with its top below the



outer cistern-wall, to take water not passing through the main filter by a direct passage into the cistern; c^2 is a pipe to allow water discharged from conduit-pipe X, Fig. 7, to come from main aerated filter-bed to its surface, and then spread over it; D is an opening to carry the water into the cistern after it has passed through the filter-bed H H in a circuit around the man-hole P. The arrangement and composition of the four filter-beds on the bottom of the cistern are as follows: O is a hemispheroidal filter composed of granulated granite, or limestone, or cleanly-washed pebble-stones. This is gravel concreted an inch thick, and perforated, before concrete sets, with small holes, c^2 c^2 c^2 c^2, midway between its base and top, as shown in Fig. 3. m^2 m^2 is a filter-bed around O, made of coarse gravel concreted in form of an inverted arch, with small holes, b^2 b^2 b^2 b^2, near its outer edge, as shown in Fig. 4; l^2 is a filter-bed above m^2 m^2 made of fine gravel and gravel concreted in form of an inverted arch, with a twelve-inch opening, g^2, as shown in Fig. 5. k^2 is a filter-bed above l^2, of closely-compacted clean and sharp sand, and concreted with gravel an inch or more in thickness, with small holes, a^2 a^2 a^2 a^2, near its outer edge, as shown in Fig. 6. Fig. 2 shows the top of cistern. Its several parts are as follows: U is a four-inch wall of brick, filling space between the man-hole P and the outer wall of cistern, which compels water coming into main aerated filter on its left side to pass around P before entering the cistern through D. Fig. 7 is a receiving-reservoir fountain-filter, with its bottom above the top of the cistern-wall. h^2 is a leader discharging water from roofs into this filter on a flat stone; E, a filter-bed, first, of small pebbles or gravel-stones, to allow free drainage; second, very coarse gravel and charcoal mixed; and, third, a layer of small pebbles or gravel-stones on top; F is an overflow-pipe for surplus water; X, conduit-pipe to carry water into main filter-bed on arch. W represents the pump-stock leading into the hemispheroidal filter O. The dotted lines on the left of Fig. 1 indicate a possible connection between main aerated filter-bed on arch and the hemispheroidal filter O, should a longer line of filtration be desired, which does not seem necessary. Should such a connection, however, be made it would duplicate the distance through which the water must pass, as with such a connection it would be forced by fountain-head pressure through O, m^2 m^2, l^2 and k^2 in horizontally divergent and convergent currents into main cistern, and then, by its own gravity and suction-power of pump, when in action, be drawn back again into hemispheroidal filter O in a reversed order of horizontally convergent and divergent currents, through these several filter-beds into hemispheroidal filter O, where it is drawn and filtered as needed for use.

233,328. HEATING APPARATUS. — Thos. Connelly, Philadelphia, Penn.

233,337. MACHINE FOR MAKING PLUMBERS' TRAPS. — Frederic N. Du Bois, New York, N. Y.

233,348. SIDEWALK. — Samuel P. Hodgen, Pittsfield, Ill.

233,372. VENTILATING GASOLIER. — John P. Putnam, Boston, Mass.

233,389. GAS STOVE. — Jas. Adams, Glasgow, Great Britain.

233,393. AUTOMATIC FIRE-EXTINGUISHER. — Chas. Barnes, Dayton, Ky.

233,424. ELLIPSOGRAPH. — Cyrus McBean, Toronto, Ontario, Can.

233,454. CLOSURE FOR SEWER-PITS. — Peter Wolff, Aachen, Prussia, Germany.

233,464. BIT-STOCK. — Q. S. Backus, New York, N. Y.

233,470. WATER-CLOSET BASIN. — Dominic Burke, New York, N. Y.

233,479. TOOL-HANDLE. — George L. Culver, New Haven, Conn.

233,483. DRAIN-TILE JOINT.—Oswald L. W. Dietz, Chattanooga, Tenn.

233,492. UNDERGROUND TELEGRAPH. — Stephen D. Field, New York, N. Y.

233,507. WRENCH. — Leslie P. Hiatt, Peru, Iowa.

233,509. LATHE-TOOL. — Joseph B. Hoffman, Raritan, N. J.

233,511. ERASIVE RUBBER. — Francis H. Holton, Brooklyn, N. Y.

233,535. BRICK AND TILE MACHINE. — Joseph C. McKenzie, Adrian, Mich.

233,556. GRATE FOR FIRE-PLACES. — Edward Scanlan, Louisville, Ky.

233,567. STOVE. — Joseph Gregory Smith, Alliance, Ohio.

233,570. FIRE-EXTINGUISHER. — Marshall B. Stafford, New York, N. Y.

233,573. CUT-OFF FOR CISTERN SUPPLY-PIPES. — John Straszer, Manchester, Mo.

233,578. FIRE-ESCAPE. — Felice Tocci, New York, N. Y.

233,584. CHIMNEY-BONNET AND WIND-GUARD. — Nathan N. Walker, Wellsville, Ohio.

233,594. SYSTEM OF WATER SUPPLY FOR CITIES AND TOWNS. — George E. Beach, Marshalltown, Iowa.

233,595. CENTRE-PIECE. — Paul Bedeau, St. Louis, Mo.

233,599. TACK-EXTRACTOR. — George J. Capewell, Cheshire, Conn.

233,609. GAS-BURNER. — Joseph S. Ford, Philadelphia, Penn.

233,618. DRAUGHTSMAN'S TRIANGLE.—August Herzog, New York, N. Y.

233,621. REFRIGERATOR-BUILDING. — Theodore J. Hughes and Edward H. Hughes, Philadelphia, Penn.

233,659. DOOR-HANGER. — Chas. B. Clark, Detroit, Ind.

233,670. FAUCET. — Andrew Goetzinger, Cincinnati, Ohio.

233,674. SINK. — George Hayes and Chas. Hayes, New York, N. Y.

233,677. EAVES-BOX. — John M. Hess, Philadelphia, Penn.

233,690. WATER-CONDUCTOR AND JOINT. — Jas. L. Old, Allegheny, Penn.

233,693. KNOB-ATTACHMENT. — Charles A. Pettet, Belleville, Ontario, Canada.

233,696. JOIST-SUPPORT. — Benjamin T. Raisor, Corydon, Iowa.

233,711. LATCH. — Henry F. Spencer, Ripon, Wis., and Hiram C. Eggleston, Hillsdale, Mich.

233,714. RESERVOIR-WELL. — David H. Tichenor, Newark, N. J.

233,737. PARALLEL RULER. — William A. Ducker, Burgoyne, Ontario, Can.

233,741. DEVICE FOR CLEANING OVERFLOWS OF WASH-BASINS, ETC. — John J. Elwood, Cleveland, O.

233,752. SCROLL-SAWING MACHINE. — Wm. D. Herschel, Philadelphia, Penn.

233,775. ORNAMENTAL VENEERING. — Fred. Koskul, Grand Rapids, Mich.

233,788. FIRE-ESCAPE. — Francis L. Mitchell, St. Joseph, Mo.

233,794. ELEVATOR. — Charles R. Otis, Yonkers, N. Y.

233,814. LEAD AND CRAYON HOLDER. — Charles Sneider, New York, N. Y.

233,825. APPARATUS FOR FORMING CEMENT SEWERS OR PIPES. — Wm. Wilson, Otsego, Mich.

233,826. APPARATUS FOR LINING WELLS. — Wm. Wilson, Otsego, Mich.

233,828. MACHINE FOR CLOSING SEAMS IN SHEET-METAL ROOFS. — Samuel Woodhead, West Troy, N. Y.

9,419. TRY SQUARE (*Reissue*). — Laroy S. Starrett, Athol, Mass.

9,425. WATER-CLOSET. (*Reissue*). — Robert D. O. Smith, Washington, D. C.

9,426. The same.

9,427. URINAL. — Robt. D. O. Smith, Washington, D. C.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — The following building permits have been issued since the last report: —

Chas. Marshall, three-st'y brick building, on St. Paul St., near Biddle.

Thos. Scharff, 5 three-st'y brick buildings, on Fulton Ave., cor. Tenant St.

Julius Stratmeyer, three-st'y brick building, on Russell St., between Hamburg and Fremont Sts.

Malcolm Creighton, five-st'y brick warehouse, cor Holliday and Franklin Sts.

Humphreys Pierce, four-st'y brick building, on Calvert St., between Saratoga and Lexington.

HOUSE. — Col. Charles Marshall is about to build a handsome house on St. Paul St., near Biddle St., 40′ x 60′, three stories and basement, to be of brick, with brown-stone and terra-cotta finish. Mr. Chas. E. Cassell is the architect.

Boston.

BUILDING PERMITS. — *Brick.* — *Marlborough St., No.* 370, for W. C. Williamson, 1 dwell., 24′ x 50′; three stories; Vinal & Dodge, builders.

Commonwealth Ave., Nos. 286 *and* 288, for Wm. S. Rand, 2 dwells., 24′ x 58′; three stories and Mansard.

Wood. — *Elm St.*, near Breed St., for Stephen A. Myrick, 1 dwell., 23′ x 32′; two stories; Geo. W. Adams, builder.

Heath St., cor. Parker St., for Reuter & Alley, 1 pumping house and machine shop, 25′ x 30′; Rumrill & Stanton, builders.

Albany St., Bay State Wharf, for Jos. F. Paul & Co., 1 storage of lumber, 48′ x 50′; three stories; Jos. F. Paul & Co., builders.

North Beacon St., opposite Lyman Ave., for H. Barker & Co., 1 starch factory, 30′ x 150′; three stories; H. Barker & Co., builders.

Commonwealth Flats, for New York & New England R. R. Co., 1 elevator, 162′ x 80′; three stories, monitor roof; Chas. R. McLean, builder.

Halleck St., for Geo. Sauer, 1 dwell., 20′ x 30′; two stories.

Mercer St., near Telegraph St., for Geo. H. Bond, 1 dwell., 20′ x 32′; two stories and Mansard; Wm. T. Eaton, builder.

EXHIBITION-BUILDING. — The building committee of the New England Manufacturers' and Mechanics' Institute have awarded the contract for putting in the foundation of their building to Leach & Harney, they being the lowest bidders. Arrangements are being made to insure the completion of the building by July 1, 1881.

Brooklyn.

BUILDING PERMITS. — *Gerry St.*, near Harrison Ave., four-st'y brick warehouse, 40′ x 200′; one-st'y brick warehouse, 60′ x 200′, and a two-st'y brick warehouse, 50′ x 100′; owners and builders, Chas. Pfiyer & Co., cor. Harrison Ave. and Bartlett St.; architect, M. J. Morrill.

Luquer St., No. 165, three-st'y brick tenement, 20′ 10″ x 45′; cost, $5,600; owner, Francis Vein, 167 Luquer St.; architect, Geo. Damen; builders, P. McGuinn and Geo. Damen.

Hart St., near Throop Ave., 4 two-st'y brown-stone dwells., 19′ x 42′; cost, $4,000 each; owner and carpenter, M. C. Baker, 270 Yates Ave.; mason, E. N. Wood.

Eldert St., near Bushwick Ave., 10 two-st'y brick dwells., 18′ x 40′; cost, $3,000 each; owner, S. Ledoux, 775 Fulton St.; builder, I. D. Mason.

Henry St., cor. Degraw St., 3 four-st'y brick French flats, 20′ x 50′; cost, $8,000 each; owner, M. Sherman, Sackett St., near Clinton St.; architect, R. Dixon.

Degraw St., near Henry St., 2 three st'y brick dwells., 15′ x 45′; cost, $4,000 each; owner, M. Sherman, Sackett St., near Clinton St.; architect, R. Dixon.

Margaretta St., near Broadway, 7 two-st'y brick dwells., 18′ x 40′; cost, $3,000 each; owner, S. Ledoux, 775 Fulton St.; builder, I. D. Mason.

Macon St., near Stuyvesant Ave., two-st'y brick dwell., 17′ x 46′; cost, $2,800; owner, W. R. Wasson; architect, Amzi Hill; builder, B. T. Foster.

Monroe St., No. 303, two-st'y brick dwell., 20′ x 42′; cost, $4,000; owner, etc., David Weild, 590 Marcy Ave.

Putnam Ave., near Marcy Ave., 7 three-sty brown-stone dwells., 17′ 4″ x 42′; cost, $3,500 each; owner, M. L. Swimm, 389 Putnam Ave.; builder, T. W. Swimm.

State St., near Boerum Pl., three-st'y brick factory, 38′ x 80′; owners, A. C. Keeney & Clark; architect, G. L. Morse; builders, O. Nolan and E. Hendrickson.

Henry St., cor. Joralemon St., three-st'y brick dwell., 36′ 5″ and 30′ x 62′; owner, Edwin Packard, 102 Montague St.; architect, G. L. Morse; builder, Jas. Stevenson.

Joralemon St., near Henry St., three-st'y brick dwell., 34′ 6″ x 52′ and 68′; owner, L. A. Fish, 173 Clinton St.; architect and builder, same as last.

Putnam Ave., cor. Irving Pl., 2 three-st'y brick dwells., 12′ 6″ x 40′; cost, each, $2,200; owner, Wm. O. Thompson, Putnam Ave., cor. Grand Ave.; architect and builder, O. D. Thompson.

Putnam Ave., near Franklin Ave., 6 two-st'y brown-stone dwells., 16′ 8″ x 42′; cost, each, $4,000; owners, Lambert & Mason, 277 Carlton Ave.; architect and carpenter, George Thompson; masons, Lambert & Mason.

Jay St., cor. Front St., three-st'y brick foundry, 51′ x 124′; cost, $10,000; owner, Mr. McCarthy, 30 Broadway, New York; architect, H. J. Farquhar; builders, M. Reed and E. Snedeker.

ALTERATIONS. — *Third Ave.*, cor. Atlantic St., flat gravel roof and two-st'y brick extension, 20′ x 8′ 3″, interior alterations; cost, $3,000; owner, Mrs. Christian Hartman, Bergen St., cor. Third Ave.; architect, T. F. Thomas; builders, Poderly & Murphy.

Fulton Ave., No. 518, two-st'y brick extension, 20′ 8″ x 20′ 8″; cost, $2,000; owner, Thomas Blankley, on premises; architect, Geo. W. Anderson; builder, Jno. D. Anderson.

FACTORY. — The Ansonia Clock Company has decided to rebuild the factory in Brooklyn which was burned a short time ago.

Chicago.

BUILDING PERMITS. — H. Graves, one-st'y brick barn, 32′ x 52′, Thirty-Third St., near Cottage Grove Ave.; cost, $3,000.

City, three-st'y brick school-house, 75′ x 84′, Huron St., cor. Franklin St.; cost, $35,000.

City, three-st'y brick school-house, 84′ x 104′, Twenty-Seventh St., cor. Wallace St.; cost, $40,000.

Claus Dornbush, to raise rear addition, 8′ x 20′, 650 Eighteenth St.; cost, not stated.

C. & W. I. R. R. Co., one-st'y brick baggage house, 24′ x 100′, Third Ave.; cost, $2,500.

C. & W. I. R. R. Co., one-st'y brick freight-house, 50′ x 306′, Third Ave.; cost, $15,000.

H. Pickard, two-st'y brick dwell., 21′ x 50′, 591 Sedgwick St.; cost, $3,500.

Nathan Mears, three-st'y brick dwell., 36′ x 47′, Rush St.; cost, $8,000.

Nathan Mears, two-st'y brick dwell., 30′ x 50′, Rush St.; cost, $4,000.

A. Johnson, two-st'y brick barn, 17′ x 30′, Adams St., cor. Oakley Ave.; cost, $3,000.

Chicago Sugar Refining Co., eleven-st'y brick building, 150′ x 310′, Beach St., cor. Taylor St.; cost, $200,000.

Theodore A. Koch, two-st'y brick dwell., 24′ x 64′, 15 Lincoln St.; cost, $9,000.

Cleveland.

Depot. — The N. Y. P. & O. R. R. Co. is to erect a new depot at the foot of South Water St.; cost, $30,000; to be of stone.

Stores. — A four-st'y brick block, with stone finish, is being built on the old Heard estate, on Euclid Ave.; Heard & Smith, architects; Jno. McMahon, contractor.

Oscar Townsend is to build a large block on St. Clair St.; Walter Blythe, architect.

E. I. Baldwin, of E. I. Baldwin & Co., will erect a large four-st'y brick building on the east side of Bank St., for wholesale dry goods business; cost, $20,000; S. C. Kane, mason; Geo. King, carpenter; T. H. Brooks, iron-work; Jos. Ireland, architect.

Post-Office. — The work for the extension of the post-office building is progressing rapidly; Levi T. Scofield, architect, is superintending the work.

Factory. — A large addition to Marsh & Harwood's acid works is to be built of brick, 132′ x 193′; cost, $17,000; Jno. T. Watterson, carpenter work; Robert Clements, mason; Coburn & Barnum, architects.

Milwaukee.

Building Permits. — The following building permits have been issued by the Board of Public Works since the last report: —

Mr. Bougers, brick dwell.; cost, $2,500.
Mr. Braud, brick dwell.; cost, $5,000.
Wm. Weller, brick dwell.; cost, $2,500.
Mr. Meecham, brick dwell.; cost, $12,000.
Anna Reutzer, brick dwell.; cost, $2,500.
H. Berthelet, brick dwell.; cost, $12,000.
J. S. Ricker, brick dwell.; cost, $11,000.
F. Roth, brick dwell.; cost, $4,000.
W. G. Campbell, brick dwell.; cost, $8,600.
Aug. Wendt, brick dwell.; cost, $3,500.
Mr. Briss, brick dwell.; cost, $5,000.
R. J. Thomas, brick dwell.; cost, $4,000.
W. W. Coleman, brick dwell.; cost, $18,000.
John Brier, brick store; cost, $3,000.
G. Garsler, brick store; cost, $5,000.
S. C. Herbert, brick store; cost, $2,300.
D. Inbusch, addition to brick store; cost, $8,000.
Mrs. Schubert, brick veneered dwell.; cost, $3,000.
A. R. R. Butler, double brick veneered dwell.; cost, $12,000.
Mrs. Weichman, brick veneered dwell.; cost, $2,200.
J. Boehen, frame dwell.; cost, $4,000.
J. Lynch, frame dwell.; cost, $2,600.
J. S. Ricker, frame dwell.; cost, $3,000.
J. Donohue, frame dwell.; cost, $2,500.
Geo. Burroughs, double frame house; cost, $8,000.
P. Schmidt, frame dwell.; cost, $2,700.
F. Juss, frame dwell.; cost, $2,000.
E. McIntyre, frame dwell.; cost, $2,000.
W. H. Wolf, frame dwell.; cost, $2,500.
Jos. Boehen, frame dwell.; cost, $2,500.
Best's Brewing Co., brick stable; cost, $15,000.
" " " brick ice-house; cost, $20,000.
" " " brick malt-house; cost, $25,000.
P. McGeogh, brick packing house; cost, $65,000.
Alex. Mitchell, brick soap factory; cost, $8,000.
H. Muller, addition to brick hall; cost, $4,500.

Building Materials. — Building stone for foundations has advanced in price within the last few weeks $1.00 per cord. Common brick have also advanced $1.00.

Wages. — There is a lively demand for mechanics. The wages of masons and carpenters have advanced about 10 per cent since the beginning of October.

New York.

Building Permits. — *Third Ave.*, cor. Sixty-Ninth St. and Third Ave., cor. Seventieth St., 2 four-st'y brick stores and flats, 20′ 5″ x 68′; cost, $20,000 each; owner and builder, Joseph Emrich, 413 East Eighty-Sixth St.; architect, Hugo Kafka.

Third Ave., e s, 20′ 5″ north of Sixty-Ninth St. and Third Ave., e s 20′ 5″ south of Seventieth St., 2 four-st'y brick stores and flats, 20′ x 68′; cost, $16,000 each; owner, etc., same as last.

Third Ave., e s, 40′ 5″ north of Sixty-Ninth St., 4 four-st'y brick stores and flats, 30′ x 68′; cost, $28,000 each; owner, etc., same as last.

Sixty-Ninth St., n s, 80′ east of Third Ave. and Seventieth St., s s, 80′ east of Third Ave., 2 four-st'y brick flats, 20′ x 62′; cost, $16,000; owner, etc., same as last.

Greene St., No. 102, five-st'y iron store, 25′ x 85′; cost, $18,000; owner, Isaac Guggenheim, 22 William St.; architect, Henry Fernbach; builders, Amos Woodruff's Sons and McGuire & Sloane.

Greene St., No. 104, five-st'y iron store, 25′ x 85′; cost, $21,000; owner, David L. Einstein, 14 and 16 White St.; architect, Henry Fernbach; builders, Amos Woodruff's Sons and McGuire & Sloane.

One Hundred and Eighteenth St., n s, 140′ east of Fourth Ave., 5 four-st'y brown-stone tenements, 20′ x 60′; cost, $7,500 each; owner and builder, Jas. Nunan, 2110 Third Ave.; architect, Andrew Spence.

West Thirty-Third St., Nos. 130, 132 *and* 134, 4 four-st'y brick flats, 18′ 9″ x 70′; cost, $8,500 each; owner, William Arras, 203 West Thirty-Eighth St.; architects, Thom & Wilson; builders, Thomas Cockrill and Judson Lawson.

Eleventh Ave., cor. Fifty-Third St. and Fifty-Third St., n s, 73′ 6″ east of Eleventh Ave., 4 four-st'y brick tenements, 33′ 6″ and 28′ and 28′ 6″ x 60′, street building being 26′ 6″ x 76′ 1″; cost, each, $10,000; owner, Elsworth L. Stryker; architect, James E. Ware.

Sixty-Fourth St., s s, 95′ west of Madison Ave., four-st'y brown-stone dwell., 25′ x 60′; cost, $30,000; owner, John Davidson, 128 East Fifty-Second St.; architect, Jas. E. Ware.

One Hundred and Twenty-Third St., s s, 100′ east of Madison Ave., 4 three-st'y brown-stone and brick dwells., 18′ 9″ x 50′; cost, $15,000 each; owner, Thos. F. Treacy, 80 East One Hundred and Eleventh St.; architect, Chas. W. Romeyn.

One Hundred and Twenty-Ninth St., n s, 162′ 6″, west of Seventh Ave., 2 three-st'y brown-stone dwells., 18′ 9″ x 45′; cost, $9,000 each; owner, M. A. Cockburn, 156 West One Hundred and Twenty-Eighth St.; architect, J. H. Valentine; builder, E. H. Cockburn.

West Fifty-Third St., No. 121, two-st'y brick stable, 25′ x 43′, tin roof, iron cornice; cost, about $5,000; owner, John H. Watson, 671 Fifth Ave.

One Hundred and Ninth St., n s, 145′ east of Madison Ave., two-st'y stone church, 49′ and 43′ x 96′; cost, $19,500; owner, the New York City Church Ex'n and Missionary Society of the M. E. Church; architect, E. L. Roberts; builders, Richard Deeves and Cooper & Weed.

East Eighty-Eighth St., No. 437, three-st'y brick French flat dwell., 22′ x 56′; cost, $10,000; owner, Mrs. Emma J. Johnston, Astoria, L. I.; architect, J. C. Burne.

East Eighty-Eighth St., No. 439, three-st'y brick apartment-house, 28′ x 62′; cost, $13,000; owner and architect, same as last.

Alterations. — *Broadway*, cor. Manhattan St., raised 8 feet, rebuild portions of brick walls; cost, $2,500; owner, Jas. A. Deering, 82 and 84 Nassau St.; builders, Wm. Cowan & Son and James Pettit.

Charlton St., No. 104, seven-st'y brick extension, 24′ 10″ and 25′ x 100′; cost, $9,000; owner, estate Peter Moller, 89 Vandam St.; architect, J. H. Dye.

West Nineteenth St., No. 351, raised one-st'y; cost, $2,500; owner, P. H. Chace, on premises; builders, P. Canfield and M. Sweeney.

Broadway, No. 708, two-st'y brick extension, 25′ x 30′; cost, $2,000; lessee, H. Rocke; architect, C. Kinkel; builder, H. Schiffer.

Alterations. — *Eighth Ave., No.* 877, one-st'y brick extension, 22′ x 30′; cost, $2,000; owner, K. Fausner, 303 West Fifty-Second Street; architect, J. C. Miller; carpenter, J. C. Miller.

West Fourteenth St., No. 6, two-st'y brick extension, 25′ x 107′, building extended through to Thirteenth St.; cost, $7,000; owner, W. Jennings Demorest, 17 East Fourteenth St.; architect, W. Jones; builders, Drummond & Jones.

Fortieth St., raised one story; cost, $4,000; owners, Stern & Metzer, on premises; architect, John McIntire; builder, J. F. Moore.

Hudson River, near Riverdale Station, raised 6 feet; cost, $3,200; owner, Mary J. Coxe, on premises; architect and builder, P. B. McIntyre.

Produce Exchange. — Nearly 100 applications were made to the committee on building by architects wishing to put in plans for the new Exchange. They have now selected ten gentlemen to furnish plans in a paid competition, but will also receive and consider plans put in voluntarily by other architects.

Building Materials are without any change, business having been very limited.

Philadelphia.

Building Permits. — *North Second St., No.* 2310, two-st'y ice-house, 21′ x 36′; W. Tecklenberg, contractor.

Hewston St., west of Thompson St., three-st'y dwell., 15′ x 30′; Samuel Hall & Son, contractors.

Twenty-Fifth and Thompson Sts., one-st'y chapel, 35′ x 65′; Wm. E. Veeteu, contractor.

Girard Ave., east of Sixty and One Half St., three-st'y dwell., 20′ x 50′; John W. Leamy, contractor.

Eadline St., No. 3411, three-st'y dwell., 20′ x 56′; W. J. Shedwick, contractor.

South Fifth St., No. 518, three-st'y store and dwell., 11′ x 49′; W. H. Atkinson, contractor.

Thirtieth St., north of Master, one-st'y warehouse and office, 40′ x 66′; L. Schwab, contractor.

Ninth St., south of Wharton St., 3 two-st'y dwells., 14′ x 43′; Jacob Laws.

Ripka St., west of Smick St., three-st'y dwell., 16′ x 43′; Harmer & Gillett, contractors.

Logan St., north of Nicetown Lane, 4 two-st'y dwells., 14′ x 38′; Benj. Walker.

North Fifteenth St., No. 1306, three-st'y dwell., 13′ x 40′; Jos. Reinfried, owner.

Ashmead St., east of Main St., two-st'y dwell., 18′ x 30′; J. H. Gomersall, owner.

Grays Ferry Road, between Thirty-Fourth and Thirty-Fifth Sts., five-st'y store-house, 45′ x 70′. Harrison Bros., & Co., owners.

Emerald St., south of Lehigh Ave., 3 three-st'y dwells., 15′ x 43′; Henry Gill, contractor.

Germantown Road, No. 3853, two-st'y stable and two-story slaughter-house, 20′ x 42′; G. F. Pfund.

Thirtieth St., south of Herman St., two three-st'y dwells., 16′ x 44′; W. F. Albrecht, owner.

Twenty-Third and Cherry St., one-st'y foundry, 40′ x 150′; Richardson & Shourds, contractors.

Twentieth and South Sts., three-st'y store, 20′ x 70′; Sol. Chorley, contractor.

Frankford St. and Frankford Creek, two-st'y packing-house, 30′ x 120′; R. C. Taylor, contractor.

Fifty-Fifth and Vine Sts., one-st'y school-house, 60′ x 95′; C. Tweed, contractor.

Huntingdon St., between Tulip and Sepriva St., two-st'y school-house, 70′ x 73′; Chas. O'Neill, contractor.

Butler St., east of Second St., two-st'y barn, 40′ x 50′; McShane & Lafferty, contractors.

Additions. — *Trenton Ave.*, north of Dauphin St., two-st'y addition to factory, 32′ x 44′; Henry Gill, contractor.

Review of the Month. — 340 permits were issued during October; 201 were for new structures, 139 for additions and alterations. The new buildings included 135 dwellings, 2 foundries, 3 factories, 1 warehouse, 1 depot, 1 chapel, 3 storehouses, 2 school-houses, 1 car-shop, etc.

Sugar Refinery. — E. C. Knight & Co., sugar refiners, are laying the foundation for a large sugar refinery, consisting of two main buildings — one at Delaware Ave. and Bainbridge St., 50′ x 80′, six stories high; the other at Swanson and Bainbridge Sts., 68′ x 80′, to be ten stories high. Also a boiler-house, 42′ x 80′. These improvements are to be completed during the coming summer; estimated cost to be about $200,000.

Depot. — The work of laying the foundations of the Pennsylvania R. R. passenger depot has been commenced, at the corner of Fifteenth and Filbert Sts., and has the appearance of being of a very substantial character. The company are extending their office-building on Fourth St., the addition to be 46′ x 77′, and five stories high. They are also preparing to build a large semi-circular engine-house on the west side of their property, below Spring Garden St., with capacity to house 19 engines.

St. Louis.

Building Permits. — Forty permits have been issued since our last report, of which seven are for frame structures of slight importance. Of the rest, those worth $2,500 or over, are as follows: —

Owners' Name.	Use.	Str's	Fms	Cost.
H. Westerhault,	Dwell.	2	12	$2,800
J. H. Grefenkamp,	Dwell.	2	8	5,300
F. W. Spilker,	Dwell.	2	8	5,000
Mrs. E. Loewenstein,	Dwell.	3	10	6,000
John H. Vornbrock,	Frnit're Fct'y,	2	2	4,000
J. A. Broemser,	Dwell.	2	8	3,000

Toledo.

Cottage. — Two-st'y frame cottage (Queen Anne) for Geo. H. Beckwith, Esq., Eighteenth St.; cost, about $2,700; N. B. Bacon, superintendent.

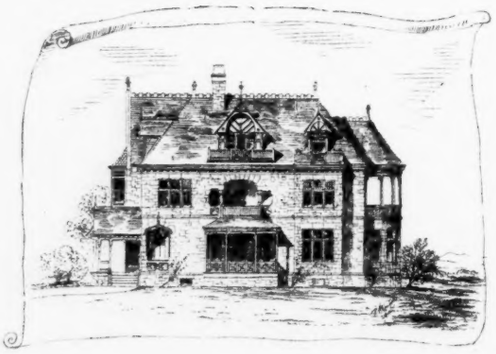
Houses. — Block of 3 brick dwells., Eleventh St., for Mr. Woolson; cost, about $7,000; E. O. Fallis, architect.

Two-st'y brick dwell., for John Andes, Fostoria, O.; cost, about $5,000; N. B. Bacon, architect.

Building operations quite active just at present, to take advantage of the little remaining favorable weather. No enforced idleness necessary with any able-bodied man just now. But very few projections for any new structures. We expect to report differently after a little time.

Bids and Contracts.

Milwaukee, Wis. — The mason-work, carpenter-work, tin, slate and galvanized iron-work, and the painting and glazing for the Exposition Building have been let to E. Kichkafer & Bro., for $185,400; the work to be completed by August 1, 1881. The excavation and pile-driving, which had been let in a previous contract for about $25,000, are rapidly progressing.



SKETCH FOR A HOUSE AT HARTFORD, CONN.

Kimball & Wisedell, Archts.

West Elevation

STONE DRAIN

BOX STALL

PIT

SLEIGH ROOM

DRAIN

8"ø ROOF - WATER DRAINS

STALL DRAIN

STALL DRAIN

STABLE

COURT YARD

STONE DRAIN

DROP

FEED ROOM

CLOSET

WASH ROOM

8"

8"

CLOSET

LAV.

ENTRANCE

3"

WAITING ROOM

RAIN CONDUCTOR

FIRST FLOOR PLAN

Scale for Plans.

HAY ROOM

DROP

GRAIN

ROOMS

BATH

ROBES

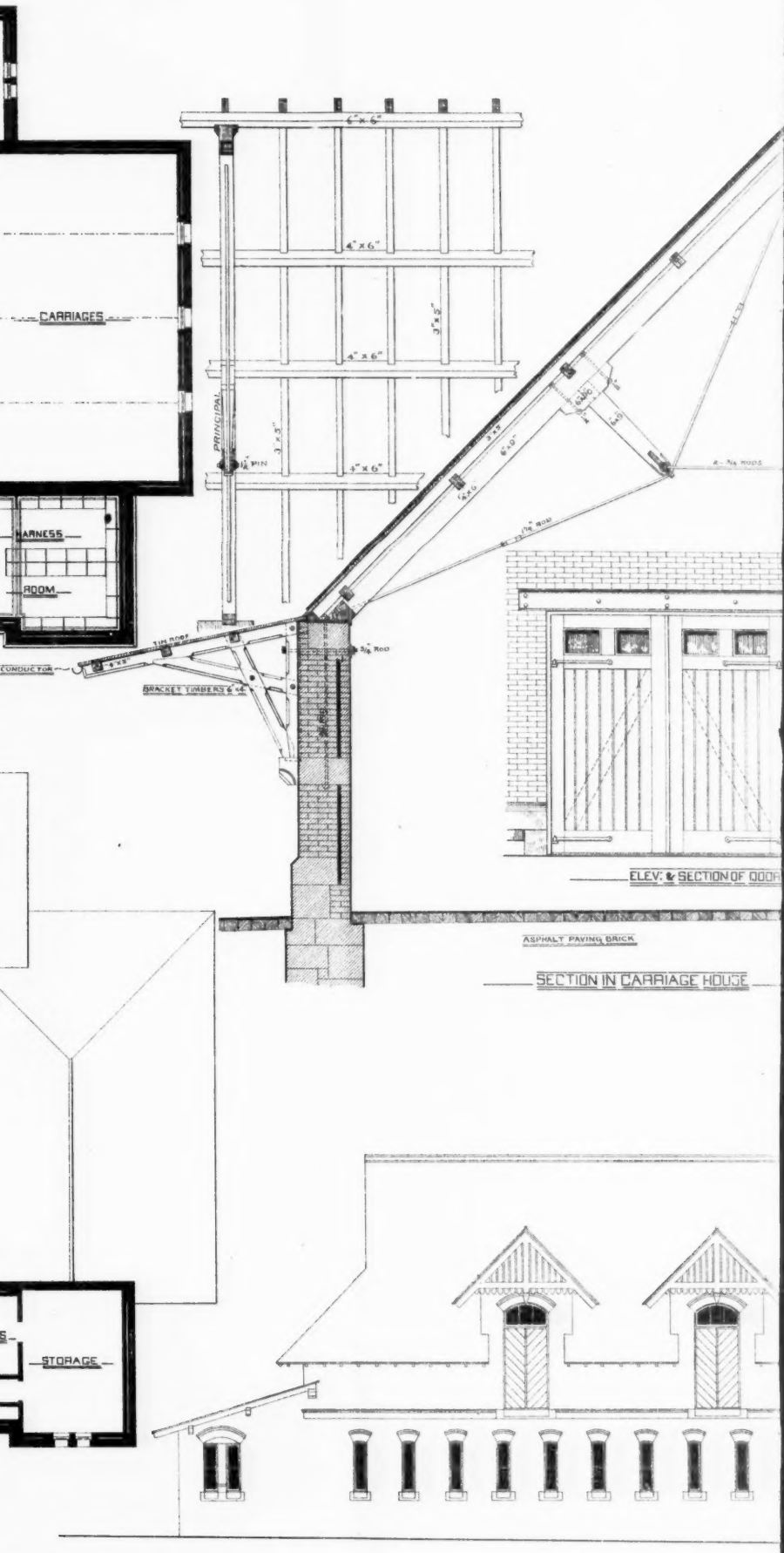
MENS

ROOMS

SECOND FLOOR PLAN

Perspective View:

A



ELEV: & SECTION OF DOOR

SECTION IN CARRIAGE HOUSE

NORTH ELEVATION

NEW STABLE BUILDING ETC:

AT CORNWALL PENN^A

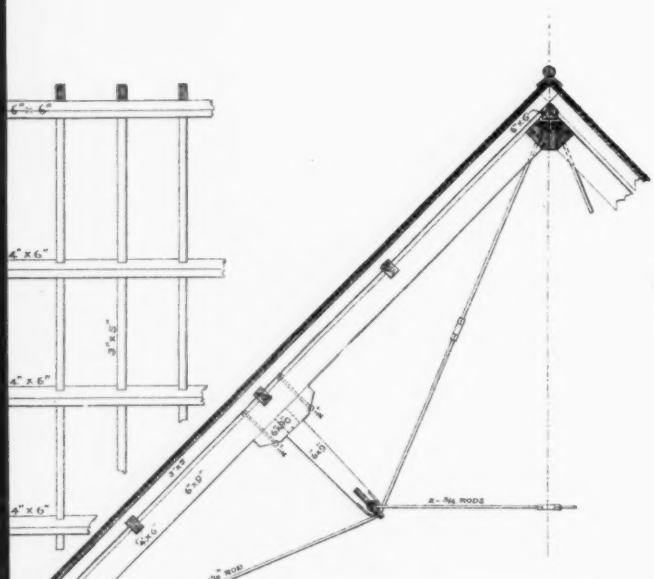
FOR

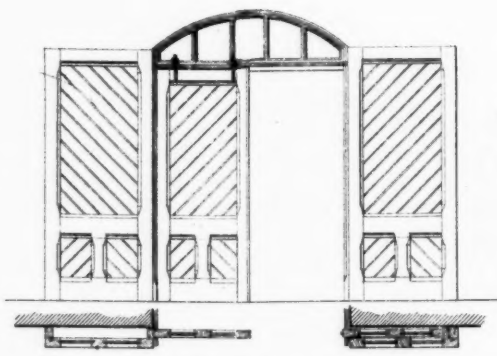
THE HEIRS OF R^OBT W. COLEMAN

1879

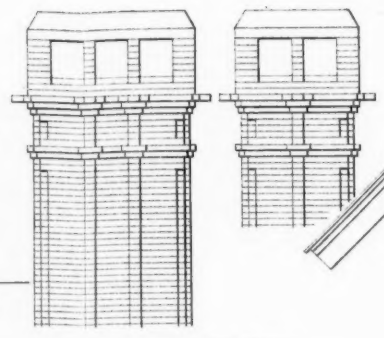
W. BLEDDYN POWELL.
ARCHITECT

scale for elevations

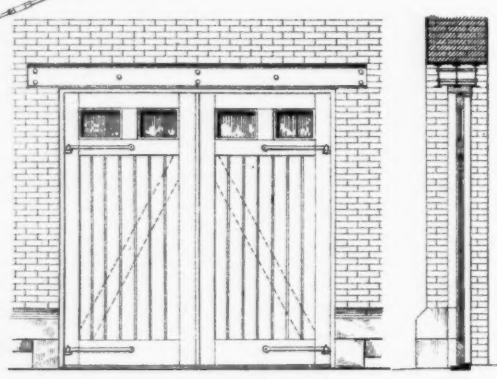




SLIDING DOORS — STABLE

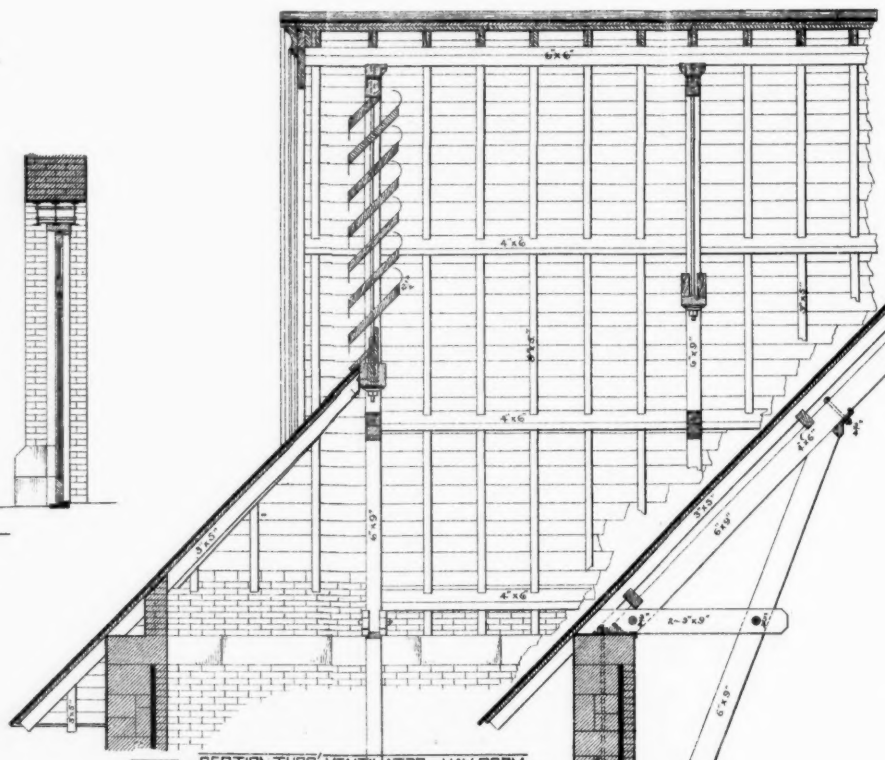


SIDE & FRONT OF CHIMNEY

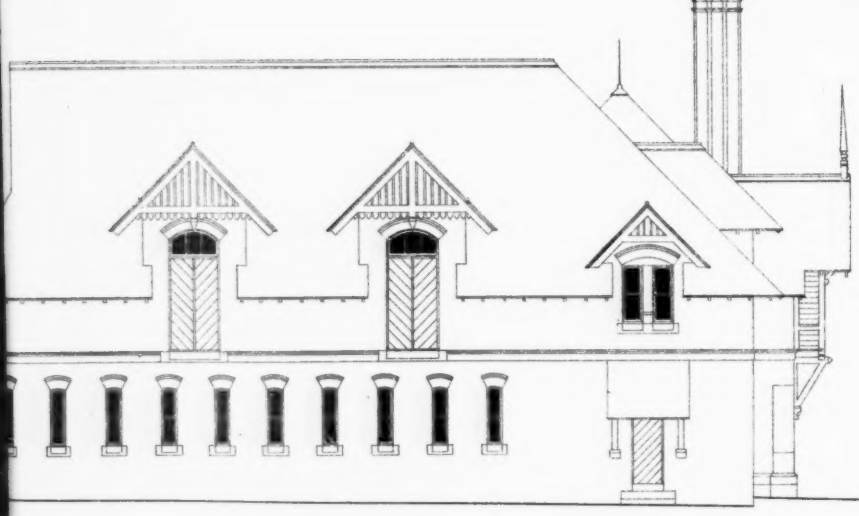


ELEV: & SECTION OF DOORS

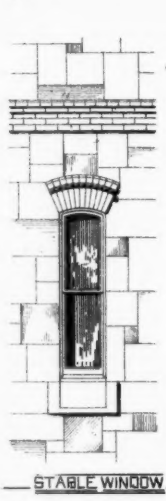
SECTION IN CARRIAGE HOUSE



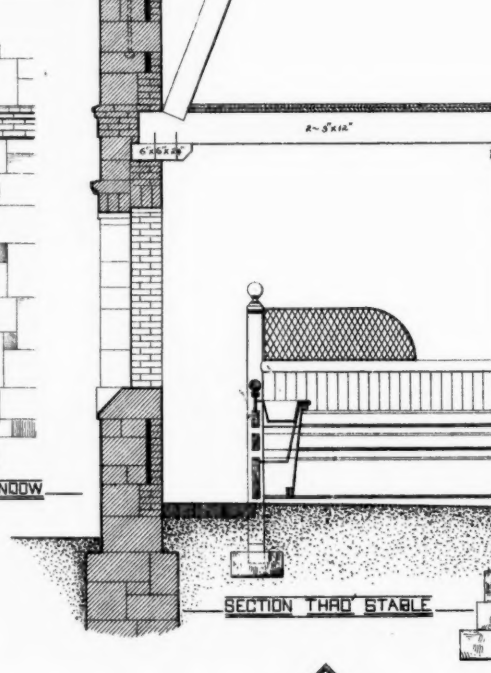
SECTION THRO' VENTILATOR — HAY ROOM



NORTH ELEVATION



STABLE WINDOW



SECTION THRO' STABLE

NEW STABLE BUILDING ETC.

AT CORNWALL PENN.

FOR

THE HEIRS OF Adst W. COLEMAN

1879

W. BLEDDYN POWELL.
ARCHITECT

EAST ELEVATION

scale for elevations

scale for details

No. 254

FRONT AND SIDE OF HAY-ROOM GABLES

HAY-ROOM DOOR - COURT YARD

SECTION - FEED ROOM PORCH

FIRE PLACE IN WAITING ROOM.

PLAN

FRONT AND SIDE OF PROJECTION OVER ENTRANCE

REAR ENTRANCE GATE

ELEVATION

SECTION

details

THE HELIOTYPE PRINTING CO. 211 TREMONT ST. BOSTON.