PRICE 15 CENTS

CONTENTS.

ILLUSTRATIONS.

Additional Illustrations in the International Edition.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XXXI. Copyright, 1891, by TICKNOR & COMPANY, Boston, Mass. No. 790.

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

FEBRUARY 14, 1891.

CONTENTS.

AN interesting scheme has been proposed by Mr. T. A. Chandler, of New York, who proposes to raise a fund, the interest of which shall be sufficient to send meritorious students of art abroad, under suitable conditions, and maintain them there for five years. For the present, it is proposed to allow them an income of nine hundred dollars a year, and to open the scholarships to students of any of the fine arts, including music, and probably the dramatic art. The student will be required to send home an "envoi" of a specified sort every three months, which is to be judged by a committee, and, if the committee decides that proper progress is not being made, the scholar will be notified that his or her allowance will be stopped at the end of the year. Continued ill-health will have the same effect as incapacity, the intention being to keep abroad only persons in good physical and intellectual health. The administration of the scheme is to be placed in the hands of a commission, consisting of the Presidents of the Metropolitan Museum, the National Academy of Fine Arts, the Society of American Artists, the New York Water-Color Society and the Art-Students' League, with two additional delegates, elected from each of the last four bodies, making thirteen in all; but the control of the money is retained by a separate committee, chosen by the donors of the fund. The beneficiaries must be residents of New York State, either now or lately, but similar enterprises will probably be carried out in other States. There can be no doubt that a great deal of good will be done in this way, but it is curious to see so much effort put forth to enable young Americans to cross the water to study the works of foreign artists, which are kept out of their own country by a heavy duty. While the friends of American art-students have their minds on the subject, it might be well to suggest that a part of the duty of the laureate scholars, who will have a very liberal income, might be to look up, and report to their committee at home, information in regard to the other American students of their own art. Few people know the privations, humiliations and dangers which beset hundreds of poor Americans, mostly young girls, who have raised a little money and set off for Europe to study art of some sort, without thinking how they would maintain themselves or get back again. There has, within a few years, been more than one case of suicide among these half-starved and despairing people, and the reports of our consuls in the cities which attract students most call attention in the strongest terms to the need of extending some sort of recognition and protection to our young fellow-citizens abroad. It would not take much time or trouble to have all students registered at home, in their own State, and regularly visited by some one armed with a State commission. Besides the fixed report, which a fellow-student could, perhaps, best make, it might be practicable to give occasional authority to persons of well-known character to represent the State's care for its expatriated children. Many a kind-hearted tourist would be glad of a chance to give a word of encouragement to poor and timid students from home, and to the students themselves, if they were worth anything, such occasional recognition would be of great use.

A great scheme has been proposed for a Metropolitan Railway for New York, which, although involving enormous expense, is so simple and sensible that it is much to be hoped that it may be carried out. The promoters, who are among the most honorable and distinguished capitalists in the city, have adopted the plan of an electric underground road, which the experience of London shows conclusively to have great advantages over any other, and propose to build a road from the Battery, under Broadway, to Union Square, and, dividing the line there, to carry one branch under Broadway and the Boulevard to One Hundred and Fifty-fifth Street, where it will cross, through One Hundred and Fifty-fifth Street, to the shore of the Harlem River. There it will run southeasterly, along the river bank, until it reaches Third Avenue, and will then turn southward, running under Third Avenue to Eighteenth Street, through which it will cross back to join the other line at Union Square, completing a loop. In connection with this main system, there is to be a loop, extending from Battery Park, under Front and Water Streets, Essex Street and Avenue A, to Twenty-third Street, under which it will return westerly, to join the Third Avenue line; and a second down-town loop will extend from the Battery, under West Street, to Twelfth Street, and thence north, under Tenth Avenue, to Seventy-second Street, where it will join the Boulevard line. A suburban loop is also planned, to extend from One Hundred and Fifty-fifth Street, under the Harlem River, to Kingsbridge; thence around Jerome Park, and down Third Avenue, back to the river, returning again through the tunnel to One Hundred and Fifty-fifth Street. In connection with the system, tunnels are to be built, under the Hudson River to Jersey City, and under the East River to Brooklyn. Grand as is the plan, there can be no doubt that it is by far the best yet proposed, and that the adoption of a comprehensive scheme of the kind will, in the end, be the most economical and advantageous solution of the present local problem. It is understood that the money is all ready for carrying the scheme into execution, as soon as the requisite permission is obtained; and there seems to be really a prospect that New York will soon be blessed with a better system of internal communication than any other great city in the world.

THE adoption of this plan would undoubtedly hasten the consolidation, which is already under discussion, of Brooklyn, Jersey City and the smaller suburban cities, with New York. For all practical purposes, these towns are now a part of New York, and simplicity and economy of administration would be promoted by making them legally, as they are practically, districts of the great metropolitan city. We do not always remember that, including all these towns, with an aggregate population which will soon amount to three millions, the area of New York would be hardly equal to that of London, and the advantage, in matters of public improvements, of having the whole territory under one administration, instead of five or six, can hardly be overestimated.

BARON VON SCHMIDT, the well-known architect of the Court-House at Berlin, and of many other splendid buildings in Germany and Austria, particularly in Vienna, where he had resided for more than thirty years, died two weeks ago at Vienna. Like nearly all the great Viennese architects, he was a foreigner, having been born in Wurtemberg in 1826. In 1857 he was placed first in the competition for the Berlin Rathhaus, and in 1858 was appointed Professor in the Academy of Art at Milan. He removed later to Vienna, where he was made Professor in the Imperial Austrian Academy of Art, and appointed architect to the Cathedral of St. Stephen, and carried out a large number of important commissions.

WE cannot help thinking that a good deal of affected sentiment has been wasted over the proposition, which was seriously made in England a little while ago, to restore to Greece the marbles which Lord Elgin brought from Athens fifty years ago. The idea seems to have been suggested by M. Rangabé, the Secretary of the Archæological Society of Athens, who published a book on Hellenic antiquities, in which he spoke in the severest terms of Lord Elgin's "scientific plundering" and "archæological pillage"; and Mr. Frederic Harrison followed with an article in the *Nineteenth Century*, presenting a touching picture of the desolate Parthenon, bereft of its statues and sculptures, which are now in London; the Erechtheum entablature, carried by a plaster caryatid, the original of which is in London, and other monuments of antiquity, in which plaster-casts replace the original sculptures removed by Lord Elgin to England, and appealing, in the name of justice and art, for the restoration of these precious objects to the Acropolis from which they were taken. As even M. Rangabé admits that Lord Elgin had a good legal claim upon them by the grant of the *de facto* Government of Greece at the time of the removal, and that, if he had left them where they were, the bullets of the Turks, and, we might add, the researches of the native lime-burners and copper-stealers, would, before now, have obliterated the last traces of them, the argument for their restoration appears to be based solely on the assumption that the Greeks have now developed such a love for antique art, and zeal in the study of what they already possess, that they are the best persons in the world to be entrusted with the care of the objects made by the people who lived, twenty-five hundred years ago, in the country which they themselves now inhabit. We are obliged to mention the ancient Athenians as the predecessors, rather than the ancestors, of the present inhabitants of Attica, as it is doubtful whether a drop of Hellenic blood runs in the veins of the modern Greeks. It is fair to say that there are two opinions on the subject, some ethnologists believing that the small-statured, dark-haired, modern Greeks are descended from the Slavonic barbarians who overran the peninsula during the Dark Ages, and that the only pure Hellenes left in Greece are the tall, handsome, fair-haired people who still linger in the almost inaccessible recesses of the mountains of Arcadia; while others claim that, after the barbarian occupation, a revolt of the native population, which is not mentioned in history, restored the country to the Hellenic race, which is, these authorities think, the dark-haired one, leaving only a small remnant of the invaders, who, by this theory, were light-haired, isolated in the remote valleys of the Peloponnesus. We will not attempt to discuss this question, which merits the attention of tourists of ethnological tastes, but need only remark that, on one theory, the Turks had exactly the same right as the Slavonic savages to dispose of the artistic spoil they found in their conquered province; and that, even on the other theory, the modern Hellenes would do well to claim the treasures still to be found at Rome, Naples and Florence, which the Romans took from their ancestors without leave, before demanding back property to which the innocent British lion holds a good title, derived from the party whom even the Greeks regarded as the owner at the time the transaction was carried out.

THE fact is, that if restitution were made of all the objects of art in European museums to which any one could set up a plausible claim, there would be some singular transfers of ownership. The Louvre, particularly, which owes much of its interest to the taste in selecting works of art of Napoleon and his generals, joined with their success in inducing the owners to part with them, would be nearly stripped; and if an Egyptian and a Mesopotamian Archæological Society could be formed to unite with M. Rangabé and Mr. Harrison in sentimental appeals, there would soon be little left of the British Museum collection, which has done more for art and science than all the modern Greeks, Egyptians and Assyrians put together. Every one knows the delightful appreciation which the modern Egyptian shows for the works of his great ancestors; how, when he comes across a statue, appearing above the sand, he gives a wild yell, fires his gun at it, or picks up a stone and hurls at it; and then, covering his face with his mantle, rushes away into the desert. The modern Greeks, we are told, and even the Italian peasants, have much the same feeling toward the "Incantade," or "enchanted" ruins among which they live, and yet it is asserted that the metopes and friezes of the Parthenon, which, through the careful and conscientious castings made by the authorities of the British Museum, have spread the knowledge of the most beautiful sculpture ever executed throughout the civilized world, ought to be restored to their place on top of a lonely hill, where, even if they could be guarded against Hellenic attempts to steal them, and sell them to the English over again, they would be exposed to certain destruction at the hands of idlers who would use them for targets, at which to throw other fragments of antiquity, which lie, unnoticed, around. It may be that the Greeks will sometime be such admirable custodians of Hellenic antiquities that no other people ought to be allowed to have any of them; but, even then, the Parthenon metopes are far too valuable to be put back where Mr. Harrison wants them, in the places whence they came, and, for the present, they are best seen, and best taken care of, where they are.

TWO new sorts of fireplaces have come into the market. In the simpler one, which is, we believe, a Chicago invention, the fireplace has a lining of firebrick, with an ordinary grate, and a cast-iron top, sloping forward, in which appear two large openings for the escape of smoke, one at the back of the fireplace, and one near the front, in about the same position as the throat of a well-constructed brick fireplace. On kindling the fire, the opening at the back is left clear, and that near the front is closed; and the smoke, which then moves sluggishly, escapes at the back, before it can come out into the room. After the fire is well started, and the flue warmed, a push of a damper-rod closes the rear orifice and opens the front one, and the flame is drawn forward, greatly increasing the radiation, and consequent heating power of the fire, as every architect knows. The other device is German, and is still more radical in character. Here, as before, there are two outlets to the fireplace, but instead of both being overhead, one is above, and the other underneath the fire. As in the Chicago fireplace, the fire is kindled with the upper outlet open, and, when the flue is hot, this is closed, and the lower one opened, drawing the flame downward through the coal. It is claimed that by this means the smoke, being drawn a second time over the burning fuel, is consumed, and the power of the fire increased; but some experiments of our own incline us to think that, if the draught of the flue were tolerably strong, the fire might burn downward with such force as to throw most of the flame and heated gases into the descending pipe, where they would be lost, so far as any use in heating or cooking is concerned. It would be possible, no doubt, to reverse the current occasionally, so as to set the top of the fuel into renewed combustion, and, if we are not mistaken, some of the "smoke-consuming stoves," which were so much in vogue a few years ago, had an arrangement for this purpose; but few people care to take so much trouble about what they think ought to be an automatic apparatus.

A GERMAN architect writes from Chili to the *Deutsche Bauzeitung*, to warn German architects, engineers and builders against a trick which is, he says, often played upon them by German residents. These last appear to lose their "German honor" as fast as they gain South American gold; for the writer of the letter says that, of late years, many architects and engineers have been invited, or rather, enticed, from Germany by merchants of their own nation, settled in Chili, on the representation that they would be employed to carry out building or engineering operations, under contracts which no one familiar with the country would ever agree to; and, after their arrival, their ignorance of the language and habits of the people has been utilized, as he says, "to plunder them in the most shameless manner." The unfortunate professional man usually finds himself, in the first place, bound by a contract which compels him to work for about one-fourth the pay which would be given to a native architect or engineer, without one-tenth the skill or experience of the new-comer, for performing the same duties; and he is deceived by various misrepresentations. Before he signs the contract under which he accepts the work, he is generally given to understand that the Chilian "peso" is worth four German marks. This was really once the case, but since the war with Peru, the peso has been debased, and is now worth only about two marks. Moreover, prices in Chili are at least twice as high as in Germany, so the incautious victim finds himself under obligation to work, perhaps for years, for a salary which is practically only one-fourth as large as he supposed it to be.

AUSTRIAN ARCHITECTURE.[1]—XIX.

THE NINETEENTH CENTURY. — VI.

Fig. 31. View of the Hofburg Theater, Vienna.

WE have seen that, while Semper was the creator of the artistic character of the museums, he nevertheless retained, in the general plan-disposition, certain elements of Hasenauer's designs. On the other hand, the Hofburg Theater (Figures 31, 32) is, beyond question, almost exclusively the work of Semper. He had already established its chief features in the general scheme of 1869 (see Figure 30); the front was the only portion changed, when, later on, the Emperor designated another and more isolated site for it. Of the plans, made independently by the two architects, the emperor decided in favor of Semper's, but desired to incorporate into it a single feature from Hasenauer's, namely, a pillared loggia above the three entrance arches, in the place of the exedra which appears in all of Semper's other theatres.

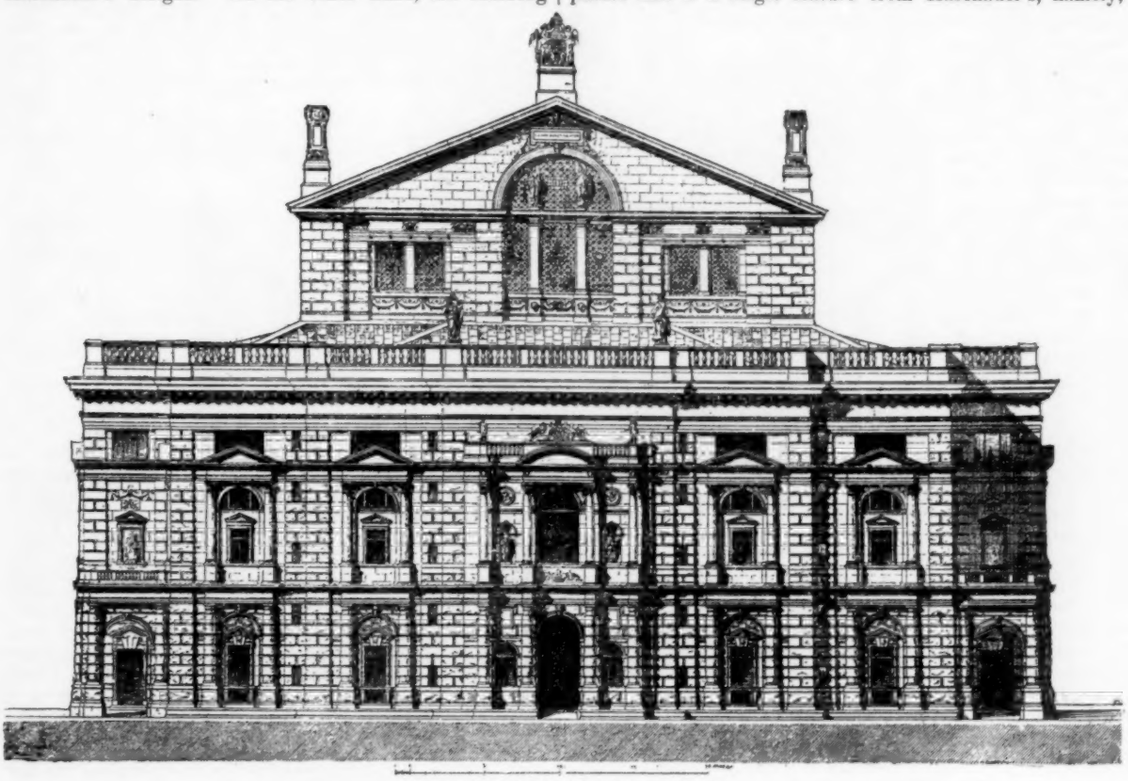


Fig. 32. Rear Façade of the Hofburg Theater.

This motive, which was wholly foreign to his style, Semper

[1] From the French of H. Semper, in Planat's "*Encyclopédie de l'Architecture et de la Construction.*" Continued from page 85, No. 789.

metamorphosed and invested with new forms. The other parts of the theatre — façades, boxes, proscenium, ceilings, foyers, staircases — were all exclusively from Semper's hand; he likewise directed nearly all the working-plans, the drafting and a perspective view, after a system original with himself.

Fig. 33. View of the Imperial Villa at Lainz.

Comparing the plan of this theatre with the plan of the Wagnerian Theater, designed by Semper for King Ludwig II of Bavaria, but unfortunately not carried into effect, the two are found to be quite similar; and, aside from the long wings, they exhibit the same types as Semper's other designs for similar constructions. The chief differences between the Munich and Vienna theatres, beyond the above-mentioned substitution of a loggia for the exedra, are these: the front semicircular building in the Vienna edifice has a single order of colossal pilasters reaching to the cornice in the place of the two orders of pilasters and half-columns of the Munich plan, and the projecting wings of the former structure contain splendid staircases, while those of the latter were designed to be occupied by fête-halls. Both of these variations are ascribable to Herr Semper, as his drawings show.

Semper's designs were executed after his death, by Herr Hasenauer; the latter followed the original plans rigorously, as far as the great cornice; above that point he introduced motives of his own, especially in the roof, where a dome over the hemicycle, with its crowning, supplants the plain, circular hip-roof projected by Semper. Hasenauer modelled the auditory roof after that of the Paris Opera-house. In Semper's designs, also, the stage gable, which is now concealed by Hasenauer's dome, was more isolated from the roof over the hall. As for the interior, the auditorium ceiling is decorated exactly in accordance with Semper's delineations, and in the architectural division of the more important halls and rooms his plans have likewise been scrupulously carried into effect, the ornamental details are, for the most part, the work of Herr Hasenauer and the architects in his office; the latter have shown much talent in the execution of their themes. Semper, we believe, would have been less lavish in the use of decorative details, he would have introduced glowing colors, especially gold, more sparingly; for, though he recognized fully the high architectural and decorative value of sculptural and polychrome elements, he was, nevertheless, always careful to subordinate both to the general architectural division, and not to allow it to be overshadowed by them. To Hasenauer also must be attributed the final arrangement of the boxes and chairs, and of the numerous stairways and exits, which were introduced after the Ringtheater disaster to facilitate the clearing of the house in case of fire. The original design has certainly not been improved by these internal alterations. Herr Hasenauer likewise directed the setting of the stage-machinery, which is operated by water, and is constructed almost wholly of iron on an entirely new plan (the Asphatie system improved). This system does not, however, meet with general approval. Before leaving the subject, we desire to call attention to the wealth of sculptures and paintings by the best artists of the empire, with which this superb building is embellished. A more detailed description would overpass the limits of our sketch and the student is referred to the drawings for further investigations.

The general dispositions of the design for the new imperial residence are found already fixed in Semper's sketch, made at Zurich in 1869 (see Figure 30). Following one of his favorite ideas, Semper had tried to make this enormous palace the dominating construction of an immense *forum*, on the north-east side of which the three sections of the castle were to be disposed in the shape of a horse-shoe, while toward the south-west the two museums were to extend along the sides, with the imperial stables in the rear. The grand monumental square thus circumscribed was to be adorned with statues and two triumphal arches, erected at the extremities of the part of the Ringstrasse running through it.

Fig. 34. Bankgebäude, Vienna.

The central structure of the new Residence, containing a colonnaded throne-room and an octagonal, dome-covered hall, was planned to mask the old castle. In the right wing, there was to be a spacious fête-hall, while the left would contain the vestibules, and the stairways reserved for gala occasions. The two buildings along the sides of the square were to be symmetrically composed of two wings, concave in front and terminating in square, isolated palaces, and a projecting central body, also having a curved façade. In this repetition and alternation of the noblest architectural motives, all adjusted with a nice appreciation of the relative importance of the parts to the whole, we find an imposing and harmonious embodiment of those principles of rhythmic subordination and of that poetry of space, which Semper so often proclaimed in his writings and accentuated in his works.

The detailed designs for the palace, which were made later at Vienna by Semper and Hasenauer, and exhibited in 1873, were in complete accord with this general project, and they display correspondingly worthy architectural types; we will merely call attention to the severe rustic-work of the ground-floors, with arched bays alternating with gabled niches — dispositions which recall those of the Pitti and Medici palaces at Florence — the columns, the portals and loggie, and the majestic attics. It is of course impossible for us to indicate what changes Herr Hasenauer may introduce into the details during the process of construction, but the portions already completed show that at least the plan of the *ensemble* will be preserved intact.[1]

Even when the imperial palace is completed, Herr Semper's conception of the *forum* will not be realized; nor will it ever be realized until the propylæa of Nobile are removed, and the two triumphal arches are erected on the Ringstrasse between the museums and the castle wings.

When all this is accomplished the Residence and the museums will form one of the most impressive monumental groups in existence; and, together with the theatre and the other structures on the Ring, they will proclaim to posterity the glory of the emperor Francis Joseph I as an enlightened protector of the arts, and also the genius and merits of the architects who have contributed of their best to the embellishment of the imperial city. Then indeed the truth of the proverb, *Saxa loquuntur*, will be attested! H. SEMPER.

LIST OF THE PRINCIPAL WORKS ON MODERN VIENNESE ARCHITECTURE USED IN THE PREPARATION OF THE ABOVE TEXT AND ILLUSTRATIONS.

"Wiener Neubauten, unter Mitwirkung von Architecten herausgegeben," by C. von Lützow and Ludwig Fischler. *"Vienna: I, Privatbauten, II, Monumentalbauten."* Lehmann and Wenzel. — *"Zeitschrift für bildende Kunst,"* Lützow. Volumes II, V, VI, VIII, XIV, XX, XXIV. — Förster, *"Allgemeine Bauzeitung."* Vienna, *passim.* — *"Deutsche Bauzeitung."* Berlin: Carl Belitz, *passim.* Number 63 of the year 1885, of this periodical contains an important statement by several architects relative to Semper's work in Vienna. See also: *"Beilage zur Allgemeinen Zeitung,"* No. 140, 1879. *"Ruber Gottfried Sempers bauliche Thätigkeit in Wien."* — *"Die Bauten, Entwürfe und Skizzen,"* von Gottfried Semper. Published by Manfred Semper. Leipzig. — *"Gottfried Semper Ein Bild seines Lebens und Wirkens,"* by Hans Semper. Berlin, Calvary, 1880. — *"Gottfried Semper, in seiner Bedeutung als Architect,"* by Constantin Lipzius, Berlin, 1880. — *"Œstreichische Monarchie in Wort und Bild."* — Franz Reber, *"Geschichte der neueren deutschen Kunst.* 2d edition. 3 vols. Leipzig, 1884. — C. von Vincenti, *"Wiener Kunstrenaissance: Studien und Charaktercritiken."* Vienna, 1876. — Lübke, *"Geschichte der Architectur,"* 2 vols. Leipzig, 1886. — The cuts of the Bahocz chapel were contributed by Herr Hampel, of Buda-Pesth.

EMMANUEL FRÉMIET.[2] — II.

The Mother Cat. Fremiet, Sculptor.

MME. FRÉMIET, seeing that her son was really making sculpture, told him that if his fancy was in that direction he must go at once to Rude for instruction. He was then seventeen years of age. To Rude, whom he regarded as little less than a god, he went with his little plaster models. The great sculptor looked them over, and made the boy happy, by saying, "You must come to the studio of my pupils."

Agreeable as was the invitation, there was at the same time a serious condition attached to it. Every new student to the school was obliged to contribute, on entering, the sum of twenty dollars, which was spent by the pupils for a gorgeous repast, and a dollar and forty cents had to be paid every month for school expenses. The Frémiets had no money to meet the first requirement, but the second was assured by Emmanuel's wages at Vernet's, which were now five dollars a month for his forenoons' work. The lad went home to tell the news to his mother and hold a council of war with her. "You must go, my dear," said the noble woman, "and I will get the money." And this is how she did it: among her friends was the wife of a shirt manufacturer, and to this woman she went, and told her that she wanted some shirts to make. Mme. Frémiet's duties were already heavy enough but she undertook this new one with burning affection. The twenty dollars came from the very blood of her fingers. Her son entered Rude's studio. At that time the master had fifty pupils, and they worked in the Rue du Regard. He came to correct them twice a week for a while after Emmanuel entered the school, but as he was now an old man the studio was moved to the Rue d'Enfer, nearer his home, and there he came every day. "Rude's manner of teaching," says Frémiet, "was free and frank, never keeping anything from his scholars that could serve to push them on in their studies.

"He would often say, 'Gentlemen, I cannot make you artists, but if you have art in your natures, I can help you to become masters.' His sense of personal dignity was very acute, and of the proper respect due to art, very fastidious; one day, after some of the students had been to see a man guillotined, he came into the studio in a towering rage, and announced that he would never give them another lesson, because they had shown such vile curiosity. But he forgot all about it, and came as usual."

Finding that his new pupil was specially endowed, Rude said to him, "Come to my own studio, I can't do enough for you here." Though delighted beyond measure at hearing these words, Emmanuel was obliged to answer that it was impossible, because he could not give up the money he was earning at Vernet's in the forenoons. "O, no," replied the master, "don't give that up, for that is sure, but can't you come evenings?" This he could do, and he began by copying a little antique by the light of a solitary candle.

When alone, he became so impressed with the darkness that filled the place, that he felt the shadows of the figures that were covered with cloth, as they cast themselves here and there in curious and suggestively funereal forms. A mortal fear came over him, and he dared not look around. Neither the hideous corpses in the deserted attic of Doctor Suget, nor the murdered and mutilated unfortunates found in the Seine, created such terrors as now tenanted the pure silence of the studio of his friend and master. The temple of art had its horrors to the spirit of its young disciple, and the night sent forth its formless inhabitants to tempt his courage. Shadows returned from other worlds to take possession of their imitated dwellings, and their attendant harpies flitted about in angry protestation against the unwarrantedly strolling fancies of their superiors. Surrounded by such an unexpected troop of visitors, the young sculptor suffered more than tongue can tell, and he dared not even move until deliverance came in the presence of him who had long since dominated these turbulent wanderers. And thus the youth worked in two worlds, in fear and trembling.

While he was studying with Rude, a sculptor named G——, of very mean ability, though the director of the cabinet of medals of the Duchesse de Berri, offered him a dollar for half a day if he would come and work in his studio. The sum was a fortune, he left Vernet and accepted this employment. His task consisted of making from life, little girls being used as models, small figures of Virgins, saints and evangelists. After he had completed one, his employer would work it over and spoil whatever merit it might have originally possessed.

G—— had a son, a sculptor of talent, who often came to his father's studio, and seeing that his parent's assistant did pretty good things, in spite of the scrapings they were subjected to, asked Emmanuel to come and work for him for the same price and time. Thinking that this proposition might lead to more agreeable conditions, it was accepted, though the work was still to be of saints and holy men. It will be seen that the change of employers brought its due amount of annoyance.

Young G——, was at heart a good fellow, but in habit a real bad Bohemian. He loved luxury, was always in need of money, overwhelmed with debts, and the smoothest-tongued debtor imaginable. It need not be said that his faithful workman, from whose labors he derived his chief means of subsistance for the next two years, was the first and greatest sufferer. Emmanuel was never paid.

When pushed to the last extremity, he would screw up courage enough to say, though very humbly: "I must have my wages. I have nothing but rags to cover me." "Oh, my dear fellow! Never mind; go to my tailor and boot-maker and get everything you want, and have it charged to me," encouragingly replied his employer, and that was all the pay he ever gave. Emmanuel went as directed and got himself clothed, but, as the things were never paid for, he received an unlimited amount of cursing from the angry creditors. Hardly a day passed that did not witness some amusing scene between young G—— and the people he owed, and, though it was a costly farce for Emmanuel, it revealed to him the whole programme of Bohemian art life.

One fine morning the studio bell was rung with unusual vigor, and the wily sculptor looked out of the little hole in his door, as was his invariable custom, to see if it would do to let the ringer in.

He saw one of his heaviest creditors, who had come with a turnout of the most attractive kind, to G——'s eyes. It was a beautiful basket-cart, drawn by a stylish pony, and fit to carry a prince. The door was opened, and the visitor received with the greatest attention and politeness. He left on foot. The sculptor had flattered his creditor so successfully that the latter not only omitted to present his bill, but permitted himself to be wheedled into parting with his horse and cart for a lot of plaster-casts. The pony and carriage were brought into the studio, there being no other place to keep them, and the sculptor assumed the duties of a stable boy. Going to the Champs Elyseés soon after to enjoy his new possession, he was caught in a thunder-storm, and the immediate necessity of a cover to his cart became evident, so he drove to the shop of the man who made them and ordered one. Having no money to pay, he resorted

[1] One of Hasenauer's latest creations, the Villa of the Empress at Lainz, offers a good example of this architect's present style, when he is working entirely alone. For this reason we insert a cut of this edifice (Figure 33).

[2] Continued from No. 788, page 73.

to the convenient dodge of impressing a new creditor with the financial importance of his client by buying a four-seated carriage for his family.

This sprightly-witted fellow was obliged to exercise the fullest powers of his invention in order to keep the wind in his sails, and here is one trick that he practised upon his rich visitors. He would say to them in an easy, off-hand and generous way: "Come, as I am at leisure to-day, I will make you something at the rate of four dollars an hour for the time I spend on it." Pleased with the novelty of the idea, the visitors would almost invariably consent, stay an hour or two, pay the amount and take the sketch home with them. Curiously enough, the sculptor got enough money in this way to satisfy his immediate daily needs, and, what is still more curious, this ingenious trick of entrapping the unwary possessor of a full pocketbook became quite a custom among the artists of the Avenue Frochot quarter. G—— was by no means ignorant of the growing facilities of his assistant, but he was too limited in his nature to take full advantage of them, save in the matter of immediate financial return. One day, a plaster-moulder who sold Biblical images came to the studio and wanted a lot of magi, Virgins and saints made on the backgrounds of plates which he proposed to reproduce by the gelatine process, and G—— agreed to make them for eighty dollars each. This order was filled by the deft hands of Emmanuel at the rate of one plate each five days, or five dollars a plate. But these were not the only pleasing events in his experience with his exploiting employer. Though the latter hated to have it known that he employed assistance, he was quite as ready to submit Emmanuel's work to the criticism of his wife and certain intimate friends, as he was anxious to hide the fact that it was made by some one else. It was, therefore, a very common occurrence that objects were not accepted, and pay for them refused.

These condemned models were carefully preserved by the young sculptor, and many of them, the "Dog Stretching" among the number, became in after-years some of the most interesting pieces of his important collection of bronzes.

Before the two years with G—— had passed, Emmanuel had left Rude's studio of pupils, and began to work for himself, in the afternoons, in his own studio in the Rue Rochefocauld, for the rent of which he paid sixty dollars a year. He also began to exhibit at the *Salon*, sending, for the first time, 1843, a plaster study of a "Gazelle." He had really started out on the uncertain sea of the life of a sculptor.

As dogs were favorite animals, he made a number from models lent him by his neighbor, Alfred Dedreux, the painter. After remaining in his studio a year he moved to the Rue d'Enfer, as he wished to be near his old master. Some other of Rude's pupils had already established themselves in the same quarter and for the same purpose. As the great sculptor often walked the street, venerable as an ancient patriarch, with his long, full beard, these ardent young worshippers would improve the opportunity to meet him and listen to his counsel and conversation.

Rude was a grave and earnest man, of noble heart, and loyal to his friends, and he loved to see his pupils, with whom he talked in the freest and most charming and friendly manner. "But so true, piercing, and simple were his words that they made," says Frémiet, "the cold chills run down our backs. We all adored him, and he loved to encourage and push us on in our careers. He lived in a modest apartment up a short flight of stairs, and received his pupils every Monday night. We danced, sang, and had discussions; a real old-fashioned French family party." The sculptor's favorite pupil, the subject of this sketch, led the dance with a sister of Mme. Rude, and when not dancing, a hot discussion always arose between Mme. Rude and himself about art, life and manners. In many respects these occasions were wild pandemoniums; fun ran riot, and the furniture itself was forced to join in the general fray. Rude, himself, hardly knew what to make of so much noisy amusement, and at times it seemed to bother him considerably.

The domestic life of the young sculptor was of the happiest. He lived with his mother, who watched over and encouraged him to follow the uncertain life of an artist. In the most disheartening moments her courage was exhaustless, and her faith in the nature and ambition of her son was as firm as her affection was intense. He had no intimates, and needed none. His mother was his all in all. "I owe all to my mother," he says. "We lived the life that pleased us best. Her counsel was my principal support. She taught me order in my work, and was my benefactress in every sense."

Terrier Dogs.

To the *Salon* of 1846, he sent a "Study of a Dog," and to that of 1847 a "Dromedary," in wax. During these years the sculptor was busy making various other animals, as the *Salon* catalogues will tell farther on, and among them a little life-size group, called "The Mother Cat," long since regarded as one of the most charming things he ever made: a little masterpiece.

Another subject, now famous for more than a generation to visitors to the Luxembourg Gallery, was also begun in clay, "The Wounded Dog," but before it was completed the revolution of 1848 broke out, and it, with other works, was neglected, dried up and fell to pieces. To the *Salon* of the latter year he contributed his group of "Terrier Dogs," now in the Château of Compiègne. They were life-size, made under the advice of Rude, from models lent him by the Baron de Veniet, and figured in the catalogue in all the dignity of their names and distinction. "Ravaude and Mascareau, dogs belonging to the equipage of M. de V——. Group in plaster."

As dogs were not popular subjects of sculpture in those days, their author was very glad that they were accepted, and as for any attention being paid to them beyond that, it was the last thing he dreamed of. His surprise was, therefore, so great that he could not believe it, when he received a letter from the Minister of Fine Arts, asking if he would sell the dogs to the State, and for the enormous sum of one thousand dollars. He was wild with happiness, and his mother so astonished that she could hardly express her joy. The letter had to be read many times before it became a recognized earthly fact. It is no wonder that this event produced a revolution of delight in the Frémiet family. Their artist son had never earned more than a dollar in a day, and had never had more than ten in his possession at one time. A thousand were now at his disposal. Ten times that would have made him no happier.

Nor was this all. A friend brought him a newspaper in which was an article about his work. He knew that there were newspapers in the world, but that they should occupy themselves about him and his dogs caused both surprise and quandary. What could it all mean? The secret really was that M. Jeanron was Director of the Government Museums, and he, seeing the dogs, liked them, and determined that the State should have them.

The past life and straitened circumstances of the Frémiets, and their understanding of the exceedingly precarious profession of a sculptor, especially brought home to them by the hard experience of their relative, Rude, would lead one very naturally to suppose that a large part of the money received for the dogs would be carefully laid aside for future necessities, and that Mme. Frémiet would see to it that such should be the case. The young sculptor had a different idea, and his mother enthusiastically encouraged him in its accomplishment. With five thousand francs in his pocket, for he put them all there the moment he received them, and the press in his favor, he determined to have a good taste of the gay world. Accordingly, he rented a fine studio in the fashionable quarter of the Faubourg St. Honoré, employed the furniture decorator of the Théatre Français to make him an immense divan in red plush, hung the stairway in silk of the same color, and filled up the studio in a like stylish manner, and with no end of foolish rubbish. Being fond of fine clothes, he dressed himself like a fop of the boulevards, and sallied out on the Champs Elysées to see and take part in the life that characterizes that wondrous thoroughfare. Thinking that his money would never end, he posed as a millionaire, rode in carriages, and indulged in all the cloudy fancies that often beset persons similarly situated. His good friends the Rudes were horrified, and they ridiculed and scolded him until they were tired, but his mother joined heartily in his scheme and rejoiced that the moment for dancing had come to her son. Again, one would suppose, as the Rudes prophesied, that the sculptor had not only reached the end of his professional rope, but that financial ruin would soon arrive. Had the example of his old employer, young G——, become the programme he proposed to follow? Agreeable delusion. The young man was simply passing through a transient moment of delicious and necessary frivolity. He was like a glass of the best champagne, sparkling foam on top, solid, inspiring nectar at the bottom. He went into the giddy world with a level head. The matchless avenue for two of the most magnificent miles in the world was filled every afternoon with the greatest variety of fine horses, and no end of people. He who was destined to become the only sculptor of equestrian statues of modern times was taking his first lessons, and to his fill, for he sketched all the time. His work was his first and principal object, and his grand studio with its imposing hangings of silk was a well-filled and well occupied work-room. His art was never for a moment lost sight of. He looked at the Champs Elysées, with its endless procession of style and luxury, like a general reviewing his army, and he gathered what he wanted with the avarice of a miser. The preliminary preparation for the work of coming years on equestrian statues needed time to season. To the *Salon* of 1849, he sent four subjects, all animals, and all life-size, including the "Mother Cat," which the State bought, in marble, for five hundred dollars. This *Salon* brought him a third-class medal, the first one he ever received.

The sculptor's contribution to the famous *Salon* of 1850–1, held in the Louvre, consisted of seven pieces, of varied subject and character. With the exception of Barye, whose *Salon* exhibits were mostly small objects, no sculptor, up to that time had made such a show. They consisted of the "Wounded Dog," life-size, in bronze; the "Mother Cat," in marble; a "Griffon Dog," "Chinese Hen," and a "Marabout," all life-size, in plaster, and his great group of a "Wounded Bear," larger than life, also in plaster. They had all been made in his gorgeous studio, besides several other life-size groups of animals that had been destroyed because they did not

please him. The "Wounded Dog," was bought by the State, for six hundred dollars, the jury gave him a second-class medal, and his exhibit created a great deal of public excitement.

The "Wounded Bear," composed of a hunter and bear, was one of the sculptor's most important and dramatic compositions. Its duplicate will be noticed farther on under the name of the "Hunter of Young Bears." While making this first group he asked his master to come and see it, and the latter, finding that the man was not vigorously enough hugged by the bear, grasped his old pupil in his arms and nearly squeezed the life out of him. "When I began to change the group," relates the sculptor, "I took my revenge for the fearful hug Rude gave me, by making the bear squeeze the life out of the man."

Though accepted by the jury of the *Salon*, it was not placed with the other sculpture, but near the entrance, the locality reserved for unworthy work, as it was considered too revolutionary — not the sort of sculpture wanted by the School: it would not do to encourage tendencies of this kind. The public did not make that discrimination, for there was such a crowd continually around it that it was with difficulty that any one could get into the exhibition. This group, and a copy of the "Wounded Dog," were sent to the World's Exhibition held in New York in 1853, and were burned with the building. The "Marabout" has the following history:

While calling one day upon M. Charles Blanc, then Minister of Fine Arts, the latter said, "Frémiet, there is a porphyry table-top in the Louvre, without legs, and I wish you would make some for it." "Very well, I'll see what can be done," answered he. Four life size marabouts were made, represented as sitting upon as many crocodiles, connected by chains, and the porphyry slab placed upon their heads. Either singly or together this composition of bird and beast was one of the most striking of the sculptor's efforts. For the original model in plaster, of this imposing bird, the sculptor received $240. A reduced copy was added to his collection of bronzes. The table has disappeared, as also the group of the "Mother Cat," both probably burned in the Tuileries. Before that event, Frémiet met at the palace General Valliant, Marshal of France and housekeeper to the Emperor, who, in their conversation, made this pleasurable observation, "O, I have one of your things, the cat and her young. It pleases my children, and they like to play with it."

It will be seen, as this story goes on, that Valliant's appreciation of this beautiful work was quite on a par with the respect paid to art by most of the authorities connected with the Tuileries, the Emperor and Empress included.

T. H. BARTLETT.

[To be continued.]

ARCHITECTURAL SHADES AND SHADOWS.[1] — XII.

CHAPTER IX.

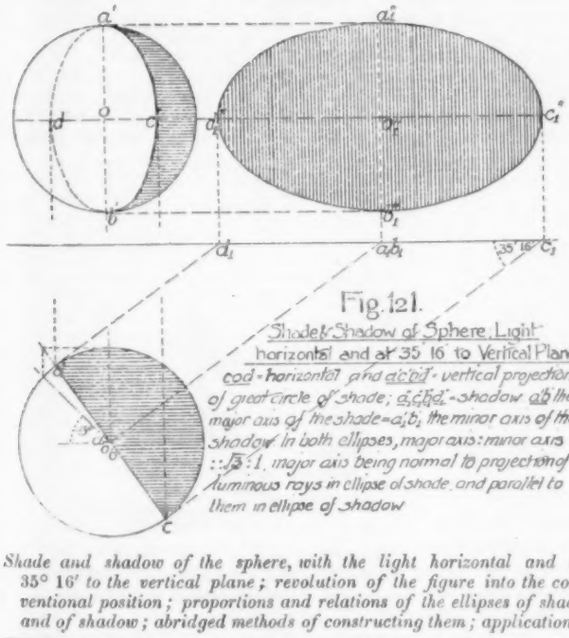


Fig. 121.

Shade & Shadow of Sphere. Light horizontal and at 35° 16′ to Vertical Plane. c o d - horizontal and a′c′b′ - vertical projection of great circle of shade; $a_1'c_1'b_1'$ - shadow a_1b_1 the major axis of the shade = a_1b_1 the minor axis of the shadow. In both ellipses, major axis : minor axis :: $\sqrt{3}$: 1. major axis being normal to projections of luminous rays in ellipse of shade, and parallel to them in ellipse of shadow.

Shade and shadow of the sphere, with the light horizontal and at 35° 16′ to the vertical plane; revolution of the figure into the conventional position; proportions and relations of the ellipses of shade and of shadow; abridged methods of constructing them; applications.

[1] By A. D. F. Hamlin, Adjunct Professor of Architecture in the School of Mines, Columbia College. Continued from page 133, No. 766.

NOTE. — [In view of the inconvenience of having to refer to back-numbers for explanations of the notation used in these papers, the following memorandum will be found of service.]

HP = horizontal plane of projection; $V'P$ = vertical plane of projection; GL = ground-line or horizon. Capital letters designate points and lines in space, small italics their horizontal projections, and the same accented or "primed," their vertical projections. Subscript figures indicate points of shadow; small figures above the line indicate points of shade. Greek letters (α, β, γ, θ, δ,) designate angles. The *diagonal* of a line or dimension is its length multiplied by $\sqrt{2}$. Shadows are indicated by vertical shading; shades by horizontal shading; shearing light by oblique shading parallel to the projections of the luminous ray.

143. Before passing to the detailed study of the general method, which was briefly sketched in Chapter III,[2] it is desirable to consider with some thoroughness the shade and shadow of the sphere.

144. If we revolve the rays of the sun about an axis perpendicular to $V'P$ into parallelism with the horizontal plane of projection, their horizontal projections will be inclined at an angle of 35° 16′ to GL, while their vertical projections will be horizontal lines. The shadow of the sphere upon $V'P$ will he a horizontal ellipse (being the oblique section of the cylindrical shadow in space by the vertical plane inclined at 35° 16′ to its axis) whose axes will be to each other as $\sqrt{3}$ to 1, the minor axis being, of course, equal to the diameter of the sphere (Figure 121). The line of shade, being a vertical great circle of the sphere, appears in plan as a straight line normal to the rays, and, in elevation, as an ellipse whose limits are easily projected up from the plan. It is seen to be of the same proportions as the ellipse of shadow, but at right angles to it, and its major axis is obviously a diameter of the sphere.

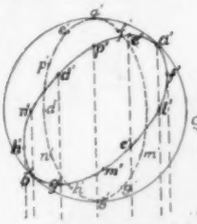
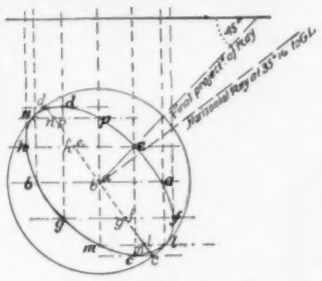


Fig. 122.

Revolution of Ellipse of Shade 45° in vertical projection. Dotted lines show original projections. Points in horizontal projection transposed along horizontal lines (traces of the vertical planes of revolution) until each falls under its new vertical projection. The final positions are indicated by the heavier letters.



145. If now we revolve sphere and rays back into their original position, *i. e.*, through a vertical angle of 45°, the shade and shadow are revolved with them, without change of shape in their vertical projection. Their horizontal projections are altered by the displacement of every point along a horizontal line[3] until it falls under its new vertical projection, as illustrated in Figure 122, and the line of shade becomes an ellipse, precisely similar to that in the vertical projection, but at right angles with it, while the rays are now restored to their original angle, in plan, of 45°. Figure 123 shows the operation completed.

146. Examination of the proportions and relations of these ellipses at once suggests abridgments of these operations, by which we get rid of the revolution entirely. All these ellipses are inclined at 45° to GL, in different directions; all have the same ratio of $\sqrt{3}$ to 1 between their major and minor axes, and, as the diameters of the sphere form the major axes of the ellipses of shade, and the minor axis of the ellipse of shadow, all three can be drawn by the ordinary processes for constructing an ellipse upon known axes.

147. But there is a very simple and expeditious method of obtaining twelve points in each ellipse, with the direction of the curve at eight of the twelve; for its circumference passes through three corners of each of the two squares constructed upon the two halves of the major axis as diagonals (as p', l', m', n' and e'_1 f'_1 g'_1 h'_1 in Figure 123); and if we construct a square having the minor axis for its diagonal, and extend each of its sides by half its length in either direction, the curve will also pass through four of the eight extremities of these lines, these four points being, respectively, the points of horizontal and vertical movement of the curve, as well as its highest and lowest and extreme right and left hand points (Figure 124).[4] These four points, with the six previously mentioned and the extremities of the minor axis, make the twelve required points.

148. A neat method of locating the extremities of the minor axis of the line of shade is shown in Figure 123. At the end of the horizontal diameter of the sphere erect a line at 45° (parallel to the major axis) till it cuts the ray or tangent from the extremity of that axis. Connect this point of intersection with the centre; the line thus drawn cuts the circumference in a point which, being projected down at 45° (*i. e.*, parallel to the major axis) upon the diameter at right angles with that axis, gives us the required extremity of the minor axis.[5] To lay off the true length of the major axis of the ellipse of shadow, we may either lay off from one end of the minor axis along the ray passing through it the diagonal of half that axis, and revolve the point thus obtained down upon the ray passing through the centre of the shadow (*i. e.*, the shadow of the centre of the sphere), as in Figure 125; or, having drawn a

[2] In No. 694 of the *American Architect* for April 13, 1889.

[3] This line is the horizontal trace and projection of the vertical plane and arc of the revolution through 45°, to which the point has been subjected.

[4] A square circumscribed about the ellipse and touching it at these four points will have its sides horizontal and vertical, and its diagonals upon the axes of the ellipse, and equal to twice the minor axis.

[5] For the triangles $o'c'x$ and $o'a'y$ are similar; now $a'y' : z o'$ (or its equal, $o'a'$) : : 1 : $\sqrt{2}$; hence the hypothenuse $o'y : a'y' : : \sqrt{3} : 1$, and, therefore, $o'x : o'c' : : \sqrt{3} : 1$. But $o'a = o'x$, and $o'c'$ is, therefore, to it as 1 to $\sqrt{3}$, which was required.

line connecting the extremities of the axes of the ellipse of shade, we may then draw a line parallel to it from the end of the diameter containing the minor axis of the same ellipse until it meets the major axis produced, upon which it will cut off the length of the semi-major axis of the shadow (*o's* in Figure 123).

149. In actual practice the first thing is to find the centre of the shadow, which is the shadow of the centre of the sphere; the minor

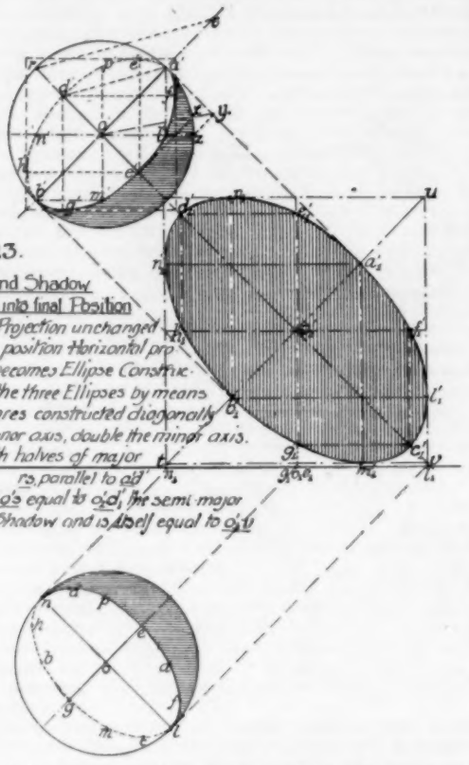


Fig. 123.

Shade and Shadow revolved into final Position

Vertical Projection unchanged except in position Horizontal projection becomes Ellipse Construction of the three Ellipses by means of Squares constructed diagonally upon minor axis, double the minor axis and both halves of major axis. r_2s_2 parallel to $o_2'l_2'$ cuts off $o_2's_2$ equal to $o_2'd_2'$, the semi-major axis of Shadow and is itself equal to $o_2'y$

axis of the shade, and the major axis of the shadow lie on the ray passing through it. The operations just described are then easily performed. We may state the general rule as follows:

150 (*XVII*).—*The visible line of shade upon a sphere in either projection is half of an ellipse whose major axis is a diameter of the sphere normal to the direction of the light in the same projection, and is to its minor axis as* $\sqrt{3}$ *to* 1 *or as* 1 *to* $\sqrt{\frac{1}{3}}$. *The ellipse passes through three corners of each of the squares constructed upon the halves of its major axis as diagonals, and is inscribed in the square whose diagonal is the minor axis produced to double its length.*

The shadow upon either plane of projection is an ellipse whose minor axis is equal to a diameter of the sphere and normal to the direction of light in the same projection, and is to its major axis as 1 *to* $\sqrt{3}$. *The ellipse passes through three corners of each of the squares erected upon the halves of its major axis as diagonals, and is inscribed in the square which has for its diagonal its minor axis produced to double its length.*

151. It is hardly necessary to emphasize the frequent occurrence of the sphere and parts of the sphere in architectural forms. The methods just explained are believed to be the most convenient and accurate of practical processes for drawing the required ellipses, which one often sees very incorrectly proportioned in architectural drawings. Particularly is this apt to be the case in drawings of domes and half-domes of low curvature, like that of the Pantheon or of Santa Sofia, in which the shade is usually greatly exaggerated, or is shown where in fact it should not appear at all (No. 2, Pl. IV). It is also sometimes forgotten that the shade on the hemisphere is precisely the same as the visible shade on the sphere; while the shadow of a hemisphere attached to the plain of incidence (when the latter is a coördinate plane) is so much of the half of the ellipse of shadow as is not covered by the hemisphere itself, the major axis of the shade and minor axis of the shadow being one and the same diameter of the sphere (Pl. IV, Nos. 1, 5 and 6).

152. When the hemisphere or any portion or zone of the sphere merges into a cone, cylinder or other rectilinear surface of revolution, as in vases, spindles and similar forms, the lines of shade of the two bodies meet in an abrupt angle even when the surfaces meet tangentially, precisely as in the case of the cone superposed on the cylinder (Figure 126; also see Figure 90, in No. 755 of the *American Architect*).

153. The sphere may be used in finding the line of shade of solids of revolution in the following manner. If a sphere be inscribed in such a solid, the point where its line of shade crosses the circle of contact is a point also of the line of shade of the solid, as may be easily seen in Figure 126, and in No. 9, Pl. IV. So that if we inscribe (or circumscribe) spheres at a number of assumed circles of contact on a given solid of revolution, the points where their lines of shade cross each its respective circle of contact, will be points in the line of shade required. The centre of the tangent sphere in each case will be on the axis of the solid, where it is crossed by a normal (a line perpendicular to the tangent) drawn to the profile-curve of the solid at its desired point of contact with the projection of the inscribed sphere. The process is illustrated in Figure 127, and sometimes furnishes a convenient substitute for the "Method of Slicing," which forms the subject of the next chapter.

154. Plate IV furnishes illustrations of a number of shades and shadows of spherical surfaces in architecture. In some of these, as in the upper part of No. 1 and in No. 4 the whole "visible" line of shade of the hemisphere comes to view. In others a portion only of the sphere is employed, and it becomes necessary to complete the sphere and find the whole line of shade of which only the portion lying on the spherical surface is then used, as in the flattened nail-head of No. 1, which presents only a zone of the sphere; in No. 4 where the lower part of a hemisphere forms the corbelling-out of a semi-cylindrical turret or oriel, and in No. 11, where the various rosettes or bosses on the cubical top of the newel are all parts of one and the same sphere. It will be noticed in this case that the upper part of the line of shade of the sphere is lost in the shadow cast by the cubical newel-top. The spindle-collar in No. 3 is also a zone of a sphere, as is the lip of the vase in No. 9; though in the latter case it is cut from the lighted part of the sphere, the highest visible point of the line of shade (the upper end of the major axis) falling below the edge of the lip. This is also the case with the dome of the Pantheon, No. 2, in which only the lighted portion of the sphere emerges from the encircling haunch-steps.

No. 5 shows the shadow of the hemisphere cast upon the horizontal plane of its base, and Nos. 1, 6, and 11 in the same plate illustrate the shadows of portions of hemispheres, of varying extent, cast upon vertical planes of incidence passing through their centres. In No. 6 we have an illustration of the principle explained in Chapter VI:

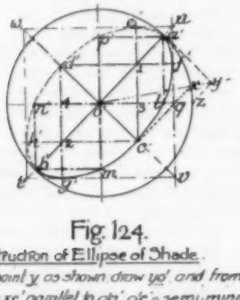


Fig. 124.

Construction of Ellipse of Shade.

Find point y as shown draw yo' and from x draw xs' parallel to $o_2'z'$, $o'r'$ = semi-minor axis; complete this axis and construct upon it the square $r'2d'$ as shown, prolonging its sides till they meet the square tuvw drawn through q (or upon diagonal vw equal to twice $c\bar{q}$) Draw the squares $g'a'f'$ and $e'm'b'n'$, and draw the Ellipse thro' the 12 points thus found. $a'f'k'c'm'g'b'h'd'p'e'$

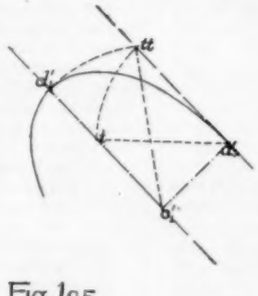


Fig. 125.

Given the centre o_2' of the Ellipse of Shadow, to lay off the semi-major axis. Take $o_2'a_2'$ equal to radius of Sphere; make $a_2't = a_2't_1$ = diagonal of $o_2'a_2'$; then $o_2't : o_2'a_2' :: \sqrt{3} : 1$, and $o_2'd_2' = o_2't_1 : o_2'a_2' :: \sqrt{3} : 1$. = required semi-major axis.

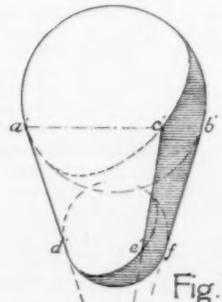


Fig. 126.

abc, def, = circles of contact of two spheres with conical frustum. Points c and d are common to lines of Shade of cone and of spheres.

[1] In No. 718 of the *American Architect*, for September 28, 1889.

with reference to the crossing of lines of shade and of shadow; the intersection of the two lines of shadow on the wall is the shadow at once of a point on the line of shade of the spherical corbel where it is crossed by the shadow of the belt-course above it, and of another point on the line of shade of the belt-course itself.

The fact that the ellipses of shade and shadow are tangent to the circumscribed vertical squares having for their diagonals the doubles of the minor axis of the ellipses, at points midway between two opposite corners and the centres of the four sides, may be proved from the

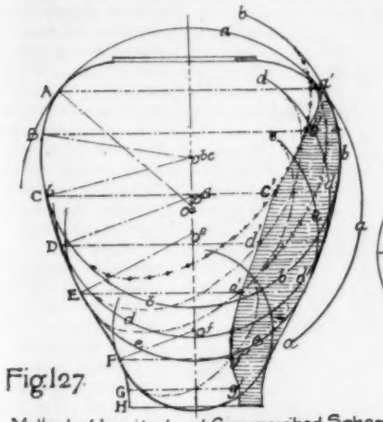


Fig. 127

Fig. 128.

Method of Inscribed and Circumscribed Spheres

The Spheres aaa. bbb. ddd &c. having their centres at a^a. b^{bc}. $d^{d^2 bc}$ &c. are tangent to the jar's Surface in the circles of contact A B C D &c. (From B to C the Surface coincides with the Sphere bbb: from G to H it is a Cylinder) The 5 lines of shade cross each its circle of contact at the points a', b'c, d' e' f, which are points in the line of shade of the jar. Ao^a. Bo^{bc}. Co^{bc}. $Do^{d^2 bc}$ are Normals to the profile of the jar by whose respective intersections with the Axis the centres of the Spheres are located.

equation of the ellipse referred to rectangular axis at 45° to its own axis $(a^2(x+y)^2+b^2(x-y)^2=2a^2b^2)$ by making $a=1$, and $b=\frac{1}{\sqrt{3}}$, and assigning to y in the resulting equation, the value $\frac{1}{4}\sqrt{\frac{2}{3}}$, which is the length of $f'q$ in Figure 124, and the height of f' above the horizontal diameter. The corresponding value of x will be found to be precisely the double of this, or $\frac{1}{2}\sqrt{\frac{2}{3}}$, or $\sqrt{\frac{1}{6}}$, which is the length of $o'q$ or half the side of the circumscribed square, as it should be. But this demonstration, as well as the purely geometrical one, is too long for the limits of this paper, and may be left to the industry of the ambitious student to work out in full.

NOTE. — The line of shade on the sphere as found by the method of revolution explained in this Chapter, is seen to conform to that of the "five-point method" explained in Rule XV and §116, and illustrated in Figures 93-96 of Chapter VII. It is tangent to the profile of the sphere at the 45° points of tangency, it crosses the "equator" at the right-hand front "corner," and left-hand back "corner," and its highest and lowest points are on the right-hand back "corner" of the upper circle and the left-hand front "corner" of the lower circle of contact of tangents at 35° 16'. Some reader may ask for demonstration of the correctness of the rules given for drawing this shade and shadow of the sphere. This has already been given, indirectly at least, in Figure 121, so far as the ratio between the axes of the ellipses is concerned. To prove that the curves pass through three points of each of the squares constructed diagonally upon their semi-major axis, it is necessary to establish the proposition that when the angle at l' (Figure 128) made by $o'l'$ and $a'l'$ is a right angle, the ordinate qp will be to its segment pl' as $\sqrt{3}$ to 1, since this will prove l' to be a point in the ellipse whose axes are to each other in that ratio.[1] Now $o'l'a'$ is isosceles as well as right-angled, hence $pl'=o'p=pa'$. Drawing qa' and qo', we have an equilateral triangle since $a'o'$ and qo' are radii, and $qa'=qo'$ ($o'a'q$ being also isosceles), hence $qa'=2pa'$, and if we suppose pa' equal to 1, $qa'=2$, and $qp=\sqrt{qa'^2-pa'^2}=\sqrt{4-1}=\sqrt{3}$, hence $qp:pl::\sqrt{3}:1$ or as $1:\sqrt{\frac{1}{3}}$. Q. E. D.

[To be continued.]

JADE. — The estimation in which nephrite is held in Burma and China is well known to those having any acquaintance with those countries. The Tombstone of Tamerlane at Sarmarcand is of dark nephrite, embedded in white jadite, and the source of the dark stone has recently been discovered by M. Grombchevsky in the nephrite mines of the Raském-daria, on the eastern slope of the Pamir. There is here a huge dyke of extremely hard nephrite in the rocky banks of the Raskem-daria, which are chiefly formed of white jadite. Professor Muskhetoff has analyzed the specimens brought home by M. Grombchevsky, and finds them identical in composition with the nephrite of Tamerlane's tomb. The white jadite is similar to that found on the tributaries of the Irrawaddy in Burma. — *Indian Engineering.*

[1] Because in any ellipse and the circle constructed upon its major axis as a diameter, the ratio between the ordinates of the circle and of the ellipse dropped to any given point on the major axis, will be the same as that between the axes of the ellipse.

EQUESTRIAN MONUMENTS.[2] — XXXV.

GENERAL WASHINGTON. — II.

Athenian Horseman from a Vase of Euphronios. After "*Courier de l'Art Antique.*"

FAR better than the statues by Mills or Crawford is the one by Henry Kirke Brown, which had the fortune to be erected at an earlier date than either in Union Square, New York, upon the spot where Washington is believed to have been received by the citizens of New York, November 25, 1783, when he entered the city after the evacuation by the British.

It is altogether the fault of its position that the absolute merits of this group are not more often recognized. The best piece of sculpture in the world, with such a background of dingy and irregular brick buildings, and surrounded by the rush and confusion of the street traffic at that point, would more often than not wholly fail to attract attention. So far as Washington is concerned, Brown has made a thoroughly dignified rendering of character, and, in the pose, the quiet-compelling action of the down-turned palm-furnishes the essential element of stillness which the unmeaning impassivity of Mills's figure does not lend to his group. The fact that the figure is bare-headed, which may have been made desirable for reasons affecting portraiture, is a feature which seems out of place in any out-of-door statue in aught but Classic costume, and particularly so in an equestrian figure. The horse is less good than Brown's later horses, and the detail of the modelling is more timidly done, but it is more than a fair piece of work. In fact, the great shortcoming of the group is that the modelling was not carried far enough, the sculptor seeming to be content to stop as soon as he had somewhat sketchily developed his idea.

This group, which was the outcome of a popular movement, resulting in a subscription of $31,331, collected by Colonel James Lee, was unveiled July 4, 1856, a year and a half before Crawford's

Washington, a Bronze Statuette. Marochetti, Sculptor.

figures were unveiled, and five and a half years before Mills's group was set in place. It took Brown less than four years to deliver the completed group, and this was remarkably rapid work, considering that it is so large — the height being fourteen feet and the weight about four tons — and that it was composed of the largest castings that the Ames Manufacturing Company, or, for that matter, any other founders in this country, had made. The rough castings were sent to New York, and the finishing and mounting done in Brown's studio under his own supervision. A contemporary account states that Brown did not model his work in clay, but cut it out of plaster — a very improbable story, which may have had its origin in the unfamiliarity of the writer with the several processes through which a

[2] Continued from No. 787, page 60.

statue passes in its development. Still, if the tale be true, it may account for Brown's treating his figures in simple planes, and not carrying the detailing of his modelling any farther than he did.

The signal virtue in Brown's group is its dignity.

Mills's statue is the nation's statue, Crawford's is the offering of the State of Virginia, but Brown's and all the other equestrian figures are the results of the efforts of individual citizens, or of associations formed often with the erection of a statue of Washington for their prime or only object. In the case of Brown's statue, it may be suspected that Colonel Lee and others were hardly prompted to undertake the erection of a statue of Washington because of any knowledge of the slumbering resolution of the first Congress. It is not unlikely that it was one of a number of similar schemes which the good citizens of New York may have been entertaining at that time with a view to creating more ornamental surroundings for the approaching World's Fair, which doubtless was much talked about at the time Colonel Lee began his canvass; and what would so surely add the stamp of cultivation and metropolitan distinction as the possession of an equestrian statue? However this may be, even so rapid a workman as Brown could not have his statue finished in time for the Exhibition of 1853, and visiting citizens from other States and foreign countries could have carried away with them no memory of any equestrian figure of Washington but for the chance that the Italian sculptor, Marochetti, at that time domiciled in England, exhibited a large model of Washington on horseback, to which was given the place of honor under the dome of the Crystal Palace. It does not appear what prompted Marochetti to send a large model across the Atlantic, but those were the days before the sculptor had achieved a high reputation in England, which placed him beyond the need of seeking patronage from people so far away, and so presumably ill-able to appreciate it. The model was probably destroyed when the Crystal Palace was burned in 1858, and the sculptor got nothing for his venture save some very savage criticisms from Horace Greeley, who wrote that the model was everything that was atrocious. There was nothing derogatory to either horse or rider too bad for this user of plain words — but art-critic of doubtful capacity — to say of the group. What seemed particularly to excite his ire was that the horse was the same as the one upon which Marochetti had already placed Richard Cœur de Lion. Washington's face was said to be wholly unlike any Washington that had ever been devised — and, seeing that there is so great a variety in the recognized portraits of Washington, the fact that it had no resemblance to any must have shown that the Italian drew on his own imagination entirely in creating his model. If half this savage criticism be true, the destruction of the model was a fate that none can lament. If the bronze statuette, some three feet high, in the Metropolitan Museum of Art, be a reduction of this model of Marochetti's — and it was believed by those who added it to the Huntington collection to be that sculptor's work — it does not entirely accord with Greeley's description of it, and fails to support his fault-finding in some respects. The statuette, particularly the equine portion, has a general likeness to Marochetti's facile and perfunctory work, and there seems to be little reason for questioning the ascription of authorship.

Washington, Union Square, New York, N. Y. H. K. Brown, Sculptor.

Washington, Boston, Mass. Thomas Ball, Sculptor.

Washington (Wooden Statue), Boise City, Idaho. Charles Ortner, Sculptor.

The impulse given to the creation of memorials to Washington by the preliminary steps taken in Washington, Richmond and New

York was felt in Boston, and the method adopted by the citizens of New York was carried a step farther there by the organizing of a Washington Statue Committee, who were appointed at a meeting held in Boston, April 9, 1859, at the instigation of certain artists, and at once began an active canvass for funds. In this task the ladies assisted greatly, raising over ten thousand dollars through a fair they organized. Another large contribution was secured by the transfer to the new project of the surplus of the Everett Statue Fund, which amounted to some five thousand dollars; the City of Boston contributed ten thousand dollars, and the remaining twelve or thirteen thousand — the entire cost, including pedestal, was $42,442.28 — was made up by private contributions of varying amounts.

It does not appear whether the meeting called in 1859 was the result of a conception originating at that time, or whether it was in any way connected with the earlier movement of the same kind, which had its beginning much earlier in the century; for in this matter, as in many other things, Boston has been the first to make a movement. On April 27, 1811, a similar meeting of citizens was held to consider ways and means for compassing the erection of an equestrian statue of General Washington, and a proper organization was at that time formed, with a board of trustees consisting of prominent citizens, and a code of rules and regulations. This first association does not appear to have accomplished anything or to have raised any funds, for we find no record of a transfer of any such fund to the new project fifty years later, as would probably have been the case had any such fund been collected.

It is doubtful, too, just what part Thomas Ball played in getting together the second meeting. He had already made a model for an equestrian statue of Washington, and the meeting recommended that it should be adopted and carried out at colossal size; but whether some one asked him to prepare the model so that the meeting might have something tangible to consider, or whether his friends organized the meeting for the sake of giving him a chance to carry out his design, is not plain, but the first supposition is probably the most reasonable one. However, whatever was the starting-point, the result is that in Ball's "Washington" Boston has a very good equestrian statue, simple, straightforward and, best of all, quiet and dignified. It is not a great piece of sculpture, and its essential nature is pictorial rather than statuesque. It is not one that artists and art-critics, when at a distance, will recall as one of the best statues of the world, but, if they cannot do that, no more can they recall to mind any improprieties or absurdities, and they can hardly fail to remember that its dignity and its sobriety of composition were most marked. If it cannot be considered a piece of sculpture of the first rank — and it is certainly far above the average of its kind — its claim to a place as a first-class piece of urban decoration cannot be disputed. It is a distinctly decorative piece of property that Bostonians have secured, and it is well placed. Many statues require an architectural background to bring them out and support them, and would sink to insignificance if set in an open space like the Boston Public Garden. But this group is notable for being one of the few which give to the eye a just account of their real size; in fact, it rather gains in this respect, for the group is but sixteen feet high, and is mounted on a pedestal of nearly the same height, the work of Hammat Billings, and, like all of his works, this pedestal has in it elements which he did not quite know how to carry far enough.

The only equestrian statue of Washington that has as much of dignity as Ball's is one which is most likely to attract the ridicule of those who do not know its story. Among the hundreds of European political refugees who have come to this country was Charles Ortner, who was born in Baden in 1828, so that he was just of the right age to be carried off his feet by the revolutionary wave that swept over Europe in 1848, and was led by his hot-headed youth to take part in an unsuccessful Hungarian insurrection. The result of his rashness was that he had to leave home suddenly, and came to New York in search of that glittering future which all immigrants believe is in store for them here. He found, however, that gold was not dug in the outskirts of New York, but that he must travel some three thousand miles by land, or thrice that distance by sea, before he could actively enter on that fascinating pursuit. Which course he followed does not matter, but he finally arrived in San Francisco in 1850, and spent the next ten years in the neighboring gold regions. In 1860 he joined the "rush" to the Florence mines — of unsavory repute in the English market — in the northern part of Idaho. After four years he settled down on a small farm, and led the variedly monotonous existence of farmer, gold-miner and hunter. Such a life tempts a solitary man either to forget his manhood and seek a relief in the brutal excesses of the nearest mining-town, or else sets him to developing those inner qualities with which nature has endowed him. Ortner chose the latter course, and about 1865–6 he conceived the idea of making an equestrian statue of General Washington as a means of occupying himself in the long winters' solitude. For a miner with no tools and no books to aid him, and with a government postage-stamp as the only piece of guiding portraiture within his reach, this was, to say the least, an ambitious task. Environment and familar materials have in all cases had an important influence on the development of art. A backwoodsman with such an aim in view would naturally think not of clay or stone or bronze, but of wood, and of wood Ortner determined to make his statue, and of fir-wood he made it — full life-size — after three years' labor, having for his only tools a gouge, a chisel, a saw and, of course, the axe with which a woodsman can do more things than most men can do with a full kit of tools.

While the Territorial Legislature was in session at Boisé City in the winter of 1869, Ortner brought his statue to the city and modestly offered it to the Governor, saying that, "should there appear to be any merit in the work sufficient to cause its acceptance, I shall feel not only gratified, but sufficiently rewarded." Here is modesty and generosity that few sculptors have equalled. Other sculptors have presented statues to States and municipalities, but they always had in mind the future benefit to themselves that would accrue from such an advertisement of themselves and their abilities. Ortner had no such *arrière pensée*. He was not a sculptor, and did not propose to follow farther the path which had thus led him before the public gaze. The simple German refugee sought only to give expression to his gratitude to the country which for a score of years had sheltered him, and to his admiration for a character whose dignity he appreciated.

The members of the Legislature may not have been competent art-critics, but they were, at least, warm-hearted Western men, and they not only accepted the gift, but did not feel that the mere acceptance was the sufficient reward the sculptor declared he should esteem it, and so they voted him a compensation of twenty-five hundred dollars.

The group was at once set in place before the State building, and unveiled in the middle of a snowstorm in the presence of the State officials, the troops and all the citizens and miners of the neighborhood. It was subsequently removed to the city park, where it still stands, after twenty years, in reasonably good condition. Its only protection from the weather has been an occasional coat of bronze paint, which kept out the weather well enough, but could not keep off the local hoodlums, some of whom, in 1882, broke off the horse's left foreleg — or perhaps it was some tourist who wanted a relic. Instead of letting the statue go to ruin, as was done in the case of the statue of George I in Leicester Square, London, the damage was repaired, but somewhat unskilfully, and the statue will probably remain for many years longer a monument of sincere artistic effort carried out under most inauspicious circumstances. If sincerity and purpose have any part in sculpture, then this statue, in spite of its crudeness, has a valid claim to be called a work of art.

[To be continued.]

THE BYZANTINE MOSAICS OF SICILY.[1] — I.

Campanile of the Church of La Martorano, Palermo.

IN the history of Byzantine art, so little known, yet so worthy of study, the monuments of Sicily hold a deservedly high place. If in Ravenna, a Greek town in the far west, the Byzantine art of the fifth and sixth centuries displays its most splendid configuration; so if we unite Cefalu and Monreale to Palermo, we realize the most exact idea of the school of Byzantine mosaic which flourished in the twelfth century. By a strange chance, no great ancient remnant, no modern monument over-shadows the eclat of this glorious epoch; no rival splendor draws the admiration away from these incomparable works of Siculo-Norman art, real gems resembling nothing to be seen elsewhere.

During nearly one century — the only remarkable one in its history — Palermo presented to the world a unique and wonderful spectacle. Under the influence of a foreign dynasty (the Norman princes), who were truly the national house of Sicily, it produced a refined civilization and an original and charming school of art, which at its height was the first in the world; an art, seductive above all others, which understood how to combine and conciliate three elements seemingly irreconciliable, namely: the Byzantine, Arabian and Latin worlds. These elements, thrown together by the chance of conquest on Sicilian soil, brought out the most extraordinary medley which ever existed; Roman churches sparkling

[1] An article by M. Ch. Diehl, in *L'Art*.

with mosaics, and treated in detail according to Arabian and Byzantine rules; cathedrals, which, according to Renan, "were embellished from foundation to dome like the pages of a resplendent Bible"; Latin Basilicas surmounted with Byzantine cupolas; chapels built on the plan of mosques, with ceilings decorated with pedentives shaped like stalactites, and ornamented with cufic inscriptions: Saint Sophia

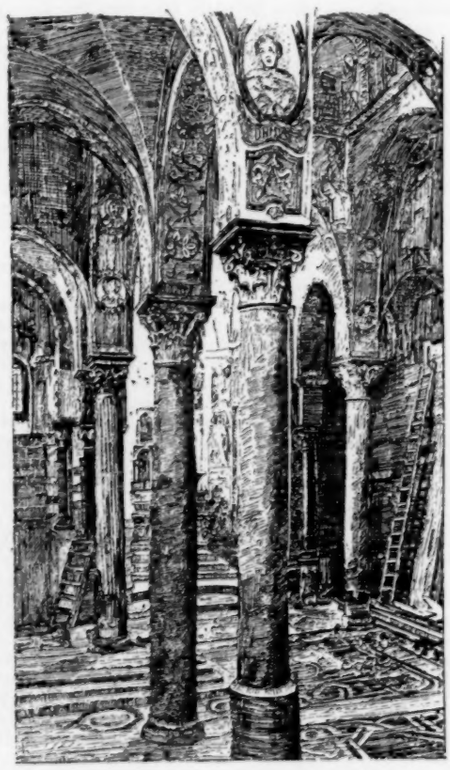
Twelfth-Century Mosaic in the Church of La Martorano, Palermo.

and the Mosque of Omar associated with Saint Etienne de Caen — such is the unexampled combination which Sicily conceived and realized in the twelfth century. La Martorana and the Palatine Chapel, the cathedral of Cefalu, and the Abbey of Monreale are counted among the most illustrious monuments of this rare and curious civilization. But to perceive its true value it is not sufficient to be merely seduced by their charm or astonished at their splendor; in order to be well acquainted with them, one must try to find out the environment in which such marvels flourished, and what circumstances gave them birth. Here the History of Civilization must precede the History of Art: the researches of the historian explain and illustrate the works of the artist.

THE SICULO-NORMAN CIVILIZATION OF THE TWELFTH CENTURY.

All know the wonderful fortunes of those Norman adventurers who, in the middle of the twelfth century, came to offer their aid to the princes of Southern Italy, and at last cut for themselves at the point of the sword, dukedoms and kingdoms in the peninsula. The latest comer among them, Roger, the youngest son of Tancrede de Hauteville, was not the least fortunate. After twenty years of battle, the history of which has often the quality of an epic, that hard fighter knew how to withdraw Sicily from the hands of the Arabians, who had been her masters since the ninth century; and what is still more noticeable, he knew how to organize his conquests. Events had brought together in this land of Sicily elements most heterogenous and races most diverse. The Byzantines, who, for over three centuries were without interruption the only masters of the island, have left here as everywhere else, enduring traces of their influence; the native population, Hellenized by contact with its masters, became Greek in language, religion and heart; and in spite of the ruin of the Byzantine denomination, they preserved the memory and regretted the fall of the régime. In their turn the Arabians, who replaced the Greeks, introduced the Mussulman element into Sicily during two centuries of a prosperous and glorious government. Therefore these men of different race, language, and religion, Greek Christians, Mohametans and Jews would seem to be hostile to their new masters also. The Norman princes being true Catholics, Islamism had everything to fear from them; the Greek Church had but little to expect from these Latin Christians, faithful servants and devoted champions of the papacy. The Norman princes must have shown wonderful ability and great political genius, which compels our admiration, to be able to calm so much legitimate suspicion; to live in peace and at the same time to attach to their domination elements which seemed incompatible; to maintain among all a just balance, and to inspire in all the same devotion. Between Catholics, Greeks, and Mohametans the princes made no differences; like their brothers, the Normans of Syria, they knew how to accommodate themselves to the customs and habits of their new subjects, using each one of them with care, and dividing their liberality and favors with equal measure among all; borrowing from all, with an unusual eclectism, the widely differing elements which formed their civilization. They knew how to become Byzantines and Arabians, although they remained Normans, and to show, in the full tide of the eleventh century, a most striking example of politic tolerance and religious impartiality. Great Count Roger (1060–1101), the conqueror of Sicily, was the first who put into practice this judicious line of conduct; after him, when fortunate circumstances had united the whole of Southern Italy under the reign of his son, who had taken the title of king, his three successors, Roger II (1101–1154), William I (1154–1166), and William II (1166–1189), continued in their vast States the traditions of the founder of the race. They knew how to group and amalgamate into one nationality all the living forces, all the discordant elements of the country, and from this unparalleled combination to give birth to an astonishing and incomparable civilization.

From these turbulent but faithful vassals the Roman Church had a great deal to expect, and in fact, Count Roger's first care was to replace under papal authority the bishoprics formerly abstracted by Byzantium from the papal jurisdiction; priests in Latin orders were installed in the bishoprics of Sicily — Robert of Normandy, at Troina; Etienne de Rouen, at Mazara; Roger de Provence, at Syracuse; and in many dioceses the Greek native clergy was made subservient by Roger to these Latin bishops. But in spite of the large privileges given to the Roman Church, who protected his enterprises, and to the Latin clergy who followed the Roman Church in order to make a profit from the conquest, Roger was too smart a politician not to show the Greek element very particular consideration. On the morrow after the conquest he re-established on their seats the Greek Archbishop of Palermo and the Greek Bishop of Taormina. Anxious to treat fairly the people's susceptibilities, he carefully respected the acquired rights of the orthodox bishops; and not satisfied with having secured to the Greeks through solemn promises, the maintenance of their ceremonies, customs and rights, he occupied himself with organizing the Oriental Church and placed at Reggio, Palermo and Messina, popes by proxy to have charge of her administration. Besides Latin cathedrals which he erected at Mileto, Squillace, Troina, Messina, Trapani and Mazara, at Palermo he built churches devoted to the Greek religion; and while he called St. Bruno to Calabria, and founded in his States the first Cistercian abbeys, he favored the Greek monks of St. Basil's order. Calabria and Sicily are full of his pious foundations; after each battle won, the Count established a monastery, and these convents were always confided to Greek monks. Roger's munificence overloaded the disciples of St. Basil, as is attested by numerous diplomas and magnificent donations; and the list of Greek convents which were founded and endowed by the great Count is a very long one. St. Gregory, the Thaumaturge, and St. Nicholas in the diocese of Squillace; St. Maria de Eremo at Stilo; St. Nicodemus in the diocese of Gerace; St. Philip in the diocese of Locres; St. Mary of Reggio; St. Philip of Messina; St. Gregory, St. Eli and St. Michael of Troina, and St. John of the Greeks at Palermo, and many others could be pointed out, speaking for themselves of Roger's piety and the consideration shown toward the Greek Cenobites; and his benevolence was such that for a long time the orthodox bishops of



Interior of the Church of La Martorano, Palermo.

Sicily flattered themselves with the hope of attaching Count Roger entirely to the Eastern Church.

When Roger II became King of Sicily he did not act otherwise or do less than his father. The most renowned monasteries of Southern Italy owed to him their splendor.

St. Nicholas de Casole's Abbey founded near Otranto by the Prince of Tarentum, Bohemond, another Norman,[1] the well-known Calabrian monastery of St. Maria de Patire preserved for many centuries a grateful remembrance of the great King of Sicily; but above all the Royal abbey of St. Salvatore at Messina, owed to him its fortune and its glory. The royal patronage extended the jurisdiction of the Archimandrite of St. Salvatore over forty-four convents of Sicily and Calabria, making him in fact, the general superior of an important fraction of the Basilian order.[2] In these three rehowned monasteries the study of literature and the copying of manuscripts kept up the Hellenic instruction, and rich libraries furnished the matter for studious activity. Around these intellectual foci were grouped numerous similar foundations; and under the patronage of princes, Italian Hellenism shone with incomparable lustre.

The subjects, very anxious to follow their master's example, founded or endowed richly the Basilian abbeys and at the end of the twelfth century, at Brindisi, Otranto, Rossano and Reggio, indeed in the whole of Sicily, the Eastern rites were freely celebrated.

In spite of the reluctance of the Roman Church, notwithstanding the efforts of the last Norman princes, and those adventurers from the Province of Anjou who became kings of the Twin Sicilies, Hellenism left a long train of reminders in these regions. At the end of the thirteenth century the envoy of Pope Clement VII found the worship of the Greek Church so flourishing that he thought himself to be in Greece, and in our day, even, more than one souvenir attests the long favor which Hellenism enjoyed in Southern Italy.

The Mahometan element was not treated with less benevolence; doubtless the years of the Norman conquest were more painful to Arabians than to Christians; but immediately on the taking of Palermo, Roger guaranteed to the Saracens the free exercise of their worship and entire safety to their persons and property; and if he did not allow them authority to build mosques, and if, during the early years of his government, he even tore down more than one edifice erected by the unfaithful and took away from them the old churches which had been turned into mosques by the Arabian domination, this situation, at first a little precarious, improved rapidly under the successors of the great Count. Under King Roger and both Williams, the Mussulmans had in each town their respective quarters, judges and communities; mosques were opened unmolested at the side of churches. And if the Government, by a wise measure easy to be understood, forbade the "djoumah," or solemn assembly for the Friday's prayer, in everything else the largest tolerance obtained, and Christians witnessed without astonishment or scandal the great feasts of the "Beiram," the Mussulman magistrate proceeding accompanied with horns and kettledrums to make solemn prayer at the mosque. Mohammed-ebn-Djobair, the Arabian traveller, a Mussulman from Spain, who visited Sicily at the end of the twelfth century, tells us in a curious relation what importance his co-religionists maintained in the Norman Kingdom. Doubtless, the religious zeal of the Christians was carried a little too far, and they committed unwarrantable excess, and, for the sake of proselytism, were not reluctant to extort conversions by force or misrepresentation; but in spite of these transitory vexations, the Arabians of Sicily had nothing to complain of against their new masters — their mosques were numerous, their religious schools prosperous, many of them were wealthy, powerful, esteemed; and their devotedness to their masters was such that at the death of William I, Arabian women were seen rushing down the streets of Palermo with mourning dresses and loose hair, accompanying their funeral choruses by the rolling of their tabours and weeping for the Norman king as they would have done for a Mussulman emir.

Moreover, the conquerors were quickly seduced by the powerful charm of the two superior civilizations they met in Sicily. Roger II and both Williams lived like princes of the East. The high officers of the Crown and the great dignitaries were Greek or Arabian. At the head of King Roger's fleet were found Syrians, like Christodoulos or George of Antioch and eunuchs converted to Christianity; the place of grand chancellor was confided to Arabian cadis; the royal council was composed of Greeks and Musselmans. At the Court of Palermo, the Latin, Greek and Arabian tongues were spoken equally. Theophanes Alerameus, Bishop of Taormina, pronounces his Greek homilies before Roger II, and the geographer, Edrisi, writes in Arabian, by the King's order, his "*Book of the World*." Under the protection of the princes Greek literature flourishes: it is the time when the Hellenico-Byzantine poetry is represented by Eugene of Palermo, Constantine of Sicily, Roger of Otranto: the time when the Archimandrite Neilos Doxopatrios shines in the ecclesiastical literature; Prosper, Bishop of Reggio, surnamed the philosopher; Adelphirios, Deacon of Atrani, historian and poet. William II, according to Ebn-Djobair, reads and writes Arabian and imitates the Mussulman princes in his system of laws, the luxury of his costume, the forward march of his government, in fact, in everything. On solemn occasions the King is clothed like a sovereign of the East; the royal mantle of Roger II preserved at Nuremberg, is studded with golden embroideries, covered with cufic inscriptions and dates to the year 528 of the Hegira (1133). Palermo's palace seems to be an Oriental residence; a negro guard under the commandership of a Mussulman watches to assure the safety of the Prince; pages, chamberlains and even cooks are Arabians; nothing is forgotten, neither the eunuchs nor the harem, which is decently concealed under the guise of the manufacture of silks and embroideries established in the palace, where are both Greek and Arabian workwomen. Pleasure castles, where the luxurious fancy of kings revels, have the charm of Arabian construction; with their ceilings hung with stalactites, their cupolas, clusters of palm and orange trees, their flowing waters, with the Arabian inscriptions which ornament them. The palaces of Zisa and Couba might be considered, even to-day, as edifices of the Mussulman epoch, if these same inscriptions did not teach us that William I and William II erected these castles and gardens for their dwellings and pleasures. The capital of the Norman kings reminds Ebn-Djobair of the splendors of Cordova, and, including the customs of the people, the influence of his race is everywhere found. "The Christian ladies of Palermo," says he, in his relation, "in the elegance of their language, the way they veil their faces and wear their cloaks, follow exactly the fashion of the Arabian women. At Christmas, they went out dressed in silk dresses of gold color, wrapped in elegant cloaks, covered with colored veils, wearing gilded buskins — and displayed themselves in their churches overloaded with necklaces, painted, perfumed; in fact, in Mussulman lady's fashion."[3]

Thus we see what strange people, how full of originality and life, circumstances produced in Sicily in the twelfth century. Three races, three creeds, three languages, met and intermingled without being confused. In the inscriptions pleasure is taken in inserting, side by side, Latin, Greek and Arabian. In the royal diplomas the Norman Chancellor's office uses equally the three official languages. In the army, where King Roger enlists almost ten thousand Arabian soldiers, Greek or Latin captains command them. In the council, in the great administrative charges, Mussulman cadis and Byzantine lords possess the confidence of the master. On the acts of the prince the royal seal is stamped with Greek and Latin inscriptions; the first Norman coins are imitated from those of the Emperors of Constantinople. The costume, distinguished by the Oriental robe, is Byzantine and Arabian; even the customs are permeated with exotic influences. Justinian's code is respected by the side of the Koran and the customs of Nomandy. The Mussulman cadi renders judgment at the side of the Norman sheriff. The Greek workingman, brought by thousands from Athens, Corinth and Thebes (1148) work beside Arabians in Roger II's manufactory; and from such discordant and hostile elements the foreign conquerors succeed in founding one nationality.

From this original *mélange*, from this civilization, a powerful artistic impulse must have sprung. Those Norman princes of Sicily were great builders indeed! At the very moment of conquest their pious foundations were united under the shock of battle. Their ardent piety multiplied cathedrals, their luxurious fancy knew no decoration sumptuous enough for their palaces. Their self-love was exalted when they witnessed the wonders of the Arabian architecture; and Roger I, remembering with admiration the edifices of the Mussulman epoch undertook to do more and better. Under the reign of his successors, edifices seemed to spring up from the ground as by enchantment. Here are St. John of the Hermits (1132–1148) and St. James (1133) at Palermo; the Cathedral of Cefalu (1132) and the Palatine Chapel (1139–1140), the Cathedral of Messina and the incomparable Cathedral of Monreale (1174–1182). Great dignitaries of the kingdom, archbishops and bishops, vied with princes in pious emulation. Scolario Graphes, a Greek by birth, counsellor to Roger I, founded the convent of St. Pantaleon at Messina (1029), while his brother built another monastery; Admiral Christodoulos loaded the Basilian Abbey of St. Mary of the Crypt at Palermo, with his favors; George of Antioch built the Greek Church of St. Mary of the Admiral, (1143); Matteo de'Ajello built the Magione (1150); Majone de Bari, the powerful chancellor of William the Bad, built the Church of St. Cataldo at Palermo (1161); Archbishop Walter of the Mill (Gaulterius Offamilius), an Englishman, who became preceptor and grand chancellor of King William I, erected the Cathedral of Palermo (1184); and we need not mention the castles of pleasure at Favvarah, Minenio, Zisa and Couba, where in the midst of cooling shades, running waters and elegant Moresque architecture, Kings Roger and William sought their pleasures and rest.

The same eclecticism which ruled their policy inspired the artistic tastes of the Norman sovereigns; when these rough warriors, who had not blushed to be at first actual highway robbers; when these assuredly very illiterate knights became, after the conquest, skilful promoters of the arts and civilization, they knew enough to borrow from the diverse elements gathered in Sicily, and weld together in pleasing combinations the characteristic outlines of each of them. The Norman art-students who came in with the conquerors desired to build churches according to the style they understood, and they exercised a definite influence on the general plan of the edifices. The cathedrals of Troia, Cefalu, Monreale, Palermo, are Roman basilicas but slightly modified, and the high towers which flank them could only come from the North. But to these Latin influences the Byzantine workingman brought the shapes of the Greek Church and combined them with the general plan: churches of Sicily present the right aspect, like the ones of Byzantium; at St. Mary of the Admiral, at St. Cataldo, the dome appears with pendentives, and St. Jean des Ermites, with its three apses and numerous cupolas, is a true Byzantine church. Architects and Arabian masons brought to the

[1] See my report on monastery of St. Nicholas de Casole. "*Miscellanies of L'Ecole Francaise de Rome*," Volume VI.

[2] See my report on the manuscripts with miniature of St. Salvatore. "*Miscellanies of L'Ecole de Rome*," Volume VIII.

[3] *Journal Asiatique*, 1846, page 32.

common work the inheritance of their ancient traditions, and decorations of stalactites and cufic inscriptions are developed along the walls and arches. On the outside, the sober and severe decoration of the walls reminds one of the Norman cathedrals; inside, the Byzantine artists make the marble to sparkle and the splendors of the mosaic to gleam, as at St. Sophia's; while in the royal palaces the Arabian architects rival the wonders of the Alhambra. In these different combinations proportions differ indefinitely: at St. Mary of the Admiral, at St. Jean des Ermites, the Byzantine style prevails throughout; the plan of the cathedrals of Monreale, Cefalu, Palermo, comes from the North — the decoration belongs to the East; but the marvel of this art is the Palatine Chapel — to the plan of the Latin basilica is added a sanctuary with a Byzantine cupola; a ceiling of stalactites is laid over walls sparkling with mosaics, and at the vault Arabian, Latin and Greek inscriptions are intermingled — a perfect and living image of this original and alluring civilization.

The ancients who saw these marvels called into existence cannot praise them too highly. Latins and Greeks, Jews and Mussulmans, are united in the same enthusiasm. Bishop Theophanes Cerameus exclaims in one of his homilies: "When one sees the Palatine Chapel for the first time, one is struck with admiration and astonishment wherever the sight is carried," and the pious orator describes the ceiling as "similar to a cloudless sky sparkling with stars," and the pavement and walls sparkling with mosaics "like to a bed of primroses."

Richard de San Germano declares of Monreale that neither king nor prince in the whole world besides have ever built anything so beautiful. And Pope Lucius in his solemn bull affirms that since remote antiquity nothing so admirable and powerful has ever been done. Hugues Falcand never wearies of exalting the splendors of Palermo; the magnificence of the Royal Palace, the wonderful works produced in silk, the wonders of the Palatine Chapel, and those splendid gardens and edifices, those ever-flowing fountains, those ever-blooming trees, all that make the country of Palermo a real terrestrial paradise. "Happy country" exclaims the writer, "which offers in itself alone all the delights of the world, the seductiveness of which is so powerful that whosoever has had the happiness to see it once can never forget it."

The Mussulman, Ebn-Djobair, who cannot be suspected of much good feeling towards the Christian princes, stands astonished at the sight of Palermo's splendor. "She offers all we can desire of good things, in reality as well as in appearance, all the fruits and flowers of the earth. Ancient and elegant, magnificent and agreeable in her entrancing aspect, she spreads herself out with pride among her squares and plains, which are but a garden. Remarkable by reason of her broad avenues and streets, she astonishes by the exquisite beauty of her prospects."

Wandering through the Royal Palace, the astonishment of the traveller increases: "We crossed esplanades," says he, "we went through doors and yards belonging to the king and so many high constructions, amphitheatres with seats in tiers, gardens and cells for the servants of the king and the court, that our eyes were dazzled and our minds confused. Next we saw a hall built about a vast court surrounded by a garden. Endless porches were built around the circumference of the yard, and the hall which occupied the whole length had such large dimensions and such high towers that we were lost in wonder. We were told it was the dining-room of the king and company. . . The royal palaces are arranged around Palermo as a necklace which ornaments the neck of a young girl; so that the king always travelling to places of amusement and delight, goes at his pleasure from one garden and amphitheatre in the town to another. How many pavilions he possesses! How many kiosks and belvederes! How many convents in the vicinity of the town belong to him who has ornamented the buildings and has appointed large fiefs to their monks! How many churches for which he has caused gold and silver crosses to be cast!"[1] And the good Mahometan, looking at so many splendors erected by the hand of the unfaithful, consoles himself by the hope that God is great, and some day he will be pleased to improve the destiny of Sicily, and give her back into the hands of the faithful, and cause them to share this richness among his faithful servants.

One can see what the Norman domination had done in Sicily in less than a century; and the great Count Roger foresaw the future very closely when, directly after the conquest, heinvited his new subjects "to celebrate with praise the happy day wherein the Lord had thrown a look of pity upon the distress which the Church of Sicily had suffered under the domination of the Saracens; the happy and glorious day wherein Normans entered the island for the first time to fight and destroy the armies of the Saracens and to restore the Christian name; the happy day wherein the Faith had again acquired its dignity, and Paganism had fallen as it deserved."

Now let us look at the monuments themselves and see what Palermo has retained from the glorious time of the Norman kings. However, it will be a questionable advantage to ennumerate or study here all the edifices which the Siculo-Norman art of the twelfth century has bequeathed us, and which have already been pointed out in this study. Three among them, renowned as the most beautiful, will suffice to illustrate the different aspects of this civilization: The church of St. Mary of the Admiral, the Palatine Chapel, and the Cathedral of Monreale will show us the ingenious and varied combinations which were realized by the architects and artists of that time; and above all, they will illustrate and make known to us (and that is the main part of this study) one of the most beautiful chapters of the history of Byzantine art, thanks to the incomparable series of mosaics which decorate them.

[To be continued.]

[1] *Journal Asiatique*, 1846, p. 77, 79, 80.

ILLUSTRATIONS

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

OFFICE OF THE HOLLENDEN HOTEL, CLEVELAND, O. MR. GEORGE F. HAMMOND, ARCHITECT, CLEVELAND, O.

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

The only particulars concerning this room with which we have been furnished are, that its height, length and breadth are respectively 33, 78 and 45 feet.

REJECTED COMPETITIVE DESIGN FOR THE MASSACHUSETTS STATE-HOUSE ENLARGEMENT, BOSTON, MASS. MR. HENRY S. MCKAY, ARCHITECT, BOSTON, MASS.

SHADES AND SHADOWS: PLATE NO. 4.

See article elsewhere in this issue.

CARISBROOKE CASTLE, ISLE OF WIGHT, ENG.

HOUSES FOR CHARLES LOWTHER, ESQ., NEW YORK, N. Y. MESSRS. LAMB & RICH, ARCHITECTS, NEW YORK, N. Y.

These houses at the corner of Riverside Drive and West 76th St., are placed on a terrace overlooking the Hudson, and are built of granite and Indiana limestone.

HOUSE FOR N. F. WARNER, ESQ., MINNEAPOLIS, MINN. MR. L. S. BUFFINGTON, ARCHITECT, MINNEAPOLIS, MINN.

[Additional Illustrations in the International Edition.]

SIXTEENTH-CENTURY CHIMNEY-PIECE FROM THE SPITZER COLLECTION.

[Copper-plate Etching.]

This subject may serve as a sample of this remarkable collection of Renaissance art which is now in the market, and is to be sold only as an entirety.

A DOORWAY OF THE OBENTRAUT PALACE, VIENNA, AUSTRIA. HERR L. VON BOGUSLOWSKY, ARCHITECT.

[Gelatine Print.]

A VIEW ACROSS THE CHOIR OF THE CATHEDRAL, MONREALE, SICILY.

[Gelatine Print.]

"SWEARING ALLEGIANCE." FROM THE PAINTING BY M. HENNEBICQ.

HEAD FROM STATUE OF CHRIST IN THE CATHEDRAL OF ST. OMER. DRAWN BY MR. W. R. LETHABY.

MOSAIC PANEL FROM AMERICAN CHURCH, ROME, DESIGNED BY MR. E. BURNE JONES.

ST. MICHAEL'S VICARAGE, PORTSMOUTH, ENG. MR. R. J. WITHERS, ARCHITECT.

The house here illustrated has lately been erected on a site adjoining the church of St. Michael and All Angels, Park Road, Portsmouth, for the residence of the vicar. The style and material of the church gave the cue, for the fabric was built so as to harmonize with same. The materials used are red bricks from Chandler's Ford, near Romsey, Doulting stone for dressings, with green slate for roofs. The accommodation is three sitting-rooms, seven bedrooms, and the usual offices. The total cost was 2,200*l.*

STA. MARIA DELL' ORTO.

SOCIETIES

THE WORCESTER ART STUDENTS' CLUB.

The Worcester Art Students' Club will hold their twelfth annual exhibition the third week in April. The exhibition will continue one week.

COMMUNICATIONS

[*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.*]

THE OPERATION OF THE FORFEITURE CLAUSE IN CONTRACTS.

ASHLAND, KY., January 28, 1891.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — You will greatly oblige me by answering in the *American Architect* the following questions:

1. What is the effect of a $ — per day forfeit clause in a contract where articles furnished (such as doors, windows, stained-glass, etc.), are not according to designs and specifications?

2. Has not the owner a right to use part of the unsatisfactory work and pay less than contract price for same, while demanding that the remainder of work contracted for be made according to designs and specifications, especially where the completion of the building would be otherwise delayed and owner suffer loss thereby?

3. By what rule, if any, are architects governed in estimating damage, where the owner is obliged to accept unsatisfactory work or suffer loss and inconvenience by waiting for good work to be substituted?

4. Where a contractor admits that his work is not according to contract, but hopes that the architect will decide in his favor after the receipt of his letter which closes with the following: "P. S. We shall be glad to have with you, after settlement of this, some correspondence in regard to designing, as you seem to have great talent for it. We pay good prices for useful designs." Should an honest architect take the precaution of adding somewhat to his former estimate of damages to provide against the probability of invisible defects?

I rejoice that you are fighting the illicit-commission evil and will always do what is in my power to have it understood that honest architects do not trade on commission either directly or indirectly.

Very respectfully,
A SUBSCRIBER.

[1. IF the owner chooses, he need not take possession of his house until the specification has been exactly complied with, and, if he has given timely notice of the defects which he has discovered, the contractor must lose the forfeiture agreed upon for the whole time of the delay, unless the stipulated forfeiture is grossly in excess of the loss in rent, interest, etc., which the owner would actually suffer. If the forfeiture were much in excess of a reasonable estimate of the loss caused to the owner by the delay, a court would probably cut it down to a suitable amount, but we think that no court would hold that an owner, for the sake of saving forfeit-money to the contractor, ought to take possession of a building not erected by the latter according to his contract. If, however, the owner prefers, he may take possession of his house in the condition that he finds it, and, if it is so fully habitable that it costs him no more to live in it than it would if it had been built as specified, the forfeiture will then cease to run against the contractor; but

2. The owner, while using the unsatisfactory building, is entitled, nevertheless, to require any variations from the contract that he chooses to be made good, and, if he is willing to overlook other variations, to deduct from the contract-price a sum equivalent to the inferiority in value of the work actually done to that which the contract required. This, we should remark, is the modern way of looking at the subject. The courts, fifty years ago, often held that the contractor could get nothing for work not carried out in every detail in accordance with the contract, even though what he did might have been just as good as what was specified; and there are cases where the owners have been allowed to hold permanent possession of houses without paying the builder a penny, because the specification had been varied from in some detail of no very great importance. Of late years, the doctrine "that the contract is one," and that the breach of the smallest detail violates the whole, and frees the other party entirely from his engagement, has been modified by the courts, so far as building-contracts are concerned; and it is held in most States that if the contract has been mainly carried out, so that the owner can use his building for its intended purpose, and does so, he must either allow the contractor to change it, to conform to the contract, or, if he prefers, may waive such variations as he chooses, and deduct the difference in value from the contract price; but under some circumstances, or in some courts, the old, and more rigorous doctrine might still be followed.

3. The architect should estimate the actual difference in cost of the work done, and that specified, and something may be added for practical inconveniences. For example, if the back-plastering of the house were left out, it would be fair to add something to cover the extra cost of coal which would be required, year after year, to heat the building, deprived of this protection; but little or no account must be made of æsthetic deficiencies. It may be very annoying to the owner to have his house painted in chrome yellow, instead of a subdued ochre, and he is unquestionably entitled to have it repainted with the color specified; but if he dispenses with the repainting, he cannot mulct the contractor in damages because the more lively tint grates upon his soul whenever he sees his house in the sunshine. So, if the contractor has given the cornice an overhang of six inches, instead of two feet, he can be compelled to change it, but if the owner chooses to take it as it is, while he can collect the price of the roofing and finish-work left out, he is not entitled to sooth the wounds which its hideous appearance makes in his nervous system with a plaster of the contractor's greenbacks. Most owners disapprove of this way of looking at things, and think that they are entitled to larger damages for injuries to their sense of beauty than to anything else; but a jury, in this country, would make short work of such claims, and the fair-minded architect will see that, unless a real estimate could be put upon defects of the kind, as, for example, when, in the opinion of a good real-estate agent, they diminish definitely the salable value of the house, they are rarely entitled to much consideration.

4. The architect is not entitled to take the contractor's money and hand it over to the owner of the house, simply because the contractor acts in a manner which lays him open to suspicion, any more than because the owner is grieved about the proportions of his door-panels. While the suggested bribe would naturally make the architect more thorough in hunting out defects, and lead him, with reason, to interpret doubtful indications unfavorably to the contractor, he is bound to have reasonable grounds for every particular of his award. — EDS. AMERICAN ARCHITECT.]

A MATTER OF FALSE PRETENCE.

ELMIRA, N. Y., January 28, 1891.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — A and B, partners in the business of architecture, dissolved partnership and divided the unfinished work of the office, A taking the work he previously had charge of to finish, and B the same. B makes extensive changes in the plans of a house which he has charge of, makes new plans, elevations and specifications, which are used in building the house. He also makes a perspective of the house, which was published by one of the architectural journals, and copyrighted by that journal. A, who takes the journal, erases B's name as architect, writes his own name under the title as architect, and hangs it up in a prominent place in the reception-room of his office. Has B any legal claim for redress?

Very truly yours,
OTIS DOCKSTADER.

[B DOES not, strictly, own the copyright of his design, and could not, therefore, proceed on the ground of infringement; but if persons were misled by the misappropriation of his design, to his injury, he could undoubtedly collect damages to the extent of his injury. — EDS AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

WAGES IN EUROPE AND IN THE UNITED STATES. — Throughout the foregoing work repeated references are made to the rates of wages in Europe and the United States. As such references are not based on exact official data, the following tables from "Labor in Europe," as published by the Department of State, are given. These tables cover the year 1884, but the relative conditions in Europe and in the United States have not materially altered since then, so that the rates are, generally, as applicable to the year 1890 as they were to 1884.

Comparison of the average weekly wages paid in the general trades in Europe with those paid in similar trades in New York and Chicago.

Occupations.	England and Wales.	Germany.	France.	Belgium.	Austria.	Holland.	Switzerland.	Russia.	Chicago.	New York.
BUILDING TRADES.										
Bricklayers	$7.56	$4.21	$5.74	$4.56	$3.55	$4.80	$5.21	$4.32	$24.00	$20.00
Hod carriers	4.94	2.92	3.13	3.22	2.08	3.60	2.99	2.45	10.50	11.00
Masons	7.68	4.07	5.33	5.22	3.73	4.80	5.27	6.72	24.00	18.00
Tenders	5.07	3.15	3.23	3.09	1.92	4.00	3.50	2.88	10.50	10.00
Plasterers	7.80	4.43	6.34	4.66	4.01	4.00	5.03	4.61	27.00	18.00
Tenders	5.27	2.91	3.23	3.02	1.82	4.00	3.40	2.55	15.00	10.00
Slaters	7.10	4.20	5 65	4.98	4.00	4.00	4.35	4.20	21.00	14.00
Roofers	7.35	4.28	5.65	4.97	4.20	.....	2.99	3.75	16.50	12.00
Tenders	4.24	2.81	3.64	3.28	2.80	.....	3.18	2.60	10.50	9.00
Plumbers	7.90	4.26	6.10	5.46	4.11	4.80	5.18	4.32	22.50	16.00
Assistants	4.69	2.72	3.61	2.93	2.41	2.80	3.36	2.30	5.70	10.00
Carpenters	7.66	4.11	6.20	4.07	5.10	4.80	4.74	3.30	16.50	14.00
Gas-fitters	7.66	4.08	6.07	5.00	6.09	5.60	5.04	3.76	18.00	12.00

From the foregoing statement it appears that bricklayers and masons in Chicago are paid very nearly three times the wages; plasterers, nearly four times; slaters, three times; plumbers, nearly three times; carpenters, twice; blacksmiths, twice; bookbinders, more than twice; brickmakers, nearly three times; brass founders and cabinetmakers, nearly twice; confectioners, twice; cigarmakers, nearly three times; coopers, once and a half as much; draymen, teamsters and street railway drivers, nearly twice; dyers, more than twice; engravers, nearly three times; furriers, twice; horseshoers, three and one-half times; jewellers, more than one and one-half times; laborers, porters, etc., more than twice; lithographers, three times; telegraph operators, twice and one-half; sailmakers, more than twice; printers, twice and one-half times; saddlers and harnessmakers, more than one and one-half times; stevedores, more than twice and one-fourth times; tailors twice; and tinsmiths, once and three-fourths the wages paid to similar trades and callings in London. — *Note by the Department of State.*

PHOSPHORUS PHOTOGRAPHS. — A novel method of contact-printing has recently been described in *Photographische Archiven*, based on the fact that yellow phosphorus under the influence of light is converted into the red allotropic modification which is insoluble in carbon bisulphide. A solution of phosphorus in this solvent is first prepared and poured over a glass plate or lithographic stone, and allowed to dry in the dark. It is then exposed to the light under a negative for about half an hour, when a faint red image is produced. Any unchanged phosphorus is then washed off the stone or plate by a carbon bisulphide to fix the picture. Copper or silver images can be obtained from this by immersing the plate in a silver nitrate or copper sulphate solution, when the red phosphorus reduces the metallic salt. If paper moistened with either of the above salts be pressed on to the plate the metallic image appears on the paper. Further experiments are necessary in order to see whether the above reactions can be used for the reproduction of pictures on a commercial scale. — *Industries.*

The Biggest Stationary Engine in the World. — At the Friedensville Zinc Mines, six miles south of Allentown, Pa., there is in operation the largest stationary engine in the world. During the past few months it has pumped dry, by underground drainage, nearly every ore pit, spring and small stream within a radius of five miles. The engine is known as the "President," is of 5,000 horse-power, and is run by 15 boilers. At each revolution of its ponderous wheels a small stream is thrown out, the number of gallons raised every minute being 17,500. The driving-wheels are 35 feet in diameter and weigh 40 tons each. The sweep-rod is 40 feet long. The cylinder is 110 inches diameter, while the piston-rod is 18 inches in diameter and makes a 10-foot stroke. The engine has a ballast-box capable of holding 60 tons, and to feed the boilers 28 tons of coal are required daily. On the engine is the largest nut in the world. It is hexagonal in shape, and weighs 1,600 pounds. To tighten or loosen this nut 20 men are required, while the wrench that fits it is 20 feet long. From the end of the walking-beam of the engine to the bottom of the shaft the distance is 300 feet. The masonry on which the engine rests is 108 feet deep, some of the foundation stones weighing five tons. The engine operates four pumps, three of which are 30 inches in diameter, and the fourth 22 inches. — *The Brickmaker.*

New York Theatre-fires. — The list of theatres burned since 1821 in New York city is as follows:

Park Theatre	July 4, 1821.
Bowery Theatre	May 28, 1828.
Lafayette Theatre	——, 1829.
Richmond Hill Theatre	July 4, 1831.
Bowery Theatre	Feb. 18, 1838.
National Theatre	Sept. 23, 1839.
National Theatre	May 29, 1840.
Bowery Theatre	April 25, 1845.
Niblo's Theatre	Sept. 18, 1846.
Park Theatre	Dec. 16, 1848.
Barnum's Museum	July 13, 1865.
Butler's American Theatre	Feb. 15, 1866.
Academy of Music	May 22, 1866.
New Bowery Theatre	Dec. 18, 1866.
Winter Garden Theatre	March 23, 1867.
Barnum's Museum	March 3, 1868.
Bull's American Theatre	April 8, 1868.
Theatre Comique	Dec. 4, 1868.
Niblo's Garden	May 6, 1872.
Lena Edwin's Theatre	Nov. 28, 1872.
Barnum's Circus	Dec. 24, 1872.
Fifth Avenue Theatre (Twenty-fourth Street)	Jan. 1, 1873.
Park Theatre	Dec. 18, 1879.
Windsor Theatre	Nov. 29, 1883.
Standard Theatre	Dec. 14, 1883.
Theatre Comique	Dec. 23, 1884.
Union Square	Feb. 27, 1888.
Tony Pastor's	June 6, 1888.
Fifth Avenue Theatre (Twenty-eighth Street)	Jan. 3, 1891.

— *Fire and Water.*

Rangoon Cathedral. — There are prospects of this structure being pushed on towards completion. The building was started some five years back — the foundation stone being laid by Lord Dufferin during his visit to Burma, and after being raised some 18 feet the works were stopped for want of funds. Sanction has now been obtained from the Government of India to demolish the old Pro-Cathedral on the Strand and to sell the materials and lands for the purpose of raising funds to meet expenditure on the new works. Most of the decorative items have been purchased and are now lying at the works, and it is to be seen how much longer the Protestant public will have to wait for this long promised edifice (specially designed by Mr. Chisholm) to become an accomplished fact. The Catholic ecclesiastics appear to have a better system in regard to building churches. The Cathedral begun in Mandalay some two years after the former is almost completed. — *Indian Engineering.*

Claim the Washington Capitol Site. — W. H. Platt, of Alton, Ill., has filed a claim for Edward Hugo, Mrs. P. W. Paul and Mrs. Price of this city, and O. S. Hugo of Peoria, wherein these persons claim ownership to part of the land on which the Capitol at Washington is located. The foregoing persons are the heirs of Dr. Samuel B. Hugo, and have in their possession a land-warrant from the General Assembly of Maryland, dated April 15, 1786, for lots 2,698, 2,701, 2,303, and 2,704. The lots are 50 acres in size, and in the ancient land-warrant are described as lying to the west of Fort Cumberland, Alleghany County, Maryland. The claim has been filed in the Land Office at Washington. — *The Continent.* As Fort Cumberland happens to be about 150 miles from the Capitol, the alleged claim cannot be very dangerous.

How Celluloid is Made. — While everybody has heard of or seen or used celluloid, only a few know what it is composed of, or how it is made. A roll of paper is slowly unwound, and at the same time saturated with a mixture of five parts of sulphuric acid and two parts of nitric acid, which falls upon the paper in a fine spray. This changes the cellulose of the paper into propylin gun-cotton. The excess of the acid having been expelled by pressure, the paper is washed with plenty of water until traces of the acid have been removed. It is then reduced to a pulp and passes to the bleaching-trough. Most of the water having been gotten rid of by means of a strainer, the pulp is mixed with twenty to forty per cent of its weight in camphor, and the mixture is thoroughly triturated under millstones. The necessary coloring having been added in the form of powder, a second mixing and grinding follows. The finely-divided pulp is then spread out in thin layers on slabs, and from twenty to twenty-five of these layers are placed in an hydraulic press, separated from one another by some sheets of blotting-paper, and are subject to a pressure of 150 atmospheres, until all traces of moisture have disappeared. The matter is then passed between rollers heated to 140° to 150° F., whence it issues in the form of elastic sheets. — *The Colliery Engineer.*

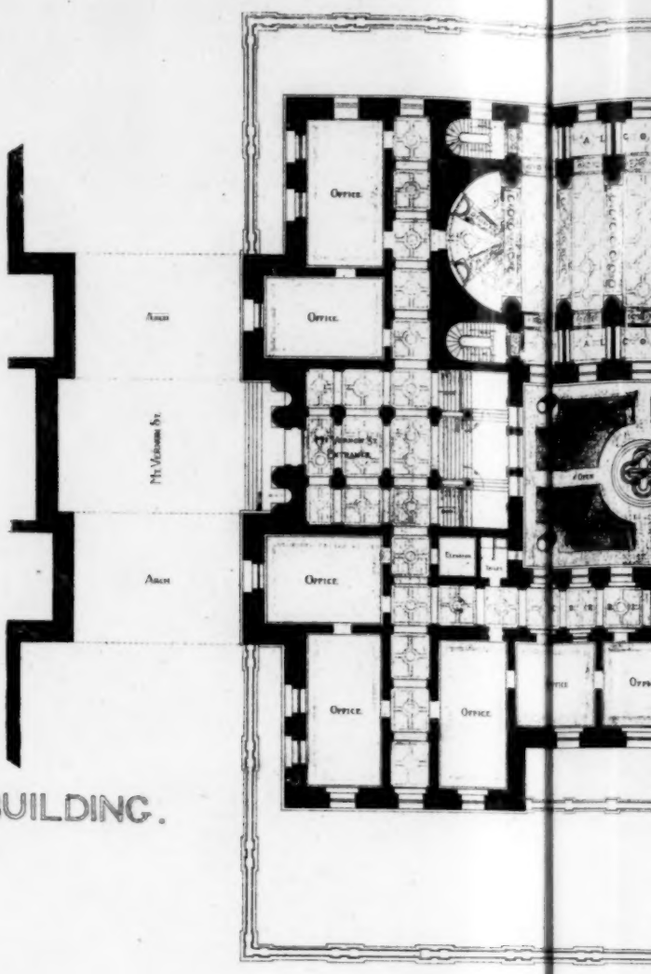
A Year's Building in Three Great Cities. — New York, Brooklyn, and Chicago put up a great many structures in 1890, and made alterations to many others. The three cities spent over $158,000,000 in new buildings, and in New York and Brooklyn the cost of alterations amounted to $9,000,000. Permits were given in New York for the erection of 3,537 buildings at a total cost of $74,900,812, and plans were approved for alterations in 2,417 buildings at a cost of $7,188,250. In Brooklyn 2,577 permits were issued for the erection of 4,800 buildings to cost $24,334,290, and for alterations in 1,275 buildings at a cost of $1,633,290. In Chicago, over 50 1-2 miles of frontage of new buildings were erected, and $59,000,000 expended. This is the largest amount ever spent on new buildings in one year in that city, and it is expected that preparations for the Fair will keep up the boom. New York and Brooklyn together spent nearly twice as much on new buildings as Chicago, but while the Western city spent more than in 1889, New York spent $5,000,000 less and Brooklyn $2,100,000 less. It will be some years, though, before Chicago spends as much as New York, and many years before she puts into iron, stone, and brick as many millions as the cities of the Manhattan district. — *New York Sun.*

Electric-lighting of Durham Cathedral. — The Dean and Chapter of Durham, Eng., have just arranged to light their magnificent cathedral by electricity. The river Ware is to supply the motive-power. — *Evening Post.*

TRADE SURVEYS

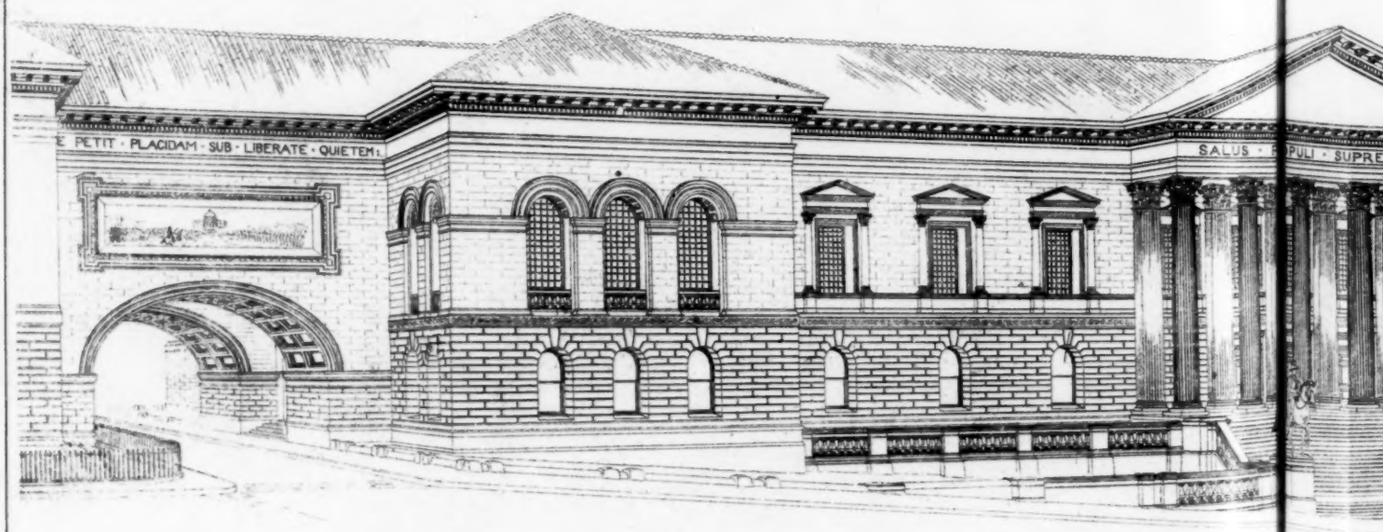
The rather sudden departure among bankers in the policy of increasing loans to borrowers has given already a sudden impulse to business, and has strengthened confidence in more financial centres than New York. If this policy can be continued until the rushing demand for money is met, it will influence business for the entire year. The volume of business throughout the country is a little in excess of last year; the surplus reserve above the legal limit at last counting was $20,000,000 in round figures; the volume of gold under the control of the Government has declined from $219,000,000, the highest point it ever reached, to $141,000,000, the present limit. Students of finance are disposed to speak very confidently of present conditions and indications; the greater number of those who count themselves as authorities on financial questions think and say that the worst is over, and that there is smooth sailing for the rest of the year. Bitter opposition has been presented by commercial interests against proposed revolutionary financial legislation at Washington, and it is quite probable that decisive action will be postponed until some future time. Meanwhile, the financial question will be most thoroughly discussed; the dangers which threatened the country a month or two ago have temporarily disappeared. It is to the interest of money-lenders and to the great Eastern commercial interests to maintain values and standards as they are, but the fact must be borne in mind that, despite the strength of the Eastern opposition to radical legislation emanating among Western people, the movement has an enormous force behind it. Railroad earnings so far this year present a very attractive front; leading systems in the West show a marked improvement; most Eastern trunk-lines also show an increase. The railway situation in general is better than railroad men anticipated ninety days ago. The Atchison Company is an exception. The movement of Jay Gould in the South has a far more reaching purpose in it than Wall Street at present supposes, but the realization of the schemes of Mr. Gould depend upon the number of consolidations of smaller railroad interests in the South, which may not be effected for a year or two to come. The preliminary steps have been taken to this end; leading railway men, it is understood, are quietly anticipating a general improvement in the value of railway securities. This belief is based upon the possibility of certain combinations being effected, both in the Northwest and Southwest; also upon the success of schemes for the harmonious dividing-up of traffic; also upon the probability that a great deal of legislative opposition to railways in the West will subside. There are some other reasons entering into the case which give long-headed railway managers a stronger faith in an improving railway situation; there is another feature which should be mentioned: namely, that in spite of the newspaper talk of restricted railroad work this year, a great deal of work will be done in the way of short lines. Southern railway managers are doing more building of this kind than any others. When all the little enterprises are figured up which are projected in the Middle and Western States, it is found that, if they are carried through, this year's railroad record will not be a mean one. All of the conditions point to an enlargement of traffic; much depends upon the policy that bankers will find themselves able to pursue; manufacturers are forging ahead as though there were not the slightest danger of over-production or of weakening prices; it would be only a waste of space to specify individual industries. With a few insignificant exceptions, there is normal activity, and preparations are being made for extraordinary activity. While the iron trade is rather dull at present, its leading spirits say that the consumption of iron this year will in all probability exceed that of last. The correctness of this statement will hinge upon the volume of railroad-building done. There will be a considerable enlargement of manufacturing-capacity, especially in the Southern States. There will be, also, a great deal of new agricultural land opened up for cultivation. The farming interests, notwithstanding the complaints of individual farmers, are in a prosperous condition, and the higher prices which is anticipated upon cereal products this year will help to stimulate agricultural enterprise in many States. Another favorable fact to be noted is the opening-up of a great many mines for iron ore, coal and precious metals. Another favorable feature is the construction of railroads into heavy timber sections, both on this side of the Mississippi and the Pacific coast. Another feature worth mentioning is the volume of business which is coming from railways for equipments. Electrical-equipment manufacturers also state that their inquiries and orders so far this year considerably exceed those of last year. The past month has developed very little concerning the "laborer" movement; the most competent to speak upon this question think that there will be very little interruption.

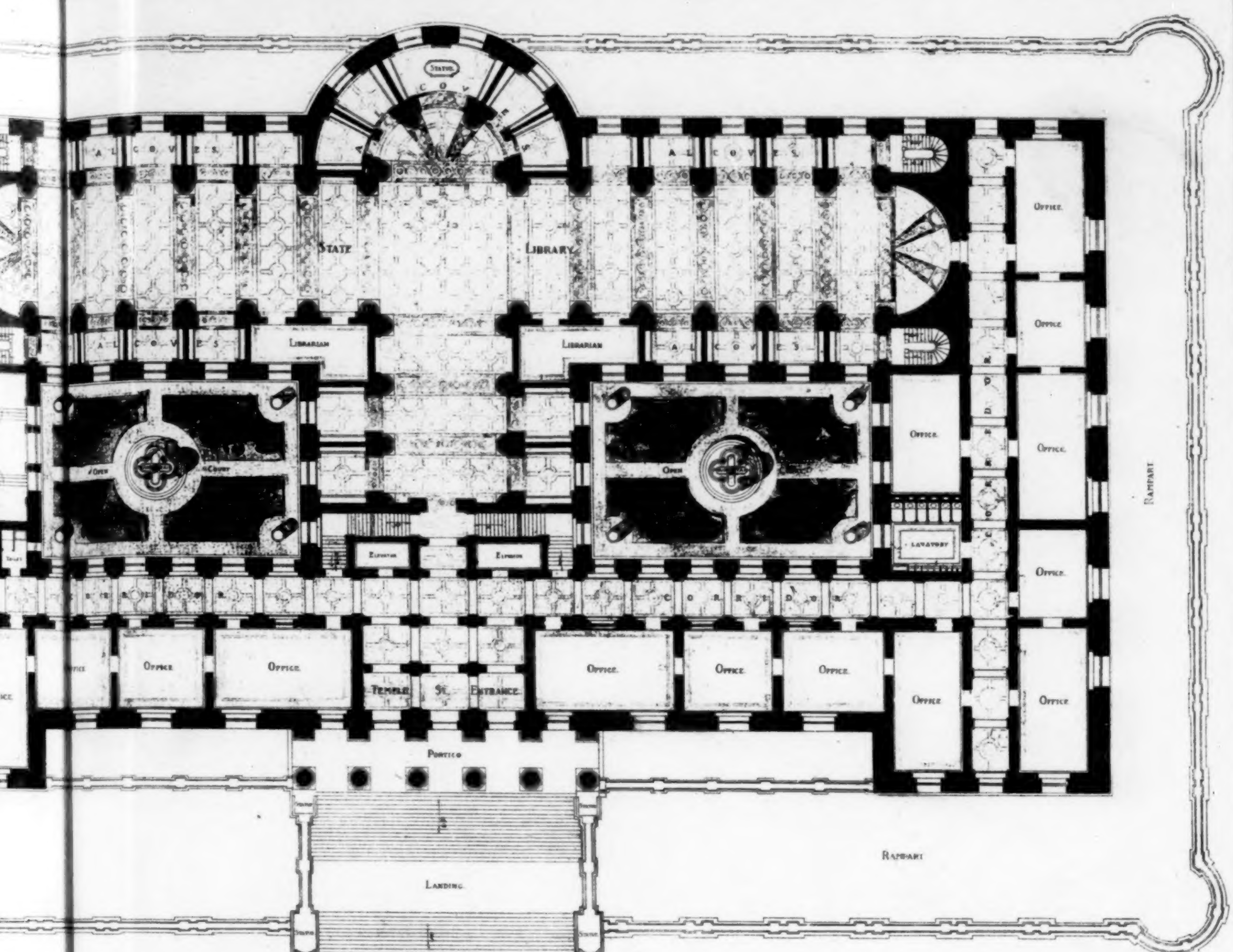
S. J. Parkhill & Co., Printers, Boston.



DESIGN
FOR
MASS. STATE LIBRARY & OFFICE BUILDING.

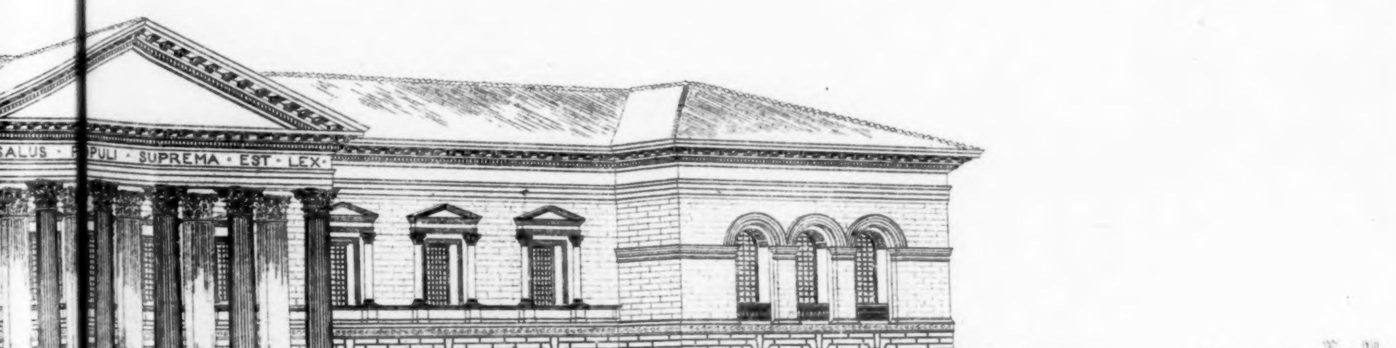
HENRY S, McKAY., ARCHITECT.
BOSTON.





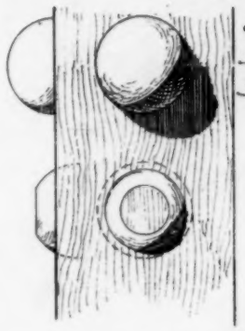
PLAN OF PRINCIPAL FLOOR OF STATE LIBRARY & OFFICE BUILDING.
SCALE [illegible]

H. S. McKAY, ARCHITECT
14 Devonshire St Boston Mas.

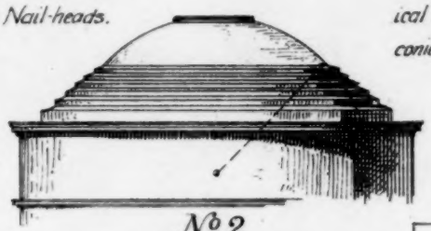


HELIOTYPE PRINTING CO. BOSTON

SHADES AND SHADOWS. PLATE 4.

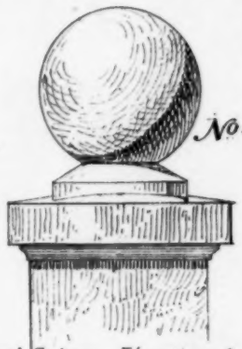


No. 1.
Shade and Shadow of Spherical Nail-heads.

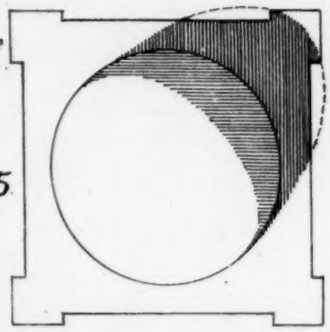


No. 2.
Dome of the Pantheon, Rome. Spherical Surface wholly in Light, shaded portion being covered by the stepped Haunches.

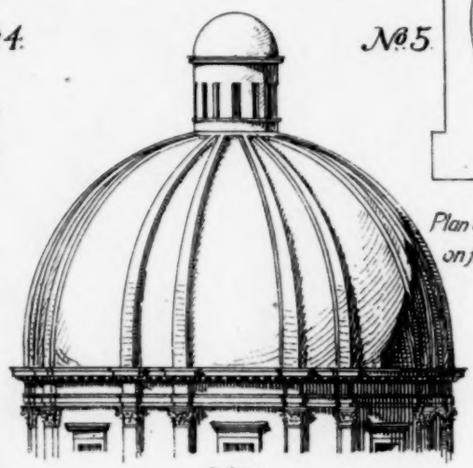
No. 3.
Spindle with spherical collar and conical Shaft.



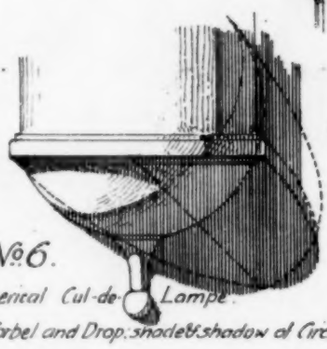
No. 4.
Simple Sphere - Elevation of Stone Gate-Post.



No. 5.
Plan of Hemispherical Dome, casting Shadow on flat top of its cubical Substructure.

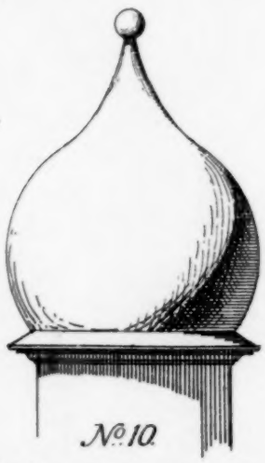


No. 7.
Dome at Lodi. Hemisphere slightly stilted. Ribs = portions of slightly larger Sphere.

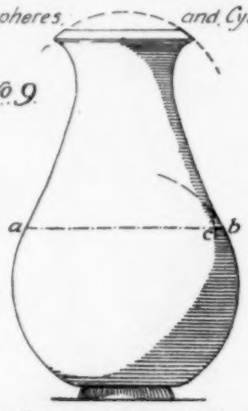


No. 6.
Spherical Cul-de-Lampe or Corbel and Drop: shade & shadow of Circles, Hemispheres, and Cylinder.

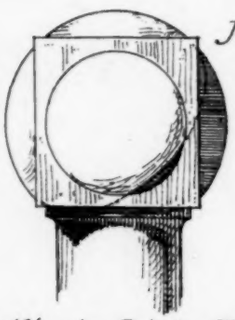
No. 8.
Metal Railing-finials; showing Lines of Shade of Spheres, Cones, and Scotias.



No. 10.
Moorish or Russian Dome: Type of many Finial-forms.

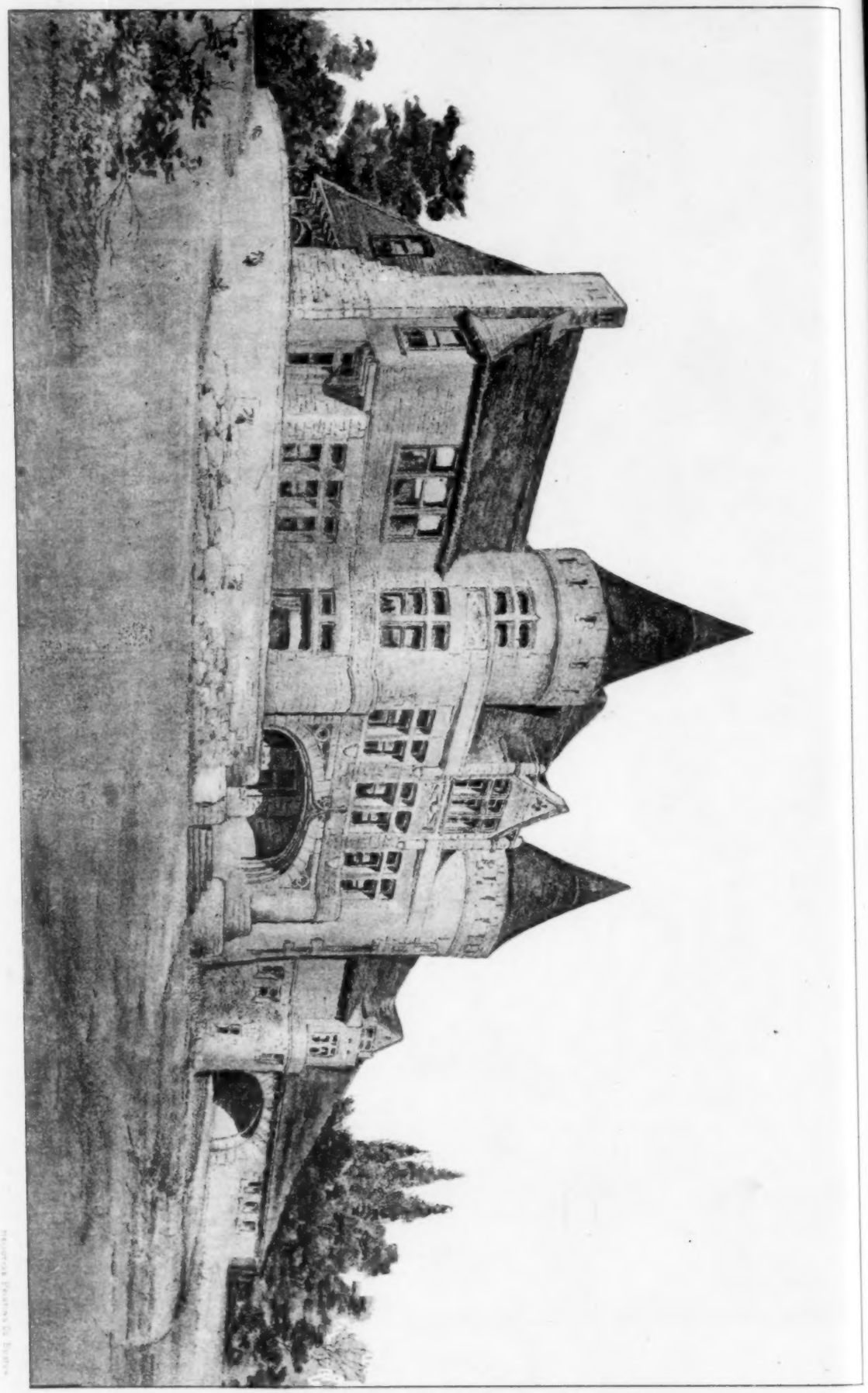


No. 9.
Line of Shade on Vase or Baluster.
ab = circle of contact of Spherical & Conoidal Surfaces.



No. 11.
Top of Newel or Spindle. All the curved Surfaces have one line of shade, being parts of same sphere.

HELIOTYPE PRINTING CO. BOSTON

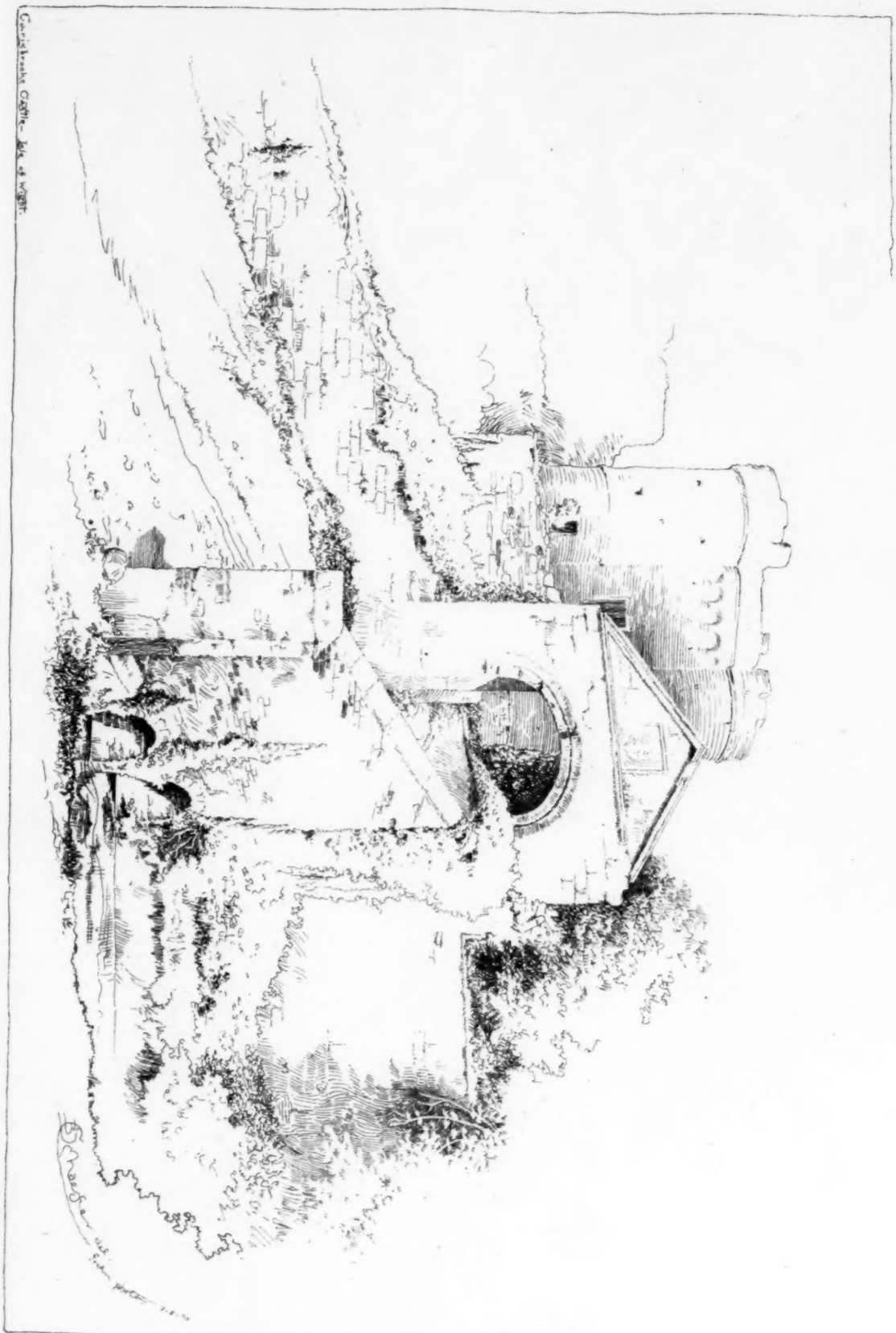


HOUSE FOR N. F. WARNER, L. I. EVERINGTON, ARCHT.

HOUSES FOR CHARLES LOWTHER, ESQ. RIVERSIDE DRIVE
NEW YORK, N.Y.
LAMB & RICH, ARCHITECTS.

Carisbrooke Castle— Isle of Wight.

Heliotype Printing Co, Boston.



HELIOTYPE PRINTING CO. BOSTON.