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MAY 17, 1890.



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THE first Annual Exhibition of Architectural Drawings of the Boston Architectural Club opened Monday evening with a brilliant reception. In point of the number and interest of the drawings shown, it is by far the best exhibition of the kind ever given in Boston, and one of the best that has been presented anywhere, in this country or any other. We shall take opportunity later for an extended notice of the drawings shown. Meanwhile, it is gratifying to see that the public interest in the affair appears to be very general, and the indications are that the undertaking on which this energetic young club has spent so much effort will prove very successful.

THE strike of the carpenters, in Boston for an eight-hour day appears to be nearly over, and the prospect is that the men, or rather, their conceited and reckless leaders, will be totally defeated. Meanwhile, it will do people who are interested in building matters good to reflect upon what they owe to the meddlesome demagogues who undertook this year to force upon our mechanics the decrees of an "International Committee" sitting in secret session in Paris or Geneva. During the winter, the prospect for an active building season in Boston was brighter than at any time for at least ten years. Innumerable projects had been made, and had, to some extent, been brought into the architects' offices, when, about the first of February, the announcement was made that the well-known mischief-makers of the building trades would undertake to carry out in Boston the orders of the foreign "International Committee." About the same time, the freestone-cutters' antics commenced, and the people who had set apart money for building, finding that they were likely to be delayed for freestone, and might, very possibly, have trouble about the carpenter-work of their intended structures, abandoned or postponed their schemes, and invested their money in some other way. According to the Inspector of Buildings, who has the best possible opportunities for judging, the amount of building in Boston this season will not be more than half as large as last year, and the carpenters, masons, plumbers, plasterers, painters and architects, whose living depends on

building, will have to content themselves with half their usual income, while the demagogues, whose desire to advertise themselves has deprived them of the other half, will impute the deficiency to the "capitalists"; that is, to the very persons who desired to give their fellow-citizens employment, and were prevented from doing so. What the men themselves secretly think of the matter, and would say about it if they dared, may be inferred from a letter written to the Boston *Record* a few days ago by a woman, who inquired, with reason, whether this was a free country, where men who wished to work were obliged to stand idle until the people who were ready to employ them would promise to hire them for only eight hours a day, whether they were willing to work longer or not. To her mind, an hour a day taken from the man's work meant an hour added to the toil of his wife and children, and she thought that this was the opinion of a large part of the men, who, however, dared not express it. With a curious mixture of the feeling, so pertinaciously inculcated upon poor people, that the newspapers and the rich men are against them, with the sentiment which is habitual in the trades, and is not unfounded, so far as newspapers are concerned, that no one dares offend the labor leaders, she concluded her letter by saying that she supposed the *Record* would not be willing to publish it—an apprehension which the editor met, much to his credit, by printing it *verbatim*.

THE Rotch Travelling-Scholarship for 1890 has been awarded to Mr. William T. Partridge, of Boston. Mr. Partridge is well-known in the architects' offices as a skilful and ambitious draughtsman, and his work for the examination seems to have been highly creditable. There were this year some seven or eight competitors. The holder of last year's scholarship, Mr. Henry Bacon, has already sent home some most beautiful work in the way of measured drawings, and it is to be hoped that this branch of study will be followed more closely than it has hitherto been in most cases. The new scholar will take with him the best wishes of his late associates in Messrs. McKim, Mead & White's Boston office, as well as of those in our own drawing-office, who will be pleased to see so much industry and talent rewarded.

M. BLANCHEPIERRE makes, in *La Semaine des Constructeurs*, some excellent remarks on the proportion of pedestals to the statues which they support. It seems that a statue of M. Paul Bert, the distinguished administrator of the French colonies of Annam and Tonkin, has been made in Paris by M. Alfred Lenoir, and set up provisionally in the Place de la Sorbonne, before removing it to its destination at the colonial city of Hanoi; and M. Blanchepierre takes occasion to criticise the dimensions of the temporary pedestal on which it is mounted, and which, as he says, crushes by its size the surrounding buildings. This particular fault, he thinks, is common to many modern monuments. The worst examples are to be found in the colossal figures of the Virgin, or of saints, which are perched either on the steeple or the roof of so many French churches, where nothing is visible of them but a bare outline, altered in proportions by the effect of the light background, and devoid, so far as can be seen, of all charm of modelling and expression, while they are so out of keeping with the surrounding landscape as to shock the sensitive eye. Where, as he says, the pedestal has been carefully studied by the sculptor, it is almost always small and low. Rude, after preparing the model for his statue of Marshal Ney, designed a pedestal for it. Notwithstanding the greatness of the subject, the sculptor could not find that the grandeur of his conception was heightened by a tall pedestal, and, proportioning it as best he could to the whole design, he made it less than twenty inches high. The architect Duban, with the same artistic perception of the influence of the pedestal on the statue standing upon it, altered the pedestal of the statue in the middle of the arcade of the Château d'Anet twenty times before he was satisfied with the result, and until we can do something better with our statues than to hoist them indiscriminately into the air, as if they were lightning rods, M. Blanchepierre thinks there is still something for us to learn in the art of architecture.

THE Madison Square Theatre, in New York, always famous for its stage machinery, has surpassed itself in the mechanism used in producing the illusion of a horse-race in the play of the "County Fair." The stage is rather a small one, yet three thoroughbred horses, ridden by expert jockeys, run at their utmost speed over a straight course a mile or more long without getting beyond the proscenium arch, and arrive at the goal amid the shouts of the excited audience, which cheers the horses alternately as they gain upon each other in their keen struggle. The secret of this remarkable performance is, after all, a simple one. The floor of the stage is removed for the race, and the turf of the race-course, which appears in its place, is composed of three strips of compressed paper. These strips form endless bands, passing over rollers set beneath the stage, at opposite ends, and actuated separately by powerful machinery. The movement of the upper surface of the bands is in a direction contrary to that of the racing horses, and the speed is as nearly as possible that of the particular animals employed when running at their best pace, so that, although they put forth their utmost exertions, stimulated by the whips and voices of the jockeys, they remain constantly in or near the middle of the proscenium opening. As the story of the play requires that a certain horse should win, his band of fictitious turf is made, near the last, to move a little more slowly than the others, so that he comes in victor by half a length. To increase the illusion, the scenery in the background is made to move in two planes. The distant objects are painted on a "flat" scene, which moves like a panorama, on vertical rollers, but changes place slowly, while the nearer details are shown on a separate roll, of nearly the same kind, which moves almost as fast as the horses. Another essential element, the effect on the horses and riders of rapid passage through the air, is supplied by means of a powerful blast from a blower, placed behind the scenes, and pointed at the advancing horses. This makes the manes and tails of the flying steeds flutter with a violence appropriate to a gait of thirty miles an hour, and the effect is complete.

THE different Classical schools in Athens are already busy with explorations, which, according to the *Builder*, promise to be of much interest. The American School, during its suspense as to the success of its efforts to raise funds for the excavation of Delphi, has been at work at the site of Plataea, the little city which sent its one regiment to help the Athenians drive back the Persians, and was subsequently the scene of the greatest battle of the Persian War. The town, after its destruction by the Thebans in the Peloponnesian War, was rebuilt by Alexander, and offers little interest, compared to Delphi; but some curious Byzantine work has been discovered, which makes amends for the poverty of Classic material. The British School has undertaken excavations this year for the first time, and is at work at Megalopolis, in Arcadia. This, though dating only from the time of the Peloponnesian War, was a large city, and the ruins of the theatre, the most extensive in Greece, have already been uncovered, while nearly all the trial pits reach the foundations of buildings. While the British School will hardly find anything of poetical interest in Megalopolis, the French, who are digging at Træzen, in Argolis, will hardly find anything else. Træzen itself was founded by and named after the son of Pelops, who, as all the world knows, was, when young, cut up by his father and stewed to furnish a banquet for the gods, and who, after being restored to life by Jupiter, had to wear an ivory shoulder, to replace the piece which Ceres had eaten.

TRÆZEN the son of Pelops was brother to Atreus, and thus uncle to Agamemnon; so that the city of Træzen, and the Mycenæ of Agamemnon, are likely to show some curious relationship. Træzen's great-nephew, again, was Theseus, who was born in the town, but went thence to Athens, where his well-known adventures began with the expedition for the slaying of the Minotaur. It was long afterwards that Hercules erected a monument to the family, and with this pious act the history of the principal inhabitants of Træzen seems to end. The Germans are making excavations in Cyprus, and Dr. Schliemann is preparing for renewed work at Troy, so that the season promises to be rich in archaeological discovery.

THE *Deutsche Bauzeitung* gives, as an interesting novelty, a description of the method of building small houses in Belgium, particularly in Brussels, which is much more like our mode of city building than the practice which prevails in Paris or Berlin or Vienna. In Belgium, it must be premised, tenement-houses are not popular, each family living, if possible, in a house by itself, so that the modern portions of Brussels or Ghent, which look something like Philadelphia, are much less imposing than cities like Vienna, where nearly all the new buildings are immense barracks, containing a large number of families. The pattern of the Belgian city houses is generally nearly the same. The basement contains the kitchen and store-rooms, the first story is devoted to parlor and dining-room, and there are two or three stories of bedrooms above. The soil in Brussels is a loamy sand, and, although it is easily excavated, the wheels of the excavators' carts sink deeply into it when loaded, and it is, therefore, customary to facilitate the removal of the material by laying a rough track, composed of a pair of channel-irons placed on the sand, in which the wheels of the tip-carts can run. This strikes us as an excellent idea. The wear on the channel-iron track must be slight, and the difference in the size of the loads which can, with its help, be hauled out of the excavation must be very appreciable. The remaining part of the system of construction is not in all respects so commendable. A footing of rough concrete is laid on the sand, and the walls then carried up, and, as no special pains is taken, in building small houses, to find a firmer stratum of sand to lay the concrete on, many settlements take place. The bricks in common use are so soft and weak that the workmen do not use hammers on them, cutting them with the trowel as required. When delivered at the building, it is common to find about one-fourth of them broken, but the fragments, as well as the whole bricks, are taken up on the staging in baskets, as if they were eggs, and used indiscriminately in the work. Tin hods are used for conveying the mortar, which is made on the ground in a very unscientific fashion. The first step is to dump the lime in heaps in the street. Then a few pailfuls of water are thrown upon it, and sand is strewn over the heaps. After a few days the lime is found to be reduced to a dry powder, containing, naturally, unslaked lumps. The second part of the process is to make a ring of sand on the ground, shovel in the lime-powder from the preliminary heaps, and mix with water; then stirring in slowly the fine, loamy sand from the excavation until the result satisfies the workman in charge. The mortar so made contains many unslaked particles, which swell later, and cause various blemishes. The outside and party-walls are sixteen inches thick, and the inner partitions are either of eight-inch brickwork or of studding, lathed and plastered. The roofs and floors are either of brick arches between iron beams, or of wooden beams, boarded on top, and plastered on laths underneath; the fireproof filling between wooden beams, so common in France and Germany, being here unknown. The beams, if of wood, are light, but are usually bridged with what we should call double herring-bone cross-bridging; but the bridging-pieces, instead of being simply cut in and nailed, are mortised at each end into the sides of the beams. This mortising has no advantage over nailing, and requires an immense amount of time and labor, besides seriously weakening the beams. Perhaps, like so many of the peculiarities of Swiss construction, it is a reminiscence of a period anterior to the iron age, when all woodwork was put together without nails. As, by law, any person can put floor-beams to the centre of the party-wall which bounds his house, the natural consequence is that no flues are allowed to be built in the party-walls, and chimneys have to project about two feet into the room, in order that the flues may not encroach upon the wall. When, as is very common, in order to save fuel, the fireplace opening is closed, and a stove set in front of it, the total space occupied in the width of the room is very considerable, and in the better class of houses the heating is done by a furnace in the cellar. In plan, most of the houses are arranged with a narrow hallway along one side, and a front and back room opening into each other on the first story, with double doors; but some follow the arrangement now quite common with us, in having the stairs in the middle, between the front and rear rooms. Most houses have a third room in an extension, beyond the dining-room, which may serve for a kitchen or library, and many have conservatories opening out of the dining-room. In Ghent, particularly, "Flora's city," as the Belgians themselves call it, nearly every house, however small, in the modern part of the town, has a conservatory, bright with flowers.

RELIGIOUS ARCHITECTURE.¹—VI.

III. RELIGIOUS ARCHITECTURE OF ANTIQUITY.—GREECE.



Gate of the Convent des Filles de la Croix, Rue de Charonne, Paris.

ABOUT the year 1100 B. C. the Dorians invaded Greece, and occupied all the northern part of the country. The Achæans were driven southward into Attica, and thence to the neighboring islands, and as far as the shores of Asia, where they established a vast number of Ionian colonies.

The two races were totally dissimilar; the Southern was vivacious, brilliant and capricious, incapable alike of discipline and perseverance, while the northern was slower and heavier, but possessed of a spirit of persistence and organization, and not without resemblance to the Roman people. Each race furnished certain traits to the Greek character: from one came keenness, delicacy, subtlety even, clothed in youthful, graceful and natural forms; from the other was inherited a spirit of devotion to the city which, under the ancient organization, wholly subordinated the individual and his interests to the superior interests of the human group to which he belonged. One was flexible, gay, passionate and, it may be said, materialistic; the other was grave and severely spiritualistic.

From earliest times the Greeks were mariners. In the eighth century B. C., after the invention at Corinth of the galley, which admitted of much longer and safer sea-voyages, the Grecian colonies multiplied. Naxos, Syracuse, Megara, Messina, Gela, Sybaris, Crotona, Rhegium and Tarentum were founded, and these in their turn established Cyrene and Marseilles. Egypt was opened, and Thrace and the shores of the Black Sea were colonized. Cumæ, Tenedos and Lesbos each became the mother-land of thirty different cities, and the colonies of Miletus numbered eighty.

Evidently it was a powerful civilization, whose foundations were laid at that moment, powerful in its fleets, powerful in its mariners and soldiers, and powerful in its accumulated wealth. Vast edifices were erected by the colonies in their earliest days, richer even than those of Greece itself; the mother-country was obliged to have recourse to the liberal contributions of her colonies to build her first temples, since she was unable to bear the expense of the undertakings herself. It was in this way that the Temple of Delphi was reared, and its construction occupied thirty years; long before that time, in the days of Herodotus, the two greatest edifices known were the Artemisium of Ephesus and the Heraum of Samos.

Magna Græcia possessed, from the sixth century B. C., the Temples of Syracuse and of Selinus, and three of the temples of Pæstum.

Toward the sixth century B. C. a change began to take place in the conditions of fortune and wealth; the colonies lost ground, or were gradually invaded by neighboring nations. Hellas, on the contrary, gathering in their heritage, became more and more prosperous. In the fifth century B. C., the Parthenon, the Propylæa, the Erechtheum, the Odeum, the Temple of Eleusis and the Temple of Phigaleia were erected.

At the same period the supremacy passed from Sparta to Athens, and the latter city took command of the Greek troops and fleets in the great war against the Persians. The population of Athens increased rapidly. "The latter was not slow" in transferring within her walls, along with the treasure of Delos,

the direction of the affairs of the Confederation; her allies and subjects were forced to bring their suits to her courts for judgment. Magnificent *fêtes* were created to attract them to the metropolis. . . . Athens assumed the burden of equipping, by means of subsidies, the greater part of the fleet, and in that way drew a large population of seamen; these settled at the Piræus, which was connected with the old town by long walls." At the same time, Athens was the *entrepôt* of all Greece. Her silver mines of Laureium and gold mines of Thrace threw the coinage of money into her hands. In a word, Athens was at that moment the veritable capital, bulwarked by a budget supplied by the tribute of her allies. The surplus of this budget was lavishly and intelligently expended for the embellishment of the city. It was this money that built the Parthenon, the Propylæa, the Erechtheum, the Odeum and the Temple of Eleusis. However beautiful these works may have been, there is no doubt that the allies sometimes raised a timid protest against their construction, for Pericles took the trouble several times to explain to them that "the tribute, once paid, no longer belonged to those who paid it, but to the receivers, and that the latter were bound only to fulfil the obligations which they imposed upon themselves in receiving it."

It was between the sixth and fifth centuries B. C. that the earliest Grecian religious edifices known to us were erected. Like most primitive peoples, the Greeks were doubtless content at first to assemble for religious ceremonies in a sacred enclosure, or *hieron*, probably situated on an eminence. Then, as the god to whom the worship was addressed assumed a more definite, distinct and, later on, a more personal character, a separate dwelling, the *naos*, was constructed for him within the enclosure. This was the origin of the temple which, among the Greeks and their Roman imitators, was never anything more than a structure consecrated to a divinity, and in which the priests of the worship performed the ceremonies; it was in no sense a place for the faithful to assemble.

These uses, so unlike those of Christian churches, were the cause of the very modest proportions of the temple, while the peribolus, which embraced all the annexes of the sacred edifice, and was designed to admit the multitude, was often of great size and importance.

The temple was intended, first of all, to protect the image of the god; this purpose would naturally restrict the dimensions of the structure. The Erechtheum was not more than 32.8 feet by 65.6 feet; in the Parthenon, the interior *naos* was 65.6 feet by 98.4 feet. Again, the temple was often very small in proportion to the size of the statue; the Minerva of the Parthenon was 45 feet high without her lance, and the roof of the *naos* was only 55 feet above the floor. Strabo, in speaking of the Jupiter of the Temple of Olympia, remarks: "If the god should rise, he would break through the roof." It was even necessary in some cases to perform the sacrifices outside the temple, as is shown by a Pompeian painting, in which the altar is stationed without the structure, surrounded by two rows of persons. The processions were very probably relegated to the exterior of the *cella*, and even of the porticos, for the galleries seem to have been ordinarily too narrow for the passage of a throng. In the large temples, the steps observable in the basement were altogether too high to serve as stairs of access; they were purely decorative, and there were no stairs proper except in front of the entrance. These sufficed for the service of the temple, but were surely not adequate for the circulation of a large crowd.

It is in Sicily, and later at Rome, that we must look for those structural modifications which opened the temple to the multitude; namely, stairs running across the entire front, and galleries broadened by the pseudodipteral disposition.

The Greek temple served still another purpose. As the presence of the god rendered it a holy and respected spot, it was used as a treasury. In the *cella*, which was divided into two parts, the posterior portion, or *opisthodomus*, was utilized as a repository for the public funds; while the *naos*, or sanctuary enclosing the idol, received at the same time the sacred ornaments, the lamps, chalices, perfuming-pans, religious furniture, etc. According to the official report of the Hellenotamiae, the Parthenon contained "gold and silver vases and phials, a gold crown, shields, helmets, gilded swords, a silver-gilt mask, griffins, golden serpents, lions' heads, a statue of a young girl on a column, nine folding-chairs, an ivory table, lyres, eight Chian and ten Milesian beds, and ivory quivers." The Erechtheum had also its share of valuables; aside from the tapestries of the *pronaos*, a folding-chair, the work of

¹ From the French of P. Planat, in Planat's "Encyclopédie de l'Architecture et de la Construction." Continued from page 81, No. 750.

² E. Boutmy. "Philosophie de l'Architecture Grecque."

Dædalus, a cuirass belonging to Masistius, and the scimitar of Mardonius were deposited there. One can imagine what treasures must have been housed in the Temples of Delphi and Olympia, where offerings accumulated. The Greek temple was then put to many and various uses, which were quite out of keeping with the traditional idea of a Christian church.

Such was the religious edifice adapted to Greek views and customs, and which was destined to furnish the world many admirable architectural models.

It is scarcely a matter of question to-day that Hellenic art was half Oriental in its parentage. Beulé has thus summed up the present currently received opinions on this subject: "Their manners³ and industry were the result of contact with Asia; commerce, navigation and piracy contributed still more than did the Trojan War to their progress in these respects. When art made its appearance in the sixth century B. C., we find it imbued with Oriental traditions. The pyramids, remnants of which are to be seen near Epidaurus and Argos, the ruins of Mycenæ, and especially the decorative débris transported to the British Museum from Mycenæ, the most archaic remains of the rest of Greece, the tombs and the oldest vases found in them, the testimony unwittingly dropped by Greek authors—all go to show how very close were the ties which bound the ancient art of Greece to the art of the Orientals." Without attempting to settle the disputed question of the Egyptian origin of the Doric order, or of the Assyrian origin of the Ionic, we can, nevertheless, hold to these general terms, which express a general and, under this form, incontrovertible fact.

Having noted this influence, let us follow the gradual development of the Doric order in Greece, which was the starting-point of the entire Grecian architectural system, and also its subsequent transformations. By this means we shall be able to mark the various stages of progress which carried Grecian art from the primitive temples, still bearing the impress of barbarism, up to the purest and most beautiful edifices of the age of Pericles.

The earliest temples were built of wood. At Olympia and Metapontum, the wooden columns of the old temples were preserved in the structures rebuilt of stone. It is well-known that the Temple of Neptune, near Mantinea, was made wholly of intertwined oak trunks; Adrian reared an immense edifice around it, but he took care to preserve the venerable wooden temple inside the modern construction.

Many archæologists are, consequently, disposed to seek in the wooden structure the prototype of the elements constituting the Doric order. The tree-trunk, tapering upward, became the circular column;⁴ the strokes made by the axe in squaring the beam suggested, it is said, channellings or flutings, which were at first flat, but were later hollowed or cut into the stone. Between the wooden pillar and the supported portions it had been necessary to enlarge the head of the pillar and interpose a shelf for greater stability, and hence originated the capital and abacus. Architraves spanned the spaces between the pillars, in imitation of the ancient wooden beams. The beam-heads appearing above became the triglyphs, and the pins used to keep them in place were represented by the guttæ.

Vacant spaces must have been left between the triglyphs, for in the *Iphigenia at Aulis* Orestes is obliged to slip through these openings into the temple; a similar indication of the fact also occurs in the *Bacchæ*. It became necessary then to close these apertures by means of a small board; this was the origin of the metopes.

The roof, with its two slopes, furnished the pediment; the survival of the rafters and even of the pins in them has been determined by antiquarians; the dentils are the round sticks, which were afterward squared, and so on. Everything, then, can be explained in accordance with the theories of archæologists. In any case, it is true that even man's inventions are always inspired by some visible object; and it may certainly be legitimately assumed that a direct affiliation existed between the primitive wooden structure and the earliest translations of it into stone by the Dorians.

The Doric order, which served as the point of departure for all the other orders, did not, however, assume at once its final proportions. It may be said to have been subject to ceaseless variations. "Heavy and squat at first,"⁵ soberly decorated and

painted in severe tones, it at length reached, by slow stages of progression, its highest perfection, when it displayed a grandeur full of power, a wealth decorously lavished, and hues which were at once brilliant and harmonious; then, passing these bounds, it attained slenderer proportions, and, seeking after delicacy, exchanging strength for refinement and elegance, it entered upon the path of decadence. Not only is the Doric of the age of Pisistratus distinguished from the Doric of the times of Pericles and of Alexander, but shades of differences are discernible through each period, and there is, as it were, a continual transition. . . . For example, if we study the relation of the height of the column to its diameter, we find that the columns of the oldest temples are four diameters in height; then, later, they are $4\frac{1}{2}$, 5, $5\frac{1}{2}$ and 6. If all the monuments of Greece had been preserved, we should discover here a constant progression, corresponding to the progress of time. The dimensions of the entablatures vary in an inverse ratio; that is to say, as the columns became slimmer, the entablatures diminish, in order not to appear heavy and inharmonious."

The oldest Greek temple of which any important ruins now exist is probably the Temple of Corinth. These were six columns in front and thirteen on the sides; there must have been a pediment and antifixæ in terra-cotta, as this invention had already been made by the Corinthians themselves. In the interior there was a *pronaos* in front, a *cella* in the centre, and an *opisthodomus* in the rear. The columns are not fully four diameters in altitude; this fact is good proof of the antiquity of the building; the shafts are monoliths; the angle-column is nearer than the other columns, and it is probable that, even at this period, its diameter was somewhat greater than that of the others. The architrave is very heavy. The temple was dedicated to Minerva or to Juno.

The Temple of Delphi belongs to a little later period; the architect was Spintharus of Corinth. It was begun about the year 540 B. C., where a first sum of \$336,000 had been raised by subscription for its construction. The principal façade was in marble.

The temples of Syracuse are of the same epoch. According to Hittorf, the dimensions of the columns in the most important of these are as follows:

Height	27.69 feet.
Base diameter	6.23 "
Upper diameter	5.25 "

The curve of the capital is as depressed as in the Temple of Corinth, and the entablature is as heavy.

The Temples of Selinus date from the sixth and fifth centuries B. C. We remark in them, and notably in the one dedicated to Jupiter Agoræus, a departure from the customary design of this kind of edifice, and one which is peculiar to Sicily: the steps, of the ordinary height (from 9.45 inches to 5.90 inches), extend entirely across the façade, and the width of the peristyle is exceptionally great; the porticos were thus made accessible to the multitude. Within, active circulation was possible, as the rear wall, or *posticum*, was pierced with three doors, like the one in front.

Pæstum, or Posidonia, was a Greek colony. The temples (Figures 1, 2), which are still to be seen, are of the sixth century B. C., and were erected two hundred years after the

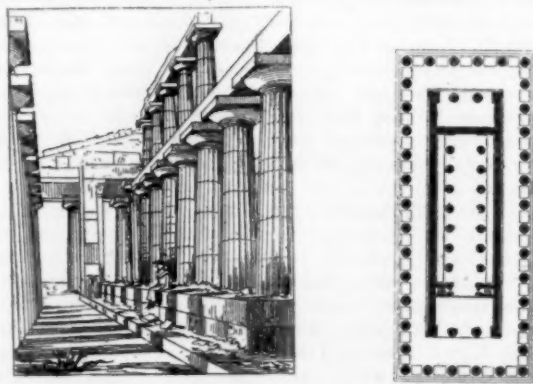


Figure 1. Interior View and Plan of the Great Temple of Neptune, at Pæstum (6th Century B. C.).

founding of the city. The most remarkable of them is conjecturally called the Temple of Neptune. The ratio of the height of the column to the diameter is about $4\frac{1}{2}$; the columns are 29.10 feet high, the entablature 12.30, and the pediment 10.43. The impression is of heaviness.

³ Beulé. "Histoire de l'Art Grec."

⁴ See, apropos of this, the two antique columns in the Louvre, in the form of tree-trunks. These curious specimens seem to indicate that from early times the analogy had at least been noted, if, indeed, there was not in them a reminder of the origin of the column.

⁵ Beulé. *L'échelle des Proportions*.

The antæ of the *pronaos*, instead of being in a line with the columns, as is the case in ancient temples, are carried forward so as to give greater depth to the vestibule.

The great Temple of Neptune is probably the only one in the interior of which two orders of superimposed columns have been preserved; these are arranged as in the hypæthral temples, which were open over the central nave. This nave, however, seems to have been purely decorative, as was also the case in the Parthenon, for there was no corresponding gallery on the first floor. The columns of the lower range are four diameters high, or perhaps a little more; the ratio in the upper range is somewhat less.

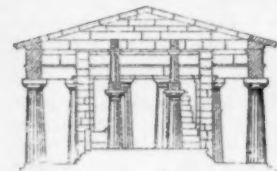


Fig. 2. Section of the Great Temple of Paestum (6th century B. C.).

MM. Thomas and André discovered the altar before the temple, in 1848; it measured 27.63 feet by 8.69.

Henri Labrousse was of the opinion that this temple was wholly covered, while Thomas believed that he had proof that it was hypæthral, or open in the centre. In fact this question, like most questions of Greek antiquity, is left somewhat in doubt.

The ruins of the temples of Metapontum apparently take us back to the sixth century before our era; for details concerning them the reader is referred to the great work of M. A. de Luynes. The height of the columns is about $4\frac{1}{2}$ diameters.

Nothing apparently remains of this period in Asia Minor except the temple of Assos. On the island of Ægina, there are important ruins of a temple supposed to have been consecrated to Minerva; a complete study of these has been made by M. Charles Garnier. The temple had six columns in front and twelve on the sides; the *naos* was divided into three naves by a row of six columns on each side. The columns were $5\frac{1}{2}$ diameters high, nearly the proportions adopted later, when Greek art was at its zenith; in the temple of Theseus, at Athens, they were not over $5\frac{1}{2}$ diameters high. There were two superimposed orders in the interior, fragments of which have been discovered. A special interest attaches to the studies carried on here, as bits of colored stucco and of paintings have been brought to light, which have rendered it possible to reproduce the coloring used in Greek temples.

Such were the chief edifices, so far as known to us, which were reared in the early period of the beautiful architecture of Greece, from Pisistratus to Pericles.

[To be continued.]

PARIS CHURCHES. — IX.

ST. DENIS.



ALTHOUGH the Benedictine abbey church of St. Denis is some miles from Paris, it is so mixed up with the history of the capital, that it ought not to be omitted in the series of "Paris Churches." Moreover, as it is by far the finest church in, or near, the metropolis, and since its restoration one of the grandest examples of the thirteenth-century architecture in France, no one ought to grudge the tiresome journey by train or rail in order to see it, even if his stay in Paris be limited to a few days. The only thing required to make it perfect, is new stained-glass in the windows of the clerestory to replace that put up during the reign of Louis Philippe, a horrible example of the execrable taste of the period.

The legend of St. Denis, the patron of France, is exceedingly picturesque. By some ecclesiastical authorities he is said to have lived

in the first century, by others in the second or fourth, but by most he is one and the same person as Dionysius the Areopagite. Hilduin, abbot of St. Denis at the beginning of the ninth century, seems to have had no doubt upon the subject, and in art the saint and the disciple of St. Paul have always been looked upon as one and the same persons, although tradition records the existence of another St. Denis, a bishop of Paris in the third century. Dionysius was an Athenian philosopher named Theosophus. Travelling in Egypt to study astrology with a companion named Apollonides, they were surprised by a strange darkness that came over the heavens and were naturally much troubled thereby. Returning to Athens, Dionysius heard St. Paul preach, and thereupon he was converted to Christianity, and then he understood that the darkness which he had seen at Heliopolis, was none other than that which fell upon the earth for the space of three hours when the Blessed Redeemer was crucified. Baptized and ordained priest, Dionysius subsequently became bishop of Athens; and in some of the writings attributed to him he relates that he travelled to Jerusalem to see the Blessed Virgin, whom he found continually surrounded by a dazzling light, and attended by a company of angels. He also gives an account of her death at which he was present with certain of the Apostles. After this, he returned to Athens and subsequently he was present at St. Paul's martyrdom in Rome. Thence he was sent by St. Clement to preach the Gospel together with a priest named Rusticus and a deacon Eleutherius. Arrived at Paris, an exceeding great city full of people and provided with all the good things of the earth, they found it so attractive that it seemed to them another Athens and so they sojourned there teaching the people, who were learned in all things but the way of truth. St. Denis also sent missionaries into other parts of Gaul, and into Germany. But these successes were not pleasing unto Satan, and so he stirred up the nobles against the good bishop, and he was accused before the Emperor Trajan. Some say it was Domitian, but in either case the result was the despatch of one Frescennius a pro-consul, from Rome, with orders to throw Denis and his companions into prison. This was done, and finding that they would not retract, they were put to death upon the Hill of Mercury (who was so much honored by the Gauls), and which was subsequently called Montmartre. Then a stupendous miracle took place. St. Denis not desiring, or not being permitted to become food for wolves, took up his decapitated head in his hands, and walked for the space of two miles, angels singing by the way. Accompanied by this celestial body-guard, the saint marched over the plains beyond the city, and signified in some way, unrecorded, that he desired burial where now stands the church dedicated to his memory. This was accomplished by a pious woman named Catulla, who had ministered unto the three blessed martyrs in their prison, and who now laid their mutilated remains in her own field.

Paris formerly, even as late as the last century, contained many spots sacred to the memory of St. Denis and his three companions. At Notre-Dame-des-Champs, a crypt used to be shown where they preached to their first disciples. At St. Benoit, now destroyed, was an oratory, on the wall of which was an inscription recording that St. Denis first invoked the name of the Most High on that spot. At St. Denis-de-la-Chartre, was the prison where the martyrs were visited by our Lord, and where He administered His Blessed Body and Blood to them. At St. Denis-du-Pas, was the spot where they suffered their first tortures; and upon Montmartre the church of St. Pierre records the spot upon which they were decapitated. The way across the plain from Montmartre to the place of burial was marked by a succession of crosses, and the field where the saint's remains were laid subsequently became the precincts of the famous abbey.

The first church is said to have been erected before the invasion of the Franks, but this had fallen into ruins in the fifth century, and it was through the piety of St. Genevieve and the people of Paris that it was rebuilt. St. Genevieve, like all good Parisians, held St. Denis in great esteem; and it was during a visit paid to his shrine that her taper, maliciously blown out by the arch-enemy, was successfully relighted through the fervor of her prayers.

But the magnificence with which Dagobert rebuilt and endowed the church, completely eclipsed the work of the maid of Nanterre; and so effectually was the king looked upon as the founder of the abbey, that, up to the dissolution of the monasteries, the monks celebrated his festival (January 19th) with great solemnity and splendor. It was about the year 630 that Dagobert undertook the rebuilding of the church, which is said to have been decorated with precious marbles, magnificent bronze doors, and gold and silver vessels enriched with precious stones. These latter, and the shrine of the saint, were the work of the famous artificer in metals, St. Eloy, who was also the maker of the shrines of St. Martin, St. Germain, and St. Genevieve. All these and in fact all this great smith's works (as far as is known) have perished; but his memory is still preserved by pictures and sculptures representing some of the legendary incidents of his life. In the Florence Academy is a picture by Botticelli, and at the church of Or San Michele is a statue and bas-relief, both of which represent one of the great events of the saint's life. A horse having been brought to him to be shod, the animal proved restive, and the saint being exercised in his mind as to how he should keep the beast still, bethought him of an excellent plan. He calmly cut off the leg, and placing it upon his anvil, fastened on the shoe, this done, he replaced the leg upon the horse, to the amazement of the beast and the edification of his owner. Another picture in Florence,

¹ Continued from No. 646, page 222.

painted for the Company of Goldsmiths by Jacopo da Empoli, is curious, showing the saint arrayed as Benvenuto Cellini, presenting a shrine to King Dagobert, who figures in the costume of Francis I.

In 754, Pepin and his queen Berthe, after being anointed at St. Denis by Pope Stephen II, began the reconstruction of the church which Charlemagne finished and dedicated in 775. From that date until the twelfth century, little is known of the history of the abbey. Like all the churches and monasteries in the north of France, it was probably destroyed, and its land laid waste by the invasions of the Northmen and the disastrous civil wars which characterized the end of the Carolingian dynasty. But it may be the fact, as asserted by some authorities, that a part of the crypt, a few columns, and some marble capitals belong to the eleventh century.

The third, and present church, was begun by the great Abbot Suger, and is considered by many French architects to have been the earliest specimen of the Gothic style. Suger erected the tower, the portals, the choir and the nave; he filled the windows with stained-glass and loaded the shrines and the ornaments with precious stones. Some of the sacred vessels formerly belonging to his church are now in the Louvre (in the Salle d'Appollon) and testify to the artistic feeling as well as to the religious enthusiasm of the good abbot. "As it is our duty to present unto God oblations of gems and of gold, I, Suger, offer this vase unto the Lord" is the inscription upon an antique sardonyx amphora which he converted into a vessel for the altar. The dedication of this church took place twice, in 1140 and 1144; but in 1219 and again in 1230, parts of it were destroyed by fire. In the following year, 1231, Abbot Eudes Clement commenced the reconstruction, which was continued by his third successor, Mathieu de Vendôme. Some of the chapels of the north aisle were built in the fourteenth century. A portion of the famous Valois Chapel which was erected by Henry II and Catherine de' Medici, and afterwards destroyed under the regency of Philippe d'Orléans, still exists in the shape of a sham ruin in the Parc Monceau.

It is generally supposed that the destruction of churches and the despoiling of monasteries, were the work of the enemies of religion in the form of the "people." But kings and emperors did not hesitate to rob the church when they could drain no more money out of their suffering subjects. To Francis I and Louis XIV, the eighth commandment was no more binding upon kings than the seventh, laws were made for the vulgar herd; and so, when the "Grand Monarque" saw fit to please Mme. de Maintenon by founding St. Cyr, he suppressed the abbey of St. Denis, and relieved the monastery of the abbot's revenues.

Many of the seventy-three abbots, from Dodon the first (who lived in 637), to the last, the Cardinal de Retz, were distinguished men. Amongst them were Hilduin, Suger, Mathieu de Vendôme; the Kings Eudes, Robert and Hugues Capet; and the cardinals, de Bourbon, de Lorraine, de Guise and Mazarin. The conventual buildings were all destroyed in the reign of Louis XV, and during the Revolution the church suffered in the same way as Notre Dame by being "secularized" in the most revolting manner. But if the Revolutionists destroyed or carried away monuments, the Imperial architects did worse, for they began a restoration in their own hideous taste and "style"; and it was not until a few years ago that the old church was restored to its pristine grandeur.

Perhaps few churches have seen more vicissitudes than the silent walls of St. Denis have witnessed. The burial place of most of the kings of France, it was also upon its high altar that Louis le Gros deposited the oriflamme, the famous standard of France; while some seven centuries later its tombs were only saved from utter destruction through the wit of Alexandre Lenoir, who declared them to be objects of artistic merit and therefore worthy of retention in a national museum. Even the church itself was threatened with destruction and was only saved by an architect seriously suggesting that it should be turned into a market, the side-chapels forming shops.

The façade has three doorways which are rich in sculptures representing the Last Judgment and the life of St. Denis. Some statues on one of the other doorways are curious examples of how a fraud may be perpetuated. They represent, without doubt, some members of the royal house of David; but at some period they were said to be kings of the Capetian line, and as such, casts were taken of them and sent to Versailles, where they figure as portrait statues of Hugues Capet, Robert, Henri, Philippe, Louis VI and Louis VII.

On each side of the western rose-window are some bands of black and white marble after the manner of the churches of Pisa and Genoa, souvenirs probably of Suger's travels in Italy. Indeed, he tells us in the account of his administration, that he took much trouble in preserving a mosaic which he had brought home and placed in the tympanum of one of the doors. This was unfortunately replaced in 1774 by a bas-relief of the meanest workmanship.

The interior of the church consists of a nave and two aisles, with a chévet of seven chapels at the east end, considerably raised above the level of the nave. Access to these chapels is gained by a flight of steps on each side of the high altar, and under them is the royal crypt. The whole of the east end of the church, the double aisles with their single shaft columns, the chapels, the vaulting and the glass is one mass of color and forms a most beautiful *coup d'oeil*; indeed there is but one eye-sore in the whole building—the aforesaid series of windows representing Louis Philippe's heroic deeds. Blue swallow-tailed coats and white trousers scarcely form a costume

which is either effective or appropriate in designs for church windows.

The wood-carving of the stalls is of the fifteenth century and was brought from the abbey of St. Lucien-lez-Beauvais; while the inlaid marquetry work at the backs of the seats is from the château de Gaillon, built by Cardinal d'Amboise. Many of the *misereres* have the usual quaint conceits which one sees everywhere. Portions of the old glass were preserved by Lenoir in the museum of the Petits-Augustins during the stormy period, and were afterwards replaced in the windows of the apse; upon some of these, inscriptions by Suger, explanatory of the designs, may still be read.

Of the early kings of France, Dagobert was the first to be buried at St. Denis, and his memorial tomb (much restored) still stands on the right of the high altar. From Hugues Capet to Louis XV, most of the sovereigns were interred there; but it must be borne in mind that almost all the early tombs are modern, either wholly or in part. In the thirteenth century the strange custom came into fashion of dividing the bodies of royal personages, and burying the parts in different places. The Benedictine monks of St. Denis protested against this division of valuable property, asserting their right to possess the entire remains of the kings; but the Dominicans and the Cordeliers contested these claims, and subsequently gained permission for their own churches to share in the spoil. Later on, other religious orders obtained the same privileges; and the ladies of Val-de-Grâce were distinguished by the possession of the hearts of nearly all the royal princes and princesses from Anne of Austria, the founder of the monastery. Naturally, when each defunct sovereign was divided into three portions—the body, the heart, and the entrails—great opportunities were afforded to architects and sculptors; and we thus find three marble monuments with recumbent figures erected for the remains of Charles V, that at St. Denis containing his body, while Rouen and Maubuisson respectively possessed his heart and his intestines. Francis I's heart was placed in an exquisite vase in the church of the nuns of Haute-Bruyère; while his body was buried in the grand monument at St. Denis. The vase was the work of Pierre Bontems and is now in the same chapel as the tomb, which was the joint work of Philibert Delorme and Bontems. The beautiful group of the "Three Graces" by Germain Pilon, now in the Renaissance museum of the Louvre, was intended to support a vase containing the heart of Henry II.

None of the monuments of the early kings are anterior to the thirteenth century, consequently, even the original portions of the effigies which remain, cannot be looked upon as in the slightest degree portrait statues. On the other hand, the magnificent tombs in bronze and the brasses which adorned them, erected to the memory of Philippe Auguste, St. Louis and his father, and which were destroyed centuries ago, were most probably as valuable as contemporary portraits as they were for their workmanship. The last tomb erected was that of Henry II; the sovereigns who followed him having no memorials. They were laid together in one great crypt, and when disturbed by the Revolutionists for the sake of the lead of their coffins ("of the coffins of our old tyrants, let us make bullets to hurl at our enemies,") there were fifty-four bodies arranged upon iron trestles side by side, Henry IV heading the list and the elder Dauphin, son of Louis XVI, being the last. Amongst the distinguished men buried at St. Denis, were the following:

Pierre Chambellan, of whom Joinville writes, "*Messire Pierre Chambellan fut le plus loial homme et le plus droicturier que je veisse oncques en la maison du roi . . . l'homme du monde en qui le roy croiroit plus*"; and Alphonse, son of Jean de Bienne, King of Jerusalem and uncle of St. Louis, whose epitaph designates him as "*moult saige et moult loial chevaliers*." Both of them died "*au service de Dieu et de Monsieur Loys, roy de France, dessous Cartaigne l'an de l'incarnation de Nostre-Seigneur MCCLXX*," and were "*enterrés en l'église Monsieur Saint Denis*" in the year MCCLXXI, "*le vendredi devant la Penthecoste, le jour et l'heure quand Monsieur le roy Loys fut enterré*"; indeed, the old chronicler says, "*aus pieds du bon roys tout en la manière qu'il gisoit à ses pieds quand il estoit en vie*."

Close to the tomb of Charles V were those of Duguesclin, Louis de Sancerre, Bureau de la Rivière, Arnaud de Guilhem seigneur de Barbazan, who, before Bayard, was called *le chevalier sans reproche*, and who with six others, was victorious over seven English knights in 1404. During the reign of Louis XIV, the duc de Châtillon, the marquis de Saint-Maigrin, and Turenne were buried at St. Denis. The only civilian thus honored was Jean Pastourel, one of the principal counsellors of Charles V.

If due allowance be made for copious restorations, the history of monumental art may be well studied at St. Denis. The memorial tomb of Dagobert who died in 638 is a fine specimen of thirteenth-century work. It is a canopied tomb with scenes from the "*Gesta Dagoberti*," in three zones under a pointed arch; below these, is the recumbent figure of the king. The legendary history is too long to relate, but one incident in it is the tormenting of his soul by demons, and his supplications to St. Martin, St. Denis and St. Maurice, who rushed to the aid of their "*bon amy le roy*," or as the text of Montfaucon puts it, "*L'ame de Dagobert est délivrée par les merites de Saint Denis, Saint Martin et Saint Maurice*." These bas-reliefs are all well worth minute study. The two enamelled brasses of the children of St. Louis were brought to St. Denis from the abbey church of Royaumont in 1791. The figures are in relief upon a ground encrusted in enamel; the heads and hands, the lions at the feet, and

the angels swinging censers are of polished brass; while the feet and the draperies are in colored enamel. To see these brasses, permission must be obtained from the architect of the church, as they are upon one side of the High Altar, a part which is never shown to ordinary visitors. M. de Guilhermy places the date of the mosaic effigy of Frédégonde as not earlier than the twelfth century. It is composed of a stone slab of the form of the early stone coffins. The design is marked out by thin bands of metal between which are incrustations of very small pieces of porphyry, serpentine, and white marble. This, like several of the early tombs, was originally in the abbey of St. Germain-des-Près. The tombs of Philippe, brother of St. Louis, and of Louis, the saint's eldest son, were also originally at Royaumont. They are in stone, colored, the figures resting on a slab supported by canopied niches. Within the latter are small figures of bishops, monks and angels. On the tomb of Louis, the background of these figures is of blue enamel. The tomb of Louis d'Orléans and Valentine de Milan forms part of the magnificent mausoleum erected by Louis XII, in the church of the Célestins, Paris. It stood in the centre of the chapelle d'Orléans, and was surrounded by various sculptures, many of which are now in the Louvre: the statue of Philippe de Chabot by Jean Cousin, the "Three Graces" by Germain Pilon, the column of Louis de Brissac by Etienne Lehongre, and of Anne de Montmorency by Barthélemy Prieur, the "Genii" by Jean Cousin, and some sepulchral monuments of the de Longuevilles. The beautiful column of Francis II, now at St. Denis, was also in the chapel and is attributed to Germain Pilon. The tomb of Louis XII and Anne de Bretagne, is one of the finest specimens of French Renaissance. It was the work of the brothers Jean and Antoine Juste of Tours, the authors of the exquisite tomb of the children of Charles VIII in the cathedral of that city, and was erected about 1530-50. It is composed of a square base enriched with bas-reliefs representing battle-scenes, and upon this rises a sort of a chapel with arcaded sides, through which are seen the naked figures of the king and queen in the agony of death. Above this on the top of the canopy are their effigies clad in regal attire, kneeling upon cushions before two prayer desks. At the four corners of the base are statues of the Cardinal Virtues, while upon the stylobate which support the pilasters of the arcade are figures of the Twelve Apostles. From the style of some of the sculptures, this tomb was long considered to be the work of an Italian, the treatment of landscape upon the bas-relief being similar to that upon the great Ghiberti gates at Florence. But of late years it has been established beyond doubt that the sculptor was Juste of Tours, and that the Italian character of his work, was the result of his travels, for on one of his works in the cathedral of Dol, he has signed himself *magister Johannis cuius cognomen est Justus et Florentinus*.

The tomb of Henry II and Catherine de' Medici, is the work of Germain Pilon (1535-90) and it was constructed for the Valois chapel erected by Philibert Delorme on the east side of the north transept. It is a large structure consisting of a base, upon which rests twelve composite columns for the support of the canopy. At each end are openings through which are to be seen the figures of the defunct in the sleep of death. The terrible side of death which is prominent in the expression on the faces of Louis XII and his queen, is here absent; and Catherine is represented young and beautiful as she appeared at the death of her husband, whom she survived thirty years. At the four corners are bronze figures of the Cardinal Virtues, and kneeling figures of the sovereigns upon the canopy are also in bronze. The bas-relief upon the stylobate represent Faith, Hope, Charity, and good works. Sauval in his "*Antiquités de Paris*," relates that "*le cavalier Bernin, a admiré le tombeau des Valois, qui voulait ne rien trouver de passable en France*," and it is said that when the monument was reconstructed, it was found that many of the marbles had been the remains of Classic times and that they had retained some traces of antique designs on their reverse sides.

The monument of Francis I and Claude de France is the largest of these splendid tombs. It was erected about 1552 by Philibert Delorme with the assistance of several sculptors. Pierre Bontems was the author of the bas-reliefs upon the stylobate, and some of the kneeling figures upon the canopy; Germain Pilon sculptured the eight statues of Fortune, allegorical figures of children under the canopy; and Ambroise Perret, the Four Evangelists; while the details of ornament were the work of Jacques Chantrel, Bastien Galles, Pierre Bigoigne and Jean de Bourges. The recumbent figures have been attributed to Jean Goujon, from the exceptional beauty of the workmanship, but without any positive proof. The tomb is of white marble, with a little black and gray introduced for some of the mouldings; the bas-reliefs represent the king's campaigns in Italy. In the bas-reliefs of the Louis XII's monument many of the costumes are more Roman than French; but those of the personages on Francis I's are treated with more historical truth. The faces of the recumbent statues are beautifully modelled; that of the queen bearing an expression of the sanctity with which she was accredited:

"*La reine Claude, décéda en l'an 1524, âgée de 25 ans, en grande opinion de sainteté; car Nicolas Gilles, qui vivoit alors, écrit en son histoire de France, qu'on faisoit des vœux, et qu'on offroit des chandelles à son cercueil, tandis qu'il fût à Blois où elle mourut, et qu'il se trouva des personnes qui affirmèrent avoir esté guéries de quelques maladies par son intercession*" (Germain Millet).

Unfortunately, some vandals have defaced these marbles by the

stupid scribbling of their insignificant names; one is cut right across the queen's face. Five figures kneel upon the canopy, the king and queen, the dauphin Francis and Charles, duc d'Orléans, and their daughter Charlotte. The *prie-Dieux* in front of Francis and Claude are ornamented with an F and a C. This, like the other tombs, was carried off to Paris in 1792; and the inscription of Lenoir, stating that he reconstructed it in the museum of the Petits-Augustins in the year VI of the Republic, still remains upon the back of it. Its restoration at St. Denis, occupied six years, much of the work being re-carved. The present restoration of the church, including the placing of the monuments in their original position, is the work of Viollet-le-Duc, a work which was scarcely finished when the Franco-German war broke out, causing still further mutilation to the exterior. During the last 150 years the church has been the constant prey of iconoclasts and restorers; from which it has suffered most, its relentless enemies or its false friends, it is difficult to say. But in Viollet-le-Duc it found a devoted lover, who effaced alike all traces of Revolutionary tribunals, Napoléonic architects and Prussian shells; and who restored it to the exquisite beauty of its youth, when St. Louis and his companions were laid to their rest before its high altar.

THE BUREAU OF ETHNOLOGY'S FIFTH ANNUAL REPORT.¹—III.



XVth Century Dormer at Dijon, France.

THE Rev. Dr. Clay MacCauley of Minneapolis, has an interesting paper on the Seminole Indians of Florida, whom he visited in the winter of '80-'81, commissioned by the Bureau to inquire into their condition and ascertain their number. Of course, in so short a time there was little opportunity for thorough ethnological work, but Mr. MacCauley has done his work conscientiously, and acknowledging frankly his limitations, he submits the report more as a guide for future investigations than as a completed result. He has, however, brought to light many important facts concerning this fragment of a once powerful Indian nation which fought the United States authority for seven years in one of the most disastrous and costly of all the wars waged with

the native races, costing over \$30,000,000 and 3,000 lives, while probably not over 400 Seminole warriors were engaged; the inaccessible character of the country, with its impenetrable swamps, having given them a great advantage over the invaders. The few remaining in Florida after the removal of the majority to the Indian territory have lived in extreme isolation, and Mr. MacCauley's is the first successful attempt to ascertain their true numbers and condition. Major Powell comments: "The status of these Indians is peculiar in that their contact with civilization has hitherto been regulated, to an extent not known elsewhere, by their own volition, and has not been imposed upon them. Visitors, traders and government agents have been denied admission, but the Indians have in a limited way visited the settlements beyond their own boundaries and traded there. The result has been a remarkably prosperous condition in agriculture and domestic industries. This is not to be attributed wholly to the favorable character of their soil and climate, as under similar environment many people are lazy and improvident, whereas the Seminoles

¹ Continued from page 24, No. 746. The Rev. Clay MacCauley on the Florida Seminoles. — Mrs. Stevenson on Zuñi Children.

of Florida are industrious and frugal. That they have advanced in culture during the last generation is doubtless true, but it is a common and pernicious error to consider the Indian tribes at the time of the Columbian discovery as wholly without knowledge of agriculture, depending solely on the chase, fishing, and the spontaneous products of the earth. This error is a part of the *feræ naturæ* theory which has been so baneful in the past consideration of the aboriginal inhabitants. No radical change was necessary for the greater portion of the Indian tribes to become self-supporting by the industries classed as civilized, provided that their treatment had been rational and in accordance with the slow but certain operations of nature. Throughout the continent generally, the pressure of the white settlers did not allow of the necessary delay, but here it was obtained. The advance of the Seminole has been practically without European instruction; their progress towards civilization has been their own work in the orderly course of evolution, and therefore instructive."

The total number of the Seminoles in Florida in 1880 was only 208, constituting 37 families, living in 22 camps which were gathered into five widely separated groups, or settlements. It is strange that although they are polygamous there is an excess of males over females, and while they are increasing in number there are more boys born than girls. Mr. MacCauley describes the personal and social characteristics of the Seminoles simply and unpretentiously. Physically they are an exceptionally fine race, as is apt to be the case with a natural people whose environment is such as to afford them abundant and healthful nutrition, with a climate that permits free and symmetrical development of the body, unencumbered by heavy and constraining garments.

The description of the Seminole dwellings will particularly interest readers of the *American Architect*. These Indians are not nomads, and

Beyond these, well fenced with palmetto logs, lay a small garden. No one of the entire household — father, mother and child — was at home. Where they had gone we did not learn until later. We found them next day at a syrup-making at 'Old Tommy's' field, six miles away. Having, in the absence of the owner, a free range of the camp, I busied myself in noting what was left in it and what were its peculiarities. Among the first things I picked up was a 'cow's horn.' This, my guide informed me, was used in calling from camp to camp. Mounting a pile of logs, Billy tried with it to summon Charlie, thinking he might be somewhere near. Meanwhile, I continued my search. I noticed some terrapin-shells laying on a platform in one house, the breast-shell pierced with two holes. 'Wear them at Green Corn Dance,' said Billy. . . . Dwellings throughout the Seminole district are practically uniform in construction. With but slight variations, the accompanying sketch of I-ful-lo-ha-teo's main dwelling shows what style of architecture prevails in the Florida Everglades. This house is approximately 16 by 9 feet in ground measurement, made almost altogether, if not wholly, of materials taken from the palmetto tree. It is actually but a platform elevated about three feet from the ground and covered with a palmetto thatched roof, the roof being not more than 12 feet above the ground at the ridge-pole, or 7 at the eaves. Eight upright palmetto logs unsplit and undressed, support the roof. Many rafters sustain the palmetto thatching. The platform is composed of split palmetto logs lying transversely, flat sides up, upon beams which extend the length of the building and are lashed to the uprights by palmetto ropes, thongs or trader's ropes. This platform is peculiar, in that it fills the interior of the building like a floor and serves to furnish the family with a dry sitting or lying-down place, when, as often happens, the whole region is under water. The thatching of the roof is quite a



A Seminole Dwelling.

indeed, the nomadic character of the Indians in general has been much exaggerated. The Seminoles have fixed habitations, settlements in well-defined districts, permanent camps, houses or wigwams, which remain from year to year the abiding-places of their families, and gardens and fields which for indefinite periods are used by the same owners: "As one Seminole home is, with but few unimportant differences like nearly all the others, we can get a good idea of what it is by describing here the first one I visited, that of I-ful-lo-ha-teo, or Charlie Osceola, in the 'bad country' on the edge of the Big Cypress Swamp. When my guide pointed out to me the locality where 'Charlie' lives, I could see nothing but a wide saw-grass marsh surrounding a small island. The island seemed covered with a dense growth of palmetto and other trees and tangled shrubbery, with a few banana plants rising among them. No sign of human habitation was visible. This invisibility of a Seminole's house from the vicinity may be taken as a marked characteristic of his home. If possible, he hides his house, placing it on an island and in a jungle. As we neared the hummock we found that approach to it was difficult. On horseback there was no trouble in getting through the water and annoying saw-grass, but I found it difficult to reach the island with my vehicle, which was loaded with our provisions and myself. On the shore of 'Charlie's' island is a piece of rich land of probably two acres in extent. At length I landed, and soon, to my surprise, entered a small neat clearing, around which were built three houses, excellent of their kind, and one insignificant structure.

work of art: inside, the compactness and regularity of the laying of the leaves display much skill and taste on the part of the builder; outside — with the outer layers there seems to have been less care taken than with those within — the mass of leaves of which the roof is composed is held in place and made firm by heavy logs, which, bound together in pairs, are laid upon it astride the ridge. The covering is, I was informed, water-tight and durable and will resist even a violent wind. Only hurricanes can tear it off, and these are so infrequent in Southern Florida that no attempt is made to provide against them.

"The Seminole house is open on all sides and without rooms. It is, in fact, only a covered platform. The single equivalent for a room in it is the space above the joists which are extended across the building at the lower edge of the roof. In this are placed surplus food and general household effects out of use from time to time. Household utensils are usually suspended from the uprights of the building and from pronged sticks driven into the ground near by at convenient places. From this description the Seminole house may seem a poor kind of a structure to use as a dwelling; yet if we take into account the climate of Southern Florida nothing more would seem to be necessary. A shelter from the hot sun and the frequent rains, and a dry floor above the damp or water-covered ground, are sufficient for the Florida Indian's needs. I-ful-lo-ha-teo's three houses are placed at three corners of an oblong clearing, which is perhaps 40 by 30 feet. At the fourth corner is the entrance into

the garden, which is in shape an ellipse, the longer diameter being about 25 feet. The three houses are alike, with the exception that in one of them the elevated platform is only half the size of those of the others. This difference seems to have been made on account of the camp-fire. The fire usually burns in the space around which the buildings stand. During the wet season, however, it is moved into the sheltered floor in the building having the half-platform. At Tus-ko-ha's camp, where several families are gathered, I noticed one building without the interior platform. This was probably the wet-weather kitchen. To all appearance there is no privacy in these open houses. The only means by which it seems to be secured is by suspending, over where one sleeps, a canopy of thin cotton cloth or calico, made square or oblong in shape, and nearly three feet in height. This serves a double use, as a private room and as a protection against gnats and mosquitoes. But while I-ful-lo-ha-co's house is a fair example of the kind of dwelling in use throughout the tribe, I may not pass unnoticed some innovations which have lately been made upon the general style. There are, I understand, five inclosed houses, which were built and are owned by Florida Indians. Four of these are covered with split cypress planks or slabs; one is constructed of logs. Progressive 'Key West Billy' has gone further than any other one, excepting perhaps Me-le, in the white man's ways of house-building. He has erected for his family, which consists of one wife and three children, a cypress-board house, and furnished it with doors and windows, partitions, floors and ceiling. In the house are one upper and one or two lower rooms. Outside, he has a stairway to the upper floor, and from the upper floor a balcony. He possesses also an elevated bed, a trunk for his clothing and a straw hat." It might have been added that in such a climate, "progress" of this sort will be likely to result in physical degeneracy, for probably nothing could be more unhealthy in the shape of a dwelling for a hot climate than a close board house, which must exclude the fresh air while it retains the heat like an oven.

It is striking how the facility of trading with the whites has extinguished some of the native arts; pottery-making and the use of stone implements have entirely ceased, and their word for stone, "teat-to," has been applied to iron. They also weave cloth no longer, but are still basket-makers in a small way. The palmetto is of the greatest value to them. "From the trunk of the tree the frames and platforms of their houses are made; the tough fibre which lies between the stems of the leaves and the bark furnishes them with material from which they make twine and rope of great strength, and from which they could, if necessary, weave cloth for clothing; the tender new growth at the top of the tree is a very nutritious and palatable article of food to be eaten either raw or baked; its taste is somewhat like that of the chestnut; its texture is crisp like that of our celery stalk."

In marked contrast to Mr. MacCauley's article, with its unassuming narration of his observations during three months, or so, among the Seminoles, is Mrs. Tilly E. Stevenson's paper called the "Religious Life of the Zuni Child." It is not too much to say that the latter is one of the most worthless contributions ever made to American ethnology, and it is unfortunate that it should have been given the prominence of a place in the publications of the Bureau, where it cannot fail to be misleading. Mrs. Stevenson had the advantage of accompanying her husband, the late Colonel James Stevenson, one of the most esteemed officials of the Bureau, on his frequent collecting trips in the Southwest, and since 1878 has spent a portion of each season at Zuni. The result shows, however, that the greatest industry and persistence are of slight account without the scientific habit of mind; the faculty of correct observation and correlation of facts. This faculty does not appear to be possessed by Mrs. Stevenson in the slightest degree. Her method is that of the *chiffonier*, and the result is an ethnological scrap-bag. The article so teems with misstatements and inaccuracies that it is useless to attempt to indicate them. It is not too much to say that it is a scientific impertinence to enter upon the most thoroughly studied ethnological field in America and gravely make assertions that contradict the researches of the foremost investigator we have; assertions that could easily be proven ridiculously incorrect. The only value of the article is as an example of how ethnological work should not be done; but one example of the kind is amply sufficient.

SYLVESTER BAXTER.

WOODS THAT SINK IN WATER.—There are 413 species of trees found within the limits of the United States and territories, sixteen of which, when perfectly seasoned, will sink in water. The heaviest of these is the black ironwood (*Coodalia ferrea*), found only in southern Florida, which is more than thirty per cent heavier than water. Of the other fifteen, the best known is the *lignum vitæ* (*Guaiaacum sanctum*) and the mangrove (*rhizophora mangle*). Texas and New Mexico, lands full of queer creeping, crawling, walking, and inanimate things, are the homes of a species of oak (*quercus grisea*) which is about one and one-fourth times heavier than water, and which, when green, will sink almost as quick as a bar of iron. It grows only in mountain regions, and has been found westward as far as the Colorado desert, where it grows at an elevation of 10,000 feet. All the species heavier than water belong to tropical Florida, or in the arid west and southwest.—*Commercial Advertiser*.



SLAUGHTER-HOUSES AT MUNICH.

ANOTHER building, or rather a group of buildings, for a less aesthetic but of as praiseworthy a purpose as the Glyptothek, which, by reason of the grand scale upon which it is planned attracts the attention of the visitor, is the city slaughter-house. A description of this establishment, erected some twelve years ago, may perhaps be of some interest, as I am not aware that any of our American cities possess any such consolidated slaughter-houses as are to be found in almost all cities on the Continent, or, that there is in any State in America, a law in existence prohibiting the killing of animals for food at any places other than those provided by the Government.

The more particular reasons which led in this instance, and which have led to the construction of similar establishments, may be enumerated as follows: In the first place, such a state of affairs as had existed previous to the erection of the city establishment rendered the proper examination of the beasts before killing and of their flesh after death by a staff of medical experts, and of the houses and their surroundings by sanitary experts, to a measure impossible, or at least increased the attending difficulties to a maximum, whereas by such means as have been adopted the necessary supervision could be perfect and the difficulties reduced to a minimum. Thus consumers had no longer to fear unscrupulous dealers, everywhere to be found, who, for the sake of a small additional gain are willing to endanger or even sacrifice the lives of their customers by selling them foul meat or the flesh of diseased stock, the disease germs of which are readily taken up by the human system, there propagated, and often lead to such dire results as the well-known cases of trichina poisoning. Also, from the lack of proper supervision the slaughter-houses about the city were sometimes found to be poorly drained and ventilated, and in a most filthy state, much to the disgust of the property-holders and those unfortunate enough to reside in the vicinity of such places. Thus, for sanitary reasons, the consolidation and the keeping of these houses outside of the city-limits was much to be desired. Not to mention the fact that the disagreeable, though then necessary, practice of driving herds of cattle through the streets, disturbing the traffic and adding much to the already difficult task of keeping the streets clean, could then be abandoned. A secondary reason, and one of sentiment, was the wish to keep from the eyes of the public, as much as possible, such scenes as are enacted in places of this description. This was all the more a consideration, inasmuch as it was thought that such sights can but have an unwholesome effect on the minds of the throng of children which is always sure to gather around such places, prompted by morbid curiosity.

In the Munich slaughter-houses and stock-yards we see combined the good points of a number of establishments; the result of a study made by the Board of Commissioners of the houses at Milan, Genoa, Turin, Geneva, Zurich, Basle, Stuttgart, Berlin, Dresden, Vienna and Buda-Pest.

A lot was chosen answering the following requirements: in close proximity to the railroads in order that branch-lines, decreasing the difficulty of transportation could easily be constructed, out of the city-limits yet within easy reach, and so located that the usually prevailing winds would blow the gases and odors which sometimes arise from such places rather away than towards the city. Sanitary specialists held, however, that if the establishment was properly constructed this was a matter worthy of little, if any, consideration. Also, in a position so that the large water-supply which would be necessary could easily be obtained, and, at the same time, offering unusually good facilities for disposing of the sewage.

The plans were prepared by the city architect; before, however, they were finally accepted, they were on public exhibition for some time, and the members of the trade mostly interested and affected by this movement invited to send to the authorities suggestions for improvements and alterations, which were duly weighed and considered, and if found of merit, accepted. From this fact, as well as from the fact that great pains were taken in collecting information and by profiting from the experience of other cities, one may well conclude that these houses are specimens of this class of architecture possessing an unusual degree of perfection.

The establishment is divided into two distinct parts—the stock-yards and the *abattoir*. These two divisions, both surrounded by brick walls eight feet high, are separated by a road 95 feet wide; access to them can only be obtained through the main gates adjacent to the offices of the superintendents. For the former division an appropriation of \$412,000 was made, and for the latter, one of

¹ Taken from the Architect's Report and the Report of the Board of Commissioners.

\$594,000, thus the total appropriation amounted to over \$1,000,000; the actual cost, however, exceeded this sum by about \$10,000. For the grounds a territory containing some 135,875 square yards was purchased, of which about 44,432 square yards are under roof. The buildings throughout are of brick and of the simplest construction possible. The only ones which can lay claim to any decorative features are the two buildings respectively containing the restaurant and exchange, and the one containing the offices of the inspector.

The *abattoirs*, the buildings where the actual killing is carried on, six in number, are one-storied, rectangular structures, three of which are devoted to slaughtering of large cattle, two for sheep and one for hogs. These buildings are divided into stalls, an arrangement which has been adopted in some cities where each individual has his own private apartment, but the killing takes place in one large hall, divided, to be sure, by low partitions into divisions, which are entirely open on one side. The former arrangement was rejected as impractical, because of the large number of butchers who had to be accommodated. The arrangement here, also, possesses the additional advantage that inspection is much facilitated. It is also desirable that the carcass should be allowed to hang a few days before being taken down and cut into its various parts, for, by thus hanging, the flesh becomes of a fresh, rosy color, and the fatty substances of a whiteness much desired. It will be seen that this practice can more readily be permitted in large halls, continually swept by fresh currents of air, than in small and perhaps illy-ventilated stalls. The general arrangement also differs from that in vogue in other cities in another particular, namely, in that the courts between the buildings are not covered. But the result which is desired by roofing these spaces is obtained, without the attending difficulties of ventilation, by allowing the roof of the house to project some ten feet beyond the walls. When occasionally the houses are in an overcrowded state, the space under the projecting roofs, which is divided by iron fencing into compartments, can be used for killing. But the original use, for which it was intended, was to afford room in which the beasts might be kept immediately before being taken inside. Therefore, each interior stall is connected with the corresponding exterior one by a small door.

Parallel to the buildings just spoken of is another one, in which are the departments for the killing of diseased stock and horses, and quite isolated, yet within easy reach, is an octagonal building, where are to be found the various appliances for the cleaning and scraping of the hides, entrails, etc.

The three buildings in which large cattle only are slaughtered are rectangular structures, 50 x 140 feet, divided by central passages 12 feet wide, thus leaving the depth of stalls 19 feet. The ceilings, which are vaulted and about 20 feet high, are supported on two rows of cast-iron columns, resting on granite blocks and I-beams. Vent-pipes inserted in the hip of the roof, containing gas-jets at regular intervals, allow the foul air to pass from the interior. The floors of the main apartments are also vaulted, the arches being segmental, and springing from I-beams supported on the two rows of cellar columns. On the layer of asphalt with which the arches are first covered is the concrete filling upon which the floor proper, consisting of granite blocks, six inches thick, laid in cement, is put. The pulleys and ropes, with which the beast is lifted from the floor and held, arranged in alternate rows, are supported from the beams overhead, as also are the iron hooks, sliding in tracks, upon which the carcass may either be hung and pushed along the whole length of the building, and placed in the carts provided for the purpose, or to the storage-rooms. In each stall there is ample water-supply from two faucets, one-and-three-quarter-inch nozzles. The supply-pipes are all exposed, and of wrought-iron lined with asphalt and painted on the outside. Each division is lighted by one window, some distance from the floor, provided with corrugated-iron shutters, with movable slats for ventilation. Several lockers are built in the wall under each window. Fresh-air openings are also to be found immediately under the sills. Because of these and the frequently-occurring vent-stacks the ventilation has been so satisfactory that the cooling-rooms in the cellar have not been resorted to, even on the hottest days. The waste-water is taken up by the gutter in the centre of the hall, towards which the floor on both sides inclines, and, after passing through several catch-basins, so arranged that they can easily be removed and emptied, is delivered to the sewer. Nothing more remains to be said excepting that all apartments are lighted with gas, and also that the upper part of the walls and the ceilings are whitewashed, while the walls to a height of seven feet above the floor are covered with a thin coating of Portland cement, which is renewed annually.

The houses for the killing of the sheep and calves are much of the general appearance and construction of the ones just described, and differ only in the fact that the floors are of a somewhat lighter construction. Thus the granite floor of the other houses is replaced by a tile floor. The gutter in the centre of the hall, however, is of granite.

The interior arrangement of the house devoted to the killing of hogs, for which the one at Milan was taken as a model, varies somewhat from those just described. The centre-aisle is wider — 27 feet — for the purpose of accommodating the vats for cleaning the pork, and also the marble-top tables resting on iron legs, where the hides, feet, etc., are cleaned and scraped. These vats, four in number, and 6 feet 6 inches in diameter, are capable of holding from six to eight hogs at a time. This operation takes five minutes; therefore,

between four and five hundred (the daily average) can easily be cleaned in four or five hours. The vats are composed of two shells — an outer one of cast-iron and an inner one of copper — which are placed some inches apart, so that steam may be conducted into the intervening space. Steam is also forced directly into the water, which in this manner is heated to the proper degree.

The next building to be considered is the one for the killing of diseased animals. This building is necessarily isolated and separated by a wall from the main yard, from which, nevertheless, it is of easy access. It is of such a size that seven horses and sixteen head of cattle can be killed at a time; adjacent to it are also the rooms for the examining of the meat before it is delivered to the retail dealers or consumers. Here the floors are either of granite or paved with asphalt; the latter is the case in the examining rooms, the furniture of which is extremely simple, and, indeed, a hose can be turned into it when cleaning is necessary. Not to be forgotten are the living apartments of the minor officials, which are also located in this building, nor the rooms provided for the storage of hides, etc.

The refuse matter, dung, etc., is carried to a reservoir, well covered and protected, some distance from any of the buildings. The sheet-iron carts provided for the purpose of removing this matter from the grounds are placed under this reservoir and filled through the holes in its bottom. Another building in the neighborhood, provided with caldrons, steam-chambers, scalding-pots, hot-water, and everything necessary for the cleansing of the various entrails, has been erected, so that all such operations can be conducted within the walls of the establishment, in order that no offal need be brought into the city.

It is wonderful how in Europe, or at any rate, in Germany, where the price of meat is enormous, what use is made of every particle which can possibly serve as an article of food — brain, heart, lungs, kidneys, liver — all are eaten. When one learns that a laborer earns about forty cents a day, a mechanic between fifty and seventy-five cents or at the most eighty-five, it is easy to believe that the working classes cannot frequently indulge in a meat diet, for the cheapest of meat at present sells for about seventeen cents a pound.

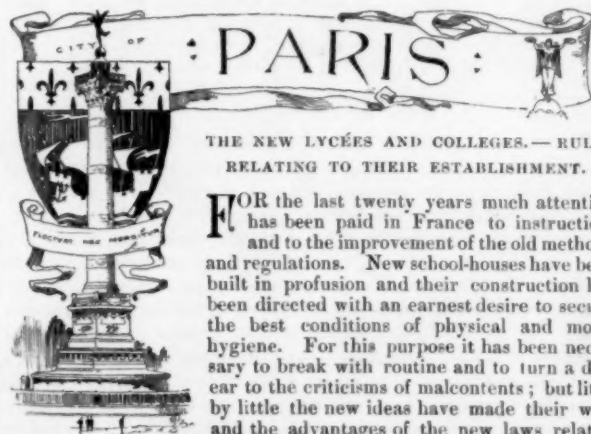
Within the enclosure are also two stables where the live stock can be kept before being slaughtered and after having been removed from the stock-yards, which lie across the road which separates the two establishments, the yards and the *abattoirs*. In general these stables are divided into stalls five feet wide; their capacity is quite limited because they are of course only put to a temporary use.

Ice-storage warehouses have not been provided because of the expense connected with them and they are, indeed, unnecessary, as most dealers possess them in their individual establishments. Be it also remarked that the grounds are very nicely laid out, well sodded and that the roads are either of granite-blocks or gravel as the case may require and that also wherever possible trees have been planted.

The stock-yards including wagon-sheds, stables for the temporary accommodation of the horses of the cattle-dealers and peasantry, market-halls, scales, out-houses need not be dwelt upon. Suffice it to say that no frame structures are to be found anywhere within the enclosure.

Finally, a few remarks on the water-supply and the sewage system. The former is derived from several wells not far distant. The capacity of the plant amounts to some 245,000 gallons per day. The water is pumped into eight reservoirs each containing 250,000 gallons, from which the water is distributed. As rarely more than 225,000 gallons are consumed daily, the water passing through the overflow is distributed throughout the net-work of waste-water pipes, flushing these and tending to keep them free from filth.

The sewage from the stock-yards and the *abattoirs* is conducted separately to a large catch-basin, divided, as usual into several compartments for collecting the solid matter, while the fluid passes on to the sewer. In case it should be thought desirable, the water taken up by this basin and before passing to the outlet can be purified by chemical or mechanical means.



THE NEW LYCÉES AND COLLEGES. — RULES RELATING TO THEIR ESTABLISHMENT.

FOR the last twenty years much attention has been paid in France to instruction, and to the improvement of the old methods and regulations. New school-houses have been built in profusion and their construction has been directed with an earnest desire to secure the best conditions of physical and moral hygiene. For this purpose it has been necessary to break with routine and to turn a deaf ear to the criticisms of malcontents; but little by little the new ideas have made their way, and the advantages of the new laws relative to the construction of high schools and colleges have been demonstrated; laws, which, if they lead to considerable expenses, at least

assure the certainty of a solid and practical education. The adversaries of the present administration reproach it with wasting money in a profusion of luxurious constructions, in which millions have been swallowed up in buildings which are empty and deserted. It is true that much money has been spent and perhaps something has been sacrificed to a luxury of construction which is not always useful; it is evident, also, that the new schools and colleges are not filled with pupils; but there are several reasons for this which can be easily understood; and on an intelligent examination of the circumstances it must be acknowledged that the path recently marked out is followed in a satisfactory manner.

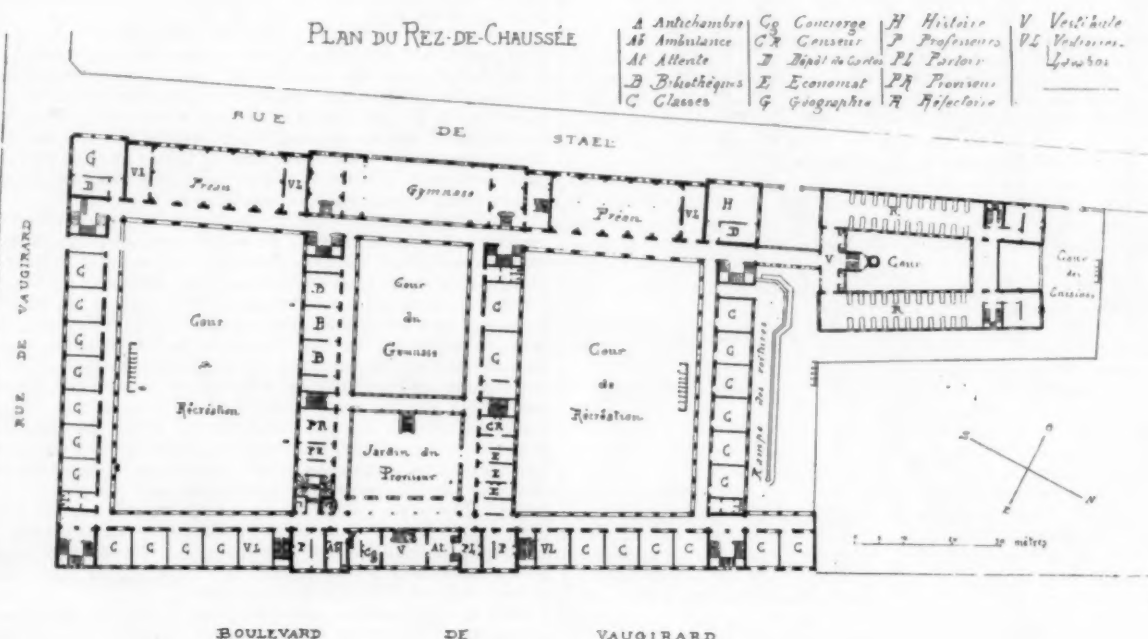
Something must be allowed for the slowness with which new ideas make their way in our country, and for the difficulty with which new programmes are thoroughly accepted, even after they are approved in theory. In the new order of educational ideas, one of the most difficult to establish is that relating to the academies for young girls, against which many people still rebel. Among these people are some who approve of convents and other boarding-schools, and who do not reflect that their opposition is therefore illogical, and that it really applies to nothing more than the change of name; for, if the convents have a special position on account of the religious instruction they offer, this is not the case with the boarding-schools, which in changing their name change nothing in their educational aims, or in the objects which they strive to obtain, by means which become uniform as soon as the results to be attained are made the same.

In any case, all the new academies and colleges, both for boys and girls, have some pupils; and the practical results achieved by the new

pupils should have its own playground, its own study-rooms, class-rooms, refectory and dormitories. The drawing-rooms, gymnasium and chapel are common to all the pupils. The buildings must be constructed, as far as possible, of local materials, and so planned that air and light shall penetrate everywhere. The playgrounds are to be open to the most favorable aspect, according to the region in which the school is situated, and must be sheltered from the most objectionable winds. Buildings only one room deep, permitting ventilation by opposite corridors, of which, however, those on one side are screened, so that light enters only at the opposite side, are recommended. A superficial area of one and one-half square metres, [about sixteen square feet.—*Tit.*] is required for each pupil in the class-rooms, including in this the aisles, and the space occupied by the professor's desk and platform. In the study-rooms, the space required for the pupil is two square metres. The class-rooms for history, the lecture-rooms for physics and chemistry, and the drawing-rooms, should be large enough for 40 to 50 pupils. In the dormitories only two rows of beds, in the direction of the length of the room, are allowed; they must be at least a metre apart; and the windows must be so arranged as to secure ventilation, without exposing the pupils to draughts. A cube of air of 8 cubic metres is required for each bed. The lavatories, which must be easy of access and surveillance, should be in direct communication with the dormitories. The water-closets are usually placed in the playgrounds; in the vicinity of the dormitories there are only perforated chairs. The kitchen has a court to itself, communicating directly with the exterior: for the refectories, experience has shown that tables for 8 to 12 pupils are most suitable for the exigencies of service. The linen-

LYCEE BUFFON

PLAN DU REZ-DE-CHAUSSEE



education can only be shown in the future, when the next generation shall have given evidence of what it can do. For the moment, let us examine the laws relative to the conditions of the establishment of lycées and colleges, and see for ourselves how far behind them they leave the confusion of the ancient method, under which children were packed anyhow into their study-rooms, class-rooms and dormitories, without any attention to the laws of hygiene and morality. The lycées for boys are now required to provide for at least 200 boarders, 80 "half-boarders," and 200 day-scholars; and the maximum allowed is 400 boarders and 400 half-boarders and day-scholars. In certain important centres, particularly in Paris, city lycées may be established, receiving only half-boarders and day-scholars, 500 as a minimum, and 800 at most; and, in the country, lycées may be established for boarders and half-boarders only, with a minimum accommodation of 500, and a maximum of 700.

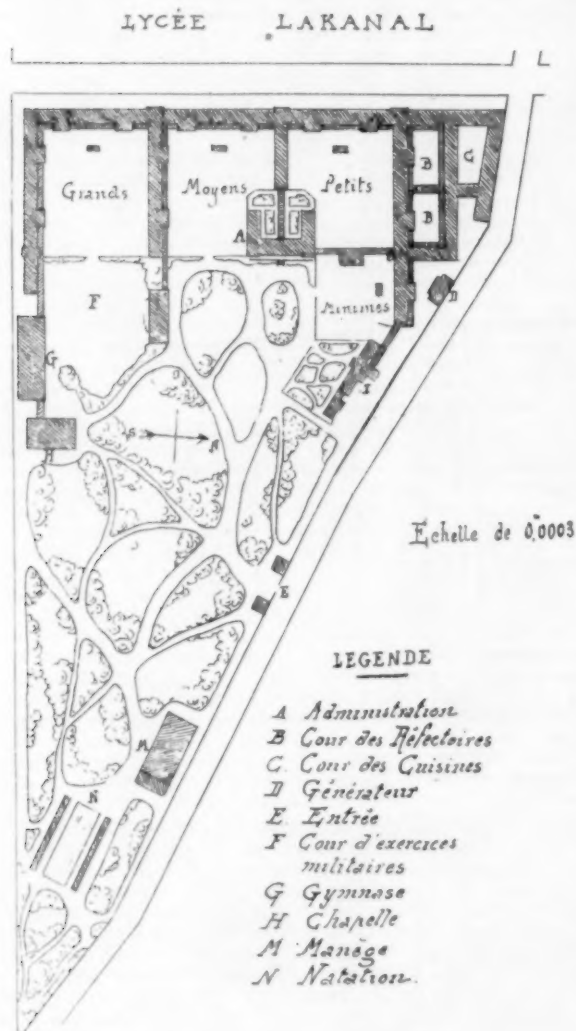
The pupils are divided into three sections: the large, the medium and the small. The classes, excepting those in history, science and drawing, are restricted to 30 or 35 pupils in each; and the dormitories are not allowed to contain more than 30 to 35 beds. To each dormitory is attached a lavatory, a wardrobe, a closet containing a "chaise percée" and servant's bedroom. The utmost liberty is allowed to architects in the arrangement of the different services of a lycée; but, in order to facilitate their work, it is thought useful to suggest the following conditions, which have hitherto been considered the best. According to these conditions each of the three sections of

room, easily accessible from the outside, is to be so placed as to permit the rapid distribution of linen in the dormitories. The dimensions of the gymnasium vary with the importance of the lycée; but it must be at least 8 to 10 metres wide, by 16 to 20 in length; and a court for military exercises should be reserved near the gymnasium. The chapel should not, in any case, have the importance of a church; and its position must be such that it will not obstruct the school business. In the large lycées, it is sufficient if the chapel will accommodate one-half the pupils. Finally, it is of advantage to provide an infirmary, in a building completely isolated, well-placed and well-ventilated, and furnished with a private garden for the convalescents. Architects must observe the same suggestions in preparing plans for the Communal colleges.

The lycées for girls, according to the terms of the law are to be arranged for half-boarders and "supervised day-scholars"; but cities may be authorized to attach a boarding department to their lycée or college. In the lycées for girls, however, the boarding department must be as far as possible independent of the day-scholar portion.

Among the lycées and colleges recently erected, we may select two, which fulfil these conditions in a perfectly satisfactory manner. One of these is the Lycée Lakanal, constructed in the neighborhood of Paris by M. de Baudot; the other is the Lycée Buffon, built on the Boulevard de Vaugirard by M. Vaudremer. The Lycée Lakanal was one of the first realizations of the very sensible idea of transferring to the open country the schools for boarders, leaving in Paris

only those for day-scholars and half-boarders. It is built on what was once a magnificent estate, planted with splendid trees and occupying a surface of more than twenty acres. The buildings and playgrounds are at the upper end of the park, at the other end of which is a riding-school and a swimming pond. The different departments, as will be seen by the accompanying sketch-plan, are clearly indicated; the sections of pupils are well separated, and the general service, placed at the point most accessible from the public road, has its independent communications assured. The administration is centrally placed, yet convenient of access, and the infirmary is connected with the other parts of the construction only by an open portico, through which a patient may be transported under cover. This lycée will accommodate 720 boarders, divided into three sections, — the large, the medium and the small, of 240 pupils each; but the last section comprises a subdivision for the smallest children. The class-rooms, study-rooms and dormitories contain only 30 pupils each. All the conditions of health and comfort are thus very carefully satisfied. The water-closets are drained into sewers, and the whole establishment is warmed by steam from three boilers, placed in a special building, with valves and regulators, to modify the heat in various parts of the school. The lavatories, forming a projection from the block of dormitories, are provided with tip-up basins, discharging the water into a trough, which has a waste pipe at each end. This disposition avoids small waste pipes and prevents choking. The lighting of the class-rooms is unilateral; but, to secure an energetic



ventilation, openings, closed by shutters, are arranged in the opposite sides of the rooms. The windows extend to the very ceiling, to give the freest possible admission of light and air, and are very large, except in the dormitories, where they are narrow, but frequent, to give air to every bed. The material of construction is principally brick, of different colors, yellow, red and enamelled, disposed in bands and patterns of a varied and decorative effect. In a word, the general aspect of the whole establishment is bright and gay; the children are not shut up as in a barrack; and on whatever side they turn, they find themselves surrounded by verdure. All this result has not been attained without a sacrifice of money, and the total expense has amounted to the respectable sum of eight million francs. The architect has been somewhat criticised, and accused of having far sur-

passed his estimates; but, if a good deal has been spent, nothing has been wasted, and the Lycée Lakanal is an interesting work, which does honor to the original and practical talent of M. de Baudot, who is an ardent disciple of Viollet-le-Duc.

We have now to examine the Lycée Buffon, which passes for a model of its kind, and is moreover, the work of an architect who is a noted master in such undertakings, M. Vaudremer. It is, indeed, to him that we owe the Lycées of Grenoble and Montauban, and that for girls at Passy, near Paris. M. Vaudremer, instead of exceeding his estimate, has, on the contrary, made a saving of more than a million — an occurrence rare enough to be noted. The estimates amounted, in fact, to six and one-half million francs, and thanks to the discounts obtained, and the skilful direction of the work, the actual cost was only about five millions. The Lycée Buffon is arranged to accommodate 450 day-scholars and 350 "half-boarders"; it occupies a lot open on three sides, with its principal front on the Boulevard de Vaugirard. The general aspect shows the character peculiar to all the works of M. Vaudremer, whose robust and logical talent is marked by a certain monastic sentiment. In the Lycée Buffon this charm is not wanting, but is modified by a certain severity and calm which are very appropriate. The long lines inevitable in such a construction are interrupted by wide openings, and the window-frames and sashes, painted of a pale green color, brighten in a very original manner the monotony of a long repetition of parts.

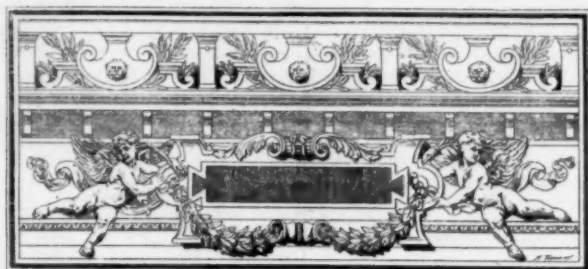
The entrance is formed by three doors, covered with flat arches, ornamented with stained-glass, and opening into a vestibule of a charming effect. On the left is the concierge; on the right a waiting-room, preceding the parlor. In front are steps, leading to a great hall, across which is seen the director's garden. This hall, or rather gallery, is divided into two parts by columns, and has a pretty effect. The proportions are carefully studied, and the decoration obtained in a simple manner, by an ingenious construction, frankly indicated; the stone and brickwork of the masonry, everywhere shown, even in the arches of the ceiling, with the iron girders and joists, forming the principal elements.

Around the director's garden is arranged the house-keeping department, with the offices of the director and the steward; whose living rooms are on the second story, reached by a special staircase, very elegantly decorated. Separated from this garden by a glazed gallery is the gymnasium court, around which are the libraries, that for the school, and the general library, and on the opposite side, two large class-rooms. The second story of these buildings, which forms the central point of the group, is occupied by collections, the natural-history lecture-room, and two class-rooms.

The left-hand part of the group is occupied by the division of large scholars; that on the right by the smaller ones, and beyond this is the kitchen department, completely distinct from the rest. To reach the young pupils' court from the kitchen court, which is at a lower level, a ramp is arranged for carriages. The court of the older pupils is reached by a special entrance from the Rue de Vaugirard. Around each of these courts, as may be seen by the accompanying plan, are the class-rooms, each arranged for 32 pupils; wardrobes, lavatories, and beyond, on the side of the Rue de Staël, along which extends the rear façade, are the playgrounds, and the gymnasium. The study-rooms are situated on the second story. Over the covered playgrounds are the physical class-rooms and laboratories, with flat roofs, for experiments in the open air. These rooms communicate with the chemical laboratories and lecture-rooms, and the physical lecture-rooms. There are two lecture-rooms for physics and two for chemistry, arranged to give facilities for all possible experiments. Light is brought in from the top; but openings, with shutters, accessible from a suspended gallery at half the height of the room furnish a prompt and powerful means of ventilation.

Over the gymnasium, under the roof, is the drawing-room. The courts are bordered on three sides by galleries, open on the first story, and closed on the second story on the side next the lecture-rooms. The aspect of these galleries is very agreeable, and the hand of an artist is perceived as well in the graceful arcade of the first story as in the colonnade of the second story, which carries a wooden plate, supporting the rafters, the ends of which are shown. This exposed construction is painted of the same light green color as the other woodwork, but brightened by red points and lines in the chamfers and on the mouldings. The effect is luminous and soft, decorative and simple at once, giving a suggestion of a cloister which is not without charm. The heating is by steam, on the system Geneste-Herschel. There are three boilers, two of which are regularly in operation. The apparatus has been the object of special care.

An examination of the plan will show, without further explanation, the convenience of arrangement, the facility of communication, and the clear indication of the different departments; but what cannot be inferred from the drawings is the diversity of aspect, the ingenuity of the details, and the cleverness with which the programme is translated into material forms. The gymnasium hall is perfectly successful and charming as a design, yet simple and unaffected; everywhere and always the decoration is rational, logical and derived from the construction, which it defines instead of concealing, as it too often does. Here is no papier-mâché, no imitation of any sort; it is all stone, brick, iron and wood. This quality of frankness is common to the two authors of the Lycées Lakanal and Buffon, who, however their special styles, which are matters of taste and training, may be discussed, are both men of conscience and conviction, both artists who will do lasting honor to the architecture of our era.

VAULTING.¹

FROM the time when the great hall of the Baths of Diocletian was built, to this day, the crossing of two vaults of different spans has remained a puzzle, solved in different ways, but always from some point of view unsatisfactorily.

The Romans adopted a circular section for both the wider and the narrower vault, but stilted the latter so that both vaults should be at the same level at the crown. Their vault was practically a concrete cast, and the centring was its mould; the groin lines were not determined beforehand, but were simply the intersection of the vaulting surfaces used, and they formed wavy lines on plan—that is, lines not contained in vertical planes.

In Mediaeval architecture, when vaults were built of stone, transverse and longitudinal arches were built, forming a ribbing on which the vaulting was placed, an arrangement which is, in my opinion, the outcome of one of the elements of Roman construction. In this system the groins are naturally contained in vertical planes, but the surface of the vault is twisted to adapt itself to the ribs.

At the Renaissance the Roman system of groining came again into favor, but the eye which had got accustomed to see groins lying in

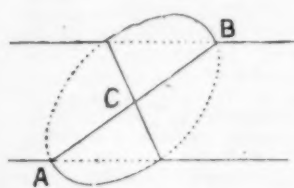


FIG. 1.

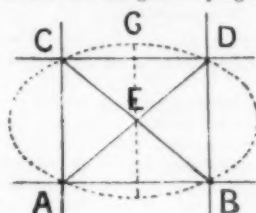


FIG. 2.

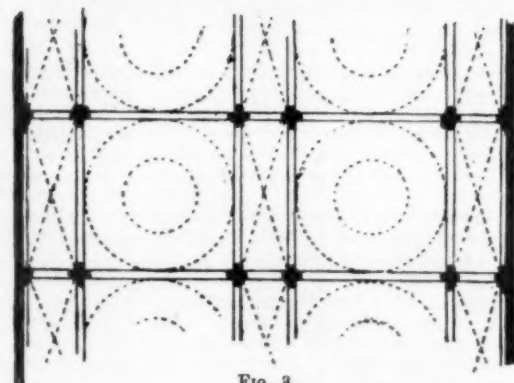
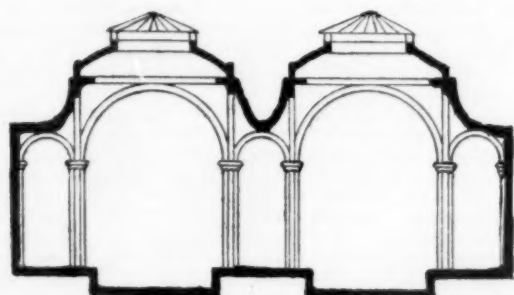


FIG. 3.

vertical planes could not brook the twisted groin lines of the Roman vaults. The Renaissance vault starts, therefore, from the very opposite direction of the Roman; the first condition laid down for the vaulting is that the groin lines shall be in vertical planes, and from this condition the sections of the vaults themselves are deduced. This led forcibly to the adoption of elliptical arches.

But elliptical arches have a weakly appearance when compared

with circular ones, so efforts have been made to get all the face arches circular, and yet obtain groin lines in vertical planes. Sir Gilbert Scott, in his lectures, proposed a system which I believe he had employed in the carriage-way to the court-yard of the Foreign Office. There the narrow arches and the wider ones are circular; the larger span is covered by a cylindrical barrel-vault, and on its surface the groin lines are determined by the intersection of the vault with vertical planes; then the triangular spaces left between these groin lines and the narrower face arches are filled by a channel surface, a surface generated by the motion of the face arch in contact with the groin lines. This gives a slightly vault, but somewhat difficult to work with precision on the banker; moreover, the properties of its surface are vague, and therefore it is a surface difficult to decorate.

The solution I propose secures all the desirable advantages of the former vaults, circular arches, groins in vertical planes, and regular simple surfaces of vaulting. It is founded on a special property of Quadratic Surfaces, or surfaces which give conic sections in all directions. If two quadratic surfaces have one axis in common, then their intersections lie in planes. This is easily tested in the case of an elliptical dome [Figure 1], and a cylindrical vault rising to the same level at C. If we cut the cylindrical vault by a vertical plane, A B, the section will be an ellipse; and if we cut the dome by the same plane we shall have again for section the same ellipse as with the cylinder. It is evident, therefore, that the two surfaces intersect one another along this section.

Some ellipsoids are of revolution—eggs, for instance. Now if [Figure 2] a cylindrical vault spans the wider arches A B and C D, and an elliptical dome of revolution, with its minor axis, G E, equal to the span of the wider arches, be made to pass through the smaller arches A C and B D, then the intersection of these two surfaces will give straight lines on plan. In this scheme the arches A B and C D will be circles, the arches A C and B D will be also circles, the triangular cells A E B, C E D will be cylindrical, the triangular cells A E C, B E D, will be portions of an ellipsoid of revolution, a surface as regular and nearly as simple as a sphere. Such a vault will be easy to work on the banker direct from the working-drawings, without any preliminary fitting of the stones, distinguished in common parlance by the title of *fudging*. Every section of the ellipsoid being an ellipse, the surface of the vault will be capable of elegant geometrical decoration.

In the construction I have proposed the intersection of the groins is at the level of the crown of the larger arches, but there might be cases where one would wish to get the intersection of the groins at the level of the crown of the smaller arches. For instance, in a railway station [Figure 3] like the Great Northern Terminus, the central platform might be covered by a narrow vault, and the spaces over the lines by large arches bearing cupolas open at the top for the escape of smoke. Over the central platform it might be desired to carry a longitudinal gutter, and therefore to keep its vault down. Now this problem I can solve as easily as the former.

I cover the narrow vault A B [Figure 4] with a cylindrical barrel, and the wider vault, A C, with an hyperboloid of revolution, which is exactly the same surface as the scotia of the Greek Ionic base. In this case we should have all the advantages of the former construction, except that the vault would present the unusual appearance of the mouth of a trumpet.

I hope soon to get the Class of Masonry to produce a model of one of these vaults, and I shall be happy to show it to any one it may interest.

EGYPTIAN GLASS.—The art of making glass in Egypt appears to have been as old as the twelfth dynasty, where it is first represented in the tombs. Dated specimens of the time of the eighteenth dynasty, one with the name of Thothmes III, are exhibited in the British Museum. The principal uses of glass were for small vases for holding unguents, perfumes, or paint for eyebrows and lashes. These bottles are generally of an opaque and semi-opaque glass, with light or dark blue backgrounds, and feather or wavy lines of yellow, light blue, and white color, running in horizontal bands on the surface round the body of the glass. These vases are as old as the eighteenth dynasty, and if not made at Thebes and Memphis, were imported from Tyre or Sidon. The principal forms resemble the Greek *amphoreus*, the *oenochoe*, and the *alabastros*. Transparent glass appears not to have been in such early use, and the larger vases of a transparent bottle-green with conical bodies and long necks, are of the age of the twenty-sixth dynasty, or about B. C. 600. Later, Egypt exported glass vases to Greece and Rome; and specimens of later vases, with figures in relief, like cameo, in white or various colors on a blue or red ground, will be found amongst those exhibited. Besides vases, a few small articles were made of glass, such as beads, bugles, pendants, figures of deities, animals, and emblems for inlaying into sarcophagi, and other objects for walls and parts of edifices. For these opaque glass, red to imitate jasper, dark blue lapis-lazuli, and mottled or schmelz glass, were used. At the Ptolemaic period transparent dark blue glass was introduced, and camei pastes and other objects were made of this material. Some of the most remarkable are the glass mosaics representing comic masks and other subjects, made by composing cylinders of different colored glass, so that the subject could be reproduced by cutting horizontal layers of the cylinder. In the days of the Roman empire there was a large manufactory at Alexandria, the sand of the locality being considered, with that of Tyre, the best in the Roman empire.—*The Architect*.

¹ From a paper by Lawrence Harvey, Instructor of the Class of Masonry at the City and Guilds of London Institute, in the Journal of Proceedings of the Royal Institute of British Architects.

ILLUSTRATIONS

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

PULPIT, CATHEDRAL OF ALL SAINTS, ALBANY, N. Y. MR. R. W. GIBSON, ARCHITECT, NEW YORK, N. Y.

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

YOUTH'S COMPANION BUILDING, CORNER OF COLUMBUS AVENUE AND BERKELEY ST., BOSTON, MASS. MESSRS. H. W. HARTWELL AND W. C. RICHARDSON, ARCHITECTS, BOSTON, MASS.

THE ABBEY OF ST. DENIS, FRANCE.

For description see article elsewhere in this issue.

CENTRAL MARKET HOUSE, LANCASTER, PA. MR. JAMES H. WARNER, ARCHITECT, LANCASTER, PA.

DESIGN FOR A COUNTRY HOUSE. MR. THOMAS WHEELER, ARCHITECT, BOSTON, MASS.

HOUSE OF JOS. MICHAELS, ESQ., ROCHESTER, N. Y. MESSRS. ROGERS, STURGES & STERN, ARCHITECTS, ROCHESTER, N. Y.

[Additional Illustrations in the International Edition.]

BED-CHAMBER EXHIBITED AT THE PARIS EXPOSITION OF 1889 BY THE MAGASINS DU BON MARCHÉ.

[Copper-plate Etching.]

OFFICES OF THE COMMANDER-IN-CHIEF, VIENNA, AUSTRIA. PROF. WILHELM V. DODERER, ARCHITECT.

[Gelatin Print.]

THIS is an oblong structure with a frontage on four streets and is 53 metres in width, 72 metres in depth and 25.3 metres in height to the cornice. Two entrances of a similar character lead to an inner court 24 metres by 33 metres, surrounded by Ionic and Corinthian pilasters. In the basement are the storage-rooms for documents, etc., the stables, carriage-house and appliances for heating the building with hot water. In the ten Corinthian columns supporting the balustrade one sees an important part of an harmonious whole and that they are not placed against the side of the building with no apparent purpose, as is often the case. The building was erected from plans by Professor von Doderer at a cost of about \$630,000.

VILLA OF HERR PETSCH, GRATZ, AUSTRIA. HERR HANS PRUCKNER, ARCHITECT.

[Gelatin Print.]

IGHTHAM MOAT, KENT, ENG. DRAWN BY MR. EDMUND SEDDING.

ST. JOHN'S ROAD, WINCHESTER, ENG. DRAWN BY MR. EDMUND SEDDING.

THE RADIA DI FIESOLE, FLORENCE, ITALY.—THE FACADE. DRAWN BY MR. R. WEIR SCHULTZ.

ST. ANDREW'S CHURCH AND SCHOOLS, FORT WILLIAM, N. B., SCOTLAND. MR. ALEX. ROSS, ARCHITECT, INVERNESS, SCOTLAND.

The church was completed a year ago. It is built of red granite with white freestone dressings, and slated with Cumberland grey slates. The church, which is richly finished, has cost about 10,000*l.*, and the schools adjoining have cost about 5,000*l.* more. The fittings are of the most elaborate kind, the reredos being of Caen stone, with beautifully carved panels representing events in the life of our Lord. The altar-piece represents the Crucifixion, in Venetian mosaics, and, as well as the pulpit and carving, is by Messrs. D. & A. Davidson, Inverness. The vestry door and choir desks are solid oak. All the

windows have been filled-in with stained-glass. The narthex, shown in view, is a notable feature, being groined in stone, and the window filled with stained-glass throughout. The schools are equally elaborate with the church, and the erection of both church and schools is mainly due to the zeal and energy of Mr. E. B. Davy, of Spean Lodge. A parsonage adjoining the church is also contemplated.

MANNESMANN STEEL IN GERMANY.



"All the Modern Improvements."—No. 2.

THERE is an exhibition of steel tubes and other articles being held in the garden pavilion of the Architect's Hall in Berlin, which raises an increasing interest among native engineers and builders, and can hardly fail to be of interest to Americans with knowledge enough of existing productions of the same kind, to apprehend the variation of the new invention and to measure the worth which is claimed for it. I cannot pretend to give an account that will satisfy specialists; and I must note in my own behalf that the lecture of the introducer of the steel, Privy Councillor Professor Reuleaux, had taken place before I arrived in town.

My attention was called to the subject, therefore, not by first hand, so to speak, but through the enthusiasm of architect-friends who visit the hall.

In their company, it is to be confessed moreover, that the models of the machines used in producing the tubes were neglected in favor of the finished productions themselves.

Engineers probably would have been drawn most to the rolling-machine, for the prime fact about the new invention is the method of rolling employed, just as the advantages of the products of the Mannesmann machines are referred to this: a method of rolling obliquely or cross-corner-wise.

The grain of the steel is made predominantly spiral-like. The surface that is exposed to the rollers directly shows sharply-drawn spirals. Away from the surface, the spirals grow more uneven, irregular and weaker, in consequence of slower reaction to the pressure of the rolling-machine and follow the influence of the forming spirals in their proximity, in such a way as to form a webt possessed of extraordinary tenacity and elasticity. Just what relation the latter quality bears to that of other steels has escaped my memory. The tenacious power of the oblique-rolled Mannesmann steel is claimed to be six times that of any other. If the claim prove good, what a new era is opened in construction!

Of the examples of tubes displayed, the greatest number, perhaps, belong to the class adapted to proving the admeasurement powers of the Mannesmann patents. Near giants of from 200–375 mm., diameter, there are dwarfs of a pencil-like size, and under tubes of from fifty to sixty centimetres thickness of wall, hang others of less than 1 mm., thickness. The inventors assert that the capacity of their machines will be improved so as to produce rolled-tubes of 500 mm., and even of a metre diameter, and that there is no limit to the increase that is possible in this direction.

The length of tube that has been rolled is said to be ninety English feet. The longest example at the hall measures forty-five feet, and is bent, for facilitating transport, into a hot-water radiator-like form. Nothing can exceed the niceness and pureness of the bends, so far as the texture of the metal is concerned: smooth and firm the distended outer inflection is without a sign of molecular loosening, or any other of the common results of the mighty force that goes to making acute curves in rolled-steel of the like diameter. And this same important trait is shown in numerous smaller objects, where extensions, distensions, turns, bends and convolutions of the most fanciful shapes occur, from that of a bow of a necktie, to the double knot of fillet work. Nowhere in the interesting series does the metal come short of perfect smoothness at every point; and the pieces bent vary in thickness from that of a leaf of paper to that of a volume of the "Authors' Household" editions. Objects are displayed from the dimensions of boilers, beams and irrigation tubes, to the filigrees of door-plates. It would be useless to describe them here. Builders will conceive at a wink what advantages must come of a process that shall make the firm, hard, tenacious qualities of steel, still harder and more tenacious. And it is to these that the present exhibition in the German capital has evidently wished to address itself most. But these same advantages implying as they do, a diminution, moreover, in the natural tendency of steel to oxidize in consequence of the diminutions of molecular looseness effected by oblique rollings, will be suggestive likewise to the decorator, where he needs a material that is insensible to strain, weight, exposure and use, or chief of all, to misuse.

BOOKS & PAPERS

MR. W. B. Tuthill, who is already very favorably known as a writer on matters of practical architecture, has tried his hand on city buildings¹ in a volume of convenient size, very fully illustrated with plans and sketches of detail. We need hardly say that the book is a very different matter from those common collections of ugly and vulgar designs, prepared by persons who judiciously endeavor to conceal their ignorance by restricting to the smallest possible limits the text with which they accompany their designs. Mr. Tuthill is a man of experience and observation, and what he writes is intended for readers of more discernment than the seekers after ready-made plans who consume the ordinary works on such subjects.

The book begins with an essay, whose principal fault is that it is not long enough, on the planning of city houses and apartment-houses, or, as we ought rather to call them, tenement-houses, since none of his plans cover ground enough, or contain rooms enough, to bring them within the category of the great apartment-houses. Of course, the plans are more or less open to criticism; but as they are not put forward as models, but only as illustrations of various types of planning, now common in New York, they are really of more value than if they aimed at a new ideal of perfection, while the conditions of each problem are clearly and judiciously stated. Following this part, which occupies only forty-six pages, comes a collection of suggestions, notes and observations on the practical matters of city-house building, divided between mason-work, carpenter-work, painting and ironwork, which will be found of great value to young architects and amateurs, and which even the most experienced architects may read with profit.



NEW YORK, N. Y., May 3, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—The finding of the jury in the criminal libel suit of Lamb & Rich vs. A. J. Bloor, has resulted in the following retraction in lieu of the \$2,000 verdict given by the jury:

NEW YORK, April 23, 1890.

I hereby retract the circular entitled "To Reputable Architects," reflecting upon the character of Lamb & Rich, and agree to publish no further communications in the matter.

(Signed) A. J. BLOOR.

Mr. Bloor pays costs, renders a list of parties to whom he sent circulars, and promises to send copy of retraction to each one.

Yours truly, SMITH & WHITE,
Attys. for Lamb & Rich.



[The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.]

A FIREPROOF STAIRWAY.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Will you kindly allow me a few lines for justification in regard to the comment (expressed about my staircase design) made by a "Draughtsman," in your issue of May 3d, wherein he obviously intends to make it appear that I tried to pass off other people's ideas as my own. I have simply to state, that:

1. I worked out the design entirely from my own ideas; never had the least knowledge that this device was used twenty-five years ago in Scotland and twenty years later in New York; neither have I seen a drawing of such or a similar stairway.

2. I left it to the Messrs. Editors to publish it or not and I wonder where your correspondent finds my expression that I "claim it for something new." (See his letter.)

3. That these stairs are "almost always adopted for the British Army Barracks," shows evidently their fitness and had they been extensively used here for the last twenty years, most of these

¹ "The City Residence, its Design and Construction." By W. B. Tuthill, A. M., Architect, author of "Practical Lessons in Architectural Drawing," "The Suburban Cottage," and Editor of "Interiors and Interior Details." New York: William T. Comstock, 23 Warren Street. Price \$2.50, free by mail.

"wholesale roastings" of tenants and working people would have been averted.

4. The stairway can easily be arranged without interfering with continuous shafting. For dwellings, where the front space is very valuable, simply place the stairs into rear wall and run a fireproof hall out to street. Respectfully yours, C. H. RAU.

THE ROTCH TRAVELLING-SCHOLARSHIP.

DENVER, COL., April 26, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Can you inform me in regard to the conditions of the Rotch Travelling-Scholarship. If so would be much obliged.

Yours respectfully, D. R. HUNTINGTON.

[The Rotch Scholarship is restricted to persons not over 30 years of age, who have spent at least two years as draughtsmen assistants or students, in the office of an architect resident in Massachusetts. Candidates are examined in April of each year under direction of a committee of the Boston Society of Architects, and the one passing the best examination receives from the Trustees of the Rotch Fund \$1,000 a year for two years, on condition of studying faithfully abroad, showing his progress by sending home drawings and sketches. — Eds. AMERICAN ARCHITECT.]

PORTABLE CHAPELS.

RICHMOND, VA., April 29, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—I am desirous of getting the address of some manufacturers of knockdown chapels, that I may get price lists from them to lay before our building committee. If you advertise any in *American Architect* I would be greatly obliged if you would mail me their address. Yours respectfully, CHARLES H. CREW.

[We do not think anything of the kind is made in this country, although houses in sections are, or have been, sold by a company in New York. Iron chapels are made, and packed for transportation, in England. Probably Messrs. Francis Morton & Co., Garston, near Liverpool, could give information about them. — Eds. AMERICAN ARCHITECT.]

BOOKS ON THEATRE CONSTRUCTION.

CHICAGO, ILL., May 5, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—In answer to your correspondent who wishes to know the latest and best work on theatrical planning and construction, will say that the latest work we know of, and it is a good one, is "Traité de la Construction des Theatres," by Alphonse Gosset. Paris: Baudry & Company, 1886.

The "Theatres de L'Europe," by Clement Contant, is a very good book, but it is rather old now; at least, the edition we have was printed thirty years ago, and it does not give the most modern methods and designs of construction.

We know of no modern publication in the English language. A good book in our language is greatly needed.

Yours very respectfully, W. & P., Architects.



INTERNAL DECORATION IN ENGLAND.—The epic style of painting, prior to the days of West, found no legitimate patronage; and had it not been the custom from the time of Charles II, who, at the Restoration, introduced a portion of the prevailing French tastes under Louis XIV, for splendid internal decoration in the palaces and houses of the great, those who studied the "grand or epic style" might have shared the fate of the epic writers. Hence the chief employment of the father of British historical design, the venerable Sir James Thornhill, was the painting of the ceilings and walls of the royal palaces and the mansions of the nobility. Happily for this artist, however, he inherited a competent patrimony, for he could not have maintained his respectable establishment by the operation of his pencil and palette, although he peopled more space with gods and goddesses than have since been created by all his successors, including all the schools, his ingenious labors being paid for, not by the mental measure of his talent, but by measurement by the superficial yard. Plafond-painting has long since become an obsolete art, which is to be regretted, for nothing within the sphere of internal decoration is more strikingly grand, or more generally imposing, than a splendidly painted ceiling in a state apartment. Sir Peter Paul Rubens, for painting the magnificent plafond of the banquetting-chamber of Whitehall, received the sum of four thousand pounds, which, occupying little more than the superficies of four hundred yards, gives for his labor nearly ten pounds per yard. This ceiling, designed as it is in richly carved compartments, finely combines with architectural effect. It should be remembered that this grand work was executed for that distinguished patron of art, the unfortunate Charles I. Our countryman, Sir James Thornhill, who plied "the epic trade" nearly a century afterwards, when the value of money had so much decreased, received for his laborious and crowded designs in the great hall of Greenwich Hospital only three pounds per yard. He was nearly twenty years employed upon this work, beginning in 1708 and ending in 1727. It is true that he was not a Rubens! It may, perhaps, be worth recording that during the progress of this laborious undertaking several attempts were made by the ruling powers to screw the painter to a cheaper contract. Sir James was stout in his demand, and the affair

was referred to several eminent artists, natives and aliens, then practising the art with various success in the British metropolis. These worthies were Vanderveldt, Cooper, Richardson, Sykes, and Degard, who reported in favor of Sir James, "that the performance was equal to any of the like in England, superior in number of figures and ornaments." Foreign painters, however, it is evident, brought their talent hither to a better market. M. Rosso received of the Duke of Montagu for painting his saloon two thousand pounds; his grace, moreover, provided an extraordinary table for him, his friends, and servants for two years, at an expense of 500*l.* per annum. Monsieur was paid at the rate of seven pounds per yard for his designs. Signor Verrio fared even better than Rosso, for he received for all his works, ceilings, walls, grand stairs, and back stairs, at the rate of 3*l.* 12*s.* per yard, exclusive of gilding; had apartments in the palace, a good house in the home park, had a table provided for himself and servants, and plenty of wine. He was almost as extravagant as Charles II, his royal patron, and drew so largely upon the privy purse that the merry monarch observed, "Verrio, i'faith! a few more such expensive chaps as you and myself would drain the royal exchequer." The signor at length becoming infirm, and his eyes failing him, obtained a pension from the king of 200*l.* and allowance of wine for life. Signor Rizzi was employed by the Duke of Portland to paint the plafonds of three rooms, for which he received 1,000*l.*; for the little chapel at his grace's seat, Bulstrode, 600*l.*; and of the Lord Burlington, for the staircase at his mansion, 700*l.* Signor Pellegrini, an Italian also, received of the Duke of Portland for decorations, 800*l.* and other sums. And of the aforementioned earl, 200*l.* for painting the walls of his entrance hall. Hayman once lamented that he had not practised as a ceiling painter, as he then should have been enabled to pick up a good living. "Yes," replied Roubiliac; "but then, Master Frank, your good living would be procured at the daily risk of breaking your neck."—*The Architect.*

"THE METEOR CONVENTS" OF THESSALY.—Among the most interesting convents in the world are the "Meteor Convents" of Thessaly, northwest of Trikala, on the River Salamvria. These properties, as well as nearly the entire Province of Thessaly, were conceded to Greece in 1881, at the time of the border-line regulation between Turkey and the former kingdom. These convents received their name of "meteors" (floating in the air) by reason of their peculiar position, i. e.: they are built upon cone-shaped rocks, which rise in precipitous cliffs directly from the prairie land. Many of these monasteries can only be reached by means of ropes and ladders. This strange, rocky region was discovered during the fourteenth century by monks who were driven from the Athos convents by the Turks. Here upon one of these columns of rocks they built their abode. Soon after one of the brothers discovered upon an adjacent summit a larger area, upon which he founded another monastery. In the course of time twenty-four of these "meteor convents" sprang into existence, and they are situated on or between the rocks at a height of from 2,400 to 2,500 feet. Their inhabitants were, of course, secure from all the persecutions of their enemies. But they were in turn confined to a life of hardship and privation. All provisions must be brought from distant places and taken up to the convents by means of ladders and ropes or baskets. At present nearly all the "meteor convents" are lying in ruins, and only seven of them are inhabited to-day by about seventy monks. Visitors who desire to ascend to one of the monasteries are compelled to announce their presence by loud calls or horn signals. One of the brothers is then dispatched down in a basket, which is fastened to a stout rope or cable. It is his duty to receive the letter of introduction without which a stranger is not permitted to enter the cloistered walls, and only after the prior has examined his credentials is he allowed to intrust his person to the basket and the trip through the air. Once within the convent walls every visitor is made welcome, for, despite their poverty, the monks practice the noble virtue of hospitality. The Byzantine Emperor, Johann VI, entered one of these monasteries and lies buried there. Some of their churches and chapels are beautifully decorated and remarkable for their architecture. The University of Athens has lately acquired the valuable contents of some of these convent libraries. The view from these summits is magnificent beyond description; to the west extends the lovely panorama of the Pindos mountain-chains, while in the east spread the fertile fields of the rich valley of the Salamvria.—*St. Louis Post Dispatch.*

CORDOVA, S. A.—A first stroll in Cordova reveals a city of antique churches, encompassed by hills approaching the dignity of mountains. Time-worn and battered towers and domes loom up in every street towards the centre of the town. Fronting on the Plaza stands the Cathedral, with its Oriental façade, double towers and massive dome. The interior may be cold and repelling, but I have seen nothing in South America more picturesque, especially in the mellow light of early evening, than this grim, battlemented pile, fashioned like a stronghold of faith. Not far away is the Jesuit Church, with medallion paintings of the chief saints of the Order, and a ceiling of carved cedar which is said to have been pieced together without hammer or screw. The Jesuit missionaries here, as in Paraguay, taught the native converts to be expert wood-carvers, and this is one of the oldest samples of their work. The metal with which it is ornamented came from Peru. The art may be crude and the shabby building itself sorely in need of repairs, but when one has seen hundreds of bad copies of the Renaissance churches of Southern Europe, it is refreshing to find an honest, albeit dingy, bit of mediæval architecture. There are a dozen churches in addition to those which I have mentioned, all of them filled with bad paintings and ornamented with tinsel and gilt, black with age and dust. There are, besides ruined monasteries, convents with orange trees in the interior courts, and orphanages where girls are taught by Carmelite nuns to make lace. There are signs of the outbreak of a restoration mania in the ecclesiastical structures. Decorators are at work in several of the churches, and the new tones of color contrast strangely with the time-stained woodwork and faded frescoes and medallions, and with the blackened and crumbling towers. Bold attempts are making to modernize one or two of the churches. This is the first stage of

a restoration movement. In the end many of them may be reformed out of existence. Mediævalism, while picturesque, has its drawbacks. It is a wet blanket upon the business of the town. Cordova suffers in a commercial sense from having the reputation of being old and musty. The florid modern architecture of the new public buildings near the Plaza is a loud protest against reactionary tendencies which retard the natural progress of the city. But ornate as these handsome structures are, they are not to be compared in grace and beauty with the old Moorish *Cubildo* which adjoins the Cathedral. That has a symmetry and a simplicity perfectly in keeping with the general lines of architecture of an antiquated Spanish town.—*Correspondence N. Y. Tribune.*

THE EASTER ISLAND MONOLITHS.—Mr. Walter Hough contributes to a recent number of the *American Naturalist* a paper in regard to the monoliths of human shape found on Easter Island, in the South Pacific. One of the idols is in the National Museum, together with smaller stone images, painted slabs and other evidences of the curious civilization of the islanders. The deep, wide eye-sockets of the big statues were carved for eyes of obsidian, and doubtless one reason for the extreme rudeness of the sculpture consists in the fact that the statues were once decorated so as to conceal their defects of anatomy. The quarry whence the monoliths came is twelve miles from the spot where the largest number has been found, and the way is difficult. Many are in the quarry, half finished. Others are abandoned on the way, yet one in place weighs about fifty tons and is sixty feet high! The islanders had no metal tools and were ignorant of the wheel. Yet they built small, heavy-walled houses of stone, lined and roofed them with slabs of stone, on which figures of animals of eccentric form were painted. Doors are very narrow and the roofs are covered with turf. For writing they used very curious and beautiful letters, carved with sharks' teeth on slabs of wood. These letters are not alphabetic, of course, but are condensed pictures which recall the past events, like the "talking sticks" used by the medicine men of North American tribes. Paymaster W. J. Thompson, who was on the "*Mohican*," when this collection was made, will contribute a monograph to the report of the Smithsonian, giving all that is at present known concerning the sculptures.—*Boston Transcript.*

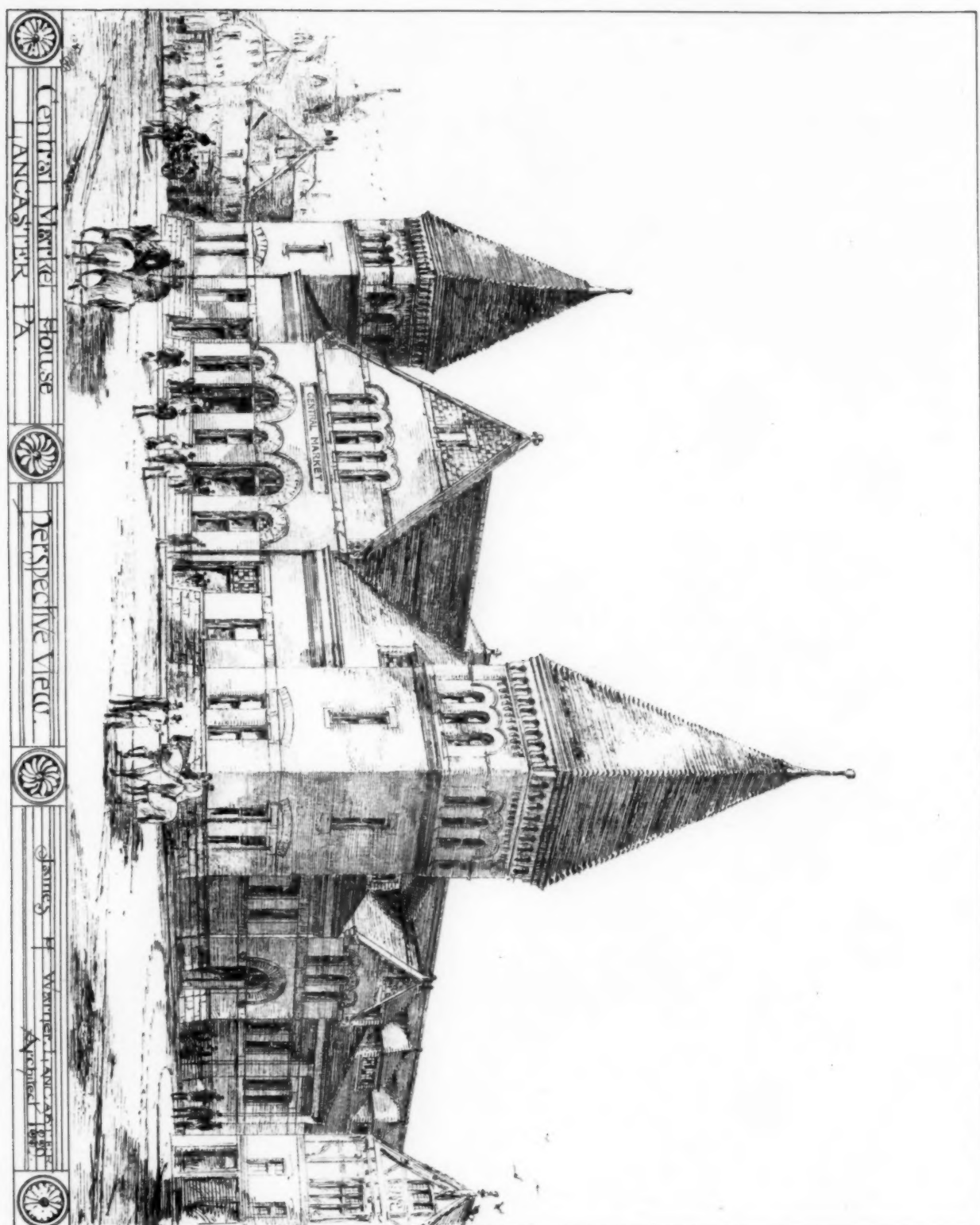
TRADE SURVEYS

RAILWAY returns and bank clearings show that everything is moving along satisfactorily. The volume of railway traffic is increasing faster than the best predicted railway managers predicted four months ago. The volume of business is also heavier, in nearly every branch of trade, than was counted upon. Purchases of raw materials which were checked during the second and third months of the year have again set in on a large scale, considerable improvement being apparent in this respect within the past few days. Building operations have been generally resumed, the strikes having been settled in large part. The business and financial interests have already discounted the effect of the pending silver legislation, and when the compromise measures now under consideration are agreed upon, the changes consequent upon the enlargement of our monetary basis will be made so gradually as to occasion no trouble or inconvenience. So far as building interests are concerned, they have escaped with much less damage and interruption than was anticipated. A vast amount of new work is now looming up, particularly in the smaller cities and towns throughout the country, more especially those in the far West and South. Manufacturers of heavy material, such as lumber, brick, iron, steel, etc., entering into the construction of buildings of all kinds, are doing a phenomenal business at this time, the intention of builders everywhere evidently being to hasten work as fast as the supply of labor will allow. The possibility of further labor complications is one reason for pushing work through. Builders and manufacturers know that labor has had its appetite whetted by a very widespread success, and fear that another experiment of the same kind may be made before the season is over. Iron and steel makers in all sections are well supplied with work, especially in plate and structural iron, sheet-iron, wrought-iron pipes and tubes, and merchant bar. The steel rail-makers are running their mills full time. From present indications, the new mileage for the year will reach about 6,000 miles; but counting repairing and extension requirements, the total amount of rails purchased will cover 11,000 to 12,000 miles. There are heavy requirements for steel billets.

The nail factories are running nearly full time, both East and West. All the sheet-iron mills are crowded with work. The blast-furnaces are turning out the usual heavy supply, but there is a tendency to lower prices in all iron centres. The lumber manufacturers of the Northwest are meeting with great encouragement in Western markets. Spruce in the East, hemlock in Pennsylvania and poplar in the West, are selling well, production not being in excess of demand. Yellow pine is also holding its own, owing to the heavy consumption in the South, and expanding demand in the new markets in the North. The lumber manufacturers in the Southwest are also favored with a good demand. The entire Southern lumber interests are prospering in a manner and to a degree that is attracting the attention of a great deal of Northern investing enterprise. Among the smaller industries there is a fair degree of activity, in view of prospects for a good fall trade. Jobbers in Boston, New York and Philadelphia report an excellent demand for textile goods of all kinds, but textile manufacturers are complaining loudly of narrow margins and active competition. The disposition of the tariff question will in a few days bring relief to large manufacturing interests. Makers of steam-engines and steam appliances have, within the past thirty days, largely increased their orders for summer delivery. It is stated upon the authority of some of the largest makers in this line that the demand for machinery for steam-power was never so large as at present; quite a number of large concerns are overcrowded with work, and this condition of things will probably continue until late in the summer. The production of anthracite coal is maintained at the rate of about 100,000 tons per day, and the bituminous output throughout the country is fully up to that of last year. Coke-ovens are being built in every locality where coking-coal is found, the demand for coke having increased very greatly within the past year, owing to the rapid spread of manufactures in new sections.

S. J. PARKHILL & Co., Printers, Boston.





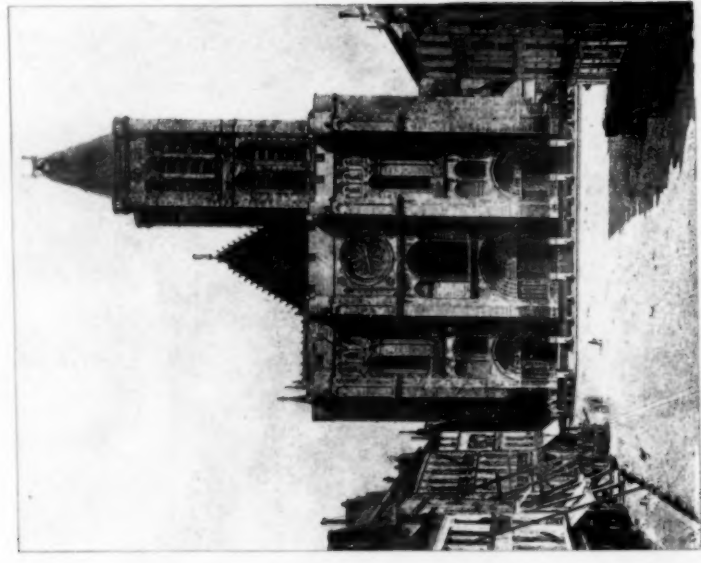
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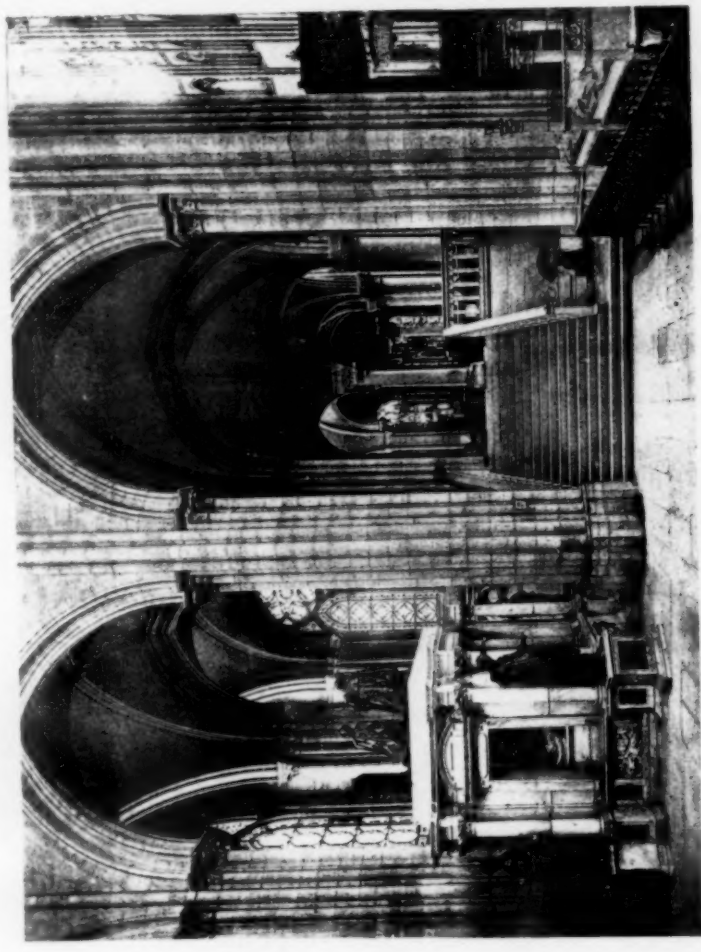


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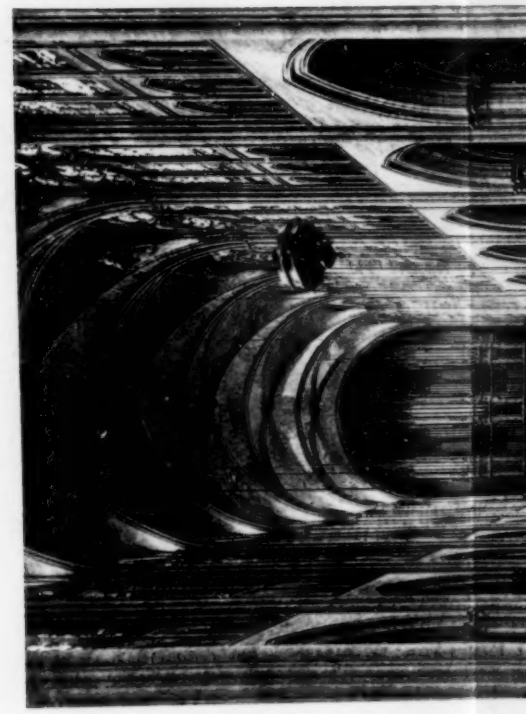


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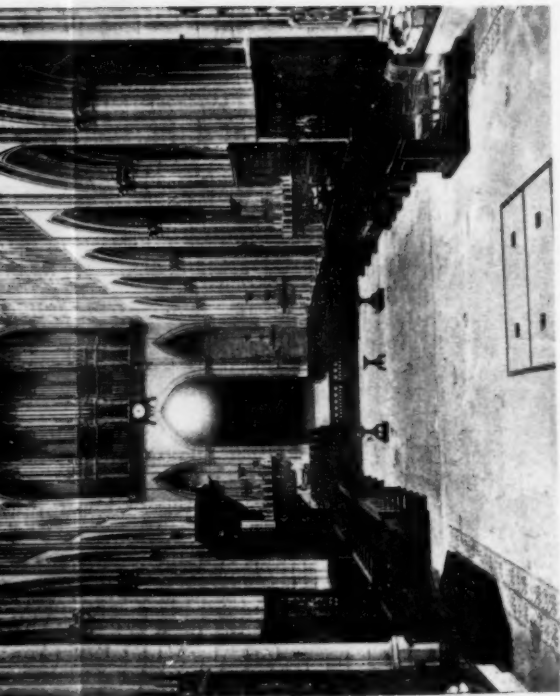


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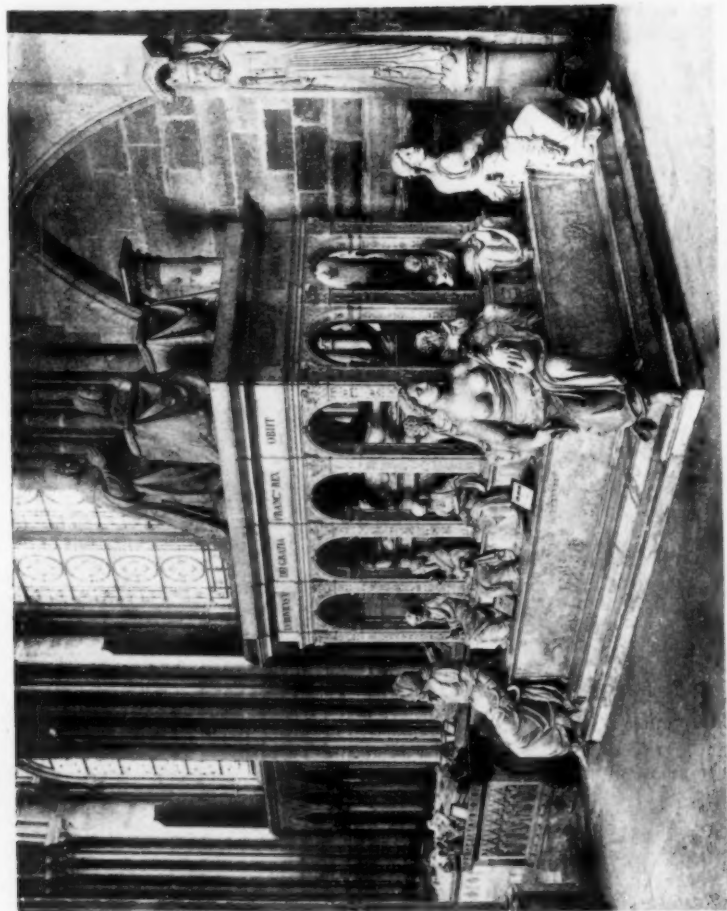
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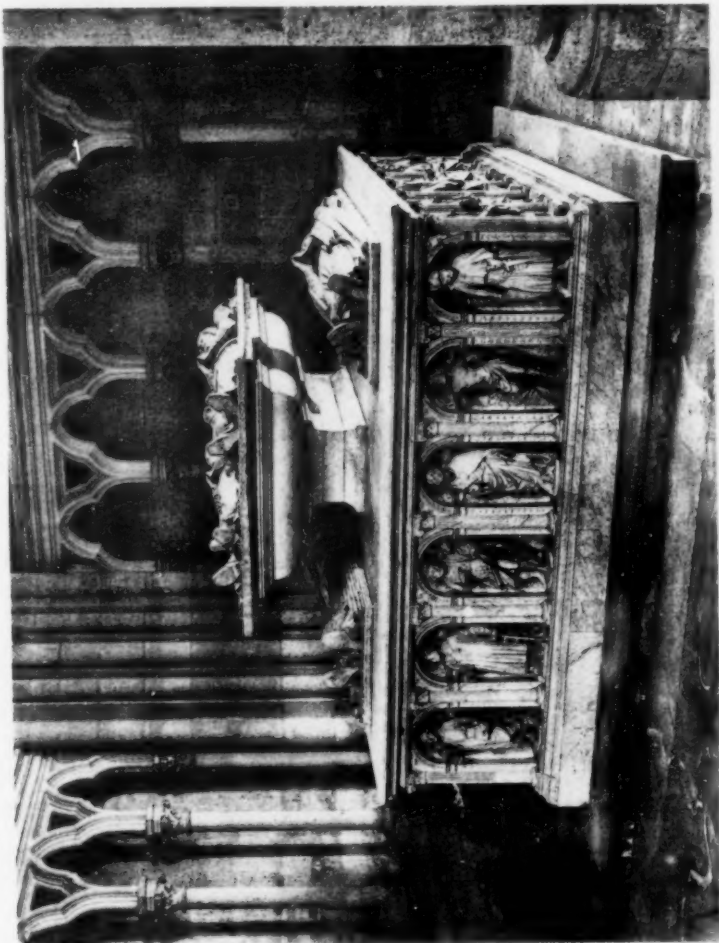
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TOMB OF
LOUIS OF ORLEANS
AND
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II



III



IV