

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XLI.

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No. 915.

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

JULY 8, 1893.



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MR. CHARLES GRAHAM, an old and well-known builder of New York, died recently under rather affecting circumstances. For many years Mr. Graham had been prominent in New York building affairs. He was a Scotchman by birth, and trained as a stair-builder. We need hardly say that a good stair-builder of the old school had to be a man of unusual intelligence, and of considerable training in geometry, and Mr. Graham found in New York, after his arrival there in 1851, employment and advancement. In 1865 he established the firm of Charles Graham & Co., which went into business first as stair-builders, but afterwards took up general contracting. As contractors, the firm built the beautiful Holland House on Fifth Avenue, the Buckingham Hotel extension, and private residences for Mayor William R. Grace, and Mr. Sidney Dillon. Like most men of intelligence and resolution, Mr. Graham had strong convictions on political matters, and, during the early days of the Civil War, he devoted himself earnestly to the cause of the slaves, many of whom he secretly assisted to freedom, while he defended them in public through the columns of the *Tribune*, with whose proprietor, Horace Greeley, he was on intimate terms. Mr. Graham's life was, in general, happy and prosperous. He had five children, two sons and three daughters. One of his sons was in business with him, and the only serious sorrow of the family was connected with the other son, who disappeared from home twenty-four years ago. Three months ago, Mr. Graham's wife died, and, almost at the very moment of this bereavement, an envelope arrived by mail, addressed to Charles Graham, and containing a photograph of a pretty little girl, marked "Your grand-daughter, Alice Graham." There was no address or post-mark on the envelope, but Mr. Graham followed up the faint clue with characteristic energy, advertising extensively over the country, and was at last rewarded by finding his long-lost son, who, though ill and wretched, had strength enough left to reach his father's house, where he died in peace a few days later, leaving his little daughter to her grandfather's care. The agitation of all these events was, however, too much for Mr. Graham, and within two weeks he followed his wife and son to the grave.

THE Annual Report of the City Architect of Boston, which has just been issued, forms an attractive and useful little book. It is a satisfaction to see such skilful and artistic work from a public office, official architecture having generally a mediocre reputation for beauty, whatever other advantages

it may possess. In the case of Boston, the accounts show that the city architect's work, since Mr. Wheelwright's incumbency, has been done at a very moderate cost, and the municipality may congratulate itself on having been so well served. We ought also to mention, as a member of Mr. Wheelwright's office who has done not a little to reflect credit on the official architecture of Boston, Mr. Maginnis, the draughtsman to whom the preparation of the perspective sketches which illustrate the book has been entrusted, and who has carried out his task with great skill and artistic feeling.

THE *Builder* has an editorial on the subject of modern architectural sketching which is interesting, if not altogether judicious. Premising, what is true enough, that it is the business of art to represent, as well as is possible with our inadequate materials, things as they are, without intentional perversion of any kind, the *Builder* thinks it necessary to protest against the ridiculous falsifications with which many architectural draughtsmen load their representations of buildings, for the sake, as they say, of picturesqueness. It cites the case of a drawing of the interior of a French cathedral, built at the end of the thirteenth century, and still in the perfect condition in which it was left by the unrivalled skill of the masons and stone-cutters of that period, every tile in the pavement being level and unbroken, the moulded ribs of the roof intact, and the surfaces of the vaulting smooth and regular. The draughtsman, in his representation of this smooth and accurate piece of workmanship, had seen fit to show the vaulting ribs so splintered and broken that the mouldings were indistinguishable, while the vaulting itself was represented as being of clumsy brickwork, in place of the smooth and skilful stonework of the thirteenth-century masons. The columns and piers, still perfect, even to the carving of their capitals, were shown splintered and disjointed, and a labyrinth of pitfalls occupied the place of the smooth pavement. This "absurd and false" mannerism usually pretends to be the result, and the evidence, of an intensely artistic feeling on the part of the draughtsman, who, we are told, being unable to endure anything which is not picturesque, unconsciously imparts picturesqueness to his rendering of what does not really possess that quality, and the *Builder* is quite right in thinking that it is quite time to protest against this notion. For our own part, we are convinced that the practice of deliberately falsifying beautiful pieces of architecture, for the sake of introducing clever touches of rendering, is the surest means of destroying the perception of proportion, contrast and modelling upon which the art of architecture depends. A comparison of a representation, by one of the modern "effective" draughtsmen, of, let us say, a Gothic church, with a photograph of the same church, will show, better than anything else, how utterly indifferent these men are, not only to the proportions of their model, but to the spacing of windows, arrangement of buttresses, curvature of arches, and everything else that makes the building really an architectural object, and it is notorious that the people who win fame in their younger days as masters of picturesque "fudging" rarely produce actual buildings, in their later career, of more than mediocre merit.

WE shall at once be reminded of Mr. Norman Shaw, who is certainly an architect of consummate talent, but who is apt, in his perspective sketches of his own buildings, to give them an air of picturesque unevenness which they do not possess when they come to be executed. Here, however, an important distinction should be noted. There is nothing wrong, or incompatible with architectural feeling, in a loss of picturesqueness, but the contrary, and it is only the attempt at deception which does the injury to those who pretend to find it where it does not exist. With Mr. Norman Shaw, as with many other architects who delight in picturesqueness, the first conception of a building presents itself with the delicately curved outlines and broken colors, which charm them in the ancient architecture of England and France. It is natural that they should make their first sketch in conformity with their conception, and the difference in effect between the straight, angular outlines of their executed building, and the picturesque curves of their sketch, which is

very noticeable in Mr. Shaw's work, is due rather to the intractable nature of the materials which they are forced to employ than to any intention on their part to deceive. Every one who has designed a building knows that the first free-hand sketch is usually much more satisfactory to the artistic sense than the later drawings, and that the labor of designing consists principally in the effort to give to the actual geometrical forms the charm which it is so easy to obtain in the sketch. There is no attempt at deception in this effort, which is simply a part of the eternal struggle of the artist to reconcile the useful with the beautiful, the material with the spiritual, and it is only the unfeeling and dishonest men who use such sense of the picturesque as they possess only to impose upon themselves and the public.

THE *Scientific American* has taken up a subject which is by no means new, in the shape of the decoration of plumbing pipes. It says, with perfect reason, that the casing in which such pipes are boxed up, to conceal them, form not only nests and passage-ways for vermin, but conduits for the conduction of odors from the kitchen and cellar to every part of a modern house. In apartment-houses, particularly, it says that the distribution of household perfumes goes on so rapidly and thoroughly that the older houses of the kind are almost unrentable, on account of the odor with which they are impregnated, and bring in hardly one-third the income that they produced when they were new. As a remedy for these evils, the *Scientific American* advocates Colonel Waring's plan of carrying the pipes exposed on the walls of the rooms, and decorating them so as to form ornamental objects. As an example, it mentions that a "dark bluish-gray" soil-pipe, with silver-bronzed hubs, presents a beautiful appearance, and that lead pipes may be "polished and varnished" with good effect.

WHILE fully agreeing with Colonel Waring and the *Scientific American* as to the importance of doing away with the nurseries of filth and vermin known as pipe-casings, we cannot say that we have ever seen a decorated soil-pipe which seemed to us an attractive feature in a room, and the problem of combining the useful with the beautiful in this, as in many other matters of building, has yet to be satisfactorily solved. It is, however, necessary to solve it soon, for hollow floors and walls furred with wood are beginning to disappear from our most costly buildings, and in such buildings the pipes must be exposed. The old practice of running the soil-pipes in a chase in the masonry, and then filling around them with brickwork, had the advantage of doing away with casings and air-channels, but there is some danger that a lead joint may start after it is buried in the masonry, and the law now usually forbids filling around pipes. The only alternative is, therefore, unless they can be covered with removable casings, to have them exposed. If left to themselves, architects could usually plan the bath-rooms so that the pipes from them would run down in closets or pantries, where they would be unobjectionable; but it often proves to be indispensable to the owner's comfort to have a bath-room or a wash-basin over a parlor or a dining-room, where concealment of the waste-pipes is impracticable. Under such circumstances the pipes must be decorated, but it does not follow that they must be painted blue, with silver hubs. On the contrary, a much better effect is produced by bronzing the pipe all over, and wrought-iron tubes, on the Durham system, lend themselves far more easily to such treatment than the cast-iron pipes, in five-foot lengths, with huge hubs, and "Mott's X heavy" in conspicuous characters on each length. For buildings of the first class, a thin cover of polished brass, or aluminium bronze, might be slipped over the iron. If cast-iron pipe must be used, it does not seem impossible that a joint might be devised not only more secure, but more ornamental, than the huge hub and spigot, and young architects might do worse than devote some of their ingenuity to the subject. For the supply-pipes, again, some new material is desirable. The nickel-plated brass commonly used for "open" plumbing soon tarnishes, and then looks worse than the unpretending lead. If the untarnished aluminium bronze could be obtained in the form of pipes and traps, it would be an excellent material, and, in default of this, a very beautiful and unchanging steel-blue color may be produced on brass pipes by the use of antimony, as we think, which would have an excellent effect. Aluminium itself is, as

yet, far too costly here for such use, but we may hope before long to see its price reduced sufficiently to make it possible to use it for the best class of plumbing.

M. DELAHAYE, in the *Revue Industrielle*, gives a novel explanation of trades-unionism. Speaking of the ridiculous strike on the English Northeastern Railway, ordered to prevent the company from testing the eyes of the engineers and brakemen, to see whether they were able to distinguish a red light from a green one, he says that agitators care nothing whether collisions occur from the color-blindness of the switchmen or not, so long as they can find any sort of pretext for asserting their influence. This passion for "bossing" other people he thinks is not a peculiarity of walking-delegates exclusively, but belongs to nearly all workmen. He says that he knows from experience that if two workmen are set at work side by side, one of them will always take upon himself to give directions to the other. This "mania for bossing," (*manie de commandement*) he finds greatly developed among multitudes of "good souls," (*braves gens*) hardly capable of directing their own little affairs, much less those of other people; and he thinks that the agitators and mischief-makers play upon this weakness of the workingman's nature to delude him into the "struggles" with capital out of which they get such a comfortable living.

IT has been whispered of late that the new American system of executing criminals by electricity was not so effective and certain as had been supposed, and it has even been asserted that the real execution is performed by the scalpels of the Doctors in their so-called autopsy on the unconscious victim. The authority for these criticisms seems to be M. d'Arsonval, a distinguished French physicist and electrician, who has recently, in connection with M. Biraud, carried out a series of experiments on the physiological effects of electricity, at the laboratory of M. Lacassagne, at Lyons. The primary object of the experiments was to ascertain what remedial treatment, if any, could be applied to cases of severe injury by electric shocks to the workmen employed in electric-light stations. M. d'Arsonval divides injuries due to electric currents into two classes. The first class comprises those where the tissues are torn and burned by the mechanical effect of a very violent momentary discharge, such as lightning, or the "disruptive discharge" of a battery of Leyden jars, or a large condenser. The second class includes the effects of the suspension of vital functions which follows the shock to the nerves caused by the passage through the body of a continuing current; and this class includes all the cases met with in ordinary electrical work. Although the action of the heart and lungs is often arrested by the passage of strong currents, so as to cause apparent death, M. d'Arsonval finds that the check is often only temporary, and that the patient may be revived by the same means used for the resuscitation of persons apparently drowned, including particularly artificial respiration. Of course, the laboratory experiments on the subject was made upon animals, but the treatment suggested by trials with them has been applied in several cases of apparently fatal injury to men from electric currents, with a successful result. It was in the course of his experience in resuscitating small animals that M. d'Arsonval was led to doubt the efficacy of American "Electrocutions." He found that with a Ferranti machine, giving a current of twenty ampères, at twenty-five hundred volts pressure, a rabbit could not be killed with certainty, artificial respiration often reviving one apparently dead from the effect of the current; and even the current from a Gramme machine, giving eight thousand volts pressure, did not always produce death in a rabbit. As the machines used for "Electrocution" in America are less powerful than the Ferranti dynamo, which could not be depended upon to kill a rabbit, and give a pressure of only fifteen hundred volts, in place of twenty-five hundred, he concluded, with some show of reason, that they must, in some cases, at least, merely produce insensibility, the patient being finished by the "post mortem" examination which appears to be the usual sequel to the execution. In order to test the truth of his surmise in regard to what he calls the "complicated, barbarous and unreliable" American process of execution, M. d'Arsonval is said to have challenged the American prison physicians to practise artificial respiration on a criminal fresh from the "death-chair," but the challenge has not yet been taken up.

DOORWAYS.¹—I.

TWO posts or limbs of a tree fixed vertically in the ground, connected at the top by a horizontal stick of timber, or two piers in masonry-work, joined at the top by a long stone, constitute all that can be conjectured of the "pre-historic" origin of the modern form of entrances to human habitations. [See "*Maison*"]. An attempt to find the dispositions best suited to assure stability to the framings, as well as the necessity of diminishing the thrust of the cross-piece, or lintel,

consoles. Do not the cymatium, on the one hand, and on the other the roses adorning the dressing, point unmistakably to an early imitation, evidently of Egyptian art in the crowning, and of Assyrian in the ornamental flora?

Vitruvius, in fixing the form and disposition of doors, doubtless includes only those of the temples. He determines three kinds: Doric, Ionic and *Atticures*. Commentators consider the last synonymous with Corinthian. The differences existing in these various types, which are all rectangular with a lintel, are confined to a few variations in measurements and detail, which it would be useless to go over here, especially since they depend mainly on the relations of the doors to the order of the peristyle. A noteworthy observation, however, is that bearing upon the *Atticures* door the jambs of which are slightly inclined. Examples of doors narrowed at the top are not wanting in antiquity. Under the word "*Augusteum*" a remarkable example has been given. Serlio (lib. IV, cap. VIII) and,

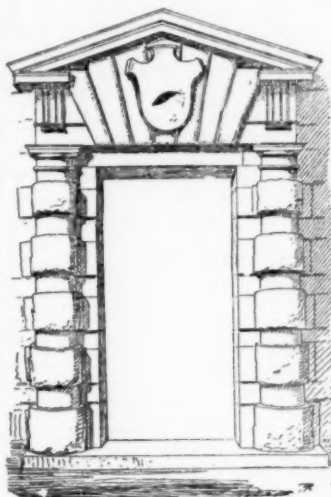


Fig. 2. Rustic Doorway designed by Serlio.

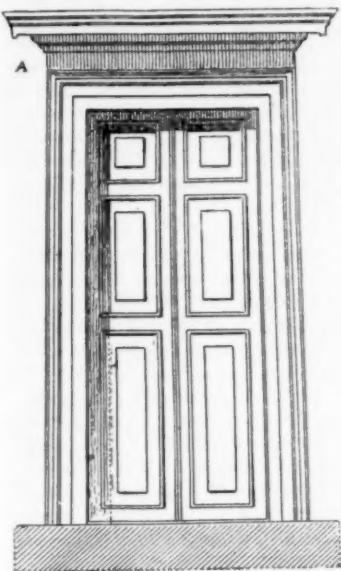


Fig. 1. From the Temple of Vesta, Tivoli.

would naturally result in a slanting of the vertical supports—posts or piedroits—and a trapezoidal form of this primitive bay.

As for Egyptian antiquity [See this word], it would seem that at least the temple doorways, which are rectangular openings formed by two piedroits and a monolithic lintel, were derived from that early tradition of a transverse beam supported by two posts; while the arch [See "*Construction*,"] was also employed by the Egyptians, but in other positions and at a later date. The Egyptian doorway, which was often made in a sloping wall, had a rectangular head and perpendicular piedroits. Then came the demand for decoration, which has in all ages and everywhere, perhaps, led architects to carry up the frames of important doors by means of a crowning plainly designed to give the motive more or less of grandeur and nobility. The great Egyptian gorge crowns the enceinte gate, or pylon, as imposingly as it is used in the temple itself, with its columnar disposition. The Egyptian pylon is an edifice by itself.

The Greek and Roman temple doorways are simply openings left in the rear wall of the portico, which in its architecture belongs to some one of the classic orders, and on which Vitruvius makes the proportions and certain details of the entrance depend. The Greek doorway sometimes has its lintel at the height of the architrave of the order [See "*Architecture Grecque*"]; it is then, as it were, merely a break in the wall of the cella, a narrow opening in the stone curtain that partially envelops the image of the divinity in mystery. When in the Erechtheum [See "*Architecture Grecque*,"] the door is of more human proportions, it is encircled by a rich ornamentation overrunning the mouldings of the casing, which is crowned by a cymatium equally ornate and accompanied by

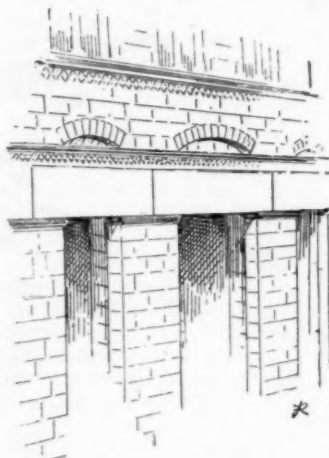


Fig. 3. From a Romanesque House at Saint-Gilles-du-Gard.

apparently effort to relieve the upper part of the door of the horizontal straight lines that recall the severe lintel of the doors of temples with a portico. There is no question here of a peristyle; the rustic door of Serlio, like the ancient door of Foligno, is independent of any shelter and can, with its embellishments and decorative importance, be carried up to any height consistent with good taste and propriety. Examples of similar architectonic license are encountered in Roman edifices

later, Desgodets, have held up to us as a model of the kind, the doorway of the Temple of Vesta, at Tivoli (Fig. 1), conforming as it does in this respect to the teachings of Vitruvius (lib. IV, cap. VII). The height of the bay is between $2\frac{1}{4}$ and $2\frac{1}{2}$ times its width, or about $2\frac{3}{4}$. The height of the entablature is nearly $\frac{2}{3}$ that of the bay. And the top of the latter is even with the top of the capitals of the peristyle, which is in the Corinthian order. The casing is continuous around the bay, without ears or crossets.

Serlio speaks a little farther on of an antique Corinthian door then existing at Palestrina (the Præneste of ancient times), of which he gives a reproduction. The height of the bay was, he said, twice its breadth; the width of the piedroits of the casing $\frac{1}{4}$ that of the bay; a quite prominent entablature, with rectangular pediment, rested on two ornamental consoles, with volutes, which extended down at the sides of the piedroits of the casing below the crossets. Crossets also projected at the bottom of the piedroits. The author classes this work in the Corinthian order.

A third antique door, quite different from the first two, and which has been copied in Italy and France at different times during the sixteenth and seventeenth centuries, is that which Serlio says he saw near Foligno, in Umbria. It is an arch constructed of long keys and inserted between two parts of a cornice, which is cut and surmounted by an angular pediment. Two Corinthian columns form, with the pediment which is thus cut at the bottom and which they support, the sole frame of the door.

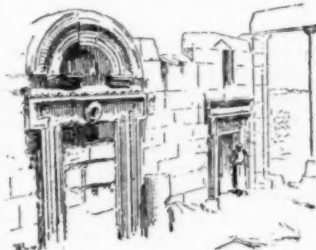


Fig. 4. From the Greco-Roman Ruins of Kefr-Birim (Galilee.)

It is doubtless after this bit, so unlike the familiar forms of ancient architectural remains, that Serlio composed the type of rustic doors shown in Figure 2, in which there is an

¹ From the French of E. Rivoalen, in Planat's *Encyclopédie de l'Architecture et de la Construction*.

of the time of the emperors [See "Construction," pl. LXXXII, Circular Temple of Baalbek]; and the artists of this so-called period of decadence seem, as it were, the precursors of the

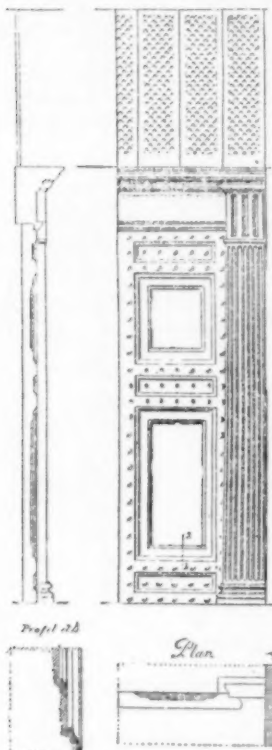


Fig. 5. From the Pantheon, at Rome.

future Renaissance and even of the so-styled eccentricities of the seventeenth century. The niches of Baalbek, for example, and their circular pediments appear to be the ancestors of the Louis XIII and even the Louis XV niches, and of the pediments of old Paris [See "Niche"]. The same may also be said of the Romanesque discharging-arch (Fig. 3), which became the arch of the Gothic tympanum in mediæval doors; its origin can be clearly traced in certain Greco-Roman edifices, such as the temple of Kefr-Birim in Galilee (Fig. 4). The discharging-arch is here constructed above the lintel, which is laid as a platband, and forms a sort of blind impost above the entablature cornice for the convex frieze surmounting a projecting dressing with crossets.

Among the examples of Romanesque church-doors still to be seen in France and especially in the south, we need only to recall "the side-door of the old Church of Alet (Aude), to-day in a great part destroyed . . ."¹ and which "seems to have been copied from a Romanesque-Greek structure of northern Syria,"² for the arch of discharge forms the archivolt—with mouldings in the ancient style—of a blind impost, and the lintel is like a part of an architrave—likewise moulded—placed on two very flat corbels which are quite finely profiled. In Italy [See "Italian Architecture," Fig. 7, *American Architect* for November 21, 1891] it is still easier to detect bonds of relationship between the art of the Middle Ages and of the later periods of antiquity.

In the thirteenth century, the discharging-arch stilted into an ogive, is found framing a tympanum with a surface sufficiently developed to admit easily of an iconographic decoration. Without going out of the limits of this article, or using again what has already been given under the heading "Portal," we would call attention to the tympanum of a door in the Castle of Coucy, a sketch of which has been preserved for us by Du Cerceau ["*Les plus excell. bast. de France*"]; this bit of Gothic architecture may complete our evidence of this traditional origin. However, it is only a matter of detail, which may be classed under the general archaeological fact worked out recently by one of the most competent critics of monumental history,³ namely, that mediæval art is connected by a succession of more or less interrupted transitions with that of antiquity.

The most remarkable ancient doorways still in existence are entrances to temples. One of the best preserved is that of the temple at Nîmes, known as the *Maison Carrée*. Its lintel forms a rectangular bay, the height of which is a little more than twice its width. The door of the Pantheon, the most perfect specimen known, is in the same proportions, and its so-called bronze divisions (Fig. 5) are formed, as was ordinarily the case, of a wooden frame revetted with metal plates. The use of ornamented nails, which have become a mere decorative feature in imitations of this celebrated model, then grew out of the necessity of fastening the metal plates by means of bolts or rivets to the wooden framework. This framework, as was later true of the robust doors of the Middle Ages, was put together in a way to resist the heavy weight by discharges constituting indeformable triangles. In giving modern wooden panels the shapes affected by the enveloping panels of laminate metal, architects have succeeded in subordinating the stability

and resistance of the work, to an ill-understood traditional form. However, Serlio (Book IV, Chap. X) recalls, in speaking of modern doors of large dimensions, the advantage which the ancients possessed in the use of the pivot à tourillons instead of the modern hinges and ironwork which are often unequal to sustain the movement of such heavy weights. At the same time, he indicated by designs the structure of the frames, or wooden stays, which were left exposed with a wood filling, or were revetted with metal. And this sort of lattice-work, with the cross-bars rabbeted together, would surely prevent the sinking of timbers and the disjoining of the scarfing, a difficulty which, in modern doors, whether heavy or light, leads so quickly to deformity [See "Menuiserie"] because they are not constructed according to these wise directions, or after the rational method adopted by the carpenters and *huchiers* of the Middle Ages.

The interior wooden door of the Château de Blois (period of Francis I) a sketch of which is given in Figure 6, seems to indicate that architects were then sometimes anxious to harmonize solidity of structure with decorative forms.

For the casting of the bronze doors of Saint Paul at Rome, about the middle of the fifteenth century, the Roman consul, Pantaleon, was obliged to go to Constantinople, which was then the refuge of the industrial and artistic traditions of antiquity. An inscription gives the name of the maker as Staurachios Tuchitos, from the island of Chio. The foundation of the doors, which are five metres high and together about 3m. 35 in width, is of wood cased with metal. We can count more than fifty compartments or panels in them, containing isolated figures of the apostles, evangelists and prophets, and sculptures depicting divers circumstances in the life of Christ, the Virgin and the early martyrs. The bronze was covered with niello and silver lines which have now disappeared, at least partially.

It was also at Constantinople that the bronze doors of San Marco, at Venice, were cast toward the middle of the thirteenth century. And yet about 1180, Bonano of Pisa cast some for the cathedral of his native town. Similar ones were also made at the same time for the cathedral of Novogorod, bearing inscriptions in Russian characters.

In the fourteenth century (1330) Andrea Ugolino executed the bronze doors on the right of the baptistery of Florence, after designs by Giotto, it is said. But the most famous doors of this monument, and the most beautiful known, are by Lorenzo Ghiberti, the successful competitor in a contest with Brunelleschi and Donatello, who themselves, we are told, acknowledged him as the winner.

The bronze doors of the old basilica of Saint Peter were executed in 1445, and afterward placed at the principal entrance to the new church. Antonio Filarete, a skilful architect, and Simone, brother of the celebrated Donatello, were the authors of the work.

There are also some very remarkable bronze doors at Padua (Church of San Antonio), at Verona (Basilica of San Zeno), at Bologna, Lucca, Loretto, Ancona, Benevento, Naples, Amalfi, Monreale, etc., in Italy; at Hildesheim, Mayence and Augsburg, in Germany; at Moscow and Alexandrowna Slo-



Fig. 6. Francis I Door, at Blois.

bada, in Russia, and in the mosque of Cordova in Spain, where only five of the twenty bronze doors formerly existing now remain. Lastly, France possesses, or, at least, did possess down to the time of the Revolution, in the Church of Saint-Denis, a metal door at the main entrance to the church, and,

¹ Lebon, "*Les premières civilisations*," p. 681.

² Viollet-le-Duc, "*Dict. rais. de l'Arch. fr.*" "Porte," p. 440, Fig. 75, A.

³ M. Corroyer, "*L'Architecture romane*," — "*L'Architecture gothique*."

in the crypt, a bronze door closing the sepulchral vault of the kings; and at Strasburg, a bronze door, with bas-reliefs, executed for the cathedral about the middle of the fourteenth century. Then there are the quite modern doors of the Panthéon, by Constant-Dufeux; those of the library of Sainte-Geneviève, by Labrousse; those in the Madeleine and at Saint-Augustin; and, lastly, the doors of the Prefecture of Police and of the Court of Cassation. The framework of these last is of iron.

(To be continued.)

CONSTRUCTION.¹—XXII.

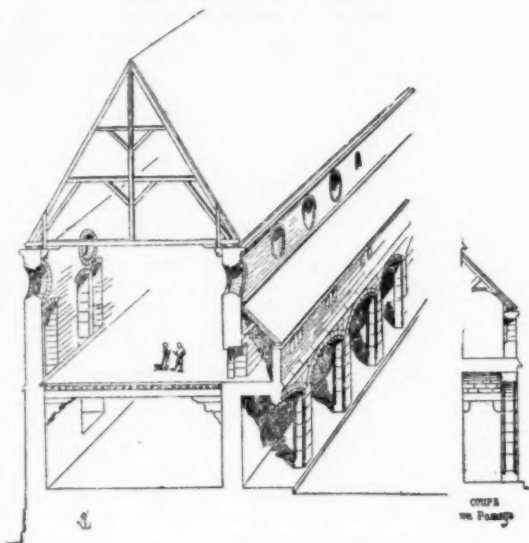


Fig. 119.

CERTAIN special arrangements were also imposed upon the architects of the great dwelling-houses by very sensible customs. It was not permissible during the Middle Ages, any more than during antiquity, to give a large hall and a small chamber the same height between joists; to make a passage-way as lofty as the apartments to which it gave access. Centuries of false reasoning in architecture have been necessary to bring about the neglect of such true principles and to oblige us to live in large low-studded rooms if the story we occupy is low-studded, or in little unreasonably high chambers if we have a story fifteen or twenty feet in the clear. In large cities the height of the stories being governed by regulations, one can understand how necessity has imposed conditions as inconvenient as they are ridiculous. But wherever an architect has free play, in a country-house or in a mansion, it is very unreasonable for him to neglect to pay attention to the superficial dimensions of apartments so as to fix the height suitable to each of them; to light small chambers or passage-ways by windows having the same dimensions as those used for large apartments; to make lateral corridors obstruct all the light from one of the faces of the building; staircases cut across the middle of window openings; mezzanine stories at the expense of large windows, so that a given architectural style, which matters very little to the inhabitants of a palace, may not be interfered with; or, still more, to place corridors along the middle of houses giving access to the apartments to the right and left, corridors lighted by makeshift windows, badly ventilated, gloomy, draughty as an inn-hallway, taking up valuable space and bringing a weight on the floor-beams in their weakest part. The mediæval architects did none of these things and did not even imagine that they could be done and they are certainly not the ones to be censured for so thinking. Their dwelling-houses were almost always one room in depth. And in order that the apartments into which they were divided transversely should not open into one another, which would have been very inconvenient in most cases, they arranged lengthwise of these buildings low, covered galleries, which gave access to each of these apartments while still permitting windows to be placed above them (Fig. 119).

If the building had several stories this arrangement could still be preserved with all its advantages (Fig. 120).

At *A* is seen the first story with its gallery, *C*, above which are the windows lighting the rooms; at *B*, the upper story, almost always open timbered, lighted by windows surmounted by dormers, *E*, on the side opposite to the gallery and by dormers only above this gallery. The passage for the upper story is carried on arches, which permit of window-openings between their vertical faces, lighting directly the first story. Such an arrangement still exists at the Palais de Justice at Paris, in the western portion; it dates from the thirteenth century. We cannot decry the reasonableness and truth

shown in such construction, which gives to each household department its relative importance, which supplies to the principal apartments all the air and light they demand and which evidences very clearly by the exterior, the interior uses and arrangements of the structure. It is certainly more in accordance with the good old traditions of antiquity than is a row of columns or pilasters planted, one knows not why, against a wall. It shows that while the mediæval ecclesiastical architecture departed from the ancient models, nevertheless civil architecture was able for a long time to preserve their spirit. We shall note more than one proof of this. When the dwellings are large and the buildings are composed of several stories, a thing which the mediæval architects frequently did, for the simple reason that two stories, one above the other, cost less to build than if one undertakes to cover a superficies equal to that of the two stories on the ground-floor, since it is then necessary to double the foundation and the roof—when, we say, the structures contain several stories, the architect increases the number of stairways so that each apartment has its own. Nevertheless there is always a principal flight, a staircase of honor which leads to the apartments intended for receptions. During the Romanesque period, stairs of cut stone are not common; they were usually made of timber, that is to say by superposing squared logs, whose ends are slightly let into the lateral walls; later staircases were made of two straight flights with landings and were included in a rectangular cage, longitudinally traversed by a bearing-wall [See "*Escalier*"]. This method was almost entirely abandoned by the constructors of the thirteenth century, who adopted spiral staircases with stone newels and treads because they occupied less room and gave easier access to the stories which were to be reached. If these spiral staircases had a very small diameter, say five feet in the clear, they were frequently built in the thickness of the walls, forming a slight projection on the outside rather than on the inside; if, on the contrary, they occupied a cylindrical or polygonal cage of considerable diameter in the clear, say eight or ten feet, they projected entirely on the exterior and did not interfere with the external arrangements. As for the attached buildings each possessed its own roof and if the structures were of double extent, there was a roof over each portion

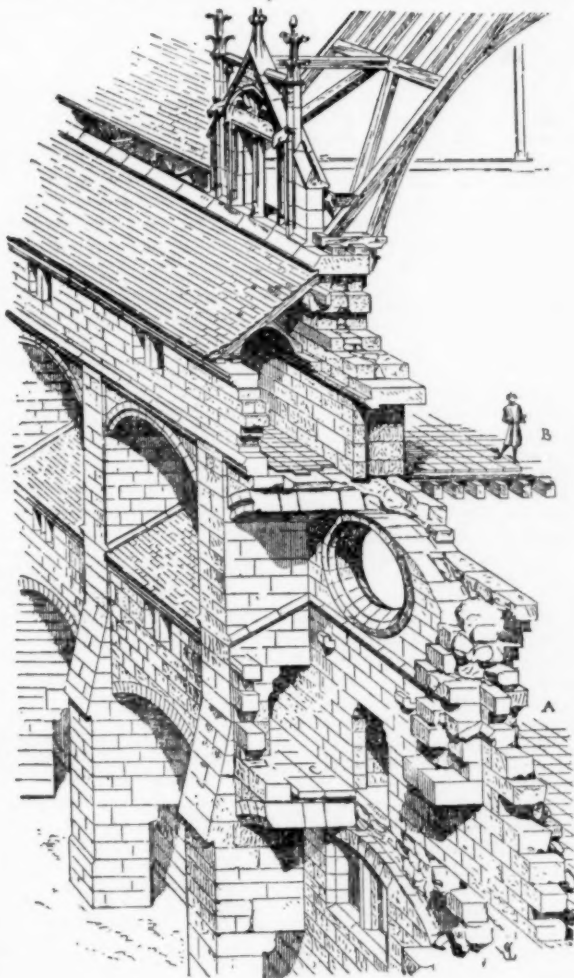


Fig. 120.

with an intermediate gutter. The mediæval architects having felt compelled to adopt roofs whose slope was more than 45° and having no conception of gambrel roofs could not understand a structure of double extent under one single roof, for this roof would then have

¹From the "*Dictionnaire raisonné de l'Architecture Française*," by M. Viollet-le-Duc, Government Architect, Inspector-General of Diocesan Edifices, translated by George Martin Huss, Architect. Continued from No. 900, page 182.

reached an enormous dimension as far as the height is concerned. It was easy to place, if need be, roofs at different levels on every detached building, every pavilion, every staircase, possessing its own roof, whether pyramidal, lean-to, gabled or hipped and thus to obtain stories high between joists when they were large, or low when they were small. This method used a great deal of wood and roof-surface and required lead-lined gutters, but it had this advantage over that which consists in enveloping all the parts of a building under one

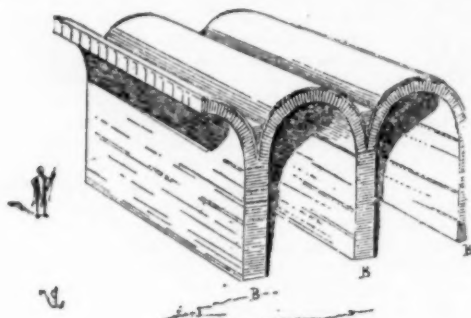


Fig. 121.

roof, viz., that it furnished to architects various resources in respect to giving height to stories, of permitting them to open a large number of dormers, to illuminate the upper stories, of detaching the staircase roof from the main roof, thus providing lookouts above the eaves and acting as ventilators for the lower stories. Seen from a distance these distinct roofs covering groups of connected buildings, indicating their form and their purpose, were very picturesque and gave to large dwellings the appearance of a collection of houses of greater or less extent and height according to their various uses.

It is easy to be seen that this construction differed at all points from that of our own times and it should be remarked that these traditions preserved their force until toward the middle of the seventeenth century. In principle if not in form we note in these arrangements the trace of the great dwellings of antiquity, the *villa*, which were in truth nothing but groups of buildings more or less connected, but distinct in form, in height and in covering. Careless of the laws of symmetry the mediæval architects placed the different departments of the large dwellings anywhere according to orientation, with due regard to the needs of the dwellers and conformably to the configuration of the ground. This furnishes another point of resemblance to the antique *villa* which in their ensemble had nothing symmetrical. In the cities which were almost all fortified at that time, ground was as rare as it was in the fortified towns. In the châteaux whose perimeter was always limited as much by motives of economy as by the necessity of defending it by a small garrison, every foot of space was utilized. Consequently the architects had to endeavor in town as well as in the country to accommodate as many household needs as possible in a relatively small space. In this regard the mediæval civil constructions differ from those of the ancients; the latter in their *villæ* scarcely built higher than one story and occupied considerable ground. Obligated to confine themselves within restricted limits, the architects of the Middle Ages were compelled to adopt interior arrangements differing likewise from those employed by the Romans; to accommodate various kinds of work on different stories; to make passage-ways in the thickness of the walls; in short to seek entirely new combinations of structures. We do not forget, however, this important point, that one reason why the ancient traditions perpetuate themselves in civil constructions is the very natural one that everything concerning everyday life transmits itself from generation to generation without possibility of interruption, that domestic habits cannot be abruptly changed and that it is possible to make a radical revolution in the system of construction of public monuments, like churches, while this is impossible for the dwellings or palaces which people live in and in which everybody follows the same way of living which his father followed. The method of construction applied at the end of the twelfth century to religious edifices has only a feeble influence on civil edifices.

The pointed arch had scarcely appeared in these last edifices bringing its wide-reaching train of consequences as we have shown.

Civil and military construction preserved something of Roman art even when the last traces of this art had long since been abandoned in religious architecture. There were then two quite distinct modes of building dating from the end of the twelfth century: the religious and the civil; and this state of things lasted until toward the middle of the sixteenth century. The monasteries even use both of these methods together; their domiciles have no relation, so far as construction goes, with their churches or their chapels. Nevertheless, one of the principal attributes of construction at the moment when it abandons Roman traditions, daring, is found also in civil as well as in ecclesiastical architecture; but, it is evident in civil architecture, that the positive ideas, the daily needs, the inherited habits have a more direct influence on the methods adopted by the builder. Thus, for example, rock-faced rubble is used in civil architecture for

a long time after all religious constructions were made of cut stone; horizontal arches of stone were everywhere applied to dwellings in the twelfth, thirteenth, fourteenth and fifteenth centuries, at a time when no trace of them was longer to be found in churches.

Buttresses are avoided as much as possible on the exterior of palaces and mansions, even where there exist vaulted stories, while they constitute the entire system of ecclesiastical construction. The civil architects still continued to employ wood, whereas this is used only for the roofs of cathedrals and other important religious edifices. Seeking to avoid plane surfaces, to diminish points of support, they at last reached the point of totally suppressing walls in rearing their grand religious edifices; on the other hand in civil architecture they augmented the thickness of the walls in proportion as prosperous conditions obtained, which created a demand for more comfortable, stronger and healthier houses. The study of these two sorts of buildings should then be followed up separately and if we find inevitable points of similarity between these two systems, it will be less in the methods used than in the frank and daring charm, the infinite resources, which belong to the lay architects of mediæval times.

All who have any notion of architecture know that the Romans, while indeed they constructed vaulted edifices, maintained the thrust of the vaults rather by interior buttresses than by piers forming an external projection. They had adopted, especially in building civil structures, the method which we shall call cellular; that is to say they made their buildings of a series of rooms with barrel-vaults on bearing-walls which reciprocally buttressed each other and thus caused no thrust on the exterior. From this principle sufficiently demonstrated by Figure 121 result the consequences which might naturally be expected. If, for example, it was desired to make a single room out of all these clustered cells, it was only necessary to throw a longitudinal barrel-vault across all these transverse barrel-vaults; there resulted a succession of groins, Figure 122, well buttressed by interior counterforts, letter A the remains of the bearing walls B shown in perspective in the sketch, Figure 121. This arrangement permitted building at C either solid walls or spaces as light as possible as there was no weight on them. This was both a simple and durable construction, easy to build and which answered for a long time as the type of civil edifices in the Carlovingian epoch.

In order to avoid expense and if vaults were not preferred, during the Roman period they contented themselves with laying floors on top of two parallel ranges of semicircular arches. In this way several stories could be built one above the other without fear of having the lateral walls spread, since they were composed of buttresses furnishing a succession of interior piers and united together by arches which intersected; underneath these arches as many openings were made as necessity demanded for furnishing air and light to the rooms. Figures 115, 116, 117, 118 which show us one of the houses built in the thirteenth century, in the town of Cluny, still preserve the remnants of this Roman tradition, as the front of this house really consists of nothing else but a series of bearing arches masked behind the exterior facing. If this combination lent itself to the most prosaic civil constructions, it was equally suitable for military purposes as we shall very soon see; it was still later applied to the construction of the great halls of the châteaux and Episcopal residences, since the hall of Henri II at Fontainebleau shows us one of the latest examples of it, seen likewise in a thirteenth-century room in the close of the castle of Montargis and also still to be seen in an ancient diocesan hall of the twelfth century at Angiers near the cathedral, both of these latter being built according to this principle [See "Salle"].

A very important thing to notice in the mediæval civil constructions is the attention which the builders paid to the smallest details

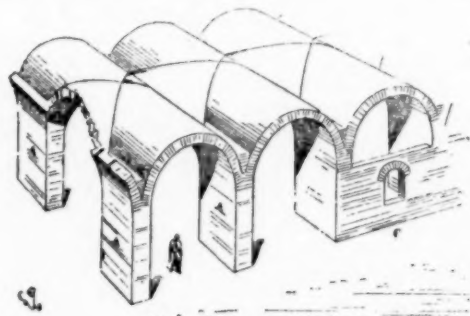


Fig. 122.

of the structure. If they are about to make a floor, well squared holes are left for the girders in the interior faces of the walls instead of cutting them out afterwards; they build-in stone corbels under the bearing ends of these girders; they make horizontal rebates lengthwise of the bearing walls to receive the headers with which the tail-beams are framed or else open bearings at regularly spaced intervals. In the embrasures of the windows they built in the hinges, they made rebates in the interior of the mullions to receive

the staples of the bolts or locks. Their chimneys built at the same time as the walls have the flues dressed on the inside with the greatest care; the jambs of the fireplaces are bonded into the walls and not simply built up against them; the passage of the flues through the flooring and the supports of the upper hearths indicate great carefulness and a plan well thought out before the work was begun. All these things would teach us an excellent lesson to-day, if we were willing to consider and rid ourselves of this mania of believing that we can obtain no good from the past when that past is a *cis-alpine* one.

In the large civil structures, such as the assembly-rooms or "Halls," the mediæval builders are almost always careful to introduce lower and upper windows, the low ones enable one to see what transpires outside and admit air; the upper ones admit light directly from above. These upper windows are made in the slope of the roof and form dormers on its exterior. Whatever the superficial extent or height of the room, the windows were always kept of a size convenient for use by men and women and, what is still more important, of a reasonable size for sashes intended to be frequently opened. So far as the dormer sashes are concerned they were opened like a lid of a box by means of cords and pulleys [See "*Lucarne*"].¹

One is too easily tempted to believe that however ingenious the mediæval architects may have been they could not form those large conceptions of *ensemble*, those vast buildings of a civil character demanded by our modern necessities which assume every day more and more importance: but this is another prejudice. It must be said that most of our great churches still standing to-day make us see plainly that in ecclesiastical architecture the constructors knew how to begin and carry through very vast monuments; but as for the civil structures of the Middle Age, cruelly treated during the last few centuries, condemned to systematic destruction since the Revolution, scorned by our French administrations of Public Works, who recall on a small scale the weakness of Louis XIV and seem to wish that everything in their town shall bear trace of their passage—our civil structures of an ancient date, we repeat, have become very rare and it is not surprising that the people have lost even the memory of them. Nevertheless it would have been very strange if men capable of conceiving and executing such immense religious edifices had contented themselves, for the ordinary needs of life, with small buildings covering but little ground, low, narrow species of cabins, of miserable appearance. There are certain persons who would wish to make us believe, as a consequence of a spirit of system which it is not now our place to criticise, because it is completely a stranger to artistic ideas, that mediæval society was shut up between the church and the fortress; that it was in consequence, unfitted to conceive and execute these immense structures of public utility demanded by our modern customs; in short that it lived a miserable life, suffocated under a twofold oppression, frequently antagonistic, but always united for the purpose of arresting its development. From the standpoint of politics the fact may be discussed, that is not in our line; but from the standpoint of art there can be no discussion. The artists who drew the plans of our cathedrals were not at all embarrassed when it came to constructing those immense civil establishments, such as hospitals, colleges, town-halls, markets, farm-houses amply provided with all appurtenances.

[To be continued.]

OLD VIRGINIA TAVERNS. — Here in Virginia we have had some famous hostleries. The old Raleigh Tavern at Williamsburg lives in romance and history. It must have been well kept, for contemporaneous writers speak of it so very respectfully. They could not have written of it as they did had the proprietor furnished them with tough beefsteak or bad bread, or sent them to shabby chambers, or hired a man with a Kohinoor in his frilled shirt bosom to give them short answers to civil questions. Tavern was once the great name here. The Bell Tavern, which preceded the present St. Charles, was a famous place of resort when Byrd's tobacco-warehouse stood on the opposite side of Main Street, and it had a worthy contemporary in the Washington Tavern, which is now the St. Clair. The Eagle Tavern was of later date and was a grander house than the other two. In it Lafayette was entertained in 1824. The Eagle stood on the south side of Main Street, between Twelfth and Thirteenth, and had an archway—the *porte cochère* of the present day—into which the stage-coaches drove and landed their passengers. Fire destroyed it early in the forties, and from the city's need for another good hotel the Exchange arose. The Exchange, the Ballard House, the Columbian Hotel, the Powhatan (Ford's) Hotel, the Monumental (St. Claire), and the St. Charles and the Spotswood were all in operation here at one time. — *Richmond Dispatch*.

¹ These dormers faced with stone were used in building from the thirteenth century onward and, nevertheless, in the time of Louis XIV, it was pretended that this method of making windows at the eaves of a roof was invented by Mansard; and in order to perpetuate the remembrance of this useful invention the term of "*mansards*" has been applied from that time onward to this sort of windows just as if all the civil buildings, the châteaux and the mansions had not been provided with mansards in the time of Francis I, Louis XIII, and long before their times. But this is one of the weaknesses of the seventeenth century which claimed to have discovered everything. But this is only a claim. It is in this case as in many others of the same epoch. It has been written and said many times, that the wheelbarrow, for instance, was invented in the seventeenth century, at the time when the great work of terracing at Versailles was undertaken; but we have numerous examples of wheelbarrows figured on the manuscripts and painted windows of the thirteenth century. It is true that the form of these little vehicles at this epoch is much more convenient for the laborer than that adopted later than the thirteenth century which we reproduce religiously in our workshops as if it were a masterpiece. It is the same way with the dray, invented, so it is said, by Pascal.

ANOTHER ARCHITECTURAL KNOCKABOUT.²—VII.



A Torero of the Cafe.

AT Toledo we were struck by the death-like stillness of the grand old ruined town. It is in truth the Pompeii of Spain, for scarce can one find a human being in its streets, and the very aspect of both the exterior and interior of this crumbling town make one wonder how it can be inhabited to-day. The Cathedral is grand, however, with an interior, more interesting to me than any in Europe. We wandered around looking in vain for the orthodox "*Toledo blade*," but were only rewarded by the purchase of a pair of indifferent scissors made, they assured us, from the famous steel.

We could not bear the stillness of the old fortress, so after making a few sketches, and seeing its sights, we returned again to gay Madrid to find it thronged for Easter week, and the first of the famous bull-fights. George and I purchased tickets in Sombra, and were much more excited at the prospect of beholding a *bona fide* fight, than even any of the natives.

On Easter day, we went to church in the morning, paraded the Calle Alcalá, with its sea of powdered faces and flashy costumes, and in the afternoon started in an open victoria driven by a gorgeous *cochero*, yelling at the top of his lungs to every other vehicle in the avenue on our way to "*Los Toros*." It is a wonderful sight the drive to the bull-fight, on a superb April Sunday. Every one is there: superb equipages flash past, gay riders and coaches big and little, some drawn by four Arab steeds, with postilions, others by eight, sometimes ten, excited mules, while inside and on top there are as many howling Spaniards as can cling on, all set upon the same errand, the "*bull-fight*," and a bloody good time.

Entering the gate, we followed the crowd into the ring, promenading over the arena, immaculate in its white sand, soon to be stained with blood and furrowed by the hoofs of frantic horses and bulls. A band of music was doing its best in the centre of the ring, still black with throbbing humanity, while the flutter of white, red, yellow, orange and scarlet skirts and fans betokened the advent of the fair sex in the boxes above, it being most decidedly the thing to attend this the first and best *corrida* of the year. A blast from a bugle, caused the crowd to break for their seats, and the arena was soon empty, and ready for the show. We had our cameras to assist our memories of this memorable scene, and our flasks, too, to help us out should we lose our nerve. Then as the band struck up inspiring strains, the gate opened to admit two *alguazils*, clothed in black velvet, like ancient "*Dons*"; taking in their hands their plumed hats, they beg permission of the "*Presidente*" that the "*Quádrillas*" may enter and return to the opposite gates. At once a gorgeous sight appears,—first come the mounted "*alguazils*," then the three heroes of the day, with their train of splendid followers, and behind them the picadors upon their sorry mounts, last of all come the mules covered with tassels, three abreast; then like a golden stream the whole cortege moves slowly and grandly towards us, a superb spectacle, the crowd yelling with enthusiasm, as the parade came to a stand in front of the President's box, and gravely bowed. "*Laqalyo*," Mazzantini and Gueritta are the *espadas*, and as they combine the daring skill and elegance of the ring the crowd howls its approval of the bloody prospect before them. In an instant their rich cloaks are exchanged for others as superb in color, though of less value, and everything is ready for the combat. The picadors, lance in hand, edge around the fence, watching for the bull, their poor horses blindfolded over one eye, that they may the more readily be ridden up to the horns of their foe, in the unequal combat. One more bugle blast, and from the dark mouth of the "*torel*" darts forth the bull, mad with pain from the barbed "*moña*," with which the owner's colors are fastened to him and which are jabbed into his shoulders just previous to the *entrées*, blinded by the sunlight, and confused by the sight of the crowd, and the roar that greets him. Seeing the cloak, waving defiantly in the distance, with no other idea than to empale it upon his horns, he makes one wild dash, only to come up with a thunderous crash, against the oaken fence, with his taunting adversary, quietly regarding him from the other side of the barrier. The bull then runs here and there, from one side of the fence to the other, always thwarted in his desire to throw his fleeing adversary; finally tired of this, he rushes to the centre of the ring, and looks from side to side. The picadors had made no sign, but suddenly he saw them, pawed the ground, and then slowly, like a cat, he approached one, the picador turned his horse with the bandaged eye toward the bull; with lance at rest he waited for the charge, then like a thunderbolt the bull came; vainly the picador thrust his lance into the shoulders of the infuriated animal. No wonder this defence is useless, for the weapon has a point of iron only three-eighths of an inch long, protruding from the iron ball, and merely breaks the skin. The horse and rider in a few minutes lay in a heap upon the sand, the man underneath, calmly looking

² Continued from No. 914, page 9.

on, with his cigarette between his teeth, his lance shattered, while two feet from him were the horns of the bull, furiously goring the wretched horse to death! In another minute the picador would have been treated likewise, and he knew it, but suddenly between the horns of the bull settled a red cloud, just in time, for the animal turned and rushed madly after "Lagartijo's" cape: coolly playing him to the right, then to the left, the "Maestro" led him away from the prostrate man and dying horse amidst the plaudits of the admiring crowd. The feeling of nausea and disgust that overtook us at the moment of seeing the horse stricken down was fearful. It is the most awful moment of the bull fight, and one that never can be forgotten. We hardly said a word to each other, but as the scene was repeated again and again, the horror of it wore off, to be replaced by mad excitement and a desire to see more.

Six horses were killed, and then the picadors were withdrawn, and the "banderilleros" took the field: alone and unaided, save by a matador or two, they slowly approached the bull, who, curious, as to who this new adversary might be, pawed the sand and watched his foe intently. The banderillero with his pointed arrow-like banderillas in either hand approached the bull and waited for the critical moment. As the animal lifted his head for a charge, quick as lightning (the crowd still as death) the torero leaped forward and put his stinging darts into the shoulders of the bellowing brute, who foamed with rage in his futile attempts to shake them off: three times this was repeated, for six darts had to be affixed to the bull's bleeding shoulders. It certainly was an heroic sight—and I never shall forget how, moved by the contagious plaudits of the crowd, the showers of sombreros, I cried "*Hole Maestro!*" with them all. Now came the third and last act of the bloody drama: a breathless silence fell upon the forty thousand spectators, on this Easter Sunday afternoon, as the great matador, with espada in hand, doffed his cap to the royal box, and the "Presedente" and thus chanted his "Ave imperator te moreturi salutamus."

"Brindo por ucia
Por su noble compañía
La gente d'esta tierra
Y la forastera."

"I toast your worships, your noble company
The people of this place, and the strangers."

Then crossing himself and swinging his cap far behind him into the crowd, he went alone and unaided to meet, to the death, his bellowing antagonist. The animal fiercely charged him, recognizing at once that here was a most dangerous foe, who must be exterminated immediately. The espada avoided him at every onslaught, twisting him with his little red cape here and there; raging and foaming the bull lost all presence of mind, and rushed madly and blindly at the flag alone, in vain; then tired out he remained at a distance, watching for a moment to make a charge. With lowered head he awaited his chance: Lagartijo stood sideways, raised his sword to the level of his eye, sighted along the shining blade, and as the brute was about to lift his head in anger, the maestro leaped forward and thrust his gleaming espada to the hilt between the bull's shoulders. A wild yell of enthusiasm went up from the crowd. The "*estocada*" had reached the bull's heart! Then slowly the dizzy animal looked around the gathering crowd before him for the man who struck his death-blow, and picking him out he made one last dying lunge, and lay dead before him. A shower of hats, cigars and money fell at the maestro's feet, as he walked bowing and smiling around the ring, while the tassled mules, hitched to the dead bull, with a rush dragged his carcass from the gory ring. This ended the



The Alguaziles.

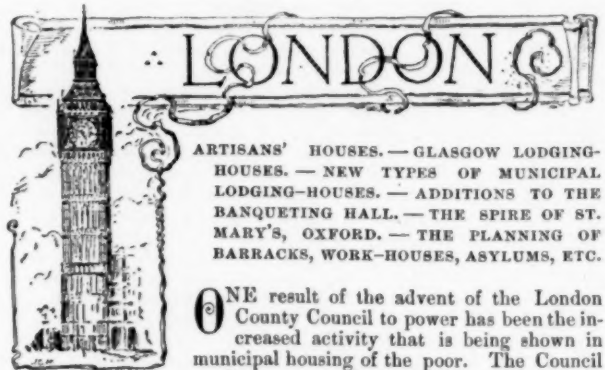
event: six times it occurred and six bulls were killed, how many horses can be calculated. The drive home was as gay and as mad as the one before the *corrida*.

In the evening, every café and club in the city was excitedly discussing the day's event. "Hole, Maestro Lagartijo! what a coup! Did you notice Guerrita when he slapped the fourth bull's face?" "Yes, but has Mazzantini quite ever been equalled in 'tauramachia?'" And so on through the evening. It seems to me strange

that this sport of the bull-fight should flourish in the nineteenth century, yet, in thinking it over and comparing it with others, such as the slow murder of battues of pheasants, the lingering agonies of pigeon-shoots, the brutality of prize and dog fights, and even hunting, where men and horses are sometimes killed, this Spanish "mote" is not much bigger than the Anglo-Saxon "beam."

George and I each bought some banderillas as mementoes, and tried to turn our thoughts away from the painful sights we had witnessed. Finding now that our time and money were getting very short, we decided to make all speed towards Paris. On the way we visited Vittoria, Burgos and San Sebastian, all replete with architectural wonders, then on to the frontier, and finally to Angoulême. How good to be once more in France! F. L. V. HOPPIN.

(To be continued.)



ARTISANS' HOUSES.—GLASGOW LODGING-HOUSES.—NEW TYPES OF MUNICIPAL LODGING-HOUSES.—ADDITIONS TO THE BANQUETING HALL.—THE SPIRE OF ST. MARY'S, OXFORD.—THE PLANNING OF BARRACKS, WORK-HOUSES, ASYLUMS, ETC.

ONE result of the advent of the London County Council to power has been the increased activity that is being shown in municipal housing of the poor. The Council predecessors confined their attention to the preparation of sites for artisans' dwellings, leaving the actual buildings to be erected by private enterprise. But it was found that this system involved many disadvantages. The control of the municipality was limited to the approval of the plans and the general supervision of the work, but their safeguards, excellent enough in theory, were not found to work altogether satisfactorily. The influences operating on the minds of the private speculators were necessarily chiefly of a financial character and this did not tend to encourage the highest development of sanitation and general convenience that the available resources might have warranted. I am not saying that work of the highest value has not been executed by the various artisans' dwelling companies; indeed, I suppose that no place presents a more favorable field for studying what is possible in the direction of combined dwellings than London, but while we are thankful for what has been done, we cannot shut our eyes to the fact that much more is possible and it seems that the municipality is the right body to undertake the work. It is not limited as private individuals and to a less extent companies are by the necessity to find money. As much as is likely to be needed is at the municipality's disposal, provided, of course, it is not spent recklessly. Then again it is not limited by the desire to make a profit. So long as the slight percentage that is paid on municipal loans can be produced this is all that is needed. The scale too, upon which work is executed, renders it possible for slight reductions to be made upon the cost of rooms individually.

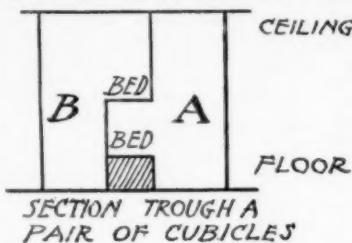
Assuming, therefore, that the same class of buildings were erected by the municipality as is now erected by the companies, it is but reasonable to suppose that a reduction in rental would be the result. But on further consideration this hardly appears to be the case. Influences bear on the municipality that the companies may afford to treat comparatively lightly.

It is compelled to pay very close attention to the increasing demands of sanitation. It is obliged to build in the best manner and cannot very well make those little economies in construction that are practised by private individuals. There are other smaller reasons which tend to swell the cost of building, and, therefore, the development of municipal housing will rather be in the direction of improved accommodation than in the reduction of rental.

The first direction in which the London Common Council turned their attention was to common lodging-houses. The accommodation of this character existing in the metropolis is notoriously of an unsatisfactory nature. The majority of the East End lodging-houses are old insanitary buildings, which have rarely been built for the purpose, but are generally old stores or warehouses adapted. The system of management is frequently of the loosest character and it is not too much to say that London owes much of its crime and poverty to the wretched character of these houses. London was, as usual, forestalled by a provincial municipality in its effort to reform the common lodging-houses. The City of Glasgow has already erected seven lodging-houses for men and one for women. They have resulted in a slight financial profit to the city. The sanitary arrangements, however, are even here open to criticism. The cubicles are in pairs, superimposed like the berths of a ship. This arrangement is not in itself good, but it becomes still more objectionable when we realize that there are four rows of cubicles to each dormitory, and that the two centre rows are unlighted and unventilated.

The Council felt that this plan might be improved upon, and determined that each separate cubicle must be self-contained between

vertical divisions running from floor to ceiling and that it must have its own window. This result was arrived at by arranging the cubicles in galleries running right round halls or pavilions. The building in which this experiment has been carried out consists of three



of these pavilions arranged with their longer diameters parallel. Each pavilion accommodates 104 men and consists of two galleries besides the cubicles placed on its floor. Each cubicle has its own window and is ventilated by fresh air warmed by passing over hot-water coils; the extracts being by large lantern-lights in the roof. Each lodger

is provided with a comfortable spring-bed and box for his clothes. The day-accommodations consist of a large day-room provided with books, newspapers, a piano and other little comforts, I had almost written luxuries; a dining-room fitted with all conveniences for cooking; a shop managed by the superintendent where men may get food and tobacco and other little wants; a locker room giving a private locker to each man, lavatories, feet-washing basins, plunge and shower baths, a room for lodgers' washing and drying their clothes, a workshop, laundry, etc. This accommodation is provided for the sum of 5d. per night per man and at this price it has been found to pay its way. It is, as might be expected, very popular; applicants, many coming from a distance, are nightly turned away.

The combined dwellings, which are now being erected in various parts of London, are of the same nature as those already erected by the companies, but of an improved type. Each tenement for example, is entirely self-contained and consists of a living-room, one or two bedrooms, a scullery containing sink and copper, a disconnecting lobby open to the outside air, from which the water-closet is approached. Particular attention is given to thorough ventilation and each tenement is so arranged that by opening doors and windows a thorough blow through is obtained and the rooms properly cleansed of foul air. No building is allowed to approach within an angle of 45° drawn from the bottom of opposing properties, and more care is being bestowed upon the design and finish generally of the buildings than is usually the case.

A third type of building which is being tried is the cottage. Terraces of self-contained and double cottages are being erected in the more distant parts of the metropolis and seem likely to become popular.

The Council have, I understand, been approached with the view of constructing a woman's lodging-house on parallel lines to that erected for men and seem to be entertaining the proposal.

The chief argument that has been urged against municipal enterprise in this direction is the tendency that it will have to stifle private enterprise, but this prophecy has not yet been in any way verified. London is large enough to provide room for many persons to work and if the ultimate result proves to be the general improvement of the whole of this class of buildings, the slight risk of interference will be held by most people to have been justified.

The competition for the new building for Christ's Hospital has now been put into order. A modification of the competition system has been adopted. Architects used to the planning of schools were asked to submit their names, and one hundred and thirty responded to the invitation. Of these, five were selected, namely: Mr. T. E. Colcutt, Mr. T. G. Jackson, Messrs. Aston Webb & Bell, Messrs. Paley & Austin, and Mr. Ingelow. Each of these gentlemen will receive a fee of £400, and the author of the selected design will carry out the building. A competition for an important public school of this magnitude is an unusual occurrence in England, and should bring forth some interesting designs.

Messrs. Aston Webb and Ingress Bell have published their design for the extension of Inigo Jones's Banqueting-hall at Whitehall. It will be remembered that the building was until recent date used as a chapel royal, but lately the Queen has handed it over to the Royal United Service Institution for their museum. The new portion is an extension to the southward, and it was very difficult to avoid either injuring the effect of the Banqueting-hall and yet to design the addition in harmony. The design shows the pains which have been taken to solve the problem, and, perhaps, at the same time serve to show how very difficult a satisfactory solution really is. The new part is lower than the old, and is set back so as not to destroy the retained pilasters which flank the banqueting-hall. It is not to be used as a museum, but for a lecture-room and offices. The lecture-room is semicircular in plan, and faces the Whitehall Gardens side of the Banqueting-hall, so that on this side the elevation shows a distinct departure from the comparative severity of the old building.

An animated discussion is proceeding in Oxford over the restoration of the spire of the University Church of St. Mary the Virgin. This spire has had many vicissitudes of fortune. In mediæval times, damage was occasionally done to the spire and pinnacles by the weather, and, about the beginning of the seventeenth century, the Jacobean restored the pinnacles in their own peculiar way. Forty years ago, in the early days of the Gothic revival, a Mr. Buckler had the handling of the spire, and he substituted for the Jacobean

jumble the complicated and ill-proportioned angle-pinnacles that are familiar to all visitors to Oxford. The stone used, however, was so bad as to again need repair. Mr. T. G. Jackson suggests the advisability of reducing the pinnacles to what was more probably their original form, and so improving the proportion of the spire. Both his design and two others from Messrs. Bodley & Garner and Mr. Parker, respectively, are under the University's consideration, and much feeling has been engendered as to the proper course to take. The matter is to be settled by the Oxford dons in congregation, and there is every prospect of an animated discussion.

We are indebted to Mr. Gordon Smith, the architect to the Local Government Board, for an interesting address on hygiene in its connection with buildings. He explained that he did not propose to deal with defects of drainage or water-supply, nor with defective construction of walls, foundations and roofs, but simply confine himself to the general arrangement of buildings from a hygienic point-of-view, and he considered, as an example, the case of military barracks. Although soldiers are generally men of robust health, selected with special reference to their good physique, experience has shown how terrible is the effect of badly-planned barracks. In 1857, the mortality of the troops was nearly double that of the male civil population, and it was not until an improved system of barrack-construction was introduced that this percentage was materially reduced. The barracks constructed in England since 1872 comprise a number of wholly detached blocks, the residential blocks being confined to two stories, and holding some 80 to 120 men. This improvement is being noted and gradually adopted by the chief European powers.

The rules for barracks apply equally to many other classes of buildings intended to hold a number of human beings. The same subdivisional blocks or pavilions are now regarded as essential, and the newer prisons form a striking contrast when compared with the older prisons of Millbank and Newgate.

The same developments had taken place in the construction of workhouses and lunatic asylums. Most of these buildings, however, were either erected directly by the Government or under Government control, and, consequently, there might be a reasonable expectation that the more modern demands of sanitation would receive attention, but there was no control over the construction of charitable institutions, such as orphanages, asylums for idiots, the blind, etc., and the higher class schools and training-colleges. Consequently, all kinds of plans were adopted: some good, some indifferent and some very bad. He felt the tendency to group a large number of children together into one building was a wrong one, and tended to encourage the production of ophthalmia, diseases of the skin and scalp, and other troublesome disorders. He therefore advocated the adoption of the opposite principles of segregation as far as possible. He investigated several experiments which have been made in England in the direction of the cottage-home arrangement for schools, and considered the results to be so satisfactory as to justify further experiments on a larger scale. In view of these considerations, he looked with no small anxiety at the enormous aggregation of children in many of the public elementary schools, where they assembled not only in large numbers in their respective school and class rooms, but where these rooms are piled up to several stories and arranged so that the vitiated air was apt to be diffused throughout the entire building by means of the staircases and corridors.

With regard to hospitals, he felt that the pavilion system of hospital-construction was often abused, and that it was not carried out in England as completely and as thoroughly as in the best examples of modern hospital-construction in France and Germany. He referred to St. Thomas's Hospital as one of the finest British hospitals, and yet in this he found huge wards piled up one upon another in four stories, with a basement for stores, etc., beneath them, and dormitories for nurses and servants in an attic above them. Not only were these wards intimately connected with each other by spacious staircases from basement to attic, lifts for patients, lifts for coal, food, etc., and shoots for ashes and soiled linen, but, as if there had been a distinct intention to assimilate the whole institution as much as possible and to counteract the effect of the pavilion system, the several pavilions, each holding some 112 patients, were connected through enclosed corridors on the basement, ground and first floors. The segregation of patients was carried to a much greater length in the best modern foreign hospitals than in England, for, as a general rule, the ward blocks rarely exceed one story in height, and are practically never more than two stories high, while the number of patients under one roof or in one ward is much less in our English and Scotch hospitals. He referred to other plans for improving the construction of hospitals, and summed up strongly in favor of segregation whenever possible. His lecture has received a good deal of attention in scientific and architectural circles.

TO LIMIT EXPLORATIONS IN PERU.—Apparently the Peruvians have taken alarm at the spoliation of objects of historical interest which they have been suffering in late years, for a report to the State Department from the Consul-General at Lima states that the President has issued a proclamation and a decree intended to stop further unauthorized depredations. The proclamation states that the explorations in pits and ruins have been carried on without order and without any other object than to satisfy individual interest, but that archaeologists will conduct their searches hereafter under closely guarded permits. — *New York Evening Post*.



FAILURE OF THE ARCHITECTURAL CLASSES.
—PUBLIC STATUARY.—THE TECHNICAL
COLLEGE.—VERANDA VS. ELECTRIC
WIRES: A CURIOUS LAWSUIT.

SYDNEY, N. S. W., April 17, 1893.

THE opening meeting of the session of the Sydney Architectural Association under its new President, Mr. George Oakeshott, A. R. I. B. A., though well attended, was not marked by any of that enthusiasm which was so characteristic of the earlier meetings. The Presidential Address, too, while alluding with a pardonable pride to the good work already done by the Association, regretted that the pupils and junior draughtsmen showed such a lamentable lack of interest in the efforts made for their benefit that the classes, which were from "the first poorly attended, . . . finally drooped and died." The fact of the matter would seem to be that Australian enthusiasm is not long-lived, and, moreover, we have not yet arrived at that stage in our life as a nation when we may expect to have a due appreciation of anything pertaining to art. Commercialism is still rampant, and this, perhaps, explains the extraordinary apathy evinced by our people with regard to artistic matters, otherwise it would be difficult to explain the astonishing complacency with which the public view the disfigurement of the public buildings by such atrocities in the way of statuary as now disgrace the New Lands Office here. In their way, these statues are feeble, and, consequently, worse, than the notorious monstrosities which still grin at us from the spandrels of the General Post-office. That magnificent reserve, too, dedicated a few years back, and now known as the Centennial Park, is studded with a heterogeneous crowd of statues of people more or less celebrated. These effigies in marble were—I believe I am correct in so stating—bought as a "job-lot" in Europe and imported here by an enterprising monument-maker, and, after adorning his yard for years, were eventually disposed of by him for a good round sum to the Government, who had a new park, and were anxious to have some work of art placed in it for the edification of the people whose money they were expending.

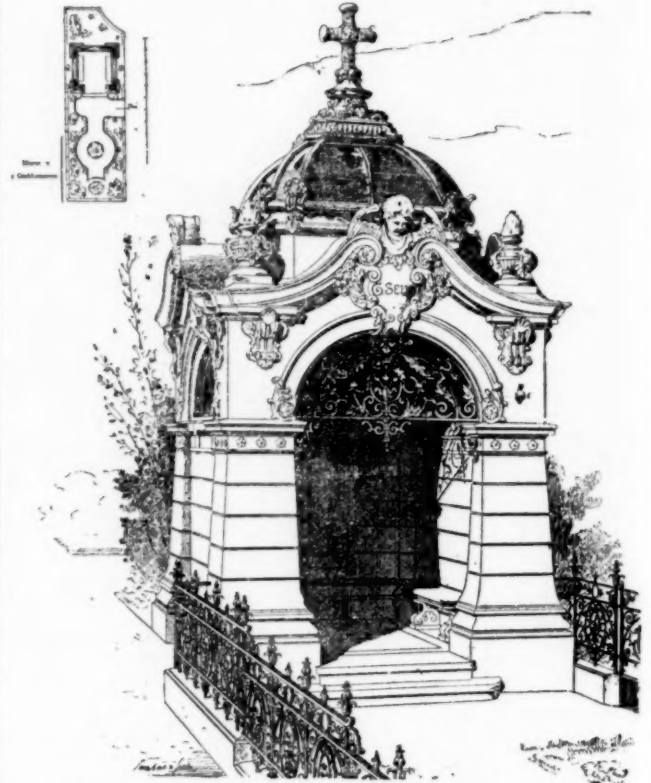
There has lately been completed in Sydney a large pile of buildings, which the State has erected for use as a Technical College. From a professional standpoint, they are not an architectural masterpiece, but they have cost a great deal of money, and the classes held in them are popularly supposed to be effecting a vast amount of good. They may be, but it is doubtful whether such institutions do not undermine to a great extent the old system of apprenticeship, without giving any compensating advantages. As an auxiliary, this system should be extremely valuable, but there would seem to be a danger of educating young men in the various arts and the trades connected with them who will blossom into full-blown craftsmen without any insight into the practical working of the particular craft they profess other than that which they are able to obtain within the walls of the College. Take the department of architecture, for instance; as the classes are held in the evening, many who earn their living in following other occupations are enabled to obtain the necessary instruction to allow them to compete in the annual examinations held in connection with South Kensington. If successful in obtaining an award—and, by the way, the publication in one of our professional journals of a set of drawings to which were awarded a bronze medal does not give one an exalted idea of the South Kensington standard—the student may not, unnaturally, imagine he is fully competent to call himself an architect, and, if he has sufficient capital, start in practice without further delay. The experience which can only be obtained in the routine of actual office-work he has not acquired; he may be a draughtsman, but his education as an architect will have to be obtained at the expense of his employers. For the *bona fide* architectural student, the classes of the Architectural Association, or similar institutions, should be infinitely more beneficial.

A late lawsuit here, the Attorney-general vs. E. Way & Co., furnishes a curious exemplification of a divided authority. The defendants had lately built large shops and warehouses in Pitt Street, and, as a veranda was required over the foot-path, a design for one was prepared by the architects which, it was considered, would harmonize as much as possible with the handsome façade to which it was to be attached. The consent of the City Surveyor was obtained in the usual way, and the veranda duly erected. The telegraph authorities then discovered that the ornamental parapet of the structure came in close proximity to their wires, and they forthwith requested the owners to remove, not the parapet, but the veranda! This request, it is needless to say, was not complied with; hence the action, which was decided against the defendants. The cost of altering the position of the wires would have been trifling, and the defendant offered to bear a portion of it, but his offer was contemptuously rejected. So the veranda, it is to be presumed, will have to be taken down.

In these days of depression, it is gratifying to be told by the English Secretary of State for Foreign Affairs that "Sydney is the

most exquisite spot in the world; its harbor is a paradise of waters beyond the ken or imagining of man; and the people represent the brightest and best qualifications of the British race." It was at a farewell banquet given to the Governor-elect of New South Wales that Lord Roseberry spoke, and possibly these things look brighter through "a vinous mist"; but of late the denizens of this region have begun to look at it as the overgrown metropolis of a land of floods and financial disasters. At least, that is the view the architects take of it.

AMERICAN SILVERWORK.¹



Tomb at Sudenscheid, Westphalia. From *Architektonische Rundschau*.

INTO the economic causes which have led to the vastly increased use of what we are accustomed to call a precious metal, this is not, I conceive, the exact place, nor am I a fitting person, to inquire too closely. It is, however, apparent that the enormously increased output of silver from the newly discovered mines in Colorado, and other of the Pacific States of America, has played the chief part in the increased and increasing use of the metal in question. Since the discovery of America, for instance, silver has been produced to the value of no less than £14,000,000,000, of which only £3,000,000,000 can be accounted for in existing coinage. This means that £11,000,000,000 worth have either been used in the arts, or practically lost to us. This enormously increased output, a great part of which has, as I have said, taken place in comparatively recent years, has naturally affected the intrinsic value of the metal; that is to say, its ratio to-day as compared with gold, is only about half of what it was 500 years ago. The Roman ratio was, in the early days of the republic, 10 of silver to 1 of gold, and subsequently increased to 12 to 1. The discovery by Spain of the mines of Potosi, raised it to 13½ of silver to 1 of gold, at which it remained until the end of the seventeenth century, when the Portuguese practically governed the rate, and raised it to 16 to 1. In the last few years it has approached more nearly to the ratio of 20 to 1 than has ever been known in the world's history. This relative cheapness of the metal has, doubtless, led to its more general introduction into our daily life. Be the cause what it may, however, the fact is certain, that one cannot walk down Bond Street or Regent Street without seeing, in every other shop-window, trinkets and nicknacks, personal ornaments and household utensils, glittering in all the untarnished radiance of the white metal. Nor to silversmiths proper is this display confined, but silver trifles, either for use or ornament, find a place in the windows of half-a-dozen other tradesmen and artificers. If this be the case in London, still more so is it in New York, where it would be difficult to find any article of daily use which one cannot procure, either entirely fashioned of silver, or in the adornment of which silver plays a most prominent part. . . .

When, however, we come to consider more closely, and compare the actual manner in which this fashioning is effected in the two

¹ A paper read by H. Townsend before the Society of Arts and printed in the *Journal of the Society of Arts*.

countries, we are struck at once by the wide difference of method, almost of principle, employed. Roughly speaking, we may say that the silverwork of England is a tradition, and that of America a discovery. The silversmith on this side of the water is hampered, I freely admit, in some directions. The mere fact of the standard fineness of his metal being rigorously guarded by law, while it has allowed the uninformed public to form a more sure estimate of the intrinsic value of his wares, has, in some mysterious way, lessened their artistic importance. For the last 200 years, at least, some sort of check seems to have been placed in this country on the manufacture of silver, though it was not until the beginning of the fourteenth century, I believe, that any actual legislation upon the subject was put into operation. It was then decreed that a leopard's head should be stamped upon all sterling articles of gold and silver. In the year 1337, the Goldsmiths' Company of London was incorporated by Edward III, and this body, until the present day, have been wont to imprint their company mark, which is the same leopard's head to which I have referred, upon all articles of sterling silver which are manufactured in London. As you are doubtless all aware, there are six other assay offices in this country, namely, those of Birmingham, Chester, Sheffield, Edinburgh, Glasgow and Dublin. The Hall-mark, which, by these offices, is stamped upon the articles of gold and silver, is evidence that these have been tested and the latter found conformable to the invariable standard of 92.5 per cent of silver, and 7.5 per cent of alloy, or 11 ozs. and 2 dwts. of fine silver to 18 dwts. of alloy. Although there is now no duty on gold or silver plate, the Hall-marking is practically compulsory, and not only this, but foreign plate, although it comes in free of duty, must be marked before being placed on sale, and, in addition to the ordinary Hall-marks, have the letter "F" enclosed in an oval escutcheon. There is no manner of doubt but that this legal hampering of a trade or art which ought fairly to be as free as any other has seriously checked its development, at all events as regards what might have become many important branches of the main stem. At present it is enough for me to point out that in America no such system prevails, and that to this fact is in some measure due the greater artistic freedom and originality which I hope to convince you is the distinguishing feature of the American silverworker. . . .

The most strenuous note in the American artistic character is a reflex of that which dominates their political faith. It is that of freedom, or, as in connection with art matters the word might be spelled, originality. This, though at times it is apt in art as in politics to degenerate into license, is in the former happily restrained by that other, and perhaps more hopeful, American characteristic, appreciativeness. As in their architecture so in their subsidiary arts, the Americans seem unconsciously to assimilate, in a degree unknown to nations fettered by the bonds of tradition, all that is good in the art work of other peoples, and at the same time to impart to the conglomeration thus obtained a distinct flavor of their own individuality. . . .

We may say what we will about American art work; we may abuse it (and in many cases we are perfectly justified in doing so) as being vulgar and *outré*, we may accuse it (and with justice) of an uneasy restlessness, which detracts to a large extent from its undoubted originality and cleverness; but in ninety-nine out of a hundred cases we find that it possesses the redeeming quality of interest. In no other branch of American art, and in no other American craft, is this quality more patent than in the silverwork. This I take it is the chief lesson which our silversmiths on this side of the Atlantic have to learn from America. Let me take as an illustration the most common and ordinary articles of household use. The peculiar qualities of silver, its malleability, its ductility, its practical freedom from oxidation, and its indifference to the action of certain acids, render it not so much a luxury as a necessity for certain of our household utensils. Even the most economically-minded householder must, therefore, reckon among his belongings a certain number of silver spoons and forks. The intrinsic value of the metal would lead one to suppose that a certain amount of additional cost, in respect to the manual labor of fashioning it, might well be bestowed upon it. The articles which are made from it, and of which I now speak, will last more than one lifetime, and are constantly and recurrently put before our eyes, morning, noon and night. It would certainly seem, therefore, that we are not asking too much if we demand from those who are responsible for their production, a certain amount of individuality and freshness of design as well as technical skill and soundness of workmanship. But in England there exist, among trade silverworkers, as I have already hinted, a more than slavish adherence to tradition and a slothfulness of mind, as it were, which no other craft can parallel. The spoons with which I eat my soup in my house I find reproduced in all their clumsy, heavy artlessness at the house of the neighbor I visit to-morrow, and were I to dine out in this England of ours on 300 of the 365 evenings of the year, I doubt whether in the whole of that time I should handle more than three distinct patterns of silver plate. In America the case is far different, in that one finds in a majority of households a display of table-ware which has been constructed to an original and a unique design. Not that each one has his table-ware made especially to order, but the varied assortment of trade patterns of silver-ware which are found not only at Messrs. Tiffany's, but at half-a-dozen other silversmiths' establishments in New York, Philadelphia and Boston, renders it easy for the householder to choose some such variation from the standard and accepted shapes as will reflect more or less his own

idiosyncrasy. Thus one finds that a New York dinner-table has something to attract one's attention and call forth either admiration or the reverse, while it gives also some clue, howsoever slight, as to the presence or absence of artistic taste and knowledge on the part of one's host. . . .

As an Englishman I cannot help experiencing a sort of vicarious shame when I go into shop after shop, house after house, and see the same painfully glittering and meaningless surfaces, the same commonplace curves, the same lifeless ornamentation, and compare them all, in my own mind, with the constant delight and pleasure I experienced in New York as I turned over the contents of an ordinary shop show-case, or called upon some friend whose acquisitive faculty had led him in the direction of silver-ware. Here in England we are content, not so much to endeavor to revivify a corpse, as to hospitably entreat, and to be perfectly satisfied with the presence at our feasts of the mere mummy of an art. To travel out of the path beaten by the hammers, or the ruts cut by the gravers of two centuries ago, seems to the English smith not only useless, but positively vicious. His fashions may change, perhaps, but they change only as regards the model he is content to slavishly follow. When he is a copyist he is too often soulless; when he summons courage enough to be original he is generally mindless. In America, on the contrary, he is ever on the lookout, not only among the archaeological dust-heaps of the centuries, but in the world of science of to-day, and the almost newly-discovered world of still living Oriental art. From science he has borrowed many a secret of metallurgy. From the East, and from Japan especially, he has learned many a lesson of form and color. He has pressed into his service, sometimes, I own, with unwarrantable rapacity, the methods of other arts. He has not been content to simply engrave the surface of his metal, but has yearned for and obtained the freedom and facility of the etcher's needle. As regards this liberal and broad-minded subjection to outside influences, there is much that is worth consideration in the different attitudes which the English and American silversmiths have respectively assumed towards the marvellously beautiful and ingeniously scientific alloys which, under the names of shibu-shi and shakudo, the Japanese have known and cunningly worked for centuries; or towards the equally beautiful effects gained by the same artificers through the use of patinas, which give to silver and its alloys a bloom as of a sun-kissed peach or ripened plum. The English have passed them by with timorous indifference; the Americans have spent large sums of money and an infinity of thought and care, and while deftly refraining from any servile copying, have adapted rather than translated these foreign arts into their own language. You will see two or three examples of the curiously welded alloys to which I refer among the little collection here, and I would beg you to especially note that while the Japanese influence is strong, none of the pieces I have here could by any possibility be mistaken for examples of native Japanese workmanship.

It is, in fact, the strong desire of the American workman to avoid any appearance of actual copying, while I am afraid his English brother, supposing him to have the necessary skill to work in so ingenious a fashion, would use his utmost endeavor to turn out something which, in its imitative fidelity to the original, should deceive an expert Japanist. Even when he does not care to expend the time and labor necessary to produce these beautiful but necessarily expensive articles, the American silversmith has an eye for color, and for the effects of contrast, which is apparent in some other of my examples. . . .

I have been endeavoring, in sufficiently brief fashion, to impress upon you the fact that one at least of the arts of a country we are far too apt to consider as given over to the outward barbarian is worthy of our most respectful consideration. But let me insist that anything I may have said which appeared derogatory to our English work is meant to apply simply and solely to those articles of silver-ware which any one can buy in any Regent Street or Bond Street shop, and, on the other hand, all that I have brought forward in favor of the American work, as compared with our own, is confined equally to the same class of articles.

I have seen in England specimens of artistic work in silver and other metals which will compare most favorably with the creations of the cinquecentists and mediæval metal-workers, but almost invariably this work has proceeded from the studios of sculptors of eminence, or from the workshops of amateurs. I am not, of course, so foolish as to belittle the marvellous creations of such an artist as Mr. Gilbert, or even to undervalue the skill of Professor Herkomer, who, at his house in Bushey, has for some time been producing to his own design a service of carefully-modelled silver, which has much of originality to commend it.

In one respect, however, I may say a good word for our countrymen at the expense of the American. Ecclesiastical silver-ware is to be found in some workshops here which cannot be paralleled either in American or in any other country in the world for its adherence to the best traditions of the mediæval craftsmen. It is more than archaeologically correct, it is alive with the true spirit of the devotionally-minded silverworkers of an age when religion permeated the life of the artisan as well as of the priest. It is worth noting, by the way, that the same holds true as regards their architecture also. The American church work cannot be compared in any respect to the best of ours, though some of us are bold enough to consider that in domestic and commercial buildings they have a great deal to teach us.

THE SALE OF GEORGE SNELL'S LIBRARY.

Fountain of Hercules, Villareale, Castello, Italy. From *La Semaine des Constructeurs*.

THE books which belonged to the late George Snell were sold by auction at Messrs. Leonards' rooms in Boston, June 9. Below is given a list of the prices brought by some of the most important architectural works, which our readers may find of some value for future reference. The total amount realized by the books was about \$2,400, the catalogue containing 394 numbers.

- Agincourt, Seroux d'. — "*Histoire de l'Art par les Monumens*." 6 vols. folio, Paris, 1823. \$21.00.
 Brandon, R. & J. A. — "*Analysis of Gothic Architecture*." 2 vols. quarto, London, 1849. \$8.00.
 Britton, John. — "*Cathedral Churches, and Architectural Antiquities of Great Britain*." 10 vols. quarto, London, 1821-35. \$50.00.
 Canina, Luigi. — "*L'Architettura Egiziana, Greca e Romana*." 11 vols., Rome, 1839-44. \$44.00.
 Coste, Pascal. — "*Architecture Arabe*." Folio, Paris, 1839. \$10.50.
 Coste, Pascal. — "*Monuments Modernes de la Perse*." Folio, Paris, 1867. \$20.00.
 Daly, César. — "*L'Architecture privée au XIX^{ème} siècle sous Napoleon III.*" 3 vols. folio, Paris, 1864. \$12.00.
 Durand, J. N. L. — "*Recueil et Parallele des Edifices*." 2 vols., Brussels. \$27.00.
 Fergusson, James. — "*History of Architecture*." Second edition. 4 vols. 8vo, London, 1874. \$22.00.
 Gailhabaud, Jules. — "*Ancient and Modern Architecture*." 2 vols. quarto, London, 1844. \$8.50.
 Gell, Sir William. — "*Pompeiana*." 2 vols. 8vo, London, 1837. \$5.00.
 Gourlier et Biet. — "*Choix d'Edifices Publics*." 3 vols. folio, Paris, 1825-50. \$42.00.
 Gwilt, Joseph. — "*Encyclopedia of Architecture*." 2 vols. 8vo, London, 1842. \$6.00.
 Hittorf et Zanth. — "*Architecture Moderne de la Sicilie*." Folio, Paris, 1835. \$20.00.
 Intime Club. — "*Croquis d'Architecture*." 8 years. Folio, 4 vols., Paris, 1868-74. \$26.00.
 Jones, Owen. — "*Grammar of Ornament*." Folio, London, 1856. \$28.00.
 Jones, Owen. — "*The Alhambra*." Large paper. 2 vols. folio, London; 1842. \$52.00.
 LeKeux, J. — "*Memorials of Cambridge*." 2 vols. 8vo, London, 1842. \$6.50.
 LeKeux, J. — "*Memorials of Oxford*." 3 vols. 8vo, Oxford, 1837. \$8.25.
 Letarouilly, P. — "*Edifices de Rome Moderne*." 6 vols., Paris, 1840-57. \$87.00.
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THE PNEUMATIC PROCESS OF SINKING A PIER.



CONSIDERABLE has been said in a general way about the size and main features of an office-building which the Manhattan Life Insurance Company is about to erect in lower Broadway, New York, nearly opposite old Trinity Church. A former Rhode Islander, now engaged in business in New York, told the writer the other day, that he had seen Broadway practically rebuilt since the war, and it will certainly be a cause for amazement to find Trinity's spire, once considered a landmark on account of its great height, overtopped by habitable floors of a building over the way. The building

is to be sixty-seven feet three and one-half inches wide on Broadway, sixty-six feet seven and three-fourths inches on New Street, 119 feet seven inches deep on the north line and 125 feet one-half inch deep on the south line. It will be sixteen stories high on the Broadway front and seventeen stories on New Street. The main building will have a height of 242 feet to the top of the main roof and from the Broadway sidewalk to the base of the flagstaff on top of the dome the distance will be 348 feet. A few years ago it would have been impossible to erect a building as lofty as this is proposed to be upon such a site without surrendering so much of the lower floors to caring for the foundation load as to render them practically untenable. It is believed that the Tower Building, a neighbor to the proposed new structure, was the first example of a tall building erected upon a narrow site in which foundation loads were properly carried without the surrender of this valuable ground-space, and the lesson then learned has been turned to practical account since by metropolitan builders in many instances. The Manhattan Building will be unique, however, in the adoption of two of the processes or principles of bridge construction, the pneumatic process of sinking a pier and the cantilever principle of distributing the load of the columns over the piers formed by the caissons. Fifty or sixty feet from the surface is rock which it was desired to reach with the foundations. The rock was covered with mud and quicksand. The building-line upon each side was bounded by existing structures, some of them upon pile foundations, and it was of the greatest importance that these foundations should be protected and supported.

It is stated that small caissons had been employed in sinking foundations for one of the theatre buildings recently erected in New York, but they were put down by mechanical means, no air-pressure being employed, and in magnitude and importance they bore very slight comparison to the undertaking now in progress. The caisson considered as an aid to sinking foundations through wet material consists of an inverted box having a sectional shape according to the work it is intended to do. The principle is, that so long as the air-pressure in this box is maintained equal to or slightly above the water-pressure upon the outside down to the lower edge of the caisson, water cannot enter. Work is carried on in the chamber formed

by the caisson, in many cases the work of laying the masonry on top of the caisson being carried on at the same time. As excavations advance, the caisson sinks, the air-pressure in the inside being reduced slightly until the dead weight of the caisson itself and the masonry on its top are sufficient to overcome the frictional grip or resistance due to the bearing upon the outside surface of the material it is passing through. There are fifteen caissons, some of the largest being twenty-five feet six inches by twenty-one feet six inches, twenty-five feet by fifteen feet six inches, and thirty-six feet by eleven feet. The air-pressure is not expected to exceed twelve to fifteen pounds to the square inch, equivalent to twenty-seven to thirty-four feet head of water. After caissons have been sunk to the bed-rock they are to be cleaned out and filled with concrete, thus forming a continuous masonry pier from the rock up to the surface of the ground. On these rest thirty-two main columns carrying the building, the load being brought to the centre of the top of each pier by a system of cantilevers of plate-girders built up in box form. This system is so thoroughly worked-out in all its details that although at some places end columns are outside of the outside edges of their respective caissons the load they bear is transferred by means of the cantilevers and bolster shoes so as to be evenly distributed over the base of the piers formed by these caissons. — *Providence Journal*.

NOTES ON GESSO-WORK.



XV-Century Repoussé Work. From Havard's "Dictionnaire de l'Aménagement et de la Décoration."

DECORATIVE design in gesso stands, it may be said, midway between painting and sculpture, partaking in its variations of the characters of each in turn—the younger sister of both, holding, as it were, the hands of each; playful, light-hearted, familiar, associated in its turn with all kinds of domestic furniture and adornment.

With an origin perhaps as ancient as the practice of decoration, its true home is in Italy. We find it at Pompeii in association with architecture and painting, with its cousins stucco and plaster-work, which are also found in such choice and effective forms in the interior decoration of Roman tombs, such as the famous ones of the Latin way. We find it united with painting in the devotional pictures of the early Italian school, used for diapered backgrounds and gilded

enrichments of all kinds, jewels of kings, and nimbi of saints. There exists a painted screen in Southwold Church, of a fifteenth-century Flemish character, though possibly English, which has figures of the Apostles with diapered backgrounds in raised gesso-work; and in the fine decorative scheme of Pinturricchio in the Appartamento Borgia in the Vatican, gilded gesso is used for caskets and other ornamental features in the frescoes painted on the walls, gilded relief-work being out on the vaulted ceilings above. A beautiful model (by Sig. Mariano) of one of these rooms may be seen in the Italian Court of the South Kensington Museum, as well as a multitude of excellent examples of gesso-work in pictures and mirror frames, and in the *cassone*, or gilded marriage-coffers, of which there are several very fine ones, mostly Florentine, with figures in relief, and backgrounds punctured or stamped in patterns on the paste, and afterwards gilded, with rich ornamental effect.

We find gesso was used also underneath the burnished gold of the medieval illuminator, and it enabled him to give that rich and sparkling effect, united with bright and rich color, in the massive initial letters and raised leaf-work which give such value to English and French fourteenth-century MSS.

The revival of classical feeling—which was never far hidden in Italy—and the love of classical lore and detail at the time of the Renaissance, led to the use of stucco and gesso, of the more elaborate and ornate development of which we may see examples in the ceilings of the Doria Palace at Genoa, for instance. Plaster enrichments and often elaborately modelled ceilings are associated with our own Tudor and Jacobean houses, and are sometimes the separate work of Italian artists and craftsmen as in the case of the famous ceiling at Blickling Hall. The Italian craftsman's skill in dealing with all kinds of plaster-work and the mystery of moulding and casting, remains pre-eminent, and perhaps the gesso-worker still survives in the adroit Italian artist who squeezes spirals and garlands, in a tinted gesso of plaster and sugar, upon our cakes. Sugar too was, I believe, an ancient ingredient in mixing gesso.

There are various kinds of gesso and recipes for the making of it, and it can be worked in different ways and on different scales and degrees of relief. For fine work on a small scale, such as might be used for caskets or small panels in cabinets, and the decoration of frames and furniture, gesso-duro is the best. It is a mixture of whitening, soaked first in cold water till quite soft, glue and gelatine, boiled linseed-oil and a little resin, mixed well together, warm of course, to the consistency of thick cream.

Supposing it is desired to work a design on a panel of wood, the panel had best receive a coat of shellac or varnish first. Then having traced or sketched direct in outline your design, lay on the paste with the point of a long-haired sable brush—the kind known as a "rigger" or fine water-color brush will answer. It should be held as perpendicularly to the panel as possible, so as to favor precision and clearness of touch, lightly dropping or floating the gesso on into the spaces of the design as its treatment may require, and adding more of the paste as greater relief is wanted.

Gesso-duro takes some days to harden, but dries, as its name implies, very hard. It can then be scraped down in parts if necessary, and worked on again or retouched to any extent; although I think, as a general rule, the peculiar quality given by the brush is perhaps best left unaltered, or at least only added to, and not taken away from by scraping down, yet a very fine finish of an ivory character could be obtained in this way, useful in some cases, as in making models for metal castings. The true character of gesso-work, however, seems best kept when the work is as direct and simple as possible.

There are various patents and materials in the market for working in gesso, but the best I have met with is called "Denoline." It consists of a fine powder sold in tins, which only requires to be mixed with cold water to convert it into a paste of any consistency required, regulated by the quantity of water used. Flour appears to be an ingredient, and wheat-flour was used, I believe, as well as sugar, by the old Italian gesso-workers. It is mixed as stiffly as possible, about the consistency of modelling clay or wax, laid on and pressed and pulled into shape by the fingers, and finished by an ordinary modelling tool. "Denoline" dries slowly and can be retouched. It gets a little clinging and sticky in working, and no doubt, like all the different varieties of gesso, in common with every workable material under the sun, requires its own peculiar treatment.

Whiting and parchment-size is said to be a good form of gesso; I have not tried it. I have, however, used for both small and large scale work simply a mixture of fine mortar, plaster-of-Paris and diluted glue or size, which answers fairly well if done with certainty and directness, as this mixture sets much more quickly than the gesso-duro. It is, too, a little apt, if the suction of the ground be not thoroughly stopped, to crack off when dry.

"The Dance," one of a series of frieze panels, was worked with a brush and in the same mixture of plaster and glue, the larger masses being laid on with a spoon, the figures being modelled nude and the draperies and details being added with the brush afterwards. On this scale, however (the original is about three feet deep), plaster and glue cannot be relied on to hold without fibre, and for work of this scale, as also for bolder relief, it is advisable to use either tow or cotton-wool—I prefer the latter. You take the mixture of plaster-of-Paris and glue as before, but into it you dip small pieces of the cotton-wool, pulled out to keep the fibre from growing into hard knots, and, having thoroughly saturated them in the gesso, you proceed to lay them on your ground or panel, gradually building up the design and modelling as you go along. The panel may be of fibrous plaster, and suited for insertion in wall, frieze or ceiling, or fireplace. It is necessary, however, to wet the ground and shellac it to stop the suction before laying on the gesso. With the cotton-wool it will dry slowly enough to be modelled by the fingers or tools, and can be added to when dry, or finished and enriched with brush-work. It is very tough when dry, and the fibre of the cotton makes the gesso cling to the panel.

It might seem at first sight that such a material had no particular limitations or natural laws, which, in all forms of art, are so serviceable in evolving what we call *style*. Yet, elastic, as gesso-work appears to be, and possessing so considerable a range of effect and expression, experience soon teaches us that it has its own most fitting characteristics and tendencies in ornament arising directly out of the nature of the material and the tools. The artist, so far from desiring to disguise the real conditions of the work, would rather emphasize their peculiar characteristics. For instance, in laying-on and modelling any design in gesso with a brush, he will find the brush and the paste conspire together to favor the production of certain forms in ornament—delicate branch and leaf and scroll work, for instance, and dotted and linear borderings, lines of hair and drapery arranged in patterns. Such forms as these the brush charged with gesso almost naturally falls into, and, indeed, leaf-shapes may be considered almost as the reflection of the form of the brush itself.

The modelling of the more raised smooth parts is produced by gradually and lightly adding or rather super-imposing, while the gesso beneath is fluid, fresh gesso—like a kind of *pâte sur pâte*—which quickly amalgamates with the layer underneath. In modelling the limbs of figures it is best to emphasize the main muscular masses, isolating them somewhat from each other, and in building them up to the desired relief, to allow for the natural tendency of the paste to soften its own edges in running together. So that a limb would be built up somewhat in the way indicated in the drawing, by successive

layers of gesso in distinct masses floated over each other while moist, gradually allowing their edges to overlap and run together. Of course, the success of the result depends not only upon the nicety of touch, but also on the proper consistency of the gesso, which, if mixed too thin, would be likely to lose form and run out of bounds. Gesso, therefore, like the Valetudinarian's gruel in one of Miss Austen's novels, should be mixed "thin — but not too thin."

It is of little use giving exact quantities, since satisfactory working depends upon all sorts of conditions, constantly varying, such as the temperature, quality of the materials, nature of tools, etc., none of which behave exactly in the same way on all occasions, and must necessarily lead to different results in different hands.

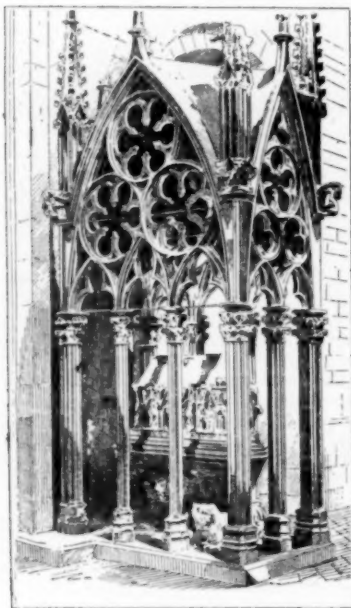
It is only personal and constant experience of the subtle mechanical and material conditions which are inseparable parts of the production of all work of the nature of art, which can really determine their fitness to each individual worker, who must, sooner or later, if his work is alive, make certain variations to suit his own idiosyncrasies.

It is perfectly hopeless to attempt to pursue any form of art on purely mechanical principles and precepts. A few plain and practical directions—as to a traveller seeking his road in an unknown land—and the rest must be learned step by step in experience, and as much as can be gathered from opportunities of seeing the work actually grow under skilled hands, from which indeed everything learnable can be learned.

Even complete mastery over materials is, after all, not everything. In fact, from the artistic point-of-view, work only begins then, as the form of expression follows the power of speech. Design has much analogy to poetry; unless the motive is real and organic; unless the thought and the form have something distinctive and individual in them; unless the feeling is true, the work fails to interest us. Herein lies the whole question of artistic production. Yet that is worth learning which can be learned about any form of art, even if it only enables us to realize its true nature, and something of the laws of its expression; which knowledge, at least if it does not confer creative power, greatly increases the intelligent pleasure of appreciation.

—Walter Crane, in the Studio.

THE AMPHITHEATRE AT ARLES.



A Tomb in the Monastery of the Holy Crosses, Tarazona, Spain. From *La Construction Moderne*.

France. It is not only in Arles and Nîmes that the remains of amphitheatres are found. They exist also in Bordeaux, Saintes, Poitiers, Senlis, Béziers and Fréjus. Nor was the predecessor of Paris without its arena.

At Arles the site was selected with judgment. Although the building has been freed from the houses which, like parasites, were attached to it (they were made up of its materials), yet as it is surrounded by streets, a visitor does not realize that the ground on which it stands is the highest in the neighborhood. In fact, the slope of the site made it necessary to employ an immense mass of masonry in the substructure.

We suppose it can never be determined when the amphitheatre was constructed. It is probably as well the date should be unknown, for if a record relating to the work were discovered, there would be an end to the controversy among the archaeologists of the South of France about the relative ages of the amphitheatres of Arles and Nîmes. Priority is claimed for Arles on account of a supposed re-

finement in the detail, which is said to indicate a period when Greek influence had not vanished. The less complete hydraulic arrangements are accepted as further proofs of age. On the other side, it is contended that the superiority of the treatment which is visible in the arching, as in other parts of Arles, is evidence that the builders were novices when they erected the amphitheatre at Nîmes, and accordingly they were able to give the benefit of their experience to the work at Arles. In both places, any pride there may be in the quality of the masonry would be sacrificed if by doing so some assurance of greater age could be given. The amphitheatre of Arles may date from the beginning of the second century, but there is no historic evidence of its existence prior to the fourth century, for about A. D. 335 it is recorded that spectacles were held in it. The later emperors were disposed to keep the people in good humor, and during their brief reigns the arena of Arles was probably not allowed to be unoccupied. The early Frankish kings followed their example, but it is to be hoped without sacrificing the lives of human beings. The remembrance of those sacrifices was enough to compel Christians to have an enduring aversion towards the theatres in which they were enacted. The amphitheatre of Arles was doomed to ruin. The quantity and strength of the masonry were not easily overcome. Before the building was demolished, Arles was threatened with an invasion of Saracens, and the people were glad to utilize the ruins and convert them into a citadel. When the danger was at an end the amphitheatre was again treated as a quarry. Fortunately Arles was a place of slow growth, and the stones were not required except for ordinary buildings. There were no palaces like the Palazzo di Venezia, the Palazzo Farnese, the Palazzo Barberini and the Cancelleria Vecchia, which were built with the stones taken out of the great Roman amphitheatre. During centuries the ruins were pillaged for mean hovels or neglected until the Renaissance gave interest to all relics of Roman greatness. The place was visited by François I, who lamented the degradation he witnessed. Henri IV took a more practical view, for he ordered some of the buildings, that were erected in the arena, to be removed. At his death there was only a partial clearance, then followed a fresh period of neglect. In the beginning of the present century, when Frenchmen were esteeming themselves as the heirs of the ancient Romans, interest was once more renewed in the amphitheatre, and the colossal work of clearing the ruins from rubbish was commenced. But the squatters were less easily removed. There were over two hundred houses within the amphitheatre, and the occupants could not be evicted without compensation. It was considered to be a victory that at the beginning of 1830 one hundred and eighty were already demolished, at an outlay of 3,000*l*. The remaining thirty-one houses cost no less than 24,000*l*. Altogether more than 7,000*l*. had been expended before M. Questel was asked to report on the works that were requisite for the conservation of the amphitheatre.

It is evident that the elliptical plan of the Colosseum in Rome was taken as a model in the provinces of the empire, but the ratios of the axes differ slightly. In Rome the major axis of the ellipse, measured to the exterior, is 616 feet, and the minor is 611 feet, or 1:1.20. In Arles the axes are 446 feet and 353 feet, or 1:1.26; while in Nîmes the axes are 433 feet and 332 feet, or 1:1.30. The arenas of Arles and Nîmes are almost identical in size. The former measures 227 feet by 130 feet; the later, 227 feet by 127 feet—a correspondence that cannot be accidental. As the ratio of the inner ellipse was about 1:1.8, the occupants of the lower seats possessed not only a closer view of the scenes in the arena, but they were able to see easily across "the house," and to recognize acquaintances in opposite tiers. Owing to the corridors being of uniform width the ratios between the axes were altered, and accordingly the upper tiers of seats were not only farther from the arena than those below, which was unavoidable, but as the ellipse gradually approached the circle (since the minor axis was increased in length at a rate that was impossible with the major axis) the occupants, in proportion to their inferiority, were kept more apart. The elliptical plan was probably adopted in order to suit the convenience of the most important people in a Roman city. If the seats were arranged on a circular plan (assuming the length of the arena to be the same) there would be fewer chances for the occupants of the podium, or row of boxes, to exercise themselves in the language of the eyes.

There were discoveries at Arles which enable us to realize some of the arrangements of the podium. That part of the amphitheatre was faced with marble, and was divided so as to form a series of boxes, which were assigned to officials, corporations, and other people of importance. At Arles the divisions did not rise from the ground, but rested on a sort of cornice which was carried by walls. It is supposed that a sort of wooden gallery was built in front of the podium, which could be used as a refuge by the *bestiaires* if they were pursued too closely by the wild animals. In the modern circus the performers, when they wish to suggest they are in danger from a trained mule or quadruped, vault among the audience, but Roman senators and commanders would not be so tolerant of the presence of men who fled instead of combating. The gallery could also be safely used by the grandees when they goaded the animals on leaving the cages. That combats with lions, tigers and panthers were more common in the amphitheatre of Arles than at Nîmes is evident from the height of the podium we have described, which no wild animal could bound over, as well as from the remains of the animals which have been found in the subterranean chambers. Two inscriptions are also to be seen in the Musée of Arles, which relate to

contests of gladiators and *bestiaires* that were provided at the cost of two of the grandees of the colony.

The exterior of the amphitheatre of Arles presents two stories or series of arcades, the lower being Roman Doric and the upper Corinthian. It is assumed there was also a very low attic on which the blocks used for supporting the *velarium* were built, but there is no trace of the arrangement, Arles in that respect being less fortunate than Nîmes. It is still possible to appreciate the arrangement of the plan, which was so simple that few of the 25,000 spectators were likely to be puzzled in reaching their prescribed places. The principal entrances were at the ends of the major axis, and from them a gallery led direct to the podium, which contained four rows of benches. There were three other divisions, each having eleven rows of benches, which communicated with corridors and staircases leading to the external arcades. The subterranean part had also its passages to and from the outside world. There is some cylindrical vaulting in one of the galleries, but on the whole the construction imposed no great difficulties on the masons. The massiveness of so many of the stones is characteristic.

It is remarkable that the theatre of Arles, of which only enough remains to suggest the splendor of the building, is supposed to owe its ruin to the portability of the stones which were employed in it. Built of stones as large as those seen in the theatre at Orange, it was likely to have as well withstood the wear and tear of ages. We have cause, therefore, to be grateful to the builders of the amphitheatre who insisted on using such a quantity of large stones in the amphitheatre, although it was necessary to convey them from a quarry that by the route taken was twenty miles distant. — *The Architect*.



[Contributors are requested to send with their drawings, plans and a full and adequate description of the buildings, including a statement of cost.]

UNITARIAN CHURCH, WESTON, MASS. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

[Gelatine Print issued with the International and Imperial Editions only.]

WEST WASHINGTON MARKET, NEW YORK, N. Y. MR. DOUGLAS SMYTH, ARCHITECT.

HOUSE FOR H. SCHREIBER, ESQ., EAST JAFFREY, N. H. MR. PATRICK A. TRACY, ARCHITECT, BOSTON, MASS.

DESIGN FOR A CITY SAVINGS BANK. SUBMITTED IN A COMPETITION OF THE DENVER ARCHITECTURAL SKETCH-CLUB.

Y. M. C. A. BUILDING, MIDDLETOWN, CONN. MESSRS. COOK, HAPGOOD & CO., HARTFORD, CONN.

A CITY HOUSE. MR. R. H. ROBERTSON, ARCHITECT, NEW YORK, N. Y.

BELKNAP COUNTY COURT-HOUSE, LACONIA, N. H. MR. WILLIAM M. BUTTERFIELD, ARCHITECT, MANCHESTER, N. H.

THE building is about 60 x 80 feet two stories in height, the first floor being occupied by the county officers and grand-jury room. Fireproof vaults and a toilet-room are provided for each office. The court-room is located on the second floor, also with accommodations for the judges, jury and attorneys. The basement is constructed with coursed ashlar of pink granite up to the water-table, above which the walls are of dark red pressed bricks with red sandstone trimmings. The interior is finished with northern ash, and the structure will cost about \$26,000.

[Additional Illustrations in the International Edition.]

STONE MANTELPiece FROM THE CHÂTEAU ARNAY-LE-DUC.

[Copper-plate Photogravure.]

This chimneypiece, a monumental work of the first rank, in the style of the French Renaissance, comes from the Château of Arnay-le-Duc, in Burgundy. The chimney-breast, greatly projecting, is supported by two groups of pilasters, whose faces are carved and decorated with bouquets of foliage and trophies. The capitals are ornamented with *putti*, carved out in the form of volutes, masks and cherubim. The base of the mantel consists of a large frieze between two groups of mouldings decorated with leaf-work, cherubim and festoons. Upon the frieze alternate genii, supporting escutcheons without blazonry, of Italian form, and candelabra supported by *rinceaux*. Above rises the main portion of the design, which is divided

into four parts by five columns resting upon the rather high bases, and supporting an entablature of antique style. Upon the podium, upon which the columns rest, are carved trophies of arms and circular medallions supported by infant figures. Upon these medallions is engraved the monogram "E. M.," and this same cipher is repeated on the bases of the columns, and upon the pedestal of these columns may be read the following inscription:

DE GRAN BIEN MERITE — ET POINT NE DEFAVLT — IL N'EST
QV'ADRESSE — QVANT TOVT PREVAULT.

In the intercolumniations are carved four great circular medallions, copied after Italian plaques, representing: Orpheus reclaiming Eurydice from Pluto and Proserpine; Orpheus playing the lyre, and surrounded by maenads and animals; four naked men in combat; a man seated on a throne before whom a personage presents a dead man, whom he carries on his back, while at his feet is stretched a fourth nude figure with his hands fast under a large stone. The height of the whole composition is 4.10 metres, its breadth 4.80 metres. This chimneypiece, which must have been carved about 1525 to 1530, evidently belongs to the earliest Renaissance. It is interesting from more than one point-of-view, and certain of its mouldings still present Gothic profiles, which, nevertheless, harmonize well with the pilasters carved in the Italian style. Nevertheless, one feels that the artist had some difficulty in habituating himself to the new style, and his want of practice is betrayed in the exaggerated entasis of the columns, which divide the mantelpiece into sections. However all this may be it is altogether a work of the first rank, and gives to the whole composition a monumental air. This subject is only one of several mantelpieces which belonged to the famous Spitzer collection.

UNITARIAN CHURCH: REAR VIEW, WESTON, MASS. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

[Gelatine Print.]

CHRIST CHURCH, FENTON, ENG. MR. CHARLES LYNAM, F. S. A., STOKE-UPON-TRENT, ARCHITECT.

The church consists of a nave of six bays, with clerestory and aisles, and north and south porches; a chancel, with a chapel on the south side, and a clergy vestry on the north; also a north transept, containing a choir vestry and an organ-chamber. The foundations for a western tower have also been put in. The floor-space of the church will accommodate about 1,000 worshippers. The chancel is enclosed by open oak screens, and fitted with oak stalls, whilst benches are provided for the church generally. The style is English Decorated, and was dictated by the requirement of the committee that certain prominent features of the former church should be re-used. In the gable of the north porch a niche has been provided in which a figure of "Our Lord in Glory" has been placed. The chancel is spacious, and the altar well raised. The side chapel has a separate altar, and is fitted with chairs for the daily services. Besides the north and south porches there are two exit doorways at the east end of the aisles. The heating vault is beneath the clergy vestry, and where the hot-water pipes are laid below the floor, openings are formed in the passages above the pipes of pierced terra-cotta. The chancel is lined with ashlar stone; all the other facings are of bricks both inside and outside, and in each case they are varied in colors not in patterns, but promiscuously, as furnished by the peculiarities of the bricks themselves. The roofs are open-timbered, unvarnished, with an external covering of lead to the aisles and slates elsewhere. The floors are laid with deal blocks and tiles in the passages and sanctuaries. The new church extends beyond the boundaries of the former one into the church-yard, and consequently the disturbance of former interments was necessary, and a church-yard cross of considerable dimensions has been erected commemorative of this unavoidable work. The total cost of the buildings and fittings was something under 7,000l.

NEW PREMISES, SHOE LANE, LONDON, E. C., ENG. MR. HERBERT KNIGHT, ALDERMANBURY, LONDON, E. C., ENG., ARCHITECT.

This building, comprising an area of some 3,000 feet superficial, is being built in a very substantial manner for a printing warehouse. The fronts are of Portland stone, the whole of the front portions of basement being in white glazed bricks.

HOUSE, BROADSTAIRS, ENG. MR. WILLIAM A. BURR, ARCHITECT.

This house will shortly be erected for Mr. King Cochran on a piece of land situate at Broadstairs, which adjoins the Coastguards' Station and Bleak House, the house in which Charles Dickens wrote and took the name for his novel. The window of his favorite room overlooks the grounds, the rustic pier (mentioned in his book), the bay, etc. The front, shown in the illustration, will overlook the sea. The lower portion of the house will be built with bright red bricks, whilst all that portion above the level of the window sills will be in depeter work, with the gables half-timbered, except the bay window and the quoins, which will also be in red bricks. The roofs will be covered with Broseley tiles.

NOTES AND CLIPPINGS

STRENGTH OF BRICK MASONRY.—The strength of brick masonry has been investigated in the laboratory of the University of Illinois by M. A. Earl and A. B. Loomis. They constructed a number of brick beams and piers, which were broken under various conditions and in various ways, with results that showed roughly that the modulus of rupture of regular brick-masonry is about twice the tensile strength of the mortar used, although it may be three times as much. With masonry less than four weeks old the results were not so good, the modulus being about the same as the strength of the mortar. — *The Engineering Record*.

PUBLIC BATHS FOR CHICAGO.—An agitation for public baths in Chicago encounters, by the admission of one of the local papers, a lack of interest, but the Common Council having made an appropriation of \$12,000 for the purpose, one house will probably be built this summer. It is proposed to make it self-sustaining. A charge of five or ten cents will be asked of each bather in order to defray the cost of maintenance. A site on the west side of the city would naturally be selected for the building. A beginning having been made, a bath-house would next be provided for the south-siders, and it is suggested that a natatorium on the Midway Plaisance at the Fair grounds might be secured. Mayor Harrison thinks well of this plan. The matter is only interesting as showing how far behind the age Chicago is in providing for its people a convenience necessary to their health and comfort, which no large city in the East or in Europe with an extensive water front is without. — *New York Evening Post*.

TAR AND ASPHALT FOR TANKS.—A mixture of coal tar and Californian rock asphaltum has been successfully employed by Mr. R. C. Gemmell for lining a reservoir for the city water-works of La Grande, Oregon. The reservoir is of oval shape, part in excavation in heavy clayey soil and part in embankment made from the excavated material, with inner slopes of three to one. The depth of water is ten feet; the area of surface, 20,880 square feet; and the capacity, 1,000,000 gallons. The lining consists of one layer of brick on edge, covered by three-eighths inch of the bitumen mixture. After the earth had been excavated and the embankment made, the whole surface was thoroughly rammed with iron punners weighing twenty-five pounds each. The bricks were then laid, and rammed solidly into place; the joints and cracks being brushed full of clean sand. Coal tar was used as a flux for the asphalt, in the proportion of from ten to twelve per cent by weight of the latter; the mixture being "cooked" by boiling for five or six hours with constant stirring. A large bucketful at a time was taken out of the kettle by two men, and spread in a thin layer over the bricks by means of shovel and broom. It required two layers put on in this way to make the requisite thickness of three-eighths inch. As much sand as would adhere to it was sprinkled over the last layer while hot. The reservoir has never leaked. It is suggested that this way of rendering tanks water-tight at small expense might be extensively used for sewage-works, etc. — *Scientific American*.

FATAL ACCIDENT IN THE CHANNEL TUNNEL.—An accident, resulting in the death of two men and the narrow escape of five others, occurred recently at the Channel Tunnel works. Since the boring of the Channel Tunnel was stopped by Mr. Chamberlain, when President of the Board of Trade, the tunnel and its machinery, timber supports, etc., have been maintained in precisely the same condition as the day the work was stopped. The excavation is as nearly as possible one mile and a quarter in length. It is periodically visited for the purpose of keeping everything in repair. A gang of five or six men descended the shaft for the purpose of carrying out some repairs upon which they had been engaged. An hour before the air-machine had been at work pumping air into the farther end of the heading to drive out any foul air. The men had not been down very long before cries for help were heard from the bottom of the shaft. A relief-party quickly descended, when it was found that all of the men were more or less suffering from suffocation, some of them being quite exhausted. They were sent to the surface as speedily as possible, some of them being apparently dead. It was found that in the heading the fumes of carbonic-acid gas were so overpowering that it was not possible to penetrate very far. The relief-party also suffered considerably, and some of them in rescuing their comrades nearly became victims themselves. It was found that two men named Henry Fisher and Charles Horton were missing. Their bodies were subsequently recovered from the heading, bearing painful evidence of the shocking death they had met with. Both men leave wives and families. Fisher had five children. According to the statements of the survivors, the men had advanced some distance into the tunnel when they suddenly became sensible of a suffocating feeling. Those in front called out, and then all attempted to return to the bottom of the shaft as quickly as possible. The fumes followed them so quickly that they were almost overpowered. As far as can be learned, it appears that Fisher, when running back, knocked off his hat, and, it is supposed, tried to pick it up. In stooping, it is believed he inhaled the carbonic-acid gas, which would be more dense on the ground, and then became overpowered. Horton either tried to assist his comrade or fell over his body. Some of the others tried to drag the men away, and nearly lost their own lives in the attempt. The theory of the disaster is that some of the old timber on the heading which was being repaired on Saturday became ignited and smouldered, and that when the air was pumped into the far end of the heading it gradually drove the vitiated air toward the outlet. The accident was not known in Dover till late in the day, when the bodies of the two men, Horton and Fisher, were removed to the mortuary. Six men were suffering from symptoms of asphyxiation, and the greatest difficulty was found in restoring four of them. — *London Daily News*.

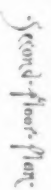
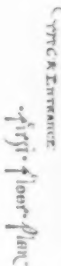
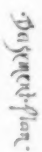
THE WATER-SUPPLY OF HAMBURG.—The terrible cholera epidemic in Hamburg last year brought the unsatisfactory water-supply of the town into prominence, and the corporation at once set to work to improve matters. Hamburg had previously taken the water from the Elbe almost without any filtration, and it was decided to at once adopt an extensive system of sand filters. The water used to be pumped from the river, but now it runs through a canal to a reservoir, with a pumping-station. Here it passes a series of filters which retain the coarser kind of impurities. The pumping-station has five steam-engines with double pumps, of which each single pump has a capacity of 2,500 cubic metres (88,291 cubic feet) of water per hour; the water then enters a series of reservoirs, of which each can hold 120,000 cubic metres (26 1-2 million gallons). From there a canal leads to the sand filters at Kaltenhof, which consist of several layers of cobbles and gravel, covered with a layer of sand 3 feet in thickness. Of these filters five are now completed; each has an area of 7,500 square metres, and with a filtering speed of 2 cubic metres (441 gallons) per square metre (1.07 square feet) for each twenty-four hours, gives 15,000 cubic metres of water, which, taking the aggregate of the five filters, now ready, affords 120 litres per individual, or about half the consumption of the town. The filters will, therefore, be sufficient for the whole requirements of the town. With regard to the effect of the frost upon the filtering, no fears are entertained. The water will always be held about 3 feet over the filters. The strongest frost which has hitherto been experienced in Hamburg has never produced ice of more than some 15 inches in thickness. The whole installation comprises eighteen filters, of which two will always be empty for cleaning purposes. In order to receive the accumulated water during the night, large covered reservoirs have been built at Rothenburgsort, where the filtered water is completely protected. The energy with which this large undertaking has been pushed ahead is a credit both to the town of Hamburg and the chief engineer, Herr Meyer. — *Engineering*.

BROAD TIRES vs. NARROW TIRES.—In order to arrive at a satisfactory solution of the effect of wide-tire or narrow-tire wagons on roads a series of exhaustive tests have been made by the aid of a dynamometer recently, and the results, as described in a California paper, show that broad tires, of any width that would be really practical, would not make good roads, simply having less tendency to cut up poor roads than does the narrow tire. It is urged that the harm to wagon roads commonly occurs when the surface is saturated with rain and the roadbed is soft and yielding, so that at such times loaded vehicles having wheels with narrow tires cut out ruts more or less deep, according to the length of the wet spell and the amount of use to which the roadway is thus subjected; when, however, the roadbed is solid and care is taken to promptly fill up inequalities created by the wear and tear of the surface, under these circumstances narrow tires, to all intents and purposes, are no disadvantage to the roadbed, while they are unquestionably of greater advantage to the vehicle. Narrow tires tend to lighten draft in drawing loads over smooth roads and over those that are soft; but over surfaces that are sandy or yielding in their nature the wide-tire wagons give the best result, and are accordingly better for general field use. Again, a consideration to be noted is that the supply of material for felloes, in the case of wide-tire wagons, is less abundant than that which is suitable for narrow tires; wide-tired wagons being, on this account, more expensive than those having tires of the usual description, a difference liable to be still further increased. — *New York Sun*.

NICKEL IN THE UNITED STATES.—At a recent meeting of the Engineers' Society of Western Pennsylvania, a paper was read and a discussion had on the subject of nickel, from which it appears that the nickel deposits at various places in the United States which may be valuable are in Oregon, Nevada and North Carolina. A trial of the North Carolina ore is reported as showing an average of about two per cent of nickel although some samples were obtained running up to ten per cent; the Nevada ores are abundant in quantity and comparatively rich, but they are arsenides of nickel and difficult to refine; the Oregon ores are of the silicate class, and have not been developed in commercial quantities. In regard to the welding of nickel and steel, an examination of rolled sheets thus treated is said to reveal no evidence at the edges as to where the nickel ends and the steel begins, though of course the outside is mostly nickel and the inside steel—the nickel is welded to both sides of the sheet of steel, making a non-oxidizable article having the stiffness of ordinary steel, and convenient for various uses. Metallurgists are of the opinion that for a variety of purposes, a steel with a high percentage of nickel may prove of considerable practical value, and the progress of experiment in this direction will be watched with much interest. — *New York Sun*.

RUSSIA'S COMPENSATION TO FREDERIC REMINGTON.—The munificent sum of \$21.71 has been sent by the Russian Government to Mr. Frederic Remington as an indemnity for the troubles he underwent in the Czar's dominions last summer. Mr. Remington bore the special passport of the United States, and his trip to Russia was undertaken simply for the sake of making sketches connected with his private work, and was devoid of all political significance. He was not permitted to make notes, the canoe he took with him from this country to St. Petersburg was detained and damaged, and he was not allowed once to launch it, and his summer was practically wasted. Hence the generous compensation. — *Harper's Bazar*.

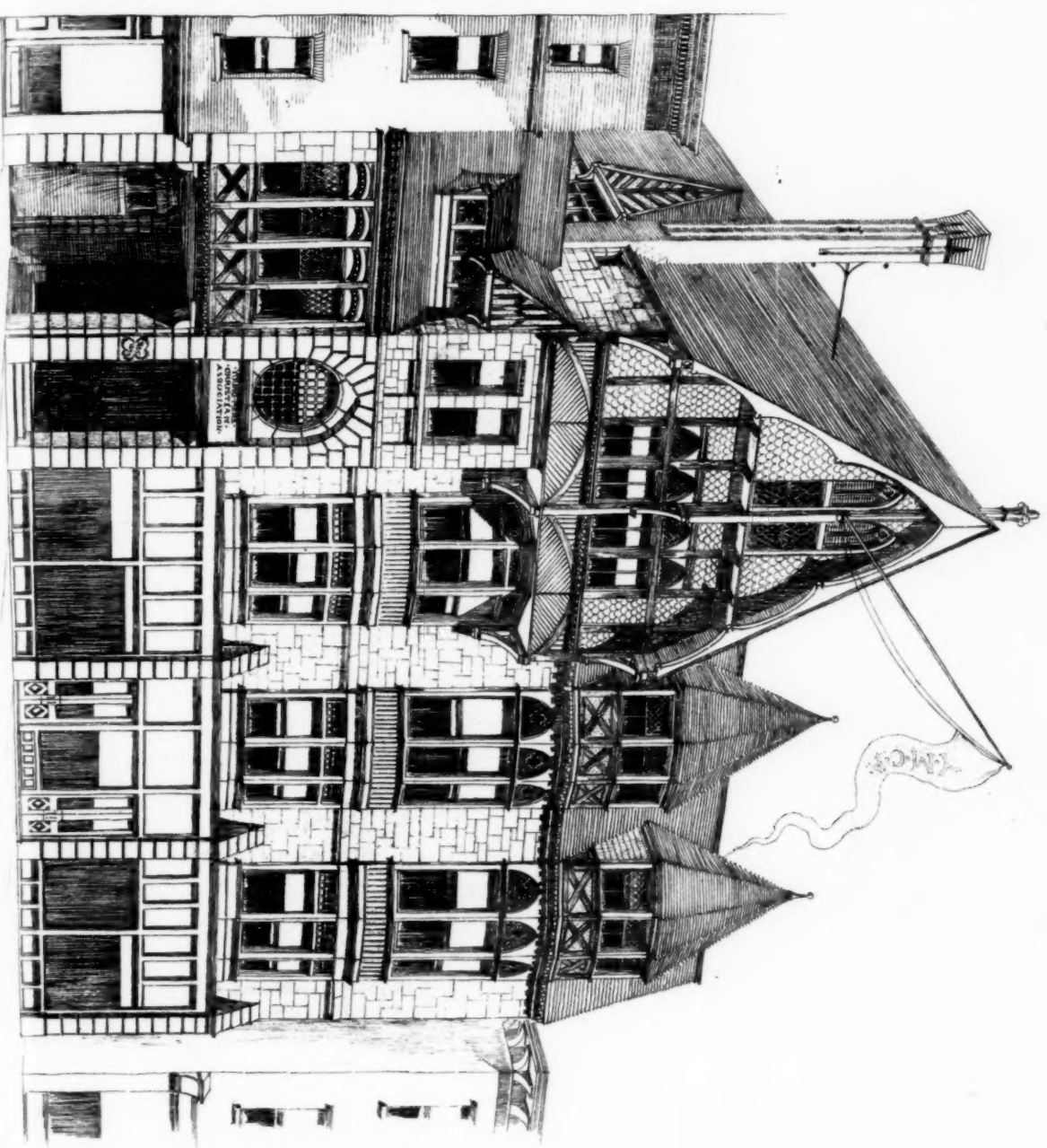
THE big wheel-pit for the Niagara Falls Power Company is nearly completed. This pit is 200 feet deep, 100 feet long and 20 feet wide, and will be fitted with the appliances for four 5,000 horse-power wheels. This is the first of eight pits of equal size included in the plans. A smaller wheel-pit for the Niagara Falls Paper Company was finished last week. — *Engineering News*.



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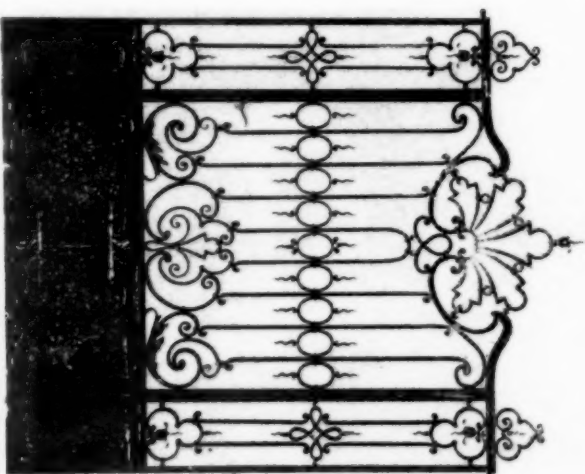
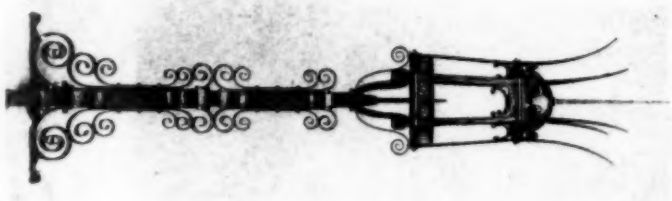
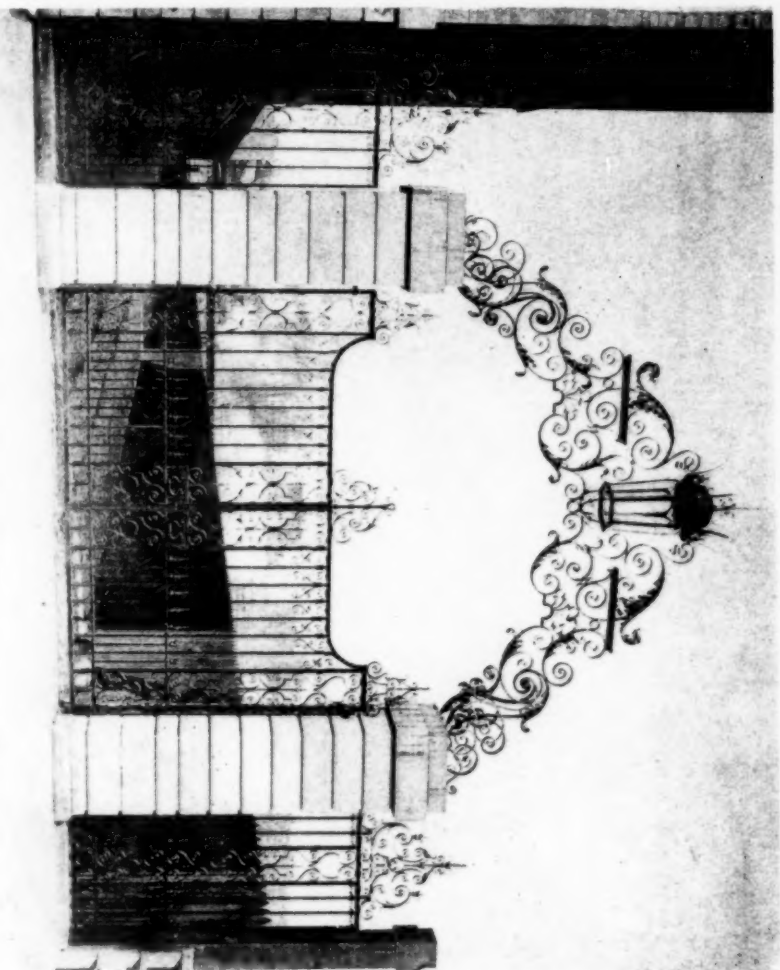
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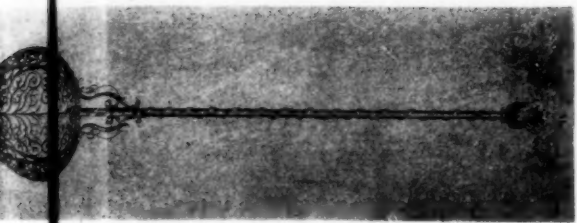
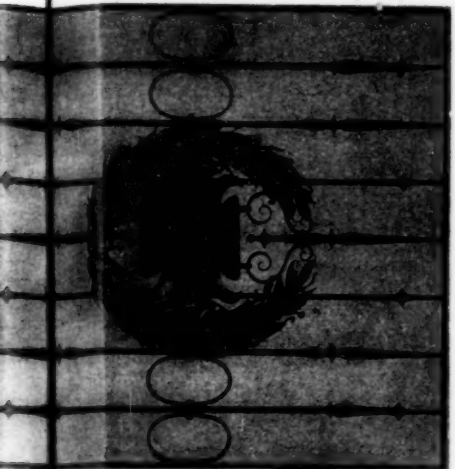
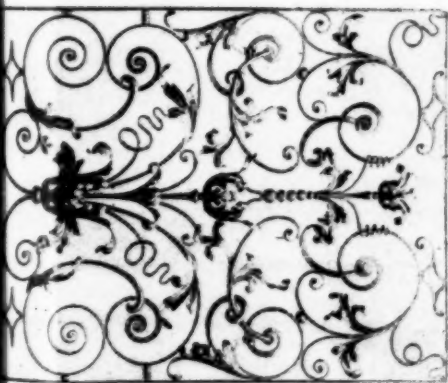
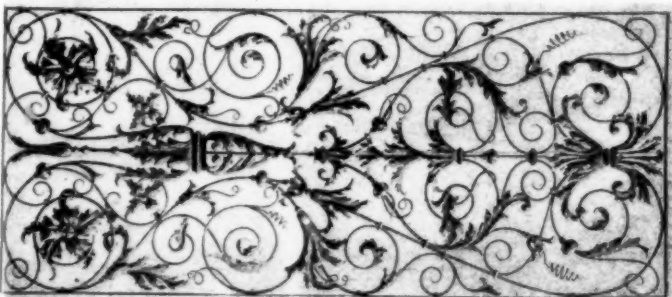
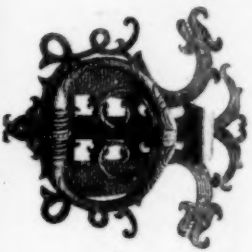
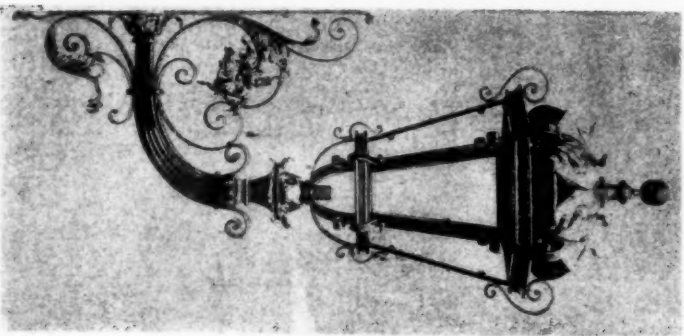
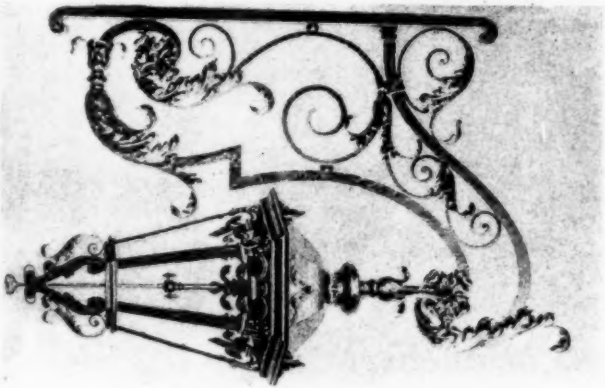
TRADE SUPPLEMENT.

REPLIQUE PATENTED BY J. H. STONE

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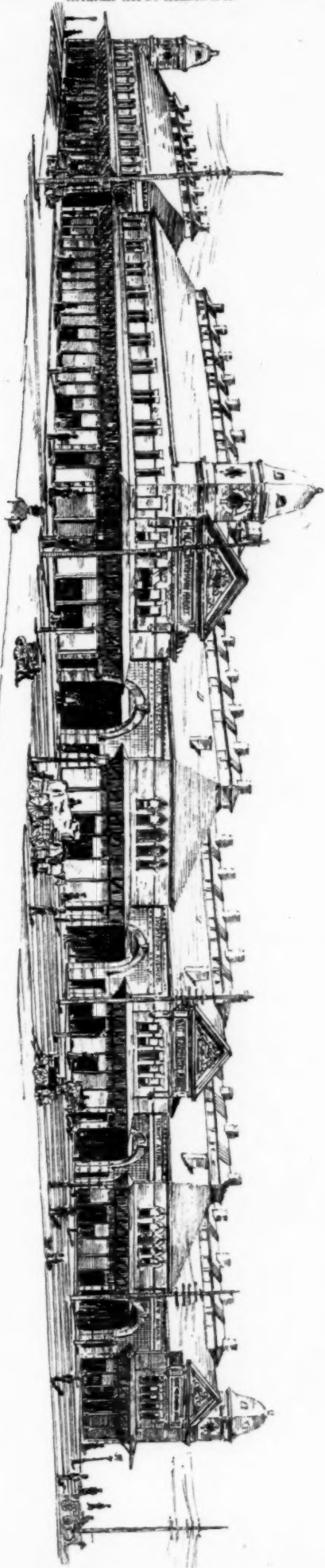


D. A. S. C. COMPETITION FOR CITY SAVINGS BANK JAN. 1893. SUBMITTED BY FORTUNA.



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LACONIA, N. H.
WILLIAM M. SWITZERFIELD, ARCHT.
MANCHESTER, N. H.

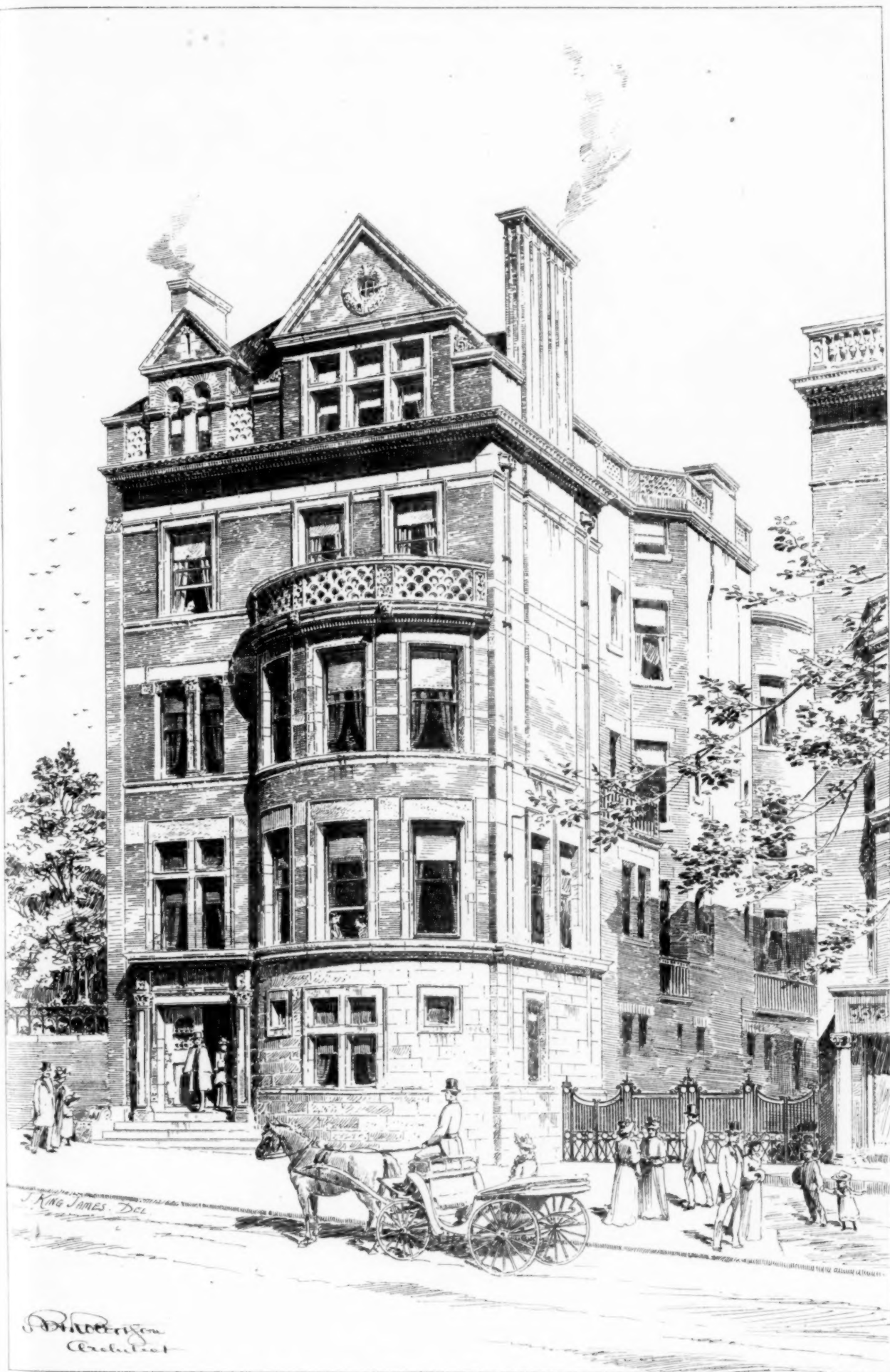
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