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ANOTHER dreadful fire has occurred in a wall-paper manufactory in Buffalo, resulting in the death—we are seriously tempted to say the murder—of nearly a score of persons. The structure was five stories high, three hundred feet long, and eighty feet wide, and occupied by about one hundred and fifty men and boys. The material used was of the most dangerously inflammable description; the floors, furrings, roof, and other woodwork were kept in a condition resembling tinder by the constant temperature of ninety degrees which was maintained throughout the building for the purpose of drying the paper; and yet there was no pretence at anything like a fire-escape, and even the doors of the different stories were hung to swing in, besides being furnished with heavy springs to hold them tightly closed. The natural consequence of these circumstances was that in less than twenty minutes after the fire was discovered the interior of the building was wholly burnt away, and the walls had fallen in. The young boys employed in the fourth and fifth stories, who were too weak to force their way through the struggling crowd at the door, or brave enough to allow their companions to go first, perished in the flames, or else jumped from the windows, to be dashed to pieces on the pavement. One daring little boy only had the nerve to jump outward from a fifth story window and catch the telegraph wires at the outer edge of the sidewalk, which broke, but he clung to them and slid to the ground safe, though with badly cut hands. We would like to suggest to owners and architects of stores and manufactories, where men, women and children are kept at work in the fourth and fifth stories above the street, that the next time they pass such a building they should stop a moment and try to imagine their sons or daughters throwing themselves from the upper windows in the hope of catching the telegraph wires as their sole chance of escape from a frightful death. His heart must be hard who would not, if he could once understand the agony of such a moment, hasten to provide some means, cheap and rough though they might be, of protection and escape for the poor human beings who are obliged to trust their lives to his care.

OUR readers will remember that about two years ago the Boston Chapter of the American Institute of Architects voted to employ a part of its slender means to aid the study of the inedited remains of the Doric order which Mr. J. T. Clarke, a junior member of the Chapter, was proposing to undertake among the islands of the Ægean. At a subsequent period the American Institute of Archaeology, then first formed, used the first money at its disposal in aid of the same undertakings, and published with its first annual report, issued last May, the very interesting Notes on Greek Shores in which Mr. Clarke narrated the archaeological fruits of his journey. The description there given of the site of the ancient city of Assos, on the southern coast of the Troad, and of the promising opportunity for archaeological research which it offers, stimulated the new society, ambitious to make itself a name, to further exertions in this field. The report closed with the statement that the

executive committee were only waiting for the assurance of pecuniary support to equip an expedition and send it to the Ægean. The money has, we understand, for some time been assured, but a definite announcement of the scheme of operations has been withheld from the public until the formal consent of the Turkish Government should put them beyond risk of interruption either from official interference or from the rival enterprise of German or Austrian explorers, who had already marked these ruins for their own. Last week the desired *firman* was granted, and the Institute is able to take the public into its confidence, and ask it to share its interest. The expedition will consist of six persons, three architects, Mr. Clarke himself, Mr. F. H. Bacon, who accompanied him upon his previous journey, and Mr. Howard Walker; a civil engineer Mr. Maxwell Wrigley; and two students of archaeology, Mr. Edward Robinson and Mr. Charles W. Bradley, both of whom are recent graduates of Harvard College. Between forty and fifty other young men have asked leave to accompany them at their own expense; an offer which it has been necessary to decline. They will reach the coast of Asia Minor sometime in March, and will remain as late in the autumn as the climate may permit. To draw and measure even what lies upon the surface will be a good summer's work, and the result cannot fail to be of value and interest. These ruins, though long known to be very extensive and but little disturbed, have been seldom visited, and only superficially studied and described. It is proposed that the public shall be informed from time to time of the work undertaken and accomplished, and that upon the return of the expedition, the results, if at all corresponding to the expectations reasonably entertained, shall be handsomely published. We give elsewhere an extract from the Notes, already spoken of, which explain the ground for these expectations.

A SLIGHT defect has been discovered in the remarkable vaulted ceiling of the Assembly Chamber in the new Capitol at Albany. As usual in so large a vault, some movement took place soon after its completion, the key-stone rising from the effect of the pressure on the haunches of the arches, so that the common expedient of loading the key-stone was resorted to to restore the balance. Now it is noticed that one of the sand-stone voussoirs in the rib toward the southwest is crumbling, and will have to be removed, and fears have been expressed that all the sand-stone will have to be replaced by granite. The position in which the cracked stone was found, about one fourth the distance from the spring to the key-stone, seems to us not to indicate the weakness of the material so much as either a second movement of the haunches of the arch, possibly caused by over-weighting the key-stone, or an original defect in the design, by which the intrados was allowed to approach too near the line of pressure, so that an undue strain is thrown upon the inner edge of the voussoir. The Capitol Commissioners are fortunate in having a very able superintendent in charge of the construction of their building, and his vigilance is likely to be of service, not only to them, but to all those interested in scientific building, if he will continue, and record, his observations on the various questions which arise in regard to the noteworthy structure under his care.

THE specifications, bills of quantities and contracts for the New York underground railroad are ready for signature, and the corporation promises to push the work rapidly, hoping to get the road completed in time for the great traffic which is expected on the occasion of the Exhibition. There are some interesting novelties about the construction as at present proposed. Instead of a single tunnel, wide enough for two tracks, such as the London Metropolitan lines employ, the New York sub-way will consist of two parallel tunnels, divided by a brick wall, and each containing a single track. This would seem to be a more economical construction, as it saves material and labor, not only in the height and thickness of the arches, but in the abutments, while a great advantage will be gained for ventilation by the movement which will be imparted to the air in each separate tunnel through the rapid passage of trains, all moving in the same direction. It is even proposed to furnish the locomotives with shields, nearly filling the space, so as to force the air more quickly out before the trains, but it hardly seems probable that this will be necessary. It is, however, to be hoped that either the pneumatic engines, or the electro-

motors, of which we heard so much a few months ago, will be made available for tunnel use by the time they are needed.

THE prospective success of the New York underground line has suggested to the Bostonians the possibility that escape may be found in some similar way from the numerous elevated railroad projects which threaten the beauty of their town. A writer in the *Herald* proposes that the different railroads now entering the city should combine to build a system of subways connecting their own stations, thus forestalling the elevated roads in what would be a profitable branch of their business; but the scheme does not look very feasible. To say nothing of the improbability that seventeen railway companies would work harmoniously together in such a scheme, the traffic between the stations is a very small part of that which now urgently needs accommodation, and the inconvenience and delay of changing cars would at any time cause the suburban, who would be expected to furnish nearly all the patronage of such a tunnel road, to desert it in favor of a rival system, elevated or otherwise, which would extend, as most of the projects now pending propose, by continuous lines into the adjacent towns on all sides. It is well known that the existing Boston railroads as a rule make suburban business, probably because they do not have to compete for it, subordinate to all other kinds, and the present great increase of freight and through traffic, which is regarded as of superior importance, seems to tend, perhaps necessarily, rather to restrict the accommodation which is afforded to local business. As we have before suggested, it seems not improbable that the great lines may eventually confine themselves entirely to freight and through business, leaving the city and suburban traffic to a system of cheap narrow-gauge roads, exclusively for passengers, running as surface lines outside the city limits, and underground within them. Boston being situated on a clay soil, tunnelling and earthwork would be cheap there, and the irregularity of the city gives it, like London, many vacant spaces between the streets which could be, as there, utilized for supplying light and air, and for building stations.

A NEW improvement is projected in the immediate neighborhood of Boston, which promises excellent results in many ways. Within a few hundred feet of the finest part of the city, separated from it by the Charles River, lies a large tract of land belonging to the city of Cambridge, so low that it is overflowed at very high tides, but with a firm, clayey sub-soil. This district commands a beautiful view, not only of the larger city opposite, whose three hills group picturesquely from that direction, but of the river, whose course it commands from the high hills near its source to its meeting with the sea, and it is proposed to utilize it by constructing an embankment at the deep-water line, with a broad drive-way around it, and filling the low land up to a suitable grade, laying it out in the same style of spacious luxury as the Back Bay district opposite, with which it will be connected by an extension of Chester Park, the important street which traverses the whole new portion of the city. Incidentally, the narrowing of the river channel by the new embankment would be advantageous to both cities, and the enterprise would, if carried through, open a tract of land excellent in situation, aspect, and facilities for drainage and water supply.

THE inter-oceanic canal schemes have reached a point where they afford much entertainment to the lookers-on, if nothing more. The Panama project has decidedly got the start of its rivals, its shares having been already successfully put upon the market, and a large amount of money paid in; a cabinet officer of the United States has accepted the presidency of the company, for which, we are glad to say, he has been promptly relieved of his office; and it is announced that medals of gold, silver, and bronze are being struck, for presentation to the shareholders. The friends of the rival enterprises insinuate that these medals are the only return which the shareholders will ever get for their money, and are ready to push their projects as soon as they can get an act of incorporation. There are now two companies in the field for the construction of a canal on the Nicaragua line, each straining every nerve to obtain its charter and exclude the other, and by a singular complication the bills to incorporate both of them have been referred to the committee on inter-oceanic canals, the chairman of which is said to be in favor of Captain Eads's ship-railway at Tehuan-

tepec, and can, if he chooses, prevent for the present the incorporation of either company by neglecting to report it from his committee, and thus give Captain Eads, who is now in Mexico, a chance to bring up his plan before any of the others have occupied the ground. We hope the comedy will not become a tragedy, like so many of the vast commercial bubbles which have been skilfully blown up out of less material than this, only to burst and bring thousands to ruin.

CAPTAIN DOUGLAS GALTON, in a discussion before the Royal Institute of British Architects a few days ago on sanitary matters, mentioned the Madison Square Theatre and Dr. Hall's church, in New York, in a manner which American architects in general, as well as those immediately concerned, will find gratifying; saying that both these buildings far surpassed, in regard to ventilation, anything that had ever been suggested in England. He was also very much struck with the perfection with which heating by steam was effected in America. He still thought, however, that for England, where the variation of temperature was less than on the other side of the Atlantic, hot water offered a better mode of warming than steam-pipes, which were subject to noise, and must always give a high temperature. If the uncontrollable character of steam heat and the noise in the pipes were Captain Galton's only objections to it, we think our engineers could meet them without much difficulty. By the method of mixing cold air in greater or less proportion with the warm air which comes from the stacks of a steam system of indirect radiation, now becoming common, a very wide range of temperature can be obtained at a touch; while even our direct radiators, choked with condensed water, as they often are by careless use, rarely give any obtrusive indication of their presence in well constructed work.

SOME alterations have, according to the *Architect*, been carried out in the Louvre. The gallery adjoining the *Salon Carré* has been fitted up for the reception of the Duchâtel collection of pictures, and is henceforth to be called the Salle Duchâtel. Improvements have been made in the water supply and heating apparatus, which involve the removal of the entrance from its rather inconspicuous position in the small interior court to the centre of the Cour du Carrousel, and to reach the picture galleries it is now necessary to traverse the galleries of antique sculpture. The modification of the heating apparatus does not seem to have been altogether successful, for three fires have occurred in the building within a short time, fortunately without doing much damage. A kind of artistic apotheosis has just taken place in accordance with the annual custom, by which the pictures selected every year at the *Salon* and placed in the galleries of the Luxembourg are, after remaining there until the tenth year after the painter's death, transferred to the company of the immortals at the Louvre, and their place is filled by the best of the new generation. It must be confessed that there is something more encouraging to the aspirations of the young in the contemplation of such a reward for successful effort than in the prospect which our American life affords, where the tickling of some rich amateur's fancy is the path to a short-lived fame, and the posthumous glory of the artist consists in having his works included in the gallery of "assorted oil paintings" of some auctioneer.

M. CHARLES GARNIER, the architect of the Grand Opéra, has been appointed to design the new "panorama" in the Rue St. Honoré, in Paris. The street is a narrow one, though situated in a fine district, but the building is intended to be rich and "monumental." Few architects and amateurs on this side of the water are familiar with Garnier's early work, although he was an architect of high reputation before the Opéra competition made him perhaps the most prominent member of the profession in Europe. Several of his designs were, however, published in the architectural journals of the time, and show in a marked degree the independent and unforced originality, the spontaneous quality which characterize the Grand Opéra. Every one knows the variety of novel ideas which developed themselves in the mind of the architect during the construction of the Opéra, but which he was able to realize at that time very imperfectly, if at all; and it will be interesting to notice what theories, or perhaps visions, of color and contrast will be carried into execution in the new work, which will offer so many opportunities for such essays.

THE PHILADELPHIA EXHIBITION.—II.

NOTE.—The illustrations to the two papers on the Philadelphia Exhibition are from sketches made from the original paintings for the *American Architect*, by Miss Dora Wheeler, with the kind permission of such artists as are resident in this country, and of the officers of the Society and of the Pennsylvania Academy of Fine Arts.

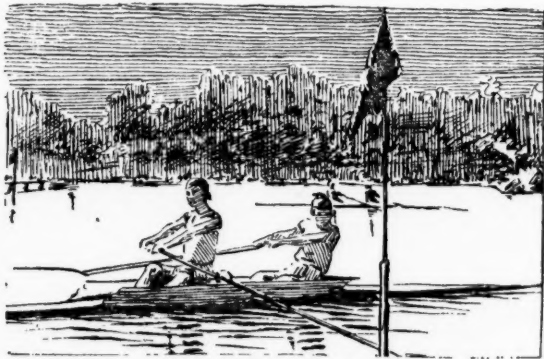


Fig. 6. "Turning the Stake."—Mr. Eakins.

AMONGST home works the first place belongs, I think, to the strong and intensely characteristic work of Mr. Eakins. There is, perhaps, no artist in the country who can rival him for originality of conception, for adapting the matter-of-fact elements of our surroundings to artistic use, no one who imprints a sign-manual of individuality so strongly on everything he touches. One of his pictures in this exhibition is called "Turning the Stake,—a Pair-Oared Race," Fig. 6. It is very strong in drawing, and the moment is cleverly chosen when the stroke backs water and his action is in contrast with that of his mate. The color of the picture is rather curiously dark. "It wants light," one hears it said, but I do not feel that there is in it any actual want of light such as we have seen in Mr. Weeks's picture, for example. To my mind at least, the canvas is simply pitched in a low and somewhat unusual key, which is yet perfectly justifiable and which justifies itself, indeed, for we comprehend at once that a sunlight effect is intended. Another singular point, perhaps, is the way in which very strong blues give the color-note of the canvas. They are found in the large flag and the head-dresses, and are continued in the water. They are neither the pale and faded nor the very dark blues to which artists usually resort for safety when they needs must undertake the color. They are deep and brilliant, and most uncompromising. They have been criticized by many in my hearing, but merely, it seemed to me, in deference to the conventional theory about blues in general. If we imagine the picture with its blues changed to the more usual reds, for instance, we find that it loses at once much of its singular force and charm. Mr. Eakins's other picture excites even more of comment than this one. It is a rather small canvas, called "A May Morning in the Park," and represents a four-in-hand with a portrait-group of figures on top of the coach. The figures are admirable for life and accuracy, and yet for the way in which they are made to take their unobtrusive part in the general scheme. Here we have red instead of blue; not the conventional shades, however, but the rather aggressive scarlet which the coach builder seems to love, and which is here continued by the vivid parasol above. The painting, as such, is admirable, the misty morning effect is well given, and one only regrets that the green foliage which forms a solid background, is not a little more subdued in tint. The disputed point in this picture is the curious way in which the horses are given. It is an established fact, I have been told, that a trotting horse has but one foot on the ground at a time. Instantaneous photographs are said to demonstrate this, and Mr. Eakins has painted his steeds in accordance with such evidence as theirs rather than with that of the unsophisticated eye. The result may be scientifically true; but it is apparently, and so, I think, artistically false. No amount of knowledge on the subject will ever teach our eyes to see a horse with three feet poised in the air. We shall forever see him with at least two feet for support, as we shall forever say "the sun rises" and "the moon sets." It is strange for the observer who knows Mr. Eakins's thorough and exact science in every line he draws, to hear the most callow critics pause in front of his canvas, and say, "All out of drawing! Dreadful!" Yet after finding that every visitor without exception bears witness to the strangeness of the effect portrayed, and after reflecting that art is not for the scientifically-instructed mind, but for the eye, which sees optically, so to speak, and not scientifically, no matter how accurate and how sensitive it may be, one must confess to wishing that Mr. Eakins had denied himself the pleasure of a fascinating little experiment, and had painted his horses in the time-worn way.

Mr. Hovenden's work has always been sincere and interesting, and grows in artistic completeness. Perhaps the best of his pictures here to be seen is the "Poacher's Story," the figures from which are given in Figure 7. Especial praise should be given to Mr. Selinger's "Study of Fish," which is not only well-done, but beautiful, and to Miss Trotter's "Hunting Four-Leaved Clover," an artistic little study of a prosaic child sitting in the grass. Another charming

bit is Mr. Marr's "Idylle," which represents a tiny child and a flock of geese in a hillside pasture. One prefers it infinitely to his large academic canvas called "The Wandering Jew," and also to his clever but oddly colored "Portrait of an Old Lady." Mr. Edward Moran, and Mr. Edgar Ward, show pictures in their best style. Mr. Dewey



Fig. 7. "The Poacher's Story."—Mr. Hovenden.

has a good out-of-door study with figures that is full of light and freshness. To complete the quota of figure-pieces one must reckon as usual, a number of essays with worn-out studio-themes,—pages, and troubadours, and matadors, whose evident posing and would-be picturesqueness, combined with an utter lack of action and expressiveness, do not suggest the reality aimed at so much as the idea that certain friends of the artist have been amusing themselves and him

with private theatrical performances. Some of these canvases show training that might produce good results if applied to more vital themes.

First upon the list of home-produced landscape work, one is inclined to place Mr. Enneking's "November Twilight with Cattle," as together with good workmanship it shows a poetical and



Fig. 8. "Bar Harbor."—Mr. Senat.

individual temperament. It is a small picture, reddish-brown in hue; it is charming in composition, and delicate alike in sentiment and manipulation. One can hardly say that Mr. Charles Miller has any distinctive manner; he does fairly good work in so many different styles. The best of his canvases here shown is perhaps the large autumn scene, called "Oaks near Creedmoor." It is very carefully and competently worked; but one has an idea that it has been "composed" rather than imagined or felt from direct contact with the reality. The color may be truthful, but I cannot see it so. To me, it is, though agreeable enough, a little too coppery. Mr. Bruce



Fig. 9. "Frenchman's Bay."—Mr. Senat.

Crane, has made immense progress within the last year or two. His "Pastoral," a sloping field with ragged trees against the sky-line, and a flock of geese descending towards us, is very good in handling and in color, combines a freshness as of *aquarelle*, almost, with the solidity of oils. Mr. Senat's sketches of Mt. Desert scenery,—Figs. 8 and 9,—are fresh and genuine, and his more important canvas, "Lifting Fog," is both true and agreeable in the way the very difficult atmospheric problem has been treated. Mr. George Smillie's "Path to the Shore," Fig. 10, is an attractive motive attractively rendered. Mr. Simon has a good landscape with sheep, and Mr. Charles P. Pierce a larger one with cattle, and a distant glimpse of the sea that

is pale and pleasant in color and good in atmosphere. Mr. William Sartain, who has been known more especially for his clever rendering of our dark-skinned brethren, comes here to the front with some very good landscape work. One beach scene, sketched in Fig. 11, is especially charming, smoother in execution than most of the landscape work which we are accustomed to liking, but none the less good on that account. Mr. Bolton Jones, has several careful pictures of which the best is a view of Tangier. Mr. Sword, the President of the Society, shows work in a variety of lines, marine as well as

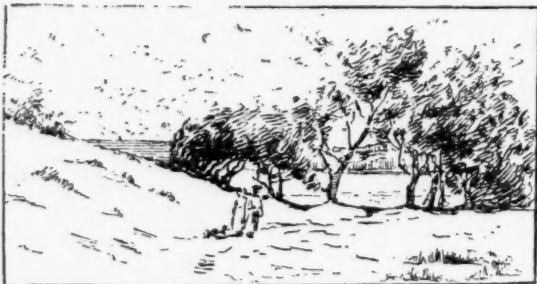


Fig. 10. "Path to the Shore."—Mr. George Smillie.

strictly landscape. From one of his wood-interiors has been taken the bit which forms Figure 12. A curious little study of white tree-stems against a dark background by M. Watermann is to be noted.

It is interesting to see how the broader methods of work which have recently been imported into American art infect even painters who are no longer young, and could not have been supposed so mobile.

A little landscape, for instance, called a



Fig. 11. "On the South Shore, Nonquit."—Mr. Sartain.

"Hillside in Chester County, Pennsylvania," one is more than surprised to find attributed to Mr. Bellows. It is delicate and good in color, cleverly worked with a free brush, and full of atmosphere,—altogether a satisfactory little study. Mr. David Johnson, whose name we connect with over-vidid and over-minute little canvases, here shows us one that at some distance might be taken for a Dupré, so close to his is the scheme of color, the effect of light, and the plan of composition. That the handling is not Dupré's goes without saying; but if one did not so strongly feel the influence of example in this little canvas, one would surely prize it as of high value. There is apparently no reason why, when Mr. Johnson has got so far as this, he may not work himself out into independence of feeling and intention.

Among the still-life pictures on the walls, the best is perhaps Mr. Hoesslin's "Study-Table." Portraits are few and uninteresting. One is disappointed not to see something stronger and better from the hand of Mrs. Anna Lea Merritt than the "Portrait of Mr. Felton," shown by her.

Among the few good water-colors, the best are some by Mr. Muhrman, that have been seen before, and one or two by the Misses Greatorex. Mr. Stephen Parrish exhibits a large number of etchings, some of which are of interest, and one is always glad to see the hand of Mrs. Greatorex. There is nothing to be said about the few pieces of sculpture exhibited, except that there is a medallion head by Mr. O'Donovan, which, however, is not new.

In conclusion, I must once more express the satisfaction one feels in contrasting the average of this exhibition with the average of American art a dozen years ago, and in measuring its most excellent works—holding, too, in reserve, all the artists I have named as so conspicuously absent—against the very best we could then accomplish. Surely we are justified in looking forward with the brightest anticipations to the progress that the next decade may bring, promising, as I think it does, to mean for American artists ten years of steady, well-directed labor and genuine aspiration.

M. G. VAN RENSSLAER.

THE MISSISSIPPI JETTIES.¹

THIS is a well printed volume of 380 pages, with copious illustrations and charts.

The subject is one that appeals to the national pride of every American, for the works described are rarely equalled in any part of the world, whether we regard their importance as effecting the growth of commerce and material prosperity in a large part of our domain, or whether we admire the skill and energy displayed in overcoming the peculiar difficulties arising during their construction.

The author was one of the workers, being the resident engineer in charge during the greater part of the time occupied by the execution of the work. He has given us an interesting narrative of events, beginning with the original discussion, prior to the action of Congress by which the contract was made.

It is a formal, professional record of all the work done, giving all the details of construction and of cost which may be of interest to engineers, all over the world, with the reasons, physical, financial, or political, which governed the plans as gradually developed and executed during the four years prior to the completion of the jetties.

The engineer had to here deal with natural forces on a gigantic scale, not only to subdue them and render them harmless, but as in all the greatest victories of his profession, to put them in harness and compel them to do the work for him.

In this point lies the kernel of the nut. The efforts made by the government, during the past generation, had been chiefly directed to scratching the bottom of the great river at the bar, by means of which a narrow and uncertain channel was sometimes maintained, rarely exceeding eighteen feet in depth, and which never remained open long enough to turn one's back upon it. The struggle was incessant and ineffectual, because man's efforts were expended in direct antagonism with the natural forces at work, colossal in power, and never ceasing in their activity.

But Mr. Corthell has here given us something more than a mere professional record. The narrative is enlivened by the earnest and deep interest of the writer, who felt most keenly how much was at stake in the great undertaking, and whose heart responded with ready sympathy to the various incidents which from time to time favored or opposed the progress of the work with which he was identified.

The reader's interest is thus sustained by seeing in all its detail the inner life of the great enterprise, while the author keeps himself modestly in the background. There is none of the *Quorum pars magna fui*, which sometimes annoys us in official records.

The man is too much in love with his work to thrust himself forward, and we fail to infer from his tone the fact that he was the presiding genius and chief executive on the ground, during all those dark days when official jealousy and financial distrust, added to the necessarily great and new physical obstacles to be met, had combined to render the leader's task anything but an easy or an agreeable one.

With such motives at the bottom, we can readily excuse some occasional flights of the "spread eagle," when looking back at the success which has crowned the effort. It is difficult for a man of much depth of feeling, who has spent any considerable time upon the "father of waters," to avoid some apparent extravagancies of expression when describing the characteristics and attributes of this mighty flood. The traveller who floats upon it for the first time sees only its commerce and its banks; it takes time to realize the physical force developed by the silent and incessant progress of such a mass of water. Its great depth is never visible through its turbid eddies, and it is difficult to realize this depth when flanked by such flat and monotonous shores as those which the river has made for itself throughout the Delta.

The bar at the mouth of the river was formed by the deposit of silt from the current, where its velocity was checked by its escape from between its natural banks, allowing the stream to spread out to the right and left over the salt water of the Gulf. The plan for the deepening of the channel by jetties was simply to extend, by artificial dykes, the natural banks of the river from their former termini across the bar to deep water, about two miles. By this contraction of its width, the current would by its scour increase the depth over the bar to that heretofore existing, through the whole length of the pass; viz., about 30 feet. The method adopted for constructing the jetties, as well as the various dams and dykes found necessary at the head of the passes, was by sinking willow mattresses on the bottom, by aid of broken stones. The silt brought by the river not only soon filled these mattresses with a solid mass, but filled also the space immediately outside, or back of the line of the jetties, from which the current had been diverted. They were in fact backed up by a solid embankment almost as fast as built across the bar, so that no portion of them except the sea ends, was much exposed to the wave action of the storms of the Gulf.

The works at the head of the passes were at once the most difficult of construction and the most uncertain in their results. The river is here 8,000 feet in width, where it spreads out, preparing to divide into three branches, and, since it flows in a bed of its own forming, its section is the result of an equilibrium between the tendency to scour its bottom or to deposit silt, as influenced by the direction and velocity of the current. This great breadth is therefore accompanied by a corresponding shoaling, and we find opposite the

¹ A History of the Jetties at the Mouth of the Mississippi River. By E. L. Corthell, C. E. Chief assistant and resident engineer during their construction. — New York: John Wiley & Sons, 1889.



Fig. 12. "Summer Hours."—Mr. Sword.

head of the South Pass a full half-mile of length where the depth ranged between fifteen and twenty feet, although over ninety feet deep within a few miles above this point, where only half a mile wide. The problem was to contract the width of the South Pass channel as it leaves this broad expanse, so as to compel it to scour out an additional depth. But the volume of water allotted to these three mouths or passes, as they leave the common basin, is nicely balanced by the natural forces previously existing, so that when the poise was disturbed by the artificial obstructions placed at the head of the middle pass, the tendency was to slightly raise the head and throw an undue portion of water into one or both of the wider channels that opened on either hand. The bottoms of these channels were also soft and yielding, and would soon be deepened by such an increased flow, so that it was feared that the proper quota of the whole river, viz., about one-tenth part of it could not be retained permanently in the South Pass, and that such ultimate loss of volume would diminish its ability to maintain the desired depths hereafter. The remedy was to limit the depths of the extreme eastern and western passes at their throats, by laying a continuous sill or submerged dam of mattresses, from 70 to 100 feet in width, across them from shore to shore. This was an arduous and a costly undertaking, but it resulted, as was hoped, in checking the scour which would otherwise have taken place in the two widest passes, and thus enabled the engineers to finally keep in the South Pass its full quota of the water.

In the words of our author, "Here, by the gentlest influences, the mighty current is swayed and directed, completely obedient to the will of man. There is no instance, indeed, in the world, where such a vast volume of water is placed under such absolute and permanent control by the engineer, through methods so economic and simple as those adopted at the head of the passes of the Mississippi River."

We suppose no great public work can be executed now-a-days without a certain amount of croaking, on the part of the disaffected. But it is rare that the croakers are so speedily put down by the facts of the case as in this instance. That class were here represented by the U. S. Engineers, whose plans had been supplanted by those of Captain Eads. The Act of Congress authorizing the undertaking was approved March 30, 1875. It required Captain Eads to secure before September 30, 1877, — i. e., during a period of 30 months — a depth of twenty feet over the bar, and before September 30, 1878, one year later, a depth of twenty-two feet, with two feet additional depth during each of the two successive years.

On the 13th June, 1875, a solitary floating steam-engine and scow began the work by driving piles for the foundation of houses for the workmen on the marshy banks among the reeds. These were the first marks of civilization on that desolate waste. There were then only 9.2 feet of water over the bar. So rapidly was the work pushed, that on the 4th March, 1876, only one year after the passage of the act by Congress, the jetties had been raised up to the surface of the water for nearly their whole length of 11,800 feet, and a vessel went to sea through this channel drawing 13½ feet of water, bound for Revel, Russia, with 2,150 bales of cotton. About two months later, May 12th, the steamer *Hulson*, one of the Cromwell line from New York, came up through the South Pass drawing fourteen feet and seven inches.

The rapid completion of the jetties up to the water surface held the current within such control as to develop a good channel during the rest of the flood season of 1876. The year was spent in further work on the jetties and the construction of the works about the head of the passes, where a formidable shoal existed. The result was, that six months before the thirty months had elapsed, after the passage of the act, viz., on March 16th, 1877, the Government had official notice from General Comstock that not only twenty feet, but twenty-two feet of water could be carried through the pass.

It is a pity that the history of such a work, national in its character, and likely to be of long enduring influence upon the material interests of a great population, should necessarily be encumbered by the records of petty jealousies and personal altercations which we should be glad to see confined to the daily press where they first appeared. But these occurrences caused serious changes of plans. Moreover, such disagreeable features create too deep an impression on the actors of a scene to be readily ignored by them, however little the world at large may care for these details, and hence we could hardly expect that such unpleasant features should be omitted from a narrative written at this early date, when they had such a considerable influence as in this case upon the methods pursued, depending as they did upon public opinion and the confidence needed to ensure financial success. Future readers of the history of the enterprise will wonder at the prominent part occupied by these obstacles, and will see only in the enduring success of the jetties themselves the monument they will long exhibit of the energy and skill of their projector, James B. Eads.

The chief arguments used against the jetty plan by the chief of the Engineer Department and his supporters were these:

1st, The material scoured from the bar between the jetties, and afterwards brought down by the river, would speedily renew the bar beyond them, requiring their continual extension to secure the permanence of the open channel.

2d, The action of the waves in the Gulf would wear away the jetties, and render their maintenance very costly.

Of course a lapse of time can alone determine how far these fears may be realized; but the first bugbear has been quite effectually

removed by the experience already acquired. The average discharge of solid matter through the South Pass channel is estimated at over two million cubic yards per month, year after year; yet thus far the deposit and accumulation of this material do not appear to have taken place within such a vicinity of the ends of the jetties as to justify any reasonable fears for the near future. The following statement is made by Mr. Corthell, p. 220: "An extended area in front of the jetties has been surveyed at various times by Capt. Brown (U. S. Inspector). This area is fan-shaped, and extends seawards from the jetties about one mile. Its smaller base is 2556 feet in length, and its larger base, one mile distant, is 9903 feet. It has twenty-one sub-divisions. By combining those that lie more directly in front of the jetties, and making a comparison between the surveys of 1876 and 1879, we find an excess of scour over the whole area of 770,087 cubic yards, and a mean increase in depth of 1.22 feet.

"Thus the swelling and disturbing influences of the waves, and the corroding influences of the salt water currents and the river floods, have for five years prevented an advance of the bar. In place of pushing the bar into the Gulf at the rate of six hundred feet per annum, or a total distance of three thousand feet, as was predicted by Gen. Humphreys, the jetties have not only cut the bar entirely away and stopped its advance, but have deepened the Gulf beyond them."

Interesting statements are given of the increase of commerce through the mouth of the river, among which is the following from the annual statement of the "Trade and Commerce of St. Louis," for the year 1879, reported to the Merchants' Exchange in that city:

DIRECT SHIPMENTS TO FOREIGN COUNTRIES FROM ST. LOUIS, IN TONS.

	1875	1878	1879
Shipments by rail to foreign ports.....	16,825	72,091	135,881
Shipments through river to foreign ports.....	6,857	154,000	176,531

On the 10th of July, 1879, a certificate was given by Capt. Brown (U. S. Inspector), as follows: "I certify that on the 8th day of July, 1879, there was a channel at the mouth of the South Pass, through the jetties, 30 feet in depth, without regard to width, measured at average flood tide, and extending from a wider and deeper channel in South Pass to deeper water in the Gulf of Mexico." This was the maximum channel required by law. In short, the facts as they now stand seem to be a full vindication of the jetty system, which has actually given the river, for the first time since its discovery, an open mouth for the commerce of the world.

The typography of the book is excellent; but it is a pity that the charts and diagrams are in some cases so reduced in size by photography that the figures and references become quite illegible. There is evidently a limit beyond which this process of reduction should not go, when printers' ink is employed in the multiplication of the copies, and this limit has been too nearly approached, if not actually passed here in some cases. But these defects concern the engineer, rather than the general reader. The latter will perhaps wonder why the author persists in Anglicizing the name of the eastern mouth, by spelling it "Pass à l'Outre," instead of the original "à l'Ontre," which is still commonly used in many official and popular writings, and we must say we see no good reason for the change. The work lays no claim to literary merits, but is full of interesting facts, presented in a manner that will engage the attention of all to whom such subjects appeal.

COTTAGE HOSPITALS.¹

THIS book, the first edition of which was published in 1877, is an elaborate work on small local hospitals for small towns, advocating them as possessing great advantages for the treatment of cases of disease or accident, as compared with retaining the same in private houses or with sending them to great "general hospitals." Of these advantages the more important are the avoidance of the dangers and disadvantage of removal to a distance, and the securing a purer air than is possible either in the homes of the poor or in the great hospitals, which are depots of disease.

No argument is needed to prove the reality of the first claim. In support of the second, elaborate tables are given, showing the greater success of serious operation in "cottage" than in large city hospitals; also, the general mortality of the two, viz., 5.4 for cottage, 10.2 for city hospitals. As regards suitable nursing, it is obvious that it must be better in the cottage hospital than in the homes from which most of its patients would come, while it can easily be made to equal that of large hospitals. Of course, country folk in need of hospital treatment can be much more easily induced to enter a cottage, than a city hospital, there being about the former a cosy and home-like character, while the medical attendants and the nurse are persons well known and trusted in the neighborhood. Add to this the sense of being within easy reach of friends and family, and one can easily understand that the poor and ignorant would regard residence in the little hospitals of their own neighborhood with none of the dread and suspicion which they might associate with the idea of transportation to a great institution where they must be at the mercy of strangers. It would seem that these advantages of the cottage hospitals must enlist in their favor all persons who sympathize with the sufferings of the poor, and have experienced the difficulties which beset any attempt to have them properly nursed through severe sickness in their own homes. And it is certain that every physician and

¹ *Cottage Hospitals, etc.* By Henry C. Burdett. Philadelphia: Presley Blakiston, 1880. Second edition. pp. 550.

surgeon in country practice will gladly coöperate with a movement to establish such an institution in his neighborhood, and will be unwearied in his contributions of professional advice and attendance, finding his reward in his satisfaction at fighting disease with less odds against his patients, and in the better opportunity for professional study and experience afforded by the little hospital, where he can reasonably undertake to treat cases which he feels it is almost idle to attempt in the narrow, noisy and dirty homes of the sufferers.

It appears that the first of the English cottage hospitals was founded in 1859, and that there are now about two hundred of them, of which Mr. Burdett gives us full tables furnishing a mass of very valuable and practical information, covering construction, management, expense, etc. Of fourteen he gives plans, which he criticises with the ability derived from long experience as surgeon of hospitals both large and small, and from many years of close observation of both. He even furnishes a table of "Cottage Hospitals in America," as well as a chapter on the same, which in reality treats of such hospitals in Massachusetts alone. In that State there are—outside of Boston—exclusive of insane, marine and naval hospitals, ten only, with an aggregate of 240 beds. But not one of these can properly be called a cottage hospital, since they are all situated in towns of ten thousand inhabitants or upwards.

A model-plan for a hospital of twenty-one beds is given on the pavilion plan, and the book abounds with directions and hints of the most practical character, and has a very complete index.

On page 38, it is stated that so far as the author's observations go, he has found "the sanitary arrangements of every new cottage hospital faulty, with one exception." And in the great majority of cases the defect consists in the failure to exclude sewer-gas. We believe Mr. Burdett to be right in his strong preference for the plan of placing the water-closets, etc., in a tower built out from the main structure and provided with "cross-ventilation." To place the bath-rooms in the same tower would scarcely be advisable in the climate of the northern United States, where also it is not practicable during four or five months of the year to depend upon ventilation by windows, as our author advises for his English hospitals. There are, of course, a few other points in regard to which our author's dicta are not suited to our wants and ways, but we can see no reason why the general scheme of the cottage hospitals should not be adopted in our country towns, and with great advantage. As to the proportion of beds to population, Mr. Burdett gives it as one to one thousand in rural districts, and from three to five in one thousand in manufacturing or mining districts, where there is great liability to accident; and this proportion would answer our purposes. In epidemics of contagious disease, a "hospital tent," such as the experiences of the war has so strongly commended, could be quickly set up near the "cottage," and would admirably meet the emergency.

It is in the matter of nurses and nursing that the greatest practical difficulty would perhaps be encountered, inasmuch as it would seem essential to the successful working of the scheme, that a competent nurse should be resident at the hospital, and the wages of such a woman would often prove the largest item of the running expenses, much larger than in England.

Two or more neighboring towns might unite to establish and maintain such a hospital, and its inmates could be treated each by his own physician, some medical man of the district being made medical director.

In the report of the Massachusetts State Board of Health, vols. V and IX, are papers on small hospitals, which cover a portion of the same ground with Mr. Burdett's book.

THE ILLUSTRATIONS.

THE HEMENWAY GYMNASIUM FOR HARVARD COLLEGE, CAMBRIDGE, MASS.—MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

[Gelatine Print.]

SKETCHES ON THE RHINE, DRAWN BY MR. L. S. IPSEN, ARCHITECT, BOSTON, MASS.

COMPETITIVE DESIGN FOR THE ENTRANCE HALL OF A COUNTRY HOTEL.

The editors publish this design with same reservation as the former one.

SECOND COMPETITION IN INTERIOR DECORATION.

The publishers of the *American Architect and Building News* offer three prizes of fifty dollars (\$50) each for each of the three designs, submitted in accordance with the following programme, which shall be adjudged of highest merit, the award being made by a jury, the members of which are Henry Van Brunt, Arthur Rotch, and Eugène Létang, all architects of Boston. The conditions governing the competition are these.

1. Every competitor, by taking part in the competition, signifies his willingness that his design be published in the *American Architect and Building News*, if the editors desire to publish it.
2. Each competitor is to submit two sheets of drawings, each measuring 14 inches by 22 within the inner framing line, the drawings being executed in pen and ink, on smooth white paper, in a manner suitable for reproduction in this journal.
3. The authors of the successful designs surrender to the publishers all property right in their respective drawings and designs.

4. In awarding the prizes, heed will be taken of the manner in which the programme has been followed, the excellence and appropriateness of the design, and the execution of the drawing.
5. Each competitor is requested to sign his drawing with some motto or simple device, which can be recognized from its verbal description, and to enclose to the editors, together with his *nom de plume*, his real name and address.
6. The drawings to be received at the office of the *American Architect and Building News*, 211 Tremont St., Boston, Mass., on or before Saturday, February 26, 1881.
7. Drawings which are received after the day named will be excluded from competition, but not necessarily from publication.

PROGRAMME.

The subject of the second competition will be the dining-hall of the same small country hotel, the entrance-hall of which furnished the subject of the previous competition. It is thought desirable to impress once more on intending competitors the fact that they should strive to give to their designs the semi-private character which such a hotel with its permanent occupants should have. The room is intended to accommodate thirty people dining at one time and yet not necessarily at the same table.

The size and general arrangement of the hall are left to the competitors, but it is required to introduce into the design the tables and chairs (in number sufficient to show their character), the side-boards or continuous buffets at which the waiters carve, the communication between the buttery and the dining-hall, the windows and means of artificial lighting,—the introduction of an open fire-place is optional. A place of observation whence the landlord or head-waiter can overlook the room should also be provided. It is suggested to those of the competitors in the first competition who are satisfied with the character of their former design that they should preserve such character as far as may be, and make the design of their dining-rooms harmonize with that of their entrance-halls.

Required: A perspective view of the dining-room, exhibiting the features mentioned above. This perspective is to occupy the whole of one sheet.

The second sheet is to contain a plan of the dining-room, and details of tables, chairs, side-boards, wainscot, windows, etc., to a larger scale. All details are to be explained by graphic scales.

CORRESPONDENCE.

THE ARCHITECTURAL SOCIETIES.—THE TEMPLE BAR MEMORIAL, ETC.

LONDON, 13th Nov., 1880.

WITH the opening of the sessions at the Royal Institute of British Architects and at the Architectural Association, the architectural year may be said to begin in London. The former held its first meeting on November 1, and the Association a conversation on the Friday evening previous.

At the Institute the President, Mr. John Whichecord, delivered his inaugural address. In it, after referring to what had been done and still remains undone in what may be called the "educational question," with its various phases of voluntary and compulsory examinations, he harped on the old string,—Why do not the architects of these islands join the Institute? He seemed astonished to find that out of something like 3,000 practitioners not quite a third of their names were to be found on the roll of the Institute, and exclaimed: "For what reason do these men stand aloof from the corporate body?" He endeavored to give several replies, all more or less unsatisfactory, till another question immediately suggests itself. Why should architects away from the metropolitan districts join the Institute? What have they to gain by it that cannot be had with more advantage in their local societies? Until the Institute is endowed by act of Parliament, or otherwise, with the power of granting diplomas without which the art of architecture cannot be practiced, just as the juns of court do for barristers, or the colleges for physicians or surgeons, what is it more than a merely metropolitan society? Larger and more important no doubt than the provincial societies, just as everything of the kind necessarily must be in the metropolis. The very fact that, while in London it has some 460 members out of its 700, in Scotland and Ireland together it has only 28, the balance being principally made up in the English counties, shows on the face of it that it is looked upon as a local body, and this, too, in spite of great efforts recently made to bring the provincials into the fold. The question therefore is, what has the architect in Dublin or Edinburgh or Glasgow to gain in joining the Institute? He cannot, except on the very rarest occasions, attend its meetings, he can hardly hope to have anything to do with its administration, or further the various schemes it may have on foot,—socially and professionally, therefore, he can get more out of his own local society, which, it may be, is quite as desirous to protect the vital interests of the profession as the Institute can possibly be. All lawyers and doctors do not belong to the same society, nor is there any reason they should; then why should architects? An advocate of Edinburgh is just as secure of his professional status as any barrister of the Temple, and all the doctors in Britain could not write M. D., London, after their names, even if they would. Until the Institute has something more substantial to offer than it is likely to have for some time to come, it will be little use keeping on asking the question "Why do these men stand aloof?" Let the Institute tell them why they are to come in, and then perhaps they may be able to arrive at a common

understanding on the subject. A much more pertinent question is, why do not some of the best men in the profession in London join the Institute? Why are the voices of Norman Shaw, Nesfield, Bodley, Gilbert Scott, Philip Webb, Davey, Jackson, or others we could name, never heard at the Institute? Asking this question once of one of its prominent members, the answer returned was: "Some men are not clubbable persons." But the Institute is not a club; it aims at something much higher than that,—why, then, are men who are looked upon as in the very first rank of their profession, who are probably doing more than any one else to mould the taste and lead the fashion of the day, outside the "corporate body." Because they are not "Clubbable"! No, no, that won't do. Such men ought not only to be in the Institute, but be a power in it. If architecture is an art, then the first artists in it should be made specially welcome in Conduit Street, and there must be something wrong somewhere, to account for their absence. Let the Council of the Institute look to it. It is no question of fees, or education, or competitions, or examinations, which keep such bright names from their roll. They had better set their house in order "locally" before they are ambitious enough to expect to become national.

Mr. Lee at the Association presided over a very pleasant social gathering. In his address he gave an interesting sketch of the history of the Association, in which, curiously enough, some of the very names we have quoted above are mentioned as among the earliest members,—after which we had a little lecture on the present state of architectural design, as instanced by some notable examples, and a hopeful speculation as to what the future is likely to bring forth; nothing very deep or very learned, but entirely suited to an evening devoted to ladies, music, photographs, water-colors, and distributing prizes. Judging from all things, the Association seems to be flourishing as well as its best friends could wish and has one hundred more members on its role than the Institute.

That flourishing young society "St. Paul's Ecclesiastical" also held its opening meeting for the session last week, when the Rev. Mackenzie Walcott read a most interesting and learned paper on "Old St. Paul's." No one is more fitted than Mr. Mackenzie for such a task as this,—who by study and research has almost made of our old cathedrals and conventual houses a special field of his own—and the result was in every way worthy its author. Step by step from the remotest period he traced its history, till having as it were "built up again that ancient and famous monument, the church and steeple of St. Paul's" he proceeded to describe its every nook and corner, and the various customs, rites and ceremonies that took place therein—perhaps the most exhaustive and reliable account that has yet been written. The paper was illustrated by plans of the old cathedral, and crowded with references and a long list of authorities for nearly all the particulars therein related.

The Temple Bar Memorial—about which so much discussion has been going on for months—was "dedicated to observation" by Prince Leopold this week. Now that the cloths and scaffolding have been removed, one is able to judge of its value as a work of art, apart altogether from the question of the fitness of its site. In regard to the latter point it must be admitted a good deal is to be said for having the memorial on the exact spot where stood the old gateway; but on the other hand, when one looks at the narrowness of the roadway even after its widening by encroaching on the foot-pavements, and the enormous traffic constantly flowing east and west, one is tempted to quote the old couplet—

"It isn't that the thing's not rich and rare,
One wonders how the devil it got there."

And so it is, and so also in one respect its value as a work of art is injured in the endeavor to concede every available inch to the roadway. The memorial is too narrow or too thin from north to south, it has been pared down (for the reason just given) almost to the verge of the ridiculous, and seen fair end on, looks more like a good sized gate-pier than a monument in itself. It is much better from east to west, where the breadth does not matter, and so has been widened out to receive a nich on each side with statues of the Queen and the Prince of Wales in them. The monument may be described as a large pedestal on a well-moulded granite base. The pedestal has ample pilasters, richly carved; on the north and south faces the niches referred to, and crowned with a cornice; above that is a smaller moulded base plinth surmounted by a large bronze griffin holding the city shield.

In the granite basement are panels filled with bas-reliefs, which would have been much better away altogether. The figures are small, "dollified," and out of scale with everything else in the work. They are also in too high relief, and in themselves are but poor sculptures. The architectural details of the Memorial—designed by Mr. Horace Jones, the city architect—are very fair, and there is some good carving in it. Its weakest point—apart from its thinness—is its sculpture. The statues of the Queen and Prince in white marble are stiff and "pokey," lacking all the grace and flow of line of the best work of the class. The Queen is in her robes of state, crown on head and sceptre in hand, and the Prince is in a Field Marshall's uniform. They are not even very good likenesses, and in each case the eyes are deeply cut in the most uncomfortable looking fashion. The bronze griffin on the top is a poor half-starved looking beast,—much more might have been made of an opportunity such as this, as the idea is not at all a bad one, but as it is, it does not balance the more solid work below. There is a decided break in the composition at the pedestal on which it stands, forming a marked

contrast, for instance, in this respect to the admirable manner in which the equestrian figure of the Duke completed the design of Mr. Steven's Wellington Monument in St. Pauls, so much so indeed, that one feels in the latter case the artist's work will never be seen to its full advantage till the horse and man are in their place. Not so in the case of the Temple Bar Memorial. The Monument and the Griffin do not by any means harmonize together. On the east, or city side of the structure, a "refuge" for foot passengers, with a couple of lamps has been formed; the lamp-posts are in bronze, of good design and workmanship. The question is asked on all sides, "how long will the Memorial be allowed to remain where it is? and where will it be moved to?" Some give it a year, others again only a few months, the general impression being that sooner or later the obstruction to the traffic will become unbearable, and the whole thing will be removed out of the way. But where to? That is altogether another matter, and quite impossible to tell. When looking round the site, a good position suggested itself, directly opposite the present spot over against the south-west angle of Mr. Street's clock-tower of the Law Courts, only the character of the design would hardly suit the Gothic of the Courts,—but just at that spot where the open arcaded front screen begins, we could fancy Mr. Street designing a very telling Memorial of old Temple Bar. The Law Courts themselves are progressing rapidly, the roof being nearly all on, the south gable of the great central hall is seen over the doorways of the principal entrance, and promises to be one of the most effective features in the design. We understand the contractors are sanguine of completing the entire building within the contract time, September, 1881, though there is no doubt an enormous amount of work yet remaining to be done. The general design still maintains a certain straggling character—though the details are very good in themselves, and much of the carving is most excellent.

The clock on the clock-tower is still waiting for its hands; how long it may remain in this useless condition is a nice problem, seeing it has already become the rival joke of its neighbor, the Memorial, in the street below.

STORM-WATER IN TOWN SEWERAGE.¹—I.

ONE of the most important questions now before the sanitarian, and very much the most important before the sanitary engineer, is the question of the best methods for disposing of the surface-water of cities and towns; that is, of the rain falling on the natural or unimproved surfaces, on the paved area, and on the roofs of houses.

The direct bearing of this question relating to the degree to which the soil is to be made wet, and the degree to which organic impurities on the surface are to be washed away or to be concentrated in depressions, affects directly the healthfulness of the community. Aside from all sanitary considerations there is a very important one on the side of convenience and of the protection of public and private property from injury by floods. That this water must be got rid of, and that it must be got rid of in such a manner as to do the least possible harm to the health of the community, and with the least practicable cost, is a fundamental fact to be borne always in mind. Economy and convenience are sure to assert their importance in any consideration of the subject. The sanitary effect of the method of removal adopted is not so sure to command attention, but it is very sure sooner or later, to assert its influence.

I have been led by circumstances to give especial attention to this subject for a number of years past. I began, as any student of engineering would naturally begin, by accepting as inevitable, or at least as most judicious, the methods of disposal universally adopted. I have ended, as I believe most intelligent and fair-minded men must end, after a careful consideration of all of the arguments bearing upon the case, with the conviction that the prevailing practice has been radically wrong, and that simplicity, economy, and above all, the best observance of sanitary requirements demand in almost all cases, if not indeed everywhere, an absolute separation of household and manufacturing waste from the surface flow.

The almost universal custom concerning the treatment of storm-water in sewered towns has been a very natural outgrowth of circumstances. The first sewers were simply natural water-courses covered over or continuously bridged to obviate their interruption to traffic, and to protect their channels from the reception of garbage and filth. As the paving and roofing of the area increased, the flow of storm-water became more and more rapid, with the natural result that this discharge was delivered into the covered channels to get it out of the way. To secure a further extension of this convenience, underground branches of these water-courses were laid to other parts of the occupied area until a more or less complete network of covered drains resulted.

The annoyance from the accumulation of foreign substances admitted to these rough channels led to the paving of their bottoms and the walling of their sides, and gradually, through various improvements of form, to the large brick sewer of modern times, and, for minor extensions of the system, to the use of pipes of large diameter.

It is only at a comparatively recent day that the almost universal restriction concerning the admission of filth to these sewers was withdrawn, and that they came to be used for conveying the wastes of human life. The withdrawal of this restriction was about coincident

¹ A paper read before the American Public Health Association at New Orleans, (1880), by George E. Waring, Jr., Newport, R. I.

with the introduction of water-supply and of the system of water-carriage for the drainage of houses. No other vehicle for removing household wastes is so convenient or so cheap as aqueduct-water, and the facilities for its discharge which large sewers afford, are sufficiently good to secure the transmission of our off-scourings more or less completely to a distant point.

We have through long practice grown up with the belief that deep sewers are necessary for the removal of storm-water, and this necessity being conceded, we have not unnaturally sought to avoid the mistake of cutting a big hole for the cat and a little one for the kitten by turning both sewage and storm-water into the one large channel. This seems the simplest way to accomplish the end, and it has the sanction of a sufficient antiquity to have commanded general adoption.

In discussing this subject we should try to divest ourselves of the influence of preconceived opinions and of universal habit, and look at it in all its various bearings. The large sewer is the outgrowth of a desire to get rid of surface-water, and incidentally of so much of the soil-water as is likely to make our cellars wet. It had in its inception nothing whatever to do with the removal of filth from houses. This further duty has been thrust upon it simply because it was capable of performing it without the expense and complication that would attend the introduction of a separate set of works.

In 1842, Mr. Edwin Chadwick, the father of sanitation in England, a most intelligent man but not a professional engineer, made the suggestion and supported it with strong arguments, that household wastes and matters of like character should be provided for by a separate and distinct system of pipes. He has long been supported in his opinion by Mr. Robert Rawlinson, C. B., now the engineer of the local board, and beyond question, foremost in his profession in England. Practically, no considerable amount of public work has been carried out in accordance with the suggestions of these gentlemen. Communities are slow to try experiments in engineering, and the force of precedent has such effect nowhere else as with the class of minds usually charged with the regulation of municipal affairs. Indeed, it is not clear that the few attempts made in England to carry out the separate system have been altogether satisfactory. The storm-water sewer of the improved modern form has at least the advantage that, from time to time, it receives very copious flushing from the rainfall, so that usually before obstructions accumulate to such a degree as to choke the channel completely, there comes a storm of sufficient volume to wash out the deposits and give the sewers a fresh start. Sewers constructed for the removal of foul sewage only, and without special means for flushing, are quite sure, however small, to become more or less filled with accumulations, especially near their dead-ends. Consequently, in the state of the science a very few years ago there was good reason for hesitating to accept the suggestion for a separate system, and for adhering to a plan which, whatever its faults, had the advantage of always working with tolerable certainty, and moving along our off-scourings toward an ultimate outlet.

That the state of the science has entirely changed within the past decade, and that the arguments formerly obtaining against the separate system are no longer valid, I shall propose to show in good time. Let us first consider what are the objections to the present mode of disposing of surface-water by its admission into deep underground sewers traversing every street of the town.

One office of a copious rain-fall, one effect which it is sure to produce, is the removal of accumulations of earth and organic matter from the surface of the street. These two very different substances are carried forward together, and are delivered, often at every street corner, into a catch-basin, which quiets the flow and permits the solid substances that it carries to be deposited. The completeness of the deposit is proportionate to the volume of the flow, and to the specific gravity of these solid matters. So much of the dirt as is carried off from the surface of the street by a light rain is quite completely deposited in the slightly disturbed water of the catch-basin. If the storm is more severe, the erosive action of the surface-water is greater; more solid matters are carried into the catch-basin, and the commotion of the impounded water removes a much larger proportion of the lighter and finer substances. Little by little, as time goes on, these deposits accumulate in various strata of fine dirt, involved organic matter, coarse gravel, and much incidental rubbish. Once firmly settled in the catch-basin, the material remains until removed by hand. While so remaining, its organic portions undergo decomposition, with an insufficient ventilation, and produce resultant gases of an offensive and often dangerous character. These gases, especially during protracted seasons of drought, manifest themselves to the senses of all who pass or who live near to their source. The catch-basin almost invariably has some form of trapping device, depending upon the interposition of a water-seal. In dry weather the water is evaporated, the seal is broken, and an escape is afforded for the air of the sewer.

During a rain the water flowing from the catch-basin into the sewer carries greater or less quantities of foreign substances. In a light rain it may be mainly the coarser and lighter parts of the horse-droppings which so pass. During heavy rains a greater disturbance of the water causes the removal of more of the deposit, some of this being already in an active state of decomposition. All of these substances pass into the sewer, from which they are completely or partially removed, according to the exactness with which its scouring quality has been developed in its original construction.

For the sake of uniformity more than for any sounder reason, this system of storm-water removal is not confined to those parts of the

town where storm-water may ordinarily become a source of annoyance or of danger to property, but is made to apply universally to every part of the town, the catch-basins being placed so near together that in an ordinary rain the flow through the gutters is not sufficient to remove anything like all of the filth; much of it is swept together into local deposits, which, under our American system of street-cleaning, remain for an indefinite time, and which are offensive, if not injurious, so long as they do remain.

ASSOS.¹

THE land eastward from Cape Baba, the northern coast of the gulf of Adramyttium, is high,—a rocky plateau, descending in most places abruptly to the water. A similar conformation occurs, farther on at the site of Assos. Here the little port is at the foot of the steep elevation upon which the city stood. . . .

The village is behind the ancient acropolis, which rises steep from the high plain, very near its sudden descent to the water. The summit of the acropolis is thus so directly above the port that a person standing upon its border, within a few steps of the southern stylobate of the temple, can look directly down into the holds of the vessels beneath. . . .

Art has done surprisingly little to ease the natural difficulty of the ascent; here and there are fragments of ancient granite paving or polygonal retaining walls, but for the greater part one is obliged to scramble up the side of the natural rock. . . .

The ancient city of Assos was grouped around the volcanic cliff which rises from the plateau, in much the same manner as was Athens at the foot of its acropolis; its ruins are the most interesting remains of the Troad, and in some respects of all Asia Minor. The extent of the closely-built town is marked by the magnificent fortification walls. These massive structures follow the conformation of the ground in such a manner as especially to protect the points by nature most exposed to the attack of an advancing enemy. The stone of which the wall was built is a reddish ferruginous trachyte, cut into rectangular blocks, fileted carefully at the joints, and laid in exact horizontal courses without mortar, being bonded from face to face by headers. The interior spaces of the wall between these veils, from about one metre to one metre and a half broad, were apparently left hollow; they are now choked with rubbish, which prevents an adequate examination. Throughout the entire length of the fortifications which remain, over three kilometres, the wall is built with unvarying care. The greater part of the circuit around the acropolis can be traced; it is only at the north, near the precipitous descent from the present village to the valley of the brook, that its position is for any extent uncertain. The gateways were flanked with towers, the lower parts of which, provided with loop-holes, are standing. In the gates themselves the bolt and pivot-holes are visible. The fortifications present, in every respect, an unequalled opportunity to study a class of Greek stone-work of which we have little knowledge. . . .

"Nature and art," as Strabo says, "had indeed united to make Assos a stronghold." The condition in which the walls at present stand shows the remark of Texier to be hardly an exaggeration: "They seem rather a commenced and unfinished work than a ruin." They deserve more attention than has hitherto been bestowed upon them, and would repay a more complete and more accessible publication than now exists.

The town, within the outline of these fortifications . . . must have been terraced in antiquity, somewhat as is the steep upon which the former city of Syra is situated. It is covered with the ruins of buildings of every description, all of the local stone; there is not a fragment of marble as large as one's hand to be found far and wide around the city. The lime-burner has made more thorough work at Assos than at any other site of Greek antiquity. Great quantities of mortar were necessary for the coarse masonry of the towers and cisterns built by the Genoese rulers in the Middle Ages, and for all the more recent structures of Assos,—built of a material so hard as to defy superficial cutting, thus leaving wide interstices between the separate stones. . . .

These ruins would have been incomparably interesting if the marble, which, from the analogy of other Greek cities of Asia Minor, and notably of the Troad, must have existed upon the plateau, had not thus been swept away. The remains of coarser materials are, however, themselves of great extent, and are sufficiently important to insure the attention of science. The ruins of Assos fully warrant the opinion of that eminent authority, Colonel Leake, who thinks that they give perhaps the most perfect idea of a Greek city that anywhere exists. Those of the town are thrown together in the wildest disorder,—antæ, columns, and their members lying upon the foundations of the buildings. It is only occasionally that a granite column or carefully built wall still stands upright. Almost all the architectural members are Doric, generally of late Greek character. The prevalence of this style is in great measure due to the hardness of the stone, granite and volcanic rocks lending themselves more readily to the broad and simple form of the Doric than to any other style. The carving of Ionic or Corinthian capitals in such a material is almost impossible. Lighter and more elegant structures must have disappeared under the lime-burner's gleaning.

Prominent in the confusion are enormous blocks, attributable to the parallel walls of a stadium or agora, and the semi-circular auditory of a theatre. The latter is in an exceptionally fine state of

¹Extracts from "Notes on Greek Shores," a paper by Mr. J. T. Clarke, published in the first annual report of the Archaeological Institute of America, 1880.

preservation, doubtless the most perfect of the many theatres of Asia Minor and, in some respects, of all to be found in Greek lands. It has been partially overthrown by an earthquake, but the greater number of the seats are almost perfectly intact, as well as the vaulted entrances and even part of the stage. Unquestionably of the Roman period, it offers many peculiarities when compared with contemporary buildings of like character, approaching very nearly in arrangement to that advocated by Vitruvius. The seats are partly worked from an inclination of the ground. Although situated far below the acropolis, they are still high enough to give a grand and beautiful view to the spectators, who, facing south, could look far across the Gulf of Ida to the promontory of Musconisia, and to the noble and pleasant island of Lesbos, dear to the Greek heart. . . .

All Doric temples are built to be seen with the perspective horizon far below the stylobate; many peculiarities of the style are to be explained only by this consideration. The situation of the temple of Assos rivals even that of the Athenian Parthenon; it was as conspicuous from the sea as that of Sunium, and as favorably situated for the city and the inland country as that of Segesta. The building is at present entirely overthrown; its stones are scattered over all the acropolis, some even rolled from the height into the eastern valley of the brook. The *grandes constructions militaires modernes*, which stood upon its plan at the time of Texier's measurements, and seem to have been a serious hindrance, have since been entirely demolished, and some blocks of the temple structure, which will assist in its restoration, were readily found. Among these may be mentioned a corner block of the tympanum corona, which will supplant the fallacious method of determining the pitch of the gable by the inclination of the cornice mutules beneath; unornamented stones of the exterior architrave, fragments of the door, and more perfect triglyphs. On the other hand, it must be confessed that, without some digging, and a small derrick to overturn heavier blocks, it would be impossible to verify or refute several points definitely given by Texier, such as the arrangement of the temple plan, its exact extent, the position of the cellar wall, and even the height of the columns, though this would be easy from the excessive diminution of the high drums, were it possible carefully to measure them, half buried as they are in the earth. The statement that the temple was a hexastyle peripteros, with thirteen columns in length, is apparently a mere supposition, which may be doubted from the analogy of all other archaic temples known, none of which have so small a number of side-columns. An accurate determination of these points is greatly to be desired. The measurements given by Texier are in the main correct, though the details vary so much among themselves in dimensions that absolute precision in any one number is out of the question. All the architectural members preserve a wonderful sharpness of outline; they seem as fresh as when first cut, owing to the exceeding hardness of their substance. This admirable preservation is especially fortunate for the sculptured remains, such as the reliefs of the architrave and metopes, now preserved in the Louvre, and well-known from their important place in the history of Greek sculpture.

From the acropolis the ruins of the ancient city can be seen stretching far away in every direction. A multitude of sarcophagi lie in a zone to the westward, which extends from the sea to the descent to the brook. These tombs stand closely crowded together upon each side of a sacred way, generally in an entirely irregular arrangement. All those preserved are of granite and trachytic-stone, built without mortar and without dowels. It is futile to attempt to gain from their material any understanding of the strange ancient mention of the flesh-devouring stone peculiar to Assos, which has given to such tombs in modern ages the name "sarcophagus." Apparently all have been opened and their contents rifled. In cases where the cover was too heavy to be removed, the sides have been broken out. Some of the tombs have been dragged away at various times towards Cape Lectum, and even across the brook to neighboring villages, where they serve as well-troughs, for which their forms are adapted. Those remaining upon the field are generally in their original position and are often excellently preserved, the materials of those now existing at all not being of sufficient value to tempt their removal or destruction. The forms of the funeral monuments vary much; many are of elongated rectangular plan, with gabled cover and acroterias.

Beside the simplest stone coffins, there are the remains of large mausoleums, at times several tombs upon one foundation, perhaps the enclosure of a whole family. The larger structures often appear so similar to a temple *edicula* that it would be impossible to determine their destination surely without long examination and the overturning of many fallen blocks. These broad fields of the dead are of great importance in architectural respects, and are truly worthy of far more attention than has been bestowed upon them. No views of the sarcophagi and the other remains of this part of Assos have been published, with the exception of two careless sketches in Fellows's "Journal." . . .

Assos is one of the very few sites of a flourishing city of Greek antiquity where the earth has not been in the least overturned in search of relics, either by authorized excavators or by the destructive predatory digging of the inhabitants themselves for marketable fragments, vases, and coins. It is known to what extent the lower classes of Greeks have recently plundered the most promising ruins of Attica and the Peloponnesus, and how regular an income was formerly derived by the peasants of Calabria and Sicily from their independent discoveries. In a Turkish province, but rarely visited

by Europeans, this robbery is impossible. The villagers of Assos are too fanatical to come readily into intercourse with unbelievers, or to allow unauthorized speculators to rummage in the earth of their neighborhood; they are too limited in understanding to enrich themselves by the recovery of the treasures of antiquity, to them entirely insignificant. All that has been brought from Assos—and this includes some of the chief treasures of antique sculpture in Paris—was taken from the surface. The decline of the city's importance, and the contraction of its extent at an early period, were also favorable to the preservation of its remains. Assos was almost deserted at the beginning of the Christian era. It is true that the ruins have not been protected by earth washed down upon them by streams, a burial which has proved fortunate in several cases; yet a dry soil has accumulated during centuries, perhaps sufficient to hide the blocks first overthrown as effectually as if they were buried six metres deep. The earth at Assos could be easily removed from the spots chosen for examination. Trial-pits and the digging and carting away of such great masses of gravel and marshy soil as rendered the excavations at Olympia and Ephesus so expensive would not be necessary at Assos. Were the results to be encouraging or disappointing, they would, at all events, here be quickly arrived at. A small derrick and rollers would be necessary to displace the fallen stones; an excavation beneath these would expose the entire plan of the ancient acropolis, so far as this may be preserved. Were the arrangement of the temple to be ascertained, it would be a gain for architectural archaeology which can hardly be overrated. The details of the elevation and its exact proportions would certainly be learned from a thorough examination of the site. Additional fragments of the sculptured decoration of the building might also be hoped for. A plain architrave block was found in the valley, which agreed exactly with the dimensions of those carried to France. This makes it probable that the sides of the temple were not ornamented by reliefs, and that these were restricted to the fronts, as are the sculptured metopes of the Theseum at Athens.

The plan of the temple of Assos was without doubt hexastyle; the architrave upon each front must have been nearly thirteen metres long. Texier discovered about sixteen metres' length of sculptured blocks, from which it may be concluded that at least both fronts bore these remarkable figures. The remaining ten metres, of a material not likely to excite wilful destruction, and secure from natural weathering, probably lie near at hand. Dr. Hunt mentions, among the architrave reliefs which lay upon the earth at the time of his visit, "three horses running"; these were not among those taken away by Texier. Of the twenty sculptured metopes which must have existed—if the front alone, according to the analogy of the architrave reliefs, be supposed thus ornamented—only three have been carried from the site. From the great wealth of sculptured decoration elsewhere employed upon the building, it must be concluded that gable groups also existed. If these were likewise of the hard stone, they may be expected to be found; if they were of marble, there is still the possibility that their early fall may have kept them hidden beneath the overthrown ruins, secure from the mediaeval lime-burners. What an interesting Asiatic parallel to the Æginetan marbles may here come to light!

The remains of the town below, though for the most part of a later period, are still worthy of thorough investigation. It is likely that much marble lies beneath the surface, and the domestic architecture of the Greeks could here be studied as at no other spot. No plans of the theatre, notwithstanding its admirable preservation, have been published, if we except the slight sketch in the topographical plan offered by Texier, where measurements are not given. Fragments near the spot may, upon adequate examination, lend themselves to a solution of the vexed question as to the thymele. A description and drawings of the sarcophagi without the city walls would be particularly desirable, and here much might be expected to be unearthed. The many fragments of carefully painted ancient vases which lie here seem to promise the existence of inimitable works of Greek pottery in the graves beneath.

THE PLUMBER AND SANITARY ENGINEER.

We take the utmost pleasure in publishing the following letter which we cannot but believe the conductors of the *Sanitary Engineer* will consider one of the most gratifying endorsements they have yet received.

Our correspondent's letter seems to indicate a very encouraging condition of things, and augurs well for the health, happiness, and prosperity of the coming generation. But if their statements may be taken as indications of the interest felt in the *Sanitary Engineer* by plumbers generally, our regret that the former title of the journal had been abandoned appears more reasonable than it at first seemed.

WASHINGTON, D. C., December 15, 1880.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir,—In your last issue you notice regretfully that that able publication *The Sanitary Engineer*, whilom *The Plumber and Sanitary Engineer*, had changed its title-head. Now that paper does not need or expect any defence from us, and we do not write in its behalf; but we judge by your remarks that you do not exactly appreciate the relation that this paper holds with the plumbing trade. We do not think, and the course of this paper shows that it does not think, the plumbers have learned all there is to be learned; neither is it, in its general make-up, too far above the mental range of the

coming plumber, from whom they must expect much of their support and correspondence. We are constant readers of both your own and that paper, much to our instruction and recreation, and we have encouraged our apprentice boys to read the *Sanitary Engineer*, by subscribing for copies enough for each boy in our shop, and they show as much eagerness for their paper as the average scrub apprentice of ten years ago would for a blood-and-thunder dime novel.

That the average standard of the boys who are now beginning to take their kit of tools is higher than it was five or ten years ago, is in a great measure due to the course of that excellent paper. That the English word "plumber," a lead-worker, should designate one who lays out the intricate system of plumbing in a modern house, seems to us to be a corruption of the word. For ourselves, however, we are content not to advertise ourselves as sanitary engineers; but we hope the boys whom we are teaching will be known as such.

Respectfully, HAYWARD & HUTCHINSON, Plumbers.

PARALLEL LINES.

NEW YORK, December 15, 1880.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sir,—Will you please inform me through the columns of your paper whether lines are parallel? If continued as dotted, they would be parallel; are they so if not extended? QUANDARY.

[They are parallel. It is not necessary to their parallelism that they should be side by side. — EDS. AMERICAN ARCHITECT.]

NOISY WATER-CLOSETS.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Referring to the question of Messrs. Kirby & Lewis, and your answer in the *American Architect* for December 11, I will suggest that resonance or reverberation of sound will certainly be lessened by covering the pipes; but if the water-closets complained of are the usual wood-box with a bowl inside of it, then the whole air-space around the bowl should be filled up with some fibrous or porous material, or — if not too heavy — the whole space should be mortared solid. The effect thereby produced may be illustrated by the following:—

Strike a pretty hard blow on a common door, thin board, or tin kettle; how much more noise will that make than when you apply the same blow to a solid tree or to a ten-inch-bore Krupp gun? Another very disagreeable noise frequently noticed in parlors or intermediate floors, is the grating of bell-wires, when drawn from the upper floors to bells beneath. This could also be obviated.

Respectfully, A. D. ELBERS.

NOTES AND CLIPPINGS.

ONE CAUSE OF FIRES.—A correspondent in San Francisco writes: "Some time since, the Galindo Hotel was burnt down in Oakland, and many reasons were given for the origin of the fire. Yesterday, on one of my houses, I was having some studding taken down on account of being less than two inches from the flue, when the mechanic told me he put wooden plugs in the flues of the chimneys in the Galindo Hotel, and then furred to the breast. Is it any wonder the hotel was burnt? This is only one of the many abuses practised here."

HOMES FOR WORKING MEN IN LONDON.—The efforts of Lord Beaconsfield's Home Secretary to improve the houses of working people in London by means of the Artisans' Dwellings Act have not been successful. The *Daily News* has come to regard it as a Landlord's Relief Act. It says that a landlord has only to let a group of houses get so bad as to be unfit to let, and the local authority may be obliged to purchase them from him, incur the expense of removing them, and endure the loss which the removal entails. In this way the ratepayers of London have already put many hundred thousand pounds into the pockets of the owners of houses which ought to have been almost valueless. On six acres which had been cleared and disposed of up to the end of last year, the loss was \$261,000. These areas have been sold to the Peabody trustees, and the sum thus lost is practically a contribution by the public toward lowering the rents of poor men's houses. It is reckoned that the loss on eight other plots of land thus cleared will come to \$2,500,000 more, and it is said that \$5,000,000 more will be expended before all the schemes now actually begun can be successfully completed.

SCULPTURE FOR THE HOTEL DE VILLE, PARIS.—The *British Architect* gives the following statement of the cost of the sculpture to be used on the new Hôtel-de-Ville at Paris:—

The subject for the clock	£2,400
Ten knights for ridges or finials.....	900
Four griffins or chimæras for the tower.....	520
Two double spandrels.....	320
Six ditto of dormer windows.....	720
Sixty-two statues.....	9,320
Six groups.....	1,440

To which has been added the commission for

Three chimney pieces of marble.....	2,880
Two statues in marble for the last.....	960
One hundred and six statues.....	16,960
Six terminals.....	480
Four groups in stone, for a staircase.....	1,280
Divers works, lions, bronzes, etc.....	1,440
Other statues, decorative work and chimney pieces.....	720
Caryatides, spandrels, etc.....	600
Twenty medallions, crowning the doorways.....	1,400
Decoration to 16 round windows.....	1,920
Reproducing, by casting, of 18 caryatides.....	360

Total.....£44,220

THE METAL SPIRE OF ROUEN CATHEDRAL.—The spire of the Cathedral of Rouen is legendary. This "unlucky manufactory chimney" has served a number of writers for a long time as a butt for sarcasm and laughter. And this work of Alavoine's, who was, nevertheless, one of the architects of the Column of July, had up to the present, only found detractors. The lantern had been set up, and for long years stood in an adjoining court-yard. Put into its place, this last portion of the spire has considerably modified its aspect, and the gigantic *flèche*, 150 metres in height, has since then been more justly appreciated. To-day, the work commenced in 1827 has entered into its last phase. The nakedness of the base was most unsightly. The artist had projected to overcome this by the aid of large turrets around it, and these are found effectual. They are nearly 25 metres in height. For a long time previously a model in timber-work carefully worked out, painted lead color, had given an idea of the importance of the intended addition. The whole of the works have been under the direction of M. Barthélemy, diocesan architect. The frame-work of the turrets, executed in iron, by M. Filleul, is covered in copper *repoussé*, with ornaments modelled and framed by M. Marron. A portable scaffolding, established by M. Gambier, was transported successively to the four angles of the tower for the building of each turret. The whole of the *repoussé* work in copper is isolated from the iron by ties and rings of hardened wood. It is composed of leaves hooked to each other, and not soldered, and is the most important work of the kind that has been executed in France up to the present time. A colossal statue of Bartholdi, which was recently to be seen at the Paris Exposition des Beaux Arts, is the only work which can at all compare with the construction of these turrets, which are of enormous dimensions, but, nevertheless, appear very fitting at the great height at which they are placed. These are, in fact, the last complement of the work of Alavoine, and nothing now remains to entirely finish it but some touches of gilding, which by this time, indeed, may have been given. — *The Builder*.

THE PARIS CATACOMBS.—The collapse of houses on one of the Paris boulevards the other day caused a panic, but the reports presented by engineers who have been through the underground passages served to allay anxiety. Money is to be spent in alterations which will prevent a recurrence of the catastrophe in any other part of the city. For several centuries the stone used in building most of the Paris houses was taken from quarries extending from the village of Châtillon to the Seine. These extractions, carried on without method, led to severe accidents about a hundred years ago, and in 1776, a royal decree ordered that plans should be prepared of these underground galleries, and that the quarries and catacombs should be placed under the control of a special body of engineers. This service, which has been continued ever since, is now attached to the Prefecture of the Seine, and comprises a first-class engineer of mines, an ordinary engineer and nine inspectors of mines, the money required being provided from year to year by the Municipal Council. The principal part of their work lies on the left bank of the Seine, where a large proportion of the houses are built over galleries having an average depth of from fifty to seventy feet, the quarries underneath four of the principal arrondissements on that side of the river having a total area of over eight million feet. The soil on the right bank of the Seine is not honeycombed to anything like the same extent, the group of underground galleries not exceeding 422,000 square yards, and there is no passage under the Seine connecting the two networks of galleries. Altogether, the underground passages formed from the quarries of the city cover an area of about 3,700,000 yards, and the length of galleries constructed at the present time is over thirty miles, nearly as much more remaining to be completed. The celebrated catacombs, the walls of which are formed of human skulls, are beneath the Montsouris Gardens, and cover an area of 74,000 feet. — *New York World*.

SANITARY RULES FOR PUBLIC BUILDINGS.—The following rules, to be observed in the construction of all buildings erected under her Majesty's Office of Works, have been prepared and issued by the Secretary to the Office of Works:—

1. All water-closets and urinals shall be constructed so that one wall at least of such closets and urinals shall be an outer wall of the building.
2. All soil-pipes shall be carried outside the building, and ventilated by means of pipes leading the foul gases above the highest point of the building. Such pipes to be carried to points removed from chimney-stacks.
3. Separate cisterns shall be constructed for the water-closets and for the general purposes of the building. No tap or "draw off" shall be affixed to any pipe communicating with a cistern supplying a water-closet or urinal.
4. All waste-pipes and overflow-pipes of cisterns shall terminate in the open air, and be cut off from all direct communication with drains.
5. Great attention shall be paid to insuring thorough ventilation in all rooms. Rooms so high that their ceilings shall be more than two feet above the top of the windows, corridors, staircases, and other open spaces shall be specially ventilated so as to prevent the accumulation of stagnant air.
6. All main drains should, where practicable, be formed outside the building. In the event of its being necessary to carry a main drain underneath a building, it must be trapped immediately outside the main wall, and a ventilating-pipe must be carried from that point to the highest part of the roof, as under Rule 2. — *Journal of the Society of Arts*.

FRENCH LIGHTHOUSES.—All the lighthouses on the French coast, except three which are provided with the electric light, have been lighted since 1873 with lamps burning mineral oil. The luminous intensity of the apparatus has been greatly increased, and, notwithstanding the increase, a saving has been effected of more than 400,000 francs (\$80,000) per annum, or more than 30 per cent of the cost of illumination with Colza oil. The use of the mineral oil has not caused a single accident in lighthouses, and after some trials it has also been brought into use for floating lights. — *L'Ingenieur Universel*.

TWO MONTHS FREE!

New Subscriptions for the *American Architect and Building News* for the year 1881, received on or before December 25, 1880, accompanied by the amount of the advance price (\$6.00), will entitle the subscriber to receive, free of charge, the eight issues for Nov. and Dec., 1880.

Prospectus for 1881.

DURING the past year the *American Architect and Building News* has adhered closely to the course which it has followed from the beginning, and its progress has been in a high degree satisfactory. It will be the endeavor of the publishers during the ensuing year to maintain the present character and quality of the journal, while they seek to attain for it an ever higher degree of excellence. To this end those features of the journal which in the past have been found acceptable to its subscribers will be continued in the future.

So far as depends on the editors, the present style and character of the published contributions will be maintained, and they will sedulously seek what may prove of most interest and permanent value to their readers. Even at this early stage of preparation for the coming year, they have made the following arrangements:

Dr. Hiram A. Cutting, State Geologist of Vermont, has agreed to furnish a series of original papers on the Character and Properties of the Building Stones in use in this country, which will give, in comprehensive form, certain technical information which can be found only in books not usually read by architects, together with much original matter, the result of long personal observation, experiment, and research.

Mr. Howard Ellis, a lawyer of repute, and editor-in-chief of the *Reporter*, has consented to report for the *American Architect and Building News* all important Legal Cases, both domestic and foreign, which affect the interests of architects and builders, whether they may arise between themselves, with owners or with the general public. These papers will be treated with legal accuracy and yet in that more intelligible style which is called "popular." It is thought that these papers will go far to supply a want that has long been felt by the profession.

The important matter of Decoration will be treated by Mr. Charles A. Cummings, F. A. I. A., in a series of fully illustrated papers, which will take up each historical style separately, showing its characteristics and its connection with preceding and succeeding styles.

It is probable, too, that the competitions in Interior Decoration, with money prizes, will be continued during the year. To a certain degree this will be influenced by the number and character of the designs submitted in the first competition, which closes December 11, 1880, so that the existence of this feature is largely dependent on the good-will and interest of the profession itself.

An exhaustive series of papers, amply illustrated, on the methods and processes of construction employed in this country, with explanations of the difficulties that arise in the daily practice of the American architect, will be contributed by Mr. Theodore M. Clark, A. A. I. A.

It is the intention of the editors to devote more attention to the selection of the illustrations for the journal, a task which the rapid and marked improvement in draughtsmanship in this country during the past five years will make more gracious than it has been hitherto.

The quadruple Detail Sheets will continue to be published with the first issue for each month, and an endeavor will be made to give to these monthly numbers the greatest practical value, so that students, draughtsmen and builders, who, for different reasons, are unwilling to subscribe for the complete yearly issue, may, by subscribing for the twelve monthly numbers, at \$1.75, benefit by the publication in a way that would be otherwise impossible. So far as possible these twelve numbers will be complete in themselves, and in them alone the papers by Mr. Clark will be published.

A new interest will be lent to the illustrations by the sketches of old Scottish Domestic and Ecclesiastical work, which are to be contributed by Mr. John W. Small, F. S. A. Scot.

Another feature that will prove of much interest to subscribers without the limits of the profession as well as within them, will be the Heliotype prints from nature, similar to the illustration of the Boston Museum of Fine Arts, published in the *American Architect and Building News* for October 30, 1880. These prints will be published with such frequency as circumstances may suggest, and will by themselves alone be worth the subscription price.

To the contributors who have so ably seconded their endeavors in the past, the editors would make their grateful acknowledgments, and at the same time would assure them that their assistance in the future will be equally appreciated.

PUBLISHERS' ANNOUNCEMENT.

According to the established custom, it will be understood that present subscribers who do not order a discontinuance, at the expiration of their subscription, desire to subscribe for the *American Architect and Building News* during 1881; it will therefore be sent to those subscribers who are now receiving it, and the publishers hope to be favored with a prompt remittance of the subscription price for the ensuing year.

Due notice is also given, that the publishers will enforce with more stringency than heretofore the rule which enables subscribers who pay in advance, to benefit by a discount on the subscription price (\$7.50).

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.]

- 235,351. VALLEY AND RIDGE SHEETS FOR ROOFS. — Valentine Fischer, New York, N. Y.
 235,354. SAFETY STOP FOR ELEVATORS. — John G. Gerding, Collinsville, Ill.
 285,365. ASPHALTUM PAINT. — Archibald K. Leo, Philadelphia, Penn.
 235,367. SKYLIGHT. — John M. Lutz, Philadelphia, Penn.
 235,374. SAW-SET. — Charles Morrill, New York, N. Y.
 235,380. BIT-BRACE. — Sherwood Rightmeyer, Buffalo, N. Y.
 235,386. LEAVE-TROUGH HANGER. — John H. Severding, Richmond, Ind.
 235,412. WINDOW-CORNICE. — James W. Campbell, Brooklyn, N. Y.
 235,417. DOOR-HINGE. — Jos. Decombe, San Francisco, Cal.
 235,434. DOUBLE TRY SQUARE. — William C. Hoffmeister, Mossy Creek, Tenn.
 235,463. SPRING-HINGE. — Jas. Spruce, Waterbury, Conn.
 235,466. HEATER AND VENTILATOR. — Hans J. Andersen, Spring Valley, Minn.
 235,503. STEAM RADIATOR. — William H. Brooks, West Point, N. Y.
 235,536. WOOD-TURNING MACHINE. — Freeman Hanson, Hollis, Me.
 235,532. BIT-BRACE. — Gardner L. Holt, Springfield, Mass.
 235,543. ELLIPSOGRAPH. — Alexius Y. Lundquist, Brooklyn, N. Y.
 235,553. ICE-HOUSE. — Jacob G. Müller, Buffalo, N. Y.
 235,559. SPRING CURTAIN-FIXTURE. — Pelatiah Osgood, Waterville, Me.
 235,562. GUAGE-CLATH. — John M. Parker, Pawtucket, R. I.
 235,573. WATER-CLOSET VALVE. — Wm. M. Sack, Oakland, Cal.
 235,582. DOOR-SPRING. — Fred. W. Smith, Freeport, Ill.
 235,592. ALARM FOR DOOR-KNOBS. — M. Truby, Elkhart, Ind.
 235,594. WATER ELEVATOR. — John G. Noorlies, Englewood, N. J.
 235,595. Nathan U. Walker, Wellsville, Ohio.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS.—The following building permits have been issued since the last report:—
 J. & E. Stinson, four-sty brick factory on North St., between Saratoga and Pleasant Sts., 28' x 81' 6".
 J. S. Farren & Co., three-sty brick building on Boston St., foot of Concord St.
 J. K. Reed, three-sty brick building on Frederick St., between Baltimore and Second Sts., 33' x 54'.
 John M. Foster, 18 three-sty brick buildings on McDonough St., between Eager and Chase Sts.
MISSION SCHOOL-HOUSE.—The Episcopal church of this city is having drawings prepared by Messrs. Wyatt & Sperry, for a mission school, 43' x 100', three stories high, to be erected in Africa.
WAREHOUSES.—Mr. E. F. Baldwin is preparing drawings for three new warehouses, two 28' x 215' each, and one 22' x 130', four stories and basement, with sub-cellar under rear portion, for Mr. John King, Jr.; to be of brick, with stone and terra-cotta, and will cost about \$75,000.

Boston.

BUILDING PERMITS.—*Brick.*—269 Commonwealth Ave., for Charles Boyden, dwell., 26' x 70', three stories and mansard.
 Rear of 340 Beacon St., for Miles Washburn, stable, 20' x 40'; Cressy & Noyes and James Fagin, builders.
 Oliver St., near Purchase St., for Josiah E. Bacon, iron warehouse, 83' x 86'; Vinal & Dodge, builders.
 Rear of 342 Beacon St., for Daniel C. Knowlton, stable, 20' x 40'; Cressy & Noyes and James Fagin, builders.
Wood.—Chelsea St., near Eagle St., for T. B. Bishop, brass foundry, 50' x 50'.
 No. 63 Water St., for Hoosac Tunnel Dock and Elevator Co., 75' x 325', two stories, monitor roof; Chas. R. McLean, builder.
 Nos. 73-79 Summer St., for the Lockwood Manufacturing Company, machine shop, 50' x 125', three stories.
 Front St., near Union St., for Fitchburg R. R. Co., storage of coal, 35' x 117'; John T. Bagley, builder.
 Rand St., near Cottage Court, for Matthew Scullion, dwell., 22' 6" x 37', three stories; Henry T. Bartlett, builder.
HOUSES.—Mr. W. W. Lewis is the architect of a house for Mr. A. A. Burrage, at the corner of Gloucester and Newbury Sts., costing \$25,000; also a block of two houses for N. B. Mansfield and H. O. Roberts on Commonwealth Ave., costing about \$21,000 each.
CONSERVATORY.—The *Advertiser* says that it is understood that a stock company is to be formed of prominent business men of the city for the purpose of

building a tower or observatory 325 feet in height, or 80 feet higher than Bunker Hill monument, near the Boston and Providence Railroad station, to be used by visitors and tourists as a look-out over the surrounding country. The tower will be built of boiler-iron, and will be of cruciform shape. The observatory at the top will accommodate about 150 people, and will be reached by four elevators, with safety attachments.

Brooklyn.

BUILDING PERMITS.—*Waterbury St.*, cor. Ten Eyck St., three-sty brick factory, 65' x 80'; cost, \$2,500; owner, L. Waterbury & Co., on premises; architect, A. Montgomery; builders, C. McQuaid and Jenkins & Gillies.
South Tenth St., n. s., about 100' w Third St., 2 three-sty brown stone dwell., 18' 9" x 42'; total cost, \$10,000; owner and architect, James Barrett, 23 Park Row, New York.
Dobbin St., Nos. 156, 156 A, 158 and 160, e. s., 100' s Calyer St., 4 two-sty brick dwell., 18' 9" x 23'; extension 12' 4" x 16'; cost each, \$2,000; owner, F. J. Barrett, 88 Meserole Ave.; architect, F. Weber; mason, J. P. Whittier; carpenter not selected.
Stockton St., s. s., 170' e Tompkins Ave., 2 three-sty frame tenement, 16' 9" x 44'; cost each, \$2,400; owner and builder, P. Denman, 101 Tompkins Ave.
Seventh Ave., Twelfth and Thirteenth Sts., four-sty brick building for factory, 200' x 200'; cost, about \$100,000; owner, Ansonia Clock Co., 11 Cliff St., New York; architect, Samuel Curtiss; builder, W. Bulkley.

Chicago.

BUILDING PERMITS.—A. Sowka, two-sty brick store, 22' x 70', 181 Cleaver St.; cost, \$3,000.
 M. Hagerhorst, two-sty brick dwell., 22' x 54', 544 Twelfth St.; cost, \$3,000.
 J. Kalal, three-sty brick dwell., 25' x 85', 261 West Twelfth St.; cost, \$8,000.
 F. Slad, two-sty brick dwell., 23' x 59', Throop St., near Eighteenth; cost, \$3,500.

Louisville.

OUTLOOK.—There still continues to be a dearth in building matters, although considerable building of minor importance still goes on.
STABLES.—A permit was granted for the erection of two brick stables, for Messrs. Jno. A. and Jas. G. Carten, to cost each \$2,000.
CORRECTION.—In last report the cost of the brick tannery for Messrs. McCarthy & Bayless should have been \$30,000.
COTTON MILL.—There are prospects for the erection of a large cotton mill here, in the near future.

New York.

BUILDING PERMITS.—*Thirty-Ninth St.*, Nos. 104 and 106 w, one-sty Collaberg brick riding school, 25' and 50' x 36' 9"; cost, \$3,500; owner, Wilson Burling, 191 West Fifty-Sixth St.; architects, D. & J. Jardine.
Eighty-Seventh St., s. s., 100' e Eleventh Ave., two-sty brick stable, 25' x 95'; cost, \$4,000; owner, James Slattery, 207 West Fifty-Seventh St.; architect, C. F. Ridder, Jr.
Nineteenth St., No. 445 e, four-sty brick store and tenement, 36' x 23' 6"; cost, \$4,000; owner, Wm. Patian, 327 First Ave.; architect, J. C. Burne; builder, J. A. France.
Ace A. w. s., 50' 11" s One Hundred and Twenty-Second St., 3 three-sty brown stone dwell., 16' 8" x 50' and extension; cost, each \$7,000; owner and builder, Samuel C. Hinman, 41 East One Hundred and Twenty-Second St.; architect, J. H. Valentine.
Second Ave., s. s., 50' s One Hundred and Thirteenth St., 2 four-sty brick stores and tenements, 31' 10" x 55'; cost, each \$8,000; owner, A. M. Jenny, 220 East One Hundred and Fourth St.; architect, J. H. Valentine; builder, Jacob Jenny.
Fourteenth St., No. 31 e, five-sty brown stone store and dwell., with studios 25' x 103' at basement, 36' first story, and upper stories 88'; cost, \$20,000; owner, W. Jennings Demorest, 17 East Fourteenth St.; architect, W. Jones.
Thirty-Fourth St., No. 631 w, three-sty brick feed store, 30' x 92' 6"; cost, \$4,000; owner, Samuel Ingersoll, 619 West Thirty-Fourth St.; architect, G. Hobbze.
Seventy-Second St., n. s., 85' e Second Ave., 4 four-sty brown stone tenements, 28' 9" x 57', extension 21' x 26'; cost, each \$15,500; owner, Wm. Noble, 181 Broadway; architect, J. M. Grinnell.
Sixty-Third St., n. s., 150' w Fourth Ave., 4 four-sty brown stone dwell., 18' 9" x 65', and extension; cost, each \$15,000; owner, Moses Gray, 88 Perry St.; architects, Thom & Wilson.
First Ave., s. w cor. Fifty-Eighth St., 4 four-sty brick stores and tenements, 25' x 58'; cost, each \$4,000; owner, James Meagher, 232 East One Hundred and Twenty-Sixth St.; architect, T. H. McAvoy.
Fourth Ave., n. e cor. Seventieth St., 5 four-sty brown stone dwell., 18' 5" x 20' and 22' x 55, and 66' and 80'; cost, each \$18,000; owner, Wm. F. Croft, 5 East One Hundred and Twenty-Fifth St.; architect, Wm. G. Prague.
Seventy-Sixth St., s. s., 100' e Madison Ave., 4 four-sty brown stone dwell., 25' x 53' and 63'; cost, each \$20,000; owner, Wm. Noble, 926 Park Ave.; architect, J. G. Prague.
Seventy-Sixth St., s. s., 20' w Madison Ave., 10 four-sty brown stone dwell., 19' and 20' and 22' x 58', 60' and 78'; cost, from \$25,000 to \$30,000 each; owner, Wm. Noble, 926 Park Ave.; architect, J. G. Prague.
First Ave., corner Seventy-Ninth St., 4 four-sty brown stone flats, stores on first story, 25' and 27' 2" x 62' and 79'; cost, each \$12,000; owners, Thomas Moore and Bernard Wilson; architect, Fr. S. Barus; builders, Moore & Wilson.
Seventy-Ninth St., n. s., 100' w First Ave., 11 four-sty brown stone double flats, 27' and 28' x 79'; cost, each \$12,000; owners, Thomas Moore and Bernard Wilson; architect, Fr. S. Barus; builders, Moore & Wilson.
Second Ave., s. w cor. Seventy-First St., 4 five-sty brown stone tenements, 25' x 64', extensions 6' x 20'; cost, each \$11,000; owner, John H. Selzau, 234 East Fifty-Fifth St.; architect, Julius Kastner.

Seventy-First St., s. s., 80' w Second Avenue, four-sty brown stone tenement, 20' x 58', extension 12' x 14'; cost, \$8,000; owner, John H. Selzau, 234 East Fifty-Fifth St.; architect, Julius Kastner.

Fifty-Seventh St., Nos. 341 and 346 w, six-sty Ohio stone apartment house, 43' x 80'; cost, \$50,000; owner, Ed. C. Coggeshall, 158 East One Hundred and Fifth St.; architect, C. W. Romeyn.

One Hundred and Sixteenth St., s. s., 315' e Second Ave., 4 three-sty Ohio stone dwell., 15' x 50'; cost, \$3,500 each; owner, James Gault, 210 West Fifty-Third St.; architect, Emil Schulze.

ALTERATIONS.—*South William St.*, No. 11, repair damages by fire; cost, \$3,500; owner, Alex. M. Lawrence, 121 East Twenty-First St.; architect, J. B. Snook; builders, W. C. Hanna and Guy Culgin.

Broadway, No. 650, new floor in basement, new beams, etc., and plate glass front; cost, \$2,500; owner, Hamilton Fish, 251 East Seventeenth St.; builders, M. R. Williams and John Leedler.

Forty-Fifth St., s. s., 300' e First Ave., raised one story and front alterations; cost, \$6,000; owners, Butchers Hide and Melting Association, Forty-Fifth St., East River; architect, John McIntyre.

Madison and Fourth Avenues, Twenty-Sixth and Twenty-Seventh Sts., Madison Square Garden; building put in good order throughout; cost, \$25,000; owners, N. Y. & Harlem R. Co.; architect, J. B. Snook.

Third Ave., n. e cor. Seventy-Fourth St., one-sty brick extension, 18' x 21', new water closets, etc.; cost, \$2,500; owner, Chr. Korner, 106 Park Place; architect, Wm. Kuhles.

Pine St., Nos. 8 and 10, raised two stories, elevator, etc.; cost, \$20,000, owner, Estate Stephen Storm, 317 Broadway; architects, N. L. Brun & Son.

BUILDING PROJECTS.—Being holiday week, little of importance is to be noted, and the permits passed are principally for buildings built on speculation.

BUILDING MATERIALS show but little difference in price. Brick is a trifle firmer, as per quotations. **OFFICE BUILDING.**—Mr. Eugene Kelley is to have built on the site of the old Clinton Hotel, on Heekman and Nassau Sts., an office building nine stories high.

San Francisco.

THE OUTLOOK.—The outlook is much better than two or three months ago, and judging from the firmness in real estate and work now in offices, business will be better next spring than for four or five years.

STORES.—James Phelan is about to erect a large building, corner O'Farrell and Market Sts., at a cost of about \$500,000. Stores and offices above; iron and brick, cement plaster exterior.

Mr. A. B. McCreery, a large owner of improved real estate, will build a large commercial house; cost, about \$200,000.

There are also several other large commercial buildings now in course of erection.

HOUSES.—There will be ten or twelve private dwellings built this spring in San Francisco, costing from \$20,000 to \$100,000.

In the country, owing to large crops and good indications for rain, the outlook is good.

RULING WAGES.—Wages and lumber are about the same as in last report.

OTHER BUILDING OPERATIONS.—The *Bulletin* contains the following information:

The new building of George C. Gibbs, on the corner of Main and Market Sts., will cost in round numbers \$50,000.

On the lot recently bought by C. Adolphe Low, on the southwest corner of Main and Market Sts., the owner is preparing to put up a building to cost \$75,000.

The new building of Huntington & Hopkins, on the northwest corner of Front and Market Sts., will cost \$60,000.

Alexander Boyd's new building, on the southeast corner of Beale and Market Sts., will cost, say, \$150,000.

Excavation has commenced for the cellar and foundation of a new building to be erected on Post St., between Kearny and Dupont Sts., by Charles Crocker, to cost about \$125,000.

A building is to be erected before spring by Mrs. Hopkins, on the north side of Ellis, near Market St., which will cost about \$125,000.

The new sugar refinery of Claus Spreckels and cottages for employes, for which preparations are being made, will cost no less than \$500,000.

These ten enterprises alone represent over \$3,500,000. Then there is additionally a large volume of new dwellings and stores projected and going up, in the various parts of the city, which, no doubt, represent another \$1,500,000. The present winter and the coming spring and summer promise to be among the most prosperous in the line of property improvement which San Francisco has seen for many years.

St. Louis.

BUILDING PERMITS.—Eighteen permits have been issued since our last report, of which two are for frame structures of slight importance. Of the rest, those worth \$2,500 or over, are as follows:—

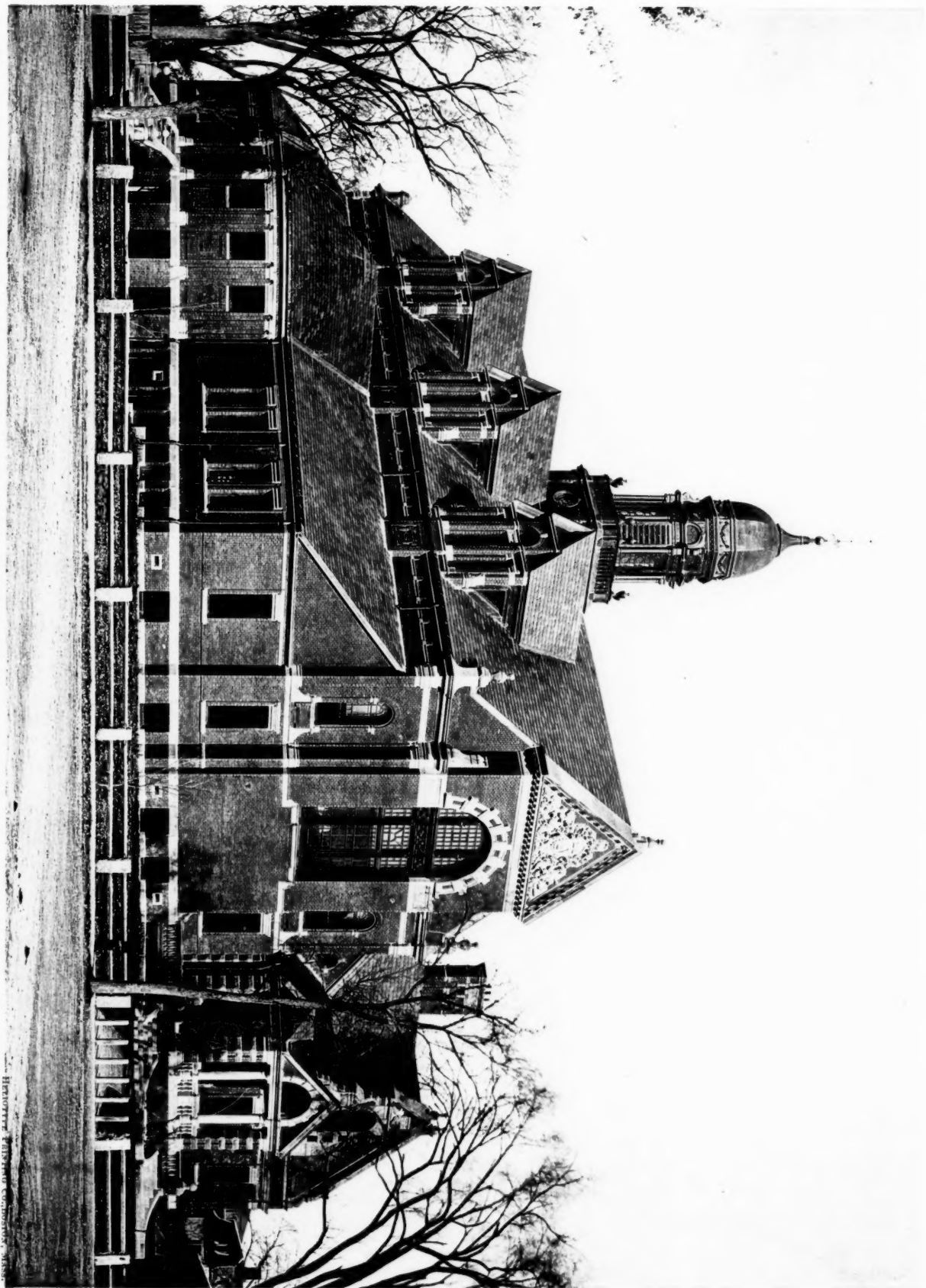
OWNERS' NAME.	USE.	Sq. ft.	Value.	Cost.
M. Manning.	Dwell.	3 8	\$4,400	
J. W. Kauffman.	Warehouse.	6 6	10,000	
St. Luke Hospital.	Hospital.	37 0	27,000	
Henry Hitchcock.	Store.	5 5	7,500	
Anthony & Kuhn.	Ice House.	1 1	2,500	
Mrs. H. Pullis.	Dwell.	3 8	3,500	
Wm. Schroeder.	"	3 8	3,500	
James Donney.	"	3 8	5,000	

Philadelphia.

BUILDING PERMITS.—*Hope St.*, south of Cambria St., 4 two-sty dwellings, 18' x 28'; Henry Hartzell.

Barry St., No. 2926, two-sty dwell., 16' x 38'; J. C. Stackhouse.

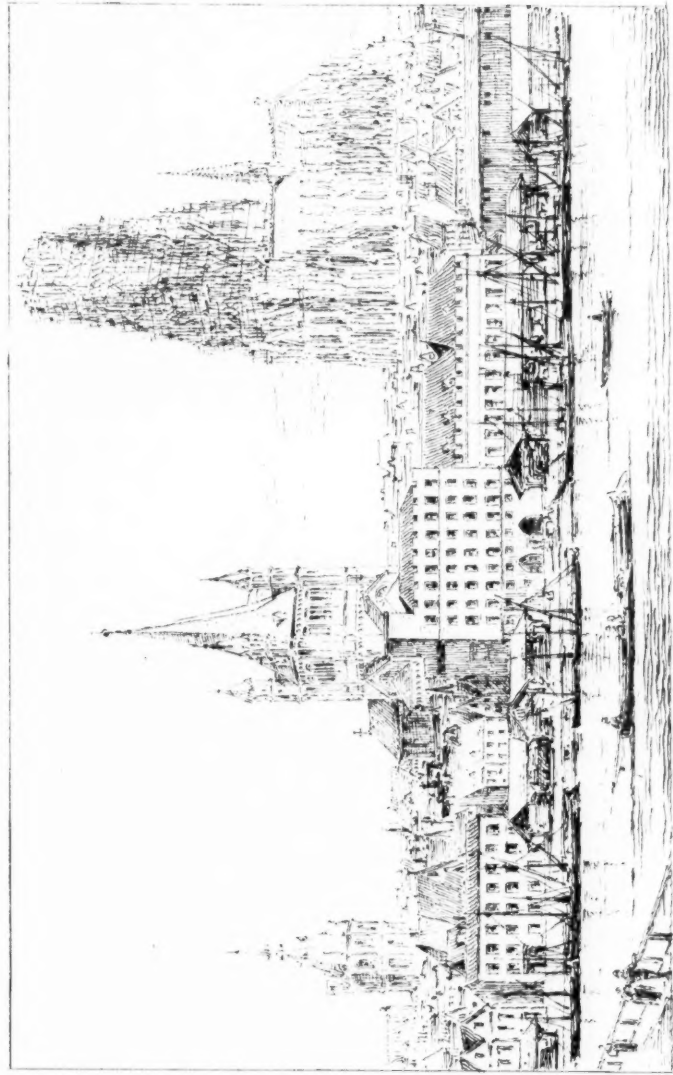
Hope St., No. 2408, two-sty stable, 13' x 30'; Jno. McCann, owner.



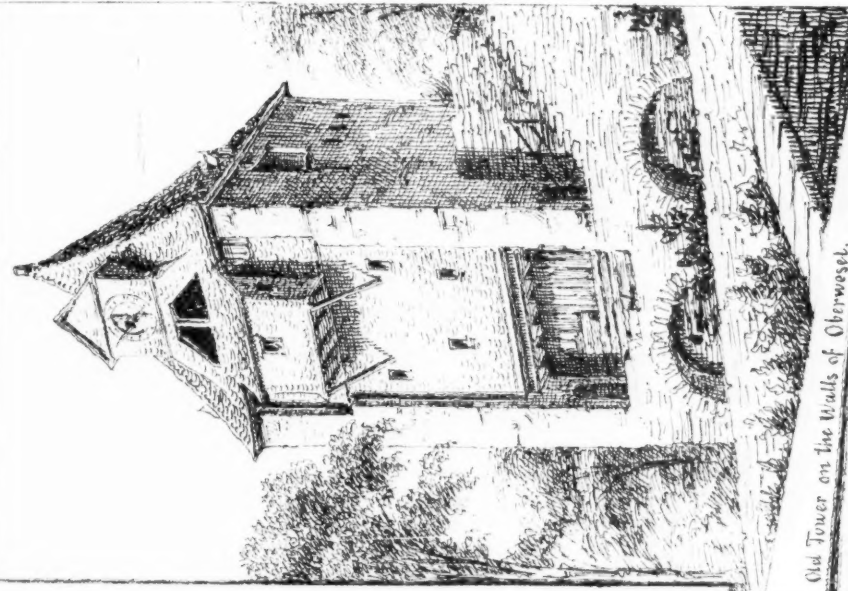
THE HEMENWAY GYMNASIUM FOR HARVARD COLLEGE, CAMBRIDGE, MASS.
PEABODY & STEARNS, ARCHITECTS.

HERMANN & CO. PHOTOGRAPHERS, BOSTON.

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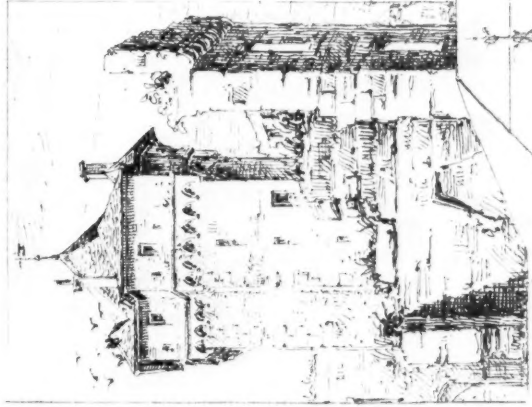
View of Cologne from Dents
JULY 1880.



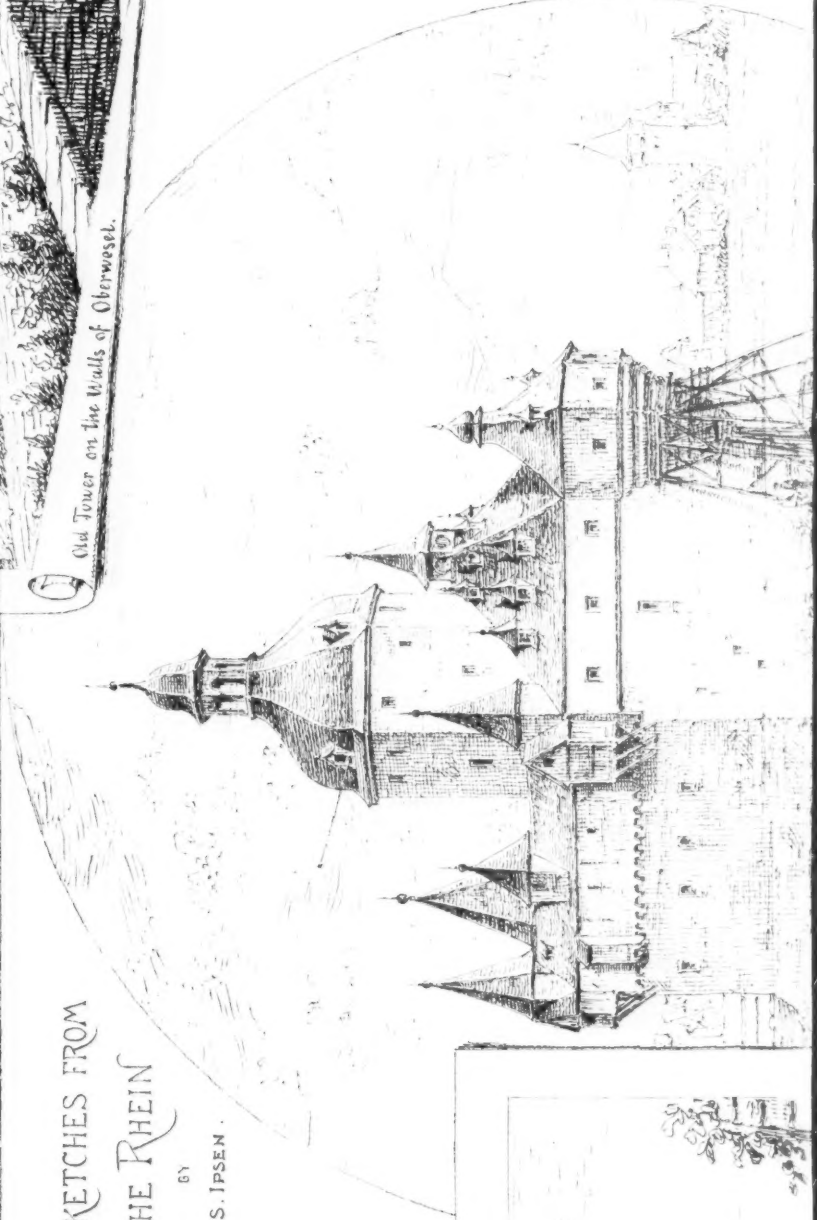
Old Tower on the Walls of Oberwesel.

SKETCHES FROM
THE RHEIN

BY
L. S. IPSEN.



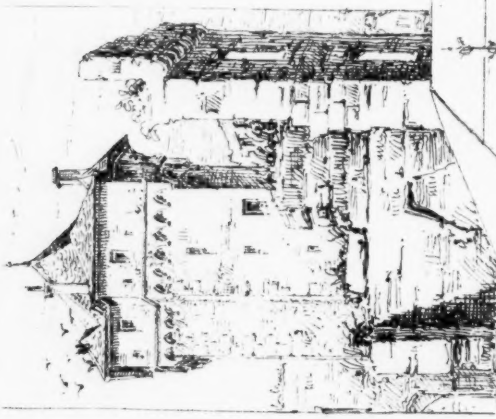
Remains of old Walls
Undermuer.



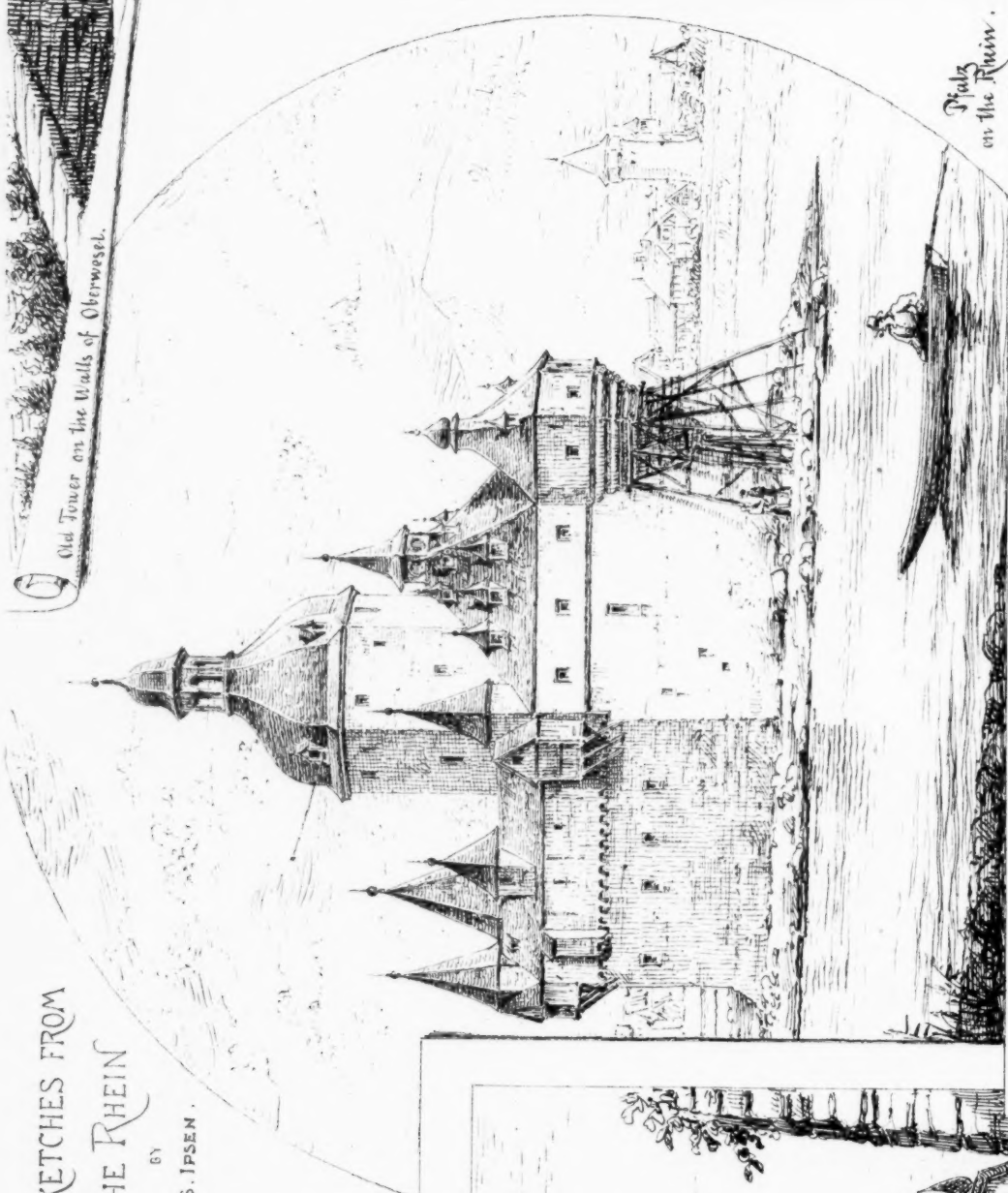
SKETCHES FROM
THE RHEIN
BY
L.S. IPSEN.



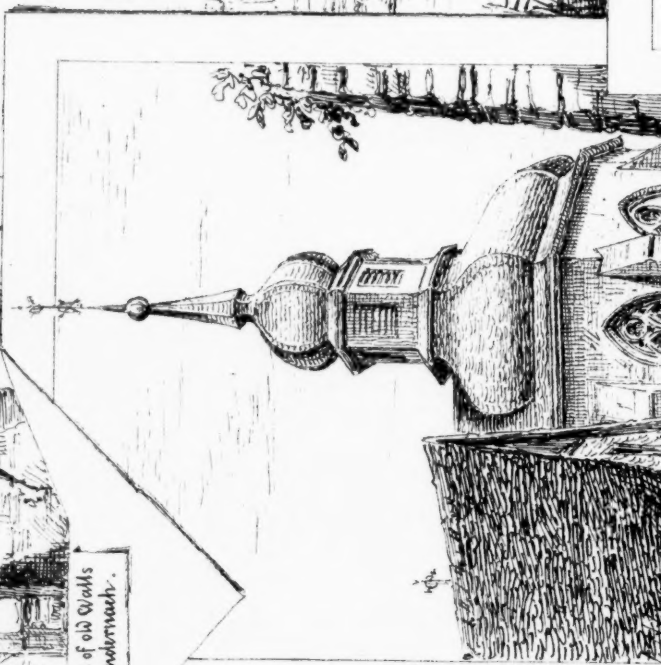
Old Tower on the Walls of Oberwesel.



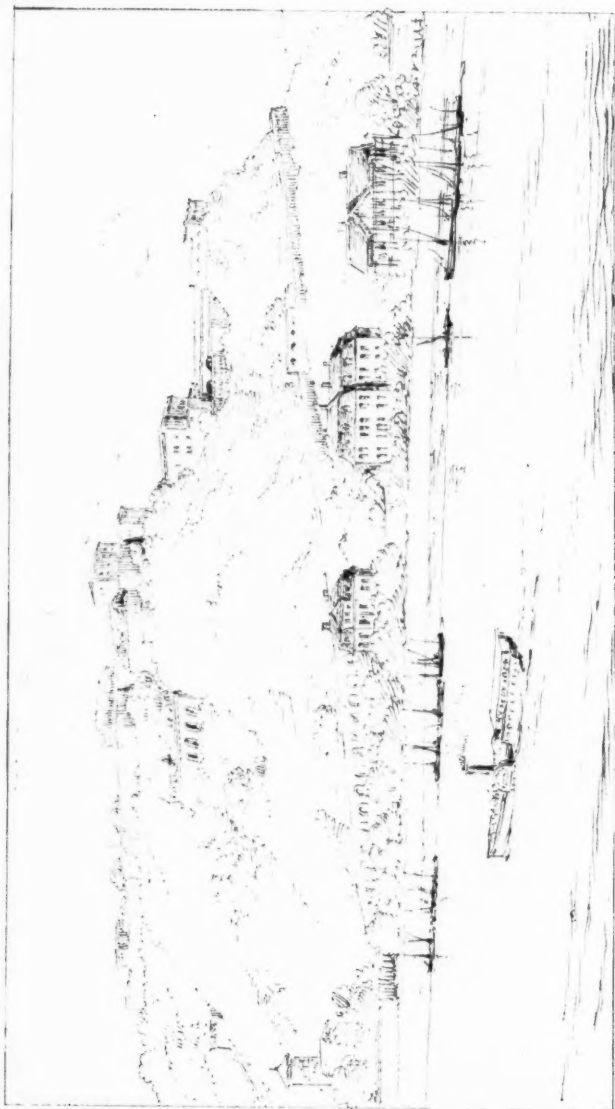
Remains of old Walls
Undermauer.



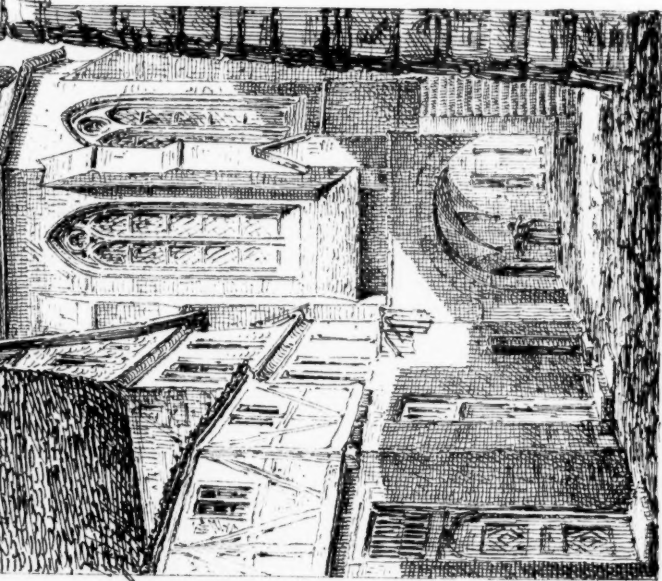
Pfalz
on the Rhine.



May
on the Rhine.

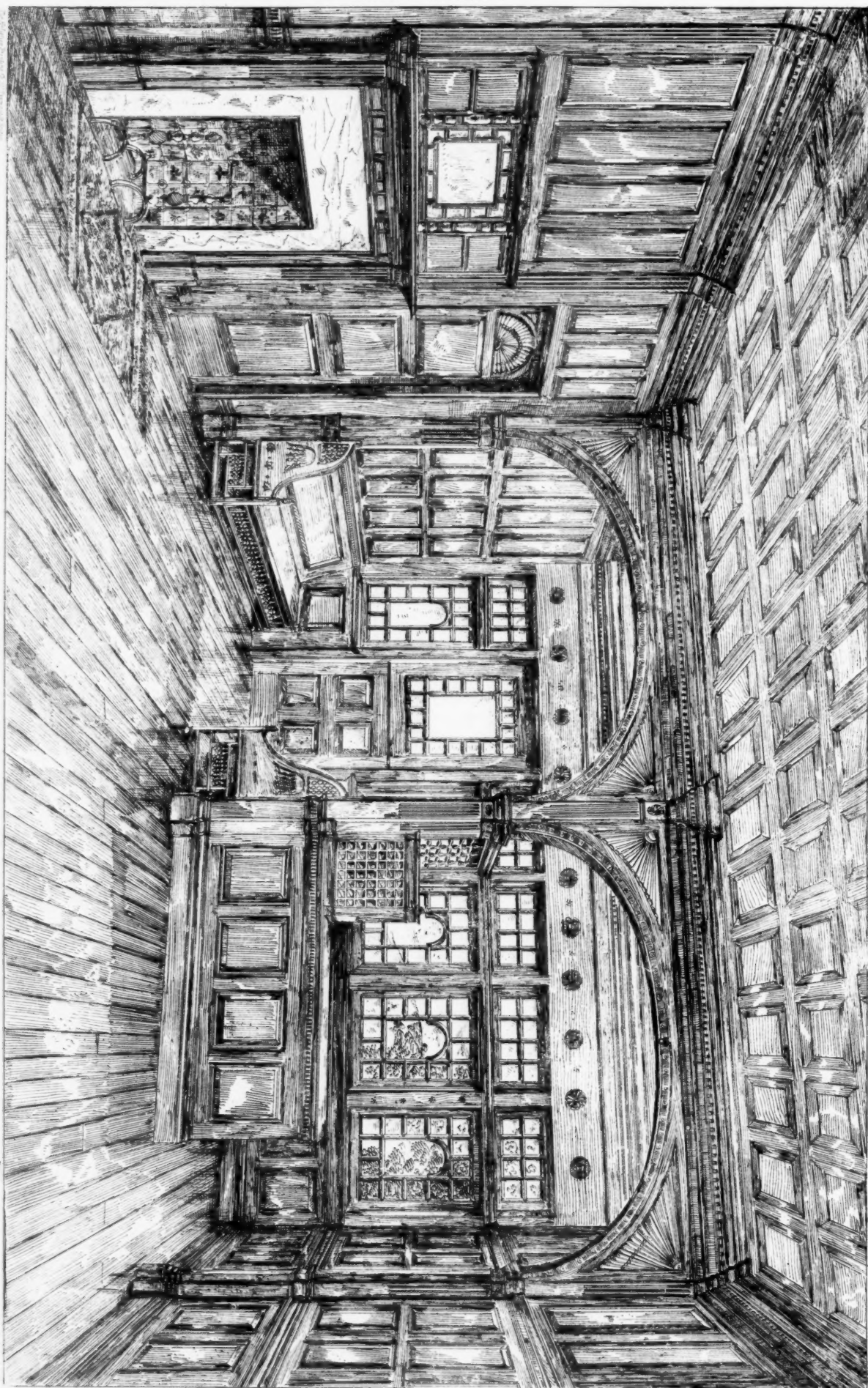


Ehrenbreitstein.



Church of St. Werner - Oberwesel.

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Perspective View of Entrance Hall in Small Hotel.

J. Fasson.

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