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SUMMARY:—

German and French Complaints touching the World's Fair.—Deaths of Mr. Gaston Feuardent and M. Alfred Darcel, Archaeologists.—Death of Mr. P. P. Furber, Architect.—The Unfair Treatment of Colonel Ainsworth because of the Ford's Theatre Accident.—The Coming Annual Convention of the American Institute of Architects.—Further Comments on the Apparent Qualities of Streets.—The Endurance of loaded Pedestrians.	1
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THE *Deutsche Bauzeitung* has a correspondent, apparently one of its editors, at the Chicago Exposition, and his letters, conveying the impressions of an expert, are very interesting. Arriving in Chicago at the opening of the Fair, he found, like every one else, the exhibition very incomplete, and he makes some rather severe criticisms upon the "gross deception" practised on the public by inviting visitors to inspect exhibits which remained still in their packing-cases. "In no department of technical art," he says, "could a visitor attempt systematic study without bitter disappointment." Fortunately, things have very much changed for the better since the letter was written. For Chicago itself, the correspondent has few compliments. Situated, as he says, on the flat, monotonous shore of Lake Michigan, it presents little architectural interest. In the centre of the town is a collection of large buildings seven or eight stories high, with here and there a "skyscraper" of fifteen or twenty stories, cutting off light and air from the neighboring estates; but the remainder of the immense area covered by the city is occupied by interminably long, straight, flat streets, lined for miles with little one and two story houses, mostly of wood, in the midst of which, rarely, a group of better houses may be seen, "like an oasis in the desert." Even Jackson Park the visitor finds naturally flat and uninteresting, but treated with consummate art by the landscape-gardeners, who, availing themselves of the unlimited water-supply at hand, have produced charming effects.

LA *CONSTRUCTION MODERNE* has also its representative at the Fair, and the French view of the show is, in its way, as interesting as that of the German architect. Like the German, the Parisian expert finds matters in a state of confusion which seems to him hopeless. In other countries, order might at last be brought out of the chaos of bales, boxes and bundles scattered about everywhere, but he thinks that the American, as an individual, has too much initiative, or "go-ahead," to work successfully in harmony or subordination with others, and that the independent efforts going on there, however energetic, will not converge to final unity. The history of the administration of the Fair gives a little color to this observation, but in the several departments there seems to be no lack of subordination, and no reason for fearing that the necessary confusion of the opening will prove permanent. The French architect, however, finds more serious things to

say. To his mind, the Fair has too much the air of a gigantic and audacious speculation. Without dwelling upon the colossal profits which the hotel-keepers, servants and bootblacks seem to be intent upon extracting from the "unhappy visitor," and with which, of course, the Administration of the Fair has nothing to do, he mentions something for which the Administration is responsible, and which he has reason to disapprove. According to him, the original invitation sent to manufacturers to induce them to contribute exhibits said that "motive power in sufficient quantity would be furnished gratuitously." After the exhibitors had got their machines set up ready for the opening of the Fair, they were informed by another circular that all those who wished to have the machines exhibited by them shown in operation must pay for power, at a fixed price, which was, to say the least, remunerative to those furnishing the power. Even the American exhibitors protested against this attempt to ignore, not only the precedent of other exhibitions, but the explicit promise made to the exhibitors, and the Directors took the matter under advisement. Finally, they devised what the Parisian expert calls "a funny dodge"—"le biais le plus plaisant du monde." They gave notice that they would fulfil their promise to furnish gratuitously "motive power in sufficient quantity" to each exhibitor who desired it, according to their original circular; but they called attention to the fact that this circular did not say how long the power would be furnished, and announced that the gratuitous supply, while sufficient in quantity to move the machines, as agreed, would be furnished for only a few minutes each day, and that those persons who wanted it at other times must pay for it at regular rates. It is understood, of course, that we give this story entirely on the responsibility of the correspondent of *La Construction Moderne*, who mildly adds that the recollection of the circumstance is not likely to develop great enthusiasm among foreign manufacturers on the occasion of future exhibitions in America.

TWO of the most distinguished archaeologists of our time died recently, within a few days of each other. Of these, the best known in this country was Mr. Gaston Feuardent, who had been a resident of this country for about sixteen years. Mr. Feuardent was himself the son of a distinguished antiquarian, and dealer in coins and works of ancient art, and, when a young man, represented his father's firm in London. On coming to this country, he went into business on his own account, and soon found his skill and learning appreciated. Some ten or twelve years ago, he was led to make some severe criticisms of the Cesnola collection at the Metropolitan Museum. The newspapers took up the matter, and developed it into an exciting quarrel, with accompaniments of bluster and recrimination very unsuitable to the occasion. As no one else here could pretend to the knowledge necessary to determine between the parties to the controversy, no one was convinced on either side, and probably no one ever will be. The effect, however, was to subtract the partisans of General Cesnola from Mr. Feuardent's customers, to the serious injury of his business. His health seems also to have been impaired by the annoyances and anxieties of the time, and he had been an invalid for a long time preceding his death. The other archaeologist whose death we have to mourn is M. Alfred Darcel, the learned curator of the Cluny Museum in Paris. M. Darcel, like Feuardent, was a Norman, having been born at Rouen in 1818. In 1841 he entered the *École Centrale des Arts et Manufactures*, in Paris, receiving his diploma as engineer in due course, and, on his return to Rouen, he undertook the direction of a manufactory of chemicals. He was, however, very fond of archaeology and the arts, and, after some years among his chemicals, he obtained an appointment under the Ministry of Fine Arts as attaché to the "service des expositions." From this he was transferred to the Louvre, where, soon afterwards, he was put in charge of the department of the Middle Ages and the Renaissance. In 1871, he was selected as manager of the Government tapestry-works the Gobelins, and distinguished himself greatly in that position by his taste and learning, as well as his technical knowledge of dyes and processes. On the death of the younger du Sommerard, who had been for many years curator of the splendid collection which his father formed and gave to the public, M. Darcel was chosen to fill his place, and continued in the discharge of this

important duty until his death, which took place in the beautiful museum, in the midst of those treasures of mediæval art which he loved so well.

WE regret sincerely to be obliged to announce the death of Mr. P. P. Furber, of St. Louis, one of the best known and most popular of all the Western architects. Mr. Furber was for a long time associated in their Western work with Messrs. Peabody & Stearns, of Boston. He had been for some years prominent in professional matters, and was, at the time of his death, a member of the Board of Trustees of the American Institute of Architects.

WE think it only fair to enter a protest against the spiteful and absurd paragraphs which are circulating through the newspapers in regard to Colonel Ainsworth, the head of the Bureau employing the clerks killed in the Ford's Theatre accident. That the jury should have held him for manslaughter is quite enough, without filling columns of Associated Press reports with material gathered, apparently, from discharged clerks and disappointed contractors. The jury probably understood the evidence better than we can, but we have seen no indication that Colonel Ainsworth assumed any control over the contractor in regard to securing the foundations during excavation, or pretended to any special knowledge on the subject of construction; and to charge a physician with manslaughter simply because he orders an electric-light service put into a house is, to say the least, a novelty in jurisprudence.

THE circular of information, published in another column, which has just been issued by the Secretary of the American Institute of Architects shows how a little properly directed and energetic work may avert a threatened disaster and secure in its place a gratifying success. Up to this time the chance that the proposed Congress of Architects in Chicago next month would be a success appeared to be very remote, thanks to a want of aptitude, perhaps, on the part of those selected to perfect the necessary arrangements, and thanks, no less, to the passive disapproval and the active hostility excited in certain quarters by the method, or rather want of method, in which the promoters of the Congress were trying to give effect to their intentions. The new circular gives encouraging assurance that though the American Institute of Architects had been treated by the officials of the Congress as a negligible quantity its own officers are taking steps that its convention proceedings, which transpire contemporaneously with the Congress, shall be of satisfactory and noteworthy character.

HERR HENRICI, in further explanation of the fatiguing effect of streets, referred to last week, says that simply to curve a street has not the effect of making it seem shorter and more interesting, as is often expected. Although the concave side is more completely visible to the traveller than even one side of a straight street, and therefore seems shorter, a considerable portion of the convex side is hidden from him, and produces fatigue as it becomes unexpectedly visible, so that two opposite effects balance each other, and a curved street of a given length, with parallel, or rather concentric sides, seems no shorter than a straight one of the same length. It is otherwise, however, if the sides are not concentric. If, for example, one side has a concave curve, and the other is straight, the straight side presents the normal apparent length, while the curved side seems shorter than it really is, so that the total effect is to shorten the apparent length; and the same effect is produced, in a less degree, where the side opposite the concave one, instead of being straight, is laid out on a curve of a longer radius than the concave side. The same principle is applicable to the designing of squares and open places along the line of a street. The worst form of all is a simple rectangular expansion, which interrupts and unexpectedly lengthens the vista, and increases the feeling of fatigue. A better form, if rectangles are obligatory, is a rectangle at one side of the street only, the other side continuing its course without a break, so as to lead the eye agreeably past the interruption. If this disposition cannot be secured, and a rectangle astride the roadway is the existing or necessary form, it is of great advantage to set lines of trees, or even rows of lamp-posts, to continue the lines of the house-fronts across the space, and give the eye the means of measuring the distance which seems to be necessary to its comfort.

THE best shape of all for such open spaces is, however, an oval, formed by two concave curves, which should be arcs of circles. Here the disagreeable element of unexpected interruption is reduced to its lowest point; while the pleasant features of space, verdure and, perhaps, artistic interest are retained. Where importance is to be given to public buildings by placing them on a space wider than an ordinary street, these principles make it evident that the best arrangement is to widen the street on one side, by a concave curve, in the middle of which is the building or monument to be honored. By doing so, the building is made visible for a long distance in either direction, at the same time that its dignity is enhanced by the open space in front of it; while the ordinary practice, of interrupting the street by a rectangular enlargement placed across it, and setting the public building for whose benefit it is destined in the middle of one side of the square, has the result of hiding the structure behind the angles of the square, and destroying the charm of distant view, and gradual approach, which it is so desirable to retain. Herr Henrici says, with truth, that most existing buildings of interest stand either directly on the street line, or on irregular spaces, formed by accident, but conforming pretty closely to the principles he has laid down; but a fashion has set in of laying out whole cities, or quarters of cities, at once, and if the rectangular and symmetrical plans devised for the purpose are carried out, and the public buildings of the future set in the places provided for them, our descendants will have cause to regret the mean, slinking effect which their principal structures will have, as compared with the unstudied, but picturesque disposition of the old ones.

A NEW athletic sport has been invented in France, and has become so fashionable that scientific men have begun to make it an object of serious study. The new sport consists in carrying a load, in the shape of a bag of flour, or of sand, weighing generally a hundred kilograms, or about two hundred and fifty pounds, over a given distance. The heroes of these exercises are generally market-porters, who, from the leather jacket, or "*coltin*," which they wear, go under the name of "*coltineurs*," and the contests in which they take part are known as "*courses de coltineurs*." The first coltineur race recorded in history was undertaken about fifty years ago, by a market porter, who made a bet that he would carry a bag of flour, weighing four hundred pounds, from Paris to Corbeil, a distance of eighteen miles. Unfortunately for him and his bet, the day was hot, and he became thirsty. Passing through the village of Ivry, thirteen miles from Paris on the way to Corbeil, he was tempted with some cool water. He drank and fell dead in the road. Since the time of this enthusiast, the weight of the loads carried in "*coltineur*" races has been reduced, but the length of the course has been increased. After a match race from Paris to Rheims, a distance of more than a hundred miles, one was undertaken on a wager from Paris to Havre, one hundred and thirty-four miles; and now a match is talked of from Paris to Bordeaux, a distance of more than three hundred miles. Novelties get extensively talked about in France, and the Committee of the Ethnographic Exhibition immediately conceived the idea of utilizing the new fashion for scientific purposes by instituting a series of "*coltineur*" contests between men of different races, so as to see which race would show the greatest strength and endurance. M. de Nansouty, the brilliant editor of *Le Génie Civil*, deplores such contests, with reason, as showing only abnormal development, instead of affording proper tests of the strength of different races of men, and, as participation in one of them usually cripples a man for life, he thinks that they need repression, rather than encouragement. In regard to the question, however, whether white men, Arabs, Indians or negroes possess the greatest physical force, it would certainly be interesting to have some careful trials made. It is commonly supposed that white men surpass, physically, all others, and it will be remembered that the Zulu Indians, on being taken to see the college boys exercising at the Harvard gymnasium, came to the conclusion that the gods must help the gymnasts, for no one could execute such feats without supernatural assistance; but some of the negroes are said to possess enormous strength, and as, even in these days, physical vigor counts for a good deal in determining the destiny of a race, it may be well to know into whose hands the empire of the world will pass when those of the Caucasian get too feeble to hold it.

COMMEMORATIVE MONUMENTS.¹—VI.

Fig. 37. Monument to General Chanzy, high relief.

THE monument to General Chanzy, at Le Mans (Fig. 37), is notable for the disposition of the figures about the pedestal. We give the following extract from an article in

the *Voix des Ardennes* for May 14, 1885, signed "A. C." "M. Croisy has conceived here a sort of heroic round, the participants in which are fighting, falling and dying in an extraordinary vibration of movement. There are fourteen life-size figures, soldiers of the line, marines, artillery-men, infantry-men, cavalry-men and officers, all of whom seem urged on by a common impulse, that of courage, and animated by the same spirit, that of devotion to the Fatherland!" The *Journal des Débats* of June 5 speaks thus of the work: "Some of the figures assume a passionate and dramatic character, and are of the finest conception; the composition, which is correct and especially remarkable for its frankness, its life, animation and movement, is perfectly suited to the subject." M. Noulens in the *Presse* of May 6, concludes as follows: "Since 1870 no painting or poem has been produced which more nobly commemorates the ill-starred heroism of France, than does this patriotic group." The statue of the general is by M. Crauck; it is three metres in height. The architectural portion comprises four blocks of granite. Total cost, 140,000 francs.

¹ From the French of L. G. Boileau fils, in Planat's *Encyclopédie de l'Architecture et de la Construction*. Continued from No. 913, page 194.

Gambetta's Monument, Place du Carrousel, Paris (Figs. 38, 39), was inaugurated July 13, 1888. The composition of the ensemble and the architecture are by M. Boileau fils, the author of the present article. It will readily be seen that he would not care to discuss the merits of his own work, but he may be permitted to call attention to the superior talent of the statuary, M. Aubé, his associate and collaborator. All of this artist's figures possess an excellent decorative character; they are modelled with a living modern feeling; the group is thrown upon the pylon with great boldness and spirit. The hero himself appears in wonderful harmony with all the secondary figures, — with the young man picking up a weapon, the wounded soldier whom he is protecting, as well as with the citizen preparing to set off for the combat, and the Genius of the country, from whom the orator is gathering inspiration: it would be impossible to condense the national defence, of which Gambetta was the soul, into a more expressive and more noble piece of statuary. Worthy of study also are the statues of Strength and Truth, seated in varied and successful attitudes, also the children clasping hands on the façade toward the garden, whose heads are modelled in an extraordinarily delicate fashion, and the group of "Democracy Triumphant."

The group against the pylon is in stone, all the other figures are of bronze. The following dimensions are of interest: the

Gambetta and each of the other figures, 3m. 60; the group as a whole, 7m. 20; the allegorical statues at the sides, 3m. 40, seated; the decorative figures of children holding shields, on the main façade, and those on the façade toward the gardens representing the army fraternizing with labor, 2m. 30; the "Democracy Triumphant," consisting of a figure of the Republic unarmed, borne by a winged-lion symbolizing the free people, 4m. 08 in all. Total height of the monument, 22m. 70; width at the base, 11m. 60 by 9m. 35; size of the platform, measured on the outside of the third step, 22 metres by 22 metres.

The lateral façades of the pylon are covered with inscriptions cut in the stone, to wit: on the right, portions of Gambetta's speech to the youth in the schools; on the left the Cherbourg speech; on the principal face above the group, the proclamation to the French after the surrender of Metz and, on the remaining face, above the trophy, quotations from the speech at Grenoble.

The faces of the banquettes supporting the allegorical figures emblematic of

the dominant qualities of an orator, are decorated with a chain of cartouches on which are inscribed the dates of the great tribune's principal speeches and the names of the places where



Fig. 38. Monument to Gambetta, Paris.

they were delivered. The black marble slab beneath the group bears the dedicatory inscription; the one on the rear façade has an inscription giving the facts concerning the national subscription which was opened after Gambetta's death for a monument to his memory.

The front of the capital of the pyramid is embellished with a shield with the lictor's fasces and a crown of oak leaves, and

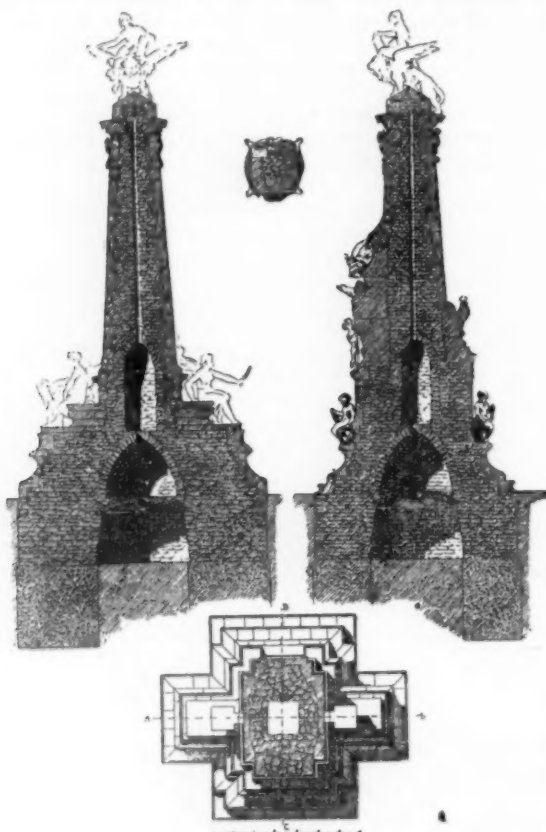


Fig. 39. Sections of the Gambetta Monument, Paris.

the monogram of the Republic; on the other faces are small tablets bearing in gilt letters the words of the device of the Republic: Liberty, Equality, Fraternity. Each of these slabs is surmounted by a cathedral motive in the abacus: a Phrygian cap, a level, and the heads of two children kissing each other to symbolize Fraternity.

The platform is raised three steps, it is of granite, bordered with Comblanchien and black marble; the steps are also of Comblanchien stone.

As solid ground for the foundations was 6m. 90 below the surface, a course of concrete 3m. 10 in depth was laid with a mass of rough stone above; the filling of the monument is also in rough-stone work, with a vaulted cellar at the base to diminish the volume of the masonry. The stone revetting—yellow Echaillon up to the banquettes of the allegorical figures on the sides, white Echaillon above—is in courses from 45 to 50 centimetres in depth with a mean thickness of 25 to 40 centimetres, *au nu*. The mean thickness, obtained by dividing the entire volume of the stone employed, by the superficial contents of the visible faces, is 52 centimetres. The carvings and finishings count for 3m. 575 in each metre of the surfaces thus developed.

These two facts it seems to us would enable one easily to estimate the cost of a similar work; all that would be required would be to develop the surfaces of the monument reduced to right planes, without taking account of the projections of the mouldings, apply to the result the regular price of the stone to be used and that of the unit of cutting, both multiplied by 3m. 60 in round numbers. In the case in question, the superficial metre of the revettings in yellow and white Echaillon, together with the furnishings of the smooth faces and the mouldings, including also anchors and cramping-irons, came to 200 francs. The rough stone filling and the foundations, with the terrace, amounted to a third of the total cost of the finished stone. The platform—granite, marble, borders and steps, including pre-

paratory works in concrete, cost 53 francs per square metre; this item may often be of help in making estimates.

It is evident that the stone statues cannot be included in these valuations; their price must be calculated separately, according to the kind of blocks which they may demand. In the Gambetta Monument, the group against the pyramid has, as we have said, a height of 7m. 20, with a maximum thickness of 2m. 30, including the part engaged in the pyramid, and a breadth of 4m. 50. It required seven blocks, each cubing in the mean four metres after they had been partially hewn in the quarry to diminish the weight and transportation charges. It cost, when in place, roughly shaped, 20,000 francs.

The following are the exact figures of the cost:

Terrace and strengthening of ground.....	4,736.15 francs.
Concrete of the foundations in cement-mortar; rough stone and cement.....	22,952.33 "
Yellow Echaillon, white Echaillon; irons and dowels.....	46,470.60 "
Carvings and finishings.....	17,652.86 "
White Echaillon for the group, including models, special scaffoldings and housing for the statuary.....	25,412.85 "
Paving and steps of the platform.....	17,807.50 "
Incidental expenses, including fencing, water, lighting, guarding, removing the stone-chippings from the statuary.....	2,397.40 "
Full-sized models of the architecture, to model the statues resting against it.....	5,011.91 "
Execution of the group and model.....	42,000.00 "
Six statues and a bronze group, execution and models.....	110,905.00 "
Ornament motives in stone, trophy and children's heads.....	24,479.70 "
Bronze wreath, execution and model.....	7,000.00 "
Marble tablets, including gilt lettering.....	2,061.50 "
Engraving of letters in the stone (2,466).....	4,432.20 "
Honoraria of the architect.....	16,680.00 "
Total.....	350,000.00 "

The contractors for the masonry and freestone were MM. Mourichon and Lemoué; the ornament-worker, J. A. Boileau frère; the marble-worker, Séguin; caster, Barbedienne.

We are indebted to the courtesy of MM. Mercié and Falguières, statuary, the designers, and to M. Pujol who did the architectural part, for the very interesting sketch of the monument to Admiral Courbet, at Abbeville (Somme) exhibited in Figure 40.

Even the composition of the construction is most original. Nothing better could be conceived for a commemorative monument to an admiral than the idea of representing him on board ship. The great difficulty, from an artistic standpoint, was to make the pedestal a ship, and hence the necessity of finding a wholly new and peculiarly expressive sculptural arrangement. The designers have succeeded admirably. The *ensemble* will present a most pleasing silhouette.

In view of the great talent of the statuary, its execution in white marble cannot fail to add to the general value of the composition; without question it will be a work of art of extraordinary merit in all respects.

One word now as to the construction. The socle, that is, the ship and the water, is in blocks, laid as in a wall, and thick enough to leave thirty or forty centimetres of solid marble in the most deeply carved portions. The remainder of the mass back of the marble will be in concrete. The allegorical figures representing "Colonization" and "Tonquin subjugated" must be cut in the part of the ship where they are introduced. The pedestal proper of the statue of the hero is of solid marble; the statue itself and the accompanying Victory will be cut from one block. Especially interesting to architects are the forms of the ship, its prow and stern, and the plan of the pedestal.



Fig. 40. Monument to Admiral Courbet, at Abbeville.

In closing we desire to call attention to a certain detail of decorative monuments adorned with statuary. In former times plinths were never attached to the statues. In the Louis XIV of the Place des Victoires and the Henri IV of the Pont-Neuf, in the Colonna statue at Venice, and twenty others besides, the horses are placed directly on the marble pedestal. In Saint Peter's at Rome, the allegorical figures embellishing the

the strains being analyzed as in § 195, tension-members being made iron rods, and compression-members in wood (Fig. 56). In connection with a bottom chord and diagonal bracing, they make very good light bridges and trusses (Fig. 57).

§ 221. **Proportioning: Arches:**—Lay off the static and vertical component of the wind-loads, adding the two together, analyzing as described in Chapter II, § 195, for arches. The

Sometimes an economy of material can be effected by making the ribs of I-section. Be careful to take the horizontal component of the wind-loads, and to take all moments in inch-pounds.

Domes:—For domes, the ribs should be spaced at the spring-line a distance apart on centres equal to about one-half radius, coming to a common centre at the top. The static load coming

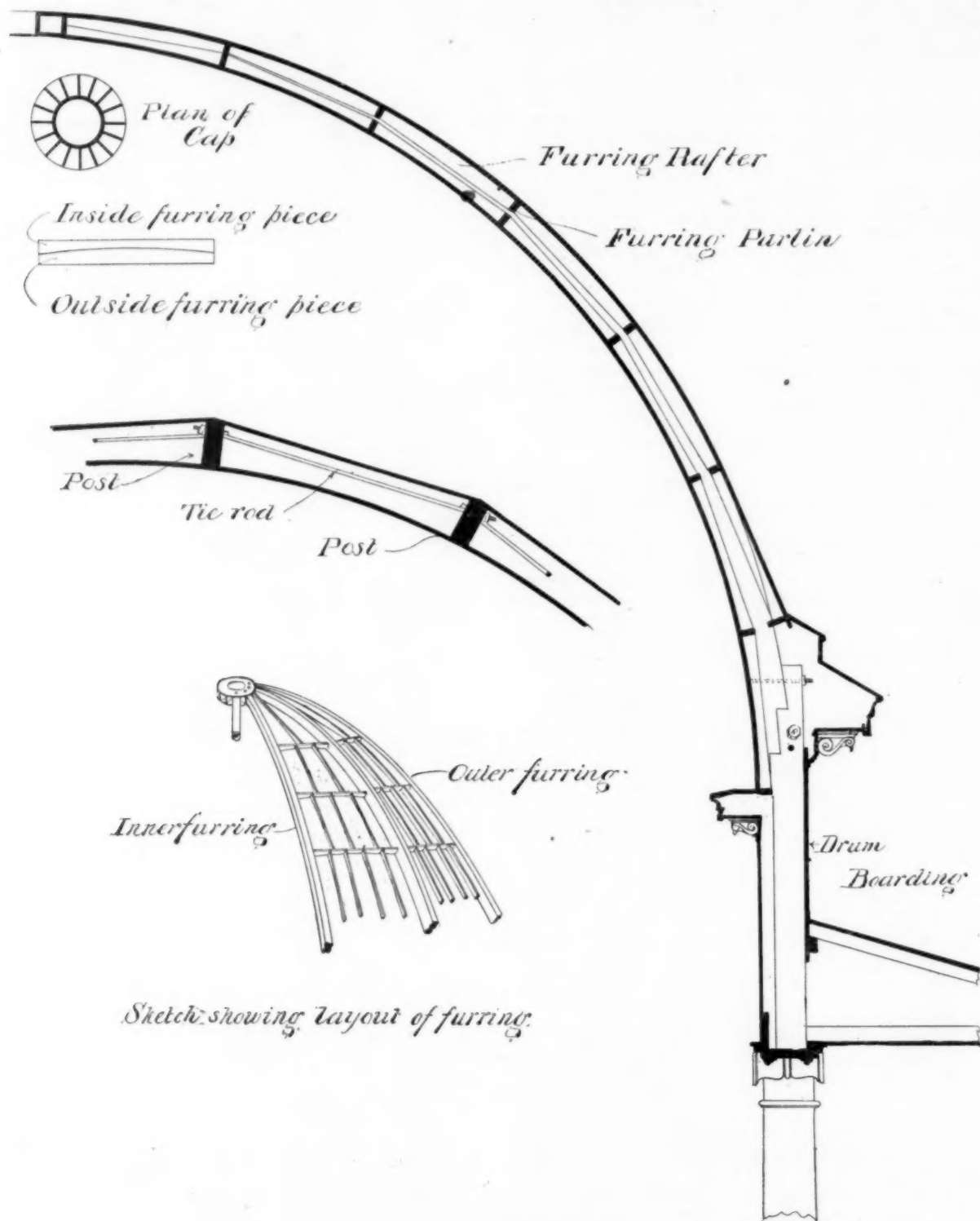


Fig. 5.

strain-polygon will probably fall below the middle third of the rib, and the distance vertically from the strain-polygon to the centre of the rib at any point, multiplied by H , will give the bending-moment at the point considered, and this will determine the size of the section by solving for the moment-of-resistance of the section (see § 175, Table VI).

on the rib would be that due to a triangular piece of the roof starting at a point at the centre and widening out at the base to a distance equal to the distance on centres of the ribs. To obtain this properly, the rib should be developed (Fig. 58) and a line drawn across the foot of the rib to represent the base of the triangle, the length being equal to the distance

the ribs are apart. If the rib is divided into equal parts and lines drawn through these parts parallel to the base line, terminating in a line drawn from each extremity of the base to the end of the rib, these lines will represent the areas of the loads on the roof. The wind-pressures on these areas must also be determined normal to the roof, and then the strain-polygons drawn from both static and wind loads, and the two combined so as to get the maximum bending-moments. From this point on the treatment is the same as for arches. The curves of the ribs should be determined by the architectural requirements, and the section made strong enough to meet the requirements of strength.

Details:—The thrust of the dome should be taken up by means of the drum boarding or tension-rods connecting the posts carrying the ribs (Fig. 59a), and the covering of the dome, which should be made of $\frac{3}{4}$ " x 4" stuff, bent over the framing in any convenient direction, or nearly at right angles to the ribs. The top ends of the ribs should butt against a wooden or cast-iron block or cap, made so as to receive the ends of the ribs and keep them from springing out of place (Fig. 59). Where the ribs are used for a barrel-vault, and the walls are not sufficiently strong to resist the thrust from the rib, it may be taken up with horizontal girders as before spoken of. The space between the ribs in domes should be filled-in with furring, taking the place of rafters and purlins, as shown in Figure 59, the inner and outer parts being cut from one board, and all of the furring being cut from the one sweep or template. Large barrel-vaults should be framed with straight rafters furred down, as the strains are more easily found and provided for (see Fig. 47). For very large domes, the ribs might be framed in two parts with diagonal bracing, and tension-rods drawing the top and bottom chords together.

SECTION II.—BRICK AND FIRE-CLAY.

§ 222. Brick Flat Arches:—Should never be made less than 8" deep, and generally the depth should be made equal to one-fourth span. They must be made with all joints radial, the radius being about three times the span. The radial joints may be made either by using common brick and filling the openings in the joints with slate chips, or by using moulded brick made especially for the purpose. When common brick are used, the arch should be limited to 4' 0" in length. Radial joints are a necessity, as otherwise the arch will fall eventually. In building, the centres should be so set as to give a crown of about $\frac{1}{4}$ " per foot, so as to keep the soffit level when the initial deflection takes place.

§ 223. Brick Segmental Arches:—May be used for any arch purpose, and always make a strong arch when properly built. They are usually laid with the long axis of the brick horizontal and the soffit of the brick showing $2\frac{1}{4}$ " x 8", and then called a "rowlock" arch. When a rowlock is laid with common brick, the back joints must be filled with mortar with slate chips wedged in so as to give a firm bearing to the work. To lay the arch properly, the mason should begin at the skew-back and lay alternate bricks on each side until about one-third of the arch is laid on each side; then the second course should be started and carried-up about half-way up the first course. Then the first course should be finished out, the key-brick being the last to be put in place. For arches on the front walls of buildings, architectural requirements will usually fix the depth of the arch, but, where any weight other than a panel is to be carried, the arch must be at least as thick as is given in Table XIX.

TABLE XIX.

DATA RE COMMON BRICK SEGMENTAL ARCHES.

Span.	Rise.	Number of rowlocks.	Thickness.
2' 0"	4"	1	4"
3' 0"	5"	2	8 $\frac{1}{2}$ "
4' 0"	7"	3	12 $\frac{1}{2}$ "
5' 0"	9"	4	17"
6' 0"	12"	4	17"
7' 0"	14"	4	17"
8' 0"	15"	5	21"
9' 0"	16"	5	21"
10' 0"	18"	5	21"

If r equals the rise of any segmental arch in inches then;

$$\text{Thrust per foot} = \frac{1.5 L l}{r} \quad (45)$$

Tie-rods should be placed about 4' 0", c to c and then

$$\text{Area} = \frac{\text{Thrust per foot}}{2,500} \quad (46)$$

§ 224. Brick Domes:—To proportion brick domes, assume that two planes, one foot apart, are passed through the dome, equidistant from the centre of it and cutting from it the largest arch that can be cut, and assume that this arch and the load upon it represents the true arch and its load. While this does not agree with any theory that the writer knows of, it gives safe results. Where openings are necessary in the dome they may be made, provided there be a ring of carefully laid bricks around them to transmit the compressive strains. Domes in brickwork should never be less than two rowlocks thick, unless the dome is to be at once covered with earth, then one rowlock is sufficient for diameters up to 15' 0". The thrust from the dome will be given by Formula (45), L representing the total uniformly distributed load. If r be in feet then we have

$$\text{Thrust} = \frac{L l}{8 r} \quad (47)$$

In building, each horizontal ring should be laid complete before another is started, then as soon as six or eight rings are laid the following courses should be started building up about three courses and then alternate rings in the two courses should be carried up. Care should be used to see that the bricks of the first course are laid with full joints and that the bricks of the second course are laid in a full bed of mortar spread over the first course. After the dome is completed it should be rendered with a stiff paste of Portland cement. By building in this way the dome will act satisfactorily according to any of the theories of its stability and the cost of centering is reduced to a minimum.

§ 225. Fire-clay Segmental Arches:—Are made in two general styles: (a) with the voids in the blocks running parallel with the beams; and (b) with the voids running at right angles to the beam. Style (b), known as the Wight system from the inventor, Mr. P. B. Wight, is also called "end construction," and is fully 25% stronger than the other when the material is good, and for floors where the area unbroken by partitions is likely to exceed 2,500 square feet it should always be used. For office-buildings, dwellings and the like, the old style gives a large surplus of strength and as it requires less careful supervision may be used. In the use of the segmental arch of fire-clay there is, practically, but one size to use, 6" deep, and that may be used for spans up to 18' 0" with a rise of 12%. The conditions as to thrust, etc., are the same as for brick. They should be used only when the ceiling under is the soffit of the arch, or, is to be left without a hanging ceiling or the conditions of the framing are such as to require the large span. For domes the treatment is the same as for tiles. See § 229.

§ 226. Fire-clay Flat Arches:—For data re the arch blocks, see Chapter IX. Thrust is given by Formula (45), taking the rise as equal to 0.8 thickness of the blocks. The strength of the flat arches is very great and therefore it need be but seldom considered. Considerations of the depth of the floor-beams required for sufficient stiffness will usually fix the depth of the block as it is both lighter and cheaper to make the block of the depth of the beam than to level up to the required point with cinder concrete. Warehouse floors and all floors of fireproof structures having an area of 2,500 square feet or more unbroken by partitions should use the Wight floor-arch block as it is very much safer in case of fire.

SECTION III.—TILE, OR GUSTAVINO, ARCHES:

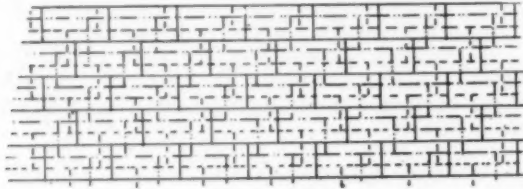
§ 227. Materials:—These tiles are made of slabs of fire-clay 1" x 6" x 12" burned to the verge of vitrification. The slabs used for the first course are sometimes moulded with a rebate on all edges but this is not necessary. The first course should be laid in plaster-of-Paris, the second course lays breaking joint with the first in two directions and is laid in Portland cement. The third course breaks joint with the first and second (Fig. 60). In the laying a swinging scaffold is made for the mason, consisting of a few plank, the centre is a single 1" board cut on the edge to the proper curve and the tiles are laid on it so as to balance until the second course is laid, when the arch becomes self-sustaining. Workmen should be kept off of it for 24 hours, however, as the arch will collapse if loaded

while still green. Should be laid segmental either as plain arch, domed arch or groined arch. In exposed work it has been found best to lay all of the joints diagonally. Where the interior is to be finished in masonry the tile makes a beautiful finish.

§ 228. **Proportions:**—Thrust found from Formula (45), for thickness t in inches we have

$$t = \frac{Ll}{200r} \quad (48)$$

Rise should be always at least 10% of the span. Where the span exceeds 12' 0" the haunches should be thickened up



————— First Course
 — — — Second Course
 ----- Third Course

Fig. 60.

one course for one-third of the span on each side for each excess of 2' 0". If the arches are intended for use in a place where there is any possibility of there being vibration their thickness must be made 10% greater and the haunches of the arches levelled with good concrete up to a point at least 5" above the crown of the arch. Use for segmental arch should be restricted as noted in § 225.

§ 229. **Domes:**—Proportions determined the same as for brick domes, § 224. In this case the skew-back should be made of Ls, as they work excellently. Large masonry domes over chapels and the like should be made with two separate domes one about 1' 6" inside of the other and connected together by means of ribs spaced about 4' 0", c to c . If the dome is of 30' 0" diameter or over, iron tie-rods should be put between the two layers for each 10' 0" of the length of the dome measured along a great circle, the ties going in horizontally.

SECTION IV.—STONE:

§ 230. **Proportions:**—Stone arches may be either flat or segmental. Usually determined by architectural considerations. Where they do not show, make the rise and thickness the same for a given span as for brick. In stonework considerable care must be exercised to see that no gravel gets into the mortar of the joint as it would probably crack the stone badly. For arches carrying great weight, careful computations should be made, the form of the arch so determined that the equilibrium-polygon will fall within the middle third of the stones, and the pressures on the stone such that there is a wide margin of safety or limited to those given in Table IV. In very large arches where any cracks would cast suspicion on the work, the first three joints from each skew-back and the two joints on each side of the key-stone should be made in asphaltic felt $\frac{1}{4}$ " thick, the felt being kept 1" away from the face of the joint and the joint pointed-up just before the final acceptance of the work. The horizontal component of the thrust should be carefully provided for as it will often be considerable.

§ 231. **Domes:**—Domes are proportioned the same as for brick or tile. They are very expensive, very difficult to build so as to be lasting as they require that every stone shall be cut exactly right, evenly bedded and perfect. Domes should not be attempted in stone unless the foundation is rock or a bed of gravel or sand at least 40' 0" deep, as the slightest settlement of the piers will probably cause a redistribution of the loads and the cracking of many of the voussoirs. Should a dome be inevitable the drawings should be all examined by an engineer of proved ability, and if the substrata are of a compressible nature the dome should be tied as described for the tile dome by means of metal rods, with provision made to take up the expansion and contraction of the metal, either by springs or by weights hanging on an arm which is raised or lowered by changes of temperature.

SECTION V.—METAL:

§ 232. **General:**—Where small ribs only are intended it is best to use bent angles riveted together back to back. For larger ribs two pairs of angles with a lacing should be used and the size made sufficient for any span by adding plates to the sections used. Where the two parts of the ribs are not more than 2' 0" apart, the equilibrium-polygon should be determined and from that the maximum bending-moment, thus finding the value that R must have. Very large ribs should have the sizes determined as in Chapter VI. For domes, proceed as described in § 221 for wood domes.

[To be continued.]

ANOTHER ARCHITECTURAL KNOCKABOUT.—VI.



ON the train between these two cities, we were treated to a very disagreeable, and not less characteristic sight. Packed like sardines in a third-class compartment, without divisions, we found with us gendarmes with loaded guns, women, laborers, herdsmen and travellers. About midday, the train creeping through a wild, uncultivated section of the country, stopping now and then at little adobe stations, we noticed that two herdsmen or laborers were opening their basket of lunch, sharing it between them. The man who was opening it, took out a long piece of bread, breaking it into two equal pieces and handing one to his companion. The bottle of wine was to be drunk "on the square" by both, but when it came to the division of the great red Spanish sausage, the first man, evidently believing in the maxim that possession was nine points, etc., made a palpably unequal division of the luscious article, keeping the larger part for himself. With a torrent of imprecations the other objected and refused the smaller piece offered him. This amounted to nearly a row, but no one interfered. It was a sickening sight to me. The gendarmes paid no attention to them whatever, and on looking at them in remonstrance I only received a stony stare in return. Finally the turmoil subsided, the injured one said the difference would be settled at the next station. So moving away from the contaminating proximity of each other's presence, they ate their unequally divided food, with looks of terrible hatred, both refusing to touch the bottle of wine as neither would take from the other, and I noticed that a woman, watching the row, leaned over the back of their seat, and quietly taking up the bottle, commenced to satisfy her own thirst and that of her neighbors. As the train slowed up at the next station, both men jumped out before it had come to a stand-still, followed by all the passengers, we among them. The duelists, without a word spoken, with no interference from gendarmes or passengers, tore off their coats and, drawing their stilettoes, rushed at each other stabbing and cutting most frightfully. Horrified by the spectacle, I again tried to get it stopped, but was thrust rudely back, and it was only when one lay dead and the other dying, that the two gendarmes pompously arrested them, with all the importance of a Napoleon Bonaparte. The rest of the journey, to a larger station, was made, with these now very silent antagonists, lying on the floor of the same carriage with us. Averting our eyes from the horrible sight, we felt that our own lives were not worth much should we do anything to attract the attention of the excited Spaniards, aroused as they were, by the sight of so much blood. This was our only experience of real Spanish brutality with the knife. There were other sights I will not narrate and once in my own case it was only the expeditious display of an American revolver and a shot in the ceiling that saved my life.

Arriving at beautiful Seville, we found that owing to its being nearly Easter, it was very difficult to get cheap rooms. Such proved the case. In spite of hours of search, and our most beguiling smiles, we failed to find lodging suitable for our purses, so we decided to go to the best hotel the city afforded and get all its luxuries, paying no more than we should have done for a room. We secured a splendid room in the "Hôtel Madrid." This hostelry is one of the best and most comfortable in Europe, even if it is in Spain, the meals being irreproachable, and no expense being spared to place before its guests every known luxury of modern times. Entering, you come

¹ Continued from No. 913, page 196.

suddenly into, apparently, a beautiful garden, for the large square court, surrounded by an arched portico, presents a most beautiful sight, the whole open to the sky, and in the centre a large marble basin, a miniature lake filled with all sorts and conditions of the finny tribe, while around and through the park, wander and twist eccentric paths, overhung thickly by shrubbery of every description, palms, palmettoes and tropical plants growing and flourishing with the utmost profusion. Some as tall as the trees, reaching far above the tympanums of the arches. We did Seville thoroughly: architecturally its beauties are legion. Revelling in the cathedral I made sketch after sketch of the Giralda tower, with its great revolving figure from which it derives its name. One day, tired of the arts, we went to the "Fabrica des Tabacos," and were led through room after room of this enormous factory, filled with women and girls, three thousand in all, I believe, all working with marvellous celerity, each turning out fifteen cigarettes a minute: sitting in rows, at long tables, with heaps of the granulated tobacco in its centre, they would seize a cigarette paper, and by a mere dash with their fingers into the mass, take from it the exact quantity required for the cigarette, transfer it into the paper, and by one quick roll of the mass, the cigarette was completed. We saw them make cigarettes with each hand simultaneously. These women were for the most part good looking, but it was a pitiful sight to see the squalor and untidiness they presented. Often they appeared half-clothed—as the atmosphere in which they worked was hot and close—and made no pretence (nor was it enforced before visitors) to cover their persons more completely. At their sides were also great baskets filled with more tobacco, and invariably, lying half buried in the redolent weed, a tiny babe; nearly every soul there seemed to own or be taking care of an infant. Think of a child sleeping daily in a bed of strong tobacco! These young matrons, also usually kept their food buried with their infants in the same basket. The whole sight was most unpleasant, and refusing the constant invitations to indulge in conversation and newly-made cigarettes, we left the poor spectacle with a feeling that something was radically wrong somewhere.

Seville is, as I mentioned before, a very expensive luxury, especially in Easter week, and staggering as we were under our hotel rates we felt we could hardly stand them doubled, so resolved to take up our traps and move to other parts. After taking a long walk over the splendid city, and indelibly impressing its beauties of architecture and color on our memories, with a farewell "café nero" in the portico of the Hôtel Madrid, we left this Spanish Paris with many regrets and set out for Cordova, where we arrived after a fatiguing journey of a whole day.

Here at Cordova, I made a complete study of the mosque, the court-yard and tower of its beautiful cathedral, so similar, in general outline, to that of Seville. The interior of the mosque has been likened by a French author to a "roofed-in forest," for the thousand columns and entwining arches overhead, make indeed a stone grove, with polished shafts of stone brought from many a mosque and palace of the Moors for the trunks of the trees, and the arches growing larger and more spreading as they rise higher, presenting in very truth a forest. I am not discussing architecture nor will I attempt to describe its beauties, which my superiors and betters have done before me, and I would only show but poor taste in attempting to criticise and describe these great monuments, which kind fate allowed me the great privilege of gazing upon. Our Bohemian life ceased after this, for we did not remain long enough at any place to be really imbued with its life, finding that as we went farther north the atmosphere of art was lost in that all-absorbing spirit of trade. At Madrid, where we found ourselves after journeying from Cordova and Alcazar, we lived in a little hotel, off the Puerta del Sol, called the "Peninsular": originally a monastery, its queer staircase and rooms were most interesting. Here we put up cheaply, though the oily cuisine of Spain made itself prominent as usual. Madrid is a great French town, nothing more; its gallery of pictures is magnificent, but far more appreciated by the foreigner than the native, for, as a rule, the latter are indifferent to their treasures of art, and with the exception of the Alhambra, the only monument they make any pretences to keep in a state of preservation, only value them as a source of income to the State, in attracting foreign money into the country. The Spaniards love beauty, however, in their impulsive way, and will always give voice loudly to their admiration; for instance, I have often observed when a pretty American or English girl was walking on the streets with her parents, or even a handsome Spanish woman, a Spaniard, or sometimes two or three, would stop short, or walk along with the girl and her mother, and in very flowery language, tell her that she is beautiful and that the country and community at large thanks her and is benefited by her presence. More often do they stop short, remove their round Spanish hats, and hurl them to the ground, at her feet, crying out, as she steps gingerly and daintily around or over them, "Hole! for you beautiful one. Hole! for your father and your mother. I admire you." This is done repeatedly and as she passes on without a word, they pick up their hats and look admiringly after, but rarely follow. This act is done with the utmost sincerity, no rudeness whatever is implied, and it is a most characteristic sight, though this admiration for beauty be displayed in so flowery and bombastic a way. The Spanish dress, the day of the mantilla is over, and is hardly to be seen except on Easter day and Sunday, and then not always; bad Parisian fashions, with the individual Spanish ladies own idea of color, have taken its place. One sees frequently most beautiful faces, yet when a Spanish woman is

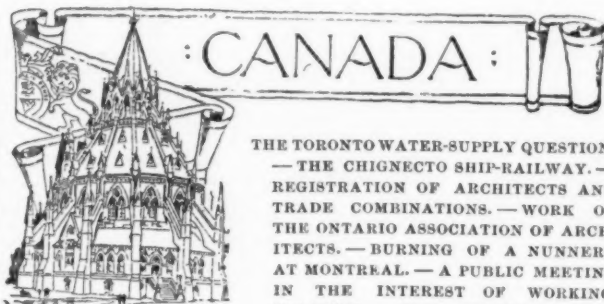
ugly, she is without exception the most unfortunate spectacle possible to gaze upon.

We went one day to see the "lavenderas," or washerwomen, of Madrid, who sit in or kneel in little wooden boxes on the muddy edge of the Manzanares river, thousands of them, scrubbing and rubbing and pounding the city linen between flat stones. Now and then there is a shriek, when a piece is carried off by the current, and is fished back to duty by the overseer with a long hooked pole.

When leaving Madrid en route for Toledo, hurrying to the station our closed carriage was brought to a sudden halt by armed gendarmes who ordered our instant exit from the vehicle. On our refusing to do as they commanded, we were literally dragged out and ordered again to doff our hats. On stoutly refusing to do this, a general scrimmage ensued, and while it was taking place, I noticed a very gallant equipage passed by escorted by a cordon of the military. In the open barouche sat a nurse, gotten up in very gorgeous style, and holding in her lap, fast asleep, adorned with much gold lace, a sleeping infant with its thumb in its mouth, totally unconscious of the affairs around him, and of the sight of the gendarmes holding us tightly by each arm, as they bowed to the ground and tried to compel us to do likewise in reverence to the very young King of Spain!

F. L. V. HOPPIN.

[To be continued.]



THE TORONTO WATER-SUPPLY QUESTION.
— THE CHIGNECTO SHIP-RAILWAY. —
REGISTRATION OF ARCHITECTS AND
TRADE COMBINATIONS. — WORK OF
THE ONTARIO ASSOCIATION OF ARCHITECTS. — BURNING OF A NUNNERY
AT MONTREAL. — A PUBLIC MEETING
IN THE INTEREST OF WORKING-
WOMEN. — THE STREET-RAILWAY
QUESTION IN TORONTO.

SCHMES for the supply of pure water to the City of Toronto darken the air; almost every day some new one is projected, but two recently presented to the public on the same day are worthy of particular notice. It is no secret now that the present system is doomed—that the thousands spent already have been literally thrown away and that the costly steel conduit laid only a year ago was hopelessly ruined by the accident of the winter, which a little foresight would have prevented. The first of these schemes seems very simple and feasible: it is to tunnel the rock which underlies the harbor, extending the tunnel into the Lake to a point where the water is seventy feet deep, thus forming a conduit which would be as solid as the present one is weak. It is estimated that the cost would be \$800,000, but the simplicity of the idea recommends itself to the citizens and even to the aldermen, so that tests are to be conducted without delay to ascertain the exact nature of the rock along the course of the proposed tunnel. It is a very unusual thing to find the public jumping at the outlay of so large a sum, but at last it is awakened to the knowledge that there has been too much fooling over the water-supply and it comes as a relief to the anxious mind of the rate-payers, who in the event of the failure of this scheme are asked to consider another, the cost of which would not be less than \$65,000,000! The public meeting called to discuss this large outlay began by formally passing a resolution of a somewhat unusual character, viz.: "That this meeting desires to express its regret that for the last decade there has been a lack of the old-time enterprise that once characterized so many of the citizens of Toronto, and it is high time that something should be done to place this city in the position which the natural advantages she possesses entitle her to." Having thus stigmatized themselves and their fellow-citizens, the leaders proceeded to unravel their plan which would convince the public that they at least should be excepted from the sweeping condemnation, although with a proper sense of humility they had included themselves therein. They would now give an exhibition of the aforesaid "old-time enterprise" and by way of commencement, would advocate the immediate expenditure of sixty-five millions! This amount they considered would enable the city to make an attempt to reach the position she is entitled to. Some sixty-five miles north-northeast of Toronto (as the crow flies) there is an arm of the Huron Lake known as the Georgian Bay. It is proposed to construct an aqueduct for the purpose of supplying the city with water from this bay—the aqueduct to be tapped at intervals to aid in the excavating of a great canal which shall run parallel with the aqueduct and make a water highway from Georgian Bay to Lake Ontario. This canal it is stated would shorten the Lake route to the city by four hundred miles while the flow of water through it would provide motive-power for "driving machinery—lighting, heating and smelting works and for fire-protection as well as for other works not enumerated." "An incalculable amount of tonnage would be brought past our doors," and finally it would be seen that there were some living who still had the spirit of old-time enterprise in their breasts

and skulls. The canal scheme is no doubt a good one despite the ridiculous method of proposing it, but unless it is proved that we can bring water to the city from a distance of over sixty miles cheaper than we can from our own lake at a point some five miles out from shore, it would be out of the question to attempt it. The canal is not to be the means of supply; that is to be furnished by the aqueduct. The Toronto Bay having an area of about four miles by two, enclosed by sand-banks, is fouled horribly by sewage, but beyond this is the magnificent sheet of water forty miles wide opposite Toronto and surely some efficient way can be found of using it. Had we not already spent hundreds of thousands of dollars in impracticable schemes, there would be no thought of going sixty miles for water, but as of late every drop of water for drinking has had to be boiled and this kind of thing has been going on so long, while there are continual breakdowns in the pumping-machinery and threats of water famine every few months, it is thought by some that an entirely new plan should be adopted. Canal projectors are not particularly well received in any part of the globe at present. Investors fight shy of them as they do of mines, so that it is hardly likely the required sixty-five millions will be raised at present. A small committee was formed to take such action as may be deemed necessary and expedient to further the objects of the aqueduct and canal scheme.

At the present moment the Dominion Government is considering the question of taking-over the works of the Chignecto ship-railway and completing them to save the credit of the country in that particular, as the investors in the undertaking are principally in England, but ship-railways or canals are such uncertain things that their projectors had better lie quiet for a while.

The Ontario Association of Architects' Bill for the amendment of their original act came before the Provincial Legislature shortly before the close of the session, but on the advice of the Committee in charge of it, it was withdrawn and the objectionable word "registered" remains. It appears that the members of the House are not sufficiently clear-sighted to distinguish between the protection of the public against imposters and the formation of "combines" for self-aggrandisement, or trade monopolies. It was a noticeable feature of the session that many dealers sought legislation with a view to keeping trade to themselves. The druggists sought to prohibit every one but themselves from selling patent medicines; but as these commodities are so sealed up that there is no risk to the buyer and no possibility of their being tampered with or adulterated by the sellers, their contentions were over-ruled. Then came the milk-dealers, arguing that only a few of them were capable of selling pure milk, and they, too, were requested to step down. After them rose up the undertakers who declared that there was imminent danger to the public in permitting any one to ply the trade and that no one should bury or embalm without he associated himself with them. After this, the members naturally looked round and asked "What next?" fully expecting to see "the butcher, the baker, the candlestick-maker" march in with a rub-a-dub-dub. This being the state of the atmosphere it was thought useless to push the Architects' Bill, for the House was not in a mood to contemplate seriously what would be the effect to themselves if their seats suddenly gave way or the roof fell in upon them or if on their return to their homes they found them collapsed, or their families poisoned by sewer-gas or otherwise killed through the inefficiency of the so-called architects who had been employed by them. Finally, the government vetoed a proposal to prescribe professional examinations for railway engineers, conductors and brakemen. Thus, the Association is no better off or farther advanced in its objects than before, except that the good work it has already accomplished in the examination of students and would-be members has opened the eyes of many who at first could see no good of such a society. So many students have successfully passed the examinations, that the public involuntarily notices the fact, and where two or three young architects are together, one of them having passed examinations and the others not, the one naturally is preferred over his fellows. The work the Association has begun cannot now be stopped, it has, in spite of considerable opposition, inaugurated a new era, and become itself a necessity of the time, though there still are some who deny this. The opposition grows weaker every year, not because it is weary of its useless fuss but because the minds of the opposers are awakening to the need of such an organization. The Ontario Association can contemplate with pride the work already done and look forward more hopefully than ever, even in the face of the present hindrance, to the ultimate general recognition which in a few years will be extended towards it.

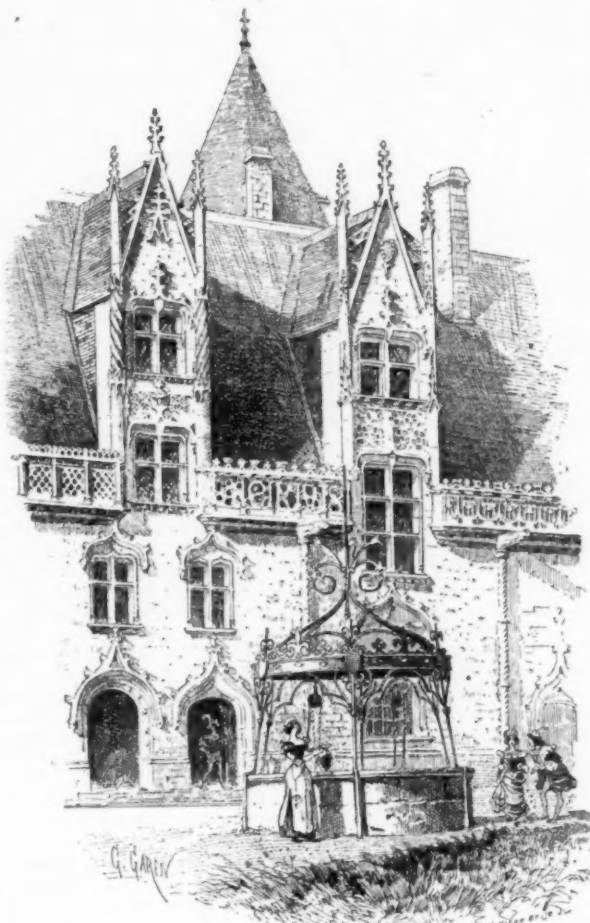
Every one who has visited Montreal will remember the great nunnery so conspicuously situated on the western spur of the "Mountain," the first object that meets the eye as the city is approached either by rail or boat from the west. The property is known as Monklands, belonging to the great religious order of the Ladies of the Congregation, or the Congregation Nuns as they are more generally known. A fine church and school building were recently erected and the whole group was probably worth \$100,000,000. A fire broke out in the institution on June 7th and despite the efforts of the fire-brigade, which had some distance to come from the city, damage was done to the extent of at least half a million dollars, the nunnery, church and schools all being destroyed. The nuns to the number of three hundred lost their home, but an adjacent convent known as Ville Marie was happily saved. This was used chiefly as a ladies' school and great alarm was at one time felt on its account. The

nuns, who own an immense amount of property in Montreal, do not appear to have been sufficiently careful about their insurances, for it seems that on the buildings destroyed there is only \$102,000 insurance, divided among four companies. The building burned very rapidly, its exposed situation, probably, having a good deal to do with that, and the fifty inmates of the infirmary were only saved by the hearty exertions of the nuns and their neighbors. The Reverend Mother St. Ursule, who has been paralyzed for the past two weeks, became unconscious when the fire broke out. She is between eighty and ninety years of age, but it is thought she will recover.

Under the auspices of the Working-women's Protective Association of Toronto, a mass-meeting in the interest of labor was held in the Pavillion early in June. The meeting had been largely advertised and it was understood that a great "kick" would be made on behalf of the many poor women, who are said to be working for a dollar-and-a-half a week, but beyond an allusion to the subject nothing particular seems to have been done. A few well-known ministers, Protestant and Roman Catholic, and public men made speeches, but no resolutions were passed, and apparently the Working-women's Protective Association was not materially aided by the affair. The meetings of the various labor organizations have for some time been very tame, there seems to be very little to meet about and but few matters upon which they can agitate; the wages questions have been settled by agreements which are to remain in force for three years, so that beyond the purpose of maintaining their organizations they might almost as well not meet.

There is a somewhat curious complication of affairs at present between the City of Toronto and the Street Railway Company which is necessarily occupying a great deal of attention. The Electric Railway Company has by its agreement to extend its line along certain thoroughfares within a given time and having agreed to do this and prepared for it, expects to reap an enlarged revenue when the time elapses. The Company is to put down its own rails paying the city \$800 a mile for road-rent and so on, the city doing the necessary paving works. But as the city has not done the paving and is not prepared to do it, the Company threatens in consequence "to have the law at them." To avoid litigation, however, the Railway Company suggests that it should be allowed to do the paving as well as laying its own rails and forego the payment of the annual mileage. This it is pointed out would give the Company a vested interest in the portion of the streets paved by them and endless difficulties and disputes would probably be the result. The city is considering an agreement drawn up by its solicitor and engineer, which allows the Company to do the paving but only under the supervision of, and to the satisfaction of the City Engineer. The spirit with which the engineer has always met the Company, obstructing it wherever possible, cutting down its poles (which though not according to the agreement were declared to be only temporary and put up for the obvious convenience of the public until the specified ones could be procured) and issuing almost bi-weekly injunctions against it, if it did anything he thought was contrary to the letter of the agreement, — is hardly likely to make the Company willing to work under him; but as it is apparently beyond the power of the city to keep to its part of the agreement and do the paving owing to the atrocious mismanagement of everything by the miserable Council and its figure-head mayor who rules the roast, lively times and frightful cost to the rate-payers are likely to ensue.

LIQUID OXYGEN. — The most popular scientific lectures of the day in London are those which Professor Dewar is delivering upon "Atmosphere" in the theatre of the Royal Institution. His experiments with liquid oxygen, to which reference has been made in the *Evening Post* more than once, are peculiarly interesting. On a recent occasion he explained the construction of the glass flasks containing the liquid oxygen. He showed that they were simply glass bottles provided with double walls and bottoms, the outer one being distant from half to one inch from the inner one. The interior bottle was open at its neck to the atmosphere in the usual way, but the outer bottle was fused securely to the inner one at the neck, leaving an empty space all around the inner bottle. From this space the air was exhausted by powerful air-pumps, and the result was that anything placed in the interior bottle could not absorb heat from the atmosphere or other surrounding objects. Sometimes two vacuum jackets are used to secure complete isolation, and, in addition, the outer surface of the inner bottle was coated with a deposit of mercury. Professor Dewar then proceeded to demonstrate the various qualities and properties of the liquid oxygen. He poured the fluid about from vessel to vessel like so much water, noting the fact that it was nearly always boiling and rapidly passing back into its gaseous state. He inserted a thermometer into it and showed that the fluid was boiling at a temperature equivalent to several hundred degrees below the freezing point of water. Absolute alcohol thrown on the surface promptly gave up all its heat to the oxygen, and turned to a mass of ice, which was shown to be quite incombustible until remelted. Drops of the liquid thrown on a piece of rock salt behaved exactly as spots of water on a red-hot plate, assuming the spheroidal shape and spinning about. The electric light passed through a globe of liquid oxygen and then, broken up by a prism, showed the same dark lines of absorption on the spectrum as in the case of gaseous oxygen. The magnetic properties of the fluid were strikingly displayed by placing a dish of it between the poles of a strong electro-magnet. As soon as the current was turned on the oxygen dashed up out of the dish, and clung around the ends of the poles, rapidly dissipating into smoke, which exhibited in its turn a similar tendency. — *New York Evening Post*.

RUSSIAN INDUSTRIAL ART.¹Well in the Chateau de Josselin. From *La Semaine des Constructeurs*.

MY first experiences of Russia were at St. Petersburg, that capital which owes its existence to Peter the Great—a city of stately palaces, of immense squares, of handsome monuments, but with little distinctively Russian about it. St. Petersburg was the window from which Peter looked into Europe. When he came to the throne, Russia was in a non-progressive state, clinging to the past with its superstitions and traditions, and bearing the impress of the Tartar yoke. He determined to cut asunder the bonds which tied her to the East, and create a new Russia by opening the door to Western civilization.

It has been said that Peter's reforms did more harm than good to his country, by interfering with her gradual development, that Russia, left to herself, contained all the elements of national greatness, and that it was too soon to polish her in accordance with Western ideas. However this may be, there can be no doubt that the genius of Peter raised Russia to the rank of a first-rate power, and that, had it not been for his reforms, she would have remained in a semi-barbarous state, a stranger to the arts, the industries, and the sciences of Europe.

St. Petersburg is a medley of Italian, French, German, and Dutch styles, or rather it has no architectural style about it. In its chief street—Nefsky Prospect—you might imagine yourself in Turin, or Paris, or Munich, were it not that the painted sign-boards over the shop fronts, the dress and appearance of the people, and the mode of harnessing the horses, remind you that you are in Russia. St. Petersburg, however, contains magnificent public buildings, and many priceless treasures of art, stored away in palaces, museums, and private collections.

St. Isaac's Cathedral, designed and built by the French architect, Montferrand, with its five gilt domes, its monolith columns of polished granite, and its gorgeous interior, is a grand conception, carried out in spite of every difficulty. The design is foreign, the malachite and lapis-lazuli columns before the altar-screen are hollow, the splendid mosaics are of foreign workmanship; yet the whole edifice is impressive, and has something distinctly national, if only in its vast proportions, and in the costly materials used in its construction. None but a Russian Tsar, the head of Church and State, could have, at so lavish a cost, erected so noble an edifice designed solely for the worship of God. Mr. Bevington Atkinson, in his work, "*An Art Tour to Northern Capitals of Europe*," says: "The

world owes its great cathedrals to the combined religious and temporal power." St. Petersburg—this northern Venice, as it is called—is in startling contrast with the squalor and poverty surrounding it. When once you are beyond the twenty-mile radius, and have left behind the capital and its elegant suburban retreats, you are in a wilderness of marsh and scrub-wood, with here and there a village of dilapidated log-huts and a poverty-stricken agricultural population barely furnished with the necessaries of life.

The Hermitage, so called by its Imperial foundress, the Empress Catherine, is a palace of art, in its way as splendid as St. Isaac's. Its collections, comprising the famous treasures found at Kertch, are unsurpassed. Here are specimens of Greco-Scythian and other early arts, which have helped to build up the Russian art of to-day. What this Russian art is, and of how many elements composed, are questions upon which authorities differ. Besides Greco-Scythian, Scandinavian, Greco-Byzantine, Mongol, Indian, Persian, Central Asian and Finnish have been mentioned. To these have to be added the later influences of Western Europe: Italian, German, French and English. With regard to Scythian, M. Vladimir Stasoff has pointed out, in the *Magazine of Art*, that Mr. Alfred Maskell (who follows M. Viollet-le-Duc) in his South Kensington "*Handbook of Russian Art*," is wrong in identifying the nomadic Scythians depicted on this celebrated Nikopol vase with the ancestors of the Russians, for the Poliani-Kiani, whom Nester mentions as the ancestors of the Russians, were a peaceful, agricultural people, altogether distinct from the warlike Scythians of Southern Russia, and Father Martinoff takes the same view.

Composed of so many and such heterogeneous elements, one might have supposed that the native art would have altogether disappeared; yet, in spite of these adverse circumstances, there remains a substratum peculiarly Russian underlying the foreign superstructure. This native art may probably be seen at its best in the works of the young Russian school of painters, sculptors and authors, in their efforts to attain realism, to make the canvas, the stone, the bronze and the writing speak for them, and tell of the realities of Russian life. This realistic side of Russian art is exceedingly interesting, for studies of real life are often true to nature, while attempts at an ideal in religious art, for want of inspiration, fall short of the sublime.

There is hardly a cathedral, church, or monastery throughout the Empire that has not some traces of Greco-Byzantine influence. St. Sophia at Kiev, with its mosaics of the eleventh century, and the Cathedral of the Assumption in the Kremlin, at Moscow, are examples of the earlier style. The plan of all these buildings is the Greek cross: a dimly-lighted, almost dark interior, walls painted with frescoes, a gorgeously decorated ikonostas, or altar-screen, and a great central dome, or cupola. The general effect, during a religious ceremony, heightened by lighted tapers, burning incense, the chanting of the choir and the rich vestments of the priests, is very impressive.

While following Byzantine models in the general design, Russian architecture adopted a peculiar form of cupola, resembling an onion, altogether distinct from the domes of St. Sophia at Constantinople, St. Peter's at Rome, St. Paul's in London, and St. Isaac's in St. Petersburg. This bulbous cupola, said to be of Central Asian origin, and surmounted by a cross rising from a crescent, is characteristic of ecclesiastical architecture in Russia.

In decorative art, these same Byzantine influences, due to the close intercourse between Russia and the Eastern Empire before and after the introduction of Christianity, are equally conspicuous. They may be noticed in the silver pectoral crosses and other metal-work, the wood-carving, the embroidery on leather, and even in the textile fabrics. The English and foreign embassies which visited Moscow in the sixteenth century were much impressed with the gold and silver plate in the Tsar's palace. Some of this was doubtless brought as presents from foreign countries, some was the spoil of war, but the greater part was manufactured in Russian workshops. In 1880, our Government applied to that of Russia for permission to reproduce some of the numerous examples of English plate and other works of art in the imperial collections. The Emperor having graciously consented, a number of electrotype fac-similes were made and brought to England. These are exhibited in the galleries at South Kensington. They include vases, cups, flagons, salts, tankards, and jugs, besides a number of other pieces used at State banquets. Russian silversmiths' work has obtained a world-wide reputation both for elegance of design as well as for the purity of the metal used.

Enamelling on gold and silver is another art peculiarly Russian, derived also from Byzantine and Eastern sources. When Russian art ceases to be Eastern in character, it will have lost its claim to be regarded as a national art. Imitations of English, French and German designs, however skilfully made, for the Russian artificer is a good copyist, are, after all, only imitations. To form a true idea of Russian art, it is necessary to visit Moscow, Novgorod, Kiev, and some of the monasteries and churches. But I must now say something of the manufacturing industries centered around Moscow.

Before the reign of Peter the Great, the industry of Russia was of a domestic, local character, and confined to villages. The chief articles of manufactures were woollen goods, cordage made of hemp, a coarse kind of linen, leather, metal-work, and articles made of wood. These were for home consumption as well as for export abroad. After the famous act of Boris Godounoff, obliging the

¹ Extracts from a paper read by E. Delmar Morgan, before the Society of Arts and published in the *Journal* of the Society.

peasants to give up their roving propensities and become fixed to the soil, the native industries greatly increased, that of leather especially benefiting. The leather industry was then centered in the governments of Kazan, Nijni-Novgorod, Moscow, Yarozlaf, and Kostroma; tallow-melting works were also numerous; soap was manufactured at Kostroma; tar came from the district of Kargopol and the Vaga, where potash was also produced for export; Moscow wove cloth and silk stuffs, deriving the raw material from Persia; Kholmogory produced iron-bound trunks and cases; Yarozlaf, small ironware; Tula was the small-arms factory, a position it has retained to this day; from Vladimir came the ikons, or religious paintings on wood. As the demand sprang up for some new article, whole villages devoted themselves to its production, and these industries became hereditary, descending from father to son for generations. The next step was their organization on the factory system, the domestic character of the industry being still retained. Thus, in the time of the Tsar Alexis Mikhailovitch, iron and bell foundries attained a certain degree of development. The government of Olonetz was the first seat of the native iron industry, now transferred to Southern and Eastern Russia. Gunpowder was then manufactured near Moscow; writing-paper and glass in the neighborhood of Moscow. But the great impetus was first given to native industry by Peter the Great, who conceived the idea of planting the arts and industries of Western Europe in Russia. It is well known how he labored himself in acquiring a practical knowledge of these arts in Holland and England. In Russia his efforts were untiring. He invited foreigners to come over, encouraged them to establish factories, protected these by all kinds of privileges, and, what was of the greatest importance, established government factories, to which villages were attached. The export of raw produce useful for manufactures was prohibited, the import of foreign fabrics limited. The Government became the chief buyer of the produce, often paying dearer than its value. Lastly, a separate college was founded for the encouragement and protection of manufacturers.

By the end of Peter's reign, Russia numbered 250 manufactories, including almost every known branch of industry at that time. But the measures taken to bring these into existence were of an artificial nature, and gave rise to monopolies, the evil effects of which were felt for the fifty years succeeding Peter's reign. About 1770, however, notions of free-trade made their way into Russia, and led to a reversal of the protective system. The privileges were withdrawn, the college of manufactures was closed, and the foundations laid of a more normal development. It was not, however, till about the middle of the present century that free-trade began to exercise a marked influence on Russian political economy, the tariffs of 1850, 1857 and 1869 having gradually adopted a more moderate scale of duties, better suited to the requirements of the country. Nevertheless, many years will probably elapse before the protective system is entirely done away with, for the artificially-created industries of Russia have obtained so firm a hold that any sudden change might cause wide-spread distress and financial derangement.

If we would see something thoroughly Russian we must visit the forest region of the north—the governments of Archangel, Olonetz and Vologhda, where the population is chiefly occupied in one form or another with the wood industry. Russia, says Mr. Atkinson, is, as far as her arts are concerned, in the period of wood. In winter, with his *topor* or hatchet, the peasant enters the forest, fells the giant pine, the larch, the birch tree or white fir, drags the fallen log with his little pony to the stacking-place, there to be stamped by the receiver. In spring he rafts the timber down the smaller stream to its confluence with the great river, then down this to the sawmill or seaport. Large numbers of the population find employment and earn a livelihood in this way. The subsequent operations of sawing the round logs into deals, or squaring them for building purposes, is another branch of the industry. The villages in Great Russia are all built of wood. Some of the churches are of the same material, the best to resist the extremes of cold and heat of the climate. There is little room for the display of decorative art in these log-cabins; occasionally, however, the traveller comes to a village where the façades are adorned with carved roof boards, and the window frames and shutters sometimes gaily painted. These have a picturesque appearance, reminding one a little of the Swiss *châlet*. On internal decorations and fittings the peasant of Great Russia devotes little labor or taste. He is too much concerned with the struggle for existence to have a mind for the beautiful in art. Quite different is the Little Russian. He adorns his *mazanka*, or clay-hut, outside and in with flowers, and tastefully embroidered linen cloths disposed on the walls; but the Cossacks of Little Russia are distinct in language, habits, and dress from the Great Russians, so much so, indeed, as to form with these two nationalities.

The industrial art of the peasantry is chiefly religious. Pictures of saints, called ikons, painted on wooden blocks or copper, are familiar objects, seen in every Russian dwelling, from palace to log-cabin. These paintings are mostly sombre representations of the Virgin, our Saviour, or some saint, often covered with plaques of silver, silver-gilt, and even gold in some of the churches, leaving only the face, hands and feet exposed. A lighted lamp hangs before them on church festivals and saints' days. The preparation of the boards for these paintings is an industry of the government of Vladimir, the painting being done by hand in the monasteries. The method adopted is that of subdivision of labor; one set of

monks paint the face, another put in the nose, a third the eyes, so that every feature is rendered in a particular style, which never varies. This is the height of conventionalism in art, and fully accounts for the absence of artistic merit in the ikon. The great sanctity attributed to some of these pictures is due to the miraculous legends surrounding them. For instance, over the sacred gate of the Kremlin at Moscow is a picture of the Redeemer of Smolensk, held in such high veneration that every one passing under it uncovers his head. The image of St. Nicholas of Mojaisk, of our Lady of Kazan, and many others, have all their legendary histories associated with some event in the life of the nation.

It would be interesting to follow up this subject, and trace the history of religious painting from the eleventh and twelfth centuries, when the monks of St. Athos produced a very similar type of sacred picture. Transferred to Russia, the art has remained almost unchanged, the stirring events in her history finding but faint echoes within the strong, fortress-like walls of the monasteries.

Mr. Morfill, the well-known author and reader in Slavonic languages at Oxford, classifies the different schools of ikon painting under the following heads:—(1) The Byzantine or Chersonian school; (2) the school of Moscow; (3) that of Novgorod; and (4) that of Stroganof. According to this authority, the first artists were of Greek origin, but they soon found Russian pupils. The models which had been received at Byzantium were faithfully adhered to at first, but gradually the art of ikonography acquired a different character in each part of the country. But M. Leroy-Beaulieu says that these schools were, strictly speaking, workshops, differing only in their treatment of the drapery and colors. The chief distinction I have noticed is that between the ikons of the old believers and those of the orthodox, the first having adopted a miniature style of painting, and eschewing all representations of Christ and the Virgin.

In recent times, however, a more artistic style of picture has been produced by the aid of chromo-lithography, and at the Troitsa monastery, near Moscow, and the Pechersky Lavra, near Kiev, large numbers of these new ikons are sold to the pilgrims.

The industries of cabinet and furniture making have flourished in the governments of Perm, Nijni-Novgorod, Valdimir, Viatka, Tver and Moscow, the furniture of Viatka being celebrated for its cheapness. This is not, however, a very flourishing industry at the present time. The Russian peasant's requirements in the way of furniture are of the simplest; a table and some benches are all that is needed. The only thing he buys is the *sunduk*, or iron-bound wooden trunk, sold in large numbers at all the great fairs.

Of the smaller articles in wood, there is a very large production of spoons, knives, forks and cups. The wooden spoon, Byzantine in shape, is indispensable in every household, for with this every peasant eats his food. These spoons are sent in large numbers to Central Asia, and with the samovar, or tea-urn, will in course of time help in civilizing the nomadizing Kirghiz, who now eat with their fingers. We should not omit to mention the important part that matting, made from the bark of the lime-tree, takes in the domestic economy of the Russian people. Of this are manufactured the bags to contain flour, grain, etc., the heaviest and best being those used for flour. The bark of the young lime-tree is stripped to make into sandals, and of these some millions of pairs are required, involving the destruction of an almost incredible number of trees. It takes the bark of four saplings to make one pair of sandals, and it is estimated that ten millions of pairs are required annually. The trees are stripped in spring and summer when they are full of sap.

The iron industry ranks only second to that of textile fabrics in Russia. When I visited the mines and works of the Ural, some thirty years ago, Russia's iron trade was of no great importance. Prince Demidoff's and Monsieur Yakovlev's were then the only large works except those of the Government. At these charcoal iron of a high quality was rolled into rolls or hammered into thin sheets for roofing. The growing scarcity of forests, felt even in those days, has limited the production, and the chief seat of the iron industry is being transferred to Southern or New Russia, where iron-mines and coal-fields have been discovered. But the Ural range is rich in copper and the precious metals. Semi-precious stones, such as malachite, lapis-lazuli, aventurine, jasper and porphyry are found there. These are cut and polished in the government works at Ekaterinburg, and adorn the halls and galleries of the Hermitage, and other public buildings at St. Petersburg. The objects consist of vases, tables, paper-weights, etc., and are attractive, not so much for any novelty or elegance in design they may have as for the rarity and beauty of the stones, as well as for the immense labor expended upon them. The celebrated malachite doors, exhibited in London in 1851, are an instance of this stone-polishing art.

From recent statistics we learn that there were 522 iron mines in the Ural, in 1888, producing 49 millions of poods of metal; 20 mines in Southern Russia, with a production of 14 millions of poods; and 63 mines in Poland yielding 12 millions, total amounting to 87½ millions of poods, or nearly 1½ millions of tons of iron.

When I selected the subject of Russian industrial art for my paper before this Society, I had in view to say something of those village industries to which passing allusion has been made in the foregoing paper, and which I had seen in Little Russia, when I visited it in 1888. The so-called *kustarny promysl* in olden times gave employment to many families, and was not confined to one branch of industry, or to any particular locality, but comprised textile, ceramic

and other industries, and was widespread throughout Russia. Large manufactories and capitalists have put an end to it, but there still survive, in a few out-of-the-way towns or villages, some remnant of these by-gone industries.

It was in one of these old-fashioned places that I happened to find myself. The particular village to which I refer is Oposhnia, in the government of Poltava, a great cereal-producing region, and interesting from its having once been the border-land of Russia. It was here that the Cossacks fought against Tartar, Pole and Swede; this, too, was the country of Gogol, the great romance writer of Russia, and it was on these wide plains, now covered with waving corn, that Russia first became a nation.

The village of Oposhnia is a large one (according to old records it was a town as far back as the twelfth century) and numbers 700 houses at the present day, inhabited by the descendants of those Cossacks who fought under their hetmans, Daroshenko and Briukovetsky. These Cossacks, long since become peaceful settlers, turned their talents to the ceramic art. They are celebrated, too, as horticulturists. Nowhere have I seen more beautiful irises than were growing at the time of my visit in the chief magistrate's garden. Possibly, the Oposhnians have imitated the color of these flowers on their ware, for I noticed a remarkable iridescent lustre about their pottery which I have not seen elsewhere except in Spain. The clay they use is an excellent kaolin obtained in the neighborhood; this is fashioned by hand into the common dish in universal use in Little Russia, and known there as the *viska*. The design is simple, but effective: only three colors are used, prepared from metallic oxides, and laid on the revolving plate in concentric rings, with the aid of a feather fixed into a horn handle; the ground is afterward stippled in by hand with a brush.

Professor Zankévitch, who has made a study of this art, says that he found no pottery to equal it except in Switzerland. I found some like it near Seville, but, whatever its origin, the art is one well worth preserving. Besides the ordinary ware of everyday use, the Oposhnia potter occasionally indulges a flight of fancy, and produces some original design, which usually takes the form of a drinking-vessel or bottle to hold spirits. These are curious rather than artistic in shape, though showing ingenuity and skill in the manufacture. . . .

A few more words on the future of Russian industrial art. We have seen how it has hitherto largely partaken of a religious character, jealously guarded and controlled by the priesthood and synodal authorities, how this art has become stereotyped or petrified through many centuries of imitation: how intercourse with the West has slightly modified the archaic type of ikonography, without, however, emancipating it from tradition. We have seen, too, how Western influences are pervading manufactures, and teaching Russia to make use of her immense material resources. Imbued with these Western feelings, a new school of art has sprung up. Sculpture, hitherto almost forbidden, is now taking a high position, and producing such works as those of Antokolsky, whose statue of Ivan the Terrible was exhibited some years ago in the Kensington galleries, and who has more recently modelled another historical subject, in the seated figure of Nestor, the annalist, of Lieberich and Lanceray, whose spirited groups of horses in bronze have been greatly admired. Among painters, too, there are already many known names, such as Vereschagin, the brilliant realistic artist of Central Asian life and landscape, Semiradsky, Malovsky, the brothers Sokoloff and a score or two more.

Stimulated by the exhibitions, held at frequent intervals in St. Petersburg and Moscow, and by the Stroganoff School of Design in the last named city, Russian art may have a future; but, whether inspired by the French or the Italian school, the subjects must be thoroughly Russian. They must depict in true colors native life and character, in every part of the vast and varied Empire.



WOMEN'S WORK IN THE WOMAN'S BUILDING.—EXHIBITS OF WROUGHT-IRON WORK.—THE SPANISH AND MEXICAN EXHIBITS.—THE DANISH, NORSE AND RUSSIAN PAVILIONS.—THE JAPANESE TEA-HOUSE.

In our last letter, we spoke of the pleasure and profit to be obtained from the serious study of some of the exteriors of the buildings. This study can be interspersed with the sight of much of architectural interest in the interiors.

In the Woman's Building, in the department devoted to work in decorative art, much that is admirable can be found, and one realizes, in looking at the examples here shown, what has been accomplished by woman in this especial branch of art. It is a kind of industrial art especially adapted to their use as a means of gaining a livelihood, and, with the thorough study which these designs bespeak, one realizes that before long there will be small chances for the class of half-skilled designers who in the past have been only too

common in this country. The men will have to study hard to keep abreast of the women, if this be a fair sample of the work being accomplished by them throughout the country. Those who expected to find the woman's exhibit a fine assortment of log-cabin quilts and worsted embroideries have much to learn from this collection. Especially worthy of note are the designs for stained-glass in the north-eastern corner of the building. Some charming work is shown both in the designs and in the work as executed from them, both glass and designs far surpassing that shown in some of the foreign exhibits by firms that have a world-wide reputation. The glass here displayed is from the factories of some of our best-known producers, and shows that these designs of women are approved and appreciated by them. Near the exhibit of the designs for glass are several pieces of tapestry appropriate for wall-decoration. There is one very strong one, a copy from one of the illustrations of William Blake's "*Book of Job*." The colors are extremely good and the mounting artistic, but it might be questioned how successful the handling of the mere technical part could be considered.

In the gallery of the building are displayed specimens of the embroidery of Madam Leroudier, about which the French architectural papers have spoken so well, while extending around one entire side of the gallery is a fac-simile of the famous Bayeux tapestries of Queen Matilda.

A good deal of wood-carving is displayed in the building which does not compare favorably with carvings from other nations, not accomplished by women, however, but by men who have devoted a lifetime to the art, and whose ancestors followed the calling before them, very likely. It is a curious fact that we, as a nation, do not seem to understand the treatment of wood as well as many another people. We finish our woods either with a polished piano-finish or else treat it merely with oil, which produces a greasy, unpleasant surface. This is especially noticeable by comparison when we come to the library in the Woman's Building, a really noble room, whose chief attraction lies in the beautiful wainscoting above the bookcases and in the mantelpiece. It seems at first sight as if this charming way of treatment had, at least, been appreciated, and the spirit of the sixteenth-century carving caught in a most surprising way. It was disappointing to learn, however, that this admirable work did not belong to to-day, but was taken from some old French convent or monastery of the sixteenth century. The report seems rather surprising, and it was impossible to verify it, but it certainly is not American work of the present day. Come from where it may, this library, which, by the way, is the New York room, is well worth careful inspection by all who are interested in architecture, either superficially or otherwise.

California, in this building, is represented by a room finished in most beautiful redwood. The room itself is not especially attractive, but the panels of the wood are many of them distinguished by great beauty. A curious design is employed for a frieze of the wood, on which, in neutral tints, are drawn in conventionalized shapes the trunks and sections of trunks of trees. The room does not pretend to be furnished, and seems only to be used as a display for the redwood.

Kentucky is represented by a really charming room, a reproduction of one of the apartments at the old Montecello homestead of Jefferson. All these rooms in the Woman's Building open out of a gallery that surrounds a really beautiful central court open to the glass roof. The building is sufficiently small to admit of such treatment, and the court is certainly a fine feature. Mrs. McMonnies has in the northern tympanum a fine decorative group, while the southern one is not so successfully adorned with a much less decorative composition with a vivid green background. Names of famous women form a frieze in gilt letters around the court, from Miriam and Esther of Hebrew days down to Jennie Lind and Rachel of our own time. Beneath the northern tympanum is the name of Bertha Honoré Palmer, while in the same position, at the southern end, is that of Sophia G. Hayden, the architect of the building. This is the only place in the grounds where the name of an architect has appeared raised in a place of honor. As the exterior of the building has not been considered above criticism, it would be no more than fair to state that the interior is especially satisfactory. The central court, hung, as it is, with the work of some of the best women artists of our century, is a very fine feature in building.

It is curious to note how the national characteristics impress themselves on work when one sees the displays from one nation side by side with others. Take, for instance, the architectural wrought-iron-work exhibit. In the French section of the Art Building there is some such work, whose design has been so carefully studied, whose execution is so painstaking, that it has, indeed, become a work of art. No crude nature, in the shape of flowers and leaves, has been introduced into it, but suggestions from nature have been gratefully received, and so studied and worked over that a most charming design has resulted for which we are very remotely indebted to the passion flower and vine. This is the only display of wrought-iron which the French seem to have made, and perhaps it is scarcely fair to compare this one excellent example with the very large collection which Germany has made. Certainly next in point of excellence to the French exhibit stands the German. This work is exceedingly good, but very different in design from the French. Nature is always beautiful to the German eye, and, consequently, black iron roses with painfully realistic thorns and leaves climb over lanterns, or poppies hang around chandeliers. Of course, such designs are

somewhat banished from the large wrought-iron gates, which form a very conspicuous and excellent object in the German exhibit. These gates are very satisfactory indeed, fine in workmanship and excellent in design, though, naturally, the work would not be of the same grade of finish of that in the one comparatively small French display. A few examples of this kind of work are found in the Spanish exhibit, and here, again, some of the national characteristics seem to be impressed on the work, there being a certain lazy slovenliness and pretentiousness both in the design and in the workmanship.

The entire Spanish exhibit is very disappointing. Out of grateful recognition to the king and queen who had such intimate relations with the Moors and whose times drew their chief artistic inspiration no doubt from them, a fine space was allotted in the Manufactures Building. Stories were current in the opening days of the Fair, when Spain seemed chiefly noted for her tardiness, of a fine pavilion which would be strikingly suggestive of the Alhambra. The pavilion actually consists of a series of heavy Moorish arches of rough timber construction painted or whitewashed in a pinkish tone. The sections which these arches surround are often empty to a somewhat noticeable degree, and form a most striking contrast to the large and superb collection of Great Britain, Germany, France and Italy, as well as to many of the most interesting small exhibits. Spain's architectural exhibit seems chiefly to be shown to prove beyond a doubt what are the things to be avoided in construction. Resting as she has for hundreds of years on the reputation which she acquired from the Moors in the use and make of tiles, it is really surprising what very poor specimens are displayed here, both in glazed tiles and tiles for floors. The designs are poor while the quality of the tiles themselves is much below our grade of excellence. Several specimens of a heavy composition stone are shown in the exhibit, used, apparently, chiefly in the manufacture of bath-tubs, making most unattractive looking articles. In the stained-glass, perhaps the one specimen, presents a little better work, though this but poorly compares with other exhibits. Naturally the work in the stamped-leather display is somewhat better, though even here one feels that a reputation is sometimes a dangerous thing to have. There is one very small exhibit of brick, hollow tile and roofing-tile, yellow and unglazed, which are well made and interesting on account of their peculiar size and shape.

It is noticeable that Mexico's exhibit, though at least excelling Spain's in the matter of enthusiasm, is characterized by the same features as those which mark, what might be called the mother country. There is a great deal in the general exhibit that is actual stuff, showing how far behind in thought and execution these countries really are. Some interesting old ecclesiastical carvings of the sixteenth century give one point of interest to the Mexican booth, and some beautiful slabs of onyx show out as an attractive natural product of the country.

Close neighbors in this southwestern corner of the Liberal Arts Building are one or two smaller exhibits worthy of passing notice. Jamaica has one generally uninteresting to the architectural eye, except for some very beautiful specimens of native woods.

Siam's gaudy and characteristic pavilion flares up as a near neighbor to this, being the same one used at the last Paris exhibition. All the exposed surfaces of woodwork are bright in red and gold, while the walls on the interior as well as exterior are composed of a curious checker-board inlaying of bits of glass and porcelain. This kind of decorative work is used to a great extent, even the risers of the steps having a strip inlaid in them. The exhibit itself is small, some little models of the famous Siamese house-boats as well as the ordinary dwelling-house being interesting.

Ceylon's banner is seen not far from this section of the building and here the chief architectural attraction lies in the beautifully carved columns.

In the Indian booth one side is composed of a series of three most exquisitely carved arches which would make a charming feature in certain rooms. Adjoining the exhibition booth is a very beautiful little Indian room in carved teakwood. A feature of this wood is that it is left in its natural color rather than stained as we generally see it. The entire room and carvings were executed in India, being brought here and re-erected. The carvings are all characteristic Indian work and are exquisite in design and workmanship. The whole thing is elaborate in the extreme, being one complete mass of carving, much of it of the finest and most beautiful character. To take away what might otherwise be a flat effect and also to accentuate the architectural features, large portions of the carvings are ingeniously arranged so as to appear to be over an inch in depth.

Denmark's pavilion also contains a room equally if not more typical in character. The furnishings and finishings are all in the style of the Middle Ages. The walls are finished with a high wainscoting, and above the tapestry. The wainscoting of black oak is in narrow panels, a small carved panel above each of the narrow ones, the background behind the carvings being relieved by a layer of gilt and red color. The design of the tapestry is good and very much in keeping with the character of the room, with the exception of the lower member, which is perhaps more classic than mediæval. Tables, chairs and settle are all exceptionally good and carry out in detail the general feeling of the room. The upholstering of the settle is well managed as the stuff hangs from the top of the high back by rings.

The entire Danish pavilion is well and carefully managed and be-

speaks much care and thought in the planning. It follows out no special style of architecture except the wooden construction in vogue in modern Denmark. On either side of the entrance, small rooms are devoted to museums for relics belonging to Anderson and Thorwaldsen, while the whole pavilion seems almost like a shrine for Thorwaldsen's works. Life-sized casts of Anderson and the sculptor stand either side of the entrance, while the arched spaces in the walls of the pavilion are casts of many of Thorwaldsen's chief works.

A little to the east and south of Denmark, Norway has her pavilion, which is in a design very characteristic of the country. The treatment of the wood is somewhat similar to that in the Danish building, the wood, however, here, being left in its natural tone while bright color is introduced. The treatment, though, is more barbaric and less refined, being a connecting link between the peculiar wood treatment of Denmark and the more exaggerated style of Russia. Norway's pavilion though comparatively small is very effective: at the back is a platform behind which rises painted views of the Norwegian mountains, fjords and glaciers, etc., which are themselves the background for a small Norwegian peasant's cottage, while on the platform are wax figures of peasants in the national dress. One of the most attractive features of the exhibit is the beautiful wood-carving. The designs are of a refined Romanesque type, and the manner of treatment of the carving itself is as refined as the manner of treating the style.

Russia's pavilion stands just north, and the general outside appearance would bespeak much of interest within. The wood is stained a walnut shade, while gilt decoration is introduced here and there through its grotesque outlines. The pavilion was designed by one of the most distinguished Russian architects and fully exemplifies the eccentricities of the national style. The entrance is through a little vestibule, whose ceiling of a curious woven stuff shows a design of the double headed eagle, while a large mosaic portrait adorns its walls. Stained-glass windows of poor design and workmanship still further ornament this small vestibule. The entire exhibit is typical of the country. Rich and beautiful enamel-work in gold is displayed most lavishly, so lavishly in fact that the uninitiated begin to suspect it must have a comparatively moderate price till told that a small vase is worth a thousand dollars. Great lapis lazuli and malachite urns and tables are there, but almost nothing is exhibited that could appeal to a well-to-do educated middle class, or bespeak any activity in industrial art or comfort in home-building. There is absolutely no architectural display of any kind. There are a few pieces of ironwork, one essentially architectural, a holder for a banner, which is very good in design. This example harmonizes more with our ideas of how architectural ironwork should be treated.

Belgium's display has small architectural features of interest. Her glazed tiles and mantel with ceramic work and tile picture at least deserve a passing glance, the ceramic-work mantel perhaps more than a passing glance, that it may sufficiently impress itself on one's memory as something henceforth always to be avoided. The marble display in this exhibit is quite a large one, comprising seventy-five different kinds, while the glass display is disappointing. Of course, an exhibit of plain window-glass would be tedious and uninteresting, and the amount that is there is quite sufficient to represent an industry for which Belgium is famous, but the few pieces of stained-glass that are there are very poor and not at all up to the standard of excellence which one would naturally expect.

One interesting little spot is found in the Japanese tea-houses on the shores of the lagoon. Incidentally these have been mentioned before in these letters, while they were in process of construction. One, at least, is presumably an exact counterpart of the ordinary tea-house in Tokio. The open tea-house is built entirely of bamboo. Three small bamboo stalks, suggestive of ordinary fish-poles are tied together and these serve for ridge poles. The roof itself is of split bamboo laid together like Spanish tiles. The walls, of segments of bamboo bound together by bamboo strips, harmonize with the window openings covered with bamboo gratings. The tables and little stools (an innovation no doubt) are of bamboo and very pretty and comfortable of construction. Across the tiny garden, a little Japanese house offers, at an advanced price, the hospitality of tea, and here one can be still more Japanese and sit on the floor and drink tea with a lady hostess. This second little building is evidently in its chief characteristics like the ordinary Japanese dwelling, paper partition-walls and all, and tininess and prettiness come out as strong points here as in the descriptions of these peculiar little dwellings. The back-door opens from what is presumably a small kitchen as a diminutive charcoal stove or brazier stands in the corner. The walls, both inside and out, are practically covered with a peculiar paper, which in texture is like our sand-paper, though in color it is between that and emery paper. The rooms are really very pretty, being dainty and restful after our crowded apartments.

A great feature of the establishment is the garden about large enough to accommodate an ordinary-sized family of English sparrows. Leading to what we call back-door and kitchen (possibly it may be an antechamber) is a diminutive walk made of tiles sunk in the earth, about a foot apart. By the side of this door, in a little hollow lined with stones and the curious resurrection plant, rests a small gnarled tree-trunk on which is a bronze urn, filled with water. Across the urn lie two curious little long-handled wooden dippers. Whether this vast fountain is intended for watering the lawn or supplying the family with cooking-water is not shown. By the front of the house a more pretentious, though similar "fountain" is found,

across the top of which several blue flag plants are laid. Everything seems most decorative and as if it had just stepped off a Japanese fan. The small elevated humps in the garden support elaborate porcelain affairs in which lights are evidently burned in the evening. Everything about the place is planned and executed with the greatest care. Even the small wooden signs which direct one to the separate tea-houses have absurd little slanting roofs built over them, the whole sign, roof and all, not being a foot square.



AMERICAN INSTITUTE OF ARCHITECTS.

THE Annual Convention of the American Institute of Architects is to be held in the new Memorial Art Institute, on the Lake Front in Chicago, in the week beginning July 31, 1893, and the Grand Pacific Hotel has been selected as the headquarters of the Institute of Architects during the Convention. It is therefore desirable that as many members as possible be accommodated at this hotel. Application for rooms should be made at once, and all applicants should give at least ten days' notice of their intended arrival, in order to be sure of securing good accommodations.

The Grand Pacific is conducted on the American plan only; is but a short distance from the Art Institute, and is only four blocks away from the station where the trains start for Jackson Park, the site of the Columbian Exposition, making the run without stopping in fifteen minutes.

Rates per day, including board, are as follows: Single rooms, \$4.00 to \$5.00; same, with bath, \$5.00 to \$6.00. Double rooms, one person, \$6.00; two or more persons, \$5.00 each; double rooms, with bath, one person, \$7.50; two or more persons, \$5.00 to \$6.00 each.

These prices, I am informed, are as low as the lowest in the city for the same class of accommodations, and will doubtless be cheaper than a \$3.00 room in a temporary building near Jackson Park, with the added expense of obtaining meals elsewhere.

I am authorized to announce that rooms can be obtained for one person in a single bed, with two or three in a room, for as low as \$1.00 per day, and that the management of the Lakota, a new ten-story fireproof hotel, on the corner of Thirtieth Street and Michigan Avenue, about midway between Jackson Park and the Memorial Art Institute, has agreed to accommodate the architects who prefer the European plan, at the rate of \$1.50 to \$4.50 per day.

The local Committee, consisting of Messrs. W. W. Clay, 218 La Salle Street and S. A. Treat, 58 Wabash Avenue, will, if desired, undertake to secure quarters at the Lakota or elsewhere, as far as in their power, from \$1.50 to \$5.00 per day, on the European plan, if they have timely notice of the same, stating the time of proposed arrival, length of contemplated stay, and the price which the members are willing to pay.

I am able at this time to announce that the following papers have been promised for presentation at the Convention:

ON THE COLUMBIAN EXPOSITION.

Daniel H. Burnham. — Story of its Organization.
Frederick Law Olmsted. — On the General Scheme and Plans.
E. C. Shankland. — On the Construction of Buildings, Docks, Piers, Bridges, etc.

W. H. Holcomb. — On the Use, for Transportation, of the Lagoons, of Lake Michigan, of the Intramural Railway, of the Alley Elevated, of the Great Trunk Lines, of the Terminal Facilities, of the Chair System, etc.

Charles F. Foster. — On the Mechanical Power Plant.

R. H. Pierce. — On the Electric Plant.

ON SUBJECTS OF GENERAL ARCHITECTURAL INTEREST.

Frederick Baumann. — A Review of Chicago's Architecture.
L. De Coppet Berg. — Engineering in Architecture.
C. H. Blackall. — The Influence of Building-laws upon Architectural Development.

A. J. Bloor. — Ethics in Architecture.
Glenn Brown. — A Review of Recent Plumbing Practice.
T. M. Clark. — Association for Mutual Defence.
Thomas C. Clarke. — Architectural Engineering.
R. W. Gibson. — Superintendence in Architecture.
William R. Hutton. — Foundations of Buildings.
Jeremiah O'Rourke. — Government Practice.
Edward T. Potter. — The Aeration of Cities and their Buildings.
J. L. Smithmeyer. — Library Buildings.
Henry Van Brunt. — Some Considerations Affecting the Development of Characteristic Style in the United States.
H. Langford Warren. — On the Use of Color in Architectural Design.

P. B. Wight. — Fireproof Construction and the Practice of American Architects.

I wish to urge upon every member his loyal duty to attend the Convention, not only as host, to contribute to the pleasure of such foreigners as may honor us with their presence, but his duty to himself and to his confrères to make the Convention worthy of the opportunity and the occasion.

All persons proposing to attend will please notify the Secretary at as early a date as possible, in order that additional arrangements may be made, if necessary, for their accommodation.

ALFRED STONE, Secretary, A. I. A.



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

HOUSE OF T. E. PROCTOR, ESQ., 273 COMMONWEALTH AVE., BOSTON, MASS. MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.

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

CHURCH OF THE GOOD SHEPHERD, ROSEMONT, PA. MESSRS. BAILY & TRUSCOTT, ARCHITECTS, PHILADELPHIA, PA.

THIS church, of which the corner-stone was laid June 17, 1893, is being erected at Rosemont, Pa., as a memorial to the late Mrs. H. B. French by her husband. It is being built of a local blue-gray stone with Pennsylvania blue marble trimmings, the interior being faced with the same local stone. The stone is laid rubble range with deep sunk joints. The roof will be of blue slate; the pillars and arches of the interior, Indiana limestone; the roof open-timbered with hammer-beam trusses; the chancel ceiling moulded and panelled for decoration. The seats, chancel furniture, etc., will be of oak; the chancel floor and vestibule tiled. It is proposed to make the windows memorials. Steam, indirect system, will be used eventually for heating. Provision is made for ventilation by means of large duct in tower. The seating-capacity is five hundred. The cost will be about thirty thousand dollars.

THE NEW TELEPHONE EXCHANGE BUILDING, ATLANTA, GA. MR. G. L. NORRMAN, ARCHITECT, ATLANTA, GA.

The building is used exclusively by the Southern Bell Telephone & Telegraph Company. It is built of Ohio sandstone and Perth Amboy buff-brick and terra-cotta, and in execution proves to be a most pleasing architectural conception.

COMPETITIVE DESIGN FOR FIRE-STATION, CAMBRIDGE, MASS. MR. JAMES MURRAY, ARCHITECT, BOSTON, MASS.

ROOKWOOD POTTERY, CINCINNATI, O. MR. H. NEILL WILSON, ARCHITECT, PITTSFIELD, MASS.

HOTEL YORK, YORK, PA. MR. J. A. DEMPWOLF, ARCHITECT, YORK, PA.

[Additional Illustrations in the International Edition.]

XVI, XVII AND XVIII CENTURY KEYS.

[Copper-plate Photogravure.]

THESE keys formed a small fragment of the famous Spitzer Collection which has recently been dissipated over the civilized world by one of the most profitable sales ever held.

DOORWAY TO HOUSE OF T. E. PROCTOR, ESQ., 273 COMMONWEALTH AVE., BOSTON, MASS. MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.

[Gelatine Print.]

THE COTTAGE, WALTON HEATH, SURREY, ENG. MR. B. VAUGHAN JOHNSON, M. A., ARCHITECT.

THIS is an addition to, and rebuilding of, an old house. The materials of the new part are red bricks and tile hangings, the stonework being in Monk's Park and Corsham stone. The joinery in the hall and billiard-room is in oak.

UNITED PRESBYTERIAN CHURCH, WEST CALDER, N. B.

OUR illustration shows the village church which has been built from the design of Mr. James G. Fairley, F. R. I. B. A., architect. A water-color drawing of it was exhibited in the Royal Scottish Academy this year.

NEW COMMERCIAL PREMISES, LIVERPOOL, ENG. MR. W. AUBREY THOMAS, ARCHITECT.

THIS building is proposed to be erected in Water Street, Liverpool, and will be adapted for large, well-lighted offices suitable for shipping firms. The staircase, which is to be of stone and of circular form, encloses a hydraulic passenger lift. The walls of corridor and staircase will be tiled. The front elevation is to be of Cefn stone, with granite bases.

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.]

TRINITY CHURCH TOWER ROOFS.

BOSTON, MASS., June 24, 1893.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—As one of the editorials in to-day's *American Architect* is somewhat amusing, I thought I would write to you and state a few facts.

It says that "Not long before his death Richardson made a vacation trip to Europe with some of the richest members of Trinity congregation," etc., and then goes on to say that "He deserted his friends on some excuse and returned to Boston, and immediately had the roofs taken off of the towers to carry up the walls." It also says: "Unfortunately, these gentlemen had thought better of the matter in the meantime," etc.

In 1882 Mr. Richardson decided to go to Europe, and asked me to go with him, which I did, and to the best of my recollection, he did not take a meal or pass a day out of my presence. He may have once or twice, but I do not remember it.

Who the rich members of Trinity parish were I cannot conceive. Rev. Phillips Brooks, Rev. Mr. McKiver, of Philadelphia, an intimate friend of Mr. Brooks, and the Rev. J. P. Franks, of Salem, also an intimate friend of Mr. Brooks, went to Europe at the same time, and, as we went over in the same steamer, we joined forces on leaving London and travelled together through France and Italy.

As I remember, Mr. John C. Ropes was also a passenger on the steamer, and the only member of Trinity parish that I can recollect at the present time, and we only saw him while on the Atlantic.

On leaving Italy, Mr. Richardson and I went to Spain, leaving the three ministers to themselves, and from Spain we went to Paris, and then to America. The reason for his coming home was that he had been away more than four weeks longer than he had laid out at first, and he was afraid that his clients would complain if he stayed longer.

In Milan, some time in early August (I should say), he gave a good deal of time to the study of the Albany Cathedral, and had a long correspondence with Bishop Doane on the matter, but I do not recollect hearing the towers of Trinity Church mentioned in any way. Possibly he and Mr. Brooks may have talked the matter over, as they had long talks in the evening.

In regard to Trinity Church, my recollection of the days in the office is that the two steep roofs were tiled, and that the tiles broke badly and dropped off, and the roof leaked, and, as they were never liked, it was decided to take them down and put on a flat tin roof, which would probably stay tight until such time as the roof should be altered.

I write this long letter to you merely to show you how curiously an editorial sometimes strikes those who are more or less interested in the subject-matter. I am sorry to spoil the article, which is interesting if not true. I never before was taken for a rich member of Trinity parish.

Yours very truly,

H. J.

[We gave the story only as it was told to us, and having seemingly blundered through overtrustfulness we think it well, in the interest of truth and accuracy, to publish this note, though it was not written in that intention.—EDS. AMERICAN ARCHITECT.]

ASPHALT ROOFS: VAULTS.

—, June 19, 1893.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—I would be very much obliged to you if you would kindly answer the following questions in your next issue:

First.—Is an asphalt and gravel roof the best for flat roofs, and if so what is the best manner of laying it.

Second.—Are there any books describing the practical building of modern fire and burglar proof vaults, if not what is the best and most usual manner of building them at the present time.

Yours truly,

F. W. M.

[ASPHALT and gravel roofs answer very well for flat roofs north of New York. In New York, and farther south, they are not so popular, apparently, for the reason that the sun, in the lower latitudes, melts the asphalt, which then drains down to the lower parts of the roof, leaving the upper portions denuded of their protecting coating. They are made with two, three, four or five "plies" of felt, according to the durability desired for the roof, and the number of "moppings" of asphalt is also generally specified. For a good roof, two layers of asphalted felt are put down, and secured with nails, driven through large tin washers, and the whole is then "mopped" with melted asphalt; then follow more felt and more moppings, three moppings being usually given to a four or five-ply roof. After the last mopping, small water-worn pebbles are scattered over the surface, to a depth of half or three-quarters of an inch. Before the laying of the felt is begun, "edge-cleats," of zinc or copper, high enough to keep the gravel from washing off, are put around the edges, and the gutter is usually formed with a similar cleat, to prevent the gravel and asphalt from running into it, and angles are flashed with zinc, or lead, or both, well covered with asphalt at the junction with the roof.

2. There is no very modern book that we know of on vault-building. The business is a specialty of the great safe-builders. Their catalogues and circulars contain much information on the subject, adapted, of course, to their own particular methods. Ordinary fireproof vaults are often built with hollow walls, generally two 8-inch walls with an air-space between,

floored with flagging on iron beams, and covered with the same, or with bricks, and doors hung to iron frames, which can be bought ready-made of the safe-makers, are built in. With a good foundation, this makes a tolerably fireproof vault, but it will not resist burglar's tools. A burglar-proof vault is a very difficult matter, comprising iron and steel linings, etc., for which the safe-maker's aid must be called in.—EDS. AMERICAN ARCHITECT.]

NOTES & CLIPPINGS

THE MASSACHUSETTS SMOKE-PREVENTION LAW.—The Massachusetts for steam-making, unless the furnace is so built or equipped that at smoke-prevention law, which takes effect July 1st, applies only to Boston, being limited to cities of over 300,000 inhabitants. The law provides that no person shall in such a city after July 1st use bituminous coal least 75 per cent of the smoke is consumed, "the degree of suppression being determined by the quantity of such smoke emitted, as shown by the density and color of the issuing smoke and the length of time which it is visible, the maximum standard of comparison being a continuous discharge of dense, dark smoke during the time the furnace is in active operation." An officer charged with the enforcement of the law is to be appointed by the Mayor, and a penalty of \$10 to \$100 is fixed for each week of violation.—*Engineering News*.

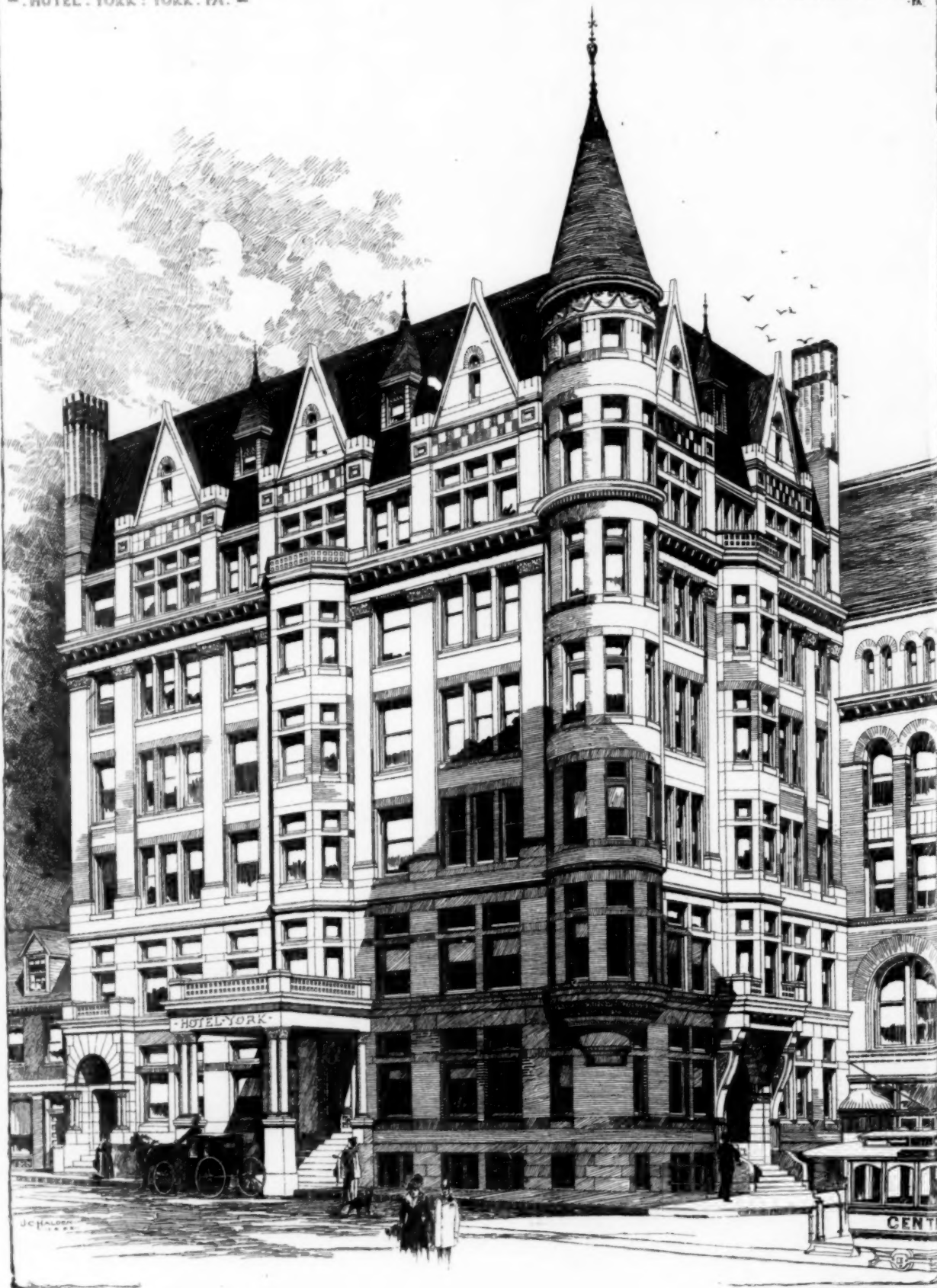
RETIREMENT OF SIR P. C. OWEN.—Sir Philip Cunliffe-Owen, to whose energy and executive powers the South Kensington collections owe much, is about to retire from the directorship, owing to the closure of his term of office. He has served since 1873. The science department is to be separated from the art department, the directorship of which has been offered to and accepted by Prof. J. H. Middleton, director of the Fitzwilliam Museum at Cambridge.—*Exchange*.

TRADE SURVEYS

It is difficult, in the face of the news from India regarding silver, to avoid a brief reference to a hackneyed topic. The combination of financiers and governments against silver does not end by the contest when it is determined to cease coinage. That, in fact, merely opens the question between financiers and people, merely appeals the question to a higher—the highest court. The crusade against silver has been no spasmodic work. The financial generals of the world have long since seen the trend of events. If human nature is not false to itself, we are on the eve of an agitation that will not terminate until radical changes are made in financial methods, ideas and standards. The people at large have never yet been heard on the question. The occasion has never yet arisen squarely. It now looks as if the issue could not be deferred. The United States Government must either fall in line with all other nations or take the consequences. It is not difficult to see what its course will be at the outset, but it is difficult to forecast the result, because the heretofore silent factor—the people—will now enter the problem, and, right or wrong, their views will prevail. The general business of the country is sound, which is a remarkable statement to make, considering that there is no market for the commercial paper of the best mercantile houses, or even of railroad companies. The drain of money westward has been at the rate of one million dollars per day. The surplus reserve is one-fourth of what it was a year ago. Loans in New York banks have decreased in that time in the ratio of 50 to 40, deposits 54 to 40, and reserves in banks have fallen off one-third. Our excess of imports in eleven months is \$81,000,000, as against excess of exports same time last year of \$210,000,000. Our gold and silver exports for same time was \$100,000,000, against \$31,000,000 same time last year. Taken in connection with declining values, increasing failures, strained banking facilities, affected credits and general apprehension, it is not surprising that the shrewdest minds in the business world refuse to believe that the worst is over, daily dinned into their ears by twenty-dollar-a-week financial writers. The present conditions are the outcome of twenty or thirty years' unobserved accumulations, and no temporary increase in wheat exports or expansion of exports for a month or two will help much. Powerful interests have determined that silver shall be discredited, and that gold shall be the unit of value the world over. The plodding masses will in due time take up the challenge. Railroad earnings for the first week in June showed increase of 5.75 in gross earnings over same week last year, and, second week, 3.09 per cent. Railroad track-laying begins in two weeks on several systems. Reorganization of a number of railroad properties is going on favorably; but the Reading plan is a failure, because of the fact that enormous pickings would go to the controlling financial agencies. In the industries, the reports for the week are favorable, though there is some just complaint of business held back because of scarcity of money or difficulty of obtaining credit. Producing interests have had the momentum of an active winter and spring to carry them over depressing conditions, but that momentum is now pretty well exhausted, and orders are slackening up for forward delivery. Consumptive requirements have not declined perceptibly, as railroad traffic and bank clearings show. Builders report for June increasing activity, and say that building material is strong. Shop and factory work has not fallen off; the shelves of retailers are not overstocked; credit is not being strained, because retailers refuse to go beyond their means. Commercial failures are uncomfortably numerous, but the fact must be kept in mind, the bulk of these failures are of those who hang on the edge of commercial existence, whose disappearance will not be much missed. Legitimate business has always been hurt by aspirants lacking important requirements. There is no inclination in manufacturing circles to make beyond orders. Even large stocks are not desirable. In some quarters a hardening tendency in raw material is looked for, but in trade circles there are no changes that way. Throughout the West there is much unrest, because of the uncertainty of always being able to promptly draw financial assistance from the East, the needs there are so much greater than usual. Jobbers at New York do not report much change in buying over last year. The commercial agencies report increased difficulty in making collections. A vast amount of commercial paper is coming due, and its renewal or extension is the only thing the banks can do, unless a general panic is precipitated—at least, so write the representatives of borrowers. The pressure is increasing and the sky is blacker, but there is even now no good reason for anticipating any but a happy deliverance from threatened woes.

— HOTEL YORK : YORK : PA. —

J. A. DEANWOLF ARCHT. YORK - PA.



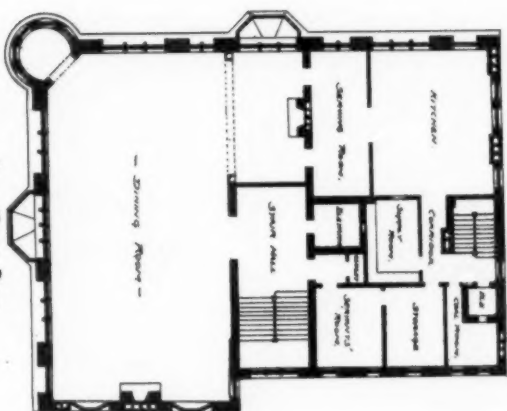
HELIOTYPE PRINTING CO. BOSTON

— PLANS OF "HOTEL YORK," YORK, PENNA. —

— J. A. DENNIFORD, ARCHITECT, YORK, PENNA. —



Third, Fourth & Fifth Floors Plan

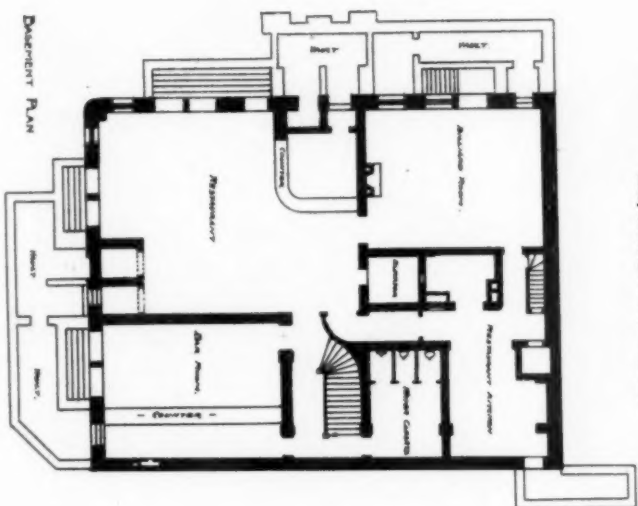


Sixth Floor Plan

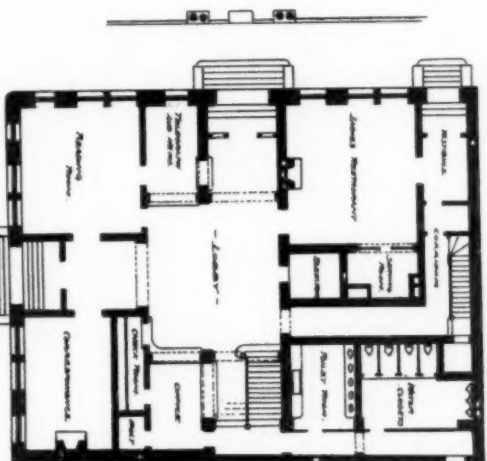
Scale
0 10 20
Feet



Attic Floor Plan



Basement Plan

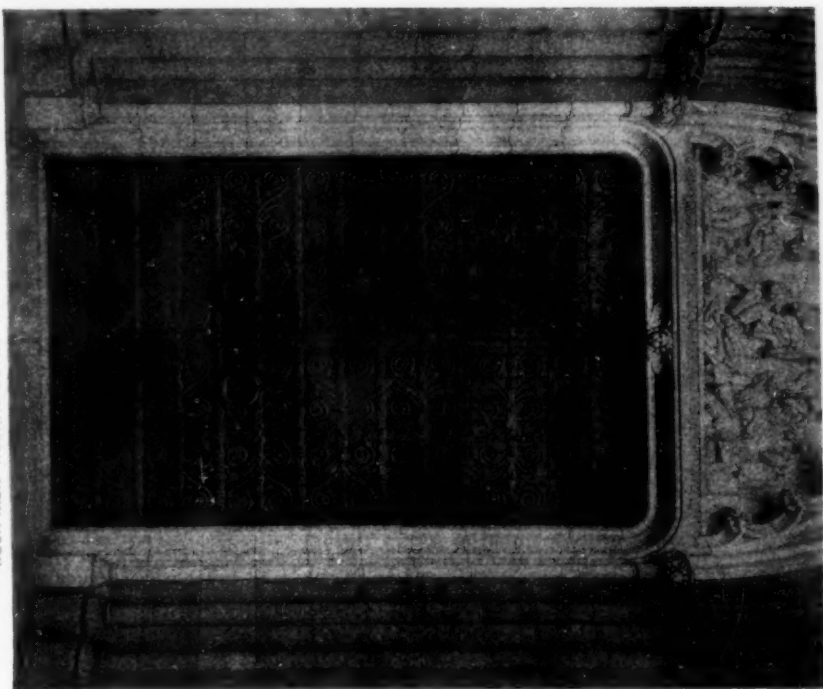


First Floor Plan

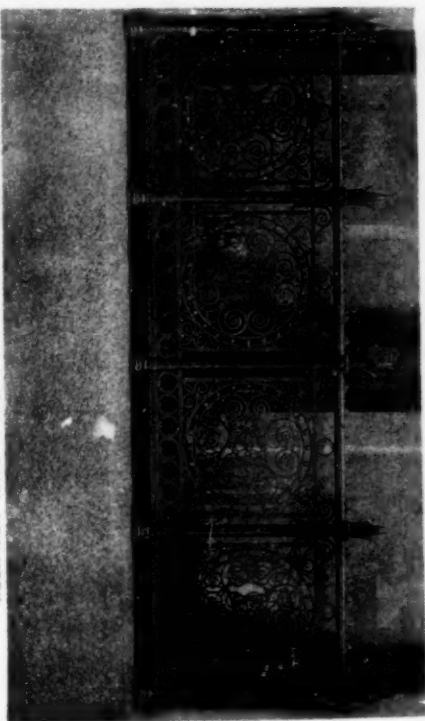


Second Floor Plan

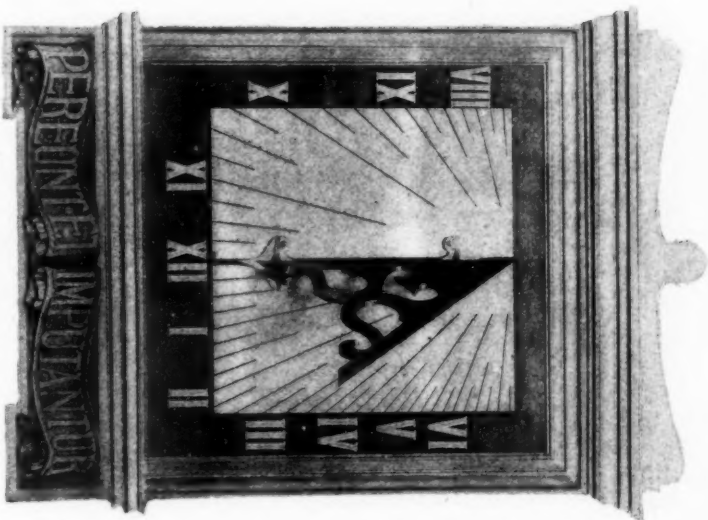
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DOOR ORNAMENTATION, GRACE CHURCH, NEW YORK.
Messrs. Renwick, Aspinwall & Renwick, Architects.



WINDOW GUARDS, MECHANICS NATIONAL BANK, NEW YORK.
Mr. Charles W. Clinton, Architect.



SUN DIAL, REFORMED DUTCH CHURCH, 7th STREET
AND WEST END AVENUE, NEW YORK.
Mr. R. W. Gibson, Architect.

ILLUSTRATIONS OF WORK EXECUTED

IN BRONZE

PAUL.....F.....CABARET

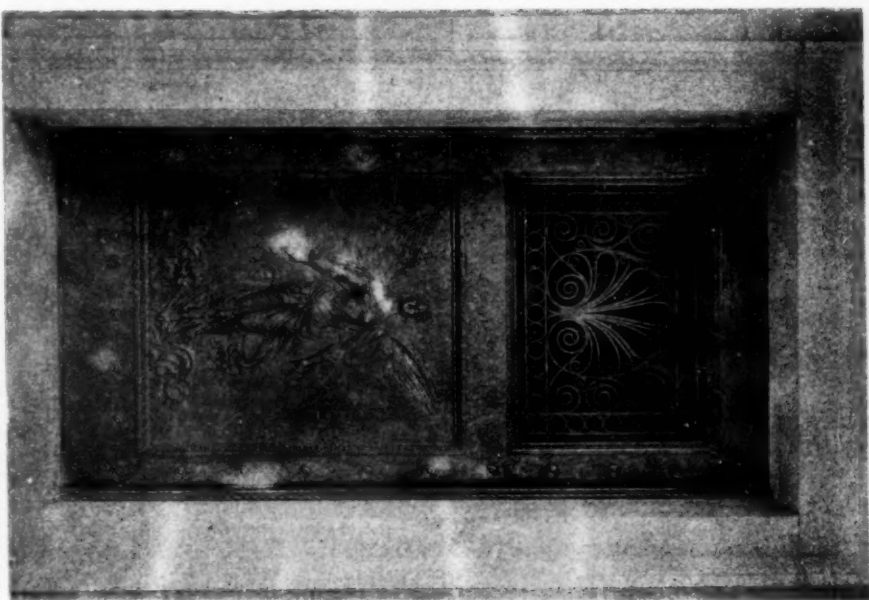
ART • METAL • WORKER •

• HERRING • BUILDING • 675 HUDSON • ST •

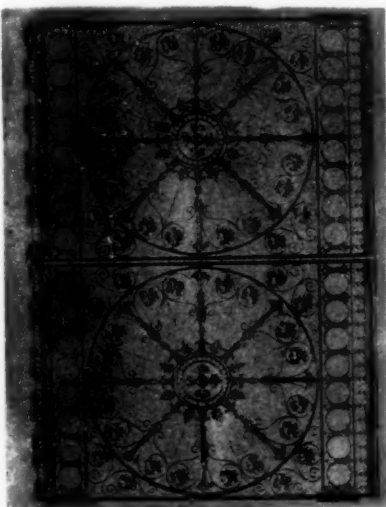
• NEW • YORK •

RELIQUARY PALMERS & BROS

TRADE SUPPLEMENT

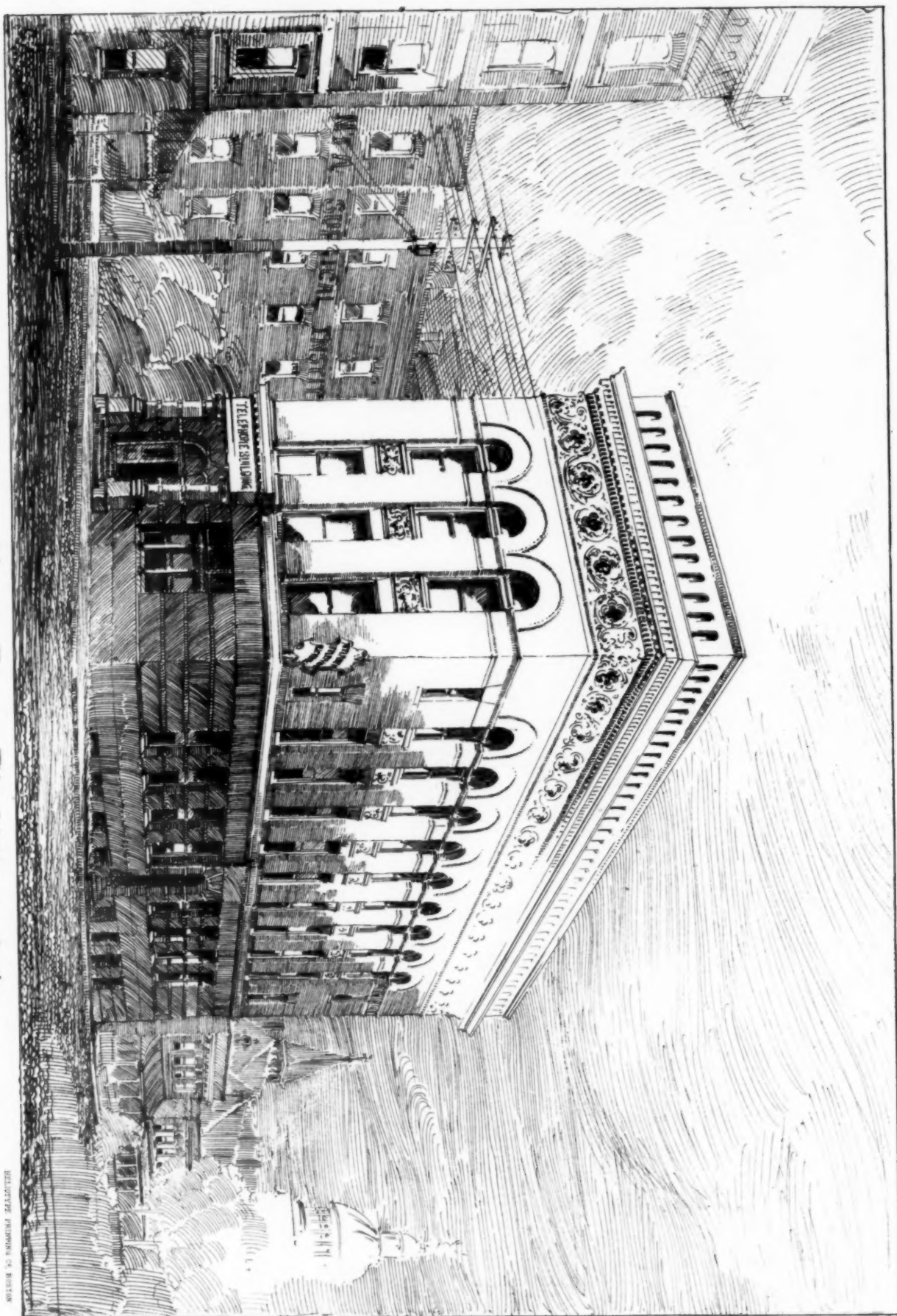


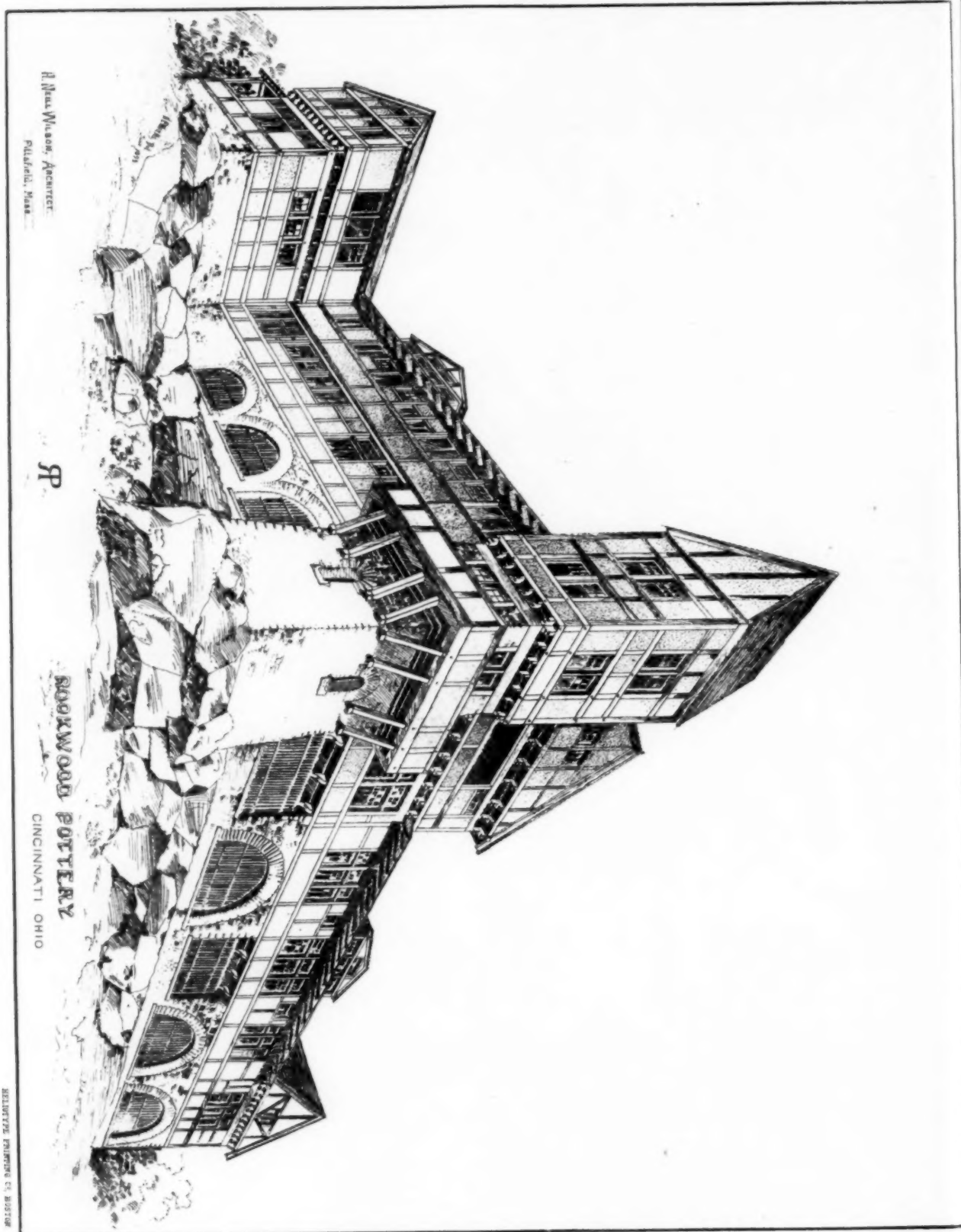
DOOR, FAVERWEATHER MAUSOLEUM, WOODLAWN CEMETERY, NEW YORK.
Messrs. Romney & Steyer, Architects.



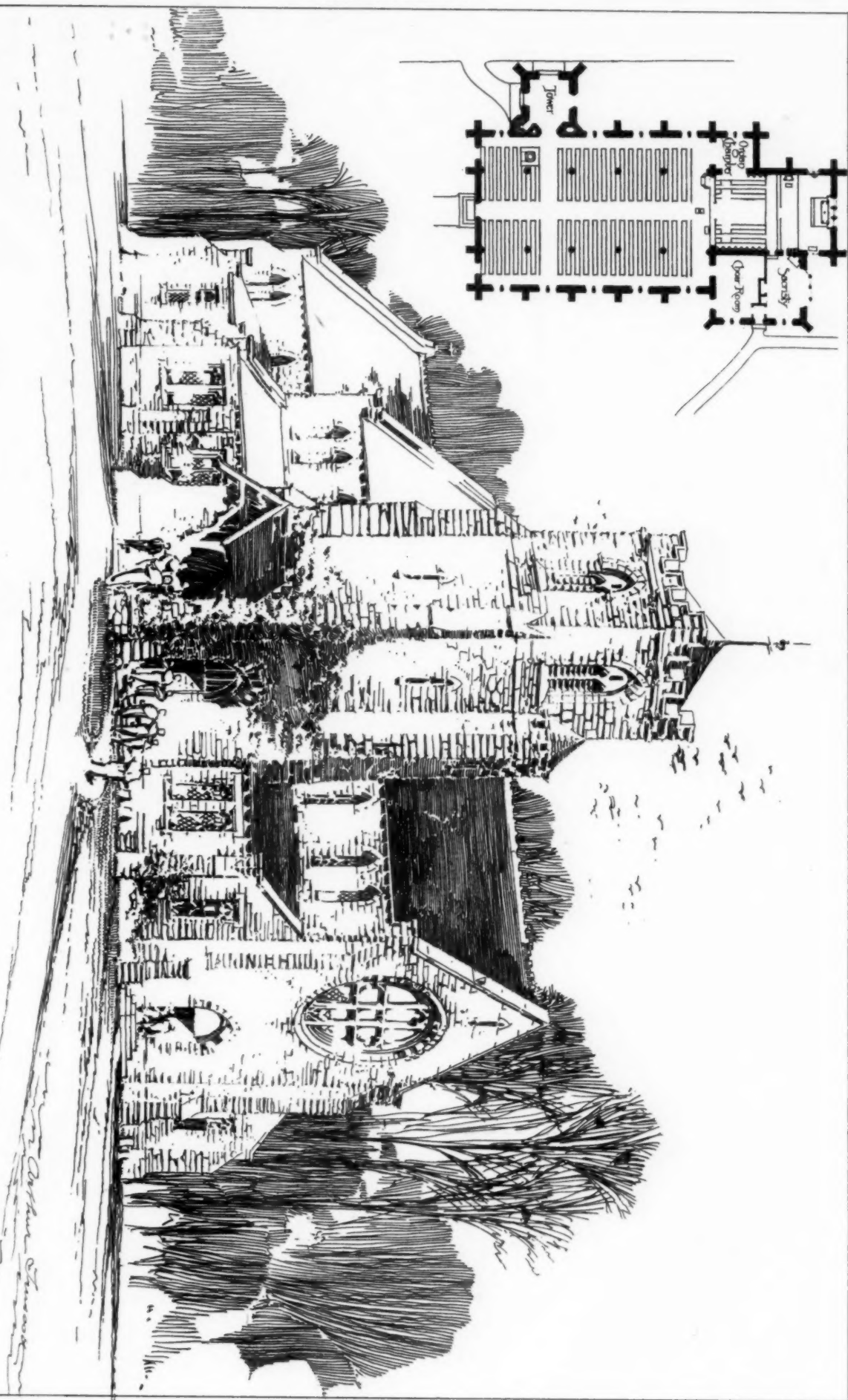
GATES, MUTUAL LIFE INSURANCE CO. BUILDING, NEW YORK.
Mr. Charles W. Clinton, Architect.

NEW ATLANTA TELEPHONE EXCHANGE BLDG., G. L. JOHNSON ARCHT.





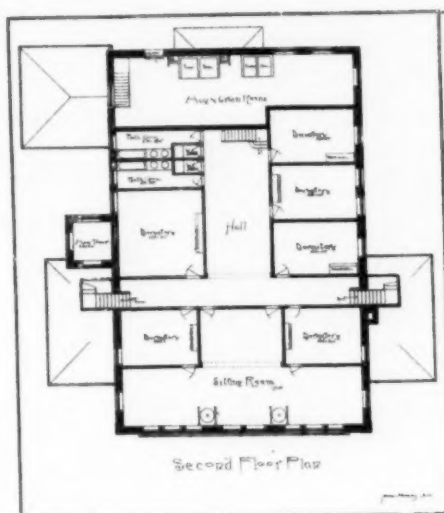
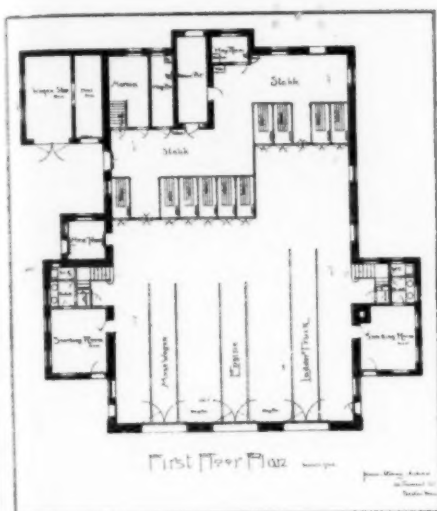
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COMPETITIVE DESIGN FOR A
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