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**E**VIDENCES accumulate that the next two or three years, if the financial uncertainty which has so long hung over business should be dispelled as a result of the election, will be years of great building activity. Although little is being done now in the way of building, architects will probably agree that there has seldom been a time when so many important building projects were being cautiously discussed, or suggested as worthy of investigation, as now. Plans have been made by architects for many million dollars' worth of buildings, the execution of which has been postponed for the present, on account of the impossibility of financing any extensive scheme of the sort; and the projects which have gone so far as the preparation of plans are, we venture to say, few in comparison with those which have only reached the stage of preliminary discussion. It is true that a great many projects which are discussed are never carried out; but present circumstances, apart from the financial uncertainty, are unusually favorable. Materials are cheap; money, apart from the influence of currency alarms, is abundant; real-estate investments, which have shown remarkable steadiness under circumstances which have stripped hundreds, perhaps thousands of millions of dollars from the value of stocks and bonds, are in high favor; and, for several years, construction, except in the item of office-buildings, has not kept pace with the normal increase in demand. A revival of confidence will inevitably be followed by a rapid extension of business, and the extension of business will find itself hampered, in nearly all our cities, by the lack of good modern stores. A renewed demand for these will find owners glad to supply it, and the construction of new stores in cities always means the provision, in some other locality, of dwellings for the people whose houses are turned into stores. All this involves business for builders, building-workmen, material-dealers and architects, and as their productions have proved, in these trying times, to be the best and safest of investments, it is likely that they will continue to be so regarded for a long time to come.

**T**HE *Evening Post* finds in the great increase in the number of mechanics' liens recorded an indication that fraudulent speculation in real estate is becoming more common, and it warns its readers against dishonesty of this sort. Architects are not often victims of such frauds, and are still less frequently participants in them, but it will do no harm to put them on their guard against adroit and plausible schemes. The first step in an operation of this kind is to secure land, generally in some popular locality. The land is paid for in full, and a builder of the right sort is next sought for. The right sort of builder is one who has already ruined himself by

real-estate speculations on his own account, and, while himself irresponsible, has an extensive acquaintance with dealers and mechanics. If he has a somewhat imposing presence, a suave manner, and a natural taste for trickery, so much the better. After securing the coöperation of such a personage, the land is conveyed to him, the consideration named in the deed being far in advance of the true value, and a mortgage-deed is given back by him to nearly the same amount; the grantor agreeing at the same time to advance money for building, the advances to be added to the mortgage debt. The speculator holds now a first mortgage for far more than the value of his security, and the succeeding stage of the game consists in inducing outsiders to add to the value of the security at their own expense. This is done through the builder, who commences operations by procuring plans, and contracting for work and materials. Sub-contractors and material-men who hesitate to trust the builder are shown the agreement for a building-loan, in which the mortgagee promises to advance the money to make the necessary payments. If any of them are cautious enough to go to the mortgagee, they are assured that he knows very little about the affair, but that he is ready to make the advances as agreed. This assurance seems to them satisfactory, and they go on with the work. The first payments are made promptly, and, encouraged by this, they exert themselves to finish their work and get the rest of their money. As the building operations approach completion, payments are slower, and, by the time the work is substantially done, a large sum is still due, and it then appears that there is trouble between the builder and the mortgagee. Finally, the latter forecloses his mortgage, cutting off all liens, and leaving the sub-contractors and material-men to get their pay from the builder as best they can. The builder, who is generally either an experienced bankrupt or a young man with little capital, who has himself been deceived, divides his small assets among the creditors under insolvency proceedings, and is then ready to embark in a new operation. It is evident that the mortgagee, although it is necessary for him to advance a good deal of money, cannot lose anything, and is sure to make a large profit, if he manages the operation judiciously. The main point is to put off the foreclosure until the building is nearly completed, at the same time contriving to keep back all the payments possible. Then, if the creditors, as is often the case, bid the property in at the foreclosure sale, the mortgagee gets all his money back in cash, including the profit shown in the pretended sale of the land; and if, for want of bidders, he is obliged to bid it in himself, little more is needed to make it ready for the market, and a subsequent sale at actual cost brings him in a profit equal to the amount out of which the sub-contractors and material-men have been defrauded.

**S**PECULATIVE operations of this sort have been very common in Germany, particularly in Vienna, where building work is generally at a large scale; but the fashion has become thoroughly acclimated here, and such schemes are constantly carried out, not only in the cities, but in the suburban towns, where the unscrupulous possessor of five or ten thousand dollars appropriates the property or labor of the small local dealers or workmen as mercilessly as the millionaire speculator of the great cities defrauds the reputable contractors of their thousands or tens of thousands of dollars apiece. Great as the evil is, there seems to be no legal way of remedying it. There is no question of the right of a man to sell land for whatever price he can get, whether it is more than he paid for it or not, and he has an equally good right to take back a mortgage for the amount of the purchase price, and to agree to advance money for building. All this may be done, and is constantly done, in good faith, and to the advantage of all concerned; and the only difference between an honest and a dishonest transaction of the kind consists in the fact of the collusion, in the latter sort, between the buyer and seller to defraud innocent people. This collusion is very difficult to prove, so difficult that it would in most cases be useless to attempt to do so; and contractors and dealers who wish to avoid being made the victims of such operations should hold fast to their only real security, the responsibility of the builder with whom they make their contracts. The warning cannot be repeated too often, that any one who trusts a builder of unknown or doubtful reputation does so at his peril, and the best way to check

fraudulent building speculations is to refuse to deal with parties not known to be responsible except on a cash basis. In fact, a contractor who has unintentionally been entrapped by schemers of this class may sometimes save himself by invoking the aid of that good angel of business, solid cash. It is evident that the speculator's interest lies in getting the building nearly or quite completed before seizing a pretext to foreclose his mortgage, and a contractor whose payments are not made as agreed, and who has reason to suspect treachery, may sometimes escape loss by demanding weekly payments in full for the work done, as a condition of continuing his labors. The speculator, in such cases, will often be willing to satisfy the demands of one contractor, rather than risk a rupture which would attract the attention of the other contractors, and might result in the abandonment of the whole work, and the prudent man will reap the reward of his caution, while his fellow-contractors will be at least no worse off than they would otherwise have been.

**A** CURIOUS form of speculation has been developed of late, consisting in the purchase and sale of storage-warrants for pig-iron, which are transferred and negotiated in the same way as warehouse receipts for cotton, or silver certificates, or elevator receipts for grain, the purchaser never seeing the actual metal which he owns, but holding simply an order on a certain storage-company for the delivery of a given number of tons of iron of a specified quality, for which he pays a certain price, and which he can assign to any one else at such price as he can get. Of course, there is no reason why this convenient and economical method of making transfers should not be applied to the iron business, as well as to transactions in cotton or grain, and the United States, which is now the largest iron-producing country in the world, will probably find the system of great value. The only difficulty would appear to consist in the numberless variations in the quality of pig-iron, which make it more important for the consumer to see the actual goods before purchasing than in the case of cotton, or wheat, or silver; but a warehouse-man thoroughly acquainted with iron and its uses may perhaps be able to make a classification which will satisfy everybody, and if this can be done, both consumer and manufacturer will be benefited by a system under which the former is sure of being able to get the grade of iron that he wants, at the price quoted in the Exchange reports, without spending his time in running from one smelting-furnace to another, to get the quantity and kind that he needs, at a price determined by hours of haggling, while the latter is sure that his iron, being classified by the warehouse-man, and represented, in common with all similar iron, by the warrants, will find its way to the consumers who wish for that quality, without the necessity for sending around a drove of salesmen to bring it to their attention, and without any loss of time in dickering about the price. It is likely that, as in the case of grain and cotton, the tendency of the warehouse system will be to diminish the average cost of iron to consumers; but it does not follow that the producers will receive less for it, as they will save a large outlay for salesmen and general expenses; while the fluctuations in price, which are now enormous, and as prejudicial to the producer as they are to the consumer, should be materially diminished by a good storage system.

**A** FEW weeks ago, the *British Architect* published a drawing of a modern church, with open-timbered roof, the hammer-beams in which served to support figures of angels, who were shown as sitting comfortably on the ends of the hammer-beams, with their backs against the curved braces. Now, there is certainly no objection to making the ends of the hammer-beams serve as pedestals for sitting statues, but something more than artistic propriety is necessary to make any detail of church work acceptable to the British public; and several critics at once rushed into print to say that there was no mediæval precedent for placing sitting figures of angels in a church roof; while another set of critics claimed that there were precedents of the sort, but without saying where. In the last number of the *British Architect* received, Mr. Harry Hems, of Exeter, the noted carver, who is, of course, very familiar with ecclesiastical work, new and old, repeats, in a most lively and amusing letter, the observation which he had previously made, that there is no ancient precedent for sitting

figures of angels in a church roof; and that those who claim that such precedents exist would be unable to point one out.

**M**R. HEMS is excellent authority on such matters, and it seems altogether probable that he is right. The most ancient and beautiful fashion of all seems to have been that of projecting the hammer-beams a few feet beyond the braces, and carving the free end into a figure of an angel, hovering horizontally, with wings almost closed, above the congregation. A great number of roofs were designed in this way in the fourteenth and fifteenth centuries, but, unfortunately, the Lord Protector Cromwell and his men had an antipathy to angels, which they gratified by sawing off the winged hammer-beam figures in such timbered-roof churches as they could get at. Curiously enough, the amputated stumps that they left came to be regarded by many people as the true original type of hammer-beam; and many modern open-timber church roofs are designed with hammer-beams richly moulded on the edges, but chopped off square at the ends, in close imitation of what their authors suppose to have been the beautiful simplicity of mediæval taste. After the horizontal angels, carved out of the solid of the hammer-beam, had gone out of fashion, it became common to apply to the ends of the hammer-beams, and often to the moulded wall-plates between the trusses, half-figures of angels, nearly upright, with outspread wings, often holding something in their hands. This seems to have been the last form in which the mediævals used angel figures in timber roofs. There is, however, no reason why the moderns should not try other types, and if the beautiful fashion of carved open-timber roofs should be revived, it is to be hoped that they may be made, by their design and decoration, as interesting and instructive to the critical modern congregations as their prototypes were to the simple peasants of the fourteenth century.

**A** REAL Raphael has come into the hands of a London picture-dealer in a singular way. In the year 1504, when Raphael was not long out of his pupilage with Perugino, he was engaged to paint an altar-piece for the nuns of the Convent of Sant' Antonio, at Perugia. He began the picture, which is in two parts, consisting of a panel nearly six feet square, and a semicircular lunette over it, but was interrupted by his journey to Florence. The next year, after his return from Florence, he completed his work. In 1677, the picture was sold by the convent for about two thousand dollars, to Antonio Bigazzini, a Perugian noble, and he disposed of it to the Colonna family, of Rome. The Colonnas afterwards sold it to the King of the Two Sicilies, and it became one of the ornaments of the palace of the Caserta, at Naples. In 1860, King Francis was besieged in his palace, but escaped to the fortress of Gaëta, and took his picture with him. From Gaëta, after his abdication of the throne, he retired to Spain, still accompanied by his picture. Unfortunately, even kings sometimes have to give chattel mortgages, and the Raphael had been pledged as security to a banker, who had received from the King the title of Duke of Ripalda. The banker claimed his security, and the picture was turned over to him. He sent it soon afterwards to Paris, to be brightened up and made salable, and the restorer whom he employed for this task fulfilled his duty by repainting considerable portions of it, including the faces of the personages. Thus renovated, it was offered to the authorities of the Louvre, who refused to purchase a picture which had been subjected to such treatment. The directors of the National Gallery, in London, also declined to buy it, for the same reason. At last, it was deposited in the South Kensington Museum, where it remained for several years, until Mr. Martin Colnaghi ventured to buy it from the representatives of the owners. He had the picture carefully treated, and succeeded in removing all the Parisian paint of 1862, finding even the varnish beneath nearly intact. The picture is now, therefore, nearly in the condition that it was left by Raphael, and is said to be a work of great beauty. Mr. Colnaghi has offered it again to the National Museum, at a very reasonable price, and the authorities are said to be seriously considering its purchase. As it is hardly likely that such an opportunity will occur again for many years, if ever, it seems as if some rich American might do his country a great service by buying the picture and bringing it over here. There is no important Raphael in the United States, and such a picture as this would become the object of pilgrimages from all over the country.



THE CHATEAU DE BLOIS.<sup>1</sup>—II.

## THE WING OF FRANÇOIS I.—II.

FRANÇOIS I inherited but little of the sedentary tastes of his predecessor and his continual change in residence and affection reveal the inconstancy of his character. That Blois received any consideration from him is due as much to its convenience as to the love of his queen for this her home, and for its people.

The Château and its dependencies constituted a portion of her dot at her marriage in 1516, and a deed, still extant, which conveyed to her the Comté de Blois, and several documents in which she is styled *Comtesse*, dated this same year, lead one to infer that her home was the gift of her chivalrous husband.

The King began this same year the construction of that beautiful part of the Château known under the name of the "wing of François I." Among the archives of the baron of Joursanvault exists a manuscript fixing definitely this date:

"Je, Raymon Phelippeaux, commis par le Roy à tenir le compte & faire le payement des batimens, édifices & réparacions que ledit feigneur fait faire en son chafel de Blois, confesse avoir eu & receu . . . la somme de trois mille livres tournois . . . le cinquième jour de juillet, l'an mil cinq cens & feize."

In 1524 Queen Claude died at Blois at the age of twenty-five, and her eight-year-old daughter, Charlotte, immediately followed her.

It is not probable that any new work was begun after these events. The taste of the king now leaned so strongly towards Chambord as to lead him to say in setting out for that château, "*Je m'en vais chez moi.*" The last document bearing the seal of Blois under his hand bears the date 1534, and a few years later the library, at this time comprising 107 printed volumes and 1,700 manuscripts, was removed to the "home" of François I.

Entering the principal story from the grand staircase, one finds himself in a large room, the Salle des Gardes, at one time the Council-chamber. At either end are the two well-known Renaissance mantels, and a charming little door leads into what we have seen, from the plan, to be the north addition to this wing. The room to the right of the Salle des Gardes, though the richest on the exterior, has a simple Gothic mantel showing clearly that the Renaissance restorer had not completed the work. A secret staircase in the thickness of the wall was closed during these alterations, though the work of the present century has brought it again to light.

Of the rooms to the left of the Salle des Gardes, we know nothing save through tradition, which assigns Henri II a bedroom there, while the Renaissance chimneys shown in the elevation of Du Cerceau's would indicate a change or restoration of the interior. The small door in the Salle des Gardes opens on what was formerly a balcony of the circular staircase adjoining, which leads from the terrace to the *chemin de ronde* of the old fortress wall. The ceiling of this little recess and soffit of the stairs exposed at this point are richly decorated, and a small window, half-way up the run, still retains its carved pilasters on the exterior, to show which the modern restorer has left a little pocket.

The north addition, to which we enter through this former balcony, contains many rooms, one of which is known as the gallery of Henri II, and a small oratory to the left and a wainscoted room on the floor above are all in the way of architectural attractiveness the interior of this wing presents.

The gallery under the roof, to which the circular staircase leads, commands a beautiful view of the city, and if one can but picture the gardens that once stretched out below, the gallery and the many loggias on this façade are fully justified.

Exploring the roof from this level, the trusses show interesting comparisons in workmanship: those over the central building are carefully hewn and reveal their Gothic origin in the sections of the accurate chamfers, while the Renaissance ones, the addition, are of as crude workmanship as one can find. The old *chemin de ronde* of the fortress can here be seen, and the old fortress tower imbedded in the addition reveals its antiquity in its thick walls. In the framing of the Gothic trusses can be seen provision for dormers, and these combined with the recesses in the old wall below afford some material for a restoration of this old façade. A Renaissance dormer on the court leads to the flat roof of the staircase and has an interesting door.

The façade on the court immediately adjoining the staircase-cage was doubtless built during the first alteration. The three stories of which it is composed are unequal in height and crowned by a heavy cornice. The sill and lintel courses are carried through by strong lines, while the vertical elements of the composition are furnished by the pilasters on either side of the windows and where, on the interior, a wall abuts, which is a decided Gothic tradition.

All horizontal bands, save the main cornice, return around these breaks, forming entablatures to the pilasters. The lines of pilasters are not marked in the main cornice, while they spring at the top of the basement story from a double console support. The base proper is formed by a simple battered wall crowned by a cavetto, a but meagre foundation. The basement windows above this are treated in the same manner as in the story over, with pilasters, which not being on the axes of those above, still further mar the foundation.

The panels formed between the lintel and sill-courses and the pilasters of the windows are sunk below the wall-line and have a

richly decorated moulding close against each of these members. The centre of the panels of the upper stories is ornamented by a salamander in high relief. This emblem of François I, and the pierced swan of Claude, his wife, appear so frequently that one asks their meaning. The salamander was originally the device of the father of François I and the medals of both father and son bear the legend in old Italian, "*Nudrisco il buono e spengo il reo,*" (I nourish the good and extinguish the evil). The pierced swan bears the motto "*Candida Candidis,*" an allusion, or comparison, to the purity of the life of the queen. The porcupine of Louis XII with its legend, "*Cominus et eminus,*" well befitted that ruler, for tradition then asserted that animal had the power of protecting itself by its spines at close quarters and of attacking by lancing them. The ermine, emblem of Anne of Brittany, is known to have been taken by chasing towards a muddy tract since it will allow itself to be killed rather than suffer a stain on its fur.

The windows of the court façade are mullioned and transomed and have both jambs and soffits panelled. The only architrave is a simple quarter-round, and while the panel moulding adjoining the pilaster appears a portion of the window treatment, it is really a decoration of the wall.

The main cornice is a Classic modillion one with dentils, surmounted by a Gothic shell ornament and consequently doubly heavy for the façade. This is still further increased by a richly carved balustrade. The various members of the cornice are ornamented and the lavishness of ornament on the balustrade is confusing.

Above the cornice appears between the dormers a short height of wall to raise the plate of the roof and allow a promenade. This is again a traditional feature, being seen in many Gothic examples and borrowed by them from the fortress. The axes of the dormers correspond with the windows below and in composition they are hardly as interesting as the ones at Chambord or Chenonceaux, but are much stronger and more vigorous than any example in their style.

That portion of the façade to the right, adjoining the Salle des États, is, as before mentioned, of presumably later date than the remainder of the façade. One is led to this conclusion from the many existing differences in detail. The most apparent are the double transomed windows, with the ornamentation of architrave and pilasters in the upper stories and the ornament in the small frieze of the cornice. The dentils of the cornice are smaller and throughout there is evinced a desire to enrich the *motif* of the old composition, and the purity of the ornament and arabesque leads us to infer a better knowledge of the forms of the new mode, and consequently a later date.

The north façade shows also the ornamented pilaster and it is not improbable that this alteration, the section of the court façade in question, and the north addition were built at the same time. The sill-courses run through without breaking around the pilaster and the upper panels are ornamented by a diamond and circular pattern, in the middle of which the same crowned salamander, smaller in size, appears.

Examining the detail of the entire façade one finds it a Renaissance clothing of a Gothic body. In the simple design of a façade the Classic forms are readily applied, for the problems of construction are comparatively simple, while in a complex structure like the staircase all the precedents of Italy were useless to aid the French architect, whose hand was skilled in all parts of a problem the Italians dared not even attempt, and yielded in minor details only to the invasion of new forms.

That there are details bearing every Italian characteristic, one cannot deny, but beyond a few capitals and arabesques the Gothic reigned supreme in this façade, though to the mind of the Court it passed as the new mode.

Of the type of workman—architect or stonemason—in France at this time, Viollet-le-Duc says: "The artisans, Florentine or Milanais, led here by Charles VIII and suddenly placed in the midst of France, still all Gothic, could not have exercised through their influence any direct action upon the corporations of workmen habituated to produce the traditional forms of their country. . . The crowd of artisans persuaded to follow Charles VIII to France were not the cream of Italian artists, but, as always happens, those mediocre ones, who not succeeding in their own country did not hesitate to risk their fortune elsewhere. . . These artisans, imbued with the new forms adopted by Italy (probably very poor *traceurs*, *appareilleurs*), were thrown in the midst of stone-cutters and carvers versed in all the difficulties of geometry, having a perfect knowledge of sections and most complicated plans, and playing daily with these difficulties. . . Thus the introduction of the Italian art in France towards the end of the fifteenth century met with mediocre result."

Yet, on close examination of the Gothic work of the preceding period, one can find the time was ripe and nothing could approach nearer the new style about to dawn than the façade of Louis XII, on which, owing to the prejudice of Anne of Brittany against Italy, it is hardly likely a native of that country would be employed; hence the so-called Renaissance detail here used is confined to a crude Gothic copy of an arabesque and capital that are as far from the formal examples in Italy of this epoch as from the Gothic of France.

The arabesques on the façade of François I have a true Italian feeling in design and execution, but in fifteen years (1500–1516) and after several campaigns in Italy even an ordinary workman would

<sup>1</sup> Continued from No. 1073, page 21.

make an excellent copy, since a premium had been placed on imitation.

This leads one to ask, If the soldier-artisan or artisan-soldier of 1500-1516 went to Italy, where did he go? What did he see?

In 1507 Louis XII remained six months at Genoa, then in revolt against the French. In 1509 a campaign was made against the Republic of Venice; a reconciliation in 1513, and a common alliance against Milan.

Thus if we seek for precedents, it should be at these two centres where ambassadors, soldiers and statesmen would be found of such taste as to be truly impressed by, or such courtiers as to affect that interest in the Classic which was destined to verify the prediction that "Rome should again conquer Gaul."

At this period there are records of French reprints of Vitruvius, but it is doubtful if they were used by the architects. The archives, a most reliable source of information, on investigation show less payment to foreign workmen than we imagine, and the names familiar to us as those of Italian architects become under their testimony, those of mere workers in intaglio, intarsia or mediocre sculpture. The work of the real artists on tombs, monuments, statues is recorded by the association of their names with their works through tradition and, more reliably, by records of payment made them for specific work.

At the time of the Renaissance in France, the early period of Italian art, marked by all grace and freedom of detail, had given way to the formal Classic period in which the orders appeared in all compositions.

The buildings of Venice, the Doge's Palace, the Palazzo Vendramini, 1481, the Scuola di S. Marco, 1485, and the churches of S. Maria dei Miracoli, 1480, and S. Zaccaria, 1456, were then either just completed or of so recent a date as to command attention.

The workman of Italy from twenty to forty years, which would be the most probable age of a man who would emigrate to a foreign, sometimes hostile, country, could have received his instruction under Martino Lombardo, Venice, 1457-1515, architect of S. Zaccaria, then building, and the Scuola di S. Marco, 1490, or under Bramante at Milan: the Hospital, 1480-1490, Santa Maria delle Grazie, sacristy of S. Satiro, 1490 (?), Como Cathedral (?), and on examining these works there is found by one just from France a strikingly familiar resemblance to the work of the Renaissance in that country. Is this due to the hands of the same workman emigrated and shut off from the formal tendencies of this period in Italy, or by French visiting artisans returning to repeat in a crude way the ornaments here used, as the authors of these same arabesques and capitals had done themselves years previous from original Classic fragments? Probably both, but beyond a doubt, both Milan and Venice furnished motifs for much of the work at Blois: and the use made thereof we shall determine later.

W. T. PARTRIDGE.

(To be continued.)

#### INFLUENCE OF TEMPERATURE IN OUR BUILDINGS.

WITH a temperature ranging somewhere between 80° and 90° in the shade, converting our rooms into veritable hot-air and vapor baths, the ordinary dweller in our towns must have been inquiring of late as to any means of excluding heat, and of rendering our buildings and houses more habitable. The resources of the modern citizen are few. He is content to shut out the sun's rays by sun-blinds of various materials, or shutters, to put an awning over his front door, to open the cold-air inlets of his ventilators, to keep his windows partly open, to betake himself to the shelter of shady nooks or refreshing trees, to cool the atmosphere of his rooms by sprays of iced or perfumed water, to indulge in bathing and cool drinks. But while he excludes the sun's rays, he at the same time shuts out his views, and his means for cooling the air, which is hotter outside than inside his house, are exceedingly difficult to carry out.

Many have asked if a modern building is capable of excluding heat to an appreciable degree, or if architects are conversant with any effectual methods on the subject? Our old houses and churches are certainly cooler than the new ones. Of this there cannot be any doubt, and why this should be so it is not difficult to explain. We hear people who are living in new houses complain of the heat of their rooms, that they are cold in winter and hot in summer; they tell you the sun's rays seem to pierce them, and that the very walls and windows let in the heat. The allegation is too true to be denied; the thin walls of the modern-built house and the quality of the bricks and roof-coverings are favorable to the heat passing through. The flimsiness of the modern wall is answerable largely for this rapid transmission of heat and cold. The older houses are built with thicker walls—at least half a brick more than the average modern house—the walls are better bonded and more compact, the mortar is harder, and they are often "battened" inside, and less transmissible to heat and cold. And how much more solid is the old roof, with its stouter rafters, its boarding and its tiled coverings, than the flimsy roof of to-day, with its heat-conducting slate surface. On the whole, it must be acknowledged the impeachment of the modern building in these particulars is well founded. Architects have not done much to render them proof against these attacks of excessive heat or cold; economy, cheap materials and modern ideas of elegance and lightness have all been prejudicial to the resistance of the structure to the weather, and of contributing to rob the modern

house of its comfort and equable temperature. Anything which reduces the substance of the shell of a building, or which increases the size of its openings, must of necessity render it less habitable under great extremes of temperature. If we could all live in buildings of asbestos or slag-wool, or even of wood and mud, some compensation for this thinness might be obtained; but our prevalent building-materials, our brick, slate and glass are all more or less conductors of heat—they, indeed, form a considerable part of the outer casing of our buildings. But if we cannot build solid and thick walls as of yore, we can make them impervious to heat by other means. We can build them hollow, with a cavity of two or three inches, the outer thickness throwing off the sun's rays, and the cavity or air-space rendering the inner thickness of wall comparatively cool. Architects have a prejudice against the hollow wall: it does not impart the solidity they desire, the openings are not so easily made, and there is a loss of strength or bond—good reasons, as far as they go, for preferring the thick, solid wall. Again, the London Building Act and provincial by-laws have favored the solid wall for obvious reasons, and so it has come about that solid brick of minimum thickness is adopted, without the advantage of the old-fashioned plan of battening the inside, which materially aided the non-transmission of heat and cold. We might enter into a disquisition on the various methods of constructing hollow walls and of the materials introduced, such as external slabbing and tile-work, internal lathing, like the "expanded metal," filling the cavity with slag-wool, or other non-conducting substances; but it is enough to draw attention to the fact that all such modes are looked upon with disapproval, or are considered innovations by a large number of the profession.

Another reason why our modern buildings suffer from an excessive heat is the increase of window-openings. They are larger, and more numerous than those seen in the older dwellings. The Tudors possessed, it is true, large mullioned windows, but the glass was thicker, and not so easily penetrated by the sun's heat. In later times, especially during the Georgian era, the window space was small compared with the amount of wall area. Hospitable as our forefathers were, their hospitality was at least in an inverse ratio to the size of their windows, and it was left for a more showy age of plate-glass, and so-called "art" crazes, to make up for real urbanity by the extent of their window-openings. What with the Blusters and Showgoods of modern society, the tendency has been to introduce more glass into our houses and shops. Mrs. Brown has a great idea of display, and insists on a house with large windows, and if it is a corner house she prefers both sides to have windows, even if thereby wall-space and comfort are sacrificed. The ordinary "jerry"-builder knows this feeling and takes care to satisfy it when he builds. He puts in a large square or octagon ended bay on one side and a plain window or two in the return front. There is a lead, or more probably zinc, flat over the bay, which gets intensely hot under the rays of a noon-day sun. The upper rooms or bedrooms have also plenty of glass windows. With such a surface of glass, how can cool summer rooms be maintained? It is next to an impossibility. The transmissive power of glass compared with other materials is large; its absorbing and radiating powers, which are equal, rendering it one of the most heat-transmitting substances. The ordinary Mrs. Grundy draws down her venetians or blinds, but with little effect when they are inside the glass, as they too get hot, and it is always better, of course, to place the blind or screen outside the window, so that the glass may not receive the direct rays—a lesson which some people are long in learning. The want of attention to aspect in the planning of some houses is another mistake. Windows are placed on the south and western sides when cooler positions are available. We often find dining and drawing-rooms made unbearably hot by large windows, which let the sun in during the hottest hours of the day. In some public offices the clerks and officials suffer much from heat, and several public libraries are rendered too warm during the summer months for comfortable reading. Large side windows, or skylights and flat roofs are often the only modes of lighting warehouses, workshops, technical school classrooms and laboratories, and free libraries, and if these openings occur on the sunny sides of the buildings, the rooms are oppressive and uninhabitable, as no ventilation or change of atmosphere can be effected without draught. In these circumstances, the architect can avail himself of external blinds, screens, double windows and roofs, so as to cut off the sun's rays as much as possible from the interior—preventive measures which are seldom adopted, however, to the extent they deserve. The extraordinary extremes of our climate, it will be said, render it impossible to adopt features which are used in tropical countries that will equally serve the exigencies of an Arctic season. No doubt. We may adopt Indian verandas and felt roofs, the overhanging eaves and wooden roofs of Burmah and Japan, which would be quite unsuited for our winter; we may combine these tropical Asiatic features with the high roofs and large windows of Northern Europe, and produce a kind of hybrid. Extremes meet, as they have in some of our architectural styles, which are elastic enough to be employed anywhere between the Arctic Circle and the Tropic of Cancer. Even the veranda, so essential an addition to the Indian building, is equally serviceable for one in these latitudes, if it were not for our greater need of light, which often renders that feature an obstruction; but with respect to materials and the building of our walls and roofs, the same principles hold good for both extremes of temperature. Protection from both heat and cold is assured by the use, as far as possible, of non-conducting



materials, such as slag-wool, felt, or by the intervention of an air-space in our walls and roof. In a few recent buildings the cornice — so valuable a feature in the South and akin to the veranda — has been curtailed to give more light, but we doubt whether any great advantage is thereby secured. As a shade to the walls, both from intense sunshine and a shelter from rain, it has undoubted use as a protection.

We hear of complaints, also, from householders, of the difficulty of drawing cold water from the taps during the late hot weather; the same people may suffer from frozen pipes in the winter. The inconvenience of the former arises from the plan of placing hot-water pipes close to the cold-water supply and service pipes; the remedy for which is simply to protect each set of pipes separately, so that the heat may not be abstracted from the cold, and *vice versa*. Another class of complaints come from people who frequent close and stuffy concert-rooms or churches. The windows are opened, and the consequences are cold draughts of air upon crowded assemblies moistened by perspiration. All this might be avoided by proper ventilation, by securing a change of air through inlets properly placed, and distributing evenly tempered streams of air; but nothing seems to assuage the suffering of certain people but large doses of cold air delivered in copious streams in a heated and unventilated room. The door or window on one side becomes the natural inlet, and a blow-through of blast-like strength to the opposite openings is a natural consequence. When pneumatic laws and physics generally are better understood by Mr. Smith and Mrs. Jones, we may possibly see buildings erected with a little more regard to these and other matters to which we have drawn attention. — *The Building News*.

#### IRON AND STEEL WORKS OF THE UNITED STATES.

THE following information respecting the development and present number of works and manufacturing plants in the iron and steel industries appears in the "Directory of Iron and Steel Works," recently issued by the American Iron and Steel Association, and is quoted from the *Engineer*:

**Blast Furnaces.** — In 1876 there were 713 blast furnaces, active or in preparation, with an aggregate annual capacity of 4,856,455 gross tons. In 1892 there were 569 furnaces, 14,550,708 tons capacity. In 1894, 519 furnaces, 16,271,027 tons capacity. In 1896 there are 469 furnaces, but their aggregate capacity is 17,373,637 tons, the steady decrease in numbers of furnaces being more than balanced by the increase in capacity of output. Thus in 1876 the average capacity per furnace was 6,811 tons per year, while in 1896 it is 37,044 tons. These figures indicate a very great change in furnace construction and management. Severe competition, better methods of manufacture, better ore and fuel, favored manufacturing localities, the constant tendency to lower prices and the crushing effects of the panic of 1893 have combined to put the manufacture of pig-iron in few and strong hands. There are 10 new furnaces in a more or less advanced stage, while 14 others have been commenced, but work upon these latter has been temporarily suspended. The four new Duquesne furnaces of the Carnegie Steel Company will be the largest in the world, 100 feet high and 22 feet wide at the boshes, the aggregate annual capacity being 700,000 tons. Of the 469 furnaces now in operation, 96 use charcoal as fuel — as compared with 118 in 1894 — and 373 use anthracite and bituminous coal and coke — as compared with 401 in 1894. The charcoal furnaces have an annual capacity of 1,098,550 tons, while those in 1894 had a capacity of 1,285,400 tons, the average capacity per furnace being 11,443 tons in 1896 and 10,894 tons in 1894.

**Rolling-Mills and Steel Works.** — There are now 505 completed rolling-mills and steel works, of which 463 have trains of rolls and 42 have no rolls. Since 1894, there have been 41 new works built and 22 abandoned. In January, 1896, there were five works in course of erection.

**Puddling Furnaces.** — The number of puddling furnaces in connection with rolling-mills — double furnaces being taken as equivalent to two single furnaces — is 4,408 against 4,715 in 1894. The greatest number of these furnaces was in 1884, when 5,265 were in operation; while 5,120 were still in existence in 1892, but since that year the number has steadily declined.

**Bessemer Steel Works.** — There are now in operation 44 standard Bessemer steel works, with 99 converters, including one small converter of 1,000 pounds capacity for steel castings by the Walrand-Legenis process — as compared with 43 works and 95 converters in 1894. The total annual converting capacity is 9,472,350 tons of ingots and direct castings, against 7,740,900 tons capacity in 1894. Few direct castings are made at Bessemer steel works. There are three Clapp-Griffiths steel plants and three Robert-Bessemer steel plants, aggregating 10 converters, but these are not all in operation. Since 1894, there have been five new standard Bessemer works built and four abandoned.

**Open-hearth Steel Works.** — There are now 88 completed open-hearth steel plants, and four in course of construction; the total capacity in ingots and direct castings being 2,430,450 gross tons. In 1894, there were 81 plants, with an annual capacity of 1,740,000 tons, but since then 11 new plants have been established while four have been burned or abandoned. There are 35 plants equipped for making direct castings, as compared with 28 in 1894, while another plant for making open-hearth steel castings is now being built. The

manufacture of steel castings has grown so rapidly within late years that it has wrought a great change in general foundry practice.

**Basic Steel.** — During the past two years rapid progress has been made in the manufacture of basic steel, but it is wholly confined to works which have open-hearth steel plants. A number of these works make basic steel regularly, while some make it almost exclusively. In all, about half the open-hearth steel works which produce ingots now make basic steel. The manufacture of basic Bessemer steel has no existence in this country, but the Troy Steel Company proposes to make it with three 15-ton converters at its new works on Breaker Island.

**Crucible Steel Works.** — There are now 45 crucible steel plants, with an aggregate annual capacity of 98,700 gross tons. In 1894 there were 48 plants and since then eight have been abandoned and five built.

**Cut Nails.** — In January, 1896, there were 53 rolling-mills devoted in whole or in part to the manufacture of cut nails and spikes, with 4,589 nail machines. In 1894 there were 55 mills and 5,094 machines, while in 1892 there were 65 mills and 5,546 machines.

**Wire Nails.** — There are 53 completed works and one plant to be rebuilt, the capacity being very much greater than that of 54 completed and one partly completed works in 1894.

**Wire Rods and Wire.** — There are 23 works equipped for rolling iron and steel-wire rods, the same as in 1894; while there are 73 iron and steel wire-drawing plants, as against 64 in 1894.

**Plate and Sheet Mills.** — These are included in the rolling-mills and steel works. There are 156 completed plants, three in course of erection and two partly completed. In 1890, before the tin-plate industry had obtained a foothold, there were 129 plate and sheet mills and three in course of erection. Most of the new mills since that time have been designed to meet the demand for black plates for tinning and terne-plating and many of the mills, which were in existence in 1890, have been enlarged or changed to meet the same demand. There are now 41 rolling-mills specifically named as making black plates for tinning, while three works of similar character are in course of erection. The armor-plate works are included with the plate works and for over two years they have fully met the exacting requirements of the Government for the supply of armor-plate for the new Navy.

**Tin-plate Works.** — There are now 69 completed works, four in course of erection and one is being rebuilt. Practically all these works have been built since the passage of the Tariff Act of 1890. In 1890 bright tin-plates were being manufactured at three works, terne-plates were manufactured at another plant and two tin-plate works were in course of erection. In 1892 there were 20 works making tin-plates or terne-plates and 10 works were in course of erection. In 1894 there were 56 completed works and three in course of erection.

**Forges and Bloomeries.** — This classification includes only the works which have wrought-iron direct from the ore and works which have blooms from pig-iron or scrap-iron for sale. Works which make blooms in connection with rolling-mills and for use exclusively in these mills, are not separately classified, as they are auxiliary and not independent works. There are now 23 forges and bloomeries — most of which are pig and scrap forges — as against 25 in 1894. In the South, where formerly there were hundreds of Catalan forges making small quantities of wrought-iron directly from the ore, there is now only one active forge of this character left. In New York there are only seven forges making iron directly from the ore, while in 1876 there were 27 such forges.

**Miscellaneous Works.** — The following are the number of works allied to the iron and steel industries: Stamping works, 27 completed and one being rebuilt; iron and steel bridge-building works, 74; iron and steel ship-building yards, 36; horseshoe-nail works, 13; malleable iron works, 82; cast-iron and cast-steel pipe-works, 70 completed and one being built; wrought-iron and wrought-steel pipe, riveted pipe and seamless tube works, 38 completed and one being built; locomotive works, 22; car works, 112; car-wheel works, 112 completed and one partly erected; car-axle works, 64 completed and two being built.

**Natural Gas.** — There are 89 completed iron and steel works using natural gas in whole or in part, of which 61 are in Pennsylvania, 22 in Indiana, 5 in Ohio and 1 in West Virginia. One Indiana plant, now being built, will also use gas. The total consumption of natural gas in works of this character is growing steadily less every year.

**SICK-PAY FOR WORKINGMEN.** — An interesting experiment in sick-pay for workmen is being made in London by the Battersea Vestry. A municipal employé falling sick and unable to work receives half-pay for a period not exceeding thirteen weeks, and quarter-pay for any further period not exceeding thirteen weeks. A medical certificate of disability must be presented each week, and no employé can receive more than six months' sick-pay in one year. To prevent fraud, every employé, on engagement, is required to pass a medical examination and receive a certificate of sound health; otherwise he cannot enjoy the benefits of the system. In case of accident in the performance of duty, an employé is entitled to full pay for a period not exceeding one year, and ten shillings a week thereafter so long as he is incapacitated from work. This is organizing the civil service on a military system, of a surety. The report from Battersea is that it works well. — *N. Y. Tribune*.

## BOOKS AND PAPERS

THE well-known author of the "Architects' and Builders' Pocket-book" has had the happy idea of taking up the details of what we may call the practice of construction, including the consideration of the quality, as well as the use, of materials, and collecting sufficient information about them to fill two good-sized volumes, of which the first, treating of "Masons' Work,"<sup>1</sup> is already on sale. We cannot quite agree with Mr. Kidder's statement in his preface, that "there exists no similar work describing American methods and materials," for Professor Baker's "Masonry Construction" treats of American methods and materials of masonry work with admirable fulness and precision, while Mr. Clark's "Building Superintendence" seems to have been found sufficiently familiar to have furnished Mr. Kidder not only with a suggestion for his title, but with the originals of a dozen or so of his illustrations, and an appreciable constituent of certain portions of the text. However, the present work contains a large amount of matter which is, indeed, not to be found in any other book. A part of this consists of the results of Mr. Kidder's own observations, while another part is compiled, with excellent discrimination, from technical periodicals, manufacturers' circulars, and so on. Out of these materials, intelligently systematized, a very useful volume has been made, modelled, apparently, to a certain extent on the familiar South Kensington text-book on materials, but covering also the use of materials, the details of the inspection of work, and suggestions for writing specifications. In addition to these, or, rather, as a sort of amplification of the subject, Mr. Kidder has collected information in regard to materials and processes of recent introduction, as, for example, the new gypsum cements, known under the names of Acme, Adamant, Windsor, Agatite and so on, and various systems of fireproof construction for floors and ceilings, patented and otherwise, besides the more important innovations of the present decade in respect to foundations for heavy buildings. Although most architects know something of the Chicago system of foundations in compressible soil, and the New York inventions of caisson and cantilever supports, it is not always easy for them to refer at once, in case of need, to the details of actual examples of such construction, and Mr. Kidder's work will here be found particularly useful to them, as well as to younger men, while the systematic arrangement of its contents adds much to its value as a book of reference. After the description of each class of materials comes an account of the proper way of using them, followed by notes of the sorts of misuse which the architect is likely to meet with; and at the end of the volume is a model specification for masonry work, including a form of General Conditions. In a book of such liberal dimensions it is, of course, possible to treat at considerable length of the materials used in masonry, and Mr. Kidder has compiled his facts with much discrimination, not only from his own investigations and experience, but from official reports and other sources of unquestionable authority. Information of this sort is, as every architect knows, on occasion extremely valuable, and it has not been easy to obtain it without a search through the shelves of a considerable library, so that Mr. Kidder has put the profession under decided obligation.

THE *Portfolio* series of monographs on artistic subjects, offers, in its first number for this year, an account of "The Picture Gallery of Charles I,"<sup>2</sup> by Claude Phillips, who has brought together a great amount of curious and valuable information about the magnificent collection of paintings amassed by Charles, who was an enthusiastic, a liberal and a judicious collector. Scattered by the fortunes of war among the galleries of Europe, many of the treasures gathered by him now enhance the splendors of art displayed in the Louvre, the Prado, the Hermitage and other museums, among these being such masterworks as Raphael's "St. George and the Dragon," Leonardo's "John the Baptist," Giorgione's "Concert Champêtre," Titian's "Entombment," Correggio's "Jupiter and Antiope," and Holbein's "Erasmus," to mention no more.

It is interesting to know that if it had not been for Cromwell, who reserved them, in accordance with the parliamentary resolution to that effect, the cartoons of Raphael and Mantegna's "Triumphs of Julius Cæsar," would also have been lost to England, when the late monarch's collection was sold by the Commonwealth. Though the cartoons have since been transferred to South Kensington, the "Triumphs" still remain at Hampton Court, where the Great Protector placed them, in company with some other pictures, certain of which are illustrated in this monograph, which also contains good reproductions of other paintings once possessed by King Charles.

Mr. Phillips has not forgotten to give some account of Charles's patronage of Rubens and Van Dyck, and has produced a book which well merits a place among the histories of art. The publishers have brought it out in a fitting manner and have added to the satisfactory

"half-tone" cuts, four admirable photogravures from Titian's "Alfonso of Ferrara and Laura de' Dianti," Dürer's "Portrait of Himself," Andrea del Sarto's "Holy Family, with an Angel"; and Van Dyck's "Madonna of the Partridges."

MISS CECILIA WAERN has written the succeeding number of the *Portfolio* monographs, which is devoted to John La Farge,<sup>3</sup> and describes his work as artist and writer. Born in New York about sixty years ago, the son of a French soldier who was a refugee from San Domingo, La Farge seems to have been intended for the law, but his artistic bent led him to study in Paris under Couture, and later to become the pupil of William M. Hunt.

He painted flowers, landscapes—among which those done at Newport, R. I., are best known—and figure-pieces, the "St. Paul at Athens" being the most notable of the latter, and drew illustrations on wood. His first decorative work of any importance was that in Trinity Church, Boston, a commission which he owed to his friend, the architect, Richardson, and which unfortunate exigencies compelled him to carry out in a little over four months. This was in 1876, his next undertaking being the decorative paintings in St. Thomas's Church in New York (of neither of these does Miss Waern's book afford any illustration), which was followed by the frescos in the Church of the Incarnation and the Church of the Ascension, both also in the American metropolis. La Farge is now engaged upon the decoration of the chancel in the Church of the Paulist Fathers in New York, a work of great size.

His remarkable achievements in stained glass, as exemplified in the "Battle Window" in the Memorial Hall of Harvard College and in the windows of the Vanderbilt houses, are widely known. Among the later manifestations of his art are the water-colors produced during his visits to Japan and to Samoa, and he has published a series of letters written from the first-named country, and a book entitled "Considerations on Painting."

Miss Waern's monograph, with its numerous excellent illustrations, deserves a wide acceptance as an authoritative and valuable record of the work and aims of one of the most vital personalities among the artists of our time.

IN the course of a conversation with one of our leading electrical engineers, the question was asked what one book could be taken as most fitly illustrating the present state of electrical science in its relation to the architect's work. The answer was that there is no work which is thoroughly up to date; that the science is changing so rapidly that before a volume could be prepared and put in print a great deal of the subject matter would be obsolete and many of the appliances therein described would be superseded by more improved machinery. There is no department of science which has witnessed such marvellous and rapid developments as electricity, and it is correspondingly difficult to keep track of all that has been written upon the subject or even to keep fairly well posted upon the current practice. Prof. Crocker's work<sup>4</sup> is intended for engineers and students and assumes to be a species of text-book, but it would seem to us rather a collection of admirably written advisory essays upon certain features of the subject. The work assumes a higher degree of knowledge on the part of readers than is customarily found even among the electricians who undertake to lay out work in our large buildings, and there is an absence of definition of terms and a superfluity of merely technical words, which go a long way towards making it not only difficult reading but obscuring the practical value of such a work. It avoids the mass of elementary facts which have been worked out in connection with electrical science up to a period of about ten years ago, and therein the scheme of the book is excellent; but it is to be regretted that the more recent nomenclature and methods which have gone so far as to make electricity an exact science should be so broadly assumed by the author without at least some explanation. On the other hand, the writer evinces the most thorough grasp of the subject and there are very few statements or descriptions in the volume which can fairly be challenged. It is full of valuable and accurate information for the advanced student or for the engineer, and for such it is strongly to be recommended. The chapter on buildings for electric-light is quite superfluous. The complexity of electrical science has hardly rendered electric-light buildings especially complicated or diverse in their conditions. Also, the chapter on steam engines would more properly find a place in a more extended work on prime motors, and there are a few slips when the author deals with other than purely electrical subjects. The fact is, the time has not yet come for anything more than a passing attempt to thoroughly classify the manifestations and the methods of control of electricity.

THE LENGTH OF THE THAMES.—The non-tidal part of the Thames is 138 miles in length and drains an area of 6,000 square miles.—N. Y. Evening Post.

<sup>1</sup> "John La Farge, Artist and Writer." By Cecilia Waern. London: Seeley & Co. New York: Macmillan & Co. 1896. Price, \$1.25.

<sup>2</sup> "Electric Lighting." A Practical Exposition of the Art for the Use of Engineers, Students and others interested in the Installation or Operation of Electrical Plants. Volume I. "The Generating Plant." By Francis B. Crocker, E. M. Ph. D., Professor of Electrical Engineering in Columbia University, New York; Vice-President of the American Institute of Electrical Engineers. New York: D. Van Nostrand Company. London: E. & F. N. Spon. 125 Strand. 1896. Price, \$3.

<sup>3</sup> "Building Construction and Superintendence." "Masons' Work," Part I, 250 illustrations. By F. E. Kidder, G. E., Ph. D., Architect, author of "The Architects' and Builders' Pocket-book." New York: William T. Comstock, 23 Warren St. 1896. Price, \$4.

<sup>4</sup> "The Picture Gallery of Charles I." By Claude Phillips. London: Seeley & Co. New York: Macmillan & Co. 1896. Price, \$1.25.

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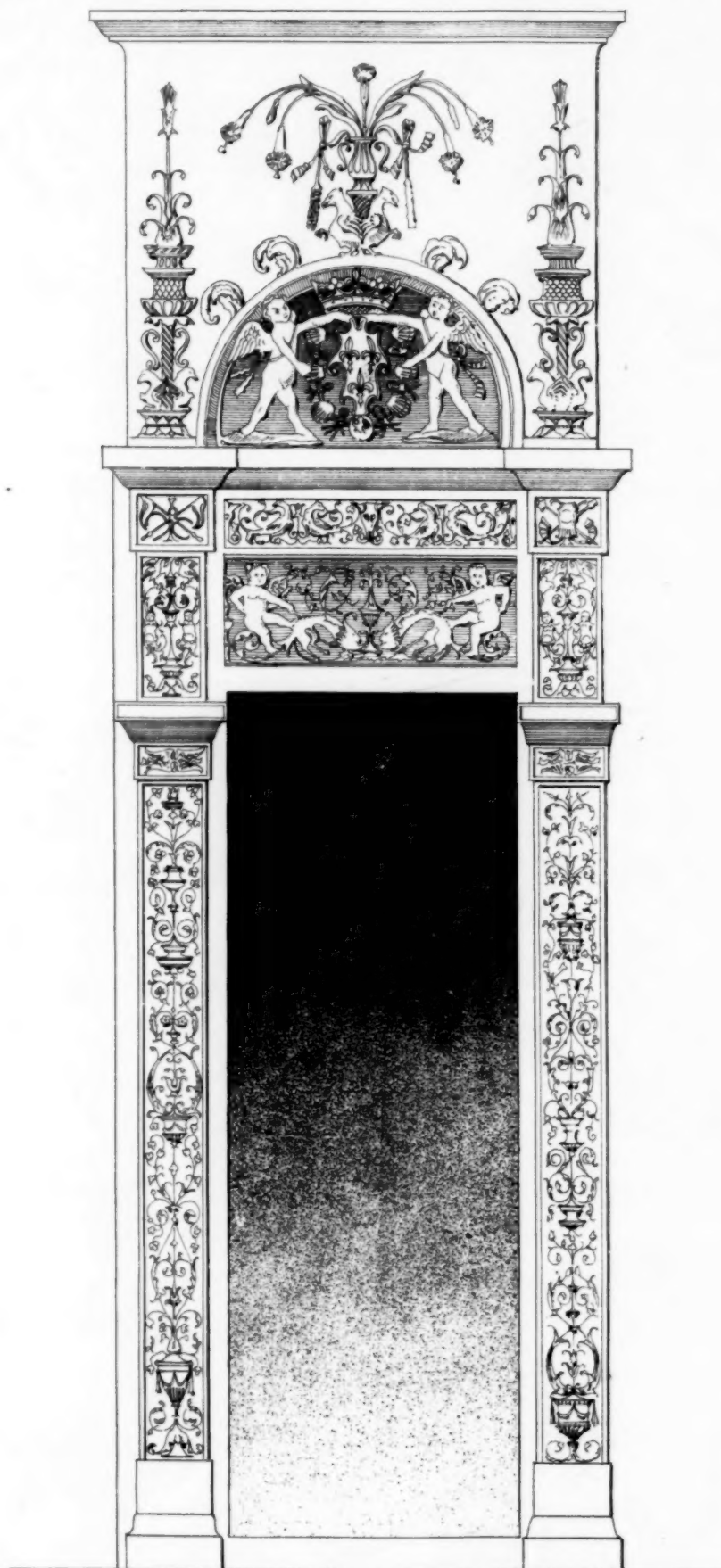
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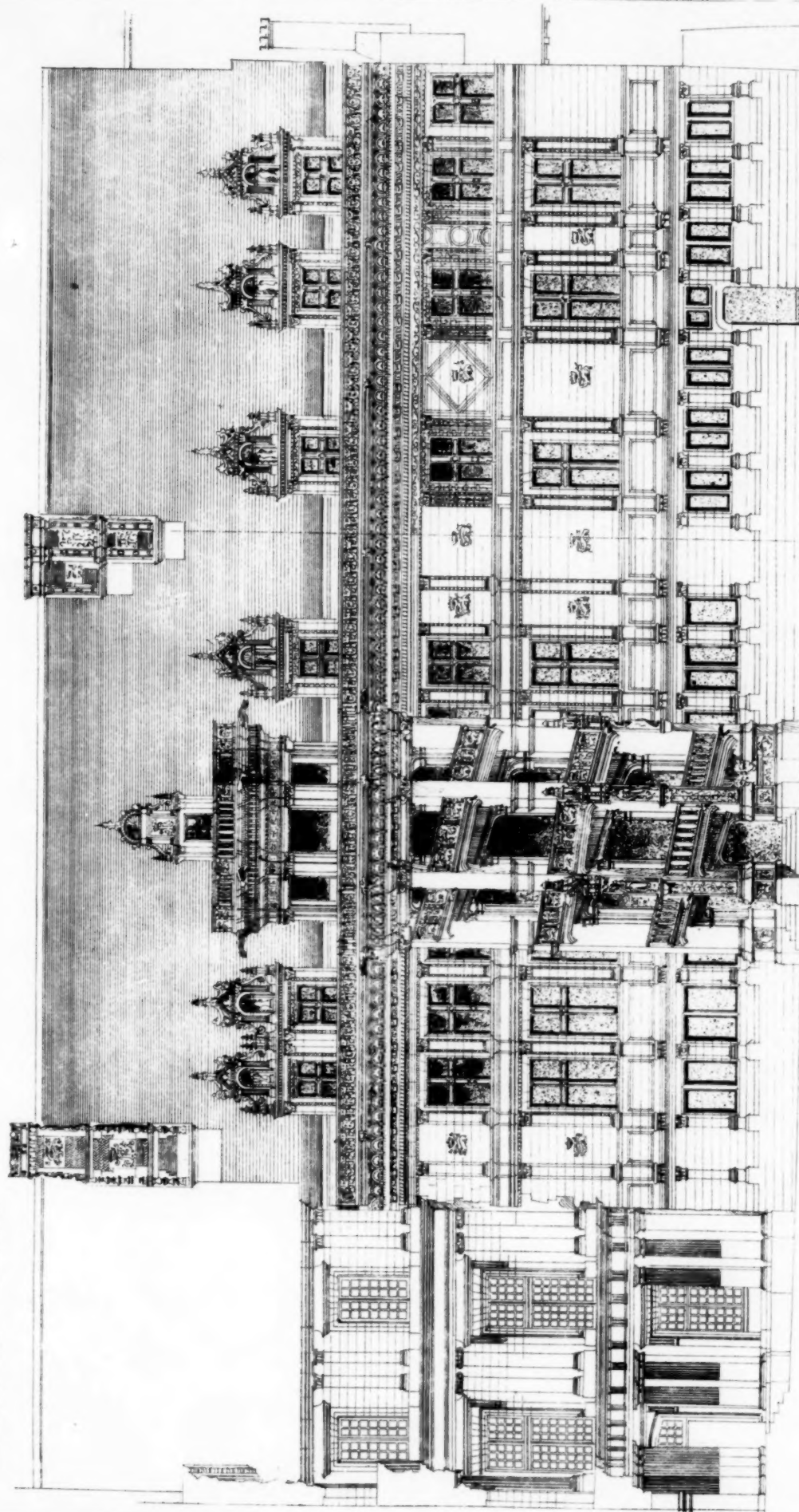
DOOR IN "SALLE DES GARDES"

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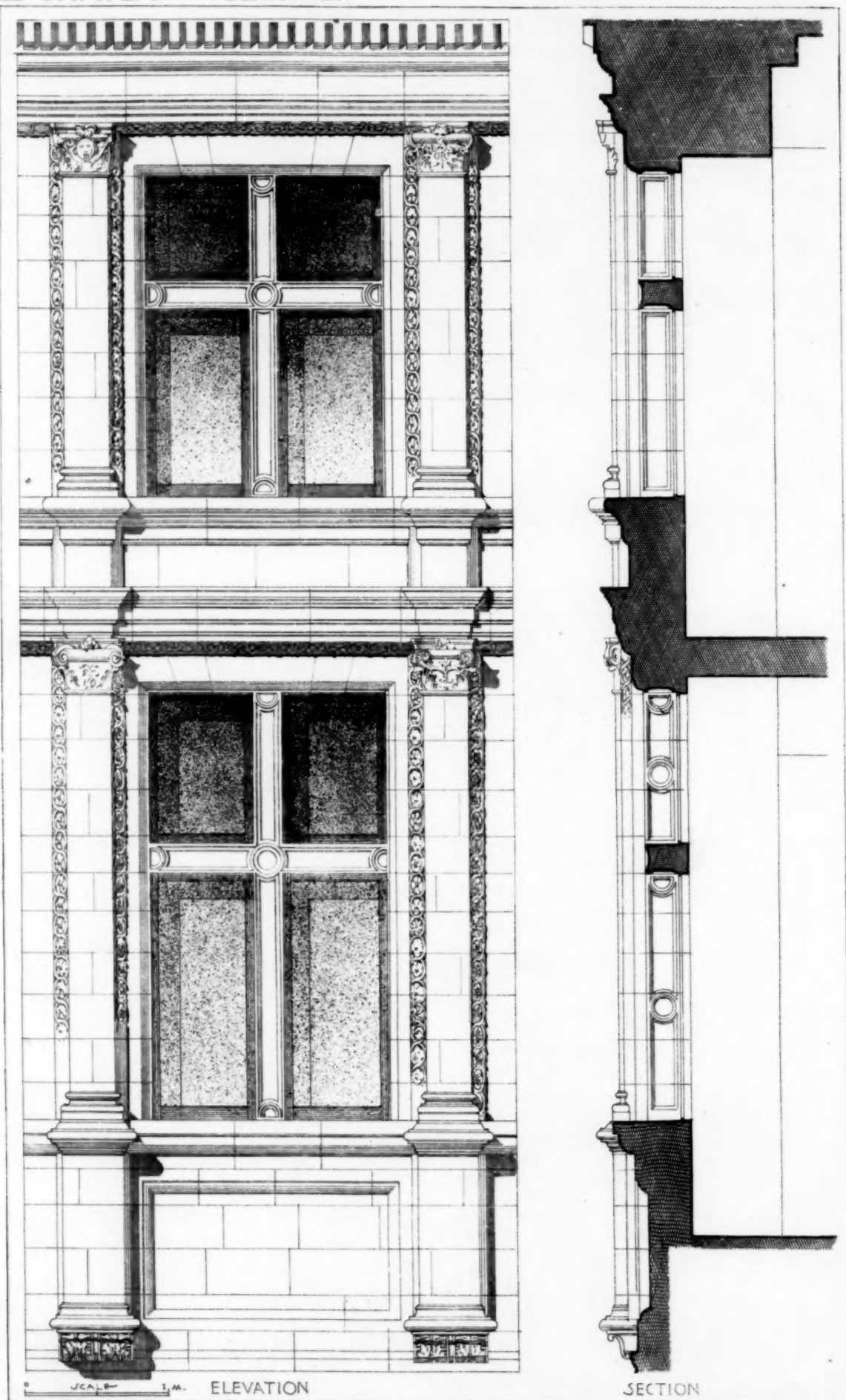


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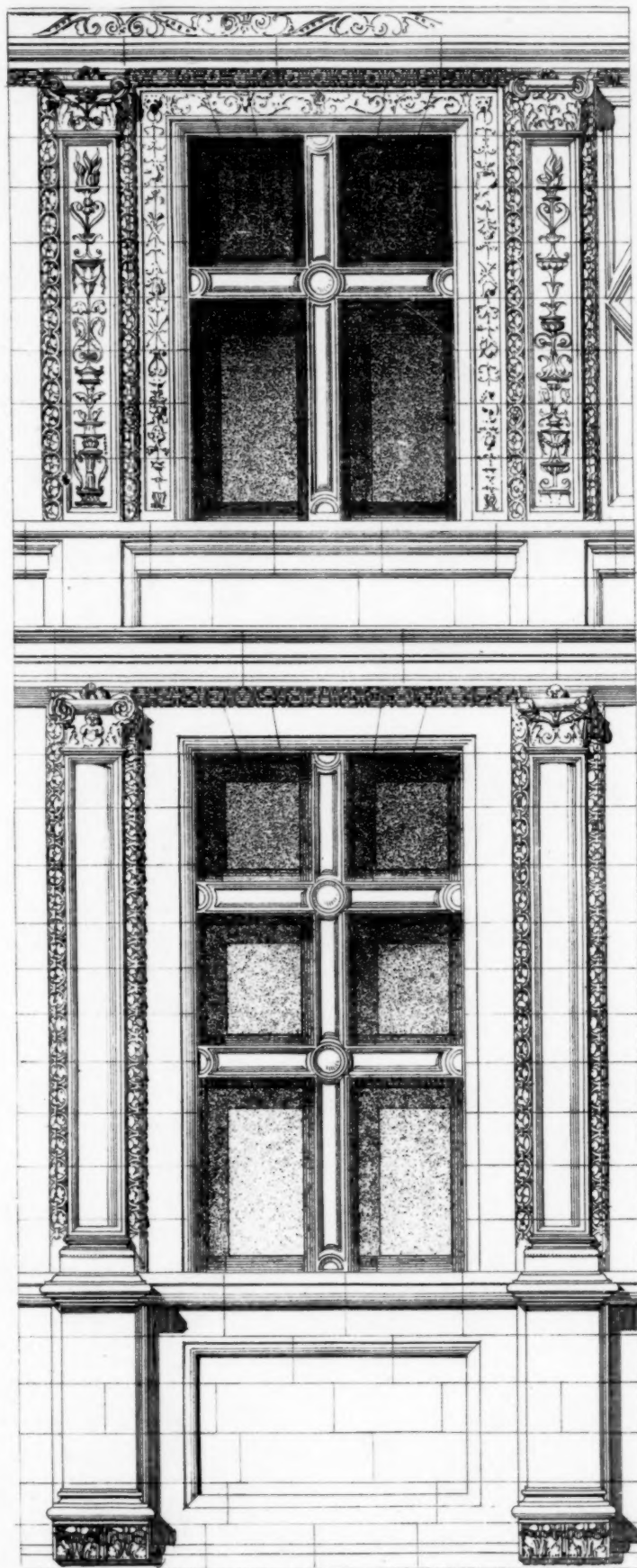
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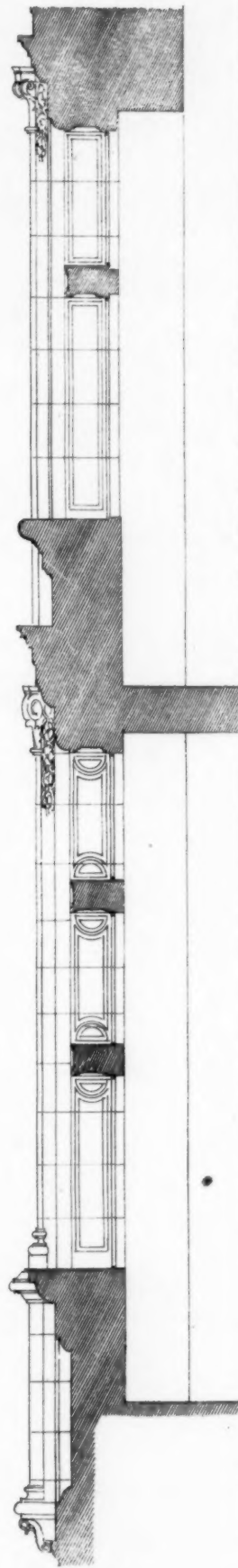


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[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

CHÂTEAU DE BLOIS: RESTORED COURT-YARD FACADE. MEASURED AND DRAWN BY MR. W. T. PARTRIDGE, LATE HOLDER OF THE ROTCH TRAVELLING-SCHOLARSHIP.

[Issued with the International and Imperial Editions only.]

THIS and the drawing of the mantelpiece are published with the consent of the Trustees of the Rotch Travelling-scholarship. The fact that these drawings are rendered with a very delicate pencil line, which is complicated with an ink line in parts, has made it altogether impossible to secure really satisfactory reproductions.

CHÂTEAU DE BLOIS: DETAILS OF THE BALUSTRADE.

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CHÂTEAU DE BLOIS: SUNDRY DETAILS.

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CHÂTEAU DE BLOIS: COURT-YARD FACADE OF THE WING OF FRANÇOIS I. AFTER THE DRAWING OF M. DUBAN.

SEE article elsewhere in this issue.

CHÂTEAU DE BLOIS: DOORWAY IN THE SALLE DES GARDES. MEASURED AND DRAWN BY MR. W. T. PARTRIDGE, NEW YORK, N. Y.

CHÂTEAU DE BLOIS: TREATMENT OF BAYS ADJOINING THE GRAND STAIRCASE. MEASURED AND DRAWN BY MR. W. T. PARTRIDGE.

CHÂTEAU DE BLOIS: TREATMENT OF BAYS TO THE RIGHT OF GRAND STAIRCASE. MEASURED AND DRAWN BY MR. W. T. PARTRIDGE.

[The following named illustrations may be found by reference to our advertising pages.]

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XXVII: TEMPLE OF FAUSTINA AND ANTONINUS, IN THE GARDENS OF THE VILLA BORGHESE, ROME.

A TALE OF CUBICAL CONTENTS.

SGRAFFITO DECORATION IN THE VICOLO CELLINI, ROME. ASCRIBED TO BENVENUTO CELLINI.

[Additional Illustrations in the International Edition.]

HOUSE OF HERR RICHARD FABER, 24 KLOPSTOCKSTRASSE, BERLIN, PRUSSIA. HERR E. SEIBERTZ, ARCHITECT.

[Gelatine Print.]

THIS building was erected in 1891-2 as a high-grade apartment-house. The street front exhibits a treatment of red and white brick with a parti-colored decoration of the rough-cast filling of plane surfaces. The site cost 160,000 marks and the building itself 317,619 marks, or about 340 marks per square metre.

SANTA MARIA DEI MIRACOLI, VENICE, ITALY. AFTER A DRAWING BY MR. G. O. TOTTEN, NEW YORK, N. Y.

[Copper-plate Photogravure.]

In the Church of Santa Maria dei Miracoli we perceive very distinctly the influences exerted by the different styles which give it its peculiar charm. Its form is in general Gothic and Byzantine, while its details are of the Renaissance. One feels rather than discerns the Gothic influence, while as for traces of Byzantine architecture they are numberless. In plan, the building is unique and recalls the basilica: the nave of the church, long, simple and without transept, ends in a square apse. The rear end is higher than the front and here is placed the sanctuary in such a fashion as to shorten the rather too long nave and give to the sacristy the needed space to produce a good effect. The dome is of masonry, but the vaulting is of wood, which is magnificently decorated with paintings. The walls, lined with marble from Greece as well as Italy, are decorated with panels in a simple but very effective manner and the sculptured details are worthy of the most attentive study. M. Eugène Müntz

has thus expressed himself on their merits: "These sculptures, undercut like works of jewelry, have as much grace as originality; they especially have a spontaneity, a freshness, a perfume of youth which make them the most spring-like and most exuberant of the stonework poems of this most fortunate epoch." The floor of the sanctuary is laid in mosaic-work of the most sumptuous description: on a ground of white marble is detached a marquetry of porphyry and precious stones enframed in a border of black cement. The effect obtained contributes to the penetrating charm of this little interior, which is still further enhanced by the exquisite figures of a Botticelli. The exterior of the church responds to the interior in richness and beauty. Here again all is marble and incrustation, but let M. Müntz once more teach us how to value it: "The grand semicircular pediment of the façade, its three windows and its two discs constitute a single composition as happy as one could desire. The circular pediment declares the interior arrangement of the nave: taken in consideration with the dome, undoubtedly of Oriental origin and inspired by St. Mark's, it gives a decidedly Byzantine air to the church. The façade that seems irregular in elevation shows better in perspective. The coloring also adds to its merits. To day, after the restorations carried out in 1877 in an exquisite manner by Signor Paoletti, this church yields in interest only to St. Mark's."

SKETCHES AT AUGSBURG AND NUREMBERG.

THIS plate is copied from *Architektonische Rundschau*.

MONUMENTS AT NICE. M. J. LEBVRE, ARCHITECT, AND AT MENTON, M. VAUDREMER, ARCHITECT.

THESE illustrations are copied from *La Construction Moderne*.

CHÂTEAU DE BLOIS: MANTELPIECE IN THE SALLE DES GARDES. MEASURED AND DRAWN BY MR. W. T. PARTRIDGE, LATE HOLDER OF THE ROTCH TRAVELLING-SCHOLARSHIP.

CHÂTEAU DE BLOIS: TWO CHIMNEYS.



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

#### "THE ACTION OF HEAT ON CONCRETE."

CHICAGO, ILL., August 18, 1896.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—As a matter of public interest to architects generally and the building trade, I trust you will find space for the following:

In your issue of the 11th of July you published a paper by Mr. B. S. Dobie, on "The Action of Heat on Cement," in which, after giving in more or less detail the result of some experiments with briquettes made of cement, and cement and sand, which were subsequently subjected to heat under varying conditions, the deduction was made that "a fire of ordinary intensity is sufficient to ruin completely a very large covering of concrete."

Several years ago, in mixing up briquettes of Portland cement for testing, it was discovered that by the use of a much less quantity of water than ordinarily used, a stronger briquette was made. From this one fact, which is incontrovertible—standing alone and unsupported by any other evidence, the deduction was erroneously made that in mixing concrete it was best to use a minimum quantity of water, and this error rapidly spread through the profession, so that the practice of dry-mixing became prevalent to a very large extent both among architects and engineers, to the great detriment of many large works and innumerable smaller ones. This error is now about exploded, but it has taken many years to accomplish this.

In an analogous manner, strikingly similar to the above, has Mr. Dobie jumped to the conclusion that because cement and cement-mortar give certain results when tested by fire, concrete must necessarily act in a like manner. Such deductions are of very doubtful value and should be deprecated.

Wherever a well-made Portland-cement concrete, after due seasoning, has been exposed to the fire-test, in comparison with stone, brick or hollow-tile work, it has, so far as I am aware, stood such test triumphantly. Not to speak of the results of the great Chicago fire or the German Government tests, etc., all of which are probably well known to your readers, I will give three cases that have come under my own observation where concrete has resisted fire successfully:

One of the buildings in the Government Arsenal at Benicia, California, which was, I believe, used partly as a storehouse and partly as a blacksmith-shop, was a large brick building with sandstone trimmings for the most part. The door-sills, however, were of granite and the window-caps of Portland-cement concrete. This building took fire some years ago and was completely burned out.



On investigation, shortly after the fire, I found that the granite sills which from their situation were exposed to the minimum amount of heat, were spalled and broken into many pieces; that the window trimmings of sandstone were very badly injured and that even the brickwork in many places adjacent to the windows had scaled off, whereas the window caps of Portland cement concrete, although necessarily exposed, on account of their position, to a yet fiercer fire, were but very slightly injured.

Again, I manufacture a brick the binding ingredient of which is like that of Portland cement, namely, a hydrated crystallized silicate of lime. This brick, therefore, if Mr. Dobie's deduction is correct, should withstand fire badly, but on the contrary, it resists fire admirably. It has been repeatedly built up in the form of a dry arch with the ordinary brick of various quantities and, in company with them and some fire-brick, been heated red-hot and then cooled as quickly as possible by throwing large quantities of water upon the arch and fire. Under this test the burnt-clay bricks of all kinds, including the fire-brick, have invariably gone to pieces—some only spalling slightly, others breaking up altogether. Yet, strange to say, this Portland-cement brick has never been known to break or suffer, except that its surface softens a little, but subsequently becomes hard again.

Again, a month or two ago, Messrs. A. Monsted & Company, of Milwaukee, made some composite beams of twisted iron and concrete, the iron being made from a bar one inch square, whilst the concrete was only three inches thick. Thus on three sides the iron was only protected by about one inch of concrete, yet notwithstanding the large proportion of iron, these beams which were heated red-hot and then plunged into cold water did not in any case separate from the iron or crack. They softened somewhat, but after exposure to the atmosphere in an ordinary chamber, became hard again.

Mr. Dobie's experiments are undoubtedly valuable, but it is very unwise to condemn Portland-cement concrete on such grounds. Let him first learn from the trade how to make a fire-resisting concrete and then test concrete, not cement, or cement and sand, and his deductions will have more weight.

Yours truly,

ERNEST L. RANSOME.

## NOTES AND CLIPPINGS

**EXCAVATIONS AT JERUSALEM.**—At the general meeting of the Palestine Exploration Fund this year, Lieutenant-Colonel Watson read the annual report, which stated that the excavations at Jerusalem, for which a firman was granted by the Porte, have been carried on by Dr. Bliss with success. An interesting rockscarp has been traced for some distance along the side of an old wall of the city, south of the present wall, and followed for over 1,000 feet. In this line of wall the remains of several ancient towers and a gateway were discovered, and no less than four sills of the ancient gateway belonging to four different periods, were found *in situ*, one above the other. Dr. Bliss wrote, saying that he knew of no more interesting example of a place where four distinct periods might be studied in the short perpendicular space of four feet. Subsequently, on following the wall toward Siloam, there was found, near the bottom of the hill, another gateway, also representing four distinct periods. A retaining-wall across the mouth of the Tyropoean Valley was examined. It was still too early to know the full significance of these discoveries. Dr. Bliss, in a summary of the results of the excavations, stated that near Siloam, outside the city wall, interesting Roman baths were discovered. Their work, he added, had gone very smoothly. A buried wall was no respecter of persons, and ran through the lands of a Greek Patriarch, a Moslem Pasha, a Latin father, or a Siloam fellow, with all of whom the excavators must come to some understanding, financial or otherwise. But he was glad to say that this understanding had always been friendly. Unfortunately, most of their work had been covered up; a barley field had revealed its secrets, and once again was in superficial appearance a mere barley field. The excavations were not the only work which have been carried on at Jerusalem under the auspices of the Fund. The veteran explorer, Herr von Schick, has pursued investigations of a very interesting character within the city. His examination of mediæval churches and convents in Jerusalem, and of the quarter known as Bab Hytta, threw a flood of light on the condition of the Holy City during the period covered by the Crusaders' occupation of it. — *London Standard*.

**THE SCHOOLS OF ATHENS.**—Mr. Morley, in an interesting and suggestive speech at the recent meeting of subscribers to the British School at Athens, described himself as neither a scholar nor an archaeologist. An archaeologist he certainly is not, says the *London News*. But he is one of those who maintain the standard of classical knowledge in public life, and exemplify in their style the permanent influence of Greek literature upon the world. The schools at Athens are intended to supply the archaeological evidence which has already produced so many fruitful discoveries, and added so much to our knowledge of ancient life. The contribution of the British Government to this object is not liberal. It is £400 a year, as compared with £3,000 from France and £2,000 from the United States. But we are not altogether disposed to blame the Government. The objects of the British School at Athens are excellent, and knowledge is valuable to the whole community, not merely to a few persons of superior culture. At the same time, the bearing of Hellenic studies upon the ordinary business of mankind does not impress itself, and cannot easily be impressed, upon tax-payers who have been debarred by circumstances from the pursuit of learning.

On the other hand, there are rich people who thoroughly understand the nature of the work done at Athens, and who could keep the School out of difficulties with no inconvenience to themselves. To them, or to some of them, Mr. Morley's speech should appeal. The lamented death of Professor Curtius gave Mr. Morley an opportunity of comparing him with the great English historians of Greece. There can be no higher praise, even for Curtius, than the acknowledgment that he ranks with Thirlwall and Grote. But it is true, as Mr. Morley says, that Curtius had a peculiar power of making antiquities vivid, and imaginative conceptions real. He was a great man, and he belonged to a nation where the government undertakes research. Here we rely chiefly upon private munificence, and we seldom rely upon it in vain.

**FIRST BUILDER OF THE VATICAN.**—The present existence of this palace is principally due to Nicholas V, the builder pope, whose gigantic scheme would startle a modern architect. His plan was to build the church of St. Peter's as a starting-point, and then to construct one vast central "habitat" for the papal administration, covering the whole of what is called the Borgo, from the Castle of Sant' Angelo to the Cathedral. In ancient times a portico, or covered way supported on columns, led from the bridge to the church, and it was probably from this real structure that Nicholas began his imaginary one, only a small part of which was ever completed. That small portion alone comprises the basilica and the Vatican Palace, which together form by far the greatest continuous mass of buildings in the world. The Colosseum is 195 yards long by 156 broad, including the thickness of the walls. St. Peter's Church alone is 265 yards long and 156 broad, so that the whole Colosseum would easily stand upon the ground-plan of the church, while the Vatican Palace is more than half as large again. Nicholas V died in 1455, and the oldest parts of the present Vatican Palace are not older than his reign. They are generally known as the Torre Borgia, from having been inhabited by Alexander VI, who died of poison in the third of the rooms now occupied by the library, counting from the library side. The windows of these rooms look upon the large square court of the Belvedere, and that part of the palace is not visible from without. Portions of the substructure of the earlier building were no doubt utilized by Nicholas, and the secret gallery which connects the Vatican with the Mausoleum of Hadrian is generally attributed to Pope John XXIII, who died in 1417; but, on the whole, it may be said that the Vatican Palace is originally a building of the period of the Renaissance, to which all successive popes have made additions. — *F. Marion Crawford, in the August Century*.

**PAINTING BRONZE STATUES.**—An interesting experiment is now being tried on the statue of James II which is the ornament of Whitehall Gardens. Workmen, having carefully cleaned the bronze, which was in a very filthy condition, are now apparently varnishing it, but are in reality painting it with a very thin solution of a certain chemical product, the use of which in such a connection is the invention of Prof. A. H. Church, F. R. S. We believe that one of the latest acts of Lord Leighton was recommending the Office of Works to apply to Professor Church for advice in this matter. The eminent chemist has for years past been experimenting on this mode of preserving the patina of bronze, but has never before had the opportunity of trying it on a public work. It is understood that, when perfectly dry, this delicate coating will take a high and durable polish; and, if so, the question of enabling bronze to endure the London smuts and dirt will perhaps be solved. The examination of the statue, a masterpiece from the hand of Grinling Gibbons, and certainly one of the most precious works of public art in England, led to the discovery of a large hole in the shoulder, in which rain-water was settling, and which was disintegrating the mass. This will be stopped up, and the roll in the monarch's hand, which was found to be merely painted wood, will be replaced by a rolled scroll of bronze. Unfortunately, when the work was cleaned last, some years ago, too great violence was employed, and the surface imperatively calls for treatment. If Professor Church's experiment is successful, it is to be hoped that the process will be applied to other statues in our streets. Much of the sculpture in London has far more artistic merit than its present dilapidated condition leads the hasty passer-by to suppose. — *Pall Mall Gazette*.

**LIGHTNING AND DEFORESTATION.**—"As a rule," says the *Lancet*, "lightning-stroke is most common in the open air, generally under the tree to which the victim has resorted for shelter, and this circumstance, even where only severe injury has been sustained, makes death more likely, as the measures for relieving shock and restoring the vital energies cannot be put in practice till too late. But this year the majority of fatalities from lightning have occurred in dwelling-houses. There is no doubt that for this greater frequency of thunder storms, as for the more prolonged drought and such like meteorological visitations of latter years, the steady tree-felling, unbalanced by tree-planting, is directly responsible." This account is fully borne out by the reports which have from week to week appeared in *L'Électricité*, that journal regularly giving a certain amount of space to the subject.

**TROLLEY-WIRE SUPPORTS IN CHEMNITZ.**—Chemnitz, Saxony, has a trolley line without poles, the owners of houses on the streets through which the line was to pass without exception allowing the use of their houses free, rather than have the poles set in the walk. The trolley-wires are supported by cross wires held by projecting hooks firmly fastened into the houses on each side of the street, an ornamental rosette surrounding each hook so that the hooks are by no means unsightly. — *Providence Journal*.

**THE PRINCE OF ORANGE'S EMPTY TOMB AT PADUA.**—Italians generally accomplish what they set about. When Prince Philibert of Orange's grave was found to be empty at Padua recently, they began to hunt for him, and have now presented to the Dutch authorities a small casket containing the Prince's ashes. It seems that his body was cremated in 1530, after the siege of Florence. — *The Collector*.