

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XV.

Copyright, 1884, JAMES R. OSGOOD & Co., Boston, Mass.

No. 422.

JANUARY 26, 1884.

Entered at the Post-Office at Boston as second-class matter.

CONTENTS.

SUMMARY:—

A Contractor's Responsibility for a Scaffold Accident.—Underwriters' Test of Fire-proof Building-Blocks.—Burning of a Hotel at Las Vegas, N. M.—Death of M. Lesueur, Architect.—Inspecting London Theatres.—Proposed Adirondack Park.—Dwellings of the London Poor.—Postal Service Abroad and at Home.—Parcels Post.	37
SPANISH ARCHITECTURE.—VIII.	39
A NEW HISTORY OF EGYPTIAN ART.—II.	42
THE ILLUSTRATIONS:—	
Bridges near Toledo, Spain.—Design for the New Orleans Cotton-Exchange.—House at Newport, Ky.—Cottage at Ridgefield, N. J.	44
ARTISTS' OPINIONS HELD TO BE FACTS.	44
SANITARY PLUMBING.—XVI.	45
COMMUNICATIONS:—	
A Pamphlet on Library Buildings.—School-House building.	46
NOTES AND CLIPPINGS.	46

A CASE involving the responsibility of a contractor for accidents to the men employed by him was decided in Massachusetts a few days ago. The plaintiffs, who are journeymen masons, in working for the defendant, a well-known builder, upon staging furnished by him, were thrown to the ground through what is asserted to have been a defect in the construction of the staging, suffering serious injuries, for which they considered their employer responsible, and claimed damages from him. The evidence as to the good or bad character of the staging was rather contradictory, but the Court regarded this as of little importance to the case, explaining the present law to be, that if the contractor had assumed the duty of supplying a finished staging, he would be liable for the consequences of any negligence of his agents or servants in constructing it; but if he had not assumed this duty, he would not be liable on account of the fault of his men, to others who were also fellow-servants of those who built the staging improperly. The jury does not seem to have found this ruling extremely clear, and deliberated eight hours before agreeing upon a verdict for the defendant. We must confess that, unless the printed report is misleading, we find about as much difficulty as the jury in comprehending the reasoning of the Court. If the assumption by a contractor of the duty of supplying a "finished staging" is all that is necessary to make him responsible for accidents to the men who work upon it, we cannot see how the defendant escaped; for a "finished staging," if it means anything, must mean a staging in such condition that men can work on it, and the fact that men are sent by a contractor or his foreman to work on a given staging would seem to be the best possible proof that the contractor has assumed, and professes to have fulfilled, the duty of furnishing such a structure. The real question in such cases is not whether a staging is a technically completed structure, but whether the men employed by a contractor are, or are not, bound to be on their guard against each other's carelessness. As to the merits of this question there is much to be said on both sides, but the important point to builders is to know how the law regards it, and this is by no means yet settled.

A VERY important test was recently made by one of the energetic committees of the New York Board of Fire Underwriters, to determine the comparative value, for resisting fire, of the two principal varieties of "partition blocks" commonly used in fire-proof buildings. An experimental house, ten feet square and nine feet high, was built, with three sides of blocks of porous terra-cotta, while the fourth side was of blocks of unburnt concrete, of the ordinary kind used for the purpose. A fire of wood and petroleum was lighted inside the structure, and allowed to burn for something more than an hour, and a powerful jet of water was then thrown upon it. On cooling, the terra-cotta blocks were found to be softened, but still very firm. The unburnt blocks seem to have resisted the test less successfully, for the committee reported to the Board that in their opinion, while the unburnt blocks were equal to a much thicker solid brick wall in resisting fire, they were inferior to the porous terra-cotta in resisting the action of fire and water combined. The committee made some further

observations, which are curiously in accordance with those recorded some years ago at a test of fire-proof materials made under the direction of some architects and builders in Boston. The first of these observations was that the joints, either of the concrete or the terra-cotta blocks, were quickly penetrated by the fire, and the committee consequently recommended that partitions formed with blocks of either sort should be heavily plastered on both sides; and another fact having been remarked, that the composition of the concrete blocks, which is the most essential point in regard to their fire-proof quality, cannot be determined from a superficial examination, the committee further decided to recommend that the use of unburnt material should be discouraged in cases where blocks of terra-cotta could be used as well. It is rather to be regretted that some architect should not have been called upon to aid the members of the committee in their researches, which concern the building professions just as much as the insurance companies. Any of those who assisted at the Boston test could have told the underwriters' committee that a fire continued only an hour was a very insufficient trial of a fire-proof material; and the petroleum fuel employed, although giving a lively momentary impression, is perhaps less adapted than coal, or a wood fire continued long enough to accumulate a bed of ashes, to imitate the relentless calcination of a fire on a large scale.

A LARGE hotel at Las Vegas, New Mexico, belonging to the Atchison, Topeka and Santa Fé Railroad Company, was destroyed by fire a few days ago, burning completely to the ground in thirty minutes. Fortunately, the fire occurred in the middle of the afternoon, when the guests were all awake; and by a frantic rush for the nearest door, they escaped with their lives. On the whole, the community is to be congratulated upon the removal, without fatal result, of another of those traps for the unwary which serve to entertain the American travelling public. In this case, too, the hotel having been insured for less than one-third of its value, the householders of the country will only be compelled to contribute about two cents apiece toward indemnifying the owners for their loss; and the remaining two-thirds of the cost of the property which disappeared in smoke and ashes will, we hope, be regarded by the great railway company which paid for it as having been expended in purchasing a lesson that may serve them in good stead for many years to come. The fire is said to have originated from the explosion of a gas-machine in the basement, used for mixing naphtha vapor and atmospheric air to be forced through the house pipes; and furnishes another warning against the danger which attends the use of such apparatus except under the strictest precautions.

ONE of the most distinguished French architects of the period which has just passed, Jean Baptiste Cicéron Lesueur, died in December last, at the age of eighty-nine years. Although for many years out of active professional life, Lesueur was until his death one of the most prominent figures in the artistic world, and had gained nearly all the honors which such a career could afford. Like nearly all other French architects who arrive at distinction, Lesueur was a successful pupil of the Ecole des Beaux-Arts, winning the Prix de Rome in 1819, after nine years' study in the school under the direction of the celebrated Percier, himself a winner of the Prix de Rome. His residence in Rome was signalized by the preparation of a project for the restoration of the Ulpian Basilica, in which he was assisted by his fellow-student, Callet, who joined with him subsequently in the publication of a book of drawings of buildings in Turin and Milan. At this period, it is unnecessary to say, the prevailing fashion in architecture throughout Europe held to a rigid classicism, and Lesueur, in beginning his professional career, could not have worked in any other style, even if he had wished it; but his taste and skill soon led him to a more delicate treatment of the heavy forms which had been popular during the First Empire, and on the return of the exiled nobility to their ruined chateaux he found himself the most favored among the architects employed to build and rebuild for the homeless aristocrats. Upon his designs for the hôtels of the Faubourg St. Germain his fame principally rests, and to this day they are regarded as models of domestic architecture. In 1840 he was commissioned to extend and complete the Hôtel de Ville of Paris, and executed success-

fully what he regarded as the greatest work of his life, retiring from active practice shortly afterward. According to the *Builder*, however, from which we borrow much of our information, he still continued to engage at intervals in professional employments, two of his latest commissions having been a sugar-refinery in Portugal, and the Conservatory of Music in Geneva.

THE Captain of the London Fire-Brigades Association undertook not long ago to inspect some theatres, and met with an experience which reminds one strongly of the visits of the New York Fire-Commissioners to the places of amusement in that city. At the first theatre the London captain found a row of fire-buckets hanging in their place, but all empty. A few lengths of hose were exhibited, but served apparently no other use than to reassure timid inspectors, as no provision was made for bringing them into action in case of need. One of the attachés of the theatre had, it is true, formed a plan for carrying a line of hose up the proscenium wall to the neighborhood of the flies, but his "intention" had borne no fruit. The manager, when asked if he had noted the time occupied by the audience in leaving the building, showed no interest whatever in the subject, remarking that his theatre had been passed by the Lord Chamberlain, and it was "no matter" if it did burn down. Whether his audience, in case of fire, would view the occurrence in the same philosophical light, is doubtful, but so far as the law is concerned, the manager seems to have had the best of it. Under such circumstances, the best weapon to use against the directors of theatres who profess such indifference to the safety of their patrons is the publication of the exact condition of their building. Men and women in general have no fancy for being burned alive, and may be relied upon to stay away from theatres which they know to be dangerous. The effect of a warning does not last very long, and it must be repeated at intervals so long as the occasion for it exists, but if this is persistently done, by the proper authority, the most obstinate of managers must succumb, to avoid ruin.

AN ingenious way of obtaining public parks in mountainous districts has been suggested by Senator Lansing, of New York, who proposes to apply his method to the conversion of the Adirondack region into a public forest preserve. A committee of the New York Legislature recently visited the district, and has designated a tract, comprising seventeen hundred thousand acres, which it thinks the State might with advantage acquire; but instead of condemning and purchasing the land by the usual process, Senator Lansing's bill provides simply for the appointment of a superintendent to guard the timber land already belonging to the State, and for the addition to the public domain each year of the estates upon which taxes are unpaid. The accretions of territory made in this way will, as the Senator thinks, bring into the hands of the State in ten years a tract equal in size to that proposed.

THE agitation in England on the subject of dwellings for the poor rather increases than diminishes, and a meeting was recently held in the Mansion House of London, at which it was determined to establish at once general and local committees for the purpose of inspecting the lowest class of tenements, and urging such legislation as might be necessary for dealing with them by the public authority. The general council, as appointed at the meeting, seems to contain too many high dignitaries to promise much efficiency, but it may at least set the fashion of a good work. The more intelligent of the English public men do not forget to call attention to the danger of "pauperizing" the people who will be most benefited by an enforced change in their modes of life, and the warning is a salutary one, but there will be ample room for the display of charity in this direction without endangering the self-reliance of any one. If the benevolent can do nothing better, they can at least provide for the health and comfort of children, whom there is no danger of pauperizing by any amount of tender care, and whose lot, in their present condition, is more pitiable than that of their parents. One of the most interesting stories related by those who have recently investigated the condition of the London poor is that of a mother, certainly not wholly abandoned, who kept her children in the streets until after twelve o'clock every night, that they might not see the viciousness of their own miserable home; and this points clearly to the advantage, or rather, the necessity, if any serious impression is to be made upon the next generation, of establishing in

great cities a comprehensive system of what the French would call "*ecoles maternelles*," or refuges for children, where those too young to be of use to their parents can be taken care of during the time when they would otherwise be in the streets. Of all public charities, this is the sort which seems to do the least harm, and the most good. To the children it brings physical and moral care at the period when they need it most, together with the beginning of new ideas and aspirations, which they will never afterward forget; while their parents, if hard-working and honest, appreciate beyond any favor to themselves the security afforded to the little ones whom poverty forces them to neglect, and even if vicious will be none the worse, if not entirely depraved, for the hold which they thus obtain upon a life better than their own.

SOME comparisons are made by *Le Génie Civil* between the cost and character of domestic postal service in Germany and in France, which are of special interest to us Americans, just beginning, as we now are, to dream of emulating the convenience, security and cheapness with which transportation of this kind is performed abroad. In regard to simple letters, it seems that the postage on those circulating within the country is, for those weighing less than half an ounce, two and a half cents in Germany, and three cents in France; the rate in both cases being higher than the new rate here. With letters of more than the standard weight there is, however, a very great difference between the German practice and that of other nations; thus, in Germany, a single rate of five cents pays for the transportation of any letter more than half an ounce and less than eight ounces in weight; while an eight-ounce letter in France would require to be prepaid with fifty-one cents' worth of stamps, and in the United States with thirty-two cents' worth. Postal cards cost in France two cents each, and in Germany about one cent and a quarter; and sealed postal cards, at the same price, have just been introduced into the latter country. Postal orders, which cost in France twenty-five cents for the smallest sum, are in Germany only one-fifth as much, and in the latter country an extra payment of one cent entitles the sender to have the money carried by the postman to the house of the person addressed, and there paid to him. In the same way, the postmen are obliged to receive money from any one who wishes to send a postal order, and give a receipt for it, entering at the same time in a book the name of the person to whom the order is to be sent; and the postmaster then makes out and forwards the order required. A species of missive used in Germany, but nowhere else, so far as we know, is the express letter, which, for an extra postage of six cents, is forwarded to the person addressed without passing through the post-office of the town in which he lives; a messenger, who travels on every mail train, taking the letter immediately on the arrival of the train, either by day or night, to the house of the one it is intended to reach. As the boxes in the stations are open to receive letters until one minute before the departure of the train, an express letter of this kind can be transmitted very quickly.

IN respect to the transmission of parcels the German postal service far surpasses that of most other nations, and an enormous business is done in this way by the post-office department. Packages of less than ten pounds weight are carried everywhere for twelve cents, including delivery at the house of the consignee. It is amusing to find that the establishment of this convenient system has fostered the growth of a large business in certain products, those particularly noted being butter and smoked herrings. Butter is now put up for this sort of transportation in ten-pound cases, of which immense numbers are sent from North Germany to the cities; and boxes of herrings of the same weight are constantly forwarded from the sea-coast towns to the interior. Last year the number of boxes of herrings passing through the mail was more than four hundred and fifty thousand, and it is said that the fishing villages of the coast appear to be on fire, from the smoke of the little fires over which each fisherman cures his herrings for this convenient market. The business of the poor fishermen is still further aided by an arrangement under which the sender of the box, on payment of a commission of two per cent, can receive at once from his postmaster in cash the value of his consignment, the post-office department taking upon itself the risk of making collections on the arrival of the package at its destination.

SPANISH ARCHITECTURE.¹—VIII.

TOLEDO (continued).



IN the nave and transepts of Toledo Cathedral one is very deeply impressed. There is dignity and sanctity in the air, and it enforces itself upon the beholder before he examines or even sees any of the details. The simple, sturdy, constructive style, and the mass and weight of the main features which compose its superb plan, effect this in great part; while the wealth of sculpture and ornament, rightly lavished upon secondary structures, takes up its different note in the chord, and each harmonizes and emphasizes the others. In venturing upon criticism, I do so with much reverence for the Cathedral as such. As an example of building art there are in it some things I dare to approach more familiarly. The proportions are not quite all that could be desired.

Some of the parts detract from the values of others. The want of height in the nave, for instance, is more apparent than real, and results from the absence of the triforium, and from the detail of grouping of the main clustered pillars. The shafts are so symmetrical and regular in size as a whole, in the lower parts, that the pillar is too much a unit. If it broke more clearly into vaulting shafts and arch shafts, or groups, the great total diameter would not dwarf the other dimensions. But the first-named cause is the more important. The omission of the triforium is a great loss. That well-defined intermediate story has in most great Gothic interiors a value that can hardly be exaggerated. Its play of light and shadow, and the proof it offers of the massiveness of the wall it ornaments, are great points; but they are surpassed in worth by the expression of height given in the separation of the clerestory windows from the main arcade beneath them by an accentuated story. Here it seems that these facts were recognized, for it is attempted to meet them by introducing the lines of a triforium into the lower parts of the windows, with a partial success. True, the existence of flat roofs so common in Spanish cathedrals would be, if it were compulsory, a good reason for abandoning a feature prompted by Northern steep-roofing expedients, but these flat roofs themselves are to be deprecated. They leave the exterior with an incomplete appearance. Many Spanish churches seem to be roofless, because the pointed roof, which they lack, is so integral a part of the pointed style that no horizontal substitute can properly supplant it. It is a pity, therefore, that at Toledo Cathedral the roofs are low and the triforium wanting. Mr. Street thinks it possible that it was originally included and has been altered to the present condition. It seems most probable that the alteration was made on paper: that is to say, in the working-drawings prepared after the original design.

This Cathedral is undoubtedly largely the production of French architectural skill. It was built simultaneously with others more characteristically Spanish, which are of far earlier types; and moreover it reveals in certain details positive proof of French design. The large size of the windows is not Spanish. Shadow and coolness were highly esteemed by these people and they always built (when following their own bent) small windows; and when, as is the case here, foreign influence caused a departure from this habit, they afterward modified the result by screen-walls and other devices for blocking out part of the sunlight or by closing up several of the windows with masonry.

In the *capilla mayor* and its surrounding aisles there are many things demanding examination. The main arcade is built up with screen-walls of masonry half the height of the arches enriched with abundant tracery and statuary. Above is a triforium each arch of which is made a niche for a statue and at the top, in the vault, the clerestory. The whole has much less of the French air than the nave, and is somewhat marred by the extravagant detail of certain Renaissance monuments and other intrusions. The altar-piece is an example of the wretched theatrical taste (or want of taste) of later times. A great carved confusion of figures and rolling doughy clouds, through which burst straight shafts of light (if light can be carved in marble) stands in the gloom over the altar illuminated by an opening in the roofs like some sensational tableau in a country show. There is a variety of beautiful work in metal and stone in

the accessories to the principal chapel, which go far to redeem its faults. The aisles around it are very handsome. The first one has a fine triforium, showing, rather curiously, how Moorish influence made itself felt even at this time and place. The little arches have their cusplings, Gothic in conception, slightly modified to an Eastern movement. Over them is a clerestory quite consistent with Spanish ideas: small circular windows filled with tracery admit just the quantity of light required. The outer aisle and chapels are also very pleasing, and they show masterly skill in vaulting expedients, to which Mr. Street devotes considerable space.

Coming now to secondary things, the screen around the *coro* invites most careful inspection. Though this *coro* is not so long as that in some other places, yet it blocks the nave awkwardly. In the western end of the Cathedral one feels as if only in a magnificent vestibule, so completely is that part isolated from the places of ceremony. But I remember a bravely-clad official, who, with a staff decked with jingling silver rings, patrolled these precincts to enforce adoration of the unseen elements. At the elevation of the Host, a tinkling wheel of bells was rung at the altar, and the beadle struck his staff upon the paving and commanded two or three who were near to kneel. Once I saw a young traveller refuse to understand: he was summarily ejected at the nearest door.

The screen which thus breaks up the building is, however, a wonderfully rich work. Its principal ornaments are a large series of alto-relievo sculptured illustrations of Old Testament lore. The Creation, the Garden of Eden, the Flood, the lives of Abraham, Isaac, Jacob, Esau, Joseph and his brethren, passages from the Exodus and other subjects are carved in panels formed by pinnacles rising from Gothic shafts and tracery of charming design. Of course this sculpture of the fourteenth century is crude and stiff, the figures big-headed and conventional; but the earnestness of religious art is there in plenty. Inside the *coro* are some splendid carved panels of wood in low-relief, of scenes in the conquest of Granada, the campaigns of the idolized Ferdinand and Isabella. They are glorious examples of the skill and enthusiasm of their day, and are full of information, too, of historic value. Berreguette also did a quantity of work here, some of which is interesting, but the greater part far inferior to the older examples. The stalls are partly of the fifteenth century and partly of the sixteenth, some by Berreguette. All are rich, but the older ones especially show fascinating devices in tracery and grotesque carving. The great eagle lectern, of brass, and some other metal-work furniture, are very beautiful.

Finally, all the windows are filled with ancient stained-glass, glowing with exceptional beauty of hue and tone. There is a depth in the ruby and blue, and an intensity in gold and amber colors, which is fairly puzzling to one who studies stained-glass work as a modern art. To think that with all our modern science and dexterity, and all our cultivation of our artistic senses, we cannot, in these matters of fulness and richness of color, produce such works as did the old-time workers with their inferior equipment. Two things I noticed particularly here. First, that the deep gloom of the interior is of nearly as much value to the stained-glass as is the light outside; and next, that a close inspection reveals a grand disregard for useless detail or finish on work designed to be seen at a distance. This latter fact is a great one. It is curious to see how a circle of glass, showing high up in the walls some strong, vivid depiction of a Biblical story, becomes, when one stands close against it, a confused assemblage of dirty (very dirty) coarse glass, in clumsily-fitted leading and iron-work. Until one sees it, it is difficult to believe that the artistic feeling is so independent of dexterity of handiwork. And the effect of the dark interiors reminds one that it is a simple physical impossibility to do in a building well-lighted by numerous windows of clear, untinted glass, what can be done where no single ray is admitted that is not strained through a harmonizing color. This is what is the matter with many beautiful modern windows. If we could keep our beholders a while in a dark place, so that they forgot the brilliancy of white light and saw only the window in question or similar ones, as they do here in Toledo, we could claim for modern glass more than is usually conceded. Yet I think even then it could not equal the superb effects of this work of the fifteenth century.

Over at the western end of the city, where the river emerges from the ravine, and the rocky hills which confined it subside toward the flat Vega, the church of San Juan de los Reyes crowns the last of the heights in that direction. It was founded and erected by Ferdinand and Isabella, A. D. 1476, to commemorate the victory of Toro, together with a great convent, of which only a few chambers and some heaps of ruins remain. Externally there is not much of unusual merit. The walls are somewhat blank and bare-looking, although relieved by a great deal of traceried panelling in the granite ashlar. A curious decoration here is a collection of chains and fetters said to be those taken off Christian prisoners released on the conquest of Granada. The interior has considerable interest for the modern architect. The plan consists of a nave, the main arches of which open into chapels between the deep buttresses, very shallow transepts, and a very short polygonal apse. The transepts scarcely project beyond the line of the nave buttresses, but their height is such that four equal arches support the lantern over the crossing. This is octagonal, formed by four fan-shaped pendentives in the angles, and, like the rest of the church, is vaulted with multiplied intersecting ribs in the prevalent style of that epoch. There are windows under the arches of the vaults, and others in the transept and nave walls, and although nearly all of them are more or less

¹ By Robert W. Gibson, Travelling Student of the Royal Academy. Continued from page 16, No. 420.

blocked up, the church is very well lighted. Clustered vaulting shafts support all the ribs and arches, and rest upon high bases with traceried panelling below them. Instead of the usual *coro*, there is a choir-gallery at the western end. It is a little unfortunate in the effect of its one great segmental arch across the nave, which, with the flat vault bearing the floor, has a very oppressive effect, and looks heavy, despite the elaboration of ribs which cover the surface like a net. There are two cleverly-designed ambones at the east end of the nave, very richly cut into traceried parapets and coves springing from the supporting shafts. The whole is a striking interior. The somewhat florid ornament is generally appropriately placed and contributes a good deal to the general effect. But additional interest lies in the fact, which immediately suggests itself, that if only arches were opened through the buttresses, to connect the chapels between them, and make an aisle wide enough for passage-ways, the church would be admirably adapted for the requirements of our own day and country. The crossing and wide nave would accommodate a large congregation, and the shallow aisles would partially screen persons moving, while no one would be hindered from sight or hearing of the service by columns. This is an arrangement of ground plan which I believe contains (with perhaps an amplification of the transepts and introduction of an organ-chamber adjoining the chancel) the best solution of the difficulties of modern churches in the traditional Gothic styles.

To the south of the church is a marvellously elaborate cloister. Its large pillars are wrought from top to bottom into mouldings and traceries. Innumerable niches with statues, surmounted by delicately-cut canopies, face from the shafts in each direction, and bases and capitals are worked to a corresponding degree of complication. These pillars support graceful groined vaults with ribs moulded in the same generous workmanship. Notwithstanding my prejudices against the elaborations of late Gothic, I could not help admiring this specimen. There is something in the proportions and in the way the superfluities are introduced, which distinguishes it from most of its class. The museum, so-called, which is quartered in these buildings is a collection unworthy the name; it seems to have been made not because there were things desirable to show, but because people come with a desire to see.

From San Juan a very agreeable walk, for one who does not fear rough ways, is across the bridge of San Martino, and along the crags of the south bank, to the other bridge, Alcantara. It is a panorama of picturesque antiquity. From the weather-beaten granite wilderness just opposite the church I made the sketch here given (*see Illustrations*). The river runs turbid with red ochreous earth-stains, under the grand old bridge whose history would make a book. It consists of one great pointed arch, 140' wide and 95' high, and four smaller ones. The effect of these dimensions is increased, too, by the narrowness of the roadway. The passage is guarded by plain battlemented towers at each end, with arched gateways fitted with ponderous doors. It is said to have been built in the thirteenth century, and that date is doubtless correct for the main works; but the towers are, at least in part, Moorish. It is a very handsome structure;

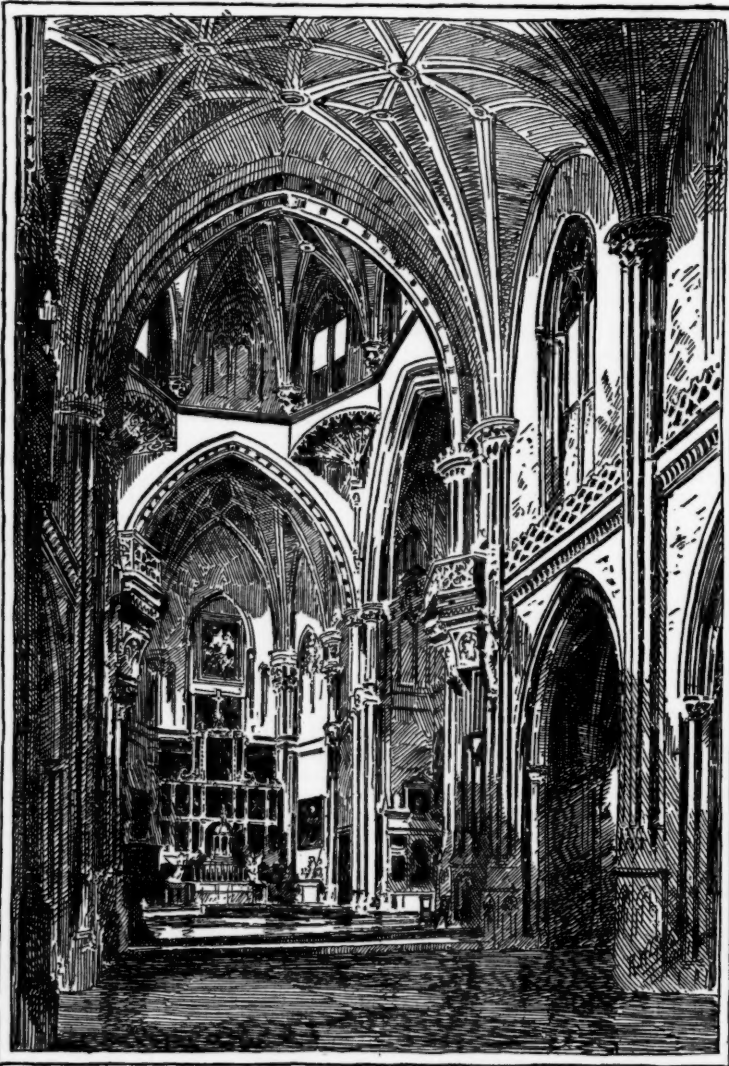
the noble piers, the chief arch, so grand in dimensions, and the irregularity in the parts make a composition full of individuality among its kind.

The following story of an event in the construction of the bridge of San Martino is worth repeating: The architect, while the work was going on, perceived that as soon as the centres were removed the arches would fall, and confided his grief to his wife. She, with a woman's wit, forthwith set fire to the centering, and when the whole fell together all the world attributed the calamity to the accident of the fire. When the bridge had been rebuilt, she avowed her proceeding, but Archbishop Tenorio, instead of making her husband pay the expenses, seems to have confined himself to complimenting him on the treasure he possessed in his wife. This was a device to save a reputation which modern efforts rarely surpass, except in their better concealment from less generous authorities. San Juan rises commandingly on the crest of the hill opposite, with sky-line

broken by numerous pinnacles, and base jostled by pigmy buildings of meaner purpose. Then a cluster of houses around a red, four-towered public building leads the eye to the white ruins of the Palace of La Cava, with slopes down toward the river strewn with, or even composed of the debris of its walls. This was the abode of Rodrigo, last of the Goths, and the baths in the river below have one of those old, old stories of passionate humanity in which the names of Zoraida and Rodrigo are chief. A road leads south-east from the bridge to a little church standing in solitary possession of its knoll of rock. People come to it sometimes: one Sunday I sat and watched a long, straggling crowd coming and going over the old bridge to a celebration or series of celebrations. There was a brass band within, a little bell overhead ringing intermittently in the spasmodic "over and over" style all the afternoon; and the people walking in and out and idling on the terrace in front, with apparently little purpose or enjoyment. It was probably the "fiesta" of the patron saint, for at all other times the church was deserted.

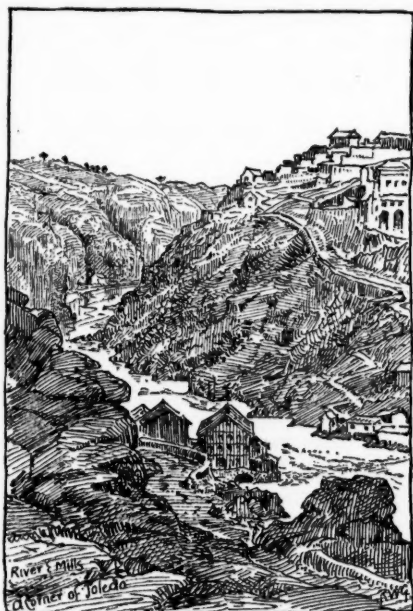
From here the Cathedral may be seen rising above the houses of the city; and several Moorish towers. The buildings nearest the river, however, are sad-looking, almost more than picturesque, so desolate and uncared-for and so

deserted are these outskirts of the city. Continuing the scramble over the rocks, across two or three ravines, down which are to be seen queer old dams and Moorish mills, the other bridge is reached, the one by which I entered Toledo, called Alcantara (Arabic for "the Bridge," yet the Toledans call it Puente de Alcantara). This, too, is a structure worth noticing; one great and one smaller arch, both round, support the roadway, and like San Martino it has a gate-building at each end. That to the west is a stern Moorish tower, but the other is a Renaissance arch with the customary pediments and terminals. I got a view and made a sketch of Alcantara from the city walls (*see Illustrations*). It is hard to say to what age it belongs, if indeed it belongs to any. The Romans built a bridge here, and the Moors and Goths and moderns have rebuilt and repaired as time and the floods have injured it. A great inundation in 1258 nearly destroyed it, and the accounts of that event describe it as having been finished 387 years before.



Toledo-Spain-Interior of Church San Juan de los Reyes

Also these records state that the king Don Alonso had it repaired and renovated. And it was further repaired and fortified in 1380 and in 1484. The sketch shows also the ruins of the old castle of San Servando, built about 1310. From the base of these walls is a charming view of the defile of the stream. A dam stretches across



just below, and two or three modern mills huddle together for foothold on the uneven banks. The city and its walls, as seen from here, I mentioned before. Mr. Street says of them, "The walls, gateways and bridges of Toledo are, I think, the finest I have anywhere seen; in part at least of extreme age, very perfectly preserved, and on a grand scale."

Of the gateways, the Puerta del Sol is preeminent. It is the grandest of all. I believe it is the grandest in the world. It is a battlemented tower rather higher than the walls adjacent, and projecting from their line of front.

It faces in a direction parallel with the wall, being built in a short projecting angle, flanking the parapets over the approach, and in turn flanked by them. The outer side, that most exposed, is round, and this curve has much to do with the beauty of the building. The gateway has a great pointed horseshoe arch, and, beneath that, recessed a foot or two, a smaller round horseshoe over the opening. Over these are two smaller arcades of intersecting arches in brickwork; and this bit of composition—the arcades are simply ornaments to heighten and dignify the entrance—is framed in slightly projecting shafts and cornice. Then the battlements above this frame are dropped some eight or ten feet between higher angles, to continue the same idea to the top, and this expedient in design is singularly successful. There are some small arched openings high up, the outer ones with projecting stone bays to enable the defenders to command the base of the tower. I much regret that accident prevented my getting a sketch of this building, but many are extant, and there is a very fine photograph.

The Puerta del Sol is in the inner and older of the circumvallations which were built by Wamba and other Visigoths in the seventh and eighth centuries. But Mr. Street thinks the gate in question is of the twelfth or thirteenth century.

Close by the Puerta del Sol I found the strange little church of San Cristo de la Luz. It is of course very interesting because it is one of the earliest Moorish buildings. But it can scarcely be called beautiful, and its diminutive size was surprising to me. I had read of it and imagined it four times as big. It is a square divided into nine smaller squares by the arches supported upon four columns, and these smaller compartments are only about seven feet on each side! It was here that Alonso VI in 1085 entering the city he had just conquered, hung up his shield and heard the first mass. Until then the building had been a mosque.

A little way down from here across that part added to Toledo by Alonso VI, may be found the outer line of walls enclosing it, and there is a gate in them, the Puerta Visagra, which is excellent. It is also Moorish in conception but its date is uncertain.

In another part of the city, near the river, are the two curious buildings, formerly synagogues, now churches: Santa Maria la Blanca, and San Benito, usually called El Transito. Santa Maria was built during the ages of religious tolerance, possibly even before the conquest by the Christians, but it has been so altered that the original date is undiscoverable. It is, however, known that in A. D. 1405, the Christians, urged by violent preaching, seized the synagogue and converted it into a church. In this capacity it endured further transformations. It is a three-aisled building with horseshoe arches upon octagonal columns; in style a mixture of Moorish with Romanesque, and some details borrowed from the Gothic. Although not of extraordinary merit there is, I think, a great deal worthy of study in it. Mr. Street gives a drawing and description. When I was at Toledo the building, which had been rescued by the Commission of National Monuments from its degradation as a warehouse, was being restored or repaired.

The other synagogue was built A. D. 1366 by one Samuel Levi who, Ford says, was killed by Don Pedro the Cruel in 1360, so

probably some time was spent upon the building and the date 1366 is that of completion.

At the time of the expulsion of the Jews (1492) this edifice was given by Ferdinand and Isabella to the order of Calatrava, and it became a church. It is 31' x 76', with a superb Moorish *artesonado* ceiling, which is the principal attraction. The upper parts of the walls are ornamented with a range of columns and horseshoe arches, the latter being cusped, and very rich in effect. The decorations are lavishly applied, but are not pure in style. There is, as might be expected, considerable admixture of Gothic and Jewish detail; still the building as an interior is very beautiful and highly instructive. Externally there is nothing of especial interest.

Among the numerous churches of Toledo are several which, although built for and under the direction of Christian authorities, were executed and in great part designed by those Moorish architects and artisans who remained after the Conquest in almost complete possession of their respective industries. Many of these buildings must have been extremely Moorish looking originally; not essentially so, because the plan and arrangements were, of course, decided by the ecclesiastic officers, but in feature and detail the Moors often worked according to their traditions almost undisturbed. In the little initial-sketch, for instance, is seen an apse: it is Christian in the main idea of its walls and lancet windows, but these have arches of horseshoe form, and with the brickwork and masonry generally are distinctly Moorish. Such examples abound.

Still more forcibly is evidence of this subordination of Moorish work to Christian purposes presented in many of the towers which rise above the city with such good effect in distant views.

They are something like the brick campanile of Italy; square and straight, without buttresses or diminishing, pierced with arched openings, usually unencumbered by louvres or glass, and roofed with a flattened pyramid of corrugated tiling; but they are Moorish in detail. A plain unbroken square of stone masonry, with brick angles and bonding bands of brick every four or five feet, rises to the height of the church roofs. Then come one, or two, or more stories of brick arches, usually with Moorish cusping in its simple or multiplied form; that is to say, with perhaps three or perhaps a dozen cusps to the arch. Sometimes there is an intermediate wall-arcade, as in San Roman, where it is made a very pretty feature between two stages of greater arches. Usually the main cornice is corbelled or bracketed in a way that suggests Italy again, and nearly always the brickwork is of broad, simple treatment; no mouldings upon the angles or cornices, but only the sharp, square arris, with perhaps a larger arch in which the real opening is recessed. The mortar joints are always extremely thick, and there is, consequently, an effect in even a bare brick wall which is not unpleasing; and the work generally in these towers is highly instructive in the art of employing common materials with economy, and yet with lofty expression.

Many of the houses, too, some of them built long after the Conquest, show the same abundance of Moorish motive in their workmanship; others of later date are equally characteristic in another way. There is to be seen a favorite arrangement of half-columns attached to the jambs, and bearing a massy lintel rather Doric in feeling, and all in granite.

One sees, also, a quantity of wrought iron-work in balconies and window-guards and in door furniture, which is artistic in the extreme. There is another manner of house decoration here not so satisfactory. Buildings are often painted like stage scenery, with representations of orders and cornices, rustications and joints, windows, balconies, and all the paraphernalia of commonplace street-front ornament upon a flat plastered wall (this is not especially Toledan, but it was here it first forced itself prominently upon my attention). At a distance, and from the proper point of view, the rather clever drawing and shading produce the desired effect, but when one is looking at it from any other place, and the perspective is turned inside out, it is all intensely disagreeable. It is depravity in art, and it must cost as much as would provide a little genuine architecture. Yet, after all, it is identical in principle with that phase of Italian art which so many thoughtless persons admire, because it goes hand in hand with the best painting ever done. Who dares to say that the Sistine chapel, for instance, is decorated in a bad, degraded style? Only a few; because the faults are mingled with such marvellous excellencies, and it is necessary to find the former without the latter to see how atrocious they are.

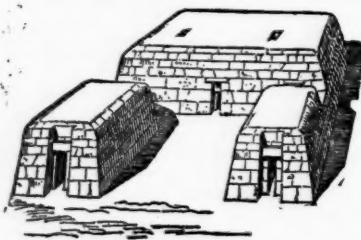
Now a pleasanter note again—rambles in Toledo are productive of abundant pleasure to overbalance a few disgusts. It does one good to see the people here using for everyday purposes pitchers and pots of exceeding beauty. The still prevalent necessity, in all parts of Spain, of carrying water for considerable distances from fountains to homes, keeps these articles in importance, and it seems as if the manner of carrying them had had something to do with their graceful forms. They are mostly of reddish-brown ware, of large size, with narrow neck, full-swelling top and tapering to a very small or pointed bottom, according as they are required for carrying upon the head, or, as is often done, upon the hip, with the arm around the thick part. Often they are fitted into wooden-framed panniers; whichever method is adopted the vase seems to sit in its place and look well there. The smaller articles are good, too, and surprisingly cheap. Nearly all domestic utensils are hand-painted, not with very careful drawing, it is true, but with some correctness of feeling, and with excellent colors. The blue is a particularly good tint. I saw, also,

some vases of tremendous size, seven or eight feet high, apparently intended for cisterns; one was partly buried in the earth. They seemed to be the very kind referred to in that fascinating story of Ali Baba, and at last set at rest certain doubts I had been possessed by from earliest days as to the veracity of the historian.

Besides the "still life" of Toledo there is great novelty in its animate nature which, although it is not exactly my province, I may be allowed to mention. The populace is more bizarre; the beggars more numerous and pertinacious; their costumes more characteristic than I had seen yet, and now and then the people would unanimously set about some incomprehensible thing to my great mystification. One Sunday I noticed, upon sallying out, that holiday-making was afoot. The people were out in great force; in dresses of all phases of transition, from the old peasant garb to the Parisian style of the advanced fashionables. There was a religious procession with all the pomp and ceremony of Roman custom, and all day long the youngsters of the population paraded the town, armed with clothes-brushes and little trays wherewith they set upon any decently-arrayed person who came in their way, and brushed him all over and over until an "ochavo" was paid for the service. Half a dozen at a time, and another relay of half a dozen ready to begin when they had finished. By inquiry I learned that all this was in honor of San Tomé, but whether brushing was supposed to be one of the peculiar functions of Santo Tomé I could not ascertain. Another day there were bonfires lighted upon the hills around the town, and those who could not go to one watched at a distance. It was the beginning of May, and almost every European nation has in vogue some festival at that season.

I left Toledo with regret: although I had made a prolonged visit, there were many things deserving better acquaintance.

A NEW HISTORY OF EGYPTIAN ART.—II.



Three Mastabas at Gizeh.

any other, are explained, and the way is shown in which they have influenced the forms of every branch of art. And, as I have hinted, the useful lesson is always enforced which oversets the too commonly-held idea that the Egyptian religion prescribed, by dogmatic formulas or unimpeachable traditions and conventions, the exact shapes in which artistic impulse alone might clothe itself. In the succeeding division the author briefly discriminates and characterizes the different periods through which Egyptian art successively passed.

In beginning, then, his detailed study, first of the architecture of the Egyptians, he explains the method he will pursue: a method which is prescribed for him by the main purpose of the work as being, not a complete inventory of Egyptian monuments, but a description of these as a whole, and an estimate of their qualities as forerunners and part-parents of Greek developments. Thus he attempts to give no complete account of all the buildings of Egypt, and no exhaustive description of any one, but rather an analysis of the style as a whole, illustrated by such references and instances and illustrations as may seem most characteristic and most important. It is doubtful whether, quite apart from M. Perrot's particular purpose, this plan may not be, after all, more instructive for the general reader than the other—more interesting in itself and apt to leave clearer and more vital impressions on his mind. Then follows the analysis of the main principles of building, which proves in a way that will, I think, surprise many readers used to the old-fashioned, ignorant way of criticising Egyptian work, that the style, far from being rigid, conventional, academic, and enslaved to formula, was above all others free, variable, and individual, even in its performance. It is impossible to name a typical Egyptian temple, to describe the parts and arrangements of any one which may serve as a standard for all or most, as we may do with Greek temples, or even with Gothic churches. They vary constantly and widely in general plan, in the arrangement of their parts, and in the nature of their details, constructive or ornamental. Take, for example, the column. Egyptian supports cannot be classified into any number of distinct forms, corresponding with the "orders" of the Greeks, and used systematically as were these; nor do they vary chronologically, as in mediæval art, each bringing with it a special and appropriate type of accompanying details. The very various styles of columns used are largely synchronous in time, and employed indiscriminately, according to the will of the builders of the moment. "In Greek art," says M. Perrot, "there is a modulus which determines the quantitative relation of forms to each other, and fixes a

brief, but adequate, and very clear general historical sketch opens M. Perrot's book, and is followed by a pregnant chapter on "The Egyptian Religion and its Influence upon Art." The peculiar polytheism and fetish worship of this people, different in many ways from similar forms of belief with

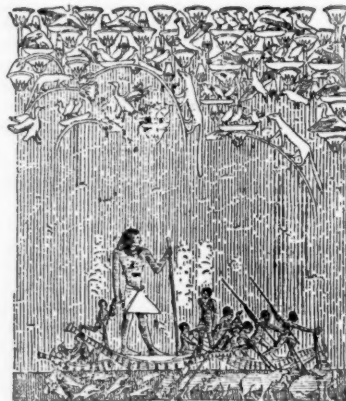
mutual and invariable interdependence. This modulus is found in the diameter of the column, and the standard of proportion which is based upon it is called a 'canon.' In Egypt, as in other countries, there must have been a certain connection between the diameter of the column and its height; but there was no approach to that rigid and immutable law which had its effect upon every detail of the Greek temple. The modulus in Egyptian art was used with such freedom, and gave rise to such varied proportions, that we may say no canon existed. The elementary forms of an Egyptian edifice had so little dependence upon the modulus that we need not take it into consideration, and in this sense the art of Egypt was not mathematical, like that of Greece."

Sepulchral architecture is first treated throughout its successive chronological periods. The introductory pages to this section, analyzing "The Egyptian Belief as to a Future Life and its Influence upon their Sepulchral Architecture" are, without doubt, the most important in the book, explaining as they do, not only certain peculiarities in tomb-building hitherto but vaguely understood, but also certain prominent characteristics of the sculptor's art which have hitherto scarce been understood at all. Very briefly and imperfectly summarized, the theory is as follows:—

The chief characteristic of Egyptian belief, most prominent in early days, but subsisting throughout all its history, is the worship and service of the dead. "The Egyptians called that which does not perish as the dying man draws his last sigh, the *ka*, a term which M. Maspero has rendered as 'double.' This double was a duplicate of the body, in matter less dense than that of the body—a projection, colored, but aerial, of the individual, reproducing him feature for feature, a child if coming from a child, a woman if from a woman, a man if from a man. This double had to be installed in a lodging suitable to its existence, had to be surrounded by objects which it had used in its former state, had to be supplied with the food which was necessary for the sustenance of its life. By the offerings of friends alone could the hungry and thirsty phantom which replaced the living man be kept alive." This conception is not peculiar to Egypt, explains M. Perrot, but its "most complete, clear and eloquent expression in a plastic form is to be seen on the banks of the Nile. Why is this so? It is because the Egyptian industries were already in full possession of their resources at the period when those beliefs had their strongest hold over the minds and feelings of the people." The Greeks had outgrown their childlike belief in the dependence of the dead upon the living, before they had reached a high stage in expressive formative art. "It was otherwise in the valley of the Nile. Egypt did not differ from other nations in its opinions upon the mystery of death. In the infancy of every race the same notions on this matter are to be found, and in this respect the only difference between the Egyptians and the rest of the world is to the credit of the former. They rapidly attained to a degree of civilization which was only reached by other races after their religious development was comparatively mature."

Then follows the explanation of how this belief affected the art of Egypt, and made its sepulchral architecture not only the first fruits of that art, but the "most characteristic and most original creation of its genius, especially in the forms which we find in the cemeteries of the Ancient Empire" (that is, before this people began, like others, to outgrow its primitive religious conceptions).

The descriptions of the mastabas of the necropolis of Memphis, which stretches from the neighborhood of the pyramids to Sakkarah on the south is extremely full, and of double interest as introducing us, in text and illustrations, to many recently-discovered monuments



"Hunting in the Marshes."—Bas-relief from the Tomb of Ti.

almost unknown as yet to the average student. Not only the number, but the artistic excellence of these very early remains will surprise him and show that in certain points Egyptian art had already reached an excellence which was unknown to its later years. I must particularly note the pictures from the wall-paintings and sculptures of these tombs as strikingly beautiful examples of decorative instinct. On page 14, of Vol. I, will be found a bas-relief from the Tomb of Ti, representing "Hunting in the Marshes," wherein not only the boats and figures at the bottom, but the reeds, with their swarming birds and little beasts, that form as it were a frieze along the top of the picture, are arranged in a way which, if naive from a naturalistic point of view, is extremely powerful and artistic from a decorative. Almost as much may be said of "Netting Birds," on page 35, and even more of the "Water Tournament," on page 42, which is a truly marvellous piece of decorative design.

M. Perrot does not waste time by examining or refuting the count-

¹ *A History of Art in Ancient Egypt*, from the French of Georges Perrot and Charles Chipiez. In two volumes; illustrated. Translated and Edited by William Armstrong. London: Chapman & Hall. New York: A. C. Armstrong & Co. 1883. Continued from page 18, No. 420.

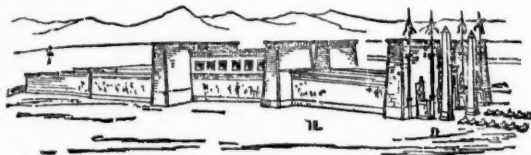
less fantastic theories which have been advanced to explain the origin and nature of the pyramids. He says simply that they were royal tombs, and as such need no further explanation for his purpose. The



"Water Tournament": from a tomb at Khoum-el-Ahmar.

The tombs of later days, when the seat of power was transferred to Upper Egypt, are very different in kind from the simple, massive pyramid or the mastaba, which satisfied the taste of early times. Instead of modifying or ornamenting the pyramid, which was the early royal tomb, the later architect took an entirely new departure. The temple, and not the tomb, had by this time become the highest expression of his art, and he strove to bring the tomb into harmony with this. The tiny funerary chapel was replaced by a temple-like structure of great extent, and this was often—so great had been the modification of belief with regard to the necessities of the dead—actually removed entirely from the tomb proper and given an independent existence, as we see in the western plain of Thebes. The difference in site also brought about a difference in sepulchral architecture, for instead of the platform of rock, as at Memphis, whereupon the pyramid and mastaba stood, or wherein the latter was sunk, the Theban builders had at their command only a sandy plain and beyond it a horizontal range of cliff, into which they dug the chambers of their dead.

Temple architecture is then explained at length, bringing us to the part of our subject which is most interesting to the artist, if not to the historian and the archaeologist. It is impossible here to give even the briefest summary of these delightful and instructive pages, by means of which and of M. Chipiez's masterly drawings and restorations, the subject is made clear and living, as it has never been before, for the eyes of those outside a narrow group of specialists. It is hard to say which strikes us as more remarkable: the authors' wide artistic sympathy, which puts them in so favorable a standpoint for kindling our appreciation of this too often misunderstood and underrated phase of art, or the critical acumen which guides them in their analysis of



Luxor as restored by M. Chipiez.

its component parts, and in their decisions as to which points they should most strongly impress upon the reader as being most characteristic of the style in question. Theirs is neither the blind partisanship of the specialist nor the prejudiced fault-finding of the devotee of another art, but the wise balancing and weighing of wide-minded critics, who can exalt one thing without feeling that they are lowering another, even if an opposite thing, and can see faults as well as beauties, even when enthusiasm is at its height. Throughout the whole work, indeed, nothing strikes us so forcibly, for nothing is so uncommon in critics of any kind, as the sound *good sense*, guided by artistic taste and catholic appreciativeness, which persuades us to follow their decisions almost without question, because showing us the grounds upon which they rest to be firm and sure, and not the quagmires of bias, the quicksands of special pleading.

The chapter on domestic and civic building is not so rich or intrinsically so interesting, perhaps, but of the greatest value as dealing with a branch of the subject that has been ignored more than any other, and the materials for an understanding of which, being fewer, need more than any other the careful and scientific treatment they here receive. When we pass, finally, from description to analysis, every page is full of novelty and interest. One point explained with care is that the Egyptians were not, as so commonly supposed, remarkable for their careful, scientific building. Examples of such work occur, of course, "but as a rule, Egyptian buildings were put together in a fashion that was careless in the extreme. The foundations were neither wide nor deep enough. It is not till we come to the remains of the Ptolemaic epoch (that is, after the truly national schools had come and gone) that we discover foundations sinking sixteen or eighteen feet into the soil. The Pharaonic temples were laid upon the surface, rather than rooted in the soil. Mariette attributes the destruction which has overtaken the temples at Karnak less to the violence of man or to earthquakes, than to inherent faults of construction and to the want of foresight shown by their architects in not placing them at a sufficient elevation above the inundations. . . . In

many buildings the Egyptians employed methods which demanded no little patience, skill and attention from the workman; but as a rule they preferred to work in a more expeditious and less careful fashion." So another traditional idea with regard to Egyptian building is exploded; this time one which was to their credit and not to their dispraise. The pages regarding the knowledge and use of the arch among the Egyptians are most valuable, as are those longer ones which immediately follow, devoted to the pier and column. M. Perrot does not directly controvert the idea that Egyptian architecture was derived from the excavations in the rock, which some suppose to have been the first attempts of local builders. He prefers simply to show how the different forms used in later days grew up: most of them, including the column, from the wooden architecture which was the first-fruit of the soil, and others, as the square pier, from the tombs, which were undoubtedly the Egyptian architect's first essay in lithic work, an essay in which he labored naively and rationally, not imitating any one or anything, but merely making the best he could, in the simplest way, of his material. In all probability the two methods of construction subsisted for long, if not always, side by side; wood, either alone or in combination with metal, being largely used even after stone construction had been completely elaborated. In examining into the probable details of such constructions, M. Perrot cites much evidence from the painted bas-reliefs on tombs, etc., and cites it, I cannot but think, with rather more confidence than is justified by our knowledge of the untrustworthy nature of similar evidence in other days and lands. He gives a number of most impossible and



Columns from Bas-reliefs.

fantastic illustrations of capitals, which he says could only have been executed in some metal like bronze, but which, I should say, could never possibly have been executed at all, in any material. He adds, it is true, "the natural tendency in painted decorations of this kind to exaggerate the character of their models must not, however, be overlooked. Not being compelled to apportion the strength of supports to the weight they have to carry, they are always inclined to elongate forms. The decorations at Pompeii are a striking instance of this. Pompeian painters gave impossible proportions to their columns, which evidently existed nowhere but in their own fancies. We admit that Egyptian decorators did something of the same kind, that they exaggerated proportions and accumulated motives on a single capital which were not to be found co-existing in reality. But with these reserves we think it more than probable that the columns shown in their paintings have preserved the general aspects of the supports employed in those curiously elegant pavilions to which they belonged." Perhaps so; but it seems to me

equally likely, judging by the works of painters and decorators in all other ages, that the artists in question not only altered the proportions of the columns they professed to portray, and "accumulated motives" as architects had never done, but also that they created forms out of the depths of their own consciousness which had actually nothing that could be called prototypes in existence. Any one who has looked much at mediæval missals and manuscripts, usually painted by ecclesiastics who were working side by side with the constructive artists of their day, cannot fail to have been struck by the extraordinary divergence of the pictures from the buildings. It is usually so great that it looks like absolute wilfulness, and not like the ordinary ignorance which might be expected from artists as naïve as those of the Middle Ages.

There is, for example, a large colored plate in the first volume of Kugler's "*Kleine Schriften*" which well exemplifies what I mean, and a thousand such testimonies may be collected from any book dealing with mediæval illustrations. No one who knows them would think of turning to them for evidence as to what was done in their day or had been done before them; and as little, it seems to me, can we depend for information, however qualified our trust, upon the decorative scribes of Egypt—for such were the men who covered her wall-spaces with sculptured and colored records. In other points they could paint so truthfully that their evidence is of the utmost and exactest historical value. But the same, to a less degree, is true of the mediæval illuminator. There seems to be a fatality about architectural forms: they seem to have a way of escaping the observation of non-professional or non-artistic observers, as do details in no other field whatever. From these earliest Egyptians down to Gustave Doré and the modern scene-painter, it is the same thing. It would be both more natural and more easy, it might seem, to paint correctly, or at least to approximate to the truth; but even the most distant approximation is an exception to the rule of fantastic invention and impossible falsification.

On the use of metal in Egyptian architecture generally, and particularly as to its employment on occasion in overlaying the stone capitals of columns, there is much that will be entirely new to almost every reader, being founded on the testimony of the most recent excavations. Another interesting point which M. Perrot enforces, and

which tends directly against, it seems to me, the old hypothesis that rock-hewn buildings were the prototypes of later structures, is explained in the following abridged paragraph. "From the rise of Greek architecture until its decay, the proportions of its vertical members underwent a continual and consistent modification of their proportions. Century after century the figure in which their height was expressed proportionately with their bulk became greater. . . . Such a development is not to be found in Egypt. The forms of Egyptian architecture did not become less substantial with the passage of the centuries. . . . The polygonal and faggot-shaped columns of Beni-Hassan are no thicker than those of far later times. A comparison of the columns at Thebes points to the same conclusion. The shortest and most thick-set in its proportions of them all is at Medinet-Abou, and is about two centuries later than those of the same order which ornament the second court at Luxor. Its heaviness is even more apparent when we compare it with the great columns of a different order at Karnak and the Ramesseum, which precede it by at least a century."

M. G. VAN RENSSLAER.

THE ILLUSTRATIONS.

COMPETITIVE DESIGN FOR THE NEW ORLEANS COTTON EXCHANGE.
MR. MAX SCHROFF, ARCHITECT, NEW YORK, N. Y.

HOUSE FOR R. ELTON MILLS, ESQ., HIGHLANDS, NEWPORT, KY.
MR. O. C. SMITH, ARCHITECT, CINCINNATI, O.

COTTAGE FOR W. C. CLARKE, ESQ., RIDGEFIELD, N. J. MR. B. L. GILBERT, ARCHITECT, NEW YORK, N. Y.

THE ALCANTARA AND SAN MARTINO BRIDGES NEAR TOLEDO, SPAIN. SKETCHED BY MR. R. W. GIBSON, ARCHITECT, ALBANY, N. Y.

For description see article on "Spanish Architecture."

ARTISTS' OPINIONS HELD TO BE FACTS.



First and Second Prizes of the Annual Exhibition, 1884, Philadelphia, Pa. McQUAY, SCULPTOR.

JUDGMENT was delivered on Saturday last in the case of *Belt vs. Lawes* in the Queen's Bench Division. Application had been made on the part of the defendant for a new trial, on the grounds of misdirection and the excessive damages (£5,000). Mr. Justice Manisty and Mr. Justice Denman were of opinion that there was no misdirection, but agreed that the amount of damages should be reduced to £500, with costs, otherwise an order will be made for a new trial. Lord Coleridge, on the other hand, was of opinion that Baron Huddleston's charge to the jury was wrong in principle, that the damages were extravagant and excessive, and that there was a serious miscarriage at the trial. On the relative value of an artist's and a lawyer's opinion on an art subject the following remarks of the Lord Chief Justice are worth consideration:—

"An importance in some respects altogether exaggerated has been imported into the case. Under ordinary circumstances, whether a public writer was or was not justified in saying of a man that he was not a sculptor, but an ingenious and successful sculpture-broker, who presents to the public as his own work which has been invariably designed and executed by other hands than his (for this is the real gist and substance of the alleged libel)—this was a question hardly, in itself, worth the expenditure of very large sums of money and forty-three days of the public time. But some of the very greatest names in the country have been involved, either personally or by reference, in the discussion. The Royal Academy has itself, so to say, been put upon its trial; and the case has assumed proportions and an importance quite incommensurate with the issues which it alone necessarily raised. The artistic character of the President will, I hope, survive the scathing criticism to which it has been subjected by my brother Manisty, but in that and other respects I intentionally abstain from making any reply to observations which, to my mind, were uncalled for, and which I therefore abstain from commenting on in any way. I will try not to add to the mass of the proceedings, and in giving my reasons for thinking the present verdict unsatisfactory I mean to be short and general. In one instance only shall I particularize the evidence which appears to me to be unsatisfactory, and in that case because it is a document which cannot be altered, though it may be argued about upon a second trial. Generally speaking, I desire to avoid detailed criticism upon evidence with which I am dissatisfied, for it almost always happens that the criticism is met by change. The evidence at the second trial is what a judge may say it might have been, or ought to have been, upon the first. I have already stated what I conceive to have been the true question in the case; it is perhaps better that I should also state what I conceive it was not. It was not whether Mr. Belt could make a passable model—one which to an uneducated or uncultivated eye would pass muster as a piece of sculpture. Most men of the least dexterity of hand could do as much as this. The question was not this, but whether fine works of art, admitted on all hands to be so, were really his work or the works of other men; and

as to this, again, not whether, in the long course of work upon them, he may not now and then have actually handled the clay, or even carved the marble, but whether the completed work, the art in them, when they had art—what I believe logicians call the 'formal cause' of them—that which made them what they are—was Mr. Belt's work or another's. Now this distinction is, in this case, of the last importance, because in sculpture, in the long and various process from the slight clay sketch or drawing, to the completed marble, there is so much which is necessarily mechanical, and which a competent carving mason can do just as well as a Phidias or Michael Angelo. Help, therefore, up to a certain point, every sculptor, from the highest to the lowest, has, or may have, with absolute integrity—indeed, with universal knowledge and acceptance. But there comes a point in the modelling, and I should have supposed, but for what I have heard of Flaxman, there comes a point in the carving, too, where mechanism ends and original art begins. I imagine that this point is almost impossible to state in words with any approach to accuracy. I certainly will make no attempt of the kind, for I have no pretensions to, and disclaim altogether, any artistic knowledge. I have it not, and if I had it I think I should have no business to apply it. The law has said that a jury who may know nothing, and a judge who may know nothing too, are to determine, if necessary, as facts abstruse points of science or subtle and delicate questions of art. It is all the more important, therefore, that what is fact in such a matter as this should be clearly understood, and that what are the true principles of judgment should be correctly laid down. There comes then, somewhere and at some time in the process of sculpture, the point at which help ceases to be honest; when the real artist gives character to his work; when mere labor ends and execution begins. I deprecate the use of fine language to conceal cloudiness of thought; and if I seem to use it, it is only because I despair, as I have said, of describing with any accuracy a fact which is a fact, but which is to be felt rather than expressed. Yet this fact—whether Mr. Belt had help which was not honest—is cardinal to the cause. If he had not—if he had no more help than every sculptor has or may have—then he is a real sculptor, and is (subject to a subordinate question as to the amount of damages) entitled to keep his verdict. If the evidence shows that he had such help, that the completed works which he put forward as his own were not his own in character nor in art, then he is a mere sculpture-broker, the verdict is wrong, and the case should be tried again. I have said 'if the evidence shows,' because I conceive the issue to be one of fact, but fact of a peculiar kind, and that the evidence to establish it must likewise be evidence of a peculiar kind. Now the character or genuineness of works of art is not, in my judgment, a matter of opinion. Anything, no doubt, may be said to be matter of opinion as to which men will not take the trouble to inform themselves. But a knowledge of art is like a knowledge of science; it is matter of education and experience; and it seems to me that you might almost as well disbelieve a body of astronomers, who tell you that the earth moves and the sun stands still, on the ground that very eminent members of society tell you, as a fact, that they have seen the earth stand still and the sun rise up in the east and go down in the west, as disbelieve a body of great artists who tell you that the same man did not make two works of art, because persons very high in the social scale, but with no knowledge or training in art, tell you as a fact that they saw the same man at work upon them.

"It is what I think (with deference) the fallacy of opposing 'fact' to 'opinion' in this matter that constitutes, to my mind, the error of the summing-up of my learned brother, and which has led the jury to a conclusion against the weight of the evidence. I do not doubt that one fact is worth twenty opinions, 'fact' and 'opinion' being each used in its proper sense. But the words are not used in their proper sense if 'fact' is confined to the physical fact of working manually on a bust, and the scientific conclusion of a body of men as to an artistic fact is called 'opinion.' It is not 'opinion' at all; it is evidence of fact. No one who has ever been honored with the intimacy or enjoyed the society of artists but must be aware how many things we overlook in works of art which are before our eyes, which are there, indeed, to be seen, but which it needs training or instruction to see. A copy and the original stand side by side, and a man of ordinary education can see no difference between them. A great artist comes, decides at once which is which, and decides it on grounds which are conclusive to the man of ordinary education, but which, nevertheless, he would never have discovered for himself. I do not call this his opinion: I call this fact.

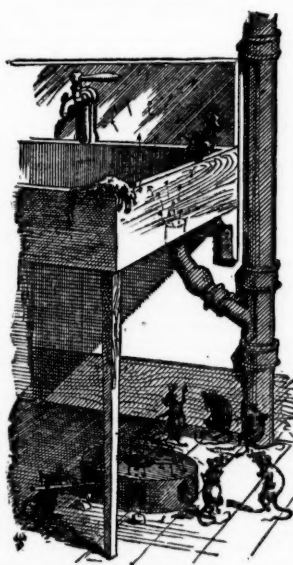
"Northcote the painter relates in his 'Conversations' that Lord Kenyon, in a trial before him as to the genuineness of an engraving, listened with infinite respect to the evidence of the Academicians of that day, and told the jury that there was a great deal in this that he had no idea of, and that he supposed they were satisfied with the evidence of the artists. Lord Kenyon probably knew little of engravings, but he knew there was a great deal to know, and he listened to and followed those who could teach him. It seems to me that the question in this case was a question of fact; that there was a practical agreement upon it on the part of the witnesses best qualified to speak; that they were witnesses to fact, call it a fact of science or a fact of art; and that their evidence ought to have been, not in theory, but practically decisive. Now this was not the view taken by my learned brother. He opposed fact to opinion in a sense which, with all respect, I think erroneous, and having once done so, the remarkable power and ability which his summing-up displays,

and which any old antagonist of his at the bar will well remember, were all the more certain to mislead the jury. Whether this is technically misdirection I really will not stop to inquire, but that he most powerfully impressed the jury with what I think a view of the evidence wrong in principle, and wrong in a point cardinal to the cause, I have no doubt. Of course, if it could be fairly suggested that a body of men such as the Academicians called in this case were corrupt or dishonest, that they gave their evidence not *bonâ fide*, but from an unhandsome wish to oppress a brother artist, such considerations as these were very proper to be put forward, and would be rightly taken into account. But in this case for such suggestions there is absolutely no ground. If Mr. Belt seriously for a moment entertained the idea that the eminent men who, unwillingly and under a *subpœna*, and without preliminary examination, gave evidence in this case, gave it from a fear of his rivalry or from a jealousy of his talents, his vanity amazingly misled him. The suggestion, to my mind, is utterly absurd. While fully, therefore, admitting the weight of such considerations—if they existed—I must add that there appears to me no reasonable ground for even suspecting their existence. I do not go at length into other questions.

It is understood that the compromise suggested by the two judges has been adopted. — *The Architect*.

SANITARY PLUMBING.¹—XVI.

(2) Anti-Siphonic Traps.—General Considerations.



Peculiar form of trap found under all the sinks of a tenement-house whose landlady had received orders from the Board of Health to have "traps put under every plumbing fixture."

of the water-seal of traps are siphonage, momentum, back-pressure and evaporation. In constructing a trap each of these must be considered separately as influencing its form. The water-seal of a trap consists always of two parts, having their surfaces on the same level, one on the house side and the other on the drain side of the trap, the two parts being separated by a depression in the walls of the trap.

Siphonage.

In the action of siphonage a partial vacuum is formed in the waste-pipe with which the trap is connected. This is equivalent to a diminution of the atmospheric pressure on the drain side of the trap, which produces precisely the same effect as would a corresponding increase of pressure on the house side of the trap. The water in the trap offers very feeble resistance to this increased pressure of the atmosphere, and the result is that the air passes through it until an equilibrium is restored. Our problem is to discover how a trap can be formed so that the water will not be driven out in advance of the air. One way in which this may be accomplished is illustrated in the reservoir traps. The body of the trap is made so large that the pressure of the air coming through the comparatively small inlet-pipe can act only on a correspondingly small part of the water in the trap. Hence only that part directly in front of the air column is driven out by it, the remainder falling back into the trap. The length of time required to siphon out a pot-trap depends upon the size of its body. If the siphonic action were long and strong enough any pot-trap could be siphoned out in time. There is nothing in the principle of its formation preventing the ultimate destruction of its seal under powerful enough tests. But under usual conditions pot-traps of the ordinary size may be considered perfectly safe. These traps being, however, not self-cleansing, are objectionable. They are, moreover, heavy and expensive.

The other way to prevent the waste of the water-seal by the passage through it of the air-current during siphonage is to give the trap such a form that, without increasing the sectional area of any part, the water shall be entirely reflected back and separated from the air before it reaches the outlet. The accomplishment of this involves a careful study of the peculiar properties of the two fluids under siphonic action, a thorough understanding of the laws which govern their movement, and a utilization of the forces which are the result of these laws. The difference in the specific gravity of the two fluids furnishes us with the most important element which can be turned to our advantage. The preponderance of the weight of water over that of air, and its consequent preponderance of momentum under equal rapidity of motion, gives us a reliable means of separating the water from the air in its passage through a properly constructed trap as simply and unfailingly as grain is separated from the chaff in the win-

nowing-machine. The relative attractive and cohesive forces of the particles of the two fluids present other distinguishing characteristics which are not to be lost sight of.

Self-Siphonage and Momentum.

Self-siphonage takes place when the waste water flows through the trap full bore from the fixture. As usually constructed, wash-basins have outlets far too small in proportion to the size of the waste-pipe and trap. The basin outlet and coupling are very seldom over one inch in diameter in the clear, inside measure. The strainer cuts off a considerable portion of this small passageway, and the hairs, lint, and other sediment which soon invariably collect on the strainer cut off another large portion, leaving an outlet about equivalent to a half-inch or five-eighth-inch pipe. The waste-pipe and ordinary S-trap are usually $1\frac{1}{2}$ " or $1\frac{3}{4}$ " in diameter, so that the stream of water admitted to flush and scour them is reduced to less than a quarter or a sixth of their capacity, and we wonder why our trap and waste pipes are never thoroughly scoured. An S-trap is no more self-cleansing when the water stream admitted is less than a quarter or a sixth of its capacity, than would be an ordinary pot-trap having a stream of the same size relatively to itself passing through it. In other words, a $1\frac{1}{2}$ " S-trap attached to a half-inch waste flowing full-bore, or to a waste having a half-inch inlet, is no more self-scouring than would be a three-inch pot-trap attached to a one-inch waste also flowing full-bore, or than would be a four-inch pot-trap attached to a $1\frac{1}{2}$ " pipe, or a five-inch pot-trap to a $1\frac{3}{4}$ " pipe, provided the inlet and outlet pipes were attached close to the top and bottom of the trap and the edges of the pot were well rounded.

This is a consideration of great importance, but one which appears generally to be lost sight of, and our plumbing-laws are defective in its omission. It is one of the principal causes of the collection of sediment in branch wastes and ordinary S-traps which have a false reputation of being universally self-scouring. They are only so when properly set, and when the waste water from the fixture is permitted to flow through them rapidly and full-bore. It cannot pass through the trap rapidly unless it is set at some little distance below the fixture. It cannot pass full-bore unless the outlet and strainer give an open water-way greater than that of the waste-pipe and trap. It should be greater in order to allow something for friction and sediment. A trap having a very deep seal retards too much the rapidity and strength of the water current passing through it; hence, it should be made as shallow as possible consistent with other requirements.

Assuming now that we have properly set our trap in such a manner that a rapid stream of water passes through it full-bore whenever the fixture is used in a legitimate manner (*i. e.*, with the outlet closed during use), we shall find that, where an S-trap is used, a siphon is formed by the outflowing waste water which, without ventilation, breaks the seal of the trap. Hence, the vent must be placed either at the crown or near enough to it to break the longer leg of the siphon. The momentum of the falling water assists the action of self-siphonage, and it is necessary for perfect protection against these two forces to place the vent very near the crown.

To make a practical test of the truth of this, the writer had a wash-basin constructed with an outlet large enough to fill a $1\frac{1}{2}$ " waste-pipe and S-trap full bore. Through this outlet the basin was emptied in $2\frac{3}{4}$ seconds, and the seal of the trap was completely destroyed by the siphonage and momentum of the falling water. The trap was an ordinary cast-lead trap, having the usual seal of $1\frac{1}{4}$ ", and was connected with a waste-pipe of the same size with the bore of the trap. With a waste-pipe very much larger or smaller than the bore of the trap the seal is not so easily broken by self-siphonage, for obvious reasons.

Back-Pressure.

With properly-ventilated soil-pipes and drains back-pressure cannot be caused by the expansion or compression of the air in the main sewers. It can only come from influences acting within the house itself, and affecting the atmospheric condition of the waste-pipes inside of the main house-trap. These influences are: first, the compression of the air in the main soil-pipe by waste water passing through it; second, the pressure of the wind; and third, the suction of open fires and ventilating outlets throughout the house.

If a large body of water is thrown suddenly into the soil-pipes from one of the upper fixtures in a house, it drives the air in advance of it as it falls like a plug through the pipe. Were there no resistance to the passage of the air, such as is caused by friction, or by a sudden bend in the pipe, the air would pass through a properly-ventilated pipe in front of the water without compression; but the rough interior of the soil and waste pipes, and sudden bends in their direction causes considerable resistance to the escape of the air in advance of the water, causing condensation of the air, and giving rise to the so-called "back-pressure" in traps, which is sometimes powerful enough to drive the water out of them in a sudden jet. The writer has completely emptied a four-inch pot-trap having a seal four inches deep, by this action, even though the soil-pipe was properly vented at the top and bottom. A much lighter back-pressure suffices to throw the water out of an ordinary S-trap. Fortunately, however, a very simple remedy exists for back-pressure caused by falling water. The back-pressure produced by the sides of the soil-pipe, and by sudden bends therein, even when taken at a maximum (that is when the water-plug fills the pipe full-bore, and the test is made at the bottom of a long stack of pipes and just above a bend of 90° in the direction of the

¹ Continued from page 34, No. 421.

water), never exceeds a few ounces to the square inch, and may easily be resisted by a column of water from 12 to 18 inches in height. Hence, a trap which is completely emptied by this back-pressure when standing alone, as shown in the accompanying Figure 65, as traps are usually tested in laboratory experiments, will easily resist the pressure when attached to and placed some little distance below a fixture, as shown in Figure 66, or when the inlet arm is simply lengthened, as shown in Figure 67. With a common S-trap the resistance to back-pressure in Figures 66 and 67 is twice as great as in Figure 65. The limit of resistance of an S-trap is the weight of a column of water twice as high as the depth of its seal. With a pot-trap the power of resistance is much greater, since it contains water enough to rise under the influence of back-pressure to a very considerable height in an inlet-pipe. Now, so far as the writer's tests have shown, the severest back-pressure that can possibly be brought to bear upon a water-trap in the plumbing of buildings having properly ventilated soil and drain pipes, can be resisted by a column of water from 14 to 16 inches high. Hence, if a trap in such a building is placed under a fixture in such a manner that the



Fig. 65.

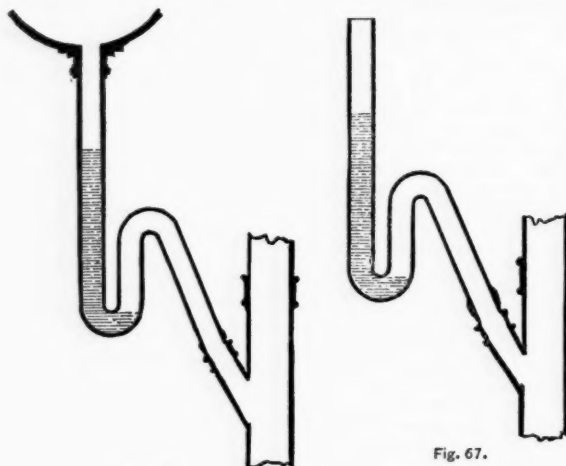


Fig. 66.

bottom of its seal shall stand from 14 to 16 inches below the outlet of the fixture it serves, it may be considered perfectly safe against loss of its seal by back-pressure. Moreover, it will be found that if the column of water in a trap is high enough to resist this back-pressure it will entirely exclude the entrance of the sewer-gas or soil-pipe air so compressed in the pipes. In other words, the air will not, under such circumstances, ever be driven through the water column in bubbles, as is sometimes feared.

Hence, in setting traps under kitchen sinks where back-pressure from water falling from fixtures above is to be feared, the traps should always be placed low enough below the outlet of the sink to permit of the formation of a water column high enough to resist the back-pressure. Otherwise the water may be blown out of the trap into the sink and sewer-gas will follow. The writer has heard of a case of diphtheria and death which was attributed solely to this cause.

Evaporation.

With unventilated traps evaporation goes on with extreme slowness, and with traps containing a considerable body of water no danger from this cause need be anticipated, unless the building is left unoccupied and unwatched for years at a time. The effects of evaporation will be more fully considered hereafter. At present it is sufficient to say that in the construction of our trap care should be evidently taken to give it as large a water capacity as is possible, consistent with other requirements.

A PAMPHLET ON LIBRARY BUILDINGS.

TORONTO, ONT., January 19, 1884.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—I am anxious to obtain a copy of the pamphlet on library-buildings, by Mr. Smithmeyer, commented on in your issue of January 5. If you have not the book, would you let me know where it is to be had? Yours truly, H. B. GORDON.

[MR. J. L. SMITHMEYER, who, so far as we know, can alone furnish the desired information, may be addressed at 703 Fifteenth Street, Washington, D. C.—EDS. AMERICAN ARCHITECT.]

SCHOOL-HOUSE BUILDING.

OMAHA, NEB., January 18, 1884.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Gentlemen,—Will you kindly favor me by stating in your next issue what you consider the best work or works on the construction, heating, and ventilating of school-buildings?

Yours truly,

G.

[A PAMPHLET by T. M. Clark, issued by the Bureau of Education, Washington, is perhaps as much to the purpose as anything. Box's "On Heat" and Putnam's "Open Fireplace" contain much practical information; also, the exhaustive papers by Dr. Billings that have been published in the *Sanitary Engineer* during the past two years.—EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS.

EXPLANATION OF THE AZTEC CALENDAR.—At a recent meeting of the California Academy of Sciences, held at San Francisco, Eusebio Molera, a graduate of the University of Madrid, who has distinguished himself by his antiquarian researches, read a paper on the Aztec calendar or Mexican calendar-stone, from which an insight has been obtained of the extent of the astronomical knowledge of the Aztecs. The stone was unearthed in the city of Mexico on the 17th of September, 1790, and was placed in the base of one of the towers of the cathedral, where it remains to this day. The stone is eleven feet nine inches in diameter, and originally weighed twenty-four tons. The conjectures of a number of antiquarians in relation to this object were reviewed by Molera, who described its prominent characteristics by means of a painting of the same size as the original, which was prepared by himself. The central figure was a picture of the sun's face, a distorted human countenance, and about it were geometrical signs, and figures of animals, reptiles, birds, and specimens of vegetation. There were characters the interpretation of which presented a history of the creation of the earth. There was a period where there was no sun, and the tigers came out of the woods and devoured everybody. After a time the sun "died again," and there were great hurricanes of wind, causing men to perish. Another age was that of the flood, when everything was submerged; and the last epoch was that of fire, and men became birds. Around and about these central figures were cycles containing representations of the days of the month, the days of the year, and other peculiarities. Some antiquarians thought that it was a calendar-stone, but Mr. Molera had an idea that it was designed for one of the sacrificial stones on which captives were slain, their hearts being offered to the sun. He believed it was constructed under the second Montezuma, who, having done nothing to perpetuate his name, determined to construct a sacrificial stone, the same as his predecessors had done. He wanted to make it larger than any of the others, and gave orders that it be two elbows larger than they were. The Indians began hauling the stone, which finally said it would not go any farther. There were ten thousand Indians pulling the stone, and the ropes broke, and the stone would not move. This the historians cite, to show that supernatural phenomena were connected with the event. However, it appears that the stone was really brought to town, and it was so heavy that it broke the canal and fell down.

PREHISTORIC PITS IN OREGON.—A. F. Johnson writes to the *Oregonian* that eight miles above the mouth of the Sandy River, and about twenty-five miles from Portland, may be found what are clearly the works of a race of men other, if not more ancient, than our present Indians. At the point named the Sandy sweeps around a ridge, and traversing a distance of probably a mile and a half, describes a figure not unlike an ox-bow. At the narrowest point this peninsula is about forty rods across, and at the highest point is probably two hundred feet above the level of the river. Here, at intervals of fifty feet, are a series of shafts or holes, each of which covers an area of, say, 6' x 20', and judging from the embankments formed on the sides (the dirt is deposited only on the sides) must have been a dozen feet in depth. These excavations are ranged in a straight line entirely across the peninsula, and, what seems remarkable, in every case the longer axes point at right angles to the line of excavations. Just how ancient these works are it is, of course, impossible to determine, but that they existed prior to the great tornado that swept over this valley about two hundred years ago, and has left its footprints everywhere, is evident. Nor can it be that the labor necessary to the accomplishment of these works was expended by our present labor-despising Indians. But for what purpose this forgotten race toiled for so many weary days, who these ancient workers were, whence they came, when they disappeared and why—these are problems for the antiquarian which time may never solve.

STEAM AS A FIRE-EXTINGUISHER.—The frequently proposed application of steam for the extinction of fire has recently met with a practical application in a steel-pen manufactory in Berlin. The owner of the factory, in consequence of frequent conflagration in the drying-rooms for wooden pen-holders, had three small steam-pipes, in connection with the steam-boiler of the establishment, fixed in three such rooms. The ends of the pipes were closed by a short piece of pipe made of an alloy of lead and tin, which would quickly melt should fire break out, when steam would at once rush out. To prevent the steam inside the pipes from hindering the melting of the ends, the latter were filled with resin. Quite recently the stoker was warned by a hissing noise that fire had again broken out in one of the drying-rooms; and when it was entered, it was found that such was the case, but that only a small portion of the contents had been destroyed. The other combustible materials in the room, frames, walls and floors, were found to be only saturated with the condensed steam, a portion of the pen-holders still smouldering. The heat caused by the breaking out of the fire had melted the ends of the pipes, and thus caused the steam to escape, which had extinguished the conflagration at its commencement without the intervention of the hand of man.—*Cotton, Wool and Iron.*

NATURAL GAS IN THE EDGAR THOMSON STEEL WORKS.—The Pittsburgh Dispatch says: "This week the experiment will be made of operating the Bessemer Steel Works at Braddock by the use of natural gas as fuel. The work of laying the pipes from the Murrysburg well to the works has been pushed forward rapidly and is almost complete. Some little delay was occasioned, owing to the objection of the Pennsylvania Railroad Company to the laying of the pipes under their tracks, but it is understood that this obstacle has been overcome, and that the work is now in such an advanced state that connection will be made with the boilers of the works within a few days. The establishment has in use one hundred boilers, which are to be heated by means of the natural gas which flows from one of the best wells at Murrysburg. It is thought that if the experiment proves a success it will cause a revolution in the use of natural gas as fuel. Thus far no attempt has been made to operate an establishment of such gigantic proportions as the Edgar Thomson works with natural gas, which fact attaches considerable interest and importance to the experiments. Should it prove a success, it is said that the Bessemer Association which controls all the Bessemer works in the United States, may adopt the same system of heating at other works wherever feasible. The company making the experiment is composed of John Doubleday, George Boulton, John Hoffman and other well-known operators in the oil regions."

PAINTING IRON.—The value of red-lead as a preservative for iron has been generally accepted. Wrought-iron requires a hard and elastic paint, which will hold itself together even if the scale beneath gives way. The following experiments made under the auspices of the Dutch State railroads, may be instructive. Iron plates were prepared for painting as follows: Sixteen plates pickled in acid (hydrochloric), then neutralized with lime (slaked), rinsed in hot water, and while warm rubbed with oil. The same number of plates were cleared of scale, so far as it could be removed by brushing and scraping. Four plates from each set were then painted alike—namely, four plates with coal-tar and four plates with iron-oxide A, another set with iron-oxide B, and the remaining set with red-lead. They were then exposed three years, and the results observed were as follows: The coal-tar on the scrubbed plates was quite gone, that put on the pickled plates was inferior to the others. The iron-oxide A on the scrubbed plates was inferior to the other two, while on the pickled plate it held well; the oxide B was found superior to that of A, but inferior to red-lead, while the plates covered with red-lead stood equally well on both prepared plates, and were superior to all others. From these results it is evident that pickling the iron removes all the black oxide, while scrubbing does not. It is also shown that the red-lead unites with oil to form a hard oxy-linseed oil acid soap—a harder soap than that given by any other combination. The red-lead is shown by these experiments not to give way under the scaling; it is more adherent to the surface, more elastic and cohesive. On the Cincinnati Southern Railroad, experience extending over some years has shown that red-lead has proved the most durable paint in the many miles of iron trestle and bridge work. It is found that the iron oxide is washed away by the rain, and perishes in spots, although a valuable paint if frequently renewed. Red-lead, on the other hand, is more expensive than iron oxide, and is difficult to be obtained pure. It is adulterated with brick-dust, colcothar, and other substances, and has lost its high repute. Referring to white-lead as a material for painting iron, one authority observes, that "white-lead should not if possible be used in priming iron, nor in any priming coat; moreover, it is a less desirable overcoat than iron oxide." The class of iron paints compounded of ores of natural iron-rust, combined with clay or some other form of silica are very useful, as they contain no water nor sulphuric acid. Magnetic oxide or pure iron oxide is an excellent protection for iron, says one writer; it is impossible to scrape it off. It is also of value in wood-work, and resists the action of salt water and sulphurous gases so destructive to most paints. There is no doubt the great protective element in paint is the oil, and the conditions required for success are stated to be to prevent the drying part of the oil from becoming hard and dry; the soft-keeping, non-drying acids must be kept from flying away in such a quantity as to reduce the oil to a brittle mass. In other words, the elastic qualities of the oil must be protected from the action of the oxygen.—*Building News.*

VIENNA'S PARLIAMENT HOUSE.—Tomorrow the Reichsrath, or Imperial Parliament, assembles for the first time in its new building, which, although not quite finished, is in a sufficiently advanced state for occupation. Thus, for the first time since Parliamentary institutions have existed in Austria, both houses of Parliament will sit under the same roof, and not many legislative assemblies in the world can boast of a more magnificent palace than that which is to be opened to-morrow. Like all the new public buildings in Vienna, the Parliament House stands on the famous Ringstrasse. It covers an area of over three acres of ground, and the style is a kind of Greek Renaissance. The new building forms part of a very noteworthy and striking collection of architectural triumphs. It faces an immense square, which contains the recently-opened Town-Hall in the Gothic Renaissance style, and just opposite is the new university, in Italian Renaissance, while the new Hof Bergtheatre, still under construction, in the style of the gayest early Italian Renaissance, faces the Town-Hall. Many other splendid buildings are scattered right and left of this noteworthy square; for instance, the famous Votiv-Kirche, in the purest French Gothic style, the new Palace of Justice, and the two imperial museums; but what distinguishes the new House of Parliament from all its neighbors is that standing on the sloping terrace in front, one overlooks at a glance not only the palatial buildings just mentioned, but a considerable part of the old city with the ancient Cathedral of St. Stephen. The front of the house is a combination of three Greek marble temples in the purest style, the middle one, which is the largest, forming the entrance to a centre hall of extraordinary splendor, while those on either side serve as entrances, that on the left to the House of Lords (*Herrenhaus*) and that on the right to the House of Commons (*Abgeordnetenhaus*). The length of the entire front is 608 feet, and the width of the building 433

feet. The above mentioned State Hall, separating the two houses from each other, is 76' x 135', and its height is 43 feet. Its crystal-glass ceiling rests on 24 monoliths of red marble, with gilded capitals, each of these columns being 27 feet high, and the walls are covered with a profusion of gold, marble and other costly materials. On the other hand, and in contrast to all this splendor, the assembly-rooms themselves, to accommodate which the whole palace was erected, show a marked degree of poverty, not only in their adornments when compared with this hall, but especially in the matter of space. It seems to be the fate of modern architecture to answer well for any other requirement than usefulness and practicability. The lower chamber, for instance, which, like the upper, is built in the form of a semicircle, contains five seats less than the present number of members; and as it has long been in contemplation to increase this number by at least a fourth, the absurdity is very marked. The lower chamber as it now stands has 354 seats and the upper house 192. The building comprises also several committee-rooms, rooms for party-meetings, refreshment-rooms, reception-rooms for the Presidents and Vice-Presidents, etc., but the galleries for the public in the people's chamber are ridiculously narrow, although in Austria the sittings of Parliament are unrestrictedly public, and the places for the representatives of the home and foreign press are so few in number that it will be considered a rare distinction to be admitted either permanently or occasionally. The works have already been in progress for nine years, and when all the gilding, and painting, and embellishing is completed the cost will amount to 10,000,000 florins, or over £300,000.—*London Standard.*

M. BORNICHE'S MANIA FOR PICTURES.—At the Hôtel Drouot, in Paris, there was lately sold at auction the first instalment of eight thousand oil paintings, which form a portion of the seventeen thousand paintings collected by the late M. Borniche during his lifetime, and which his daughter, who inherits them, has ordered to be sold. This collection is probably the largest ever accumulated by a private individual, and very likely exceeds that of any public gallery. M. Borniche, having acquired a fortune in the lumber trade, occupied the first floor of his magnificent apartment-house in the Rue de Rivoli. He began by buying one or two pictures, and then, gradually acquiring a mania for art-purchases, bought picture after picture from whatever artist brought it. The painters of Paris hailed him as a perfect god-send, and formed a line at his doors with their offerings under their arms. The tenant of the *entre-sol* complained of this blockade before his doors, and his landlord simply gave him notice to quit. After that the painters took possession of this portion of the house while waiting to be called upstairs to their patron. Every possible space in the rooms and corridors of the first floor being crowded with canvases, the tenants of the second, third and other stories were successively forced to move so as to provide room for the invasion of pictures. M. Borniche's greatest delight was to purchase such works of art as had been rejected by the *Salon*, and he exhibited one of these with a tag attached to it defying any member of the judging committee of the *Salon* to paint as good a one. He was greatly flattered at having the title *Mæcenas* conferred upon him by the not altogether candid artists whom he patronized. Fortunately for them, his purse held out as long as he lived, and shortly before his death, which occurred only recently, he was making preparations to build a museum, to be called *Musée Borniche*, not far from the *Musée de Cluny*. He intended to expose all his paintings there, and permit them to be seen by everybody, free of any charge. Of course in such a heterogeneous mass of paintings there is a good deal of absolute trash, but the number of real works of art is sufficient to make the sale one of the most important that has ever taken place.—*New York World.*

THE USE OF LIME-CARTRIDGES IN COAL MINES.—At the meeting of the Manchester Geological Society, on November 13, a paper was read on the use of lime-cartridges in coal mines, which described the process that had been adopted by Messrs. Smith & Moore, at their Shepley Collieries, Derbyshire, where the use of powder has been prohibited after a disastrous explosion in their mine. The great cost of wedging the coal induced Messrs. Smith & Moore to experiment with the view of utilizing the expansive power of lime as an efficient agent for breaking down coal, and the result had been most successful. They had been enabled to secure absolute immunity from danger of explosion of gas; greater safety in the working places, as it was unnecessary for the workmen to retire while the charges were being exploded; economy of timber, as the roof was in no way affected or shaken; a very much greater percentage of round coal; while the collier was enabled to work not only without the laborious process of breaking down the coal by wedges, but avoided the numerous accidents consequent upon their use. In the manufacture of the cartridges nearly pure carbonate of lime was used; this was compressed by hydraulic power, and the die in which the cartridges were formed was two and one-half inches in diameter and seven inches in depth. A pressure of forty tons was applied simultaneously at both ends of the column, which was reduced from seven inches to four and one-half inches in length. The cartridge was then wrapped in paper, and was ready to use in the mine. For drilling the holes in which the cartridges were placed, a light boring machine was used, the holes varying according to the hardness of the coal, the average depth of the holes being three feet six inches, and the distance apart four feet six inches. The drilling occupied from twelve to twenty minutes, and the cartridges were then placed in the back of the hole, groove uppermost; a tube having six perforations, about four inches apart, was inserted, the hole was stemmed up, and a quantity of water was forced in by means of a small hand-pump. The generation of steam and expansion of the lime commenced almost immediately after the water reached the cartridges, and the time taken by the lime to bring down the coal varied, according to hardness and position of the seam, from fifteen minutes to three-quarters of an hour. It had been stated that the heat produced by the slaking of the lime was sufficient to ignite gas, but this had been altogether disproved by special experiments made for that purpose.

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.]

- 291,883. FAUCET.—Joseph H. Dorgan, Plattsburg, N. Y.
 291,910. FIRE-ESCAPE.—John A. Johnson, Chicago, Ill.
 291,919. COMBINED VENTILATOR AND CHIMNEY.—William F. Matthews, Dallas, Tex.
 291,924. BLIND.—George Wm. Morstatt, New York, N. Y.
 291,926. WINDOW-SCREEN.—William H. Muan, Milwaukee, Wis.
 291,934. WRENCH.—Daniel R. Porter, Revere, Mass.
 291,940. FIRE-ESCAPE AND SELF-PRESERVER.—James B. Robertson, Kingston, N. Y.
 291,956. FASTENING FOR TOOL-HANDLES.—Thos. Albert Sweet, Cambria, Cal.
 292,005. HINGE.—William Gilliland, New Haven, Conn.
 292,017. CARPENTER'S SQUARE.—William R. Jones and Samuel E. Jones, Toccoa, Ga.
 292,040. WEATHER-STRIP.—Ira Paddock, Greeley, Kans.
 292,042. DOOR-LATCH.—Melvin Harry Palmer, St. Louis, Mo.
 292,046. DISINFECTING-TANK FOR THE DISPOSAL OF SEWAGE.—James J. Powers, Brooklyn, N. Y.
 292,047. FLEXIBLE SHUTTER.—John P. Recker, Indianapolis, Ind.
 292,055. COMBINED TRAP AND OVERFLOW FOR WASH-BASINS, WATER-CLOSETS, SINKS, ETC.—Carroll L. Riker, Brooklyn, N. Y.
 292,071. SEAT FOR PUBLIC BUILDINGS.—George H. Thompson, Plattsburgh, Neb.
 292,092. GUARD TO HATCHWAYS.—Henry J. Bleuler, Boston, Mass.
 292,111. SHUTTER.—Melvin Cottle, Scioto, Kans.
 292,117. SASH-FASTENER.—Robert B. Hugunin, Hartford, Conn.
 292,119. PROCESS OF MAKING WHITE LEAD.—Johann Karl Kessler, Milwaukee, Wis.
 292,120. WEATHER-STRIP.—Wm. R. Kizer, Hammond, Ill.
 292,131. THICKNESS-GAUGE.—Ebenezer Morrison and James P. Hutton, Washington, D. C.
 292,134. FIRE-ESCAPE.—Samuel Norris, Halifax, Nova Scotia, Can.
 292,135. SLIDING-JAW VISE.—Wm. H. Northall, Bridgeport, Conn.
 292,148. FIRE-ESCAPE.—Charles M. Travis and Caspar H. Stibolt, Crawfordville, Ind.
 292,149. METHOD OF CONSTRUCTING BUILDINGS OF ARTIFICIAL STONE.—Theodore W. Tyler, Stillwater, Minn.

SUMMARY OF THE WEEK.

Baltimore.

OFFICE-BUILDING.—E. F. Baldwin, architect, has prepared drawings, for Messrs. Keyser Bros., for a four-story brick building, with stone and terra-cotta finish, 43' x 80', to be erected on German St., between South and Calvert Sts.; cost, \$34,000; Mr. Roberts, builder.

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

Frederick W. Schultz, three-story brick building, s s Fayette St., between Exeter and East Sts.
 Chas. H. Callis, 13 two-story brick buildings, w s Ann St., between Chase and Eager Sts.
 Wm. A. Allers, 3 two-story brick buildings, w s Goodman Alley, n of Randall St.

Brooklyn.

BUILDING PERMITS.—Graham Ave., s w cor. North Second St., 3 three-story frame double tenements, tin roofs; cost, total, \$13,500; owner, Jno. P. Conselyea, Bowers Ins. Co., cor. Bowers and Grand Sts., New York City; architect, E. F. Gaylor; builder, Geo. Lehman and John Rueger.

Boerum St., No. 218, s s, 225' e Bushwick Ave., three-story frame double tenement, tin roof; cost, \$3,400; owner, architect and builder, Peter Kuntzweiler, 165 Boerum St.

Bushwick Ave., n w cor. Adams St., three-story frame store and double tenement, tin roof; cost, \$6,000; owner, Michael Reuser, 74 Adams St.; architect, T. Engelhardt; builders, Jno. Fuchs and C. Wieber.

Bedford Ave., e s, 120' s Herkimer St., two-story and basement brick dwells., tin roofs; cost, each, \$12,000; owner, H. N. Corwith, 108 Franklin St., New York City; architect, J. G. Prange; mason, J. M. Brown.

Douglas St., n e cor. Washington Ave., 12 two-story stone-front dwells., gravel roofs; cost, each, \$4,500; owner, Mary E. Fowler, 8 Verona Pl.; architect, Parritt Bros.; builder, Levi Fowler.

Chicago.

BUILDING PERMITS.—J. & E. Buckingham, addition to elevator, South Water St.; cost, \$5,000.

Simon Straus, 4 four-story flats, 179 to 183 West Jackson St.; cost, \$25,000; architect, C. C. Miller; builders, J. H. Miles & Co.

J. T. Ballantine, 2 two-story dwells., 478 West Congress St.; cost, \$4,000; architect, W. Drake; builder, J. T. Ballantine.

S. Berger, two-story store and dwell., 189 Fourteenth St.; cost, \$2,000.

Jas. Novoney, four-story and basement store and flats, 427 Eighteenth St.; cost, \$9,000; architect and builder, A. Charnot.

P. O. Skaaden, three-story dwell., 282 West Erie St.; cost, \$5,000.

Jacob Roth, two-story dwell., 231 and 233 Warren Ave.; cost, \$7,000.

C. Stone & Sons, three-story carriage-repository, 169 to 175 Ogden Ave.; cost, \$6,000; builder, L. G. Seulund.

C. Stone & Sons, two-story shop, rear 169 to 175 Ogden Ave.; cost, \$3,000.

New York.

APARTMENT-HOUSES.—Mr. Julius Kastner has designed 4 five-story brick and brownstone flats, 25' x 75' each, to be built for Mr. F. J. Schmugg, on the n w cor. of Ave. A and Eighty-first St.; cost, \$60,000.

HOUSES.—Mr. R. H. Robertson has on hand the plans for a house to be built for Mr. Kennedy, on Fifth Avenue.

Mr. G. A. Schellenger is the architect for 58 three-story brick houses, to be built by the "House and Home Company," on ground bounded by Helen, Lewis and Ella Sts. and Morrisania Ave., expected to cost about \$250,000.

LYCEUM.—It is proposed to build a lyceum containing a club, theatre, etc., on the plan of the Co-operative Home Club; Messrs. Hubert Pirson & Co. being the architects and originators of the scheme.

STORES.—On the s w cor. of Broadway and Lispenard St., a six-story and basement brick store, about 35' x 100', irregular shape, is to be built for the Patrick Dickie Estate, from designs of Mr. John G. Prange.

The Colwell Lead Company propose to build a six-story building for their business purposes, on the n w cor. of Sixth Ave. and Thirty-ninth St.

The building No. 3 West Forty-second St. is to be altered into a store, from designs of Mr. James Stroud.

SYNAGOGUE.—The Congregation of Bnai Jeshurun propose to build a synagogue on the west side of Madison Ave., 25' s of Sixty-fifth St., on a lot 75' x 95'.

BUILDING PERMITS.—West Thirty-fifth St., Nos. 147, 149 and 151, 3 six-story brick flats, tin roofs; cost, each, \$35,000; owner, Maria L. Olliffe, One Hundred and Thirtieth St., cor. Fifth Ave.; architect, Geo. Ed. Harding.

Washington St., Nos. 538 and 540, two-story brick workshop, gravel roof; cost, \$9,000; owners, Peter M. Ohmeis & Co., 75 Beach St.; architect, Wm. Graul.

South Fifth Ave., Nos. 159 and 161, six-story brick store, metal roof; cost, \$45,000; owners, Trustees of P. Lorillard, No. 3 Mercer St.; architect, John B. Snook.

Broadway, s w cor. Lispenard St., six-story brick and iron front store, tin roof; owner, Estate of Patrick Dickie; architect, John G. Prange.

One Hundred and Thirty-fifth St., n s, 125' e Lincoln Ave., five-story brick tenement, tin roof; cost, \$10,000; owner, Michael Kelly, One Hundred and Thirty-sixth St., near Lincoln Ave.; architect, Arthur Arcandier.

Seventy-ninth St., s w cor. Lexington Ave., 8 four-story brownstone front buildings, tin roofs; cost, each, \$28,000; owner, James A. Frame, 165 East Seventieth St.; architects, Thom & Wilson.

ALTERATIONS.—Second Ave., e s, Ninety-sixth and Ninety-seventh Sts., build additional stalls on third-story; cost, \$6,000; owner, Second Ave. R. R. Co., on premises; architect, John G. Prange; carpenter, Jno. Duke.

Hester St., No. 23, rear, two-story brick extension and interior alterations; cost, \$2,600; owner, Kaman Lasky, No. 10 Norfolk St.; architect, Wm. Grant.

West Thirty-ninth St., Nos. 660 and 662, raise one-story; cost, \$2,500; owner, Jas. McClenahan, on premises; architect, C. F. Kidder, Jr.

Philadelphia.

BUILDING PERMITS.—North Tenth St., No. 2310, two-story back building, 12' x 34'; Mrs. B. Ritter, owner.

Market St., No. 927, two-story addition to store, 24' x 50'; J. B. Epstein, superintendent.

Chestnut St., w of Third St., bank-building, 30' x 178'; Furness & Evans, architects.

ALTERATIONS.—Alteration and addition to residence of G. Ralston Ayer, Esq., cor. Twenty-second and Venango Sts.; cost, about \$7,000; plans by Hazlehurst & Huckel, architects.

COMPETITION.

PUBLIC LIBRARY BUILDING.

[At Boston, Mass.]

The Committee on Public Library, having been authorized to procure plans for a new public library building, to be erected on the lot bounded by Dartmouth Street, St. James Avenue and Boylston Street, and being desirous of interesting architects to produce the best plan for the same, hereby offer four premiums of \$4,000, \$3,000, \$2,000, and \$1,000, respectively, to the authors of the four best designs, according to the order of their merit.

The plans for which premiums are awarded will become the property of the city, with the right to use the whole or any part, or any modification thereof, without further claim from the authors for compensation or employment.

All designs must be sent to the Trustees of the Public Library on or before June 1, 1884.

Further particulars may be had by applying to William H. Lee, Clerk of Committees, City-Hall.

For the Committee,

CHARLES V. WHITTEN,
Chairman.

PROPOSALS.

PRISON BUILDING.

[At Stillwater, Minn.]

Bids will be received at the warden's office, Minnesota State Prison, until Thursday, January 31st, at 12 M., of that day, for the erection of a building 66' x 150', three stories high; said building to be built of brick, and in accordance with plans and specifications made by A. M. Radcliff, architect, and which plans can be seen at the warden's office in Stillwater, or the office of A. M. Radcliff, St. Paul. Bids are requested to be made, first, on the basis of cash payments for said work when completed; second, on the basis of payment on January 1st, 1885. The right is reserved to reject any and all bids.

By the Board.

E. G. BUTTS,
President Board Inspectors.

WORK-HOUSE.

[At St. Paul, Minn.]

Sealed proposals will be received at the office of the St. Paul work house, 56 East Third Street, until 10 A. M., February 15, 1884.

Separate bids will be received for the iron cells, and iron-work in brick cells in basement complete, and for labor only.

Separate bids will be received for window gratings, and separate bids for all stair and iron doors in walls leading to dining-room and court. The time of the completion of the work must be stated in the bid.

A bond of 20 per cent of the bid must accompany each bid.

The Board of the St. Paul work-house directors reserves the right to reject any and all bids.

Plans and specifications can be seen at the office of E. P. Bassett, architect, Gilliland Block.

Bids should be addressed:

GEORGE W. LAMSON,

President Board of St. Paul Work-House Directors,
424 56 East Third Street, St. Paul, Minn.

STONE AND BRICKWORK; also, IRON FENCES, GATES, RAILINGS, ETC., FOR APPROACHES.

[At Topeka, Kan.]

OFFICE OF SUPERVISING ARCHITECT,

TREASURY DEPARTMENT,

WASHINGTON, D. C., January 18, 1884.

Sealed proposals will be received at this office until 12 M., on the 6th day of February, 1884, for furnishing and setting in place the stone posts, etc., for fences and gates, street curbing, sidewalks, grading and sodding of lot. Also, for furnishing and fixing in place the iron fences, gates, railings and gratings required for the approaches to the court-house, etc., at Topeka, Kansas, in accordance with drawings and specifications, copies of which (for either class of work) any additional information may be had on application at this office or the office of the Superintendent.

M. E. BELL,

Supervising Architect.

PIG-LEAD, ETC.

[At St. Paul, Minn.]

OFFICE OF THE BOARD OF WATER

COMMISSIONERS,

ST. PAUL, MINN., January 17, 1884.

Sealed proposals will be received at the office of the Board of Water Commissioners of the City of St. Paul, until 12 M., February 4, 1884, for furnishing said Board the following pig-lead and hemp packing: 90 tons of pig-lead, with the privilege of 50 tons additional; 4,000 pounds of clear, sound hemp packing, with privilege of 4,000 pounds additional.

The lead shall be of the best quality of pure, soft lead in every respect suitable for filling water-pipe joints, and to be delivered in car-load lots f. o. b. in St. Paul, within fifteen days after date of order, but 10 tons of lead and 500 pounds of hemp-packing must be delivered by March 15, 1884. All to be ordered before October, 1884.

Payments will be made by monthly estimates, but no payments will be made before July 1, 1884.

Separate bids will be received for the lead and hemp packing, and must be accompanied with a bond of 20 per cent of amount of the bid.

The Board reserves the right to reject any and all bids.

422

JOHN CAULFIELD, Secretary,
Board of Water Commissioners.

BRIDGE.

[At Logansport, Ind.]

December 25, 1883.

Sealed proposals will be received by the Commissioners of Cass County, Indiana, at the Auditor's office in Logansport, Indiana, until 12 o'clock noon, on the 30th day of January, 1884, for the erection of a wrought-iron bridge across the Wabash River near Eighteenth Street, in the City of Logansport. Said bridge to have four spans of about 150 feet each, with one roadway twenty feet clear width; the bridge to have iron floor beams, capacity of bridge to be one hundred pounds per square foot on roadway, exclusive of bridge weight; no iron to be strained over 13,000 pounds per square inch in tension, and 8,000 pounds per square inch in shearing, and 9,000 pounds per square inch in Gordon's formula for compressive strains. Builders must furnish full plans and detail specifications, giving forms and dimensions of girders and sizes of each part of bridge, together with strain-sheets giving weight of bridge with maximum strains under the specified load, and the cross-section of each principal part in square inches. Said bridge to be floored with three-inch hickory elm plank, the same to be furnished and laid by the contractor. Bids to be made per lineal foot of extreme length of superstructure. Proposals not in accordance with this advertisement will not be considered, and the right is reserved to reject any and all bids.

By order of the Board of Commissioners of Cass County.

422

HARRY TORR, Auditor.