# THE AMERICAN ARCHITECT AND BUILDING NEWS.

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CONTENTS.



THE *Hydraulic Plumber*, of New York, has been recently discussing the effects of siphonage, or rather, of combined siphonage and capillary attraction, often produced in traps through the medium of bits of cloth, or strings of matted lint and hair, which catch in the outlet of the trap, and hang down, with one end in the dip of the trap, and the other extending down the outlet-pipe. Every one knows that a wet towel, hung over the side of a wash-basin, will soon draw all the water out of the basin, and the mat of lint and hair on the edge of a trap seems to act in precisely the same way. In illustration of the principle, a correspondent of the *Hydraulic Plumber* relates a story of his employment, some time ago, to investigate the causes of a foul smell in a certain bath-room, where other plumbers had worked before him in vain. The pipes had been swabbed out; the closet, an old-fashioned pan apparatus, had been burned out, and disinfectants applied, in vain. The wastes of bath and wash-basin, according to the old practice, entered the water-closet trap, but no sign of leakage could be discovered about this or the waste-pipes. The new plumber, not knowing what else to look for, removed the closet and filled the trap with water. As soon as the agitation had ceased, he measured the depth of the water, and then left it to itself for twenty minutes. At the end of that time the water-level had fallen half an inch. Twenty minutes later it had fallen still more, and in an hour the seal was so far broken as to allow a slight current of sewer air to enter the room. The plumber then left the room for two hours, locking the door, and taking the key with him. When he returned, the place was full of foul air, and on passing his hand under the bend of the trap he found a space of about an inch and a quarter between the surface of the water and the underside of the bend of the trap. The next step was to cut away the crown of the trap, so as to expose the upper portion of the bend. An opening was made, four inches long and three and one-half inches wide, but examination through this showed nothing out of the way until the trap was refilled, when a wet line was observed over the bend, which proved to follow the course of some hairs, twelve or fifteen in all, which had been caught, together with some lint and ravellings, in the slimy lining of the bend. By detaching the lower part of this collection from the walls, allowing it to hang down free in the outlet-pipe, the water was observed to drip from the end at the rate of seventy or eighty drops a minute. The whole was then cleared away, and the closet replaced, and no more trouble was experienced. The plumber in question then made some very interesting experiments, to ascertain the amount of conducting substance necessary to cause the emptying of traps in this way, using a small beaker glass in place of a lead trap. He found that with five pieces of number eighty spool cotton, about seven inches long, hung over the edge of the beaker, the water-level was lowered three inches in nineteen hours, and one-half inch in about fifteen minutes. With five long hairs the lowering amounted to one inch in ten hours, and three inches in about a day and a half. With five hairs and two threads, of the same size as before, the lowering in seven and one-half hours was one and one-half inches. One piece of cotton twine lowered the water three-quarters of an inch in four and one-half hours. Two pieces of twine drew over an inch of water in two hours, and two inches in less than four hours. A bit of cotton cloth, half an inch wide, siphoned over three-quarters of an inch of water in an hour and a quarter. There was apparently no difference in the action, whether the threads were submerged or floated on the surface of the water. In the sunshine, the drying of the absorbent material was so rapid as sometimes to stop the capillary action, but in the shade it went on steadily, even when the beaker was placed in a strong current of warm air. As nothing is of more common occurrence in drain-pipes than lint or hair, it seems likely that this observation will explain many cases of offensive odors in bath-rooms and bed-rooms not otherwise to be accounted for.

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THE superstition in regard to the value of gold must be a strong one to induce the editors of some of the ablest journals in the country to lament, as we find them doing, the compulsory stoppage of the hydraulic mining industry in California. The accounts of the value of the metal extracted from the California hills by the hydraulic process vary extremely, some setting it at eight or nine million dollars a year, while others give but a small fraction of that amount. Possibly the true average for the past ten years has not been over two millions a year, at the most making the total yield from such operations perhaps twenty millions. A portion of this went into the pockets of the workmen employed in the work, who would have earned just as much at any other occupation, while the rest was divided among the owners. The yellow metal having little real value, most of it was simply made into coin, increasing by just so much the quantity of currency representing a fixed amount of useful property, and diminishing the value of each unit of the currency, or, in other words, raising the prices of necessaries everywhere to correspond with the increased amount of gold available for paying for them. The mine owners were thus enriched at the expense of the rest of their fellow-citizens, who have been contributing ever since, in the payment of higher house-rent and grocery bills, to make up to the mine proprietors the assumed value of their yellow dust. If the hydraulic mining had been carried on in the midst of the desert, with no farming land within reach of the débris, the industry would still have been one of the least commendable and profitable to the world in general that could be carried on by men; but, instead of this, it has been pursued in the very heart of fertile valleys, which have been laid utterly waste, ruining at once and for forever the agriculture and the trade of whole districts. Every one who is old enough to remember anything about California, as it was before the construction of the Pacific Railroad, knows at least the name of Marysville, once the most important town in Northern California. This place, ten years ago, was the centre and market of a great farming country, watered by the two rivers called the Yuba and Feather, and blessed with the most productive soil known in the world. Now it is nearly ruined; the navigable stream which connected it in its prosperous days with San Francisco and the sea is obstructed, the obstruction increasing every year; and the fertile farming country about it is a wilderness, deserted by the inhabitants, and covered with sterile sand and gravel. The bed of the Yuba River, one of the streams that drained the valley above Marysville, has been raised in some places eighty feet above its old level, and its mean surface is twenty-five feet higher than formerly. The rich bottom lands on either side of this river are now buried under fifteen or twenty feet of detritus, and even the ground above, on the slopes of the foothills, has been made nearly valueless for cultivation. The valley of the Feather River has suffered the same fate, and ever since the cessation of hydraulic mining the mountains of gravel piled about the upper waters of the rivers have been gradually washing down to increase still further the burden which the farmers of the valley have had to suffer. It is even said that the bay of San Francisco has been sensibly injured by the fine silt brought into it by the Sacramento, and this effect, if it has really been produced, is likely to continue, so that it is not at all impossible that the State of California may in the end pay very dear for the liberty which has been allowed to the hydraulic miners.

THE *Scientific American* mentions a case where a sofa in an upholsterer's shop was kept so constantly charged with electricity from the two belts of an elevator machine, placed in the room below it, as to communicate a sharp shock to persons who touched incautiously a worsted cord, containing threads of gilt wire, which ornamented it. The electrical influence of the belts, exerted through the floor, must have been very feeble, but the metallic threads in the cord, insulated by the silk and woolen materials about them, perhaps performed the part of the outer coating of a Leyden jar, in accumulating and condensing the almost imperceptible current. The amount of electricity generated by the belts which transmit power in mills and other places is often very large, and independent of a possible danger of fire from the passage of sparks through inflammable material, the electrified condition of the belts themselves, and of surrounding objects, is often troublesome in attracting coatings of fibre and dust to the exposed surfaces. It would seem to be quite practicable to utilize the electricity so generated, relieving at the same time the surfaces of the belts from their power of attraction. In one place that we know of an ingenious engineer contrived to draw off, by metallic points nearly in contact with the belt of a large engine, enough electricity to light the gas in the engine-room at any time without using matches; and with a battery of Leyden jars for storage, and well-arranged conductors, the same thing might be done throughout a large building.

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*LA SEMAINE DES CONSTRUCTEURS* contains a report of a paper read at the Sorbonne, by M. Amédée Bouquet de la Grye, the head of the commission which is now slowly accomplishing the reclamation of the denuded forest lands in the mountainous portions of France. A number of photographs, projected on a screen, served to illustrate the condition of one of the valleys now under treatment before operations were begun, as well as the various steps in the process, and the results already obtained. In nearly all cases, the first efforts of the commission are directed towards checking the force of the mountain torrents, one of which, at least, flows through every valley after a heavy rain, and washes away its banks with an energy proportioned in some degree to the suddenness with which the water is collected and poured through the channel. By building rough dams of stone across the course of such streams their flow is retarded, the silt brought down is deposited above the dam, and the channel thus widened, still further moderating, by the diminished depth and increased friction, the violence of the flow. As soon as a material improvement in these respects is observed, the dam is raised, and the width of the stream still further extended, with an increase in all the good effects which are sought for through the operations. If the slope is great, and the stream very swift, a series of obstructions is placed above the main dam, to protect it from the fury of a sudden freshet. Little ponds are formed wherever a favorable opportunity offers.

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AS soon as the water-course is permanently obstructed in such a way that the undermining of the banks is no longer to be feared, the slopes of the valley are covered with fresh loam where necessary, and carefully sodded; and when the grass has well extended its roots, so that the soil is held together with some tenacity, young trees, of kinds suitable to the locality, are planted in it. Each portion of the process assists every other; as soon as the trees have become established, their leaves and twigs serve to intercept the rain which before fell directly on the rock, delivering it again in a gentle dripping, very different in its effects from the unobstructed rush of a heavy shower; while their roots, interlacing in the soil, hold firmly a mass of earth and decayed vegetable matter which answers the purpose of a sponge in absorbing the water of all but protracted rains, diminishing just so far the effect of torrents, and preparing the way for the easy extension of the plantations. In view of the benefits which must obviously follow from the operations of the commission, it is surprising to find that the inhabitants of the places in which they are carried on refuse to take any part in them, or to do anything to aid them. On the contrary, the zeal with which they endeavor to hamper the work is so great as to protract very materially the time necessary for carrying out the improvements. The persons who will reap the profit of the work almost universally declining to assist in it, the Government is obliged to employ Italians, who work in parties, inhabiting cabins on the mountains, built by themselves, like those of a railroad-building party in this country. The season during which operations are carried on is very short, since nothing can be done while the snow remains on the mountains, and the sun in summer beats so fiercely on the bare slopes that work must be suspended during the warmest months.

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*LE GENIE CIVIL* contains an account of a new iron-clad ship, now in process of construction near Marseilles for the French Government. This ship, to be known as "*Le Marceau*," will be the largest yet built of the fleet of powerful vessels designed for the protection of the French ports, displacing ten thousand five hundred and eighty-one tons of water. Although so immense in size, *le Marceau* will be defended by armor plates of less resistance than some of those which have been employed in years past. The theory of the plating is said to have been that it was useless to attempt the construction of armor so strong as to resist the shock of a ball fired at close range from modern guns, and as the ships-of-war of the present day generally endeavor to fight in as close proximity as possible, in order to use the torpedoes and rams which are their most formidable weapons, it seemed better to provide plates of moderate thickness only, which would deflect projectiles rather than resist them, and thus, by avoiding overloading, secure the certain and great advantage of making the vessel swift and easily manœuvred. The armor on the sides, above the water line, is thus only fourteen inches thick at the lower portion, and something more than fifteen inches at the upper edge. The deck plates are three inches thick, and the turrets, of which there are four, are covered with fourteen-inch plates, and these again with a "skin" of steel plates, something less than an inch thick. The two turrets nearest the end of the ship are armed with twelve-inch guns, and the two in the middle with eleven-inch; and besides these is a deck battery containing two eleven-inch guns and twenty pieces of comparatively small calibre. In addition to the cannon, four machines for throwing torpedoes are stationed on the deck. The engines intended to transport this great instrument of force as its masters may direct are double, each engine operating an independent screw. The cylinders are rather singularly arranged, each engine having three, the middle one, which is only sixty inches in diameter, receiving the steam directly from the boiler, and allowing it to expand on each side into the others, which are eighty inches in diameter. Although the collective area of the pistons is so enormous, the stroke is but one metre, or thirty-nine inches, the necessity for saving space under the deck, as well as for lessening the chances of injury from shot, making it advisable to reduce the movement of the pistons as much as possible. The power of the engines, with the natural draught, is about six thousand horses, but by quickening the draught with a steam jet twelve thousand horse-power can be obtained. Eight boilers are used, each twenty feet long, and nearly twelve feet in diameter. The construction of the hull is cellular throughout, this being considered the best protection against the effect of torpedoes. The cells are formed by means of a framework of angle and T irons carrying partitions of thin plates, and so thorough is the subdivision that the explosion of a torpedo under the most favorable conditions for the assailant would not, it is estimated, make a passage for more than two hundred or two hundred and fifty tons of water.

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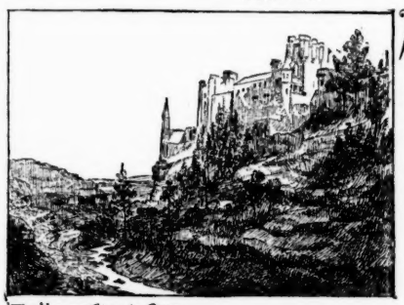
A PLEASANT account is given in a communication to *Le Génie Civil* of an entertainment given at the village of Petit-Bourg, by the workmen employed in the shops of the Decauville Brothers, to celebrate the safe return of one of the firm from a business tour around the world. The house of Decauville is well known for the manufacture of portable railways, and its production has increased so much of late years that the shops of Petit-Bourg, according to one of the speakers at the entertainment, now consume more iron and steel than any other establishment in the world. After the congratulatory dinner, which was given in a theatre erected last year by the firm, followed a ball, at which eight hundred and fifty operatives, with their wives and families, assisted. It may be said that the unusual prosperity of the firm, which has converted what ten years ago was a country village into a great manufacturing centre, has something to do with the cheerful amiability of the work-people employed there; but it is also likely that the judicious kindness of the employers has done a good deal for their own prosperity.

## SPANISH ARCHITECTURE.[1] — XII.

### SEGOVIA.



The Alcazar, Segovia, Spain.

AT last the city was in sight, a superb feature in the view of hill and dale steeped in sunshine. The great cathedral towered up from minor buildings with admirable dominance, and the latter included many picturesque breaks in the sky-line, always changing as we approached. It was Sunday morning. Segovia was gay already when we passed the outlying buildings and the noble Alcazar, and climbed the steep, grove-clad hillsides to the gate of the city proper. We stepped out in the fine ancient Plaza, and I at once realized that to see this quaint old place was worth all the trouble by the way. But more discomfort awaited me. There is a Fonda, of course. It is only a kind of boarding-house, but I anticipated a pleasant experience of a real old-style Spanish inn, here where no railways and few foreigners had come to modernize and monotonize the way of living; and I got what I expected with a vengeance. A *mozo* loafing in indolent curiosity consented to carry my valise and pilot me thither, but the *señora* coldly said the house was full. There is another *casa de huespedes*, for which I steered next. Again no room and no attempt at friendly assistance in the way of direction, only the empty information that it was a fête day and the city was crowded. I asked my porter what I was to do; I knew of no other hotel nor did he. The situation began to look comical; I had to stay here one night and some kind of shelter had to be found. At last another loafer informed us of a *posada*, and so we trudged down a circuitous lane to this modest haven. It was just such a place as Sancho Panza would have taken his ease in; the regular old Spanish inn of his day. A great gateway gave admittance to the ground-floor, which was appropriated to the use of animals and vehicles. We passed through the group of chickens and pushed a contemplative donkey out of the way, to get to the stair in the corner, and by this ascended to the upper story. This is better than the entry promised, although a queer odor of fusty hay and unkempt mules mingles with that of the oily kitchen and fills the whole house. The bedroom is dirty, but it might be worse. The bed has blankets which *are* worse. I take some chocolate, really good, as indeed it always is when one has learned the standard aimed at in its preparation. Then the *señora* brings a tin wash-bowl on a tripod, and a comb that looked like the backbone of a fossil fish, and asked if I wanted linen for the bed. Yes, I did. It is the old custom in this country to carry sheets as part of one's travelling equipment. They may be seen protruding, with the edges of lace which always garnish them, from a big rolled-up rug beside many a native *viagero*. With some misgivings I awaited my hostess's return, and explored my stores for a little bottle of insect-powder, preparatory to an early defensive operation against other inhabitants of my chamber. The linen came, clean, stiff, and duly fringed with the full regulation width of lace, and I felt a little better when the odious blankets were lined with them. Then I went out to explore.

The city stands upon a tongue of land formed by two deep valleys, whose streams meet at its extremity, and here the Alcazar is built upon the uneven promontory of brownish rock which is decaying and opening shadowy caves and hollows to the ravine below. The walls reminded me somewhat of the Alhambra; they have that same intimate connection with their craggy foundations and somewhat similar delicate screen of thin, lofty trees trying to overtop the masonry and decorating without concealing it. But this work is more Gothic in spirit than Moorish, and the towers and pinnacles group with more vertical expression. The Moors built the castle originally, but it was largely altered and rebuilt in 1351 by Enrique IV. It is a wonderfully fine composition, one of the prettiest pictures of its class that is to be found even in this land where there are many. Farther back along the ridge, where it is broader and flatter, the city clusters around the cathedral, and several churches near to it lend their towers to the central group, from which the lines of meaner buildings and walls trend away to where the curve in the valley leads them out of sight behind the hills. A week with water-colors among these bits of scenery would be well spent; but unhappily a period of extraordinarily cold weather made outdoor work impossible just then, and the one or two notes and sketches I made were done with much discomfort. There are in the valleys outside the walls, also, some buildings of great architectural interest, to which I shall refer later. Within the city the fine Plaza de la Constitucion is full of charming old domestic architecture. A great deal of wood-work is used, not as boards and casings, but in genuine timber construction of solid posts and beams and brackets with quaintly-cut ends. It is picturesque in somewhat the same way that old parts of Antwerp or Munich are, but with additional characteristics which make it distinctly Spanish: open galleries shaded with pleasantly-colored awnings — projecting balconies, too, of which the Spaniard everywhere is so fond, and lattices and signs, and the people themselves, really Segovian and nothing else. At one end of this square the cathedral is seen, not on the building line, but standing back and surrounded by its own open ground and buildings. This is a great edifice of the ambitious days when Gothic architecture here was striving for bigness and grandeur, but losing most of its old vitality in other equally important particulars. Its total dimensions are about 350 feet in length by 175 in breadth. The plan is arranged with a nave of five bays, forty or more feet in width, transepts of same width forming a great crossing and lantern, then a short *capilla mayor* with circular east end. The wide side aisles continue all around this curve, and outside, beyond them again, are chapels of considerable depth between great buttresses. It is a disposition of great nobility, both in proportions and dimensions, and the pillars are large and grandly expressive, although they have too exuberant details in bases and shafts. Beyond this the work is somewhat disappointing, even in its general effects, for the main arcades gain their loftiness at the expense of the higher parts. There is no triforium, and the clerestory is low and looks lower. If the ambitious architect had dared and been able to carry out the regular Gothic composition, *i. e.*, of triforium and clerestory, in the same noble scale as the ground-plan, it would be a superbly majestic interior; but the effect of exhausted effort which is given by the slighted upper works, together with the continual repetition of unstudied detail which ornaments the building, causes the whole to fall far short of the promise of its beginning. This was the age when details were sought in quantity rather than quality, when a buttress was decked with three similar tiers of panel and tracery work if thirty feet high, and four of the same if forty feet: when the architect spread a network of ribs upon the surface of his vaults with nearly as little earnestness as if he had papered them; all the effort and desire seemed to concentrate itself upon the primary conception of a vast interior. The architect was Juan Gil de Hortañon, who had already commenced the very similar new cathedral of Salamanca. This of Segovia was commenced A. D. 1522, and is perhaps the latest Gothic building which does not show much influence of the Classic Renaissance. About 1531, Rodrigo Gil de Hortañon took charge of the works, upon his father's death, and the cathedral was finished almost in its present form within the sixteenth century.

There is a great deal of stained-glass, some of which is exceedingly beautiful in color and richness of effect, but of course of late design, and full of imperfections in that regard. Externally there is not much of elevating architecture: a multitude of pinnacles and of other complications, necessarily picturesque in some of their groups, but usually monotonous and uninteresting compared with what the expenditure of skill and handiwork might have produced. Yet at a little distance the whole is very striking and deserving of study. There is a cloister on the south side which is said to have been moved and re-erected, having belonged to the older church, but it was probably considerably altered at the time, or else preceded it but very little in date.

Very near the Cathedral is the church of San Esteban. It has a very beautiful arcade or cloister around the outside of the building, open toward the street, formed of round arches supported upon double columns, which in turn rest upon a plain parapet. The capitals and arches are enriched with carving, the latter semicircular in form. At one angle rises a square tower, plain to the height of the church walls, then built in five nearly equal and similar stages of arcades and windows. Its simple form rising without buttresses or diminishings from ground to cornice reminds one, as do some of the Italian campanile, of the value of such quiet, unforced design when carried out with dignified detail. All this work is of the thirteenth century, the transition period marked by the use of both round and pointed arches in the same design. The steeple roof, however, is a much later addition, as can be readily seen. It is noticeable how here, and in many other places, a design found to be satisfactory was repeated again and again in subsequent works, with some variations, it is true, but undisguisedly with the view of profiting by past experience, or from simple appreciation of a good thing. The influence of this tower (unless an earlier one is the leader of the group) can be detected in several others in Segovia; even its German-looking roof has some echoes in others. Corresponding resemblances are to be found in old works in all parts of Europe. Yet we of to-day are afraid to learn by the experience of our brethren lest we should be accused of plagiarism; it seems to mark a man's inferiority to accept any other's experiments as of value, and this chiefly because only inferiors who are driven to it dare do so. And it is harder still that he who tries in this old-fashioned way to develop his own ideas is condemned for repeating himself by a crowd who strive only for novelty for novelty's sake.

A very curious building is the Templar's church, a transition structure of about A. D., 1200. It is a regular twelve-sided polygon on plan with a central and two side apses, projecting eastward, and has a peculiar inner cella in the centre, two stories in height, rising through the roof of the building, so that the internal effect is something like that of the aisle round a polygonal apse. The upper chamber of this strange inner work is vaulted, and forms a small chapel around which the outer aisle is covered with wagon vaults and lean-to roof. It is difficult to understand the motive of such a design for the purpose of any Christian ritual; it is called la Vera Cruz, and perhaps this

[1] By Robert W. Gibson, Travelling Student of the Royal Academy. Continued from page 125, No. 429.

name is a clue to the puzzle. It may have been built to receive a highly-prized relic of the True Cross, and the central chapel would be then a very expressive shrine. Its style is good: the sturdy infancy of Gothic.

Another interesting church lies on the other side of the city in the valley to the south. It is called San Millan, and is in style a well-developed Romanesque; though not nearly so fine as San Vincente Avila, it is similar in some respects, as might be expected. Its nave is of five bays, and eastward it has, besides the three apses opposite the nave and aisle, two others opposite very attractive outer cloisters, like that just described at San Esteban. The transepts are prolonged so as to intercept the cloister with a kind of vestibule, beyond which to the east the apse forms another chapel on each side of the church. The arcade of the cloister is apparently rather later than the church itself, at least in certain details of carving, etc.; and there is internally an unusual arrangement of shafts and piers which seems to indicate that a flat ceiling instead of a vaulted one was contemplated. At present it is an uninviting cover of stucco. Besides these there are in Segovia several other churches which are wholly or in part of the Middle Ages; San Martin, San Roman, San Faciendo (now a museum), Santa Trinidad, San Nicolas, El Parral (a fifteenth-century convent), and San Luine are all mentioned by Mr. Street in his "*Gothic Architecture in Spain*," and some others as well, nearly all much of the same age and type as one or other of those I have examined, so that description of them would be repetition.

Much of the city lies without the walls of the older town, and from all appearances buildings arose in the valleys long before the walls and fortifications had become superfluous. Several churches are so situated; perhaps the value of land, so much greater inside the ramparts, compelled the people to take risks for property in this manner. There are not quite so striking or perfect fortifications here as at Avila and Toledo—much more of the old work has been obscured by the growth of other buildings about them — but in many places there are portions just as noticeable as any, and of a character somewhat different from those I had seen heretofore, just as the Alcazar itself was different; that is, in being largely the work of the Middle Ages, with the Castilian turrets, and great corbel tables, and machicoulis in the more scientific military style of the age succeeding that of the Moors.

Among the great attractions of Segovia the greatest of all is that which I have left until the last in description, partly because it is a pleasant subject wherewith to close my notes of this city, and partly because it was the last of the Segovian monuments which I examined. This is the wonderful Roman aqueduct. I have noted how deep valleys separate the hills of the city from those adjacent. When the Romans were here they must have had a city of considerable importance that they devoted such a magnificent example of skill to its sanitary service. The "Devil's Bridge" the people call it even now. It is easy to understand that in the Dark Ages the ignorant populace could not imagine that such a work was done by men like themselves, and ascribed it to supernatural power. Two or three other such structures, I remember, are known to the natives of their districts by the same name. This aqueduct still performs the office of bringing water from the Sierra Fonfria, nine miles away. At some distance from the termination it begins its course upon arches of masonry. This part of the work is in four straight sections connecting with angles, and the last two sections, each over nine hundred feet long, are the chief parts of interest; for in them the masonry carrying the nearly horizontal waterway assumes loftier and loftier proportions as the ground dips down to the valley, until the greatest height is seen in the part illustrated, where the last thirty or so of the arches rise majestically above the roofs of the irregular suburb at the foot of the wall-crowned rocks of the ancient town. The highest arches are 102 feet high. The view here given shows sixteen arches in length, while the whole structure is said to be of 320. There is, besides the grandeur which comes of its straightforward simplicity, a very great deal due to excellent proportions, and to the clever placing of those few horizontal courses which can be called ornamental. The stone is cut into great blocks on a scale worthy of the work, and the joints, more visible perhaps in old age than when first executed, are themselves aids to the effectiveness of this splendid giant arcade.

The legend which supports in the popular mind the belief in its demoniac origin tells how Satan being in love with a beautiful *Segoviana* proffered anything she might ask, and she, heartily tired of unceasing journeys to carry water up the steep hill, promised her favors if he would build this aqueduct in a single night. Of course it was done when the next day dawned, and the lover claimed his reward; but the holy church interposed with the discovery that one stone was wanting, and the work was not complete; the King of Evil was thus cheated and the maiden saved.

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A Statuette of Charlemagne.— In the Carnavelet Museum may now be seen a statuette which formerly belonged to the Chapter of Metz, and which represents Charlemagne. According to qualified judgment the figure was made during the lifetime of this monarch, or immediately after his death. It is otherwise affirmed to have been cast at Aix-la-Chapelle. Until the year 1682 special personages only had their figures cast in bronze, and the statuette in question was shown on the 28th of January, the anniversary of Charlemagne, every year, in the Cathedral of Metz, for thirty-six hours, surrounded by lighted tapers. The German Government possesses several duplicates of this statue, the original type now belonging to Paris.— *Exchange.*

## PICTURES OF THE SEASON IN NEW YORK.


Of the making of exhibitions there has this year been no end. Not a week has passed during which the picture-lover might not find some goal to which to turn his steps, in addition to the dealers' collections which we have always with us. Never before have so many American works been shown, and I think I am not wrong in saying that never before have they attracted so much popular notice — though sometimes they have not deserved it all.

The season opened early in the autumn with a large collection at the Academy, containing some half dozen good works, of hardly sufficient interest, however, to redeem the exhibition from the charge of something worse than mediocrity. This was followed by a collection of sketches and studies at the American Art Gallery, which included much work that was fresh, straightforward and attractive if it could seldom lay claim to higher merits. Then—passing over one or two unimportant exhibitions — we had the Bartholdi Loan Collection, of which I have already spoken—without question the great event of the year. While this was in progress the Salmagundi Club held its annual show of black-and-white work — a show which was of about average excellence, but which suffered from the competition of the Loan Collection, and from the fact that the society had been unwise, if generous, enough to give up the Academy to this, and to retire to the American Art Gallery. The attendance was very small, and the sales not a quarter as great as they were last year.

The collection of Mr. Gaugengigl's works shown at a dealer's shop attracted much more attention than such minor incidents are apt to awake. Both the artist and the gentleman who had taken the whole of his work on what is called "speculation" must have been satisfied, for the public and the critics were alike content. I doubt, indeed, whether there is any artist in this country who can compete with Mr. Gaugengigl on just the path he chooses. It is not a very novel sort of art, but one which has few professors here. All his work is *genre* of the smallest size, elaborated with extreme minuteness and delicacy, but not sinning by hardness, or loss of breadth, or over "finish." In drawing he sometimes fails a little, and more often in the attempt to surround his figures with a veritable atmospheric envelope; but his color is so nice, his composition so effective, his manipulation so accomplished, and his power of characterization so adequate that his faults seem not radical but temporary. With so earnest and so young a worker we may look for still better things in the future. The figure playing on a violin seemed to me the best — perhaps because it depended for its charm on simple nature, and not on the factitious and rather stale expedients of gorgeously-decorative costume. The foreshortening of one arm was a little faulty, but the atmosphere was for once all that could be desired. It is to be hoped that Mr. Gaugengigl will in future always be represented at our public exhibitions. He has gained himself a place in New York which it will be for his profit and for our pleasure if he does not now abandon in favor of his Boston public.

The Artists' Fund Exhibition I did not see, but it seems to have been of about its average excellence — which, I need hardly say, is not dazzlingly attractive; still, a few younger men sent good work, and two landscapes by Mr. Homer Martin — too long an absentee from our shores — must have been a refreshing oasis if they were as beautiful as his brethren in art unanimously pronounced them.

At the American Art Gallery we had not long ago an exhibition of pictures exclusively by American artists—interesting in itself, and doubly interesting as being a private collection shown in its entirety, and probably the most important collection of recent American works that has yet been got together by any amateur. By some it was called a "representative collection," and so it was in one sense of the term. Very many artists were represented, and artists of the most diverse kinds. But Mr. Clarke is not a very wealthy man, and has often, it seems, been obliged to content himself with specimens which are far from being representative of their authors. Any one conversant with our art must have been charmed to see the proof that one collector exists who is devoted to that art, and has a catholic, and genuine, and individual taste; but a sight of his pictures, while revealing the *scope* of that art to an unaccustomed eye, would hardly show the height and depth of its accomplishment. Some of the pictures were very admirable; almost all were nice, and but few were quite uninteresting. Mr. Ulrich, who has only been home a year or two from Munich, but who has already won himself a place in the very first rank of our painters, was represented by the best work he has yet exhibited — a *genre* picture showing a group of glass-blowers at work — masterly in its broad yet accurate and expressive handling, in its management of difficult effects of light, and in its rendering of individual character — and doubly valuable as revealing the intention of at least one of our younger men to do serious work on native themes instead of mere clever trivialities or *pastiches* of foreign schools. Here is one man, thank fortune, who has not only fingers to paint with, but eyes to see the pictorial worth of fresh material, and a brain to show him how it may best be treated.

Mr. Eakins was represented by a somewhat similar work—similar

in size and intention — showing two humble musicians practising in their garret on a guitar and a zither. It was most interesting to compare this with Mr. Ulrich's work, which was more complete in certain ways than Mr. Eakins's—better "kept together," and better in its scheme of light, but which showed no such bits of truly exquisite workmanship as, for example, the superbly-painted hands of Mr. Eakins's zither-player. At an early Winslow Homer, a negro subject, we looked and wondered how out of such prosaic beginnings could have grown the finely-equipped, imposing and original artist we saw at the recent Boston exhibition of Mr. Homer's water-colors. And more such interesting lessons were taught by the earlier works in the collection. Some, however, were of an opposite sort, as was the case with a little figure of a saint by Mr. Huntington which, although quite devoid of character or originality, proved that there was once a time when our President knew at least how to color, and to use his brush. Many other works were worthy of mention, but I must pass on to what was really the most noticeable thing about the exhibition—that is the degree to which it attracted popular attention. No such collection had ever before drawn half so many visitors, and it must have convinced many eyes that our art has a range and a power that they had not previously suspected; and in this way I believe Mr. Clarke has done an incalculable service to the native art he loves so well—in addition to the special service the exhibition was designed to perform. This was to raise a fund that would provide an annual prize of three hundred dollars to be given to the best figure-picture painted in America, and shown at the Academy exhibition. It is gratifying to note that the proceeds of the exhibition, for which the proprietors of the gallery gave their room free of charge, together with sums added to the subscription list that was opened at the time are almost if not quite sufficient for the purpose, and that the first award will be made this spring. Most of these subscriptions were in small sums, and the lesson is once more enforced that it is not to our richer amateurs but to the body of our people that we must look for the patronage and encouragement which are necessary to the development of our art.

A large Loan Collection in Brooklyn, composed of both American and foreign pictures, has also been held for the benefit of the Bartholdi Pedestal Fund. The treasures of Brooklyn were never appreciated at our end of the bridge until the very fine exhibition of last year; and it would even then hardly have been believed that another collection of almost equal size and excellence, chiefly composed of different pictures, could so soon again have been got together. But the fact is that few New York collections rival Mr. Seney's in size and excellence, and that there are very many others in Brooklyn which are well worthy of admiration, and no New Yorker, I think, except Mr. Erwin Davis, is so unvaryingly generous when asked to loan his works for the public's benefit. My space is too limited to notice the exhibition in detail; but I may say that it included some admirable examples of the great French landscape school; three large, superb and various Munkácsys, and a multitude of other good foreign pictures. Among the American works were an excellent French harvest-scene by Mr. Ridgway Knight; another of Mr. Ulrich's pictures — a wood-engraver at work, and the admirable peasant interior of Mr. Mosler, which was one of the marked pictures at the *Salon* of 1882 — *Les Accordailles.*

Quite recently there has been another exhibition of American pictures at the American Art Gallery, which is said to have been unusually good; to have enforced the lesson taught by Mr. Clarke's collections, and increased the public interest then excited. Unfortunately I did not see it, but I hear its chief feature was the début of another young American from Munich, a Mr. Stiefel, who has the unwise affectation of trying to beautify his patronymic by translating it into "Caliga." His three pictures created something of a sensation, and are said to have shown great technical skill combined with true artistic instinct.

The winter exhibition at the Metropolitan Museum has consisted of a collection of copies of the old masters, some of them by ancient or by foreign hands, but most of them by American students. A few of them were very good, notably Mr. Chase's copies of the large Velasquez canvases at Madrid; but many of them were bad, and served no good end either in proving the dexterity of their painters, or in informing our untravelled public of the true appearance of the famous works they professed to reproduce. The lion of the Museum just now is a more genuine one than those sometimes permitted to roar within its walls — a fine if not super-excellent portrait by Rembrandt, lately purchased by Mr. Marquand—the portrait of a rather youthful Burgomeister.

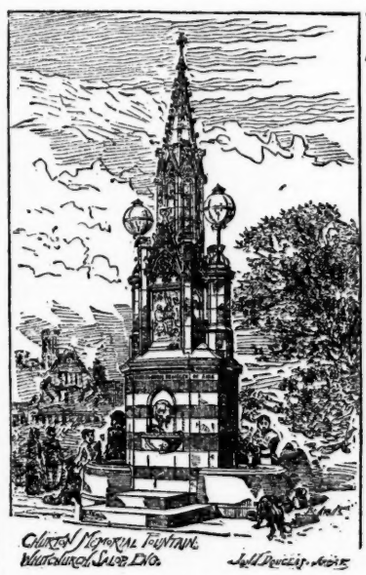
The Water-Color and Etchings Exhibitions have just opened, and also a collection of the work of two brothers, Birge and Alexander Harrison, who are already not unknown to fame. A future chapter must, however, deal with these subjects. Then in April opens the Academy Exhibition, and we are promised a novelty in the shape of a collection of pastels. Many of the younger men have been devoting themselves this winter to work in this attractive and, to us, unaccustomed branch, and their products will undoubtedly deserve the public's attention.

It is a matter for regret to all friends of the Society of American Artists that it has postponed its exhibition to so late a date, the middle of May, in order to secure the large room at the Academy after it shall have been vacated by the academicians themselves. Even if we had not had such a surfeit of exhibitions this winter the time is most unpropitious. Many people are already out of town by that time, and the most eager picture-lover is disinclined, with the advent of hot weather, to undertake what is always, even with the most interesting collection ahead of one, an expedition promising certain fatigue of mind and body.

Having taken out its lease of the Academy before the recent agitation on the subject of Sunday openings the Water-Color Society is able to defy the Academic council, and open its portals every day in the week. It thought best not to give free admittance on Sunday, but to prove itself actuated by principle, and not by sordid self-seeking, it intends to devote the Sunday proceeds to some charitable object. If it would print a little tract explaining how our clerks and mechanics are now obliged to spend their Sabbaths, owing to the impossibility of obtaining rational amusement, and would distribute it among the ranks of the Academicians, the money would, I think, be well disposed of. The Society of American Artists is, alas! not in a similar state of having nine points of the law on its side, and with much grinding of teeth has been obliged to consent to the insertion of a clause in its lease which prohibits Sunday openings. It seems a double pity, since the Society was the first body which dared to defy popular prejudice, and which has hitherto opened its doors on that day freely to all comers. Much indignation has also been excited by the action of the Academy in demanding two or three hundred dollars extra pay from the Bartholdi Exhibition because it was kept open two days longer than at first agreed upon—though those two days were included in the time originally allowed for the dispersion of the collection, and the building was, in fact, delivered over to its owners without any delay after the stipulated moment.

M. G. VAN RENSSELAER.

## MILL CHIMNEYS.



AT the meeting of the American Society of Civil Engineers held March 5, 1884, a paper by Hiram F. Mills, C. E., describing the construction of the Pacific Mills chimney at Lawrence, Mass., was read by the Secretary. This chimney was built by Mr. Mills in 1873, and consists of an outside octagonal shell 222 feet high above the ground, with a distinct interior core 8 feet 6 inches in diameter inside, extending one foot above the top of the outer shell, and 11 feet below the ground. The chimney is founded 19 feet below the ground, upon coarse sand, the foundation being 35 feet square, enclosed by pine sheet-piling. The base is concrete, one foot thick, then rubble masonry of large pieces of granite in cement, this stone-work being 7 feet high. Upon the stone-work is placed the brick chimney, the outer shaft being at the base 20 feet wide and at the top, under the projecting cornice, 11 feet 6 inches wide. This brickwork is 28 inches in thickness at the base; at 12 feet in height it becomes 24 inches, which continues 18 feet; then 20 inches for 20 feet; then 16 inches for 40 feet; then 12 inches for 60 feet; then 8 inches to the top. The inside core is 2 feet thick to a height of 27 feet, and one foot thick for the remaining height of 154 feet. The top of the chimney is of cast-iron plates $\frac{3}{4}$-inch thick. The horizontal flue entering the chimney is 7 feet 6 inches square. The vertical flue of the chimney is a cylinder 8 feet 6 inches in inside diameter, and 234 feet high, with walls 20 inches thick for 20 feet, 16 inches thick for 17 feet, 12 inches thick for 52 feet, and 8 inches thick for 145 feet. The foundations were laid in mortar of Rosendale cement and sand, the outer shell in mortar of Rosendale cement, lime and sand, and the flue-walls in mortar of lime and sand.

During the winter of 1873, the flue being 90 feet above the ground, the boilers, having 452 square feet of grate surface, were connected with the chimney with satisfactory results. Between June and September, 1874, the chimney was finished. The approximate weight of the chimney is 2,250 long tons, the number of bricks being about 550,000. The chimney is opposite the middle of a line of 28 boilers, and 210 feet distant from them. It was designed to serve for boilers having 700 square feet of grate surface, burning about 13 tons of anthracite coal per square foot of grate surface per hour.

The chimney was struck by lightning in June, 1880, after which date a lightning-rod was put up, which consists of a seamless copper tube $\frac{6}{16}$" thick, one inch inside diameter, at the top of which are 7 points radiating from a ball 4 inches in diameter, the top of the central point being 8$\frac{1}{2}$ feet above the iron cap. The rod is attached to

the chimney by brass castings, and is connected at the bottom to a 4-inch iron pipe extending 60 feet to a canal.

A description was then read of the chimney of the Merrimack Manufacturing Company, at Lowell, Mass., built under the direction of J. T. Baker, C. E., in 1882. This chimney is founded on a ledge of sandstone. The foundation, 30 feet in diameter, is built of granite blocks laid as they came from the quarry. At the surface of the ground there is a dressed granite base 2 feet 6 inches in height, laid in clear Portland cement, the remainder of the foundation being in Rosendale cement and sand. Upon this base is placed the brickwork, consisting of three cylinders, the outside one 28 feet in diameter, 24 inches thick; the middle one 18 feet in diameter, 8 inches thick; the core 12 feet inside diameter and 16 inches thick. The middle cylinder is carried up vertically 75 feet 6 inches; the outside ring has a batter of $\frac{42}{100}$ of an inch per foot to a height of 100 feet. At the height of 75½ feet the middle ring connects with the exterior ring, making the masonry at that point 36½ inches thick; it is then 20 inches thick for an additional height of 60 feet; 16 inches thick for 70 feet, and 12 inches thick thence to the enlargement for the chimney-head. The core is uniformly 12 feet inside diameter to the top; the first 100 feet being 16 inches thick; then 12 inches thick for 60 feet; then 8 inches thick for ninety feet, and then 4 inches thick for 29½ feet to the top. It is entirely separate from the outside masonry, except about the doorways and openings for the flues. The core was laid in mortar of lime and sand; the outside shell in lime, cement and sand. On one side of the chimney is a ladder of iron extending from the ground to the top, and on the opposite side is a ¾″ galvanized-iron wire rope, both ladder and rope being connected with a copper ring having four spurs, the central point of which extends 8 feet above the top of the chimney. The bottom of both ladder and rope is connected with 16-inch water-pipe. Two wrought-iron flues enter the chimney, one 5′ x 6′, the other 5′ x 11′. The chimney is constructed to provide for 15 sets of boilers, only 12 now being in use. Each set has 103¼ square feet of grate surface, and is rated at 300 horse-power. The weight of the chimney is 3,392 tons; 1,101,000 bricks were used; 6,875 cubic feet of stone masonry. The cap weighs 18,600 pounds. The cost of the chimney was $18,500.

A description was then given by Dr. Charles E. Emery, M. Am. Soc. C. E., of the construction of the chimney, built under his direction, of the Greenwich Street boiler-house of the New York Steam-Heating Company. This chimney was a creature of circumstances, it being necessary to place within a very limited area a very large boiler capacity, viz., 16,000 horse-power. This was done by making four stories of boilers—the chimney was, therefore, necessarily located with reference to these boilers, and the plan of the chimney was determined by the shape of the lot. The beach of the Hudson River was at some time at this locality, and the foundation of the chimney was placed in fine, clear beach sand, with some packets of coarser sand, and a little stone. The foundation is one foot below high-water. The chimney is 27 feet 10 inches in the clear inside, and 8 feet 4 inches wide. The height is 220 feet above high-water; 221 feet above the foundation; 217 feet above the basement floor; 201 feet above the grates of the lower tier of boilers, and 141 feet above the grates of the upper tier of boilers. The thickness of the walls on the interior of the building runs from 5 feet to 20 inches, and on the other sides from 3 feet to 20 inches. The gases for each chimney are taken from 32 boilers of 250 horse-power each. About 1,000 tons of coal will be burned daily. It is expected that elevator arrangements will be perfected to receive this amount of coal each night. More trouble is experienced with the ashes than with the coal. Ordinary grate-bars have been used. Clearing has been done once every six hours. We have used a new bar that turns on hinges, and gives good results. We have not had made many experiments with coal-dust; we have to use a fuel which has some reserve power to provide for possible contingencies; we find coal is worth about what is charged for it.

Mr. L. P. Griswold, M. Am., Soc. C. E., described a chimney erected in Mexico for a cotton factory about 160 feet high, which had been in use for over twelve years, which was built of apparently sun-dried bricks, and which seemed to be now in excellent condition. This chimney was built by Indians, and seemed to be very symmetrical and well made. The bricks were about 10″ x 3″ x 7″.

Mr. H. W. Brinckerhoff, M. Am. Soc. C. E., described a chimney constructed of old rails, which was in successful use in Pennsylvania. It was generally known as a crinoline chimney.

Mr. Wm. E. Worthen, M. Am. Soc. C. E., referred to several chimneys built by him, and expressed a doubt as to the necessity of very great height in chimneys.

Mr. J. M. Knap, M. Am. Soc. C. E., described chimneys constructed in Pittsburgh, and which, though of very moderate height, had given excellent results.

## THE ILLUSTRATIONS.

CONGREGATIONAL CHURCH, NORTON, MASS. MR. STEPHEN C. EARLE, ARCHITECT, WORCESTER, MASS.

THIS building was of the ordinary type of a New England meeting-house built about forty years ago. It has had the front rebuilt, and the interior entirely renovated, the finish being of California redwood. The work has been done wholly at the expense of Mrs. E. B. Wheaton, of Norton.

THE AQUEDUCT, SEGOVIA, SPAIN. SKETCHED BY MR. R. W. GIBSON, ARCHITECT, ALBANY, N. Y.

For description, see article on "Spanish Architecture."

PORTE DES CORDELIERS, LOCHES, FRANCE.

RESULTS OF TESTS OF THE TRANSVERSE STRENGTH OF BEAMS. — PLATE VIII.

For description, see article on the "Transverse Strength of Timber."

STABLE FOR W. L. BUTLER, ESQ., BROOKLYN, N. Y. MESSRS. ROSSITER & WRIGHT, ARCHITECTS, NEW YORK, N. Y.

HOUSE FOR C. D. FARLIN, ESQ., DETROIT, MICH. MESSRS. WM. SCOTT & CO., ARCHITECTS, DETROIT, MICH.

The cost of this house is about $9,000.

## BRONZE CASTING IN BELGIUM. — I.

THE following technical description of the method of casting bronze *à la cire perdue*, as carried on by the Compagnie des Bronzes at Brussels, has been prepared by Sir J. Savile Lumley, and published in the *Architect*.

Supposing the work to be reproduced to be the portrait-bust of a man with curly locks and a long flowing beard, such a head would not be easy to cast by the ordinary process, owing to the difficulty of conveying the liquid bronze into the cavities of the curls and the interstices of the beard, but this is easily overcome when the bust is cast by the wax process. The different operations to be carried out are as follows: 1. The production of the model in plaster or terra-cotta by the artist sculptor. 2. Its reproduction in wax by the founder. 3. The repairing and retouching of the wax bust by the artist sculptor. 4. The preparation for casting the bust before forming the mould and cope. 5. The formation of the mould. 6. Firing. 7. Casting. 8. Finishing and decorating the bronze bust.

1. *The Model.* — The bust produced by the sculptor, which may be in terra-cotta or plaster, finished as far as the artist thinks advisable, is handed over to the founder.

2. *The Reproduction in Wax* requires three distinct operations: A. The formation of a piece-mould; B. The reproduction of the bust in wax; C. Running the core.

A. *The Formation of a Piece-Mould.*— After having examined the bust so as to be thoroughly acquainted with its difficulties, the workman proceeds to cut off with a twisted wire the projecting portions of the beard and the hair, which, from the cavities of the locks and curls, would present difficulties for casting. The parts thus removed are afterwards easily replaced. The bust is now reduced to a very simple instead of the complicated form it at first presented. The plaster mould is then made in the ordinary way: the bust being laid on a table, face upwards, is fixed in that position by lumps of modelling clay, so that one-half of the thickness of the bust is completely covered, the remaining half presenting the appearance of a figure floating on its back in water. The workman then begins to make the pieces of the mould: taking the liquid plaster, which is of the consistency of thick cream, he forms a cube of five centimetres high, and the same length and width, which he squares as soon as the plaster begins to harden; with this cube of plaster he covers a first portion of the surface of the bust; close to this first cube a second is formed, and so on till the whole bust is covered with an irregular mosaic of plaster cubes, care being taken to prevent them from adhering to each other, or to the bust, by the application of a strong solution of soap. The surface of these cubes, after being well wetted with this solution, is covered over with a very thick coating of plaster, which is called the cope, the place of each cube having been previously marked. The first half of the piece-mould is now complete. The moulder then turns the bust with the face down onto the table, fixing it as before, and proceeds to cover the back in the same way with cubes of plaster, so that when this second half is also covered with a thick plaster cope, a complete mould is formed in two halves. The great art of the moulder is to make the piece-moulds at the same time simple and solid, and fitting so closely together as to leave the least possible trace of the joints on the plaster cast produced from it. Care must also be taken that in handling the mould none of the small pieces should detach themselves from it.

The mould being completed, it is opened: that is to say, the two plaster copes are separated, the bust, which is intact, is taken out, leaving a complete mould in which other busts can be cast, just as bullets are cast in a bullet-mould.

The next operation is the reproduction of a bust in wax, precisely like the original in plaster.

B. *Reproduction in Wax.* — One-half of the piece-mould is placed

on the table,— that is to say, one of the copes, with all its pieces,— and the mould is wetted with water in order to prevent the wax from adhering to it. The workman then, with his thumb, presses wax into all the hollows of the mould; this is an operation of considerable delicacy. The wax, which must be very pure and malleable, is affected by the weather, working more easily in summer than in winter. The most suitable quality for average temperature is composed of 1 kilogram of yellow wax, 6.200 kilograms of mutton fat, 0.100 kilogram of white pitch, melted together and colored a deep red with orcanette root.

The wax pressed into the mould should be 2 millimetres thick. When all the hollows of the first cope have had wax of the requisite thickness pressed into them, the same process is applied to the second cope. The two copes, on being united, form a complete mould; they are then tied together with strong cords, and the joints of the copes are smeared with clay, so that the mould shall be water-tight.

In the meantime another description of wax, of harder consistency, composed of 1 kilogram of yellow wax, 1 kilogram of resin, and 0.250 kilograms of Venetian turpentine, has been melted in a cauldron and allowed to stand on the fire until the froth has subsided.

The wax being ready is allowed to cool to 60° or 70° Centigrade, when it is poured into the mould, which it fills, and is allowed to remain there for forty seconds; the liquid wax is then poured out of the mould into a bucket prepared to receive it. On examining the interior it will be found that the soft wax which was pressed into the mould has received throughout a coating of strong wax, 3 or 4 millimetres in thickness, making an entire thickness of 5 or 6 millimetres, which will be the thickness of the bronze when cast.

C. *Formation of the Core.* — The core is the substance with which is filled the hollow left in the mould after the liquid wax is poured out of it. If the bust were cast in bronze without a core it would come out solid and weighing ten or fifteen times heavier than is necessary, and the casting itself would be faulty, owing to the great shrinkage produced by such a mass of molten metal, which would also have the effect of vitrifying the earths forming the mould. The core is, in fact, indispensable in the reproduction of artistic bronzes. The core in use by the Brussels Compagnie des Bronzes is formed of a mixture consisting of two parts of fine plaster-of-Paris and three parts of a pulverized earth composed of quartz sand, thin argillaceous clay with traces of iron oxide, carbonate of lime, magnesia, and potash, mixed together with pure water, forming a liquid paste which is called "*potin*," and which, like plaster-of-Paris, hardens very rapidly.

Having calculated the capacity of the hollow left by the wax, a quantity of *potin* sufficient to fill it, is prepared and poured into the hollow, leaving enough of the mixture to form a pedestal projecting about ten centimetres from the bottom of the bust. The core, having been thus poured into the hollow, is left to harden.

Before proceeding farther it is necessary to describe the means by which an escape is provided for the air or gases of the core, which, if not set free, might destroy, twist, or otherwise injure the bronze.

This is effected by what is called, in the language of the foundry, a "lanthorn" or chimney, by which the core of every work in bronze must communicate with the external air. The core being composed of porous matter, it is easy to understand that when the molten metal enters the channel prepared for it, the core being completely isolated and superheated, the gas within it is violently dilated, and would force a passage through the fused metal if a vent were not prepared for it. If, owing to an accident or faulty arrangement, the lanthorn should not act, the bronze figure containing the core would be inevitably bulged and distorted, and would have other defects which would considerably diminish the value of the work.

In the case of the bust already described, when the piece-mould is emptied of the liquid wax that has been poured into it, and just as the *potin* which is to form the core is about to be poured in, a round stick, about sixteen millimetres in diameter, having a pin or iron point at the end, after being well oiled, must be fixed into the centre of the hollow of the bust, so that the pin should project through the wax of the top of the head. The stick must be held in this position while the *potin* is poured in round the stick, and when the *potin* begins to harden, which it will do in a few minutes, the stick is twisted out, leaving, of course, a hollow the size of the stick traversing the bust from the base to the head. After the artist-sculptor has retouched the wax bust, the mark left by the point of the stick is sought, and sufficient wax is removed round it to permit of a small iron tube of the same diameter as the hole left by the stick being forced two or three inches deep into the head, leaving, however, a portion projecting from the head and beyond the block-mould when it is formed over the wax bust.

Any crack that may appear between the tube and the hole is carefully closed, and the wax is retouched where the tube projects from the head.

If the tube were not forced sufficiently into the head, or if the joint were not properly closed, the molten bronze would find a passage and fill up the chimney left for the escape of air from the core — an accident which would give rise to effects like those above referred to.

In complicated pieces the proper formation of the lanthorn is of the greatest importance; it is often difficult to arrange, and requires considerable experience to make and place it properly.

I am unable to give the precise proportions of the earths of which the *potin* is composed, which is in fact the only part of the process concerning which any reserve is shown.

The mould is then placed on the table, the cords are unfastened the clay closing the joints of the two copes is removed, and by inserting a wedge between the two copes the upper cope is carefully lifted off. The workman then removes, one by one, all the little pieces forming the mould, exposing the corresponding parts of the bust in wax. When all the pieces are removed from the front, the bust is placed upright on its base of *potin* and the cope covering the back is then removed in the same way, together with the pieces forming the mould.

These pieces are then carefully returned to the cope, each in its place, and the mould when put together again is ready to be used for another wax bust when required.

The bust now appears in wax, reproducing exactly the original bust in clay, with the exception of the seams from the joints of the mould, which are then removed by the artist-sculptor himself.

Although wax is neither as easy nor as pleasant a material to work in as modelling-clay, a very short time suffices to enable the sculptor to manipulate it with facility, and an opportunity is afforded him of giving the finishing touches to his work with still greater delicacy than in clay.

It is at this period that the beard and curls of the hair which were removed before making the mould, and which have been separately reproduced in wax by the same process, are fixed in their respective positions by iron points which are driven through the wax into the solid core, and hold the pieces firmly in their places; the artist then going over the joints with a modelling-tool renders them invisible.

## TRANSVERSE STRENGTH OF TIMBER.[1] — VIII.

No. 46.—Spruce joist, 3¼″ top, 3⅜″ bottom x 12″; span = 10′ 2″ quite clear; loaded at centre; slight ring shake at ends.

Tested by Professor Lanza and E. F. Ely, assistant.
No deflections taken.

6072 lbs. First cracks heard at neutral axis, north end. Piece was a little shaky there before.
13572 " Load falling off; upper fibres crushing.
13772 " Cracking at neutral axis. Broke by shearing at south end.
Modulus of rupture = 4746 lbs. per square inch.
Max. intensity of shear at neutral axis = 233 lbs. per square inch.

No. 47. — Hard-pine, 3″ x 13¼″; date, February 17, 1883; weighed 44.7 lbs. per cubic foot; span = 14′; loaded at centre.

Tested by Messrs. Bardwell, Fuller & Harriman.

| Loads in lbs. | Deflection in inches. | Differences. | Remarks. |
|---|---|---|---|
| 374 | .0000 | | 11.15 A. M. |
| 574 | .0087 | .0087 | |
| 1074 | .0431 | .0344 | |
| 1574 | .0751 | .0320 | |
| 2074 | .1069 | .0318 | |
| 3074 | .1700 | .0631 | |
| 2784 | .1637 | —— | 9.40 A. M., next day. |
| 3074 | .1811 | .0174 | |
| 4074 | .2431 | .0620 | |
| 5074 | .3045 | .0614 | |
| 6074 | .3683 | .0638 | |
| 8074 | .4907 | .1224 | |
| 10074 | .6176 | .1269 | |
| 12074 | .7471 | .1295 | |
| 14074 | .8727 | .1256 | |
| 19574 | —— | —— | Breaking load by tension and compression. |

Compression break was started by the crushing into the wood of the plates under the cross-bar of the yoke.
Weight of beam = 179 lbs. (estimated.)
Modulus of rupture, neglecting the weight of the beam = 8696 lbs. per square inch.
Modulus of rupture, taking into account the weight of the beam = 8736 lbs. per square inch.
Modulus of elasticity = 2386096 lbs. per square inch.
Max. intensity of shear at neutral axis, neglecting the weight of the beam = 356 lbs. per square inch.
Max. intensity of shear at neutral axis, taking into account the weight of beam = 359 lbs. per square inch.

No. 48.—Western oak (red) 6″ x 12″; span = 19′ 6″; loaded at centre.

Wednesday, February 21.
Heart through centre.
Weighed 54 lbs. per cubic foot.
Tested by Messrs. Bardwell, Fuller & Harriman.

| Loads in lbs. | Deflection in inches. | Differences. | Remarks. |
|---|---|---|---|
| 576 | .0000 | | |
| 1076 | .0850 | .0850 | |
| 1576 | .1843 | .0993 | |
| 2076 | .2876 | .1033 | |
| 3076 | .5145 | .2269 | [creasing. |
| 4076 | .7162 | .2017 | Load left on 3 hours before in- |
| 6076 | 1.2071 | .4909 | |
| 6776 | 1.3823 | .1752 | |
| 9276 | 1.5213 | .1390 | |
| 13776 | —— | —— | Breaking load. |

Weight of beam = 526 lbs.
Modulus of rupture, neglecting weight of beam = 5596 lbs. per square inch.
Modulus of rupture, with weight of beam = 5720 lbs. per square inch.
Mean deflection for 500 lbs. = .0874 inches.
Modulus of elasticity = 1766839 lbs. per square inch.
Max. intensity of shear at neutral axis = 144 lbs. per square inch without weight of beam.
Max. intensity of shear at neutral axis = 149 lbs. per square inch with weight of beam.

[1] By Gaetano Lanza, Professor of Applied Mechanics, Massachusetts Institute of Technology. Continued from page 117, No. 428.

No. 49.— Spruce joist (Bangor), 3¾″ x 11¼″; span = 14′; loaded at centre; heart.
Cut from the lower half of the tree.
Slightly cross-grained at lower fibres.
Tested by E. F. Ely, assistant.
No deflections taken.

11976 lbs. First tension break.
12076 " Broke finally by tension and compression.
Modulus of rupture = 5878 lbs. per square inch.
Max. intensity of shear at neutral axis = 205 lbs. per square inch.

No. 50.— Hard-pine, cut at Apalachicola, Fla., 4″ x 14 1/16″; span = 21′; loaded at centre.
Bad heart check at one end; rather poor.
Tested by Messrs. Bardwell, Fuller & Harriman.

| Loads in lbs. | Deflection in inches. | Differences. | Remarks. |
|---|---|---|---|
| 575 | .0000 | | |
| 1075 | .1230 | .1230 | |
| 1575 | .2509 | .1279 | |
| 2075 | .3815 | .1306 | |
| 2875 | .6035 | .2220 | |
| 4075 | .9442 | .3407 | |
| 5075 | 1.2556 | .3114 | |
| 5975 | 1.5460 | .2904 | |
| 12375 | — | — | Shearing at the top along an old crack at one end. |
| 12875 | — | — | Broke by shearing at opposite end. |
| 5875 | — | — | Load after breaking. |
| 6575 | — | — | Upper half of beam broke by tension above the shear. |

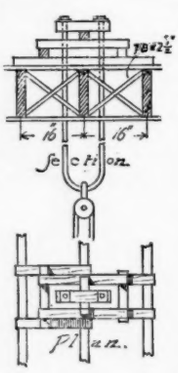
Estimated weight of beam = 365 lbs.
Modulus of rupture, neglecting weight of beam = 5914 lbs. per square inch.
Modulus of rupture, with weight of beam = 6000 lbs. per square inch.
Mean deflection per 500 lbs. = .1431 inches.
Modulus of elasticity = 1256256 lbs. per square inch.
Max. intensity of shear at neutral axis = 177 lbs. per square inch with weight of beam.
Max. intensity of shear at neutral axis = 172 lbs. per square inch without weight of beam.

No. 51.— Oak, 4¼″ 14¾″; span = 15′ 6″; loaded at centre.
Estimated weight = 355 lbs.
Tested by Messrs. Bardwell, Fuller & Harriman.

| Loads in lbs. | Deflection in inches. | Differences. | Remarks. |
|---|---|---|---|
| 276 | .0000 | | March 3, 1883. |
| 576 | .0277 | .0277 | |
| 1076 | .0717 | .0440 | |
| 761 | .0615 | — | Load next morning. March 6. |
| 276 | .0155 | — | Started again. |
| 1076 | .0907 | .0752 | |
| 2076 | .1911 | .1004 | |
| 3076 | .2882 | .0971 | |
| 4076 | .3891 | .1009 | |
| 5076 | .4914 | .1023 | |
| 7076 | .6944 | .2030 | |
| 9076 | .9038 | .2094 | Cracks heard. |
| 17076 | — | — | Sharp crack heard; some of the fibres gave way at lower edge. |
| 19076 | — | — | Broke by tension; held 17376 afterwards. Raised to 18476; broke further. Load fell off to 13176 lbs. |

Modulus of rupture = 6060 lbs. per square inch.
Mean deflection for 500 lbs. = .05135 inches.
Modulus of elasticity = 1240728 lbs. per square inch.
Max. intensity of shear at neutral axis = 234 lbs. per square inch.
Modulus of rupture, taking into account the weight of the beam = 6116 lbs. per square inch.
Max. intensity of shear at neutral axis with weight of beam = 238 lbs. per square inch.

No. 52.— Section of a floor between the trimmers. Spruce; three tail-beams (2″ x ″12) each, framed into a 3¾″ x 11¼″ header; header in turn framed into sections of the trimmers by double tenon and joint-bolt, cross-bridged in two places; tail-beams framed by tusk-and-tenon joint; pinned; floored over and furred below; load at centre; distributed between the three tail-beams by bridging.



Span = 16′; weight of joist, flooring, etc., = 331 pounds.
Tested by Mr. Paddock.
Deflections measured on the two outside joists.

| Loads in lbs. | Deflection in inches. | Differences. |
|---|---|---|
| 438 | .0000 | |
| 738 | .0331 | .0331 |
| 1238 | .0862 | .0531 |
| 1738 | .1451 | .0589 |
| 2238 | .1986 | .0535 |
| 2738 | .2639 | .0653 |
| 3238 | .3299 | .0660 |
| 3738 | .3800 | .0501 |
| 4238 | .4624 | .0824 |
| 4738 | .5083 | .0459 |
| 5238 | .5702 | .0619 |
| 6238 | .6748 | .1046 |
| 7238 | .7955 | .1207 |
| 8238 | .9324 | .1369 |
| 9238 | 1.1030 | .1706 |
| 10238 | 1.1954 | .0924 |
| 11238 | | |

11238 lbs. = breaking load.
Joist on east side broke by splitting off at the tenon; bore 7988 lbs. after; raised load; centre tail-beam broke by tension at 9988 lbs. on account of cross-grain in the lower fibres. A split also started at the lower tenon of the header which at the time of breaking was rapidly increasing.
Average modulus of rupture of the tail-beams, including their own weight, etc., = 3801 lbs. per square inch.
Average modulus of elasticity of tail-beams = 1399141 lbs. per square inch.

## THE FABRIC OF WESTMINSTER ABBEY.

FOR some time past, says a writer in the *Times*, it has been known that the fabric of Westminster Abbey is in a condition requiring the most extensive repairs. The interior, indeed, is in good order, and it may be hoped that a long time will elapse before any further restorations are necessary to it. But with the outside the case is different. Beneath the coating of grime and dust with which long ages have covered the structure, and which conceals the decay from the eye of the casual passer-by, there has long been going on a process of decomposition which, if not arrested, must speedily cause the ruin of the building. The Dean and Chapter, well aware of this state of things, have taken measures to be fully and exactly informed of the extent of the danger, and have long been casting about for a means of meeting it. In March, 1882, they received a report from Mr. John L. Pearson, R. A., the well-known architect, on the state of the Abbey, which was by no means calculated to set their fears at rest. As this report has now been for some two years before the authorities, there is no indiscretion in our mentioning the principal points of it. Mr. Pearson begins by discussing the history and condition of the clerestories of the nave and transepts, and describes the work as left by Sir Christopher Wren in the beginning of the last century. He charges Sir Christopher, who had undertaken the external restoration of the Abbey, with having cut back the wall surface two or more inches — a treatment which could hardly have answered with the best weather-stone, and which was certain to fail with the softer freestone that had been used throughout the Abbey. For the credit of Wren, however, it may be remarked that Mr. Pearson's judgment is contradicted by an express statement of Wren's, who, in the letter dated June, 1713, when he was a very old man, declares that he faced the walls with Burford stone. It is difficult to decide between two statements that contradict one another so flatly; but whether Wren cut back the face of the walls or not, his restoration of them has not proved very successful. Wren also cut out and replaced the freestone window-jambs and other features, and apparently in several cases altered the lines in the old mouldings in such a manner as to make it difficult to discover the ancient detail. The Oxfordshire stone which he used, though beautiful in color and texture, has been clearly shown to be incapable of resisting the London atmosphere.

As regards the wall surfaces around the clerestory windows, wherever the freestone has been allowed to remain, they have become very seriously decayed, the decay having in some places penetrated to a depth of seven inches or eight inches, so that the architect is surprised that the heavy cornices and parapets should have found a sufficient support in so ruinous a wall. Just before his report, in some of the very worst places on the south side of the nave, the superstructure had been removed and the face of the wall rebuilt; but this only went a very little way, and Mr. Pearson's opinion two years ago was that "immediate and very extensive repairs and restorations were urgently needed for the whole of the masonry of these clerestories."

Very much the same was his conclusion in regard to the flying-buttresses supporting the clerestory walls. In some places they are dangerous, and in others so decayed that pieces of stone are constantly falling from them upon the lead roofs below. The clerestory of the choir is also urgently in need of repair, though its condition is not quite so bad as that of the nave and transepts. Going round to the south side of the nave, over the cloister roof, the report is of the most gloomy character, declaring it is scarcely safe to pass along this cloister roof, or, indeed, along any of the lower roofs. "Large pieces of stone are continually falling, being detached by the rusting of the iron clamps with which the masonry was thoughtlessly put together. Very considerable damage has from this cause been done to the western towers, the whole surface of which is disfigured by the bursting off of triangular and other shaped pieces of stone; these heavy pieces fall not infrequently, and do much damage." As to the transepts, that on the south side has been recently restored under the direction of the late Sir Gilbert Scott; and the porch of the north

transept is also new, but above that porch the masonry is in places very loose and unsafe, and demands complete and extensive repairs. The stone-work of the clerestory of Henry VII's chapel, of the flying-buttresses, and of the pinnacles is also badly decayed, though in this part of the building the ruin may be arrested by timely measures. The cloisters also require some restoration, but they might be allowed to wait till the body of the Abbey has been dealt with.

It is thus evident that if Westminster Abbey is not to be allowed to fall into ruin very considerable works must be at once undertaken in order to save it. The question then arises, how are the necessary funds, which are estimated at from £60,000 to £80,000, to be raised, and by what means may future generations be spared the periodical scandal of discovering that this great historical church has fallen into decay? A slight retrospect of the history of the fabric of the Abbey, with a special view to this question of a fabric fund may here be not out of place, and it will at least show that we of this generation are not alone in making the discovery that a great mediæval building is a costly heritage. While the monastery of Westminster existed—*i. e.*, from Edward the Confessor's reign to the Dissolution in 1540—there seems to have been no definite provision for the maintenance and repair of buildings belonging to the monks. Two reasons may be given for this. The Abbey was in close connection with the Crown, and the abbots were individually of great power and wealth. It was seldom difficult for the monks to obtain what sums were necessary from the king for the support of a building where kings were crowned and buried, and many parts of which had been built by the benefactions of kings. Under Henry II, Abbot Laurence obtained a grant from the King and the Empress Maud for the purpose of repairing the Abbey buildings and re-roofing them with lead; and the same abbot, and many of his successors, obtained from time to time leave to impropriate livings for the same purpose — the very converse, it may be remarked, of the proceedings of the present day, when so many of the cathedrals have been mulcted for the benefit of the smaller livings. The contributions made by Henry III to the rebuilding of the abbey and the building of the Chapter-House are a matter of history, and Henry III's benefactions were continued by many of his successors. The abbots, again, were generous. The fourteenth century has left numerous records of individual abbots contributing to the work of building and rebuilding, the most munificent of all being Archbishop Langham, abbot from 1349 to 1361, who, both in his lifetime and by his will, gave so much money to the Abbey that by that means, and with aid from Richard II, the building of the nave was pushed forward, the abbot's house and the Jerusalem Chamber were added, and the cloisters completed. But by the time of Edward IV we find that the Abbey had fallen into an unsatisfactory condition, and that especial efforts were necessary in order to extricate it. A curious letter from the King to the Pope, written in the year 1478, and dated, "*Ex oppidulo nostro Grenewici*," is printed in the history of the Abbey, which was written in the last century by Richard Widmore, appealing in a piteous manner to His Holiness to excuse the newly-elected abbots from the costly journeys to Rome for confirmation, on the ground of the poverty of the monastery. The King writes: —

"We pray you that the Apostolic See should condescend to succour the Monastery, which is now not only tottering but almost fallen, and which is on the point of utter ruin. A part of that Monastery, indeed, our ancestors built, and that portion is even now almost wasted by age; but the greater part they left unfinished, and of this up to the present time the poverty of the monastery has prevented the completion, partly through the expense of the confirmation of the newly-elected abbots, and partly through the badness of the seasons and the floods, which have ruined the greater part of the estates of the Monastery."

A pathetic appeal, truly, and one which ought to find an echo in the hearts of every cathedral chapter and of every country clergyman of our own day, when agricultural distress has once more become a bitter reality.

Neither in Henry VIII's time, when the royal munificence was expended upon the famous chapel, nor up to the Dissolution, nor during the short ten years from 1540 to 1550, when Westminster was a bishopric, nor on the reconstitution of the Abbey as a Collegiate Church in 1560, were any separate estates or funds set apart for the support of the fabric. Dean Williams (1620–1640), who was also Bishop of Lincoln, and afterwards Archbishop of York, spent no less than £4,500 on the church alone, repairing at his own cost the north-west exterior, and the chapels on the southeast. Scandal, indeed, said that much of his generosity was at the expense of the prebendaries, but this was expressly contradicted in a Chapter Act of 1628, which indignantly denied that "our dean had done such repairs out of the diet and bellies of the prebendaries and revenue of the said church, and not out of his own." It was clear, then, that under Charles I there was no fabric fund in existence, and that the general tradition still survived which made the abbot or his successor mainly responsible for the maintenance of the building. It was only in 1662, after the Restoration, that Dean Dolben, afterwards Archbishop of York, prevailed on the Chapter to "assign henceforth one prebend's share" — *i. e.*, one-fifteenth of the total annual divisible income — to the maintenance of the fabric, a measure which was thought worthy of honorable mention in the Archbishop's epitaph. Until the handing over of the estates to the Commissioners the measure introduced by Dean Dolben was adhered to, but it is only too plain that the sum so assigned was totally inadequate. In 1697 a petition from the Dean and Chapter to the House of Commons stated that since the Restoration they had spent nearly £20,000 on the church, but that their surveyor reported that £40,000 more was needed, and, in consequence of this, an Act of Parliament granted to a Commission, on behalf of the Abbey, one-sixth of the proceeds of a duty levied on coals imported into London, the same to be assigned "for the repair of the Collegiate Church and for no other purpose whatever." The Act was to be enforced from 1700 to 1716, and by a new Act in the ninth year of Queen Anne the grant was commuted for a sum of £4,000 annually up to 1724 for the same purpose; but neither these large sums nor the ingenuity of Sir Christopher Wren sufficed to put the abbey into complete repair. Between the years 1731 and 1741 sums of £4,000 were granted in at least four or five sessions of Parliament; and in those years under the superintendence of Dean Wilcocks, the greater part of Wren's plans were carried out, including the erection of the western towers. We hear no more of appeals to Parliament until the present century, but in 1807 we find the Dean and Chapter petitioning the House of Commons, and stating that during the last twenty years they had expended nearly £29,000 on the church. A committee of inquiry sat, and a grant of £2,000 was immediately made, to be followed up during the years between 1809 and 1822 by grants amounting altogether to £42,000. Since that time, and until the transfer of the estates to the Ecclesiastical Commission, the one-fifteenth share of the divisible income of the Chapter agreed to in Dean Dolben's time was always devoted to the fabric, with the addition of any revenue from the sales of timber and money paid for monuments, and any odd surplus funds of which the Chapter might find itself possessed. The average expenditure in the years immediately preceding the transfer of estates was something over £2,300 — a sum which was largely increased after the commutation.

From Mr. Pearson's report, however, it is plain that this expenditure has been quite insufficient to keep the building in proper repair, and the question which is now under anxious discussion is by what means the very large sum immediately required can be raised. We understand that negotiations are in progress between the Dean and Chapter, the Ecclesiastical Commissioners, and the Government, out of which it is hoped that some prompt and satisfactory solution will be arrived at. What will be the exact nature of that solution is not as yet decided, and it would be premature to suggest any one course in preference to the others which are open. One method, however, we may deprecate, and with all the more confidence since we believe that it finds no favor with the Dean and Chapter. This is not a matter for a public voluntary subscription. Westminster Abbey is not the church of any group of individuals, or of any party, or of any sect, or even of the Establishment itself. It is bound up with the history of the nation. If the maintenance of the fabric is beyond the resources which the Chapter either commands at present or by some judicious arrangement can be made to command, then the responsibility for it ought to fall, not upon a few benevolent individuals, but upon the nation as a whole.

## A CORRECTION.

NEW YORK, March 17, 1884.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

*Dear Sirs,* — Permit me to direct your attention to an error in the article on "The Mission Dolores" in the current issue, viz.: the change of the last word from "calms" to "palms."

Very respectfully yours,

CHARLES W. STOUGHTON.

## ANOTHER COMPETITION.

CHICAGO, March 10, 1884.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

*Dear Sirs,* — A company in another city proposed to erect a building in Chicago to cost not less than $500,000. In regard to this work we not long ago received a letter, which reads about as follows: —

"If you are desirous of making competitive plans for this building you can do so with the following understanding: —

"Five hundred dollars will be paid for the adopted plan; $300 will be paid for the second best; and $200 will be paid for the third best, with the privilege of using any part of the second or third best that may be desirous to use, for which nothing will be paid. If you are willing to go into the competition on this basis you will address the undersigned to that effect, with such letter as will clearly explain your understanding of the proposition."

This letter was signed by the manager of the company. To this communication we sent a letter about as follows: —

"We are in receipt of the proposition in regard to your building here. Thanking you for the confidence you evince in us by selecting our firm as one of the four competitors, we beg leave to accept your proposition, with a slight modification, and one which we think you will agree with us is just and fair to all parties.

"We will send in drawings for the building upon the understanding that if our plan is deemed the most meritorious we are to be the architects of the building, and superintend its construction. That if our plan is not accepted we shall receive no compensation, and the drawings shall be returned to us, the company not being entitled to make any use of them."

The same day the following reply in substance was received: —

"Have submitted your communication to the Secretary of the

Company and one of the Building Committee, both of whom are here, and by their directions I am instructed to advise you that the conditions mentioned by you, under which you are willing to submit plans for the building cannot be conceded, as they are not in accordance with the conditions under which the three other architects already selected are preparing plans to be submitted."

One of us then called on the Secretary and Committeeman, and they reiterated what the Manager had written. The following remarks were then made to them: —

1. "We cannot see how any of our competitors can object to our giving up all claim to any special prize.

2. "No architect in good standing could object to our taking back drawings, and refusing you the use of them, if we are not selected to carry on the work. At any rate we will call upon our competitors, and gain their consent for us to go into the competition on these conditions, and are sure they will not refuse."

To this the Secretary representing the Home Board made reply: "Well, to tell you the truth, we did rather hope to get ideas from each of you to be incorporated into a final plan."

Now this at last was an honest appearance of the old mole. In reply to it the following was advanced: —

"Our capital is our ideas, and we, of course, cannot afford to make you a present of them. We are not in business for that purpose, nor will we sell them for less than market value, and yet this is exactly what you expect us to do, with our eyes open. We *can* afford, however, to give some time to the study of a problem with view of winning the grand prize, namely, — the position of architect, if we are at the same time sure that upon failing to do it we lose nothing but time, and that you do not get anything without paying us just value for the goods."

The Committeeman pondered and said: "Your position seems sound and just to me. I wish we could say to you here and now that your firm might go in as you propose, but we are bound by the exact orders of our Board of Directors at home, and we cannot depart from them without new action on their part."

In other words, this Board of Directors has determined to obtain the advice and assistance of certain picked architects without adequately paying them, and this scheme of theirs is directly for that end.

It seems from their account that three at least have accepted these humiliating terms, and further that two of them will in the end have contributed to the value of the Company's property without receiving more than two or three percentage of their commissions. We refused to go into such a competition, and dropped the matter at this point.

Will you not put this matter before the architectural profession at large, in order that the self-respecting element may distinctly see the trap into which they are led by competitions of this phase?

They are always arranged to enable the men who have control to obtain the best possible design, and then employ whomsoever their personal inclination dictates.

Our experience is that under agreements of the above character the owner adopts the really best arrangement for his use, but the man who made it is thrown aside with little or no remuneration, while a friend of the owner gets the name and fame.

If competing architects will demand written agreements similar to the one we proposed with the above company they will be protected. The owner will get what he fairly pays for and nothing more, and the architect's temper and general business will be more satisfactory. Of course, when a competition is formed on this basis the drawings should be displayed to the competitors as soon as received by the owner.

Very truly yours, Burnham & Root.

## TO ARTIST DECORATORS.

To the Editors of the American Architect: —

*Sirs,* — You have frequently called attention in your columns to the wretched farces called "competitions." Will you also call attention to the pernicious custom that is prevalent with decorators of furnishing designs without remuneration? A good design implies thought and labor, neither of which an artist of repute can afford to squander. The fault lies with the profession rather than with the public, and is the result of those petty jealousies from which the architects have long since freed themselves by association.

Very respectfully,

Frederic Crowninshield.

## TRAP-SCOURING.

Cleveland, Ohio, March 12, 1884.

To the Editors of the American Architect: —

*Gentlemen,* — In connection with your article on "Sanitary Plumbing" in your number of March 8th, the author says in his description of his "anti-siphon" trap: "It would be as unreasonable for the advocates of branch-waste ventilation to expect to find a harmful sediment on a surface so scoured as it would be to look for dirt on the polished face of a boulder lying in the bed of a mountain torrent." Did the author ever, as a boy, wade in a stream of swiftly running spring water, and slip when stepping on a large rounded stone on account of the almost imperceptible vegetable slime upon it? Again, even allowing that no harmful sediment will accumulate in the sharp angles of his trap from the waste fluids during their rapid passage, how about the accumulation of slime in those places where the foul liquid in the trap is in a state of repose? Does he expect that one flush will scour out all the matter that has accumulated since the last one before it? Seeing that the discussion in regard to the fouling of the trap is entirely theoretical, I ask these questions.

Respectfully, C. O. A.

## NOTES AND CLIPPINGS.

Earthquake Observatory. — An earthquake observatory is building in Japan by Professor Milne, of the Imperial Engineering College in Tokio. This novel observatory is fitted up deep in the coal mines of the Island of Takashina, not far from Nagasaki. Instruments are placed at different levels in the mines, which will afford measures of the relations in time, intensity, etc., between earth tremors below ground and those observed at the surface. — *Exchange.*

The old Senate House, Kingston, N. Y. — What is believed to be the oldest public building in the United States is now offered for sale at auction at Kingston, N. Y. It is known as the old Senate House of 1777, is situated on upper Clinton Avenue, and is a quaint-appearing old mansion erected by one Colonel Wessel Ten Broeck in 1676. The front walls are of stone and two feet thick, and the back is constructed of bricks imported from Holland. The house came into Mr. Westbrook's possession by inheritance. The old oaken beams are good for centuries to come. Some of the upper portion, being of wood, was destroyed by fire by the British in 1777. This has been carefully replaced. In this building sat the Senate of New York State during the adoption of its first constitution in 1777; and all the great men of the State were wont to assemble here in those stirring times.

Marine Salvage and Architecture. — Occasionally the utilization of odd materials results in grotesque buildings and veritable curiosities of architecture. For example, one of the Western papers recently described a house that has been built in a dry, sandy gulch on the north side of San Pedro harbor. The building is said to be a handsome square house, with a piazza extending around it, and a flagstaff surmounting the whole. It has been built from shipwrecks. On the top there is painted, on the stern of a wrecked ship, the words "Ocean Villa," which serves to indicate the nature of the building as well as its peculiar origin and location. The house and all its surroundings are made up of parts of ocean wrecks. The building is a combination of bulwarks, bulkheads, lockers and cabins. The principal room is the cabin of a first-class ship. The room above it is the cabin of a bark. The kitchen is the galley of a wrecked merchantman. No two rooms in the entire building are alike, and all preserve their original appearance. Some are ceiled with the most expensive woods. The owner has constructed this building from wrecks that he has been gathering during ten years past. The interior walls are said to be covered with marine curiosities gathered by sailors in all parts of the world. — *The Metal Worker.*

An Australian Light-House. — The Macquarie Light-house, at the entrance to Port Jackson, says an English contemporary, is one of the largest and finest in the world; it is also the grandest example of electric-lighting of which the southern hemisphere can boast. It was commenced on March 1, 1880, and the light in connection with it was brought into operation on June 1, 1883. The old light-house, which the new one has replaced, was built in 1816, and was the first structure of the kind in the southern hemisphere. It is equally interesting, and also illustrative of the enterprise of the Colony, that the electric-light is the first used for light-house purposes. The light is of the first order, sixteen-sided, dioptric, holophotal revolving white light, of the system of Fresnel, showing a flash of eight seconds in every minute, and having a range of twenty-five miles seaward. It is, however, discernible for a considerably greater distance, owing to the luminosity produced in the atmosphere by the electric beam before the direct rays become visible. It was constructed by Chance Brothers & Co., of Birmingham, under the supervision of Mr. James N. Douglas, engineer to the Trinity Board, who states, "the Macquarie light is at the present moment the most efficient in the world." Also that he had "invented an improvement in oil and gas burners by which a greater condensation of the focal light is effected than hitherto," which he had "placed at the disposal of Messrs. Chance Brothers for the Macquarie light, free of royalty, and consequently the gas and oil burners for use during clear weather have, with flames of one and one-half inch diameter, an intensity of about 200 candles instead of 80 candles, with the same diameter as with the old type of burner originally intended. When these flames are at the focus there is a consumption with the sixteen-candle gas of about forty cubic feet per hour, and with good paraffine of about one pint per hour, and I estimate the mean intensity of the flashes from the apparatus at about 40,000 candles, or about five times the intensity of the flashes of the present Macquarie light. With full power of the electric-light at the focus, the mean intensity of the flashes in the direction of the sea horizon is not less than 5,000,000 or 6,000,000 of candles. By a simple arrangement the change from gas light to electric-light at the focus, or the reverse, can be effected in ten seconds, and the flames of the oil lamp can be substituted for the gas or electric light in nearly the same space of time." The Macquarie light-house is intended only to illumine half the horizon; it is, therefore, possible to make use of the landward rays by means of a dioptric mirror. This is probably the first instance of the use of a dioptric mirror for an electric-light. Special adjustment was needed to attain the result in a satisfactory manner. The whole apparatus is carried on a round pedestal, which offers the great advantage of enabling the keeper to enter without interfering with the rotation of the apparatus. Arrangements are made to burn either gas or paraffine oil, or to exhibit the electric-light at full power or half power. When the electric-light is in use there is always a second lamp in readiness for action.

# 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.]*

294,524. CAPPED WOOD-SCREW.—Edward Stiemke, Milwaukee, Wis.

294,535. SPEAKING-TUBE ANNUNCIATOR.— Joseph Walter, New York, N. Y.

294,560. LOCK. — Rudolf E. Woodrich, New York, and Chas. Langbein, Brooklyn, N. Y.

294,569. ADJUSTABLE BLOWER FOR FIREPLACES AND STOVES. — Frank S. Bissell, Pittsburgh, Pa.

294,573. FASTENING DEVICE FOR DOORS. — John E. Bozell, Tipton, Ind.

294,626. BANK-VAULT. — John T. Hough, Chicago, Ill., and John A. Harper, Pittsburgh, Pa.

294,629. FIRE-ESCAPE. — George R. Jenkins, Weston, Ky.

294,635. EXTENSIBLE FIRE-ESCAPE. — Paul Kingston, Hastings, Minn.

294,642. WRENCH. — Orlando A. Lee, Mansfield, O.

294,643. KNOB OR HANDLE. — Charles S. Lewis, Waterbury, Conn.

294,647. ILLUMINATING TILE. — Jacob Mark, New York, N. Y.

294,663. SCREW-DRIVER. — William L. Parmelee, Ansonia, Conn.

294,665. ROOFING COMPOSITION. — John F. Perry. Chicago, Ill.

294,674. WATER AND STEAM COCK OR FAUCET.— Jos. Richter, Cincinnati, O.

294,676. PROCESS OF PRESERVING WOOD. — William W. Robinson, Ripon, Wis.

294,702. LOCK. — Warren H. Taylor, Stamford, Conn.

294,724. ROUTER-PLANE.—Henry P. Cope, Detroit, Mich.

294,736. VISE. — Henry A. Hyle, Redwood, N. Y.

294,746. LOCK-HINGE. — Thomas P. Straup and Louis Morgenstern, Easton, Pa.

294,762. RATCHET BIT-BRACE.—William R. Clarkson, Buffalo, N. Y.

294,767. AWNING. — Hugh B. Coyle, Philadelphia, Pa.

294,771. HEATING AND VENTILATING DRUM FOR STOVES. — John Franklin Davis, Altoona, Pa.

294,773. VENTILATING-DAMPER. — John P. Dorr, Neenah, Wis.

294,774. SASH-FASTENER. — Frederick Eberlein, Chicago, Ill.

294,776. WEATHER-STRIP. — Jeremiah R. Fogg, Salisbury, Mass.

294,777. WOOD-WORKER'S DOG.— John Forbes, San Francisco, Cal.

294,785. DOOR-SPRING. — William W. Jackson, Chicago, Ill.

294,787. FASTENER FOR THE MEETING-RAILS OF SASHES. — Eleazer Kempshall, New Britain, Conn.

294,809. DOUBLE-HINGE. — Charles C. Richmond, Boston, Mass.

294,820. VENTILATION.—Marshall B. Stafford, New York, N. Y.

294,822. KNOB-ATTACHMENT. — Oscar Stoddard, Detroit, Mich.

294,825. BENCH-PLANE. — Justus A. Traut, New Britain, Conn.

294,828. SCREW-DRIVER.—Alfred D. Wallen, Mendham, N. J.

294,842. ELECTRIC DOOR-PULL. — Charles Beile, Brooklyn, N. Y.

294,848. FIRE-ESCAPE.—Robt. Alfred Bush, Brockville, Ontario, Can.

294,855. SIDING AND CEILING FOR BUILDINGS. — George W. Crawford, Davenport Centre, N. Y.

294,860. FIRE-ESCAPE. — Elam Dye, San Francisco, Cal.

294,866. STONE-DRESSING MACHINE. — Essington N. Gilfillan and Samuel P. McKelvey, St. Louis, Mo.

294,879. FIRE-ESCAPE. — Ezra Randall Johnson, Buchanan, Mich.

294,881. KNOB-SPINDLE ATTACHMENT. — Horace K. Jones, Hartford, Conn.

294,887. FIRE-ESCAPE. — Theodore P. Lerton, Parsons, Kans.

294,894. SHUTTER BOWER AND FASTENER. —Wm. P. Marshall, Cambridge, Mass.

294,901. LOCK. — David Morris, Log Cabin, O.

294,905. PNEUMATIC DOOR-CHECK. — Gustavus S. Perkins, Hartford, Conn.

## SUMMARY OF THE WEEK.

### Baltimore.

DWELLINGS. — W. Claude Frederic, architect, has prepared drawings for L. H. Robinson, builder, for 3 three-st'y brick and terra-cotta buildings, each 15′ x 90′, to be erected on Lanvale St., between Fulton and Mount Sts., to cost about $10,000; and 2 Queen Anne dwells., on lot 36′ x 90′, to be erected on w s Carrollton Ave., n of Fayette St.

He has also prepared drawings for Jacob Saum, builder, for 4 three st'y and basement buildings, on lot 56′ x 132′, to be erected on McMechen St., near John St., and 8 three-st'y and basement buildings, each 16′ 6″ x 70′, commencing s w cor. John & McMechen Sts.; estimated cost, $32,000.

Chas. L. Carson, architect, has prepared drawings for Levi Strauss, Esq., for a three-st'y and mansard brick and terra-cotta dwell., 23′ x 90′, to be erected cor. Eutaw Pl. and Mosher St., and to cost $20,000; Henry Smith, builder.

George Archer, architect, has prepared drawings for I. E. Thompson, builder, for 28 dwells. to be erected, 8 on Barclay St., 15′ and 16′ x 46′; 10 on Lanvale, 17′ and 18′ x 46′, and 10 on Townsend St., 17′ and 18′ x 46′, of brick, with stone and terra-cotta finish; cost, about $70,000.

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

J. M. Wiley, three-st'y brick building, s s Edmondson Ave., w of Schroeder St.

Henry Blake, three-st'y brick building (square), e s Park Ave., n of McMechen St.

John Trainer, two-st'y brick building, s s Mosher St., w of Linden Ave.

Mrs. Margaret Hayes, three-st'y brick building, rear, w s Charles St., between Fayette and Lexington Sts.

Mrs. L. Wise, three-st'y brick building, e s Charles St., between West and Ostend Sts.

Mrs. A. F. Dulin, 2 three-st'y brick buildings, s s Monument St., e of Park St.

Geo. W. Robinson, Jr., 4 two-st'y brick buildings (square), e s Durham St., between Jackson Square Ave. and Fayette St.

Cath. Heldman, 3 three-st'y brick buildings, s s Lanvale St., between Pennsylvania Ave. and Wilmer Alley; and two-st'y brick stable, e s Wilmer Alley, rear No. 241, w s Pennsylvania Ave., n of Lanvale St.

Dr. William Rickers, three-st'y brick building, s e cor. Pennsylvania Ave. and Robert St., and two-st'y brick stable in rear.

L. H. Robinson, 3 three-st'y brick buildings (square), s s Lanvale St., between Fulton St. and Bruce Alley; and two-st'y brick stable in rear, w s Gilmor St., between Edmondson and Harlem Aves.

Jacob F. Olbrecht, two-st'y brick building in rear s w cor. Charles and West Sts.

Dr. John Thom, three or four st'y brick warehouse, e s Calvert St., between Saratoga and Pleasant Sts.

Geo. C. Hershman, 5 two-st'y brick buildings, n s Lancaster St., commencing n e cor. Cannon St.

F. Ollman, 3 three-st'y brick buildings, w s Front St., commencing s w cor. Fayette St.

Jos. Aulbach, three-st'y brick building, w s Hull St., s of Marriott St.

Conrad Ripple, two-st'y brick building, w s Paca St., between Sterrett and Hamburg Sts.

### Boston.

BUILDING PERMITS. — *Brick.* — *Newbury St., Nos.* 271–275, Ward 11, for Samuel T. Ames, 3 dwells., 25′ x 46′, three-st'y mansard; Denny & McClure, builders.

*Willard Pl., Nos.* 23–29, Ward 19, for C. W. Wellington, 4 dwells., 18′ x 34′, three-st'y flat; C. W. Wellington, builder.

*Lenox St., Nos.* 31–37, Ward 19, for C. W. Wellington, 4 dwells., 18′ 6″ x 36′, three-st'y flat; C. W. Wellington, builder.

*East Seventh St., No.* 537, Ward 14, for Eugene Simmons, store, 22′ x 51′, one-st'y flat; A. C. Barstow, builder.

*Hanover St., Nos.* 344–348, Ward 6, for John Lythgoe, dwell. and store, 33′ x 42′, four-st'y flat; ell, 18′ x 20′; M. S. & G. W. Miller, builders.

*West Broadway, No.* 474, Ward 14, for John M. Porter, dwell. and store, 27′ x 60′, three-st'y flat.

*Hanover St., Nos.* 426 *and* 428, cor. Fountain Pl., Ward 6, for Godfrey Morse, dwell., 30′ x 42′ 6″, four-st'y flat; J. H. Kelly, builder.

*Wood. — Sherman St.*, cor. Temple St., Ward 4, for Osgood & Hart, iron-foundry, 40′ and 60′ x 111′; ells, 40′ and 46′ x 50′ and 70′, one-st'y flat.

*Florence St.*, near Ashland St., Ward 23, for Thos. C. Bennett, dwell., 20′ and 26′ x 30′, two-st'y pitch; Alex. Rogers.

*Torrey St.*, near Washington St., Ward 24, for W. H. Maxcey, dwell., 14′ and 15′ x 22′ and 28′, two-st'y pitch; Miletus H. Jackson, builder.

*Evans St.*, opposite Stanton St., Ward 24, for C. M. Hickey, dwell., 20′ and 26′ x 42′, two-st'y pitch; J. H. Burt & Co., builders.

*Havre St., No.* 134, Ward 2, for Robert Ring, dwell., 21′ x 33′, three-st'y flat.

*Dudley St., No*, 781, Ward 20, for Geo. P. Brooks, store, 18′ and 25′ x 43′ and 50′, one-st'y flat.

*Clifton St.*, near Batchelder St., Ward 20, for Amos D. Gould, dwell., 22′ and 26′ x 31′, two-st'y pitch; A. D. Gould, builder.

*West Cottage St., Nos.* 33–37, Ward 20, for D. & W. Jamieson, 3 dwells., 21′ 7″ x 61′ 7″, 22′ and 26′ 6″ x 45′, and 22′ 7″ x 52′, three-st'y flat; Herman Drake, builder.

*Milton Ave.*, near Norfolk St., Ward 24, for Edward Barker, dwell., 21′ and 26′ x 28′, one-st'y pitch; J. & F. H. McDonald, builders.

*Centre St.*, near Dorchester Ave., Ward 24, for Ira A. Medbury, dwell., 20′ and 24′ x 30′, two-st'y pitch.

### Brooklyn.

BUILDING PERMITS.— *Conselyea St., Nos.* 50 *and* 52, s s, 284′ e Lorimer St., 2 two-st'y frame dwells., tin roofs; cost, $7,560 for both; owner, Albert Meyers, Conselyea St., near Leonard St.; architect, Geo. W. Springsteen; builder, A. McKnight.

*Palmetto St.*, s s, 125′ w Central Ave., three-st'y frame tenement; cost, $3,000; owner, Adam Schwerd, Central Ave.; builder, Jacob Miller.

*Quincy St.*, n s, 100′ w Throop Ave., 4 two-st'y brown-stone dwells., tin roofs; cost, each, $4,000; owner, Jas. W. Stewart, 455 Bedford Ave.; architect, M. Walsh.

*Bushwick Ave.*, e s, 100′ n Johnson Ave., four-st'y frame store and tenement, tin roof; cost, $6,300; owner and builder, Adam Krebs, 199 Montrose Ave.; architect, J. J. Smith.

*Broadway*, n e cor. Vanderveer St., three-st'y frame store and tenement, tin roof; cost, $4,500; owner, J. Savage, Vanderveer St.; architect, John Platte; builders, R. Cooke and J. Pohlmann.

*Nineteenth St.*, n w cor. Eighth Ave., three-st'y frame store and dwell., and 5 two-st'y frame dwells., tin roof; cost, one $2,500, and five $1,500 each; owner, James Warner, Fourteenth St., cor. Fifth Ave.; architect and builder, Jas. Crocker.

*Dupont St.*, s s, 600′ w Oakland St., three-st'y frame store and tenement, felt, gravel and cement roof; cost, $3,800; owner, John Creighton, Dupont St.; architect, J. Dennen; builders, John Hafford and Port & Walker.

*Lafayette Ave.*, s s, 250′ e Broadway, and Van Buren St., n s, 350′ e Broadway, 5 two-st'y frame dwells., tin roofs; cost, $3,500 each; owner, Thos. Elison, 1134 Lafayette Ave.; builders, John Auer and John Fletcher.

*Powers St.*, s s, 112′ w Catharine St., three-st'y frame tenement, tin roof; cost, $3,000; owner, Jacob Beilman, 316 Powers St.; architect and mason, Christ. Buchheit; carpenter, Anton Aman.

*Bushwick Ave.*, w s, 28′ s Wall St., three-st'y frame store and tenement, tin roof; cost, $4,600; owner, Jacob Bosert, 100′ Harrison Ave.; architect, John Platte; builder, Jacob Rauth.

*Marion St.*, n s, 175′ e Patchen Ave., three-st'y frame tenement, tin roof; cost, $3,900; owner, Kasper Martin, 139 Marion St.; builder, Jacob Pirrung.

*Fifteenth St.*, n s, 258′ w Fourth Ave., three-st'y frame tenement, tin roof; cost, $6,000; owner and carpenter, Warren W. Mitchell, 173 Reid Ave.; architect, C. Edson; mason, J. Baur.

*Dean St.*, s s, 88′ w Vanderbilt Ave., three-st'y brick tenement, tin roof; cost, $4,500; owner, Thos. R. Farrell, 824 Atlantic Ave.; architect, F. Jezek; builders, W. L. Roundtree and Leonard Bros.

*Magnolia St.*, n s, 100′ e Irving Ave., three-st'y frame store and tenement, tin roof; cost, $4,500; owner, Chas. Reeck, 204 Central Ave.; architect, H. Vollweiler; builders, Thomas C. Phillips and Jacob Phillips & Sons.

*Flatbush Ave.*, s s, 375′ e Fourth Ave., two-st'y brick building for business purposes, tin roof; cost, $10,000; owners, G. F. & E. C. Swift, Boston, Mass.; architect, Fred. C. Miller; builder, B. F. Bailey.

*Monteith St.*, n s, 50′ w Bremen St., 2 three-st'y frame tenements, tin roofs; cost, $4,000 each; owner, F. Kirchenheiter, 37 Monteith St.; architect, H. Vollweiler; builder, Geo. Loeffler.

*Hall St.*, w s, 80′ s Park Ave., three-st'y frame flat, tin roof; cost, $4,500; owner, M. Crowell, 74 Hall St.; architect, R. B. Eastman; builders, J. Fardon and Wm. Sheppard.

*Garfield Pl.*, s s, 92′ 10′ e Seventh Ave., 4 three-st'y brown-stone dwells., tin roofs, wooden cornice; cost, each, $10,000; owners, etc., Martin & Lee, 440 Clermont Ave.

*Central Ave., No.* 240, e s, 100′ s Meserole St., three-st'y frame store and tenement, tin roof; cost, $4,300; owner, Jacob Boslet, Flushing Ave., cor. Wyckoff Ave.; builder, John Rueger.

*Dean St.*, n s, 100′ e Franklin Ave., two-st'y brick stable, tin and slate roof; cost, $3,500; owner, W. F. Butler; architects, Rossiter & Wright; builder, J. C. Sawkins.

*Evergreen Ave.*, n w cor. Greene Ave., three-st'y frame store and tenement, tin roof; cost, $5,500; owner, Chas. W. Smyth, 84 Taylor St.; architect, E. F. Gaylor; mason, Jacob Schoch; carpenter, not selected.

*Clinton Ave.*, e s, 240′ n Myrtle Ave., 5 three-st'y brown-stone dwells., tin roofs; cost, each, $9,000; owner and builder, John Gordon, on premises; architect, Robert Dixon.

ALTERATIONS. — *Bowne St.*, s s, 140′ w Richards St., add another story to building, gravel roof; cost, $5,000; owners, H. R. Worthington & Co., on premises; builder, E. Osborne.

*Hicks St., Nos.* 408–422, repair damage by fire; cost, $7,500; owner, Jacob Lorillard, 189 Broadway, New York; architect and builder, B. Wallace.

### Chicago.

BUILDING PERMITS. — M. J. Dewald, three-st'y store and dwell., 333 and 335 North Ave.; cost, $7,000; architect, A. F. Boos; builder, N. Garten.

Marshall Field, eleven-st'y office-building, 178 to 192 Lasalle St.; cost, $400,000; architect, S. S. Beman; builder, W. Pashley.

G. Hawkins, two-st'y dwell., Michigan Ave.; cost, $25,000.

L. C. Huck Malting Co., two additional stories, Canal St., cor. Eighteenth St.; cost, $15,000.

Thos. Nissen, three-st'y store and flats, 886 and 888 North Halsted St.; cost, $12,000; architect, F. Berlin; builder, A. R. Peck.

S. E. Gross, 6 cottages, Sacramento Ave.; cost, $12,000.

S. E. Gross, 7 cottages, Monroe St.; cost, $10,000.

S. E. Gross, 7 cottages, Colorado St.; cost, $10,000.

T. Bucoski, two-st'y dwell., 95 Cleaver St.; cost, $3,500.

Walker & Lauritzen, 2 two-st'y dwells., 3637 and 3639 Dearborn St.; cost, $6,000.

F. Konwalinska, three-st'y dwell., 162 Bunker St.; cost, $4,000.

J. G. Earle, one-st'y addition, Cottage Grove Ave., cor. Thirty-seventh St.; cost, $4,000.

W. W. Alport, two-st'y store and flats, California Ave., cor. North Ave.; cost, $10,000; architect, Otto Matz; builder, G. Peterson.

J. F. Borchardt, two-st'y store and dwell., 495 Ogden Ave.; cost, $4,000.

E. J. Lehmann, four-st'y store and dwell., 344 State St.; cost, $14,000; architects, Treat & Foltz; builders, Rodner Bros.

W. C. Polzin, three-st'y store and dwell., 3804 State St.; cost, $8,000.

J. Williams, three-st'y store and flats, 177 East North Avenue; cost, $7,000.

B. Klein, two-st'y dwell., 423 Twenty-sixth St.; cost, $3,300.

R. E. Shimman, two-st'y flats, 22 Ogden Pl.; cost, $3,500.

C. Morton, two-st'y store and dwell., 1126 Harrison St.; cost, $2,600.

J. Blacklock, two-st'y dwell., 84 Page St.; cost, $2,800.

R. Wenter, cottage, 86 Fowler St.; cost, $3,700.

M. Kehoe, two-st'y factory, 479 and 481 Jefferson St.; cost, $7,000; architect, W. H. Drake; builder, J. Conway.

John Becker, two-st'y dwell., 775 Larrabee St.; cost, $8,000.

J. L. Burke, three-st'y store and dwell., 2139 Archer Ave.; cost, $6,000.

M. McAuley, two-st'y flats, 123 Green St.; cost, $2,700.

A. Sittig, two-st'y dwell., 991 Halsted St.; cost, $4,400.

J. B. Ort, two-st'y store and dwell., 450 Twenty-sixth St.; cost, $5,200.

Peter Jene, four-st'y store and flats, 312 West Twelfth St.; cost, $7,000; architect, P. W. Ruehl; builder, C. Kies.

S. Minchrod, three-st'y dwell., 3210 Wabash Ave.; cost, $7,000.

Chas. Gelispie, three-st'y flats, 108 Centre Ave.; cost, $6,000; architect, W. Thomas; builder, J. McCann.

H. Brinkman, two-st'y store and flats, 3840-3844 State St.; cost, $10,000; architect, S. Frey; builder, G. Snyder.

C. G. Anderson, four-st'y store and flats, 198 West Erie St.; cost, $5,000; builder, G. Oleson.

P. J. Walker, two-st'y store and dwell., 3801 Lasalle St.; cost, $2,500.

M. Duffy, two-st'y dwell., 2625 Cottage Grove Ave.; cost, $2,500.

Central M'f'g Co., five-st'y addition to factory, 37 to 41 Armour St.; cost, $7,000.

H. M. Dupee, three-st'y warehouse, Twenty-fifth St., cor. Arnold St.; cost, $17,000; architect and builder, Wm. R. Berger.

N. S. Goodman, two-st'y dwell., 26 Cypress St.; cost, $3,200.

B. F. Baker, two-st'y dwell., 1042 and 1044 Harrison St.; cost, $5,000.

F. Riddle, 2 two-st'y store and flats, 3109 and 3111 State St.; cost, $7,000; architect, J. F. Wiston; builders, A. D. Elmers & Bro.

L. Franz, three-st'y store and dwell., 158 Eighteenth St.; cost, $7,300.

A. Otto, two-st'y dwell., 131 Mohawk St.; cost, $3,000.

J. Henshaw, two-st'y store and dwell., 355 Division St.; cost, $2,500.

C. B. Carter, 3 three-st'y store and flats, 190-194 Thirty-first St.; cost, $40,000; architects, J. M. Van Osdel & Co.

G. W. Smith, five-st'y store, 199 Michigan St.; cost, $9,000; architect, E. Bauman; builders, Moss & Chambers.

F. Enders, three-st'y store and dwell., 18 Chicago Ave.; cost, $6,500; architect, J. Bruhns.

Mrs. M. Parrott, two-st'y flats, 1152 and 1154 Harrison St.; cost, $6,000.

Wm. Baker, two-st'y flats, 3743 Dearborn St.; cost, $3,500.

P. H. Stanton, three-st'y dwell., 2121 Dearborn St.; cost, $7,000.

F. Wolff, one-st'y dwell., 797 West Monroe St.; cost, $4,000.

H. Lumbard, 2 two-st'y dwells., 49 and 51 Warren Ave.; cost, $7,000.

Mrs. C. Price, three-st'y dwell., 71 Maple St.; cost, $10,000; architect, F. B. Townsend; builder, C. H. Moses.

J. K. Fisher, additional story and repairs, 194 Michigan Ave.; cost, $50,000.

### Cincinnati.

Builders' Exchange. — The sixth annual meeting of the Builders' Exchange was held March 3, 1884. The Exchange has taken a firm hold, and is now recognized as one of the permanent institutions of the city, and has a membership of 250.

The principal business of the annual meeting was the election of officers, which resulted as follows, the Independent ticket being victorious: President, Robert Thoms; Vice-Presidents, Wm. A. Megrue, Frank S. Rohan; Treasurer, J. M. Blair; Secretary, Lawrence Mendenhall; Directors, Chas. Crapsey, J. H. Finnigan, Dennis Flaherty, Lawrence Grace, J. C. Harwood, H. E. Holtzinger, T. E. Livezey, J. G. McGarvey, L. Mendenhall, J. B. Schroder.

### Kansas City.

Building Permits. — B. A. & John S. Taylor, residence, 1512 Oak St.; cost, $6,000.

John W. Riken, store, n e cor. Twentieth and Main Sts.; cost, $6,000.

Mattie E. Walker, brick residence on Forest Ave.; cost, $2,000.

A. Andlauer, brick residence, East Kansas; cost, $2,500.

Store. — Judge H. W. Ide, of Leavenworth, Kans., will build a $35,000 store at the cor. of Ninth and Central Sts.

Church. —The Vestry of Trinity Church has selected designs and let the contract for a new church to be built at Tenth St., cor. Tracy Ave. The building is to be of stone, with a seating capacity of six hundred, and will cost about $20,000.

### New York.

Apartment-Houses. — A five-st'y brick and stone improved apartment-building, 50′ x 90′, is to be built on the n s of Twenty-eighth St., w of Sixth Ave., for the T. H. Smith Estate, at a cost of about $60,000, from designs of Messrs. Chas. W. Romeyn & Co.

Seventy-third St., between Fifth and Madison Aves., 3 five-st'y brick and terra-cotta apartment-houses; cost, $75,000; owner, M. A. Lyddy; architect, J. M. Merrick.

Mr. Edward V. Loew will have built a five-st'y apartment-house, 30′ x 80′, on the n s of Sixty-first St., 95′ e of First Ave.

Houses. — Mr. Daniel Hennessy will build, on the s e cor. of Fourth Ave. and Seventy-third St., 10 four-st'y private houses, to cost about $250,000; Messrs. Thom & Wilson, architects.

For Mr. Charles Fleming, 3 three-st'y brick houses are to be built on the n w cor. of St. Nicholas Ave. and One Hundred and Fifty-second St., from designs of Mr. Jas. E. Ware.

For Mr. A. Irvine, a two-st'y store and dwell., 25′ x 50′, is to be built on the s s of Seventy-fourth St., between Second and Third Aves.; Mr. John Brandt, architect.

Tenement-Houses. — Mr. Michael Duffy proposes to build 21 five-st'y brick and stone tenement-houses, 25′ x 80′ each, on One Hundred and Second and One Hundred and Third Sts., between Second and Third Aves., at a cost of about $350,000; Mr. Andrew Spence, architect.

Building Permits. — *Cannon St., No.* 129, five-st'y brick tenement, tin roof; cost, $10,000; owner, Valentine Hill, 131 Cannon St.; architect, Julius Boekeil.

*Washington St.*, n w cor. West Twelfth St., four-st'y brick tenement, tin roof; cost, $12,000; owner, Wm. W. Warner, 166 West Seventy-ninth St.; builder, J. Jordan.

*Boulevard*, n e cor. Sixty-eighth St., three-st'y brick and stone building, for church, Sunday-school and parsonage, slate and tin roof; cost, $80,000; owner, the Bloomingdale Reformed Church, Rev. Carlos Martin, 439 West Seventy-third St., pastor; architect, S. B. Reed, of Consistory.

*Fifty-second St.*, n s, 50′ w Third Ave., four-st'y brick store and tenement, tin roof; cost, $14,000; owner, Thos. Regan, 858 Third Ave.; architect, J. C. Burne; builder, not selected.

*Third Ave., No.* 247, four-st'y brick tenement, tin roof; cost, $9,000; owner, Emanuel Frankfeld, 222 East Twentieth St.; architect, Wm. Graul.

*Third Ave., Nos.* 249 *and* 251, 2 four and five st'y brick provision houses, tin roofs; cost, each, $24,000; owner and architect, same as last.

*Forty-seventh St.*, s s, 182′ e Tenth Ave., five-st'y brown-stone tenement, tin roof; cost, $24,000; owner and builder, Peter Wagner, 317 West Fifty-fourth St.; architect, M. Louis Ungrich.

*Tenth Ave., No.* 438, five-st'y brown-stone tenement, tin roof; cost, $14,000; owners, Jacob and Salome Huber, 511 West Twenty-ninth St.; architect, R. H. Bschaidner.

*West One Hundred and Twenty-fourth St., Nos.* 108, 110 *and* 112, 3 five-st'y brick and brown-stone tenements, tin roofs; cost, total, $45,000; owner, Jacob Bittroff, 108 West One Hundred and Twenty-fourth St.; architect, C. Kinkel.

*Ave. A*, w s, 75′ s Seventy-second St., 2 five-st'y brick tenements, tin roofs; cost, each, $14,500; owner, Peter Stastny, 1288 Ave. A; architect, J. Brandt; builder, G. D. Schmid.

*West Sixteenth St., No.* 317, five-st'y Dorchester stone tenement, tin roof; cost, $9,500; owner, James O'Donnell, 315 West Sixteenth St.; architect, F. W. Klemt.

*Stebbins Ave.*, e s, 103′ n One Hundred and Sixty-seventh St., three-st'y frame dwell., tin roof; cost, $2,000; owner, Andreas C. Poellot, 218 East Twenty-first St.; architects, Berger & Baylies.

*West Sixteenth St., No.* 347, five-st'y brown-stone front flat, tin roof; cost, $18,000; owner, Elizabeth Seitz, 18 Beekman Pl.; architect, John Brandt.

*Ninth Ave., No.* 331, five-st'y brick tenement, tin roof; cost, $13,500; owner, John W. Theisz, 511 East One Hundred and Eighteenth St.; architect, F. W. Klemt.

*Thirty-second St.*, s s, e of First Ave., three-st'y brick stable and office, gravel roof; cost, $5,000; owners, Chas. and Geo. Lowther, 104 West Forty-fourth St.; architect, M. N. Cutter.

Alterations. — *East Eleventh St., No.* 216, add one st'y, flat tin roof, etc., altered for three families; cost, $4,300; owner, Wm. Wiese, 410 Second Ave.; architect, J. Kastner.

*East Thirty-third St., Nos.* 215-231, one-st'y brick extension, tin roof; cost, $20,000; owner, Fred. J. Kaltenberg, 125 Fulton St.; architect, Adam Weber.

*One Hundred and Twenty-fifth St.*, n s, 260′ w Third Ave., add three stories, iron-work on front; cost, $21,500; owner, G. G. Grenell, 149 East One Hundred and Twenty-fifth St.; architect and builder, G. Robinson, Jr.

*Franklin St., Nos.* 195 *and* 197, lower beams and girders, put in new flooring, new front, etc.; cost, $3,500; owners, Holmes & Coutts; architects, Wm. Field & Son.

*One Hundred and Seventy-seventh St.*, s s, 200′ e Central Ave., two-st'y frame extension and internal alterations; cost, $3,500; owner, John Crawford, 174 West Fifty-eighth St.; architect, S. B. Reed; builders, Outwater & Felter.

*Third Ave., Nos.* 720-734, 8 buildings, one and four st'y extensions, tin roofs, also internal alterations; cost, $65,000; owner, Thos. B. Gilford, 473 Lexington Ave.; architects and builders, Charles Graham & Sons.

### Philadelphia.

Medical College. — The Hahnemann Medical College Building will soon be erected on Broad St., above Race St., and will have a frontage of 70′ and a depth of 95′, basement and first st'y of brown-stone, balance of brick and terra-cotta, to be four stories high, with central tower; cost, about $90,000; plans prepared by G. W. & W. D. Hewitt, architects.

School-House. — The trustees of the new Catholic High School have decided upon a site for the building, on the n e cor. of Broad and Vine Sts. It will be some time before all leases on the property will expire.

Building Permits. — *North Second St., No.* 231, four-st'y storehouse, 24′ x 150′; C. B. Porter, owner.

*Twenty-ninth St.*, cor. Parrish St., two-st'y stable, 24′ x 72′; Louis Bergdoll Brewing Co., owners.

*Thirty-fifth St.*, n of Sunnyside Ave., three-st'y dwell., 17′ x 34′; Geo. Fillyon, owner.

*Lawrence St.*, s of Huntingdon St., 8 two-st'y dwells., 16′ x 38′; Geo. Kessler, contractor.

*Lawrence St.*, s of Huntingdon St., 10 two-st'y dwells., 13′ x 26′; Geo. Kessler, contractor.

*Eighth St.*, cor. Dickinson St., three-st'y store and dwell., 20′ x 58′.

*Catharine St.*, w of Broad St., four-st'y tin and smith shop; E. Cubberly, contractor.

*Mervine St.*, s w cor. Montgomery St., two-st'y stable, 19′ x 25′; smoke-house, 16′ x 24′, and alterations to building; T. McCarty, contractor.

*Chestnut St., No.* 3943, three-st'y brick building, 20′ x 45′; G. Keefer, contractor.

*Hancock St.*, n of Oxford St., three-st'y addition to factory, 20′ x 30′; David Mayhew, contractor.

*Westmoreland St.*, cor. Memphis St., laboratory; 35′ x 72′; Drueding Bros. & Co., owners.

*Germantown Ave.*, near Marshall St., two-st'y smith-shop, 96′ x 40′; Eldridge & Stewart, contractors.

*Race St., No.* 2030, four-st'y addition to dwell., 18′ x 70′; Geo. W. Plumley, owner.

*Germantown Ave.*, cor. Glenwood Ave., two-st'y dwell., 16′ x 50′; Jno. Donley, owner.

### St. Louis.

Building Permits. — One hundred and twenty-two permits have been issued since our last report, forty of which are for unimportant frame houses. Of the rest those worth $2,500 and over are as follows: —

Mrs. A. Kahle, 3 adjacent two-st'y brick dwells.; cost, $8,500; H. Schulte, contractor.

J. H. Smart, two-st'y brick dwell.; cost, $3,700; contract sub-let.

P. Tierney, two-st'y brick dwell.; cost, $2,600; A. Mormann, contractor.

Wm. Klute, two-st'y brick dwell.; cost, $3,500; Scheltham & Gross, contractors.

Conrad Grote, two-st'y brick dwell.; cost, $3,800; C. F. May, architect; H. Drees, contractor.

Mrs. Ellen E. Sherman, two-st'y brick dwell.; cost, $8,000; James McGrath, architect; B. Weber & Co., contractors.

Mrs. Ellen E. Sherman, two-st'y brick dwell.; cost, $8,000; James McGrath, architect; B. Weber, & Co., contractors.

Luke McLaughlin, two-st'y brick dwell.; cost, $5,000; J. H. McNamara, architect; L. McLaughlin, contractor.

Wm. F. Niedringhaus, two-st'y brick dwell.; cost, $5,000; A. Beinke, architect; E. T. Hoffmann, contractor.

J. F. Yaeger, two-st'y brick dwell.; cost, $7,500; Z. T. Knott, contractor.

J. Fanseck, two-st'y brick dwell.; cost, $3,000; A. Dietz, contractor.

J. Verdin, 2 adjacent two-st'y brick dwells.; cost, $8,000; J. A. Conlon, contractor.

L. H. C. Lindsley, two-st'y brick dwell.; cost, $3,000; J. B. Lindsley, architect and contractor.

A. Druiding, agent, three-st'y school-house; cost, $9,000; A. Druiding, architect; contract sub-let.

L. Stutz, two-st'y dwell.; cost, $5,000; A. Beinke, architect; W. Gahl, contractor.

### St. Paul, Minn.

Building Permits. — Thomas Bowers, three-st'y frame dwell., on West Seventh St., between Oneida and Duke Sts.; cost, $5,000.

F. H. Dayton, one-st'y frame roller rink, Jackson St., between Tenth and Pearl Sts.; cost, $3,500.

Frank Danz, three-st'y double brick building, Sixth St., between Franklin and Exchange Sts.; cost, $5,000.

Conrad Wurm, two-st'y brick veneered stores and dwells., on Seventh St., between Randolph and Bay Sts.; cost, $2,400.

### Bids and Contracts.

Cincinnati, O. — The following is a synopsis of bids for iron galleries and stairs for the custom-house and post-office: —

Snead & Co. Iron Works, $5,512; additional stair, $295; aggregate, $5,807.

McHose & Lyon, $6,000; additional stair, $230; aggregate, $6,230.

Haugh, Ketcham & Co., $6,072.45; additional stair $244.82; aggregate, $6,317.27.

Joseph Hall & Co., $7,630; additional stair, $250; aggregate, $7,880.

M. Clements, $7,644; additional stair, $240; aggregate, $7,884.

Concord, N. H. — The contract for furnishing the cut granite for the new railway station has been awarded to Sargent & Sullivan of this city.

Quincy, Ill., —The following is a synopsis of bids for stone-work for post-office, court-house, etc.: —

Indiana Oolitic Limestone Company, Oolitic limestone, $37,997 (*accepted*).

W. D. Collingwood, $42,346, Bedford, ten months.

Blatz & Krebs, $59,572, Bedford, 225 days.

Larkworthy & Menke, $54,350, Bedford, Quincy steps; $63,500, Quincy, Bedford steps.

Scott Webber, $54,464, Bedford, September, 1884.

M. A. McGowan, $55,101.25, Quincy limestone, twenty months; $66,084.18, Illinois limestone, twenty months.

Smith, Sargent & Co., $55,737, Lemont, fifteen months; $60,131, Bedford, fifteen months.

E. R. Brainard, $52,495.22, Indiana limestone, October, 1885; $58,608.82, Illinois limestone, October, 1885.

Hughes & Dugan, $63,690, Bedford or Warrensburg, eighteen months.

James A. McGonigle, $67,635, Bedford buff, eighteen months.

Sales, Burns & Co., $79,000, Bedford, 450 days.

Thomas Osborne, $83,000, eight months.

The Young & Farrell Diamond Stone and Sawing Company, $104,239, Lemont, December 1, 1884; $109,239, Indiana limestone, December 1, 1884.

## 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 August 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.