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CONTENTS.

A SERIOUS attempt is now making in New York to compel the removal of electric-light wires from the streets; the occasion chosen for the struggle between the electric-light companies and the public being the trial of a suit brought by Mr. Henry N. Smith for an injunction to restrain the United States Illuminating Company from erecting poles and wires in front of his land on Forty-third Street, between Fifth and Sixth Avenues. Distinguished counsel are employed on both sides, and the most eminent experts in the country have been called upon for testimony. As might be expected, the Edison Electric-Light Company, which takes special pains, as the public is frequently informed, to carry its conductors under ground, and to adopt all possible precautions against accident, has interested itself on Mr. Smith's side of the question, and seems to have lent the aid of its own lawyers, as well as some of the best expert testimony, for the support of his cause. The main motive of the plaintiff in praying for the injunction seems to have been the fear that he feels lest some accident should happen to him or his friends from the dangerous wires stretched so near his estate, or perhaps the corollary from that apprehension, that a similar dread on the part of intending purchasers might reduce the price which he could obtain for his property if he should wish to sell; and as the dangerous character of arc-light wires is too notorious to be disputed, it must be confessed that his appeal to the courts for protection seems natural and reasonable. Unfortunately, it appears probable that the decision will turn finally, not on the merits of the case, but on the question whether the stretching of the wires through the streets has, or has not, been authorized by the Legislature and the city government; the matter of the dangerous or innocent character of the wires not being, in the judge's opinion, material to the case.

TO the ordinary mind it would seem that it ought to make a good deal of difference, in deciding as to the propriety of stretching wires in front of a man's estate, whether the wires would be mere bits of harmless metal, or were to be kept charged with a force which would inflict instant death upon any living creature which happened to touch them without special precaution. To quote the apt illustration of one of the daily papers, a street or city through which arc-light wires run above ground is like one in which volleys of rifle-bullets are continually being discharged at certain heights. So long as a person keeps out of the way of the bullets, they do him no harm, but he is obliged to restrain his movements within a comparatively narrow space, or run the risk of sudden death by coming inadvertently within range of the fatal messengers; while, even at the best, a shot will occasionally go astray, and kill or injure persons to whom no lack of care can be imputed. As an example of the latter class of occurrence, one which is said to have happened in New York while the trial was going on is interesting. According to the account, some runaway horses in Fifth Avenue came in collision with an electric-light post and broke it down, trailing the wire on the pavement. A carriage soon came by the place, and the horse stepped upon the wire, receiving the whole current through his body, and falling dead on the spot. A moment later another horse also came up and also stepped on the wire and dropped dead. The police, discovering that something was wrong, then stopped travel through that portion of the street, and no more casualties occurred. Fortunately, the night was stormy, and very few people were passing. In any ordinary evening a crowd would have gathered in a few moments after the throwing down of the post, and would have trampled about and over the wire in every direction.

A GOOD illustration of the way in which fire spreads through the high, combustible buildings which, under the name of ordinary apartment-houses, are beginning to menace the lives of so many innocent persons, is to be found in the account of a recent occurrence in Boston, where the flame from a kerosene lamp, overturned in the basement of a handsome five-story building of the kind, immediately climbed up the elevator-well to the roof, spreading out at each floor into the adjoining rooms, something in the way that the flame from the match runs over the "set-pieces" of Fourth-of-July fireworks. Fortunately, some one in the building had sense enough to give the alarm, and the occupants of the various apartments were hastily awakened, just in time to escape in their night-clothes, leaving their furniture and other property to be spoiled by the smoke and water. The fire-service of Boston is admirable, the distances short, and the house was situated on a corner, where streams from the hose could be brought to bear upon it from three sides; but notwithstanding all this, the interior of the building was very seriously injured before the flames were subdued. "Fortunate" as it is that the occupants escaped with their lives, we venture to say that they would consider themselves still more fortunate if they could have been spared altogether the experience of leaping at a call from their beds, to run half naked into the inhospitable street in the middle of a cold winter's night; and some, at least, of them will certainly suffer serious results from the fright and exposure.

AN admirable scheme is just going into operation in New York, where technical education has for some years been pursued with extraordinary zeal and success. The new plan proposes to apply to the teaching of a particular branch of technical knowledge the "correspondence system," or, as it is often called, the "Chautauqua system," in which instruction is given by means of carefully prepared lesson-papers and questions for examination, sent through the mails, and replied to in the same manner. The honor of being the first school of the kind to adopt a method which must soon be followed by many similar ones belongs to the trade-school of the Carriage-Builders' Association, which has made all needful preparations for extending to pupils in any part of the country the advantages hitherto offered only to those in New York. The regulations of the carriage-builders' correspondence school provide that all intending pupils must be employés or apprentices of established carriage-builders, or members of accessory trades, and must be recommended by their masters or employers as fit persons for admission to the advantages of the school; and a nominal tuition fee is required of one dollar from each apprentice, and two dollars from each journeyman or other employé, which covers all the cost of instruction through the school year, ending May 1. The pupils are required to provide themselves with drawing instruments and paper, or may purchase them at cost price through the school if they desire. One or more lesson-papers are mailed to each pupil every week, with the necessary explanations and directions printed upon them, and the responses, which take the form of drawings or written replies, according to circumstances, are mailed to the school, and there examined, corrected and returned. The selection of papers is made to suit the capacity and industry of each pupil, and at the close of the school year diplomas are awarded to those who have done most to deserve them. The regular correspondence includes suggestions as to text-books to be read by the pupils, and in addition to this, answers are given to

questions relating to points in the lesson or examination papers, or to any detail connected with the trade. We are glad to extend, so far as we may, the announcement of this most promising movement, and to refer all those who wish for further information to Mr. John D. Gribbon, instructor in the school, at No. 214 East Thirty-fourth Street, New York, and only regret that we cannot make sure of conveying such good news into every country wheelwright's shop in the United States.

THE Prince of Wales seems to inherit the interest of his lamented father in matters relating to the material welfare of his future subjects. Encouraged by the remarkable success of the Fisheries Exhibition, which he did much to promote, he is now said to be engaged in efforts to secure similar success for the Health Exhibition, which is intended to be held in London next year. Already the Corporation of London has signified its willingness to aid the enterprise, if necessary, by a gift of seventy-five thousand dollars, and the Government is very likely to do at least as much for the cause. Like the Fisheries Exhibition, the Health Exhibition is to be international, and efforts will probably be made to secure the best possible representation from foreign countries. So far as ordinary sanitary appliances go, it is certain that no country can furnish an exhibit to compare with that of England itself, that being the country, above all others, where physical purity is held in the highest honor, and secured by the most ingenious means, but there are many other allied matters in which much can be learned from other countries. In heating and ventilation, for instance, the palm would probably be disputed between Germany and the United States, the best modern buildings of these two countries being apparently about equal in merit, and far superior to any yet constructed elsewhere. It is to be hoped that the present practice of sewage disposal will be fully illustrated, all nations being equally interested, and having progressed about the same distance, by different roads, toward the solution of this great problem. If Great Britain, with one hundred and fifty towns disposing of their wastes to their own satisfaction by irrigation, can show the greatest number of examples of this mode of treatment, the accounts seem to indicate that our own town of Pullman, a very advanced specimen, by the way, in other respects, of the best American sanitary practice, can show results more successful than those of any English town; while Milan, Paris, Edinburgh, and probably many other cities and villages, near which disposal by irrigation has been going on quietly for centuries, will have their share of valuable information to contribute.

WE have received a circular from Mr. Henry Lord Gay, of Chicago, announcing that a project has been formed, under his direction, for establishing in that city a "Permanent Exposition of Building Arts and Appliances," which is to comprehend all sorts of materials, manufactures and inventions useful in building. The exhibition is to be free to the public, and to be supported by the reasonable charge of five dollars a square foot per year for the floor space covered by the exhibit of each person who may avail himself of the advantages which such an exhibition offers, for introducing and advertising new appliances and materials. The attendants will distribute circulars and pamphlets, and will give to visitors any necessary explanations of the objects shown, so that exhibitors will be at no expense for maintaining attendants of their own, although they will be at liberty, as we understand the circular, to do so if they wish. We are glad to see that the promoters of the undertaking are so well assured of its success that they have secured an immense building in the heart of the city, furnished with elevators and other conveniences, and presenting an area of twelve thousand square feet on each floor. There can be no doubt of the great interest and value of such an exhibition to all who concern themselves with building matters, and it is much to be hoped that Mr. Gay may find the results of his enterprise in every way satisfactory. A promise is given in the circular that when the Chicago exhibition shall have reached substantial success, a similar one will be established under the same management in New York, and possibly in other large cities, both east and west. We are sure that all architects will gladly lend their aid in preparing the way for the formation of collections which will be of so much, and such constant service both to them, and under their advice, to their clients.

A PAPER has just been published in Geneva by M. Colladon, a physicist of some distinction, upon the mode in which fire is kindled in buildings by lightning. As an example which both shows clearly the circumstances under which the electric movement is transformed into fire, and indicates the mode in which this result may be prevented, M. Colladon cites the case of a large barn in a village near Geneva, which was set on fire by lightning this summer, and consumed in a few minutes. The roof of the barn was supported by ordinary trusses, with king-rods of iron, and the ridge was covered with a saddle of tin. The main part of the building was filled with hay, and pipes led from the cellar to a reservoir of water not far off. According to M. Colladon, the lightning was first attracted in its downward course by the tin-covered ridge, and from this ran down to the end of the iron king-rods. The best conductor in the direction of the earth was now the reservoir and the water-pipes communicating with it, but to reach these it was necessary for the current to force its way through the non-conducting and combustible hay, setting it on fire by the energy of its motion. If, as M. Colladon says, a passage had been provided for the charge, by means of a rod of iron connecting the nearest king-rod with the reservoir, the current would have followed this course in preference to attempting the more difficult journey through the hay, and the fire would not have occurred. The lesson to be drawn from this instance is that the danger of fire from lightning may be much diminished by connecting the scattered portions of metal which enter into the construction of every house by good conductors, and the whole system with the ground. Then the transmission of electricity will be direct and harmless, unless a charge should pass so heavy as to leave the conductor, which would be a rare contingency.

THE New York *Tribune* mentions that the Daft electric motor about which various accounts have been published, was tried a few days ago on an ordinary railway near Saratoga. A third rail had been laid in the middle of the track, through which the electric current was conveyed to the motor, the current being generated by an engine of twenty-five horse-power in a building about five hundred feet away. A passenger car, containing about fifty persons, was attached to the motor, and several more rode on the motor itself. The current proved strong enough to draw the engine and the car a distance of something more than a mile in eleven minutes, up a grade of about seventy feet to the mile. On the return trip the motor ran off the track, and was broken to pieces, the passengers escaping with a few severe bruises. Considering the circumstances, the motor may be considered to have shown good promise of future development, although, as the *Tribune* sarcastically remarks, twenty-five horses might, it would seem, have dragged the little train with sixty passengers, a mile and one-eighth in eleven minutes without the help of electrical apparatus.

THE French occupation of Tunis has already resulted in a certain amount of benefit to several of the sciences, and amongst others to archæology. An official expedition, which was recently sent out for the purpose of investigating one or two districts known to have been in classical times the seat of important settlements, succeeded in identifying the position of the ancient city of Gicthis, once a thriving commercial town, but now presenting only a great extent of scattered ruins. In this place the remains of the buildings which were still visible indicated massiveness of construction rather than richness of ornament, and very few sculptured pieces were found; but not far away, on the island now called Djerba, were discovered the fragments of a rich and magnificent town, probably the capital of the island, and dating apparently from a period before the Christian era. Some hasty and incomplete excavations were made at this place, resulting, however, in the uncovering of the ruins of a large temple, situated close by the sea, and a little removed from the town. The temple was of extremely rich and costly construction, the whole being of marble, in blocks of immense size. The principal front was adorned with columns, the shafts of which were of green and red marble, and twisted columns were found in the interior order. Statues, of red Egyptian granite, lay on the ground about the temple, but for some unknown reason, the heads of all of them had been cut off and carried away, not one being found in or near its place. Among the houses in the town itself were found great numbers of beautiful mosaic pavements, but the time did not permit of more extended explorations.

STROLLS ABOUT MEXICO. — II.

Buried Figure near San Juan Teotihuacan.

ON a recent Sunday, with two friends, I visited for the first time the famous pyramids of San Juan Teotihuacan. These pyramids are near the line of the Mexican or Vera Cruz Railway, the station being about an hour from the capital by accommodation train. I took the mixed train, leaving the Vera Cruz station at 10.30 o'clock. This station, by the way, looks as if it had been transferred from a French or German city; it is new, and of a quietly elegant Renaissance. The stone is a whitish gray, susceptible of beautiful carving. The main portion of the head-house has two stories, flanked by wings of one story, and the train-house has a roof of iron. Hardly any wood is used about the structure, the platforms, of course, as in all this part of Mexico, being of stone. The European aspect is heightened by the English coaches, which, with their primitive appliances, compare unfavorably with the handsome American trains of the neighboring Mexican Central and Mexican National Railways.

Of all the railways centering here, the Vera Cruz Railway has the dreariest approach to the capital, and after his day's travel amid magnificent mountain scenery the traveller's first impression of the ancient city would be particularly unpleasant by contrast, were it not that the last hour or so of the journey is made in the dark. But that morning we had the full sight of the twenty miles of arid alkali marshes which border Lake Texcoco, making a most depressing foreground for the sublimity of the distant mountains. The lake is finally passed, however; we are no longer half-suffocated by alkali dust, and we enter a more garden-like country, the vegetation gratefully green under the almost daily summer rains of the valley, and brilliant under the intense sunshine of the morning.

San Juan is the second station out from the city, and as we approach it we see the two great pyramids standing in the plain. The neighboring mountains being conical in shape, the pyramids resemble foot-hills, and would hardly be recognized by the casual observer as works of man. The humble dwellings of San Juan are more scattered than the houses of the average New England farming community. We pass by a particularly ugly church, with a freshly white-washed tower, and leaving the *Camino Real* or highway, strike across the fields in a bee-line for the pyramids, about two miles away. There is an abundance of the national plant — or tree, it might be called — the nopal, or prickly-pear cactus, and in some fields they have an orchard-like appearance, which might deceive one were it not evident that the picturesque growth is too common to induce its cultivation.

The paths led across the fields, following their boundaries between thick stone-walls a few feet apart. As we neared the pyramids we saw that the plain around was dotted by numerous minor mounds, and since the larger pyramid is called the Pyramid of the Sun, and the other, the Pyramid of the Moon, it seemed as if the small ones might be named for the stars. We passed through a broad avenue, as it might well be termed, bordered by these mounds placed at regular intervals on either side. It was, perhaps, the main thoroughfare of the populous city that anciently occupied these plains. Here and there were long steps cut in the stone bordering this way, and remains of old cement pavements. It must have been a stately avenue in its day. Whether these mounds are remains of the ancient dwellings, or had religious uses must be left for authorities like Adolph Bandelier and Frank H. Cushing to say.

The multitudinous ruins and relics give evidence of a very large population on this spot in the ancient days. When near the first pyramid, or that of the Sun, we crossed a field of maize. The ground was sprinkled with bits of obsidian, or volcanic glass, probably chips from the armories of the primitive dwellers. Here and there were broken arrow-heads, spear-heads, and knives of this material, with occasionally a perfect specimen. This obsidian varied in color, some of it being like common bottle-glass, while other pieces were of a beautiful pearly gray, or smoky topaz hue. Fragments of pottery were equally plentiful. Teotihuacan is believed to have been a Toltec city. I chanced to have a bit of ancient Zuñi pottery in my pocket, which I had picked up near Fort Wingate in New Mexico, and I was struck by the close resemblance in the style of decoration. — Mr. Cushing believes the Zuñis to have been either Toltecs, or closely allied to them.

Occasionally we picked up fragments of terra-cotta work: broken heads or faces. It is astonishing how these antiquities prevail in Mexico; the ground is literally sown with them. It is a mistake, the report that these relics are manufactured by the Indians for the benefit of tourists. In the first place, there are not yet enough tourists to justify enterprise of the kind; and in the second place, it is much cheaper for the natives to dig them than to make them, for they could not afford to make them and sell them at the prices which they take, even with the present low cost of labor in the country. The relic-selling natives of Mexico, and even the merchants in the city, are much more modest in their prices than are the pueblo Indians of New Mexico. One of my companions had been over this field before, when it had just been plowed, and he picked up a large number of these terra-cotta fragments: every plowing turns up a fresh crop, and the supply seems almost inexhaustible. A little Indian boy was crossing the field with a sack over his shoulders; it turned out to contain a large number of the relics. He seemed a little troubled that we should be searching for the same things, and with the spirit of one of our little country boys jealous against intrusions on his secret huckleberry patch, he assured us there were no more, that he had gathered them all! We bought a goodly number of him for a *real*, or about twelve cents. They were all of about the same size, an n ch or two in diameter. Some were heads, probably of figurines, for there were also broken-off arms and legs; others were reliefs. The variety in types was considerable; some were evidently realistic, and others mythological in character; others were strikingly Egyptian in style, and still other heads seemed thoroughly idiotic in form. One relief had what looked like a cowl and mask, another was marked by a most comical grin, and another was slashed like a tattooed person: one face in relief, with an elaborate crown, had its eyes rimmed with what looked like spectacles, and it might perhaps lead a closet archæologist to write a learned essay on optical science as known to the Toltecs. One curious little head, which closely resembled one of the mythological dance-characters of the Zuñis, was pierced as if to be worn as a charm or amulet. There were also some animal heads, including a well-modelled head of a tiger. Over in the neighboring town of San Martin there is a most interesting store devoted to the sale of relics from Teotihuacan, but unfortunately we did not get time to visit it.

We engaged the boy to go with us to the pyramids, and on the way we stopped at his parents' house, a little stone hut bare of furniture of every description. The boy's mother greeted us courteously, but said she had nothing in the house to eat, which disappointed us considerably, as we had only taken the customary cup of coffee before starting, and expected some tortillas at least. There were plenty of tunas growing on every hand, however, and the boy climbed the trees to gather them for us. We had previously tried gathering them, but had given it up after filling our fingers with the provoking little prickles which cover the fruit. The boy did not mind these in the least, however, and deftly tore open the skins with his finger-tips, presenting us with the cool, dark-red, and seed-filled pulp, in flavor something like a water-melon, and most refreshing. I believe the pyramids have been measured, but I cannot lay hands on the figures: hazarding a guess I should say that the Pyramid of the Sun is between one hundred and fifty and two hundred feet high, and that of the Moon something like fifty feet lower. We found that their bases were perfect squares. It took about five minutes to climb to the summit of the first pyramid; it appeared to consist of a mass of small volcanic rocks, and the surface was now dilapidated and overgrown with shrubs and cactus, so that it seemed much like a natural hill. The top was flat and square, and commanded a broad view over the valley. In ascending we observed two broad level intervals, and from the neighboring Pyramid of the Moon the structure was clearly shown, two terraces dividing the great pile into three sections, each apparently of the same height.

On the way to the Pyramid of the Moon, about half-a-mile distant, we stopped to see one of the most interesting features of the locality, the head of a gigantic stone figure or idol, standing about six feet above ground: it is said that the rest of the figure below ground is something like five times the length of the visible portion. The mound around is now a shapeless mass: possibly it might have been the site of a temple, and the figure thrown down by the conquerors. Behind the figure is the opening of an underground passage, which a friend who crawled in said was a hundred feet or so long. The figure shows a rude face, now noseless, and is well hewn. The top forms a square, altar-like cap, and a channel cut through the centre across the surface perhaps indicates that it was used for sacrificial purposes, although the Toltecs are said to have made no human sacrifices.

The Pyramid of the Moon showed its structure better than its larger neighbor. Where the surface had been cut away to make place for a path which zigzagged up to the summit, where a rude cross had been erected, a layer of cement could be seen which evidently ran entirely through the pyramid on a level. Other patches of cement followed the slope of the side, and it looked as if the pyramid might once have been covered with a shell of masonry, which had been removed from time to time to furnish building material for the neighborhood.

On our way back we asked Felipe if we could not get some white tunas, as we were hungry, but wished to vary our diet somewhat. We felt as if we had been feeding on watermelons! Felipe said that he knew an old woman who had a tree of white tunas. We descended into a hollow beside the road where there was no sign of a habitation, but found that the side toward the road was a ledge, in which was a cave with two doors. Felipe peered into one of these, and an ancient crone, who almost might have been the Witch of Endor, came crouching out. The boy told her of our wishes, whereupon she took a long pole with an iron hook in the end, and proceeded to gather the fruit from a high tree and place it in a basket. Meanwhile Felipe was making fun of her for living in a cave, as though there were something uncanny about it, but as we peered inside we saw that it was far more comfortable than his habitation, and really had considerable furniture. When the old woman had gathered about a peck we said that was enough, and we sat down on a stone to eat them as she deftly opened them with a knife; they had a delicious, spicy flavor, sweeter, and with more body than the red tunas. As we threw away the rinds a number of little pigs came up and devoured them. "*Esos*

son puerquitos" (those are little pigs), said the old woman, who was stone deaf, and talked as if she were giving an elementary object-lesson in natural history to some little children. "Those are little pigs; they make lard and ham of them, — not of *them*, but when they grow up, like *those*," she said, as some huge grunters came into sight.

"Would you like to see my house? It is a cave," she explained, as we followed her down the steps. There were two rooms, and both were neatly kept. The only way for the smoke of the fire to escape was through the door. A strong smell of incense pervaded the air. In the other room we noticed on the wall a large old oil painting, evidently the spoil of some church; in the dim light, aided by a match, we could see that it was well painted, subdued and agreeable in color, and gracefully correct in drawing; it was an "Ascension," and had some beautiful figures; possibly it was the work of some Spanish master, more or less famous.

We paid her for the tunas; she wanted only a *medio*, or six cents, and as we handed her the money she muttered that she did not mean the Señor Cura to get hold of it, which indicated that the parish priest was inclined to press his flock rather closely.

Just then her husband, a very old man, appeared. He yelled at us most cordially; — he was so accustomed to pitch his voice to the ear of his spouse. "Would we care to see an ancient relic?" and he brought forth from the obscurity of a recess of the cave, which we were unaware of until then, a large stone vessel, a shallow vase with a rude sculptured face, showing the same style as the huge figure we had seen at the pyramids. He said it was worth one hundred dollars, but we could probably have bought it for ten, or even five, had we been so inclined. He was disposed to loquacity, and was evidently proud of his cave-dwelling; he said that his fathers had lived there before him.

At the railway station we asked the agent if we could get nothing to eat or drink around there. "Eat? No! *Es el verdadero país del hambre* (it is the genuine land of hunger); but you can get something to drink across there at that little tienda, the Porvenir Futoro, or Futuro Porvenir, whichever it is," alluding contemptuously to the redundant title of the "future to come," as the humble little shop was called; but we found some bread there, and the friendly proprietor got his wife to fry some sausages for us, with which, and a glass of Catalan, the native distillation from molasses, we managed to stave off famine until we reached the capital. Sylvester Baxter.

SPANISH ARCHITECTURE.[1] — V.

THE ALHAMBRA (*continued*).

THE "Court of the Lions" is probably the best known portion of the Alhambra, and with the various chambers grouped around its sides and eastern end, constituting the domestic and harem quarters of the palace, it is the most complete of all. It is quadrilateral in form, about 115 feet long by 66 feet broad, surrounded by arcades supported upon slender marble columns, alternately single and coupled along the sides, with groups of three to turn the angles. The composition is still further varied by pavilions in the centres of the two ends projecting into the court, with columns and stalactite arches similar to the peristyle. There are small fountains, like the one in the "Hall of the Two Sisters" within the pavilions, and four marble channels conduct the overflowing water from the four sides toward the centre. There is placed the fountain which gives the court its name. It is a large twelve-sided bowl of alabaster enriched with mouldings, and with a long Arabic inscription couched in the most exaggerated terms of praise, such as these: "Look at this mass of pearl glistening through the air, spreading its showers of prismatic bubbles. . . . Beholding the basin one might imagine it to be a globe of solid ice, with the water melting out from it, for it is impossible to see which of the two is really flowing . . . like a lover's eyes pregnant with tears;" and of the lions, "O, thou who beholdest these crouching lions, fear not! life is wanting to enable them to show their fury." This reminded me of "A Midsummer Night's Dream," where Bottom exclaims, "I would entreat you not to fear, not to tremble," at his personation of what he calls the "most fearful wild-fowl living." The twelve lions of the Alhambra fountain are queer looking creatures, angular and stiff as the most primitive wooden toy, with straight posts for legs, and water-pipes protruding from their mouths. Still they are less offensive, and more fitted for their position than many a modern casting which tries to be a veritable lion; and the effect of the many fountains in action, with the tiny rivulets coming from the interiors on each side is very pleasing indeed. The court was lately occupied by a somewhat undisciplined garden growth, which has now been cleared away. Doubtless the place is better without it, yet there was something wanted to redeem the ground from that utter bareness which was its condition when I saw it. The walls behind the arcades are in many places restored. The plaster decorations renewed are, however, of undoubted authenticity, as they are cast from moulds made upon the best preserved of the ancient remains, of which there is an abundance for the purpose. The color is of course nearly all gone in those parts somewhat exposed to a not very merciful climate. Indeed, it is marvellous that such a light, fragile construction of wood and plaster (the arcades are hollow like those previously referred to) should endure so long.

This section of the palace was probably built A. D., 1325, by Abou Abdallah, and the court has been for five centuries, therefore, open to the weather. The chief beauty of the detail is in the capitals and arches, all alike in general form, but abounding in variations of detail. The capitals (*see Illustrations*) are surmounted by blocks ornamented with an inscription in Arabic character, which is exceptionally graceful in form, and the arches are stilted upon little shafts enclosing panels of rich leaf-work. There is a charming contrast in this ornamentation between the inscriptions and the other forms; at a little distance a sort of texture of surface is seen which enhances the excellent proportions. Some traces of color can be discerned, but not enough for restoration with any degree of certainty. It is clear, however, that color was used to heighten the effect of the forms, and to decorate those surfaces (such as the hollow of the abacus) which look bare by contrast without it.

Some authorities assert that the shafts also were colored or gilded, and although that seems to be true of some examples it is scarcely likely that it was the general custom. We find descriptions extolling the beauty of marble for its own sake, and sometimes mentioning the beauty of the polish in such terms as render it very certain that no paint or gold was used on it except, perhaps, as an enrichment in line or other delicate drawing, only partially concealing the material. Several experiments in restoring the color have been made at various times, and in various parts of the Alhambra. The baths are completely restored, and painted; and besides these I found some bits here and there, a few feet each, of modern essays, but they nearly always looked crude notwithstanding the evident care in harmonizing them; and I doubt very much whether the work of the Moors themselves was not harsh and strong when new. It does not appear at all likely that greater skill was attained by these (or any other colorist of ancient times) than is now by the leaders in art who attempt, often unsuccessfully, to use strong primary colors in restorations. It is certain that strong colors were used, and it is equally certain that examples that remain to us are often superb harmonies which seem almost mysterious in their perfection, yet I feel assured that time would do the same gentle service for the modern work, softening and toning it to the same beauty. It is doubtful whether any essential secrets of art are involved other than those worked by time. So I feel satisfied that the color decoration lately done in the Moorish baths will in a few years acquire what it now lacks—unless defective materials have been used. There is a vast amount of abuse of this age wasted in comparisons made by persons who, thoroughly well acquainted with the old work they adore, yet do not know enough about that of their contemporaries which they depreciate; and a goodly amount of this kind of criticism falls upon modern color, not only upon that which is irrevocably rank and bad (of which we all know there is enough), but upon the work of artists as able as ever lived, who are condemned simply because they cannot condense the breath of years upon their work while the critic waits. My delight in the beauties of the old-time artists was not lessened by the conviction that it is not hopeless to try to rival them.

There is a good deal of color left in fairly good condition in the apartment called the "Hall of Justice," a very beautiful gallery divided into a series of squares by cross arches. Besides the conventional painting upon the carved plaster there are here several pictures scarcely consistent with the Moorish laws of ornament, although they are all of Moorish subjects, and executed to the honor and glorification of that race. It has been surmised that they were painted by an Italian artist. One series among them, depicting a number of patriarchal Moors in council, has originated the name given to the hall. It is probable that it was one of the private apartments. Some more of the original coloring is to be seen in the "Hall of the Abencerrages," a very beautiful chamber, with stalactite roof in the same style as the "Hall of the Two Sisters." This room, the story asserts, was the scene of Boabdil's awful massacre of the men whose name it bears. One after another they were decapitated until the fountain was filled with their blood and their heads, and to this day certain stains on the marble floor are pointed out as evidence of that tragedy.

Although I have unfortunately no drawings to illustrate the "Hall of the Embassadors," I cannot pass it unnoticed. It is best approached from the "Court of the Fish-pond," across the north end of which the great tower containing it rises behind a beautifully proportioned arcade and vestibule. The arched inner doorway, through a wall of enormous thickness, has in its jambs prettily contrived niches to receive vases, perhaps for drinking water. The inscriptions around them, which here as elsewhere, constitute an important portion of the ornament, include one as follows: "If any one approach with thirst he shall find water cool and limpid," etc.

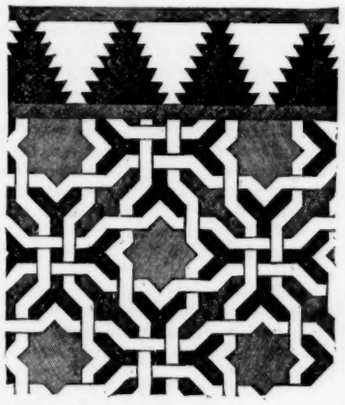
Passing these agreeable hospitalities one enters the "Tower of Comares" and the Hall, which was undoubtedly the chief state reception-room. The interior is about 35 feet square and 60 feet high, decorated with a splendor of form and color equal to any in the

[1] By Robert W. Gibson, Travelling Student of the Royal Academy. Continued from page 245, No. 413.

palace. The ceiling is of wood, an "artesonado"[1] dome with intersecting ribs and geometric panelling, all rather dark and gloomy now, but originally a blaze of gold and colors. In each of the three walls (the first being occupied by the entrance archway) there are three recesses, little chambers or alcoves in the thickness of the masonry, with windows in their outer sides, and larger arches toward the hall. They are in fact simply windows, but the size of the wall and the original beauty of the treatment make them unlike any other windows in the world. The tower projects beyond the line of the fortification, and these nine windows command superb views.

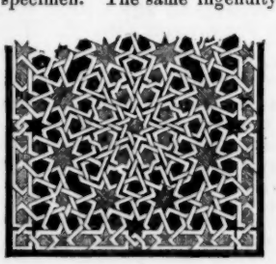
The azulejo dado is exceptionally fine. Beside the usual elaborations in the mosaic of tile there are some individual pieces, which are gems of minute art, worked in as centres of the design. There has been a good deal done here since the original artists left it; Charles V and other monarchs caused alterations and repairs to be done at different periods, but the general effect is undisturbed, except as it has faded in age. In the details—in some of the tile-work, for example—there are monograms and mottos which, upon close inspection, prove to be those of the Christian kings. Evidently, they were substituted for the originals to gratify the conquerors.

These azulejo dados in the Alhambra are very interesting. Being of glazed-tiles their coloring is still vivid and full, although there are evidences of decay in parts where the glaze is disintegrating and chipping off. They are composed of tiles of complex shapes: perhaps one of the characteristics of Oriental tile design, as compared with European, is this invention of a form which combines with its own counterparts in numerous changes, and produces elaborate figures without further design on the part of the workman. Sometimes patterns of considerable complexity are managed with only two shapes of tile. The white, interlacing bands in the wall-tiling of the vestibule to the "Hall of the Embassadors," are entirely made of two shapes very ingeniously arranged. Not only is the figure determined in them, but the interlacing (each band going alternately "under and over" those it crosses) is automatic, so that a dull workman could hardly make a mistake in setting the design. And there are only four other shapes; that is a total of six different tiles to produce one complete repeat of an elaborate pattern. In some cases the design is extended to alternations of color in the stars, with a distinct gain in interest. Black, white, buff, blue, purple, green, and a brownish yellow, are the most frequent tints, the interlacing lines being usually white.



Wall-Tiles, from the Vestibule to the "Hall of the Embassadors."

The greater number of the designs in the Alhambra are more complicated than that just described. That, as may be seen, is based upon rectangular lines and diagonals, others are worked to radiating centre lines, at 67½ degrees with the horizontal, as if two sets of rectangular lines were combined, the lines of one set bisecting the angles of another. This will be seen in the example from the "Hall of the Two Sisters," a design which shows much advance from the last. The radiating principle here made prominent is accompanied by a circular grouping of great value; for although all the lines are straight, yet there is considerable expression of a circular curve in the disposition of the figure, supplying very cleverly one of the essentials in linear design which is wanting in the first (an earlier) specimen. The same ingenuity appears in the shapes of the tiles, and the same accuracy of interlacing. The latter, indeed, seems to be almost a mechanical necessity; yet if a novice attempts to originate one of these designs, he will find this simple interlacing the most perverse thing in the work. The first essential in setting out and arranging these designs is extreme accuracy. Their existence shows to what a degree of perfection in geometrical science their inventors had advanced, not alone by their forms, but by the fact that they were so highly appreciated in their untempered purity. The Normans and Goths with a good deal of appreciation for interlacing and geometrical movements, always, intentionally or not, got their attempts at such ornament, simple as they were, full of queer inaccuracies and "fudgings." But the Moor was a mathematician even more than an artist, and his drawing was so accurate that the modern student with all his instruments has to bring unusual care to the task of copying it. The smooth, rich solidity of these dados, forming a basement three or four feet high to the lighter plaster-work, contributes not a little to the fine effect of all the principal apartments. The tiles seem to have been laid together in the workshop, probably face downward; then backed with sufficient thickness of plaster to enable them to be set in position in slabs; and the pattern was then filled in and made continuous, so that the lines of junction should not show. The raised plaster-work was somewhat similarly executed. The first piece having been carved, and, when so required, arranged to repeat, a mould was made from it, and the desired number of slabs cast; these were bedded upon the walls, and the lines of jointing all filled in with similar plaster. Lastly, the whole was finished up by hand-carving, so as to remove very much of that mechanical similarity and repetition of effect which the mould must give, as inevitably as do the printing-block and stencil now in vogue. It is a pity that all of our mechanically produced decorations are not finished with at least some few touches by the hand of an artist. No better example of the value of mechanical and hand work so combined can be found than the Alhambra wall-linings.



From the Dado in the "Hall of the Two Sisters."

But that is not the chief source of the beauty of Moorish work; it lies rather in the absolute obedience to the great principle of decorative art: That the *grace and movement* taught by living Nature, and not her actual objects, shall be wrought upon the lifeless material. The beauty of Nature's life seems to have been abstracted and bestowed upon this wood and plaster, as separate from the materialism of copyists as the perfume of Oriental attar is from the grosser matter of the rose. The Moor was by his religion forbidden to represent living things; he might not carve roses and birds in his ornaments, as doubtless he would have done, if this restriction had not been. He was denied exercising that imitative art which is with most races the preliminary stage. It would hardly have been surprising, therefore, if he had plodded on without ornament, beyond a few slowly developed constructional forms; but the instinct of decoration, the feeling for, and yearning after luxuriant beauty was too strong in these people to be so easily suppressed; while their talent for constructive design, that ability to evolve beautiful forms by the study of fitness which the Greeks possessed, was wanting in the Moors. Geometry was employed, and as we have seen, a most ingenious system of straight-lined ornament was developed. A lavish use of the graceful Arabic characters (forms derived from the reed pen used) in inscriptions, gave some of the necessary curved detail, and suggested certain conventional forms to satisfy this want more fully. And then came the most beautiful development: leaves might not be copied, but they might be studied, and an ornament designed which grew and moved as the leaves did; obeying the laws of growth not of one particular example, but of Nature generally. It is very extraordinary how exactly these designs comply with the theoretical conditions deduced from other styles. And it must be remembered that although the Arabian, and Turkish, and some others are kindred styles, yet each has its distinctive character, just as the European branches of the Renaissance have; and of all the Mohammedan styles the Hispano-Moresque is the purest in its ornament, as if the isolation had caused less influence to be felt from the old East, while there was no contamination from the North and West. Consequently the Moorish work illustrates the precepts of proper conventional art better than any other known style. There is a perfection of movement of curves in the way stems branch, and meet, and spread into leaves, always joining in tangential smoothness, reposeful because unstrained, yet vigorous in suggestion of growth and movement along the lines. Look at the ornament in the background of the inscription "There is no conqueror but God." The eye follows the lines without voluntary effort, without finding an uncomfortable angle or awkward joint to the end, where the leaf bends in graceful curves back upon itself, so that the motion is insensibly arrested. Then the veining or ribbing which makes up these leaves is just as harmonious though its dimensions are fractions of an inch. There is a systematic variation of the form in these small details, which is very like Nature's way of working, and each rib leaves the parent stem with a grace as carefully studied as is found in larger parts. All these details are subordinated, according to their situations, to a general plan, wherein main divisions differently treated afford contrasts of texture at distances where the detail is not discernible. There is the perfection of balance in proportion of straight and curved lines, and great appreciation of their expressiveness. Notice for example the transitions from the base of the wall upward in the "Hall of the Two Sisters." The dado does not contain a single curved line, only suggestions of curves in the radiating colors; straight lines of strength and rigidity ornament this substructure. Above it, still with much rectilinear design, some curves are introduced; and the inscriptions, less flowing than the leaf ornament, but more so than that of the dado, lead up to the curvilinear work upon the walls. Higher up the curves become more prominent, until in the roof they predominate in leading lines, and so the whole has that delightful appearance of each part belonging to its place.

Moorish ornament is an abstract of the art. Beauty apart from symbolism, from story, from passion, all of which contribute to the interest of many other styles; simply beauty for its own sake, reasoned out of Nature's workings. And as such it is worthy the deepest study, even by those who have no desire to imitate its particular methods. It is a grammar of the language of floral nature.

[1] *Artesón*—1. A round kitchen trough for dishes, etc. 2. Ceiling carved in the shape of a trough.
Artesonado—Shaped in the form of a trough: applied to ceilings.—*Velazquez.*

AMERICAN SOCIETY OF CIVIL ENGINEERS.

CRANES. — THE SHUBENACADIE CANAL.

AT a meeting of the Society held October 18, 1883, a paper by Mr. C. J. Appleby, Member Institution of Civil Engineers of England, on the subject of cranes as labor-saving machines was read by the author, who remarked that a well-constructed crane or other similar power machine, requiring only one man to drive it, would do as much work as could be done by the manual power of ten men, but in one-tenth of the time they would require. It seems singular that railroad and water-side depots and workshops should so rarely be laid out with reference to the employment of such labor-saving machines. The most economical working result is obtained from machines so arranged that when they take hold of the load, it is not released until final deposit. The author considered the following systems for transmitting or applying power :—

1. The well-known hydraulic system, with pressure-pumps, accumulator, and distributing pipes.
2. Compressed air distributed through pipes.
3. Steam distributed as above.
4. High-speed rope, or "endless cotton cord," which runs at a speed of 5,000 to 6,000 feet per minute.
5. Low-speed rope, running 1,500 to 2,000 feet per minute.
6. Square shaft supported on tumbler-bearings.
7. Steam from a boiler delivered on the top of a piston, with multiplying chains similar to the hydraulic system.
8. Boiler and engine fixed on the crane, and driving-gear for the several motions required.

The first, second and third can only be applied to cranes fixed or moving over very limited areas. The fourth, fifth and sixth will transmit power over large areas, which, however, should be nearly rectangular. The other two can be used generally wherever there is a railway track. The hydraulic system possesses great advantages over compressed air or steam, but experience tends to the conclusion that its common use will be attended with considerable inconvenience where the winters are cold. The use of compressed air has not been applied with great success in many cases.

Steam is largely used, and frequently carried through 1,000 feet of pipe without much inconvenience. The high-speed cotton cord, running at a speed of 5,000 to 6,000 feet per minute, works in grooved pulleys, is carried on rollers or other supports at intervals of ten to twenty-five feet, and is kept in tension by a weighted pulley. Low-speed rope transmission is generally effected by a hemp rope running from 1,500 to 2,000 feet per minute. The square shaft has been used for many years, the only special difficulty experienced being that of supporting the long main line of driving shaft. The author exhibited recent designs whereby this difficulty has been very successfully overcome. The relative advantage of rope or shaft transmission is largely influenced by local circumstances. As a general rule, the rope system costs less and is better where the distance for transmitting exceeds 200 feet. Below that distance the shaft is probably the best and cheapest. But the rope possesses advantages when machinery has to be driven at different levels, or at an angle with the point from which the power is transmitted.

The steam crane, employed under many differing conditions, perhaps performs more functions than any other mechanical arrangement for lifting and placing loads. All such cranes should lift and turn around by steam power. One specially illustrated has additional motions for altering the radius of the jib, for hauling materials so as to bring them within the reach of the machine, and also for moving empty or loaded cars. Fixed cranes are often seen so placed that one-third or even one-half of the number erected at a particular point are idle. It would therefore seem that, for the same outlay, the best performance will be obtained from movable cranes.

Where two or more railroad tracks are parallel with the water-front, it will often be desirable to make the crane span the two lines of tracks, allowing head-room for the vehicles to pass under it. Cranes fixed on floating vessels were also illustrated up to 60 tons power. Locomotive cranes up to 25 tons were described, and also cranes specially adapted to terminal freight stations. One of these has lifted 80 tons per hour a height of twenty to thirty feet, and deposited the loads of 1½ to 2 tons each 60 feet from the point where taken up. A similar crane commonly delivers 240 barrels of oil per hour the same height of lift and length of deposit. The cost per day is one driver's wages and the necessary fuel, oil, etc. Five per cent per annum is ample allowance for depreciation. The cost of this system of working is easily ascertained, but a great gain also arises from the increased speed of passing large quantities of merchandise.

A paper by E. H. Keating, Member American Society of Civil Engineers, upon the "Shubenacadie Canal," was read at the meeting of the Society held November 21. This canal lies between the City of Halifax, Nova Scotia, and the Basin of Minas, an arm of the Bay of Fundy. It was commenced in 1826, and the intention was to build it so as to accommodate vessels drawing eight feet of water, with the idea that at comparatively small additional expense it could be used by vessels drawing eleven feet. It was to have fifteen locks 87 feet in length and 22 feet 6 inches in width, with a lockage of 95 feet 10 inches, ascending from Halifax, and of 95 feet 4 inches descending to the Bay of Fundy. The total length is about 54 miles, the greater portion of which was to be in the Shubenacadie River, and in a chain of lakes existing along the line of the canal.

Mr. Thomas Telford, the celebrated engineer, made a very favorable report upon the proposed canal and its prospects. Up to the close of 1831, £72,000 had been expended upon the work, which was, however, in an entirely uncompleted state. Some of the locks near Halifax had not been commenced, and large and expensive work remained to be done upon the line of the canal. All the available capital being exhausted, the works were abandoned and fell into ruin, never having been completed on the original plan. In 1856 a report was made by Mr. W. H. Talcott, C. E., upon a scheme for completing the works upon a very much smaller scale than at first proposed, substituting for certain of the locks an inclined plane near Halifax, with a lift of 55 feet, and a similar plane with a lift of 33 feet at another point; the planes to be worked by hydraulic machinery. This report was adopted, and the work was completed in 1862, at a cost of $200,000. The diminished canal has, however, proved a failure as a commercial enterprise, and since 1870 no trade of any account has been carried on through it.

There was also presented a description, by Charles C. Smith, Member American Society of Civil Engineers, of an hydraulic canal built at Minneapolis, Minn., during the severely cold winter of 1881. This canal is under Main Street, Minneapolis, its entrance being at right angles to the street. It is covered with a semi-circular rubble-stone arch of 17 feet 6 inches span, and where the line turns the angle of 90°, the abutments of the arch were built on curved lines of the radius of 31 feet 3 inches and 48 feet 9 inches. The arch was built of rubble masonry, of stone varying from 4 to 6 inches thick, and from 18 to 36 inches long, the joints at the soffit being slightly hammered off, to approximately form beds conforming to the radial lines of the arch. The mortar was made of one part Louisville cement to two parts of sand, and was mixed in hot water without salt. During its construction the weather was extremely cold, the frost having penetrated the ground to the depth of six feet. An examination of this work having been made quite recently, it was found to be perfectly sound and free from any indication of settlement or rupture two years after its construction.

A discussion followed by the members present, more particularly in reference to the best methods of laying masonry in very cold weather, the experience of a number of members being favorable to the use of a strong solution of salt in the water with which the mortar was made.

THE ILLUSTRATIONS.

GLORIA DEI CHURCH, PALENVILLE, N. Y. MR. W. H. DAY, ARCHITECT.

THIS church is built of Catskill Mountain bluestone, found in the neighborhood. It is 28′ x 50′ outside, and is calculated to seat one hundred and thirty-five people. Walls (side walls) thirteen feet high and two feet thick.

CAPITALS FROM THE ALHAMBRA, GRANADA, SPAIN. DRAWN BY R. W. GIBSON, ARCHITECT, ALBANY, N. Y.

SEE article on "Spanish Architecture."

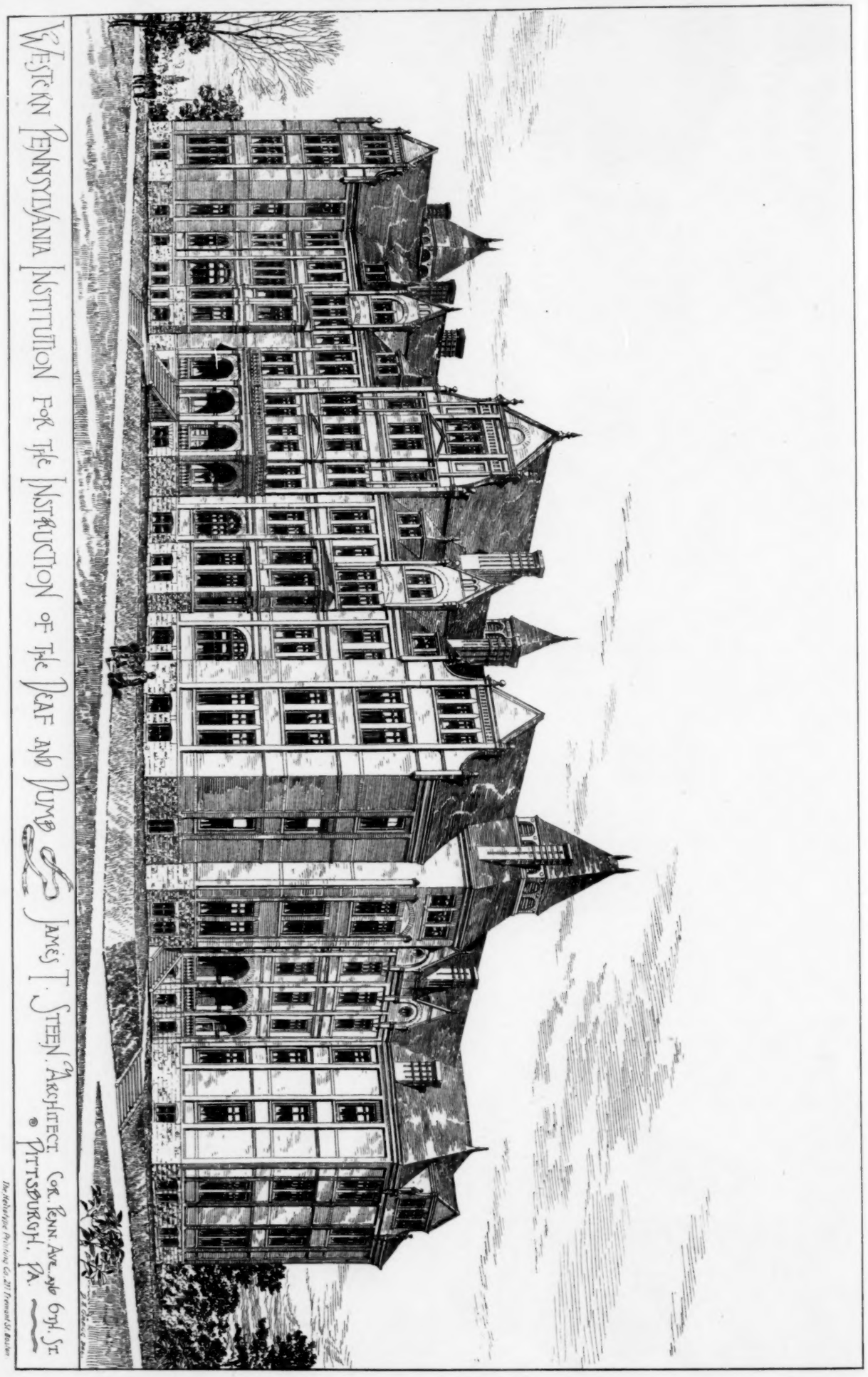
WESTERN PENNSYLVANIA INSTITUTION FOR THE INSTRUCTION OF THE DEAF AND DUMB. MR. JAMES T. STEEN, ARCHITECT, PITTSBURGH, PA.

THE building is being constructed with basement of rock-face sandstone; the superstructure is of brick, faced with selected brick laid in red mortar, and is roofed with Pennsylvania slate.

BUILDING FOR C. O. MILLER, ESQ., STAMFORD, CONN. MR. WARREN R. BRIGGS, ARCHITECT, BRIDGEPORT, CONN.

THE building is constructed with pressed-brick front and terra-cotta finish; inside finish of ash. It has a frontage of thirty-seven feet and a depth of one hundred and twenty-two feet. Offices on second story, and large hall on third. It is heated throughout by steam. Cost of building complete, $25,000.

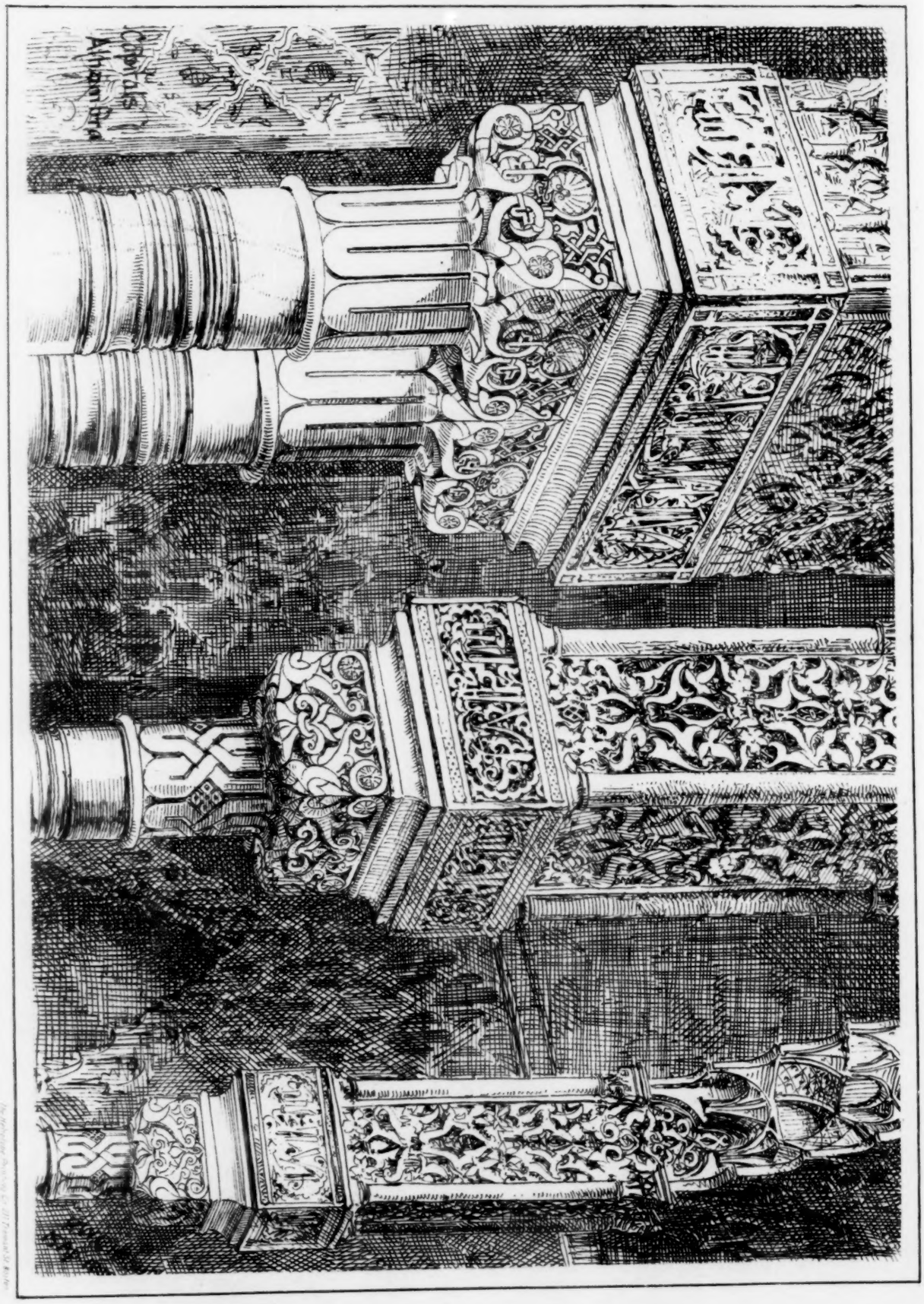
IRRIGATION IN INDIA. — The system of irrigation now in use in the Madras Presidency is on a vast scale, a record, though imperfect, of the tanks in fourteen cultivated districts showing them to amount to 43,000 in repair and 10,000 out of repair, or 53,000 in all. The length of embankment required for each may be estimated on a moderate calculation at half a mile, and the number of masonry works in irrigation-sluices, waste-weirs, and the like may be taken to be at least six. The embankments alone for all these tanks would extend over 30,000 miles, while the total number of separate masonry works are at least 300,000. The most remarkable feature about this gigantic system is that it is entirely of native origin, not one new tank having been made by Europeans; and, according to all accounts, there must be a good many equally fine works which have been allowed to fall into decay. According to the *Tropical Agriculturist*, the revenue dependent on existing works is roughly estimated at one hundred and fifty lacs.

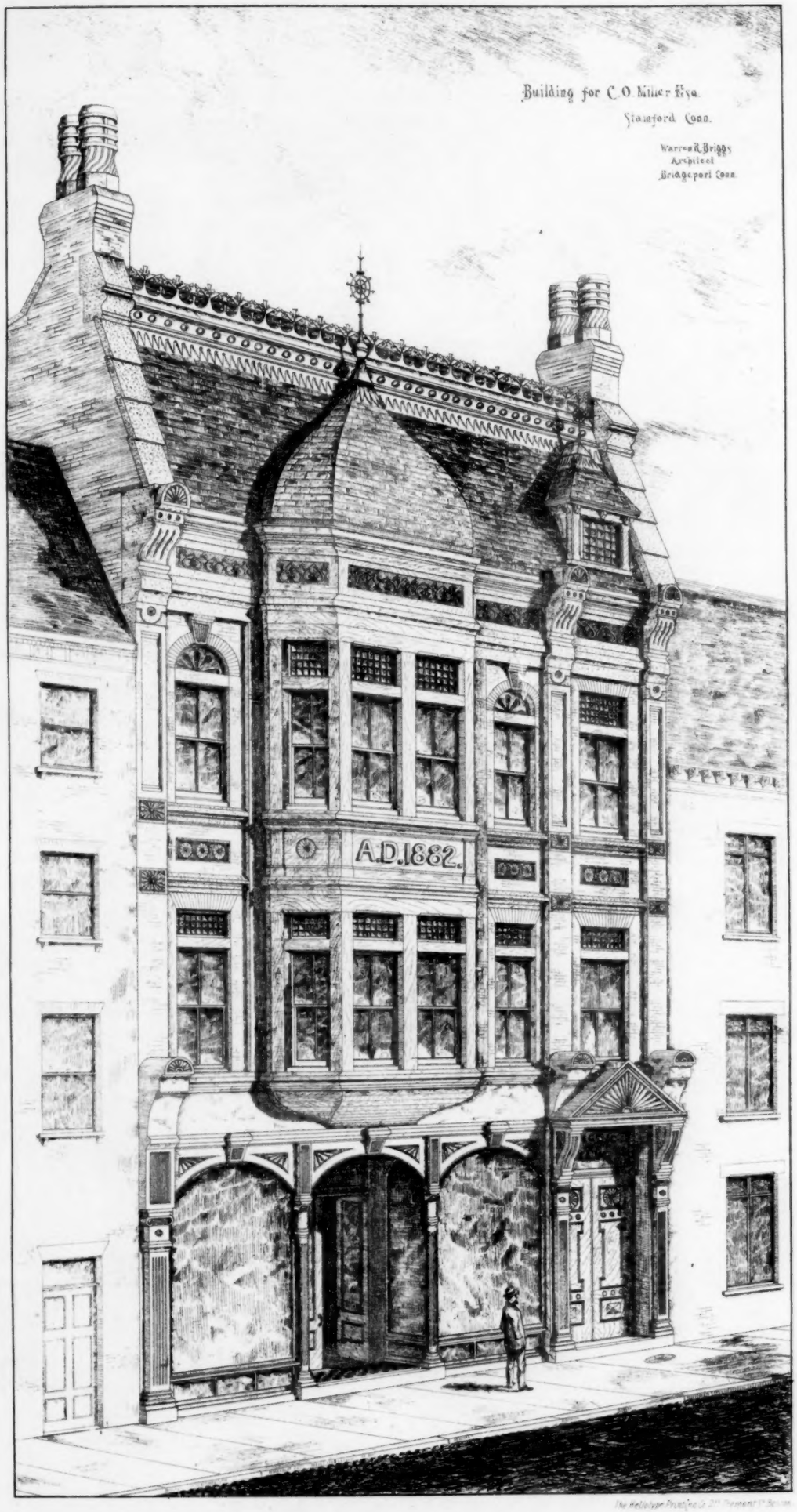


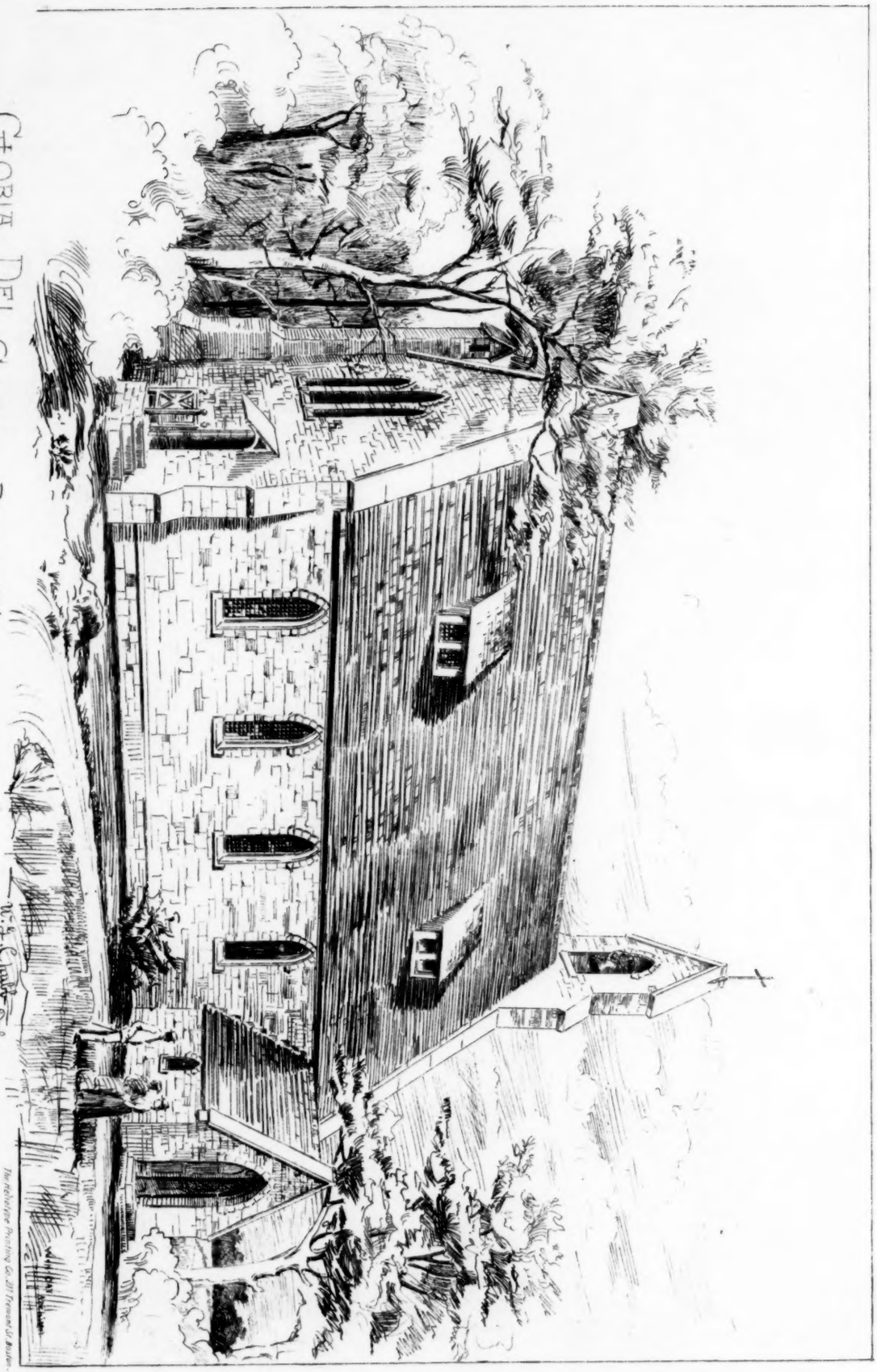
Western Pennsylvania Institution for the Instruction of the Deaf and Dumb.

James T. Steen, Architect. Cor. Penn Ave. and 6th St. Pittsburgh, Pa.

The Heliotype Printing Co. 211 Franklin St. Boston.







GLORIA DEI CHURCH Paleville N.Y.

N.Y. Chas. Del.

SANITARY PLUMBING.[1] — XI.

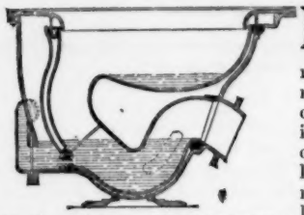


Fig. 27.— Section. — "Wash-out" Closet with Anti-siphon Supply-pipe.

FIGURES 27 and 28 represent an improved "wash-out" closet, showing the manner in which any closet may be so made as to be self-sealing, and any ordinary supply-pipe with which it may be connected converted into our anti-siphon pipe. Instead of having the bend which carries the mouth of the "inverted bottle" below the normal water-line of the trap, in the supply-pipe, it is here again, as in our "self-sealing" closet, made in the casting of the closet, so that the plumber has only a single connection to make for the supply, and is neither obliged to wrestle with subtle laws of hydrostatics, nor to carry about with him a skilled hydraulic engineer as helper.

The bowl and trap are constructed of glass, and framed in iron. The interspace is filled with plaster-of-Paris and putty. The manner in which the supply-pipe is connected is clearly shown in the drawing, and requires no further explanation. In order to prevent the flushing streams from twirling the lighter waste matters about in the bowl before ejecting them into the drain, the upper flushing-rim has a peculiar construction which causes the water to flow from all parts of it in a direction towards the outflow, and also provides that the largest volume of the water shall enter at the end opposite the outflow, and sweep across the bowl in a line parallel with its axis. This is done by simply constructing the flushing-rim in a separate piece from the bowl proper, and providing it with a partition, dipping into a groove filled with mastic, which causes the water to flow from the inlet, as shown by the arrows, first to the end of the bowl opposite the outflow, and thence into the inner flushing-rim, from which it flows in a direction always towards the outflow. The details of the construction are rendered sufficiently clear by the drawings. The longer axis of the bowl is preferably made at right angles with the water-way, inasmuch as this arrangement is the most convenient for use with the seat, or as a urinal.

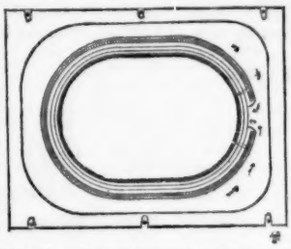


Fig. 28. — Plan of improved "Wash-out" Closet.

Although this form of "wash-out" closet does away with many of the objections of its class, it cannot be recommended because of its noisiness. Moreover, it is in many respects inferior to the "self-sealing" closet under consideration.

When the writer suggested this treatment of the supply-pipe as an "inverted bottle" to one of the leading plumbers of the city, this sanitarian attempted to dissuade him from undertaking the experiments to investigate it, saying, that while it was well known that water could be sustained in a pipe by atmospheric pressure for a certain length of time, say for a few hours, or possibly days, varying perhaps with the hygrometric condition of the atmosphere, yet it could not be depended upon for any greater length of time, as air or gas would surely make its way through the water and ultimately cause it to fall from the pipe. The experiments were nevertheless made, and it has been found that no variations of barometric pressure, nor any gaseous or aeriform emanations from the sewers or water-surface have, during the eighteen months at least of our experience with it, been able so to cure Nature of her abomination for the vacuum as to induce her to release this column of water in our supply-pipe.

(*c* and *d*) The effect of the combined action of the upper and lower jets is to fill the outlet-pipe of the trap for a moment full bore, which, of course, produces the maximum of *scouring* effect on the trap and soil-pipe. It also partially siphons out the water in the water-closet bowl. The loss is supplied, however, by the gradual return of the water which had risen to the upper edge of the bowl, through the small holes of the upper flushing-rose, and the water is raised again to its normal level without drawing on the supply standing for the purpose in the inverted bottle. The water rises to the rim much more rapidly than it falls from it, because in its passage upwards through the rose it is under pressure, but in its return it is not. It is this retardation by the rose-nozzle of the return of the water which enables it to restore the loss; since it gives time for air to break the siphon before the water arrives.

(*e*) The noise of the powerful flushing streams has been smothered in the manner described. No machinery exists in the closet to rust and creak, or to hammer in operation. No air-pipe is used to hiss and whistle when the flushing is finished.

A simple, slow-closing, noiseless valve is employed to regulate the flow of the water, as will hereafter be described; and in short, the closet may be used in becoming secrecy as is agreeable to civilized people, and without the usual flourish of trumpets which so ridiculously proclaims the fact to the household, whenever any one has sought a moment of special privacy.

[1] Continued from page 248, No. 413.

(*f*) The flushing is effected by the simple pulling of the valve-cord, a long lever being all that is necessary to enable the heavy column of water below and above the valve to be lifted with perfect ease.

(*g*) A special supply-cistern is preferably used with this closet to avoid possible contamination of the water in the mains. The danger of a direct supply for all closets is now recognized by sanitarians, and legislation has rightly begun to provide against it.

(*h*) The manner in which the flushing streams are operated and directed renders spattering evidently impossible.

(*i*) The whole of the water used in flushing being used to the best possible advantage in ejecting the wastes, it is evident that the quantity required is at a minimum.

(*j*) The regulation of the quantity used for each flushing is chiefly the function of the supply-valve, and as such will be considered in detail hereafter; but the immediate response of the column of water in the supply-pipe to the action of the valve, renders the regulation more accurate and positive, and in so far it is due to the form of the closet proper.

The Form.

Of the form and material of this closet, enough has already been said to show with the aid of the drawings that they conform in every particular with the desiderata given under these heads, in our original table of requirements for an ideal water-closet.

The interior surface of the bowl and trap have been reduced to a minimum, by making each form part of the other, so that practically the water-closet consists of a trap alone, enlarged at one end, but otherwise having the simplest form that is possible with a trap. Hence there is no superfluous surface, corner, or angle, and none which does not receive the full and direct scouring of the flushing stream.

The standing water in the bowl measures $8\frac{1}{2}'' \times 10\frac{1}{2}''$, and as the glass is blown in an iron mould, the form which gives this surface will be as unvarying as the iron of which the mould is made. The glass for this bowl is blown in such a manner that the variations in thickness at this point are practically inappreciable.

The whole of the interior of the bowl, and more than half of the trap, including its lowest part, may be seen from above. The rest of the trap is made of clear, transparent glass, and the iron frame cast with large openings or windows on each side of this part of the trap, so that the entire surface both of bowl and trap may be inspected from without.

Glass, of which the bowl is made, is found in practice to be a far better material for the purpose than any other now known. The surface cannot craze or discolor. When opal glass is used for the bowl, the appearance is the same as that of the finest white porcelain; but glass of any desired color may be used instead of the white glass.

The frame is of cast-iron, which may be painted, enamelled, lacquered, galvanized, or treated in any way the taste may dictate; or it may be cast in solid brass, which may be polished, gilded, nickel or silver plated. The cost of brass for the frame would add ten or fifteen dollars to the cost of the closet.

The Construction.

(*a*) The bowl and trap are formed of two pieces of glass embedded in water-proof cement in the iron frame, so that they become with the frame, when the cement has hardened, practically a single piece. A tough cement is used, which is water-proof, and, after a few weeks, becomes harder than sandstone. The connection between the bowl and trap piece is made beyond the line of vision from the top of the bowl, as shown in section by the dotted line.

(*b*) As already described, the "inverted bottle" supply-pipe immediately restores any water which may be drawn from the trap by siphonic action or otherwise. The upper opening of the upper rose-nozzle governs the level below which the fall of the water opens the mouth of the bottle, and, by admitting a small quantity of air, allows a corresponding amount of water to flow slowly into the bowl. This upper opening is therefore placed very near the dip of the trap, say, three-quarters of an inch, so that should the water in the trap be suddenly lowered by siphonic action until the siphon were broken by air passing under the dip, the supply-pipe will afterwards gradually deliver to the trap enough water to restore a seal of three-quarters of an inch, and no more. The amount is limited in order to economize the water in the pipe and make it last as long as possible. Thus two disks of water four inches in diameter and less than three-quarters of an inch thick would be drawn from the supply-pipe every time a siphonic action was created powerful enough to lower the water in the trap to its lowest possible point before the siphon was broken by the entrance of air. The contents, therefore, of a four-inch supply-pipe seven feet high would restore a seal three-quarters of an inch deep to a trap so acted upon at least seventy-five times before the supply-pipe required refilling by usage of the closet. Now, when we consider how rarely it happens that the seal of a water-closet is thus broken by siphonage, and that the supply-pipe may be indefinitely increased in its capacity, or proportioned to conform to the influences affecting it, it is evident that this closet becomes practically *anti-siphonic*. We have assumed in our calculation that part of the water in the outer limb of the trap falls back as soon as the air breaks the siphon.

(*c*) The iron frame is constructed in a single piece from the top of the bowl to the connection of the trap with the soil or waste pipe. There is therefore no joint above this connection for a possible leakage. The glass within is so firmly and extensively embedded in

water-proof mastic that the escape of water into the space between the glass and metal is impossible. Even were it possible, it could do no damage, because it could neither extend nor escape at any other point than that of its entrance. The manner in which the iron frame is formed and connected with the supply and waste pipes is so clearly shown by the drawings that no further description is necessary. The labor of the plumber in setting is reduced to a minimum, and the closet may be taken apart and replaced at any time, as easily as the wooden casing of an ordinary closet can be unscrewed. It becomes practically a "portable" closet, and may be put up or taken down like a piece of furniture. A screw-driver and wrench are all that is necessary to connect or disconnect it, and the joints thus made are tight and strong enough to stand a steam pressure of a hundred pounds to an inch.

(*g*) Inasmuch as the water for the upper flush never rises above the edge of the glass bowl, the space above this, and below the portable flushing-rim may be made to serve as a ventilating-pipe. By connecting this space with a proper flue, the seat and bowl of the closet may be ventilated. Such ventilation is serviceable at the moment of usage of the closet; but is not needed for the bowl and trap themselves, which are kept odorless by their construction and arrangements for flushing. It is well, however, always to ventilate toilet-rooms, to remove the vapor and gases generated during their use by the occupant, and by the illumination, and as good a place as any to locate the ventilating outlet is under the seat of the water-closet as described. It is to be recommended that the gas-burner of the room be encased in a glass lantern connected above with the ventilating-flue, and below, both with the outlet-pipe already described, and with an additional ventilating opening or register placed somewhere as near the floor as possible, so that, when the cover of the water-closet is closed, the ventilating current shall not be arrested. This outlet-pipe may at the same time receive the cistern overflow-pipe, if desired; the end extends over the edge of the glass bowl, so that a leakage of the cistern-valve will be detected. Or the cistern-overflow may be connected with other overflow-pipes in the house and be carried to some open sink-bowl, or bath-tub, where escape of water will at once be seen.

To facilitate the emptying of the closet for disuse during winter, a small faucet is provided at the bottom which empties every part of the closet-bowl trap and supply-pipe. It may be connected with the soil-pipe, if desired, by a quarter-inch pipe which is connected with the faucet by a brass coupling.

The cost of the materials used in this closet is undeniably greater than in other hoppers; but this is offset by the saving in manufacture and repair. The expense involved in baking and glazing large pieces of earthenware is saved, and the money actually invested is returned in valuable and serviceable materials, not found in the others, which strengthen and protect the closet, so that no after expense is required to keep it in repair.

The appearance has been considered worthy of some attention in the design, in order that, now that it is customary to dispense with the wooden casing to ensure cleanliness and ventilation, the casing of iron, simple and appropriate in design, might in a measure fill its place. Thus in saving the expense of the panelled wood-work, we do not necessarily expose a fixture so offensive to the sight as to serve as a perpetual plea for a return to the old fashion of concealment.

A Tornado-Proof House.— A house built to withstand tornadoes— so the *Minnesota Tribune* says — is that of a banker, the wealthiest man in Osakis, Minn. All the corners are acute angles, and the sides sink back into other angles, giving this architectural freak the contour of a star. From the highest point of the roof the gutters sink suddenly, making great depressions. This angularity was, it is said, inspired by the banker's wife, who lives in constant dread of storms. The corners were made very sharp to split tornadoes. The cellar walls are of unusual thickness, and the timbers of the structure are anchored in them, so that the house may not be blown down without taking up the foundations. All the weather-boarding is put on in oblique lines.

TRANSVERSE STRENGTH OF TIMBER.[1] — II.

SUMMARY OF THE TESTS.

THE tests recorded may be divided into four classes: —

1° Spruce beams.
2° Framing joints.
3° Built-up beams.
4° Hard-pine beams.

I. *Spruce Beams.* — Before giving a summary of the tests made in this laboratory I will insert some of the moduli of rupture and moduli of elasticity given by different authorities.

Moduli of rupture are given as follows: —

	Maximum.	Minimum.	Mean.
Hatfield,	12996	7506	9800
Rankine,	12300	9900	11100
Laslett,	9707	7506	9045
Trautwine,			8100
Rodman,			6168

Hatfield's, Laslett's, Trautwine's and Rodman's figures are from their own experiments. Trautwine advises, for practical use, to deduct one-third on account of knots and defects, hence to use 5400. The tables show the values obtained in these tests, and I will add a statement which I have already made in public, viz.: —

As a result of the tests thus far made in my laboratory it seems to me safe to say that, if our Boston lumber-yards are to be taken as a fair sample of the lumber-yards in the case of spruce, that if such lumber is ordered from a dealer of good repute, no selection being made except to discard that which is rotten or has holes in it, that 3000 pounds per square inch is all that could with any safety be used for a modulus of rupture, and even this might err in some cases in being too large; 2°, that if the lumber is carefully selected at any one lumber-yard, so as to take only the best of their stock, it would not be safe to use for modulus of rupture a number greater than 4000, and if we required a lot of spruce which should have a modulus of rupture of 5000 it would be necessary to select a very few pieces from each lumber-yard in the city.

If numbers 14, 15 and 60 be omitted, which would seem fair to do, the average modulus of rupture would be 4596.

The modulus of elasticity (*i. e.* that determined from the immediate deflections) was: maximum, 1588548; minimum; 897961, mean, 1293-732.

The time test was made on yellow-pine, but if we should consider the effect of time on spruce the same as for yellow-pine we should obtain for use about 862488.

SPRUCE BEAMS.

No. of test.	Width and depth. inches.	Distance between supports. ft.	in.	Manner of loading.	Breaking load. pounds.	Modulus of rupture in pounds per square inch.	Modulus of elasticity in pounds per square inch.	Remarks.
3	2 × 12	15		Load at middle.	5894	5526	1237 215	
4	2 × 9	6	7.5	" " "	7322	5389	1067 893	
5	2 × 12	15		" " "	5586	5237		
5 a	2 × 12	7		" " "	8982			
6	2.75 × 9	6	8	" " "	7586	4082	938 453	
7	3 × 9	4		" " "	11086	3285		
8	3 × 9	10		" " "	6086	4508		
9	3 × 9	15		" " "	8086	5651		
10	3½ × 12	20		" " "	6586	4253		
11	2.5 × 13.5	10		" " "	9585	3787		
12	3.75 × 12	16		" 4.5′ from end	7585	3271		
14	7 × 2	7		" at middle.	1944	8748	.....	Selected stock.
15	1.75 × 6.75	7		" " "	4785	7562	.....	
16	3 × 9	6	8	" " "	9985	4931		
17	3 × 9	6	8	" at four points 16″ apart.	16744	4961		
18	3.9 × 12	16		" 4.5′ from end.	12585	5218		
19	2 × 12	14		Load at middle	4404	3854	1482 645	
20	2 × 12	14		" " "	5108	4469	1588 548	
21	3 15-16 × 12	14		" " "	8627	3834	1187 073	
22	3½ × 12	14		" " "	12545	5666	1332 715	
23	3½ × 12½	14		" " "	6917	2993	897 961	
24	3 × 11½	14		" " "	8927	5442	1572 470	
25	2 × 9½	14		" " "	3198	4139	1460 620	
26	2½ × 12	14		" " "	6819	4339	1396 667	
27	1 15-16 × 10	14		" " "	4306	5601	1355 860	
28	4½ × 12	18		" " "	8829	4816	1397 136	
29	4 × 12½	18		" " "	8324	4586	1259 224	
31	3½ × 12	18		" " "	7721	5559	1231 498	
35	6 × 12	18		" " "	11188	4196	1347 910	
36	2 × 11½	7	2	" " "	7870	3599		
37	4 × 11½	12		" " "	10572	4135		
45	3½ × 11½	16	4	" " "	8072	4436		
46	3 11-16 × 12	10	2	" " "	13772	4746		
49	3½ × 11½	14		" " "	12076	5878		
60	4 × 12	17	2	Distributed equally at 12 points.	26000	7448	1461 039	

34) 166247

Average modulus of rupture = 4889

17) 22214927

Average modulus of elasticity = 1306760

II. *Framing Joints.* — Perhaps the best course to pursue is to give simply the results of the tests.

As to conclusions to be drawn from them I can only say that framing weakens the timber very much, and causes it to split, and, therefore recommend very strongly the substitution of iron hangers.

Enough tests have not yet been made to deduce any rules from them, but the isolated tests exhibit the action of certain practical examples in common use.

It is also to be observed that the loads in the case of the headers were applied at the top, whereas in practice they are applied at the bottom of the holes. The latter arrangement was, however, obtained in the case of the floor, and in regard to this it is to be observed that the header already began to crack when the tail-beams broke, and hence that the floor could have borne but little more even if the load had been uniformly distributed.

In the following table I shall merely give a list of the tests made on

[1] By Gaetano Lanza, Professor of Applied Mechanics, Massachusetts Institute of Technology. Continued from page 222, No. 411.

such framing, with the respective breaking weights, referring the reader to the records themselves for details.

No. of test.	Span. ft.	Span. in.	Width and depth. inches.	Description.	Breaking weights
1	6	8	2 × 12	Beam framed at both ends. Loaded at the middle.	6304
2	6	8	4 × 12	Header. Framed at ends. Mortised for four tail-beams. Loads applied above mortises.	10338
13	16		3½ × 12	Trimmer. Mortised 4′ 6″ from one support. Load above mortise.	9085
38	6	8	6 × 12	Header. Framed at ends. Mortised for four tail-beams. Loads applied above mortises.	10798
39	6	8	6 × 12	Header. Hung in stirrup-irons. Mortised for four tail-beams. Loads applied above mortises.	21298
40	17	10	3 × 12	Tail-beam. Framed at one end. Loaded at the middle.	8171
41	6	8	3½ × 12	Header. Framed at ends. Mortised for four tail-beams. Loads applied above mortises.	10757
52				Floor-header and three tail-beams mortised into it. Loads applied at middle of tail-beams.	11238

III. *Built-up Beams.*— These were three in number, and were all of spruce. I will confine myself to a list, referring to the tables for details.

No.	Description.	Span. ft.	Span. in.	Width and depth of cross-section. inches.	Breaking load. pounds.
42	Scarfed beam, bolted.....	16		6 × 12	15070
43	Keyed beam, bolted.....	15	6	6 × 12	15674
44	Sheathed beam.....	15	6	6 × 12	11984

IV. *Yellow-Pine Beams.*— The moduli of rupture in common use are given as follows by different authorities, viz.: —

	Maximum.	Minimum.	Mean.
Hatfield,	21168	9000	15300
Laslett,	14162	10044	12254
Trautwine,		Yellow-pine	9000
		Pitch-pine	9900
Rodman,	9876	8796	9293
Stetson & Moseley's book,			11676

A summary of the figures obtained from these tests will be given in a table at the end of these remarks.

It will be observed that we have for

	Maximum.	Minimum.	Mean.
Modulus of rupture,	9380	4764	6984
Modulus of elasticity,	2386096	1256286	1779517

We also have a considerable reduction of the modulus of elasticity with time, as shown by the time test, the immediate modulus of elasticity being 1721605, of which two-thirds is 1147737, this value being reached with a load somewhat less than 8000 pounds.

YELLOW-PINE BEAMS.

No. of test.	Width and depth. inches.	Span. ft.	Span. in.	Manner of loading.	Breaking weight in pounds.	Modulus of rupture.	Modulus of elasticity.
30	3 × 13¾	14		Load at centre.	15158	6614	1937025
32	4 1-16 × 12 3-16	18		" " "	13751	7383	1733976
33	3 15-16 × 12½	18		" " "	9832	5386	1793923
47	3 × 13¾	14		" " "	19574	8696	2386096
50	4 × 14 1-16	21		" " "	12875	5914	1256286
53	3½ × 14	24	6	" " "	10076	7206	1784426
54	3 × 12½	24		" " "	9576	9380	2116821
56	3½ × 14	15	4	" " "	10572	4764	1490396
57	2 15-16 × 12	19	2	" " "	8472	6950	1444521
59	9 × 13¾	24		" " "	21083	5352	1417793
62	4½ × 12½	19	10	" " "	15461	9102	2037939
63	4 3-16 × 12 3-16	20		" " "	14073	8145	1593339
64	4½ × 12½	19	10	" " "	10573	6098	1917976
65	4 × 12½	19	8	" " "	11573	6782	1966717
						14)	24913237
				Average modulus of elasticity =		.....	1779517
						14)	97772
				Average modulus of rupture =			6984

Besides those above enumerated there are: —

No. 34, the time test.

No. 58, a beam with an iron flitch, and

No. 61, a beam with iron straps.

Each of which is a special case, and can be found in the records.

Also, on oak beams we have the three following tests: —

OAK BEAMS.

No. of test.	Span. ft.	Span. in.	Width and depth. inches.	Description.	Breaking weight in pounds.	Modulus of rupture.	Modulus of elasticity.
48	19	6	6 × 12	Load at middle.	13776	5596	1766839
51	15	6	4½ × 14⅜	" " "	19076	6060	1240728
55	13	8	3 × 13¼	" " "	10671	4984	853098

MODERN BLASTING AGENTS.

FOR many years the only explosive agent at command was gunpowder, and often the process of blasting was slow and unsatisfactory, particularly in wet or very hard ground. In course of time chemistry found the means of blasting in the wettest ground and hardest rocks. Quite recently a number of explosives of a far more powerful character than gunpowder have been produced, some of which have found their way largely into practice for blasting purposes. The tendency of invention has been to produce an explosive of greater potential energy than gunpowder, and which shall be practically safe. The successful attempts in this direction can be counted on the fingers' ends: they relate mainly to nitro-compounds, of which gun-cotton, dynamite and lithofracteur are the chief.

Although gun-cotton and kindred explosive agents possess a wide sphere of usefulness, especially with regard to military purposes, they are not adapted to mining operations. The rigidity of gun-cotton and similar cartridges is a great disadvantage in charging the bore-hole, the charge being liable to stick fast, and this has, in fact, been the cause of accidents. The plastic nature of dynamite and lithofracteur, on the contrary, permits of the cartridge adapting itself to any irregularities that may occur in the bore-hole, and so the operation of charging is facilitated, and one great source of danger is absent. Hence the nitro-glycerine compounds are greatly preferred to those explosives which in their nature are rigid and incompressible. As a natural result, and seeing that the power of well-made standard dynamite—that is, dynamite containing 75 per cent of nitro-glycerine and 25 per cent of kieselguhr — is equal to that of pure compressed gun-cotton, dynamite, introduced first into England in 1867, has taken a firm stand as one of the most practically useful explosive agents for industrial purposes. According to Sir Frederick Abel, the sale of dynamite was eleven tons only in 1867. The demand, however, rapidly increased, and 5500 tons were sold in 1877 from Nobel's dynamite factories alone, whilst in 1882 the consumption reached 9500 tons; this, however, by no means represents the total amount of dynamite made and used.

Aut although possessing many advantages, dynamite has two slight drawbacks. In the first place it develops nitrous fumes after a shot has been fired, rendering close workings untenable for the time being. The development of these fumes is due to imperfect combustion of the nitro-glycerine, and the energy developed by the explosion of the main bulk of the charge so acts upon the unconsumed portion of the nitro-glycerine as to convert it into vapor, which mixes with the atmosphere, and, with the smoke from the fuse, hangs about the face of the work for a considerable time. This it is which causes the fumes which are detrimental to health, and which enforce idleness on the part of the miner while waiting for them to clear off. On the other hand, the use of lithofracteur is not accompanied by this disadvantage, for it does not develop any fumes by its explosion if properly used, as has been demonstrated by practical experience in its use. The reason of this is that, whilst lithofracteur contains a smaller percentage of nitro-glycerine than dynamite it also contains other ingredients, which, while acting as perfect absorbents, assist also in the explosion, and enable every atom of the nitro-glycerine to be exploded in the bore-hole, thus preventing any portion being projected into the air in the form of poisonous gas, the result of imperfect combustion.

The second drawback possessed by dynamite is that its action, being exceedingly rapid, is more or less locally intensified, producing a smashing, rather than a rending, effect on the rock. The rapidity of action is due to the fact that nitro-glycerine is the sole explosive, the development of the power due to its combustion being enormously rapid. Lithofracteur, on the other hand, consists of nitro-glycerine combined with a large additional percentage of other combustible and explosive absorbent media, and but a small proportion only of incombustible matter. The result is that the action and reaction of the ingredients of lithofracteur are so nicely balanced as to cause a retardation of the explosion. In other words, it is slower burning than nitro-glycerine, just as large-grain gunpowder is slower burning than rifle-grain powder, although weight for weight they may both develop the same power, but with a different result. This retardation causes lithofracteur to act with greater rending effect than in the case of other nitro-glycerine compounds, which have a smashing action. With lithofracteur the rock is not merely crushed to powder within a limited area around the bore-hole, but it is rent and fissured—lifted, in fact — to a very wide extent, so that at each shot the miner gets much more ground. This has been proved by the use of lithofracteur, and the fact being recognized by practical men, it may be concluded that its merits only require to be better known for it to take its place with dynamite as a useful blasting agent.— *Iron.*

A QUESTION OF RECOVERING A CONTESTED FEE.

November 30, 1883.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — The *American Architect* for Novemi er 24, states as editorial opinion: "A proprietor who requests an architect to prepare plans, implies in that request a promise to pay him the customary compensation . . . and the architect has only to prove employment to recover," etc.

Will you kindly advise us of the decisions in England or America, on which your opinion is based, and if by "*prove employment*" you mean simply to show the *work was done*, or show proof *it was ordered done?* We have a case in suit at present, where *contract is denied*, as no written engagement accompanied instructions for the work; though the drawings are acknowledged to be as ordered, and no tender to return same, or declination of acceptance has been made.

Respectfully, X.

[In English practice see Ward *vs.* Lowndes, 1 E. and E., 940; 28 L. J., Q. B., 265; also Worthington *vs.* Holland, L. R., 1 Q. B., 63; 35 L. J., Q. B., etc.

We have no notes at hand of American cases, but think we can find some. In X.'s case the question whether the drawings were ordered or only volunteered seems to be the important one. Of course, the fact of their having been made is *prima facie* evidence that they were ordered, and as no written instrument is necessary to constitute a good contract for professional service it should require very strong testimony to prove that either an architect or his client supposed that such service was to be rendered gratuitously. The only testimony of this kind which is likely to be brought will be, we fancy, a citation of the example of some one of those pernicious individuals among the cheap variety of architects who "solicit the privilege of submitting sketches," without mentioning the disagreeable subject of remuneration, to the ruin of their own reputation, and the injury of all those who have the misfortune to be classed, in the directory, in the same profession with them. — Eds. American Architect.]

THE ATLANTA STATE-HOUSE COMPETITION.

November 21, 1883.

To the Editors of the American Architect: —

Gentlemen, — Some of your subscribers are noticing the fact that nothing has been mentioned editorially in regard to the Atlanta competition. There is a certain sophisticated look about the advertised invitation, but at the same time there is so much left in the hands of an unnamed commission that it might lead some people to suppose that there was to be no show of fairness. Can you offer any information or explanation of the situation other than your advertisement and the printed matter furnished by the Governor, all of which is very fine, but far from assuring; as, for instance, there is nothing to show that all the drawings may not be kept for months, to be "milked" by a local builder, and nobody awarded the prize. Also, can you explain what "a reasonable time" means?

Very respectfully yours, A. B. C.

[We regret to say that we are quite ignorant of the facts in regard to the Atlanta competition. A year or more ago we had occasion to notice an "invitation to architects" issued from that city, which seemed to indicate that "architects" were regarded there as beings perhaps a little superior to field laborers, but inferior to clay-eaters; and since that time have preferred to confine our attention to districts which give evidence of a greater regard for the fine arts, or at least for those who profess them. We should not think of imputing any unfair intention to the commission which, as our correspondent says, will have the matter of the new competition in charge, and, in fact, we think that such bodies generally conduct themselves, according to their light, with scrupulous integrity; but it is a good rule that men who wish to have their rights respected do best to look after them for themselves; and architects who have so much spare time on their hands as to be able to make designs for State-houses on speculation must expect to receive less consideration than their more independent brethren who insist on being paid for what they do. We can hardly offer any suggestions for protecting the interests of competing architects, other than the rather belated one of keeping their drawings safe in their hands until satisfactory assurance has been given as to the composition of the jury and methods of judging, with other important details. Except for the trouble and expense of tracing such large drawings, it might be worth while to copyright them by filing at Washington. This would prevent "local builders" or any one else from reproducing them or carrying them into execution without leave from the owners.

What "a reasonable time" means depends wholly on the circumstances of the case. As applied to the production of working-drawings for a building, a year would be little enough for the contract drawings of an important public structure, and details for execution should have as much more, even if it were possible to make them all before the commencement of the work, which it seldom is. — Eds. American Architect.]

STRAINS IN FRAMED STRUCTURES.

To the Editors of the American Architect: —

Dear Sirs, — I was much interested in your review in No. 412 of the *American Architect*, of Du Bois's "*Strains in Framed Structures*." It is very desirable that all book-reviewers should use equal care and discrimination in preparing notices. Your review was mainly from the architect's standpoint; the following items gathered in a hasty examination of the book in connection with your review, are offered that your readers may have the benefit of a view from the engineer's standpoint. We agree with you that this volume is superior to any other on the subject, and call attention to the following, that "the defects may be corrected in the next edition."

On page 57 counter-braces are defined, and their supposed use in stiffening the truss explained. On page 342 camber is explained; the deflection is assumed to be due only to the chords. The author concludes an unnecessarily long analysis to find camber by saying, "but the formula gives less than is allowed in practice," and "it is well in practice to increase it, say, two inches." Roughly, the deflection due to the web is about three-eighths of that due to the chords. If counters were put in every panel, and screwed up to their full capacity — only about half of this amount, or less than one-fourth of the whole deflection can be retained. The "stiffness" obtained in ordinary cases by screwing up the counters is inappreciable.

One of the weak points in all treatises on stresses in bridges is the neglect of the effect of the wind. Although this volume is an improvement on its predecessors it is still deficient in this respect. No mention is made of even the approximate amount of surface exposed to the action of the wind by different type-forms of trusses, although a great deal of space is given to the consideration of "dead weight." Surface exposed and dead weight are analogous. The author should not have omitted (1), the distribution of wind-pressure between top and bottom chords; (2) the effect of the wind in throwing more than half the load upon the leeward truss; (3) the method of transferring the wind-pressure borne by the unsupported chord to the abutment.

It is to be regretted that the author did not give some of the reasons why the working stress is but a small part of the ultimate strength. It would not be lost on the rising generation of engineers, and perhaps it would remove the misapprehension of the non-professional in this matter.

In reference to the strength, etc., of different qualities of material, as bar, plate and shape iron, and also the effect of impact, the specifications at the end of the volume are superior to the text. The only item concerning the floor-system of a bridge is a drawing copied from the specifications of the Cincinnati Southern Railroad of the standard roadway on that line, and inserted at the very end of the book without a single word of comment. The width of a bridge is nowhere mentioned. I. O. B.

BOYLE'S INDIAN GROUP.

St. Paul, Minn., November 23, 1883.

To the Editors of the American Architect: —

Dear Sirs,—I was much interested in your illustration and mention of "Mr. Boyle's Indian Group for Lincoln Park, Chicago." You consider the "unity of the impression" not preserved in the position of the dog. On the contrary, this seems to me particularly well conceived, for the dog, while keeping close to his master and with one eye on the alert for the least sign from him, at the same time has the other eye intently fixed on the approaching stranger. The whole posture of the surly looking brute suggests distrust and ready defence, though not defiance.

I like the spirit shown in your answer to "G. G. G.," and am glad to see you improve every opportunity to show up architectural plagiarism in its true light. Yours truly,

H. R. P. Hamilton.

NOTES AND CLIPPINGS.

Demonology and House-building. — House-building is an affair of so much spiritual importance and elaboration in Burmah and Siam that there are bulky treatises on the subject, containing minute instructions for the propitiation of all manner of demons.

The Present Nail Product.— *The Bulletin* of the Iron and Steel Association prints a list of the nail-works, and states that seventy-four now completed have 5,008 machines, and will add 391 more before the close of the year, while there are five new works being built which will have at least 200 more nail-machines in operation by January 1. By that time there will be 6,599 nail-machines ready to work, with a capacity of 12,376,000 kegs of cut nails and spikes yearly. The mills and machines now completed have a capacity of about 1,000,000 kegs less; about 3,264,000 in Pennsylvania, 2,200,000 in Ohio, 1,668,000 in West Virginia, 875,000 in Massachusetts, and 690,000 in New Jersey.

Apropos of the same subject the Philadelphia *Press* remarks: "The building boom has been for at least nine months past the chief support of the iron market; but there are many minor signs that it is near its end. The pause in the rise of rents on Manhattan Island last May was the first indication that building in New York City was overdone, and it has been followed by others which point to a serious check in real estate values there in the next six months. Nails, which since their tremendous jump in 1879–80 have been in steady demand, now show over-production. The capacity of the nail-works in the country, finished or unfinished, is 12,376,000 kegs, or twice the output in 1882, and this increase is launched on a failing market. In addition, various forms of iron used in building show a decided decrease in demand. Unless there is a sudden increase in railroad building, the falling off in house building must have a serious effect on the labor market before Spring."

The Thirsty Eucalyptus.—Where there is surplus moisture to dispose of, as, for example, a cesspool to keep dry, says the *Pacific Rural Press*, a large eucalyptus will accomplish not a little, and a group of them will dispose of a vast amount of house-sewage. But if you have water which you do not wish to exhaust, as in a good well, it would be wise to put the eucalyptus very far away. Daniel Sweet, of Bay Island farm, Alameda County, recently found a curious root formation of the eucalyptus in the bottom of his well, about sixteen feet below the surface. The trees to which the roots belonged stand fifty feet from the well. Two shoots pierced through the brick wall of the well, and, sending off millions of fibres, formed a dense mat that completely covered the bottom of the well. Most of these fibres are no larger than threads, and are so woven and intertwisted as to form a mat as impenetrable and strong as though regularly woven in a loom. The mat when first taken out of the well was water-soaked and covered with mud, and nearly all a man could lift, but when dry it was nearly as soft to touch as wool, and weighed only a few ounces. This is a good illustration of how the eucalyptus absorbs moisture, its roots going so far to find water, pushing themselves through a brick wall, and then developing enormously after the water is reached. Mr. Sweet thinks one of the causes of the drying up of wells is the insatiable thirst of these vegetable monsters.

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.]

288,977. SUPPORT FOR SWINGING OR PENDENT SCAFFOLDS. — James T. Churchill, St. Joseph, Mo.

288,980-981. STAY-ROLLER FOR SLIDING-DOORS. — William Cronk, Havana, N. Y.

288,984. SPRING-HINGE. — Levi M. Devore, Freeport, Ill.

288,995. STEAM-RADIATOR. — Samuel F. Gold, Englewood, N J.

289,003. ROOF-COATING. — James H. Kelley, New York, N. Y.

289,005. VENEER. —Frederick Koskul, St. Louis, Mo.

289,022. FIRE-PROOFING COMPOSITION. — John H. Nolan, Boston, Mass.

289,024. BRICK-KILN. — James W. Penfield, Willoughby, O.

289,031. DOOR-LOCK. — John Schilling and Abram Albert Massar, Pomeroy, O.

289,045. HEATING-DRUM.—George W. Weamer and Franklin T. Zimmerman, Auburn, Ind.

289,048. PAINT-DISTRIBUTER. — John P. Whipple, Whitewater, Wis.

289,050. FIRE-ESCAPE.—John S. H. Willcox, Whitby, Ontario, Can.

289,052. PLIERS. — Charles F. Winslow, Pawtucket, R. I.

289,056. SCREW-DRIVER. — George S. Allen and Robert C. Ellrich, Southington, Conn.

289,061. FIRE-ESCAPE. — George Borst and Frederick Will, Rochester, N. Y.

289,068. AUTOMATIC HATCH, ETC.— Cass Chapman, Chicago, Ill.

289,069. WRENCH. — John H. Coes, Worcester, Mass.

289,076. LIGHTNING-CONDUCTOR. — Thomas H. Dodge, Worcester, Mass.

289,080. FIRE-ESCAPE. — David L. Garver, Hart, Mich.

289,094. SHINGLE-SAWING MACHINE. — Oley C. Hanson, Eureka, Cal.

289,096. MACHINE FOR THE MANUFACTURE OF SKY-LIGHT BARS, WINDOW-SASH BARS AND MOULDINGS. — George Hayes, New York, N. Y.

289,101. FIRE-ESCAPE. — Walter A. Holbrook, Milwaukee, Wis.

289,105. BUILDING-FRONT. — Peter H. Jackson, San Francisco, Cal.

289,107-108. SEWER-GATE. — Samuel Johnson, San Francisco, Cal.

289,112. ARTIFICIAL STONE FOR VENEERS, MOULDED ARTICLES, ETC. — Wilhelm Matti, New York, N. Y.

289,119. FIRE-ESCAPE. — John Metzger, New York, N. Y.

289,126. EXPANSION-BIT. — George Nichols, Seymour, Conn.

289,163. FIRE-ESCAPE. — Leo Straehl, Detroit, Mich.

289,170. WOOD-BORING MACHINE. — Miles Sweet, Troy, N. Y.

289,174. DRIP-PAN FOR WINDOWS. — Winfield S. Taylor, Trenton, N. J.

289,176. INSIDE BLIND. — Wm. Teuteberg, Omaha, Neb.

289,188. PIPE-WRENCH. — Conrad D. Volkmann, Nappanee, Ind.

289,210. WATER-CLOSET. —William Bishop, Brooklyn, N. Y.

289,218. FIRE-PROOF FLOOR. — Andrew J. Campbell, New York, N. Y.

289,229. FIRE-ESCAPE. — Thomas T. Church, Port Hamilton, N. Y.

289,233. HOTEL AND BURGLAR-ALARM ELECTRIC ANNUNCIATOR. — William S. Corwin, Newark, N. J.

289,259. DOOR-CHECK. — William H. Herrick, Grinnell, Iowa.

289,262. FIRE-PROOF COMPOUND. — Karl A. Hohenstein, Brooklyn, N. Y.

289,286. FIRE-ESCAPE. — Bernard C. Margileth, Aurora, Ind.

289,287. FIRE-PROOF BOX FOR FIRE-ESCAPES. — Bernard C. Margileth, Aurora, Ind.

289,304. FIRE-ESCAPE. — Peter P. Pealer, South Dansville, N. Y.

289,305. KNOB-ATTACHMENT. — Edward L. Phipps, Milford, Mich.

289,318. FIRE-ESCAPE. — Thos. B. Smith, Baltimore, Md.

289,332. JOINER'S PLANE.—Henry B. Beach, Meriden, Conn.

289,333. DRIVE-SCREW.—Thos. J. Bray, Pittsburgh, Pa.

289,347. WRENCH. — James Houlehan, Toledo, O.

289,350. SAFETY-GUARD FOR ELEVATORS. — Wm. A. Ingalls, Providence, R. I.

SUMMARY OF THE WEEK.

Baltimore.

DWELLING AND STABLE. — Messrs. J. A. & W. T. Wilson, architects, have prepared drawings for A. G. Davis, Esq., for a three-st'y attic brick and Cheat River stone dwell., 50′ x 55′, on Eutaw Pl., cor. Lauren St., and a two-st'y brick and Cheat River stone stable, 47′ x 51′, its rear to cost, $50,000; John E. Marshall, builder.

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

George A. Blake, 2 three-st'y and mansard roof buildings, n s Biddle St., cor. Lovegrove Alley.

E. J. Cooper, three-st'y brick building, n s Harlem Ave., bet. Gilmor and Stricker Sts.

Jas. V. Pryor, 2 three-st'y brick buildings, n s Preston St., w of McKim St.

Asendorf & Dryer, three-st'y brick building, s e cor. Lombard and Concord Sts.

A. K. Robins, two-st'y brick building, s s John St., e of Wilcox Alley.

Wm. T. Phillips, 7 three-st'y brick buildings, n s Franklin St., com. n w cor. Vincent Alley; and a three-st'y brick building, w s Stricker St., n of Saratoga St.

Boston.

BUILDING PERMITS. — *Wood.* — *Elmore St.*, near Erie Ave., Ward 4, for William Coady, 2 dwells., 20′ x 32′, two-st'y pitch; Wm. Coady, builder.

Centre St., opposite Church St., Ward 23, for Geo. F. Tillston, stable, 20′ x 40′, two-st'y pitch.

Bismark St., rear, near Boylston St., Ward 23, for Haffenreffer & Co., storage, 17′ x 34′, one-st'y flat; Haffenreffer & Co., builders.

Boylston Ave., near Boylston St., Ward 23, for J. M. Cutter, dwell., 22′ x 30′, three-st'y hip.

Mt. Vernon St., near Centre St., Ward 23, for Thos. O. Grady, Jr., dwell., 29′ and 32′ x 36′, two-st'y pitch: Thomas O. Grady, builder.

Melville Ave., near Washington St., Ward 24, for B. B. Whittemore, dwell., 28′ 6″ x 32′ 6″; ell, 14′ x 21′ 6″, two-st'y pitch; H. P. Oakman, builder.

Athens St., No. 324, Ward 14, for Henry R. Stevens, dwell., 18′ x 26′, two-st'y pitch; Lewis Bros., builders.

Gallop's Island, East End, Ward 2, for City of Boston, quarantine building, 40′ x 100′, one-st'y flat; Josiah Shaw, builder.

Nonantum St., rear, near Newton Line, Ward 25, for J. J. White, dwell., 20′ x 20′, two-st'y mansard; stable, 20′ x 20′, two-st'y mansard; A. G. Tapper, builder.

Everett St., near Leaverus Ave., Ward 23, for B. F. Sturtevant, dwell., 39′ 4″ x 41′ 8″, two-st'y mansard.

Cottage St., cor. Iliad St., Ward 20, for Wm. Donaldson, dwell., 25′ and 28′ x 34′, two-st'y pitch; Wm. Donaldson, builder.

Commercial St., near Pleasant St., Ward 24, for Bridget Lally, dwell., 22′ x 30′ 6″, three-st'y flat; Hugh Smith, builder.

North Ave., No. 14, Ward 20, for Mrs. S. C. Rowell, dwell., 14′ x 16′ and 20′ x 30′, two-st'y pitch; Wm. Donaldson, builder.

Norfolk St., cor. Withington St., Ward 24, for Richard B. Hassett, dwell., 24′ x 53′, three-st'y flat; Mr. Rockwell, builder.

Brooklyn.

THEATRE. — A meeting of representatives of the amateur dramatic societies of Brooklyn, interested in the plan to erect a new opera-house, was held lately, at No. 187 Montague St., with G. de Cordova in the chair. It was announced that $125,000 of the $250,000 necessary to purchase a site and erect the building had been subscribed.

Chicago.

BUILDING PERMITS. — J. L. Campbell, 7 two-st'y dwells., cor. Campbell Ave. and Flournoy St.; cost, $16,000.

W. D. Kerfoot & Co., 7 one-st'y cottages, cor. Rice and Leavitt Sts.; cost, $9,000.

Newberry Estate, five-st'y factory, 153 to 159 Superior St.; cost, $40,000.

U. P. Smith, 2 two-st'y dwells., 3247 and 3249 Groveland Park Ave.; cost, $11,000.

Anthony Kane, five-st'y warehouse, 212 Michigan St.; cost, $14,000.

William Burke, three-st'y store and dwell., 506 Ogden Ave.; cost, $5,000.

J. Jela, one-and-one-half-st'y cottage, 712 Holt Ave.; cost, $2,300.

E. Baumann, 2 two-st'y dwells., 531 and 533 Jackson St.; cost, $10,000.

M. Base, one-st'y dwell., 313 Henry St.; cost, $1,200.

Cincinnati.

HOUSE. — Miss M. Louise McLaughlin, the artist, is to build a new brick dwell. on Walnut Hills. The plans are being prepared by her brother, Mr. James W. McLaughlin, architect.

BUILDING PERMITS.—F. Grammann, three-st'y brick dwell., State Ave., near Eighth St.; cost, $4,800.

Wilson & Co., additional story on store; cost, $8,000.

Enterprise Carriage Co., six-st'y brick factory, Court St., near Main St.; cost, $10,000.

John Griffith, two-st'y frame building, Lincoln Ave., near Orchard St.; cost, $5,000.

Jacob Elsas, five-st'y brick store, Pearl St., near Elm St.; cost, $6,000.

W. E. Stephens, 2 two-st'y frame dwells., Prichard St., near Willow St.; cost, $4,000.

B. Frickers, two-st'y brick building, State Ave.; cost, $4,000.

Adam Hoecke, two-st'y brick dwell.; cost, $4,000.

J. Straub, two-st'y frame dwell., Clifton Ave., cor. Warner St.; cost, $4,000.

Wilson Hinkle & Co., addition to store, Walnut St., near Baker St.; cost, $8,000.

Catholic church, on Price Ave.; cost, $6,500.

E. M. Spellmire, two-st'y frame building, Hawthorne Ave.; cost, $3,500.

E. A. Snyder & Co., five-st'y brick factory, cor. Smith and Augusta Sts.; cost, $10,000.

Ten permits for repairs; cost, $5,500.

Total permits to date, 750.

Total cost to date, $2,613,250.

Minneapolis, Minn.

HOUSES.—Charles Robedeau is building a $4,000 house in Yale's addition.

Kees & Fisk are preparing plans for a house for Charles Sparks, in Calhoun Park.

Dr. Simpson is building a $3,500 house on Sixth St.

J. Haley is preparing plans for a $3,000 house for Mr. Rohann, on Hennepin Ave.

S. W. Van Dompsellar is the contractor for a $4,000 house now being built for John Fleetham, cor. Second St. and Tenth Ave.

TENEMENTS. — C. P. Moses is building a $10,000 three-st'y brick block of four tenements, cor. Hawthorne Ave. and Fifteenth St.

Orff Bros. are the architects of a $5,000 double tenement for Frank S. McDonald, on Eighth St.

J. A. Spear is building a brick veneered block of eight tenements on Fourteenth Ave., s e cor. Fifth St. The cost will be from $20,000 to $25,000.

New York.

APARTMENT-HOUSES. — On the s e cor. of Sixty-second St. and Boulevard, it is proposed to have built a ten-st'y apartment-house, to cost $325,000; Messrs. McClay & Davis own the land.

Mr. E. H. M. Just proposes to build 7 five-st'y brick and stone flats on the e s of Eighth Ave., between One Hundred and Thirty-fourth and One Hundred and Thirty-fifth Sts., from designs of Mr. Mortimer C. Merritt; cost, $140,000.

For Mr. D. W. Slocum, 2 five-st'y flats, 25′ x 55′, are to be built at Nos. 407 and 409 West Forty-ninth St., from designs of Mr. Robert Mook.

For Mr. George Ehret, 2 five-st'y flats are to be built on the s s of Thirty-ninth St., 65′ w of First Ave., 30′ x 61′ each, from designs of Messrs. H. J. Schwarzmann & Co.

Mr. Peter McManus will build 3 five-st'y brick and stone flats on the s w cor. of Avenue A and Fifty-eighth St.; cost, $50,000.

For Mr. Thos. Maloney, a five-st'y flat house, 25′ x 60′, is to be built at No. 349 East Seventieth St., from designs of Mr. R. W. Buckley.

For Mr. F. S. Schnugg, a five-st'y flat with store below, 25′ 6″ x 75′, is to be built from designs of Mr. Julius Kastner.

STORES. — On the e s of Greene St., between Houston and Greene Sts., 3 five-st'y brick stores, 38′ x 95′ each, with iron fronts, are to be built by Messrs. Schoolherr & Goldenberg, at a cost of about $175,000.

BUILDING PERMITS. — *One Hundred and Twentieth St.*, s s, 90′ w Lexington Ave., 4 five-st'y brick tenements, tin roofs; cost, each, $18,000; owner, Patrick Dempsey, 5 East One Hundred and Thirty-second St.; architects, Cleverdon & Putzel.

West Forty-second St., No. 327, five-st'y brick flat, tin roof; cost, $25,000; owner, Samuel McMillan, 245 West Forty-second St.; architects, Thom & Wilson.

Eleventh Ave., Nos. 479 *and* 481, one-st'y brick workshop, gravel roof; cost, $2,000; owner, Albert Smith, 445 Eleventh Ave.; architect, Jas. Codey; builder, Mr. Buckley.

Fifty-seventh St., s s, 210′ e Third Ave., 2 five-st'y brick tenements, tin roofs; cost, each, $18,000; owners, Kunkell & Stauffer, 58 East Forty-first St.

East Eighty-first St., No. 224, five-st'y brick tenement, tin roof; cost, $17,500; owner, Peter Seebald, 232 East Eighty-third St.; architect, John Brandt.

Sixty-seventh St., n s, 125′ e Fourth Ave., 4 five-st'y brick flats, tin roofs; cost, each, $25,000; owners, Wall & Weyer, 110 East One Hundred and Twenty-fifth St.; architect, R. Rosenstock; built by day's work.

Seventy-seventh St., n s, 94′ e First Ave., 3 five-st'y brick tenements, tin roofs; cost, each, $16,500; owner and architect, same as last.

ALTERATIONS. — *Third Ave., Nos.* 1042 *and* 1044, one-st'y brick extension, etc.; cost, $5,000; owner, Hannah C. Gerry, by E. T. Gerry, 8 East Twenty-eighth St.; architect, B. McGurck; builder, Thos. Brennan.

Tenth Ave., Nos. 22, 24 *and* 26, raise one-st'y; cost, $18,000; owner, Strauch Bros., 16 Gansevoort St.; architect, Wm. Howe; builder, Jacob J. Banta.

Philadelphia.

THEATRE. — Col. J. A. Haverly is to build a theatre here in addition to the larger one he proposes to build in New York.

BUILDING PERMITS. — *South Eleventh St., No.* 710, one-st'y stable, 15′ x 28′; W. H. Miller, owner.

Castle Ave., cor. Broad St., addition to church, 16′ x 43′; Thos. Gamon, contractor.

Clearfield St., n s, w of Jasper St., two-st'y dye-house, 32′ x 60′; Dickson Bros., contractors.

Hancock St., e s, n of Columbia Ave., two-st'y engine and boiler-house, 36′ x 40′; J. Mander, contractor.

Mervine St., No. 1435, two-st'y stable, 38′ x 44′; J. Wilson & Sons, contractors.

Walnut St., No. 2039, fourth-st'y addition to brick building, 16′ x 55′ J. W. Howard & Co., contractors.

Wheat Sheaf Lane, cor. Richmond St., two-st'y dwell., 36′ x 36′; Jno. Shoemaker, owner.

Bermuda St., e s, bet. Buckries and Margaret Sts., laboratory, office, and store-house, and stable, and dwell., 40′ x 118′, 40′ x 68′, 32′ x 40′; Benj. Linfoot, architect.

Thirty-fifth St., cor. Wissahickon Ave., two-st'y stable, 113′ x 116′; Wm. Mackie, contractor.

Fifty-second St., cor; Wyalusing Ave., two-st'y stable, 20′ x 38′; L. C. Smith, contractor.

Moore St., n s, w of Second St., 2 three-st'y dwells., 16′ x 30′; David Trance, owner.

Columbia Ave., e and w of Forty-second St., 3 three-st'y dwells., 15′ x 38′; R. J. Dobbins, owner.

Cumberland St., n e cor. Aramingo Canal, two-st'y warehouse, 37′ x 100′; Jno. T. Lewis & Bros.

Twenty-first St., bet. Reed and Garrett Sts., 6 two-st'y dwells., 16′ x 36′; Dan'l McGettigan, contractor.

Wishart St., n s, e of Frankford Road, two-st'y stable, 16′ x 33′; W. H. Ewing, owner.

General Notes.

BRISTOL, N. H. — The Concord *Monitor* reports that Hon. Josiah Minot, of Concord, and Hon. S. S. Sleeper, of Cambridge, Mass., have purchased a lot of land, upon which they propose to erect a fine library-building for the town.

BURLINGTON, N. J. — Two cottages to be built for G. H. Todd, Esq.; from plans by Wilson Bros. & Co., architects, Philadelphia.

CHESTER, PA. — Madison Street Methodist Episcopal Church expects to erect a chapel on the ground adjoining the church-building.

CROWN POINT, IND. — The Board of Commissioners of Lake Co., having adopted plans and specifications

for a new poor-house, received bids Friday, December 7, 1883, for the erection of said building, to be located at the poor-farm, about three miles east of Crown Point, Ind.

EAST HAMPTON, L. I. — Seaside house of frame, outside work shingle, for B. H. Campbell, Esq.; plans by Hazlehurst & Huckel, architects, Philadelphia, Pa.

FALL RIVER, MASS. — Z. Paras is erecting a six tenement block, with a store on the first floor, on the cor. of Webster and Alden Sts.

GERMANTOWN, PA. — George Souders is erecting 8 three-st'y brick houses at Main and Johnson Sts.

GREAT BARRINGTON, MASS. — James Renfrew, Jr.'s new house on the hill at Adams has been covered, and the inside work begun. Rumor says that it will cost about $5',000.

IRON CITY, ALA. — A company of southern capitalists is preparing to build a new manufacturing city, on the south side of the Tennessee River, in Alabama, near Mussel Shoals. The site is 100′ above high-water-mark, and it will be named "Iron City." It is at the head of navigation, on the Tennessee, and will be the terminus of at least three railroads, which run through the coal and iron fields of the South.

KANSAS CITY, MO. — The building committee of the First Presbyterian Church consists of Messrs. F. B. Nofsinger, J. E. Rhoades, P. S. Brown, William Young, Joseph Rayburn, John S. Martin, and J. R. Frith. The new church will be erected at the northwest corner of Tenth St. and Forest Ave., but the plans have not yet been completed.

NEWPORT, R. I. — The voters of Newport have defeated the proposition to purchase a lot and build a poor-house, at a cost of $33,000.

OLNEYVILLE, R. I. — An addition is building to the wool-room of the Providence Worsted Mills, 45′ x 120′, and four-st'y.

PALMETTO, GA. — Frame Baptist church, to cost $25,-000; Bruce & Morgan, architects, Atlanta, Ga.

PICTOU COUNTY, N. S. — The Burnside Woollen Mills of Pictou Co., N. S., which were burnt with a loss of $30,000, will be rebuilt.

Bids and Contracts.

BOSTON, MASS. — The following is a synopsis of bids for all the "Low" tiles and brass frames required for mantels for the post-office and sub-treasury extension.

C. A. Wellington, $440.
Kenderdine & Paret, $480.
Murdock Parlor Grate Co., $412.

The contract hasbeen awarded to the Murdock Parlor Grate Company, of this city.

GEORGETOWN, D. C. — Bids were opened in the office of the District Commissioners for the erection of a home for destitute colored women and children, in accordance with the Act of Congress appropriating $20,000 for that purpose, the plans of which have been completed by the building inspector. The bids were as follows: —

Peter McCartney, $19,925.
R. W. Darby, $21,600.
C. C. Thomas. $18,350.
J. T. Corrigan, $18,300.
W. H. Germann, $22,200,40.
C. C. Martin, $19,286.

MONSON, MASS. — The contract for building the new granite town-house has been let by the committee to W. N. Flynt & Co., and work will probably be begun at once. The building is to be finished by May 1, 1885, at a cost not to exceed $35,600.

MONTGOMERY, ALA. — The following is a synopsis of bids for fire-proof covering for iron columns in the court-house and post-office: —

Wight Fireproofing Company, $350.
Ottawa Tile Company, $300 (*accepted*).

The following is a synopsis of bids for wire cloth for the court-house.

The John A. Roebling's Sons & Co., 28 cents per square yard (*accepted*).
Fulton Iron Works, 29½ cents per square yard.
E. T. Barnum, 31 cents per square yard.
Bromwell Brush and Wire Goods Company, 32 cents per square yard.
Kiely & Voss, 32 cents per square yard.
Kiely & Voss, 27 cents, cloth and staples only.
Gilbert & Bennett Manufacturing Company, 33¾ cents, No. 18, B. W. G.
Gilbert & Bennett Manufacturing Company, 27 cents, No. 19, B. W. G.
Gilbert & Bennett Manufacturing Company, 22½ cents, No. 20, B. W. G.
Clinton Wire Cloth Company, 40 cents per square yard.
Watson & Schalck, 40½ cents per square yard.

RAVENSWOOD, ILL. — The contract for the stained glass-work on the new Episcopal church, has just been awarded to Healy & Millet, of Chicago, for $500.

WASHINGTON, D. C. — November 13, the District Commissioners awarded the contract for constructing a two-st'y and basement brick building, for the National Association for Destitute Colored Women and Children, to J. T. Corrigan, for $18,300, he being the lowest bidder.

The Commissioners also awarded the contract for the construction of the addition to the Industrial Home School, located above Georgetown, to C. Thomas, the lowest bidder, at $4,975.

COMPETITIONS.

COLOSSAL STATUE OF SIR W. WALLACE.

[At Aberdeen, Scotland.]

10 BRIDGE ST., ABERDEEN, October 15, 1883.

The testamentary trustees of the late Mr. John Steill, of Edinburgh, hereby notify that they will receive models for a colossal statue of Wallace, in bronze, with basement of granite blocks, to be placed on the mound in the northwest part of the Duthie Public Park, near the city of Aberdeen, in conformity with instructions left by Mr. Steill, at a cost not exceeding £3,000.

Intending competitors, on application, accompanied with a remittance of 10 *s.* 6 *d.*, to Mr. John Otto Macqueen, 10 Bridge Street, Aberdeen, will be supplied with copies of (1) Mr. Steill's instructions, (2) conditions of the competition, and (3) lithograph plan of the Duthie Park, showing sections of the mound.

The author of the accepted model will be employed to execute the work, and the author of that next in order of merit will receive a premium of £50. The trustees do not, however, bind themselves to accept any of the models.

All models must be in conformity with the above conditions, and must be delivered in Aberdeen, free of expense, addressed to Mr. J. O. Macqueen, Municipal Buildings, Aberdeen, **not later than July 1, 1884.**

420

COMPETITIONS.

MONUMENT.

[At Milwaukee, Wis.]

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

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

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

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

Proposals may be sent to, or any further information obtained from, WM. P. McLAREN,

414 Chairman Committee, Milwaukee, Wis.

PROPOSALS.

PLASTERING.

[At Cincinnati, O.]

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., November 21, 1883.

Sealed proposals will be received at this office **until 12 M., on the 14th day of December, 1883,** for all the plastering required in the custom-house and post-office at Cincinnati, O., in accordance with drawings and specification, copies of which and any additional information may be had on application at this office or the office of the superintendent.

415 M. E. BELL, Supervising Architect.

GRAVING DOCK.

[At Esquimalt Harbor, British Columbia.]

DEPARTMENT OF PUBLIC WORKS,
OTTAWA, November 12, 1883.

Sealed tenders, addressed to the undersigned and endorsed "Tenders for Graving Dock, B. C.," will be received at this office until Friday, the 8th day of February, 1884, inclusively, for the construction and completion of the partially finished Graving Dock, at Esquimalt Harbor, British Columbia, according to plans and specifications to be seen **on and after Monday, the 24th December next,** at the Department of Public Works, Ottawa, and on application to the Hon. J. W. Trutch, Victoria, B. C.

Persons tendering are notified that tenders will not be considered unless made on the printed forms supplied and prices affixed to the whole of the items stated therein, and signed with their actual signatures.

Each tender must be accompanied by an accepted bank check for the sum of $7,500 made payable to the order of the Honorable the Minister of Public Works, which will be forfeited if the party decline to enter into a contract when called upon to do so, or if he fail to complete the work contracted for. If the tender be not accepted the check will be returned.

The Department will not be bound to accept the lowest or any tender.

By order,

417 F. H. ENNIS, Secretary.

AGENCY BUILDINGS.

[At New Crow Reservation, Montana.]

DEPARTMENT OF THE INTERIOR,
OFFICE OF INDIAN AFFAIRS,
WASHINGTON, D. C., November 26, 1883.

Sealed proposals, endorsed "Proposals for Agency Buildings on the New Crow Reservation in Montana," which are to be erected about fourteen miles south of Fort Custer, near to the Custer battle-field, on the north of said field and on the west bank of the Little Big Horn, will be received at the office of the Commissioner of Indian Affairs, Washington, D. C., **until 12 o'clock, M., Wednesday, December 26, 1883.**

Complete plans and specifications of the buildings, fourteen in number, and of the work to be done, can be examined at the office of the Agent at Crow Agency, M. T., of the *Inter-Ocean*, Chicago, Ill.; *Pioneer Press*, of St. Paul, Minn.; and *Nonpareil*, Council Bluffs, Io., and at this office.

The contract to be awarded to the lowest responsible bidder or bidders, subject to the approval of the Secretary of the Interior; the right is, however, reserved to reject any and all bids, or any part of any bid, if deemed for the best interest of the service.

Proposals must be made for each building separately, as none will be received for all the buildings in a lump; and proposals must state the length of time required for the completion of each building after the approval of the contract. Time required to complete the building will be taken into consideration.

CERTIFIED CHECKS.

Every bid must be accompanied by a certified check upon some United States depository for at least five per cent of the amount of the proposal, payable to the order of the Commissioner of Indian Affairs, which check will be forfeited to the United States in case any bidder receiving an award shall fail to execute a contract with good and sufficient sureties; otherwise to be returned to the bidder.

The contract will provide for four payments, three of which will be made at such stages of the work as will fully protect the United States: the last payment will be made when the building is accepted.

416 H. PRICE, Commissioner.

PROPOSALS.

WATER-WORKS.

[At Fort Smith, Ark.]

The Board of Aldermen of the city of Fort Smith, Ark., desiring to obtain a system of water-works, will grant a liberal franchise to a company willing to erect and operate the same. To that end propositions will be received up to the **first Monday in February, 1884.** For information address

ED. M. KENNA,

418 Chairman Committee on Water-Works.

IRON FURRING AND LATHING.

[At Memphis, Tenn.]

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., November 24, 1883.

Sealed proposals will be received at this office **until 12 M., on the 14th day of December, 1883,** for furnishing and fixing in place complete, all the iron furring and lathing required for the custom-house and post-office at Memphis, Tenn., in accordance with drawings and specification, copies of which and any additional information may be had on application at this office, or the office of the superintendent.

415 M. E. BELL, Supervising Architect.

ELEVATED RAILROAD.

[At Pittsburgh, Pa.]

CHIEF ENGINEER'S OFFICE, PGH., J. R. R. CO.,
ALLEGHENY, November 25, 1883.

On and after December 1st, 1883, sealed proposals will be received at this office for the building of the iron elevated railroad, Pittsburgh Junction R. R. Co., on Thirty-third St., Pittsburgh, Pa., **until December 20th, 1883.**

Plans and specifications can be seen at office of Theodore Cooper, Consulting Engineer, No. 35 Broadway, New York city, or at office of the Chief Engineer, in P. & W. R. R. Depot, Allegheny City, Pa.

H. A. SCHWANECKE,

416 Chief Engineer P. J. R. R.

FLOATING GATE OR CAISSON.

[At Mare Island, Cal.]

NAVY DEPARTMENT,
BUREAU OF YARDS AND DOCKS,
WASHINGTON, D. C., November 12, 1883.

Sealed proposals, addressed to the Chief of the Bureau of Yards and Docks, Navy Department, Washington, D. C., indorsed, "Proposals for Floating Gate," will be received at this Bureau by the undersigned **until 1 o'clock, P. M., of Tuesday, the 22d day of January, 1884,** at which time and place the proposals will be opened in the presence of bidders, for furnishing the necessary labor and material for the construction of a floating gate, or caisson, for the dry-dock at the Mare Island Navy Yard, California.

Plans of the floating gate, or caisson, and all attachments thereto, can be seen, and copies of specifications and instructions to bidders obtained, by applying to the Bureau of Yards and Docks, Navy Department; the Civil Engineer's Office at the Mare Island Navy Yard, California; or the Navy Pay Offices, at No. 17 State St., New York City, and No. 45 Milk St., Boston, Mass.

The Bureau reserves the right to reject any or all bids that may not be deemed advantageous to the Government.

No proposal will be considered unless accompanied by the prescribed bond which forms a part of the same. EDWARD T. NICHOLS,

417 Chief of Bureau.

INDUSTRIAL SCHOOL.

[At Devil's Lake Agency, D. T.]

DEPARTMENT OF THE INTERIOR,
OFFICE OF INDIAN AFFAIRS,
WASHINGTON, D. C., November 23, 1883.

Sealed proposals endorsed "Proposals for the construction of an Industrial School-building at Devil's Lake Agency, D. T.," will be received at this office **until Wednesday, December 19, 1883, at 12 o'clock, M.**

Complete plans and specifications of the work can be examined at the office of the *Inter-Ocean* of Chicago, Ill.; the *Pioneer Press* of St. Paul, Minn.; the *Bismarck Tribune* of Bismarck, D. T., and at the agency.

Bids are requested for building complete, with the basement, and also without the basement, as per plans and specifications.

The contract to be awarded to the lowest responsible bidder or bidders, subject to the approval of the Secretary of the Interior; the right is, however, reserved to reject any and all bids, or any part of any bid, if deemed for the best interests of the service. Time required to complete the building will be taken into consideration, and proposals must state the length of time required for the completion of the building after the approval of the contract. Each bid must give the names of all parties interested in or parties to it, and a copy of this advertisement must be attached to bid, with post-office address.

CERTIFIED CHECKS.

Each bid must be accompanied by a certified check or draft upon some United States depository, payable to the order of the Commissioner of Indian Affairs, which check or draft shall be not less than five per cent on the amount of the bid, and shall be forfeited to the United States in case any bidder receiving an award shall fail to execute promptly a contract with good and sufficient sureties, according to the terms of his bid; otherwise to be returned to the bidder.

Bids not accompanied by a certified check or draft will not be considered.

Parties receiving awards will at once enter into contract.

The contract will provide for three payments, two of which will be made at such stages of the work as will fully protect the United States; the last payment to be made when the building is completed and accepted. H. PRICE,

416 Commissioner.