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WE are disposed to be profoundly amused at the manner in which, during late years, we have allowed ourselves to acquire the mistaken belief that in the matter of competitions the architects of this country were suffering under an evil which might fairly be thought to be longer intolerable. Being strenuously possessed by this belief, we some weeks ago addressed an open-letter on the subject to the profession at large (see p. 162, *American Architect* for April 5), with the expectation that it would draw out so fairly representative an expression of opinion for or against the movement there suggested, that there would be sufficient reason for taking another step forward in the same direction, or on some other course pointed out by the most ingenious of those who opposed the scheme laid down. We regretfully admit that we were as much mistaken in entertaining this expectation as in the original belief that gave it rise. Apparently the profession has no evil to cry out against, or, at least, the present method of conducting architectural competitions is not one of them; for the score or two of letters we have received can hardly be considered the representative expression of opinion desired, though they yield us the modest gratification that no one who replied at all has suggested any modification of the terms of alliance proposed.

SEEMINGLY, then, the profession at large is content with the present method in which competitions are conducted, and is willing that the great and moneyed public should understand that it is so content. Apparently, too, the evils of the present system, being purely imaginary, are "only tools of service," which an editor may employ when preparing what has the appearance of an ingenuous diatribe against a great abuse, but which is understood by the initiated to be only "copy" for the printer, who must have words enough to fill his page. In times past we have received many letters, both private and for publication, from architects in all parts of the country, who complained more or less loudly of some competitive programme which they had encountered in their private practice, and we fully expected that these men, at least, who had had actual experience in the matter would cast a vote for or against the coalition. Hardly one has declared himself willing to have applied to him the law he would like to have applied to others. Seemingly, these past letters were the utterances of a merely splenetic mood, which vanished with the next post. These men and others who might also have written, were it not too troublesome to do so, would hardly like to have the public understand that though they are willing to protest openly they will still—unwillingly through force of circumstances, perhaps—make their protest of no avail by doing the very thing they protest against. We do and shall continue to believe that the evil does exist, and that the best, surest and quickest mode of eradicating it is to unite all architects—not merely the members of the American Institute of Architects—in some such union as we have pointed out, whose sole object shall be mutual protection in the matter of securing fair compensation for services rendered. If

there is any one who did not notice our original open-letter we ask him to turn to it. If there is any one who did not yield his assent because it was too troublesome to do so, or because he saw no way in which it would benefit him personally or immediately, we ask him to consider whether the possible chance of aiding his fellows should not outweigh any purely selfish consideration. Working, as we do, on one of the side-tracks of professional life the question concerns us personally far less than it does the least busy architect in the country, and so far as the question in the concrete affects us we are perfectly willing that the present bread-and-butter scramble should go on. But it is not dignified, it is not wise, it is not even business-like in the best sense of the word, while it is distinctly injudicious, needless and injurious to the true interests of our art.

THE New York *Mail and Express* does some injustice to architects in a recent editorial about the burning of the Cincinnati Court-House, in saying that "there are architects of repute who do not know what a fire-proof structure is;" and, farther on, that "it is certain that no provision has yet been made for the protection of elevator-shafts;" and that "it ought to be possible to close each shaft automatically with horizontal iron doors at each floor, by a mechanism connecting and controlling the doors, and adjustable at any part of the shaft." The editor of the *Mail and Express* being convinced of the correctness of his own statements, deduces from them the conclusion that our profession has been remiss in its duty in neglecting to provide for all these things, and warns us that "the burning of the Cincinnati Court-House ought to set the architects to study upon the problem how to erect structures that will be thoroughly fire-proof." We do not often think it worth while to defend the members of the architectural profession against such hasty and ill-considered assertions, although they do much to defeat the usefulness of architects, and increase the difficulties under which they labor in endeavoring to promote improvements in the art of building; but this particular slur upon the profession depends upon statements which are so glaringly opposed to the facts that we will for once take the trouble to contradict them specifically.

THAT the Cincinnati Court-House was called fire-proof, and yet was destroyed by fire, we admit without hesitation; but it is not by the fault, or with the connivance, of architects that many buildings claim that reputation which do not deserve it, and moreover, the Court-House which was burned was built in 1853, when the profession of architecture was barely known in this country, and the art of cheap fire-proof building, all over the world, was in the most rudimentary stages. Even if any trained architect was concerned in the construction of the original Court-House, which we very much doubt, he could hardly, considering the imperfect knowledge of the fire-resisting properties of wrought-iron then available, be held responsible for the failure of his building to endure a test which at that time had probably never been applied to any similar structure; and to infer from this failure of a building designed more than thirty years ago that the architects of the present generation "do not know what a fire-proof structure is," seems to us exactly as logical as it would be to assert that the physicians of to-day do not understand the value of fresh air to the sick, because cases of septicæmia occur in the Maison Dieu, or the other old hospitals which have not yet been abandoned.

THE assertion, which the editor of the *Mail and Express* appears to intend as a condemnation of the architectural profession, that "no provision has yet been made for the protection of elevator-shafts," these being acknowledged to be the most dangerous features of ordinary constructions, simply betrays an ignorance of the subject which might have been corrected by asking a question or two of any respectable architect. In this way the information would at once have been elicited that elevator-shafts can be, and in thousands of cases are, effectually protected by hatches, automatic or otherwise, made in a variety of forms; and that, moreover, the building-regulations of one or two cities, and the insurance rules of all, specify the mode in which such hatches shall be used, with a minuteness which leaves nothing to the discretion of the architect who has occasion to employ them. If, as the *Mail and Express* thinks is the only way possible, it is desirable to cut

off the draught through an elevator-shaft by "horizontal iron doors at each floor," acting automatically, devices for this purpose also are in use, one of these, by the way, if not two, having been devised by those same architects, who, as we are told, "do not know what a fire-proof structure is." Passing from the consideration of the protection of elevator-shafts to the enclosing of iron construction with fire-clay, which, as the *Mail and Express* says, "is essential to the security of many buildings now supposed to be fire-proof," we must confess that we are surprised to find that the editor of a daily paper of such high reputation should not know that nearly the whole system of protecting iron structural work with terra-cotta or concrete, as now used in this country, is the invention of a well-known and highly-trained architect, who, endeavoring, as all other good architects do, to make his theoretical and practical knowledge available in solving certain serious problems of fire-proof construction with which he had to deal, produced, one after the other, those admirable methods which are known in the profession by his name, and which have placed the modern fire-proof buildings of this country far in advance of those yet constructed in any other part of the world. We could cite other examples of improvement in the art of fire-resisting construction which have been introduced by architects, but we hope that the answer just made to the two points on which the *Mail and Express* bases its imputations upon the profession will be sufficient to show that the architects have not waited for the burning of the Cincinnati Court-House before beginning "to study upon the problem how to erect structures which will be thoroughly fire-proof."

BUILDERS' and Traders' Exchange has been established in Chicago, with rooms in the National Life Building, 159 La Salle Street. The Exchange has already more than three hundred members, including representatives of all the building trades, as well as manufacturers of brick, lime, cement, glass, terra-cotta, paints and so on, and dealers in all sorts of building appliances. The directors of the Exchange have endeavored to restrict membership to the most responsible and intelligent men in the various professions represented, and a code of rules has been adopted, under which any deviation from proper business practices on the part of members will be promptly punished. An innovation has been introduced in the usual management of mechanics' exchanges, by choosing rooms for the business of the association in a large office-building, where individual contractors or dealers in materials can find accommodation near to the centre of their business; and this feature of the arrangement will undoubtedly add to the convenience of all persons concerned. No one who has not practised building or architecture within reach of a mechanics' exchange can understand its value in saving time and steps. In the towns where such exchanges exist, the necessary communication between the architect and the contractors engaged upon his work, or between the various contractors, is effected during the exchange hour, when all the contractors belonging to the association are, either in person or by deputy, present at the rooms; and business can be more forwarded in this way in a few minutes than in as many days of the ordinary letter-writing. If well managed, a builders' exchange undoubtedly assists in raising or keeping up the quality of workmanship among the local mechanics, as where the best builders are in daily communication, the discussion of current work sure to be carried on serves both as a guide and incentive to those who wish to excel in their profession; while those who would be capable of doing bad work, if they were sure of not being found out, fear, with reason, the criticisms of the exchange assemblages; and, considered simply as a device for promoting the interests of its own members, such an exchange offers considerable advantages in the publicity which it generally gives to the competing offers for contracts in the market, as well as in the opportunity which it affords for mutual support in cases of difficulties which an isolated individual could hardly meet successfully.

A RECENT number of the *Builder* contains a description of a typical Indian house, similar to those which still form the ordinary habitation of all well-to-do persons in the most polished and aristocratic country in the world. According to this account, which is accompanied with a plan, drawn by a Hindoo draughtsman, the entrance to the ordinary Indian dwelling is preceded by a narrow portico, the columns of which carry the front of the upper stories. The portico serves in the

daytime as a lounging place for the men of the household, and at night is left either to the lower servants, or to the beggars, who are generally allowed to sleep there. The main entrance opens in the middle of the portico, giving access to a spacious hall, and through this to an open court beyond, occupying the whole width of the house. The hall, if the owner is a mechanic or artisan, serves as his workshop; or if not, is used as a servants' dining-room and store-room, except on occasion of weddings or special festivities, when it is cleared for the reception of guests. On each side of the entrance-hall is a small room. That on the left hand is occupied either by the guard, or, in these peaceful times, by the oldest male member of the family, to whose infirmities a bedroom on the ground-floor is generally grateful, while his age and discretion make him of service in keeping watch over the entrance-hall and the stairs, which ascend from the court, close to the inner door of his apartment. The room on the right hand of the entrance-hall serves as the lavatory, and is furnished with washing utensils and a latrine. Both these rooms have an inner door on the court, which forms the vestibule to all the rest of the house.

THIS court is in arrangement almost exactly similar to the Roman impluvium, being open to the sky, and having a sunken basin in the middle, surrounded by a colonnade. Under the basin a cistern is sometimes constructed, in which the water which falls into the court is collected; but in most instances a well is sunk in the basin, which is then simply drained to the outside of the house, and serves as a bathing place. The colonnade which surrounds the basin is, like the Roman peristylum, the family meeting place, where religious ceremonies take place, and much of the household work is done. Behind the courtyard is a large room for the domestic occupations which cannot conveniently be pursued in the peristyle; and a small kitchen and two store-rooms open out of this. The remaining space is devoted to a small square apartment, opening from the peristyle, where the images of the gods are placed. The rear portion of the second story, approached by a separate staircase from the court, is occupied by the apartments of the unmarried ladies of the family. A balcony opens on the court in front of these, stopping at each end against the wall of a bedroom. These bedrooms are built over the side passages of the peristyle, and through them is the only direct communication between the women's portion of the second story and the front part, which contains the divan-khanna, or main reception-room, occupying the whole width of the house, and furnished with a raised dais around three sides. Near the middle of the reception-room is a fountain, supplied by a cistern placed in the story above. This upper story is divided into small sleeping-rooms, and a sort of garret above, in the air-space under the roof, gives room for storage. The stairs are in all cases very differently managed from those of European houses, being usually mere step-ladders, set in certain definite positions, but made so light that they can be drawn up entirely out of reach in times of danger.

A RECENT decree has taken away the privilege which until now has been conceded to the official ateliers of the Ecole des Beaux-Arts at Paris, of receiving pupils in preparation for entering the school; and henceforth no one will be admitted to the official ateliers who has not been regularly admitted to the school. This change will be a matter of some importance to Americans, who are very apt to need six months or a year's study after arriving in Paris, before they are qualified to pass the entrance examinations. This regulation does not seem to apply to the ateliers which are outside of the school, although licensed to receive its students as pupils; but an effort has been made to abolish all instruction in outside ateliers, and it seems very likely that before many years the instruction given to matriculated students will be kept entirely distinct from that appropriated to candidates for admission. There would probably be an advantage in this, since young students, although they profit in some respects, lose in others, by association with men of superior skill; and the latter, who have little to gain by working side by side with beginners, suffer from being deprived of the attention of their masters which the beginners are so importunate in demanding; and if the change should be made, preparatory ateliers would soon be opened to receive the aspirants who might be shut out of the regular ateliers. One of these preparatory ateliers has, in fact, already been established, and may, perhaps, become, later, familiar to many of our compatriots.

ON THE COLOR OF VENETIAN MONUMENTS.¹—II.

THE Porta della Carta, though in harmony with the above-mentioned façade, was an entirely new conception, for here the father and son, Zuse and Bartolomeo Bon *sajapiera* (stonecutters) as they called themselves, were left comparatively untrammelled and permitted to follow their own ideas. They made a slight use of colored marbles, facing the panels of the basement with verd-antique, carving in red broccatello other portions, and alternating with colored lozenges the small lions' heads which surrounded the door and the archivolt. Only slight traces of azure are left at the tops of the doorway, in the incisions of the shell-like decorations; much gold was lavished on the foliage crowning the archivolt, on other members of the architecture, and in ornamenting the vestments of the statues, and their swords, balances, cups, and other symbols. The lion before which the Doge Foscari was represented kneeling was also gilded, as it appears in the picture by Gentile Bellini, in the Academy. During this period the correspondence is clearly seen between the lavish employment of gold and color and the profusion of sculptured ornament, each showing an attempt to substitute for the purity and delicacy of the refined decoration of an earlier epoch, a loose intemperance fitted to gratify a more sensuous taste.

The evidences of the alternation of the successive steps in the decline of Gothic art with those of the development of that of the Renaissance declare themselves decidedly in the first half of the fifteenth century, but the substitution of the latter for the former art took place so gradually that it continued to be called Gothic long after it had lost the Gothic spirit and retained only something of the Gothic form, as in the pointed arch and other architectural elements, which, though furnishing the general observer with an index to the character of the architectural form, give us no assurance of the preservation of the architectural spirit. The arch opposite the foot of the Giant's Staircase is round, but its mouldings and polished voussours of white and red are such as would belong to the time of Foscari, who caused it to be erected. In front of it, at the head of the same staircase, the façade, though in the spirit of the purest Renaissance, has the pointed arch throughout the *loggia* on the first floor to bring it into correspondence with the Gothic *loggia* on the other two sides of the court. The resemblance, however, is not so close but that a glance at the capitals of the former will show that they are repetitions of the same model, which repetitions were never made during the period of the pointed arches.

These instances of the fallability of the arch as an index are not, perhaps, the best, but as being the most available may be cited to show that architectural forms, though of the greatest historic value when left in their original state, do not, when reproduced in a drawing, a model, or a restoration, always present the most important quality of that architecture. Hence after 1450, the pointed arch, though sometimes employed, does not by any means stamp the character of the architecture as Gothic, as the round arch being used before that date does now imply that the architecture could be entitled Renaissance. Still less will architecture of our own day, though employing the arches of all those nations, furnish posterity with any monuments of Roman, Byzantine, Arabic or Gothic art. In these cases, when old forms are re-employed, the work can only remain as a monument of the industrial spirit of our times; when, however, the soul of an artist animates the architect, and his spirit as well as his hand is employed, the result will be both his own and the product of his time; such an intimate relation between the author and the epoch will impart to the work a character which will surely make it as original to succeeding ages.

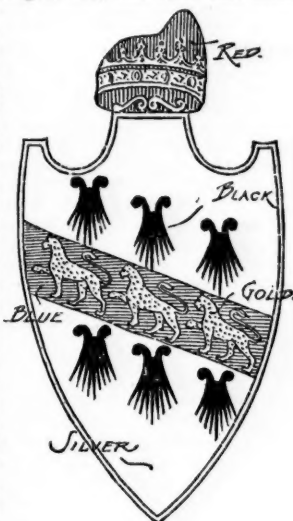
Early Renaissance architecture is found in full development in the great Lombardesque façade on the court of the Ducal Palace. As in the case of the interior, the architecture of this portion of the building must also be divided into two periods, because, though that of the second is a continuation of almost the identical forms of the first, and the interval of time between the two periods brief, some changes took place in the art feeling of the time, and changes of such a nature always reveal themselves on the sculptured pages on which we read the history of human sentiment.

Particular attention should be given to this façade, which marks the climax and the first indications of decline in Renaissance art, because with the beginning of this decadence disappeared the last traces of color decoration in architecture.

In the year 1483 the side of the Palace last spoken of was destroyed

¹ A paper by Signor G. Boni, for several years employed on the restoration of the Ducal Palace, Venice. Continued from page 185, No. 431.

by fire, and its reconstruction, in accordance with the taste of the time, was soon after begun by Bregno, who, with other able architects, erected that portion approached by the Giant's Staircase, as far as that point of the lower arcade marked by the shield of Barbarigo. Raising the eye to this first section, easily recognizable by the atticus on the cornice making it higher there than the rest of the façade, as is also the case with the corresponding exterior section on the canal, it may be remarked that the gorgeous and elaborate ornamentation when analyzed exhibits friezes embellished with leaves and discs of marble, the pilasters and columns flanking the windows quadrated and sculptured in graceful meanderings, and covered with the finest intaglios, while the panels between the windows are ornamented with festooned garlands of flowers and fruits and circular medallions of colored marble. Examining more closely one of the pilasters, its delicate foliage



and bas-relief seem detached from their background, which is left sometimes with a slightly rough-hammered surface, while the ornaments are always smoothed or chisel-veined, and the mouldings of the quadratures have polished facets; both ornaments and facets being originally gilded. Traces of the gilding are still to be found where it was protected by any projection, and although gold does not now appear on any unprotected portion of the façade, there remains, however, in many places the violet tint of the mordant. This violet tint, as well as the traces of gilding, show that the precious metal was only employed on the foliage and other sculptured decorations, and on the polished facets of the contour; never on the background surfaces, neither, as appears from observation, have these latter been colored in any manner. Though backgrounds in some of the finest works of the Renaissance were polished, they were left rough in the present instance, in order to increase the relief of the polished ornament. In the frieze of the same façade, the sea-horses and the capricorns, with the curled foliated extremities, were gilded, the inlaid discs of Oriental marble, porphyry of the most beautiful tint, and the rosy Egyptian granite—all these gave the frieze a resemblance to a girdle of the finest golden lace besprinkled with sparkling gems.

There is no doubt that in the rich decoration of the churches and palaces of the Renaissance gold bore its proportional share. The Scuola di S. Marco in this respect must have surpassed them all. This structure and many other ecclesiastical buildings and the Renaissance palaces, if they have now lost the ephemeral gleam of the gold, still preserve the infinite grace of the sculptures and the lasting richness of the marble facings. Worthy of particular remark is the small Ca' Dario, on the Grand Canal, the dwelling of an unpretending Venetian of the fifteenth century; the façade of this palace is completely covered with purple-veined *pavonazzetto*, flecked with discs of porphyry, serpentine, and verd-antique—discs sometimes circumscribed by a sculptured wreath and isolated, in other cases combined into varied groups by the interwindings of the surrounding wreaths.

Scarpagnino, the architect who resumed, in 1546, and brought to a termination the rebuilding of the façade on the court of the Ducal Palace, suspended for a few years, did nothing more than to continue the cornices as already begun, adopting for the contours of all his windows a repetition of only one of the original designs, and preparing the incisions to contain the marble slabs, making every effort, in fact, to so closely conform his work to that portion previously built that, when seen from a distance, the one should not be distinguished from the other. After such a short lapse of time, accuracy in the direct copying of the mouldings and other architectural parts would seem to be possible, but the close observer may perceive that the stone under the hand of Scarpagnino does not appear to have been so obedient to the chisel as that of the earlier work, and it is because the architect employed his chisel simply for pay.

The slight convexities in a cornice lintel, and the vigorous life and variety in the curvatures surrounding the ovals, seem not to have been necessary or even understood in the time of Scarpagnino. His work is straight, measured, mechanical, lacking every one of those slight indications which even in the squaring of a stone show that the workman is not a machine.

The capitals of the upper stories and the panels between the windows, are only coarse reproductions of the more ancient ones, while what slight invention there is in the ornamentation of the lower story gives evidence of the degradation of the artistic spirit of the epoch.

This fading appreciation of form is attended by a corresponding abandonment of the use of color; there is not a trace of gold on the ornaments, not a piece of porphyry, or of marble, or of any colored stone. Since that period architectural monuments have been left white. This particular evidence of degeneracy in artistic decoration is evident in the latter portion of the Ducal Palace built by Scarpagnino; it is the

first instance of the total abandonment of color, and it is a fact of sad importance in the history of art.

A little gold, a few pieces of marble upon an ancient building, may excite to-day only an archæological curiosity. In observing that the practice of employing color or any other means of artistic effort falls into disuse or loses its informing spirit at certain periods, it may appear to many that this decay belongs to that natural order which brings about the fading of the flower or the fall of the autumn leaf. On the contrary, this phenomenon has been most unnatural. The flower fades and the leaf falls, only to be reproduced the succeeding year. The interval of Nature is regular and equal, while the periods of lethargy between the triumphant eras of art have been at each recurrence longer and more profound. It would rather seem to be a paralysis of the sense of color, one of the noblest sources of human enjoyment, educated and developed through so many generations, under all conditions of nationality and climate, exhibited through a continuous chain of manifestations—a chain emerging from the obscurity of a primitive age, and which, unbroken by repeated catastrophes, we can trace, link by link, down to the classical Renaissance of the sixteenth century when it is suddenly and rudely torn from our hands. For the Classicists the sky is not blue, nor the grass green, nor the flowers red—idolators of a nation which had been dead more than a thousand years, they collected together its whitened bones, and, recomposing them as well as they could, destroyed so many monuments of mediæval art, in order to plant in their stead, with about the same variety among them as is found in a succession of mile-stones on the public highway, the pale *simulacra* of ancient Rome.

For the last three centuries much the same course has been followed in the exclusion of color from architecture, but at least in the monuments, the effects of light and shade have been to a certain extent considered; much worse has been done in our own day, because, without giving anything in compensation, worse than destroying them, too many of the artistic creations of past ages have been profaned and falsified by improper restoration and substitution. The life of centuries which palpitated in them, and would not entirely abandon them as long as a single stone remained in its place, is extinguished, and as if through the vengeance of their tutelary deities, they remain, in the hands of the sacrilegious, cold and colorless as a statue of salt.

RECENT BOOKS ON ART.¹



THE ALAMEDA FOUNTAIN, MALAGA.

—Sculpted from Phototype—A. D. D. London.

the whole history should be rewritten—conceived from a somewhat different point of view, and based upon somewhat different ideas from those which had hitherto prevailed. It is a matter of just pride that the first such history that has appeared should have come from an American scholar, and it is still more gratifying that it should be of so satisfactory a character. An ideal history it is not, but its good qualities so far out-balance its defects that it seems almost ungrateful to dwell upon these last.

In many ways Mrs. Mitchell was peculiarly fitted for the task she undertook. She had lived in the East, and studied ancient art in its own home; and for many subsequent years she pursued her examinations in the museums of Europe, inspiring the confidence and securing the help of many of the foremost archæologists of the day; and her book

itself proves that she was endowed with the immense patience and fairmindedness which are indispensable to the prosecution of such a task. Her faith is pinned more firmly upon German savants than upon those of other countries, but even when she follows them to conclusions that do not seem quite justifiable,—that savor a little of the imaginative license which often marks German scholarship when it leaves the path of strict investigation for that of theorizing, we feel that she does not thus follow in a blind fashion, but after due consideration of the monuments themselves. What we find most fault with in her book is its voluminousness. So great has been her interest in the subject that she has sometimes forgotten the needs of the audience for which she writes. She strays very often into outside considerations—historical, mythological and traditional—which are of interest to specialists only; and here she makes mistakes (I am told by those better qualified to judge than I pretend to be myself) which injure the value of her paragraphs for these initiated few. It would have been better, it seems to me, had she confined herself more entirely to the art she professes to treat, giving only so much commentary of other sorts as was needed to make the subject intelligible. The diminution in the bulk of her volume that would thus have been obtained would doubtless have added to its usefulness.

A true history of ancient sculpture, moreover, her work is not. Such a grasp of the subject in its entirety as Messrs. Perrot and Chipiez, for example, exhibit in their analogous work Mrs. Mitchell does not show. What she gives us is rather a *catalogue raisonné* of all the remains of ancient art which exist to-day, or which are mentioned in the ancient writers, with descriptions more or less full as the materials permit. It is not, therefore, what one would call a very "interesting" work if one reads it through from cover to cover—particularly as Mrs. Mitchell's style, though clear and sensible, has no special literary grace or charm; but as a book of reference, a volume to which we may turn for a full account of any ancient work of sculpture that we have preserved to us to-day, or for such knowledge as can be gleaned from classic writers of those others which are lost to the world, its value is very great. With all its general conclusions we may not perfectly agree, but with the majority of which we must; and the detailed descriptions cannot be paralleled in any similar work destined for the popular eye—neither in their fulness, nor, in the great majority of cases, in their accuracy. Naturally, the chapters to which we turn with most eager interest are those which treat of the periods to which I have above referred—those which tell about the recent discoveries at Pergamon and Olympia. These "finds" are here for the first time introduced in an adequate, intelligent and instructive fashion to the English-speaking reader.

Illustrations naturally play a large part in a work of this sort. Those in Mrs. Mitchell's book are numerous enough, but vary greatly in value. It will be remembered that she wrote a few years ago several chapters on the same subject for the *Century Magazine*. The admirable wood-cuts then used have mostly been reissued here, and with the exception of the six phototype plates, are much the most satisfactory of all. They are supplemented by others prepared in Germany, in which a visible effort has been made to follow American examples, and secure texture and "effect," as well as form—an effort which has not, however, in the majority of cases been crowned with success. Among the remaining simple cuts some are fairly good; others, reproduced from time-honored (and time-worn) plates, often put to service in other works, are distinctly bad and misleading, and an almost inexcusable blot in a volume of this importance. The phototype plates are both truthful and beautiful. I may add that Mrs. Mitchell has also prepared an atlas containing a number of other similar plates, which further elucidate her text, and reproduce for the first time in this country many of the finest among recently-discovered sculptures. There is still place on our shelves for another work which shall be more sympathetic, and less simply analytic in form than this; but meanwhile Mrs. Mitchell's is absolutely indispensable to all students of ancient art.

Mr. Armitage is one of the most widely known, and in his own country one of the most popular of the elder, more conventional, as opposed to the younger or "Grosvenor-Gallery" school, of English painters. For six years he held the post of lecturer to the Royal Academy, and this book² is a reprint of selections from his official discourses. One opens it, therefore, with the expectation of finding much that is sensible, instructive and valuable, if not necessarily much that is original or fascinating; but even the most modest expectations are grievously disappointed. One ceases to wonder, after it is perused, that Royal Academy students do not more often make good painters, if this is a type of the theoretical pabulum offered them, and if their practical instruction is not more sound and to the point.

The most immediately noticeable but not the chief defect of the volume is its fragmentary character. It begins with a chapter on antique costume, which is well enough in its way, but contains nothing that cannot be found in a hundred other places. Then begins a series of historical lectures, of which we are given the first, on Byzantine and Romanesque art, and then the final ones on the painters in the eighteenth century, and of our own. The intermediate lectures are entirely omitted, because the author thinks they would not be intelligible without more illustrations than he (or his publisher) could supply. Then comes a series of "practical" chapters on technical themes, such as color, composition, choice of subject, etc. A book

¹ *A History of Ancient Sculpture*, by Lucy C. Mitchell, with numerous illustrations, including six plates in phototype. New York: Dodd, Mead & Co. 1883.

² *Lectures on Painting*, delivered to the students of the Royal Academy, by Edward Armitage, R. A. New York: G. P. Putnam's Sons. 1883.

composed in this fragmentary fashion would needs consist, to justify its publication, of fragments of a very excellent sort; but, as I have said, its fragmentariness is its least defect. There is more that is good in the practical than in the historical chapters—but this is not saying there is much, since these last are positive curiosities for the want of insight, of judgment, and of taste, and of a true theoretical standpoint they exhibit. Mr. Armitage is extremely honest and uncompromising in his statements—quite unaffected by the popular verdict of the day, or even by the accumulated verdict of the centuries behind us. He speaks his mind freely with regard to the greatest as well as the humblest reputations. Such a course is, I admit, theoretically praiseworthy; but in this instance it is practically unfortunate. Mr. Armitage speaks very briefly and positively. He gives no general view of what in his estimation are the qualities which go to make great art, nor in special cases does he explain the reasons which lead him to judge differently from all the world beside. In most cases he merely says, "I like this and I do not like that;" and his likings and dislikings are such, I repeat, as to prove him quite unqualified for the task he undertakes. His dislikings, by the way, are far more numerous than his likings, and include not only most modern Continental masters but the few earlier names he mentions. Our curiosity is excited to know how he must have dealt with the great historic periods he omits, and with their greatest names, since his condemnation falls so strongly upon the few of those whom he incidentally mentions—our curiosity, but nothing more, for we are quite convinced we should gain nothing of value from the perusal of the missing chapters. A man who calls Cotes, Dance and Ramsey "portrait painters who have fully as good a right to celebrity as Gainsborough"; who "confesses that he cannot appreciate the art of Corot and Daubigny," but classes them with Fortuny and Regnault among the "eccentric painters," who have "unsettled" the public taste; who sees nothing in Fortuny's art but eccentricity, and ranks Meissonier as an artist far above him; who gives praise to Fuseli for the great imaginative qualities which he denies to Blake; who thinks it necessary to explain that it is "as the father of modern art rather than as a perfect painter—that the name of Giotto ought to be held in reverence"—does not impress us as a very intelligent guide. Of Ingres, again he says, that his portraits "are fine works of art, but want life." If they did want life would they be "fine works of art?" The fact is they are full of that life which was lacking to his other compositions, and are surer of immortality than anything else he painted. So it is throughout. Even where a child could hardly go astray Mr. Armitage manages to be original at the expense of truth and simple common sense. Nor is he better when he traces the history of the modern school in France; its great names he takes up one after another with but small appreciation of their *historical* as apart from their intrinsic importance, with no teaching to show the reader how the different phases of classicism, romanticism and realism came about, or who were their first professors. I might go on forever quoting instances of a similar want of discernment, but will close with a dictum that will show the author's facility in getting the cart before the horse when general principles are in question. "The first quality in the pictorial rendering of a subject," he says, "must be truth, the second novelty or originality, and the third poetry or feeling. Where these three qualities are combined in a picture it will more than hold its own in the eyes of competent judges against works far more brilliantly executed." I think most people who have thought upon the subject, and have studied the testimony of time-honored works will agree with me that the first necessity in a picture is that it should be well painted—brilliantly if possible, but skilfully at all events; the next that it should have feeling—not "poetry" of a literary sort, of course, and that "novelty" is of minor importance. Yet what a prominent place it is given by this writer who condemns the Frenchmen for "eccentricity." The interpretation of the word "truth" admits of such wide latitude that I can hardly fix its place in the list. Truth of an artistic sort is a prime and most necessary factor, of course, and involved in all the others, but the prosaic, literal sort of "truth," which is what Mr. Armitage in common with most Englishmen evidently means, is a thing with which art has less concern than he imagines.

But, after all, the chief fault of Mr. Armitage as a teacher is his want of enthusiasm in any direction. We gather from his pages many hints as to what he dislikes, but few, I may repeat, as to any admiration he may have for any painter, past or present. Surely an inartistic temperament—and one which distinctly unfits him for being a helpful teacher. Nothing could be more childishly inadequate than his treatment of this period, of which he says, "I question very much whether the revival of art would not have been very much more rapid and complete (what does he mean by complete? was the Italian Renaissance incomplete?) had the Byzantine school never existed."

But even his condemnation of all earlier work does not open his eyes to the value of the new impulse given by Cimabue; he says that his famous Madonna was better than preceding work, "but I cannot understand the enthusiasm of the Florentines." Altogether the book, considering the position of the author, is one of the most curiously inadequate it has ever been my fortune to consult. Indeed, one would say the same even were his profession and position left entirely out of sight, even were he an unknown lay critic making his first attempt in print.

M. G. VAN RENSSSELAER.

AN ANTIQUE BUT UNDATED ITEM.—Cannot this item be dated and then buried. "A paper chimney fifty feet high has been erected at Breslau." It has done duty for many years.

SOME NINETEENTH-CENTURY ARCHITECTS.—II.

The author, Mr. Barry, is a native of Germany, and is now in England.



SIR CHARLES BARRY.—Sir Charles Barry ought to be ranked as the foremost architect, at least

in Great Britain, and possibly in Europe, of the present century. No other man has had so great an opportunity in England in our time as he, and I think no other man has made such good use of his opportunities, great

or small, as he made of almost every opening for his talents that was presented to him. In other words, I claim for Barry that he had the most difficult single work to carry out which has risen, and that he succeeded not only as well, but better than other men have succeeded in less arduous tasks; and that, in addition to this, he has left fewer failures, and a larger proportion of highly finished and admirable performances—apart altogether from the Palace of Westminster—than any English architect of our day.

Probably the two greatest undertakings that an architect can encounter are a church of the dimensions and dignity of a great cathedral, and a secular building of the first importance. Of the two the cathedral may, no doubt, be the higher work of art; but the difficulties of its architect are wonderfully lessened by the fact that it is a product, not of this age, but of some fifteen centuries of continuous unbroken traditions and effect. Limitations even, when they are irksome ones, act as a guide to the architect, and the best designed buildings have probably always been those where site or use prescribed many conditions which it was impossible to escape from, and the worst those where the architect has absolute *carte blanche*. The architect of a great secular building has often little or nothing by way of precedent to guide him. The requirements are modern ones; the scale of expenditure is dictated by the resources of communities whose wealth has been amassed since the invention of steam; and so the designer of a parliament-house or a palace-of-justice has to originate the *idea* of his building as well as its features, to an extent which is not required of, or is indeed impossible to, him who designs a cathedral.

Barry was blessed with genius and strong will, a sound constitution, a fertile invention, great constructive ingenuity, and that combination of fine qualities, natural and acquired, of taste, eye and hand which go to make an accomplished designer and draughtsman. He had few advantages in the way of early education, but had a long and probably very useful apprenticeship in an office where much of the more prosaic detail of surveyor's work fell to his lot, as well as pure architecture. He inherited a little money at the time when he could best use it, and wisely spent it in a prolonged period of study on the Continent. He was absent more than three years, and travelled and studied during that time in France, Italy, Greece, Turkey, Egypt, Palestine, and Syria; and thus his preparation for professional life extended over no less than ten years, from the age of fifteen to that of twenty-five; a commentary on the notion now not unusually entertained that three years in an office are amply sufficient preparation for the arduous and complicated duties of an architect's profession.

In the early period of his practice Barry built several churches which were not much in advance of the imperfect Gothic of sixty years ago; but in 1824 the Royal Institution at Manchester, from a refined Renaissance design, and one of the works which shows the peculiar bent of his genius, was erected; and in 1829 the Traveller's Club-House, a comparatively small but very successful work in Italian Renaissance, was gained in limited competition. The Pall Mall front of this design was more or less based on the Pandolfini Palace, in Florence, but the beautiful garden front was strikingly original, and the plan is as happy a composition as any architect could desire to produce. After this success there is no doubt that private commissions, with from time to time a public work, would have continued to occupy Barry; and the way in which they were discharged would have marked him out as distinguished among his contemporaries for skill in design, refinement of detail, and cleverness in planning, even had no great opportunity presented itself. But such a chance came to Barry as no one since Wren's day has enjoyed. The Houses of Parliament were destroyed by fire on October 16, 1834, and after various delays a public competition was instituted, with the result that Barry's design was accepted in 1836, and the work actually began in the following year. From that period to his death in May, 1860, he was constantly at work on this great undertaking, which was all but completed at his death. The long period of nearly, if not quite a quarter of a century, during which his active mind and pencil were busy on this building, allowed time for not a little recasting of the design; and though I believe it may be said that the plan was never varied in any essential feature, the treatment gradually changed from Elizabethan to Tudor, and a far greater degree of richness than had been at first thought of was introduced.

The works at Westminster became a real school of art. Barry had

¹ A paper read by Professor T. Roger Smith, at a meeting of the Leeds Society of Architects, and published in the *Architect*. Continued from page 189, No. 434.

the talent (indispensable to the man who would do a great work well) of getting round him men of ability and power as assistants, and he knew how to trust them. Pugin's engagement led to the formation of a kind of museum of works of Tudor decorative art, and many carvers in wood and stone and workers in metal got their best art training in the workshops at Westminster. Mr. Thomas, who looked after the stone-carvers, was a sculptor of the highest talent. Pugin, as we have already seen, directed the wood-carving, metal-work, and stained-glass; and men of unusual ability were found to fill the posts of clerks-of-the-works. The long and unhappy controversy with Dr. Reid, who was to have arranged the ventilation, and did not, and many other disputes and troubles which are now happily forgotten, arose in the course of the undertaking. No doubt for some of these Barry was to blame. He was constantly improving the building, and this means constant change; and, though the result of his efforts was an immense advance upon original ideas, there were many bitter complaints about expense and delay; indeed, it is not too much to say that these complaints and the publicity given them tended for years to render the position of other architects engaged on other works more difficult, and made their relations with their clients less confidential than would have been otherwise the case. A curious and unfortunate result of the great length of time which elapsed was a change in public taste, or at least in fashion, which interfered very much with the due appreciation of this fine building as it approached completion. In 1834 Tudor was quite the fashion, and that portion of the public who cared for architecture, and those architects who practised Gothic, were pretty generally agreed in its favor. Long before 1860, however, the general taste had gone back from Tudor to Decorated, and from Decorated to, or towards, Early English, so that I well remember being told gravely by a man, now of great eminence, that he did not consider the Palace of Westminster Gothic at all!

There can, however, be no doubt that the influence, direct and indirect, of this great work was extremely powerful and lasting, and that the perfection with which it was wrought out has contributed materially to that influence. The architect has shown himself master of his work, and whether we regard the splendid plan, the general design, the varied sky-line, the beauty of the towers, or the high finish of the detail, we have a building of which England may be proud, and one which fortunately is designed in a style more entirely and peculiarly English than any that either preceded or followed it.

Of Barry's other works only the most prominent can be mentioned. He gained the Reformed Club in a limited competition, and at a later period he built, not far from it, Bridgewater House. In London he also erected the Treasury and the College of Surgeons, and these buildings, with those above-mentioned, form his chief record in the metropolis. Out of London there are several princely mansions, such as Cliefden and Clumber, and several public buildings, such as Birmingham Grammar School, and his last and most florid Renaissance work, the richly-ornamented Town-Hall at Halifax, to bear witness to his skill.

My personal recollections of Sir Charles are confined to seeing him occasionally at the Institute, where, however, I do not think he often took much part in what was going on, and to one interview from which I came away a good deal impressed with the strong impenetrable manner of the man. I remember well feeling that if one had wanted to persuade him one might as well have talked to a stone wall; and yet it is stated that Barry was very accessible to the advice, and valued highly the opinions of those on whose judgment he could rely on points of construction, and even in artistic matters. Barry published no books, but his official reports and memoranda, of which he had to prepare many, were excellent specimens of clear statement and cogent powerful reasoning in good clear English. He was buried in Westminster Abbey, as were also Scott and Street, and the first time that a flag was raised on the newly-erected flag-staff on the summit of the Victoria Tower of this great work, was when it was hoisted half-mast high on occasion of the architect's funeral.

Sir William Tite. — The names of some other architects who practised chiefly in the Classic styles must be passed over with rapidity. Among them were Sir Robert Smirke and Sydney Smirke, with neither of whom was I ever brought into contact, and Sir William Tite, a prominent figure in London professional life for many years. Tite was an excellent man of business, and made a large fortune, much of it, however, being gained by work in connection with sales and purchases of land, and railway compensation cases. He had the reputation of being a dangerous opponent and a firm friend. He was a man who was proud of his profession, and was generous towards it; and his position as an influential member of Parliament enabled him now and then to stand up for architects and architecture. A tall man — but not handsome — strongly built, with deep lines in his face, a strong voice, he had a singular power of removing all expression from his countenance if he was hearing things he did not agree with; but he could show himself genial, courteous, and kind when business was over. His best and best-known work was the Royal Exchange, which he obtained in competition, the choice having ultimately lain between his design and a very beautiful one by Professor Cockerell.

Owen Jones. — Owen Jones, whose name was at one time constantly associated with that of Digby Wyatt, was an artist in the truest sense of the term, and one of the first architects of his day, if abilities are to be taken as a test. He was a highly-educated and accomplished man, and spent, while a young man, much time and no small sum of money in studying and making known to the public the decorations

of the Alhambra Palace in Spain. His volume on this building is one of the few fine architectural publications that this country has produced, and its publication made a fame and a position for its author. The Great Exhibition furnished him an opportunity for becoming famous, since he designed and successfully carried out the simple but telling decorations it received; he also planned all the plotting of the space in the building. The success of his coloring led to no small amount of decorative work, and to a great development of other sorts of occupation in connection with the Sydenham Crystal Palace. Owen Jones built the St. James's Hall in London, one of the most original interiors of modern times, and one of the most successful of music-rooms. But though a good deal of work, some of it of an interesting character, passed through his hands, several of his best designs were unsuccessful. He had a very thorough knowledge of the qualities of iron, and far better ideas of how to treat it so as to make it effective than most architects, and he designed a magnificent iron building to stand where the ill-starred Alexandra Palace now stands, and another for erection at Saint Cloud, neither of which, it is hardly necessary to say, ever was carried out. Owen Jones was one of the men with a logical mind who think out the matters to which they turn their attention thoroughly, reduce them to the first principles, and thus can attain something like absolute certainty where common minds cannot get beyond a vague notion. He thoroughly knew what he wanted to arrive at, what means to employ, and what the result of these means would be; and he was thus able to go to work with a directness which gave him preponderating influence. He was a man of striking personal appearance, of very courteous manners and rather retiring disposition; he was a great ornament to our profession, and by his practice and his writings, which though few and short, were cogent, he helped not a little to advance the use of colored decoration and the right understanding of the principles upon which it should be designed.

The name of Sir Digby Wyatt, whom we reached a moment ago, recalls another set of associations besides those connecting him with Owen Jones. He was one of the examiners in the first Voluntary Examination. The rule which I have laid down for myself prevents my going into the history of all that preceded that event, one of great importance to our profession, for, happily, several of those who carried on the movement which led up to it are still living among us; and without referring to them, and above all, to my friend and predecessor at University College, who, as honorary secretary of the Institute, made the examinations possible, the story could not be told. Of the five architects, however, who actually conducted that examination (which took place in 1863) the speaker is, alas! the only one left. The three examiners were Sir Gilbert Scott, Sir Digby Wyatt, and Mr. Arthur Ashpitel; the two moderators, Mr. John W. Papworth and Thomas Roger Smith. Let me say a word or two about Ashpitel and Papworth, as, unlike Wyatt and Scott, they might hardly on other grounds enter into our enumeration.

J. Papworth. — Mr. John Papworth was a man of extensive attainments, a vast power of work, and an energetic nature. He was one of those who devoted much time and trouble to the elaboration of the scheme of examination and the preparation of the comprehensive list of books which once formed part of it; and he was of great service in that rather troublesome duty, for he shrank from no amount of trouble or pains. There was nothing connected with architecture which he did not know, or, at any rate, did not know about, so that on any subject he could either furnish the information required or tell where it must be sought for. In many matters, such as the work of the Architectural Publication Society and of the Institute, especially in connection with the formation of our library, he rendered essential but unobtrusive service to our profession, and many who knew him will consider that his name ought to have a place among our worthies.

Arthur Ashpitel. — Arthur Ashpitel, affectionately known for many years and in many circles as "dear old Ashpitel," was a remarkable man. Concealed under the exterior of a sturdy, unimpressible-looking, John-Bullish Englishman — conspicuous, however, for those never-failing tokens of something good behind, a bright eye and a massive head — lay a warm heart, a kindly nature, an elegant fancy, true wit, classic learning, and the power of a natural but not an untaught musician. In easy circumstances, and taking an interest in many things, Ashpitel did not push his practice with keenness, and did not in fact, build much; but he had a wonderful knowledge of all matters connected with materials, construction, the history of architecture, and the literature of all the arts; and his contributions to the early numbers of the Dictionary of the Architectural Publication Society, each of which goes far towards exhausting the subject on which it treats, are good witnesses to his attainments and his thoroughness. Ashpitel was the most delightful of companions and one of the most sociable of men, so that it was sometimes hard to understand when he made the time to be alone and do his work. But he did perform a great deal of that sort of work which is of essential service to the members of a liberal profession.

Sir James Pennethorne. — Sir James Pennethorne, who held for many years the appointment of architect to Her Majesty's Commissioners of Woods and Forests, was a remarkable man, little known outside London, but much employed in the metropolis. He began his career under Mr. Nash, the architect of the Brighton Pavilion (built in "Mr. Nash's positive order," a man whose talents for street improvement erected Regent Street, Carlton House Terrace, and the Regent's Park. Pennethorne was employed to form New Oxford

Street, Battersea Park, and Victoria Park, and he was the architect of some very good public buildings, such as the Museum of Practical Geology, the buildings of London University (behind Burlington House), the Record Office, the extension of Somerset House, and the Queen's ball-room at Buckingham Palace. He was a most painstaking and fastidious worker, grudging no trouble to improve and perfect his designs, and frequently recasting them. Like many other architects, Pennethorne's best design was never executed; it was for the Government Offices since built by Scott, and was one of several made by him for the Government before the competition took place. Had it been adopted, we should have to-day a far finer structure than the one actually built. Pennethorne did not mix much with his brother architects, and fancied himself unpopular, but he was the subject of a demonstration of respect which no other member of our profession, so far as I am aware, has received; for when his difficult and excellent work in the enlargement of Somerset House was completed, the architects of London subscribed, and had a gold medal struck and presented to him to testify their admiration of his work.

Mr. Walters.—Other architects of the Classic and Renaissance school were Walters, Thomson of Glasgow, Edward Barry, and F. P. Cockerell. Walters, who practised in Manchester, was a man of real genius, and has left his mark on the buildings of the great city where his chief work was done; but, if I mistake not, specimens of his skill are to be seen as far afield as Constantinople. His most considerable work was the Free Trade Hall, a building with an original but rather heavy exterior, and a fine interior, very cleverly arranged as an auditorium, and very successful. More original were the warehouses which he designed and erected, at a time when warehouses with an architectural exterior were all but unknown in Manchester; and so well did he grasp the conditions of the problem, that in all probability a sound judge of architecture examining the whole of the fine piles of such buildings now to be found in Manchester, critically, would select Walters's as the best. The only other works of his that I am familiar with, are the elegant stations which he erected for the directors of the Midland Railway on part of their line between Derby and Manchester. These are simple and unpretending, and at the same time each one of them is unmistakably an architectural work.

"Greek" Thomson.—"Greek" Thomson, as the eminent Glasgow architect was sometimes called, was a man whom I only had the opportunity to know through his works and by corresponding with him, but his buildings are so remarkable that his name seems to call for mention. He believed in the superiority of Greek architecture to every other style; he held the faith that a Greek Renaissance was as practicable as the Roman Renaissance with which we are all familiar, and he devoted his life to a practical demonstration of the soundness of his belief, for he erected in an Anglo-Greek style a large number of important buildings, the bulk of which are in Glasgow; and he suffered, I have been told, both from loss of commissions and from opposition, on account of his sturdy adherence to the lines he had laid down. He has, however, enriched Glasgow with some public buildings of the most delicate refinement, joined to vigor and originality. No one can pretend that his works are not thoroughly modern; no one can for a moment hesitate to admit that the feeling which animates them is quite Greek. They differ widely from the *néo-Grec* of France, and yet in many points they recall it. Few architects or critics will admire the whole of them; some may not admire every part of any one of them, and yet few will fail to admit that they are works of genius, that they are eminently successful, and that they include Renaissance work as beautiful as any city in Europe can show.

E. M. Barry and F. P. Cockerell.—Edward Barry and Frederick Peppys Cockerell have been too recently among us for me to be willing to say much about them. There was something of resemblance in their circumstances. Each was the gifted son of an eminent father; each was a singularly cultivated man, as well as accomplished architect; both possessed in no common degree the rare gifts of a power of conversation which made them welcome wherever they came; and in both cases a brilliant career met with a tragic ending by a sudden and unexpected death. Cockerell did not secure much public work, but the galleries of one of the water-color societies in Pall Mall East, and Freemasons' Hall, remain as sufficiently conspicuous and striking specimens of his skill; but he was much employed, and was very successful, in domestic work. He was one of the most accomplished draughtsmen of his time, and was a gallant, high-spirited gentleman—and as much artist as gentleman. Cockerell will have been known to many here as having filled the post of honorary secretary of the Institute of Architects. By many of his colleagues, and many artists of all kinds, he was regretted as a beloved and trusted friend, singularly brilliant in society, of the finest and most generous temper, and capable of doing the noblest acts in the most simple, unobtrusive manner possible. Few men, in short, have been such a loss to us as he.

Edward Barry worked with his father during the closing years of his life, and after his death completed his Halifax Town-Hall and some of his works at Westminster. Energetic and able, he sought and secured a fair share of public work, and his magnificent design for remodelling the National Gallery, which was successful in competition, but a mere fragment of which was carried out, will be remembered by many. He rebuilt Convent Garden Opera-House, and added the Floral Hall, and built the Cannon-Street and Charing-Cross Hotels. Barry, in his domestic work, introduced the beautiful Renaissance of France, of the time of Francis I, and carried out several

very successful country houses in it. He adopted the same style for his buildings belonging to the Temple, erected on the Thames Embankment. Here, however, he pushed ornament too far, and this can hardly be called one of his successful designs. Barry underwent a severe disappointment in connection with the Law Courts competition. The judges originally recommended that he and Street should be jointly employed, and after seeing this great prize within his reach he had to reconcile himself as best he could to the work being placed entirely in the hands of Mr. Street.

Edward Barry for some time held the position of Professor of Architecture at the Royal Academy, and his excellent lectures there delivered, and republished in a volume, remain as a memorial of him. His removal in the prime of life was a misfortune for our profession, and cut short a career which already had been crowned with brilliant success, and bid fair to be a prosperous and distinguished one had it been more prolonged.

THE ILLUSTRATIONS.

HOUSE FOR MR. WM. STURGIS, JR., CHEYENNE CITY, WYO. T.
MR. W. A. BATES, ARCHITECT, NEW YORK, N. Y.

SALAMANCA OLD CATHEDRAL. SKETCHED BY MR. R. W. GIBSON,
ARCHITECT, ALBANY, N. Y.

FOR description see article on "Spanish Architecture."

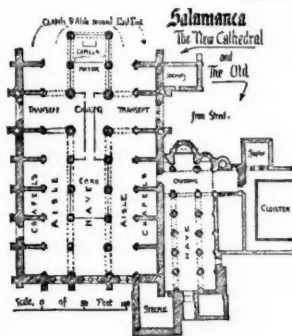
THE DUCAL PALACE, VENICE.

SEE article on "Color in Venetian Monuments."

CHAMBER OF COMMERCE BUILDING, ATLANTA, GA. MESSRS.
FAY & EICHBERG, ARCHITECTS, ATLANTA, GA.

SPANISH ARCHITECTURE.¹—XIII.

SALAMANCA.



MY portfolio was next opened at famous old Salamanca, city of noble but unfortunate history. By a zig-zag route westward from Segovia, coaching back to Arevalo, and thence over the northern railway and the branch from Medina del Campo I made the journey leisurely, breaking it at the latter place for the enjoyment of such refreshment and repose as the hotel at this important junction station offered. I use the word enjoyment advisedly; it is astonishing to what an extent that sensation is comparative, and how much of it is to be

found under circumstances not in the least propitious. With a certain elasticity of temperament, which travelling on the byways of Spain tends to foster, there are times and opportunities for reflection upon luxuries abandoned, without regret, and necessities so rarely obtained that they are promoted to the luxurious places. This was well exemplified at Arevalo where, being very hungry, I almost enjoyed a most barbarous dinner obtained by special command, and amid much ostentation in a "paradox" a few yards from the station. The "pièce de résistance" was an omelet filled with smoked cod, which smelt outrageously defunct, so the coarse steak and coarser bread received more attention, although I had to share the solitary table knife with a companion in misfortune. We did regret that there were not two knives, but this privation was more than balanced by our joy in each possessing a fork.

Medina is a small town of four or five thousand inhabitants. It is quaint, and old, and dirty. The irregular streets and big plaza are bordered by low houses, many of which have arches and piers of heavy plastered masonry supporting the upper story, so that there is an air of solidity about the tumbling dwellings, giving them some character beside that of squalor and decay.

There is a late Gothic church of no particular merit, and a very fine old brick castle, with battlemented walls and towers, and with those overhanging turrets corbelled out upon the angles, which distinguish the best period of Castilian military architecture. Medina was not all attractive as I saw it, yet I think in harvest time and autumn an artist would find much to see. The country hereabouts is not interesting; it is a grain-growing district, the land generally flat or undulating without much diversity; but the people and their belongings are old-fashioned and odd, and they do not seem to deplore or even to realize their forlorn condition, and can be as gay at times and look as happy as the most favored of their fellow creatures.

At Salamanca there is even yet, more life although this is one of those unhappy cities to which the future is nothing in comparison with the glorious past. Its population is about sixteen thousand now; in the fourteenth century, it is said, its university students alone numbered ten thousand.

¹ By Robert W. Gibson, Travelling Student of the Royal Academy. Continued from page 136, No. 430.

Its thoroughfares are narrow and crooked, as might be expected, and its street-plan shows no evidence of anything but chance in its arrangement (or rather absence of arrangement) for public benefit; but here we are far enough away from rectangular blocks to be able to exist without them, and, to tell the truth, there is a sufficiency of order in certain squares and places to impress the idea that Salamanca is a city, and was a superb one. The Plaza Mayor is very striking, and more than that, it is useful and beautiful at the same time. A large square surrounded by buildings of uniform character—these were designed together as a single subject—always has a certain dignity.

This one is very large. It has arcades all around on the first story, and within these, under the second floors of the houses, are the footways; cool and shadowy in summer, dry and sheltered in winter, appreciated in both seasons by the citizens. The upper parts of the façades are of good design for their date (A. D. 1700), and additional interest is lent them by a series of busts of monarchs. All the streets entering upon the plaza do so by large arches beneath the buildings, so that the cornices and other upper lines are continuous and unbroken, and this is perhaps the chief of the good points in its arrangement. A public garden, with neatly-trimmed hedges and inviting seats occupied the middle space within the roadway when I was there; but the square like many others in Spain has frequently undergone vicissitudes of most varied kinds. In Spain the *plaza mayor* is the rendezvous of the citizens; it is there they assemble to foment revolutions or to celebrate festivals. In the good old days the plaza was the favored scene for the burning of heretics and execution of criminals. Even within twenty years the plaza at Salamanca has been transformed into a noble amphitheatre for bull-fighting, so we need not expect to find trees or any very permanent growths here.

There are several other open squares of considerable size, but none of them are of note. The buildings upon them, when they are interesting, are usually so individually, and there are innumerable buildings of this class scattered in almost every part of the city, and lending interest to its streets. Foremost among them stand the cathedrals,—there are two, the "old," a modest monument of the purity of the earliest Gothic, and the "new," overshadowing and almost hiding the other,—a vast example of the later inartistic but skillful ambition. The old cathedral is of the first half of the twelfth century. The town was in the power of the Moors until 1055, when the Spaniards reconquered it and re-established its importance as a Christian city. Soon afterward (1102) Bishop Gerónimo caused the cathedral to be built. Gerónimo was a Frenchman by birth, from Périgord, and it is undoubtedly true that the style which it exemplifies was affected by his influence. It is very similar to buildings of the same age in France, and it is natural that certain details and methods should have been affected by the connection; but some value attaches to the fact that it is a logical development of the style of San Vincente at Avila, already commenced. Whether this, too, was indebted to French precedent is another question: it seems most probable. The Romans had been in Spain as well as in France, and the Spaniards had a similar inheritance from which to evolve a new style; but they did very little, indeed, in this direction. Their race is one strangely deficient in the creative faculty, and the Moorish wars and influence engaged their attention, almost monopolized it, in fact; so that the Spanish people did less than even the inartistic Saxons in Britain, who had some beginnings established when the Normans imported their examples. Nevertheless, the style brought from France was simply one very like that the Spaniards had begun, or would have developed under similar circumstances. It was not a pure exotic. It was only the solution presented to them before they had worked out the problem. Once introduced the style was speedily given some new characteristics in successive examples, each one accumulating them upon the last. So it seems to me that Salamanca's old cathedral may fairly be called Spanish, early as it is. I feel assured that if, instead of a French-born bishop, there had been a native Castilian the style would have been the same, viz., the first period of Gothic, with pointed arches instead of round, and a few more mouldings than had been hitherto used, which modified the Romanesque without causing any actual break in its growth. It is a grand style. It will perhaps be hard to believe, yet it is true, that the older interior, 70' x 170' or less is quite as impressive as the newer, which measures 160' x 340'. The sketch-plan given above will better show the great difference between the two buildings in respect to size. If the old work had been as great and costly as the other it would be a marvellous monument. The pillars are grouped piers and shafts, the smaller shafts supporting the diagonal ribs in pleasing contrast with the larger ones. The massy round bases are perhaps a trifle crude here, but it is hard to say so. The carved capitals are splendid studies of simplicity in richness. The arches are quite plain, with square edges, yet look extremely well, and quite without any effect of bareness or clumsiness. They are heavy, it is true, but there is strength and grace as well as weight in their expression.

There is no triforium, and I think this is the only church of this kind which seems to be complete without it. I hardly know why. There is unusually fine proportion in the lines of the main arches of the vault and their shafts down to the floor, and the side arcade arches are of very similar ratios, so perhaps this contributes to the good effect. The clerestory is a plain window in each bay of the vaulting, with shafted jambs. The vaulting itself is somewhat peculiar; it is unusually domical, that is to say, the masonry from rib

to rib curves considerably on the surface instead of being nearly flat, and at the west end of the nave, in alternate bays, the jointing is actually that of the true dome. The central lantern is a modified kind of dome, and the vaults of the aisles are some of them of the same character. These are especially curious facts when we recollect that Périgord, whence came the Bishop of Salamanca, has some notable domed churches of slightly earlier date. It seems to be possible that the architect would have worked a little differently, but the bishop impressed some features of his own native style upon the design, and helped to make it what it is. True, the domical vaulting of the nave is no great advantage, but it lends some additional interest to the interior. The dome of the lantern is, however, a fine structure, and if not strictly original is the first of its group to assume a finished character. At Zamora, its prototype was just built under similar circumstances of French influence, and contained all the essentials of the composition. The string-course over the four arches of the crossing is a circle on plan supported over the corners by domical pendentives. Then come two tiers of small arches, some of which are windows. There are sixteen arches around the circle, and the shafts between support as many ribs under the pseudo dome, a very graceful arrangement—except for the crudeness of the pendentives which, of course, do not work out so regularly over pointed arches as on semicircular ones. The transept which is not cut off by the new cathedral is of considerable length, but the southern bay was probably intended for a separate chapel. It is nearly square, and has a quadripartite vault built dome-fashion. The eastern apse is a half dome decorated with a painting of the Last Judgment, said to be by an Italian artist of the fourteenth century, called Nicholas Florentin. The retablo which covers the circular end wall with its five tiers of panels, fifty-five paintings in all, is in the main by the same painter. There are some monuments enriched with sculptures and effigies which also attract attention.

The exterior of this cathedral is now so enclosed by other buildings that but little is to be seen. The view given is the only available one. It is taken from a small plaza at the east end, opposite the south transept of the new cathedral. The round Romanesque apses, similar to some before described, are richer in carving, but the persistency of these general features shows how highly they were appreciated. The roofs above are curiously picturesque later contrivances. The termination of the staircase turret is a pinnacle of the fourteenth century. Above these rises the central lantern. Of it Mr. Street says: "The effect both inside and out is admirable. I have seldom seen any central lantern more thoroughly good and effective from every point of view than this. It seems, indeed, to solve better than the lantern of any church I have yet seen elsewhere the question of the introduction of the dome to Gothic churches."

It is highly interesting to examine the origin of this success. The problem stood thus:—Required, a dome supported upon four arches and pillars, lofty enough to get light above the surrounding roofs, and independent of buttresses for its vault. We have seen how the interior was treated. Externally the thrust is counteracted by four pinnacles which stand over the pillars, and form buttresses to the circular drum, and are very beautiful in the way they carry up the suggestion of the square upon which it stands. Between each of these again the weakest point is fortified by weight; a gable of considerable solidity assists in opposing the outward spreading vault ribs; the outer dome (also of stone) is raised to a conical form, so as to withstand the weather better, and the composition is complete. Some judiciously-applied ornament, and much skill in the placing and detailing of windows, etc., add interest to it. In every respect it is a most useful study.

To the right of the view, showing the old cathedral and lantern, may be seen something of the character of the later edifice. A flight of steps here gives access to the north transept portal. The contrast is striking in many ways. See how the same details are in the new building repeated indefinitely until what they have of grace and beauty becomes tiresome in its monotony. In the Romanesque work each part has received equally specialized art and care. In the late Gothic it was a mechanical process of multiplication. This cathedral was opened for service A. D. 1560. As early as 1509 the architect, Anton Egas, of Toledo, was summoned by royal order to Salamanca, and he and another of Seville, by name Alfonso Rodriguez, in 1510 commenced work, and presented some plans showing certain propositions, but they were unable to agree about the proportions of the Capilla Mayor, and so the matter rested until 1513, when the bishop and chapter summoned Anton Egas, of Toledo, Juan Gil de Hontañon (whose work has been noticed at Segovia) and some others, who jointly (not competitively) drew up a report as to dimensions of the building, thickness and height of walls, etc. This considered, the chapter appointed Hontañon architect to carry out the works, probably with no liberty to vary the determined proportions, but only to direct the construction and details. The details are poor, as has been said; the proportions and sizes are superb, yet almost every part of the work is marred by its weak design. What I said about Segovia cathedral will almost all apply to that of Salamanca, and this is not extraordinary since the same architect worked upon both.

Hard by the cathedral may be found the buildings of the University. There is a good deal of more or less interesting Renaissance work there, but all is eclipsed by the wonderful façade of the library. In this work exuberance of ornament is carried to the highest pitch possible; a tractable stone, and apparently unlimited expenditure produced a result probably only rivalled by Hindu lavishness of

detail. This specimen of what is usually an offensive parading of wealth alone is redeemed to a great degree by more than ordinary care for the whole composition, and by the interest and variety given to its detail by the heraldic symbolism it abounds in. It really seems that the greatest fault in such extravagance is its meaningless character. Here there is something to encourage attention, and it becomes satisfactory.

The church of San Esteban has also a marvellously elaborate west front in a kindred style, but its details of pilasters, and panels, and Italian arabesques lack any power of sustaining interest. I use forcible words to describe these things, but they are not exaggerated more than are the buildings themselves.

There is another bit, the doorway of Santi Spiritu, which I visited a second time with some thought of making a sketch; but a second glance convinced me it would be waste of time. The camera can best portray such unrestrained profession of form.

SANITARY PLUMBING.¹—XXI.

TESTS OF THE EFFECTS OF CAPILLARY ATTRACTION IN THE ANTI-SIPHON TRAP.—GENERAL CONSIDERATIONS.

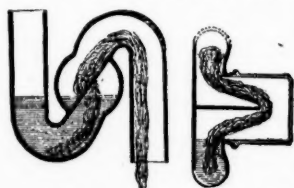


Fig. 126.

FROM the foregoing experiments on capillarity we learn that the capillary force cannot, under the most adverse conditions which can possibly be met with in plumbing, raise the water to a height exceeding $4\frac{1}{2}$ ", nor even so high as this, if the conducting material be of sufficient length horizontally. The conditions necessary to produce this extreme lifting power are that the trap should be filled with the fibrous material nearly full-bore, which would so arrest the discharge of the water from the fixture it served as to lead to its detection and removal. If the amount of sediment is smaller, or only such as could exert its adverse influence without being detected, the limit of its lifting power would fall below this, and probably not exceed 4", or of $3\frac{1}{2}$ " with an increase in horizontal extension. Hence traps having a dip of at least 4" or of $3\frac{1}{2}$ ", and a water-way which would give a considerable additional length in a horizontal direction to fibrous sediment which might collect in it in such a manner as to create a capillary action, in the manner described, may be considered safe against loss of seal through such action.

Our anti-siphon trap is constructed in this manner: The seal is $3\frac{1}{2}$ " or more in depth, and the central partition necessitates a considerable horizontal extension of any matter capable of acting upon its water at the bottom of its seal by capillary attraction. To reach from the bottom of this seal over the outflow, and down to a point equally low in the waste-pipe, would require a connected chain of fibrous sediment over a foot in length, and this is beyond the extreme limits of the lifting power of the substances which are supposed to be most dangerous in this direction. Moreover, this form of the trap is such that it would be almost impossible, without special manipulation, to so weave a mass of fibrous material through the trap that it could connect the lower with the upper bend in such a manner as to place the former within the influence of capillary attraction.

Experiments on the Anti-siphon Trap.

To make a practical test of the truth of the above reasoning, an anti-siphon trap was arranged, as shown in Figure 126. Different substances already employed in the tests for capillarity were woven through the trap by removing the glass caps, and using wires to aid in the process, until one end of the mass stood at the bottom of the lower bend, and the other extended below this point in the waste-pipe. To render one of the tests crucial the substance used was jute, which was found in our previous experiments on fibrous substances to produce the most powerful capillary action. The amount used was $\frac{3}{8}$ " diameter; a much greater quantity than this would obstruct the water-way in a manner which would necessitate its removal. It was found impossible to break the seal even after three weeks of exposure. The outer arm of the jute drying up after a few days of exposure.

In another experiment a mass of hair-felt 1" wide and $\frac{1}{4}$ " thick was similarly threaded through the trap. Less than half the water was drawn from the trap after an exposure of a month, 2" of seal remaining in the trap at the conclusion of the test. The last fifteen days made no appreciable diminution in the water-level, though the trap was open both at outlet and inlet ends. As there was no ventilating flue attached the loss of water was inappreciable.

FRICTION.

A consideration of very great importance in trap construction and arrangement is the amount of retardation to the passage of the waste water caused by the friction against its interior surfaces.

In order to obtain the quickest delivery and the maximum of scouring action on the waste-pipes below the trap, it is important that the trap should afford the minimum of obstruction to the flow of the water.

Many traps, especially gravity-ball traps, are so formed as to

greatly retard the flow of the water. With many ball-traps, when the water is permitted to escape from the fixture through the waste-pipe full-bore above the trap, the ball is so forcibly driven against the outlet mouth of the trap as to very seriously obstruct its farther passage and prevent its exerting its full scouring effect on the pipe below.

An ordinary S-trap offers the least resistance to the flow of the water, the gravity-ball trap the most, if we except certain forms of mercury-seal traps. A bath-tub like that shown in Figure 83 will discharge through a $1\frac{1}{2}$ " waste-pipe, 9' 0" long, arranged without trap, as shown in the figure, in 73 seconds, or at the rate of 1.4 gallons per second.²

An ordinary unventilated $1\frac{1}{2}$ " S-trap, with seal $1\frac{1}{2}$ " deep, was found to retard the flow only 17 seconds, or 23 per cent, thus prolonging the time of emptying the tub to 97 seconds, or a little over a gallon a second.

Another $1\frac{1}{2}$ " unventilated S-trap emptied the tank in 90 seconds, or at the rate of 1.1 gallons per second. The same trap ventilated prolonged the time of emptying to 113 seconds, thereby retarding the flow 23 seconds, or 26 per cent. The ventilation also created a loud and somewhat terrific roar during the entire duration of the discharge, caused by the suction of the air at the vent-opening.

A hinged-valve trap, unventilated, prolonged the discharge to 126 seconds. The same trap ventilated required a very much longer time, or 163 seconds; the ventilation not only retarding the flow 37 seconds or 30 per cent, but also creating the usual constant and alarming roar. The discharge through the unventilated traps was in all cases perfectly noiseless.

A 4" pot-trap, unventilated, prolonged the discharge to 104 seconds; the same ventilated to 144 seconds, or 38 per cent more than the unventilated pot. The discharge was accompanied by the loud roar of the air.

A 4" bottle-trap unventilated prolonged the discharge to 94 seconds. All these traps delivered the water at the rate of from 1.1 to 0.6 gallons a second.

The gravity-ball trap, however, retarded the emptying of the tub to two hundred and twenty-six seconds, giving a rate of discharge of only 0.4 gallons per second.

The air-vent trap gave 0.7 gallons per second, and the anti-siphon trap from 0.66 to 0.7 gallons per second.

The following table gives the retardation due to trap ventilation:—

TABLE SHOWING THE RETARDATION IN SECONDS OF THE RAPIDITY OF DISCHARGE OF A BATH-TUB THROUGH TRAPS AND WASTE-PIPES AND THE CONSEQUENT LOSS OF SCOURING EFFECT DUE TO VENTILATION.

Number of Gallons Discharged.	S-Trap, unventilated.	S-Trap, ventilated.	Percentage of Loss due to Ventilation.	Pot-Trap, unventilated.	Pot-Trap, ventilated.	Percentage of Loss due to Ventilation.	Hinged Valve-Trap, unventilated.	Hinged Valve-Trap, ventilated.	Percentage of Loss due to Ventilation.
6	4	5	25%	4	5	25%	5	6	20%
"	5	6	20	4	6	50	7	8	14
"	5	6	20	6	8	33	7	9	28
"	5	6	20	6	8	53	7	9	28
"	5	6	20	6	8	33	7	9	28
"	5	6	20	6	8	33	7	9	28
"	5	7	40	6	8	33	7	9	28
"	5	7	40	6	9	50	8	9	12
"	5	7	40	6	9	50	8	10	25
"	5	7	40	6	9	50	8	10	25
"	5	7	40	6	9	50	8	11	37
"	5	7	40	7	9	28	8	11	37
"	6	7	17	7	9	28	8	11	37
"	6	7	17	7	10	42	8	11	37
"	6	7	17	7	10	42	8	11	37
"	8	9	12	8	11	37	8	11	37
102	90	113	26%	104	144	38%	126	163	30%

Thus we see that the average retardation of the discharge from a bath-tub arranged as described, and the consequent loss of scouring effect caused by ventilation, amounts to 30 per cent, or nearly a third of the whole.

The discharge of a wash-basin having an outlet large enough to fill the waste-pipe full-bore gave similar relative results for different traps.

The rapidity of discharge depends upon the length and pitch of the waste-pipe. A basin having a waste-pipe attached to its outflow will empty itself much quicker than one having no pipe attached, supposing the size of the outlet be the same in both, and large enough to fill

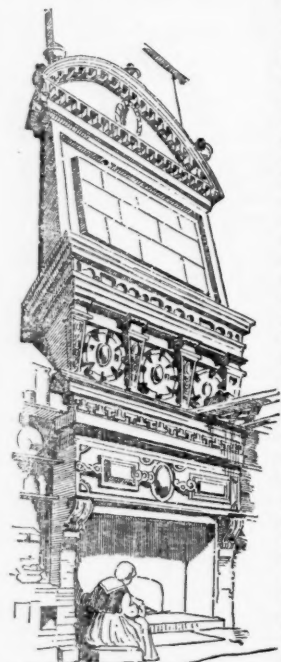
¹ Continued from page 188, No. 434.

² An average between two tests giving seventy-two and seventy-four seconds respectively.

the waste-pipe when used full-bore. Thus a wash-basin of 2 gallons capacity, with such an outlet, but having no trap or waste-pipe attached thereto, will empty itself in 4 seconds. With a $1\frac{1}{2}$ " S-trap, $1\frac{1}{2}$ " seal, and a $1\frac{1}{2}$ " perpendicular waste-pipe 10' 0" long, the basin will empty itself in from $2\frac{3}{4}$ to $3\frac{1}{4}$ seconds. With the same trap and a waste-pipe 5' 0" long, having 2' 6" fall, 7 seconds are required. With the same length of pipe having 5' of fall (perpendicular), 5 seconds are required. With a waste-pipe 12' 0" long, having 3' 0" fall, 5 seconds; the same, having 10' 0" fall, required 3 seconds.

The same rate of retardation and disagreeable noise is produced on these discharges by ventilation.

NOTES ON THE MORTAR OF ENDURING BUILDING.



A CHIMNEY IN BRITAIN. *Engr.*

WHERE have been various conjectures as to the date of the first use of mortar in the British Islands, as also with respect to the constituents of the materials used by the Greeks and Romans, and other nations of antiquity. Our oldest class of pre-historic structures, including Cashel or stone-built forts, clochans, or beehive-shaped erections, forts, and raths, are all of dry-wall masonry; but many of them exhibit good fitting and bonding, though no cementing material was used in their construction. The Rath-chambers appear to be the oldest specimens of stone-built work in the British Isles, the character of the work, of course, differing with the locality and the material obtainable. An examination of the most representative of this kind of buildings shows that no mortar nor any substitute for it had been used. The walls in some instances are built of surface stones and boulders, with the interstices packed with spawls; in other cases flat longitudinal stones are carefully placed together, and again, large blocks of all sizes and shapes are found well fitted in their natural forms. Indeed, there are examples of this class of building presenting masonry work of excellent character, well bonded and fitted, and

showing to some extent an appearance of squaring and dressing. Our early Christian edifices existing show that mortar of very good quality was used in their erection, but even some of these buildings have uncemented walls. One thing is clear: whether the early Gaelic and British masons were skilled in the use of mortar or other cementing materials or not, they were certainly skilled in an art more difficult, that of preparing and fitting the stone. Although there are none of those Celtic structures known as Round Towers in England, they are plentiful in Ireland, and two examples exist in the North of Scotland. If these buildings, which have given rise to such a voluminous mass of controversy, are of Pagan origin, as many able archaeologists and architects have contended with good reason, then the use of mortar must have been long centuries known in these islands before the introduction of Christianity. It is assumed by some writers on the Christian origin and uses of the Round Towers, that mortar or lime cement only dates in Ireland, from the time of St. Patrick's mission. Now, it is a fact, that the Romans used cements several centuries before Christ; and though the Roman legions never set foot upon the soil of Ireland, they carried their building knowledge into all their colonies, including Britain. The early Britons and the early Celts in Pagan times, as well as later, had constant intercourse with France and Spain, and other Continental nations, as the pages of Tacitus will testify. Although mortar or lime cements may have been used sparingly in remote times, nevertheless, we have good evidence of its high antiquity. The walls of the Acropolis of Pharsalia, and at other places, exhibit an unusual thickness, and are lined on both sides with large blocks; yet the interstices are filled up with small stones, and with earth or mortar. Again, the walls of Methana are constructed with a compact mass of small stone, with mortar, tiles, and earth between casings of regular masonry. The Greeks, in their art of building, cultivated the faculty of joining their large stones in such a skilful manner, that they seem for a long time to have discarded the use of mortar as a binding cement. Whenever they did use it, they appear to have used it very thinly or sparingly. It became necessary for the Greeks in their massive and matchless buildings to make very close joints, and they often brought the surfaces of their stone so close that the points of union were not observable except on keen inspection.¹ Stones or lengths of masonry were often fixed together by means of oaken dowels, pegs, or bolts, or by cramp-irons let in or dove-tailed. In the

Colosseum at Rome, and in the Amphitheatre at Verona, cramp-irons were used to hold the freestone firmly, but no mortar. One architectural authority is of opinion that it is possible that mortar might have been used "of a nature sufficiently fine and subtle to blend and assimilate itself in course of time to the masses of which it formed the cement." The Roman method of making ordinary building mortar did not differ much from the modern British method in use among the old school of respectable builders. The sand the Roman builders used was of different colors and qualities, and from the quarries or pits they excavated three sorts, black, white and red; the latter seems to have been preferred. Though the Romans, as we have said, used a cementing material long centuries previously to the Christian era, the regular use of lime-mortar is of later introduction. The burning of stone into lime, according to some authorities, does not appear to have been brought into use until about three centuries before the Christian era. The sun-dried bricks used in the building of the Tower of Babel are stated to have been cemented with bitumen or pitch, and this and other material was used in different countries for centuries subsequently. When lime-mortar had been used for a while, builders soon recognized its advantages, and they often employed it in profusion. The Romans used it in plentiful quantity in the body of their walls, the lime being generally burned on the spot, and used fresh before cooling and crystallization set in. Of course, when lime-mortar became well known among the Roman builders, they used it in all kinds of masonry and brickwork. Some of their rough stone or rubble walls were, in fact, a species of concrete construction through the ample use made of the mortar they employed. The Romans as well as the Greeks used wooden wedges, dowels, and clamps of metal work in portions of their masonry, as well as mortar. The Roman brickwork of the first century appears superior to that of a later period, the bricks being of large size, flat, and thin, usually two feet square, and one inch thick; in fact, what may be termed tiles, though used for wall building, and not only for paving or roofing. After a time the bricks were made of diminished size, but thicker, and continued to decrease down to the fourth century, when they counted only four to a foot in the surface of the wall, as in our modern brickwork.

In the British Islands, although the burning of lime, and the use of mortar were known at an early date, the craft of the bricklayer was of late introduction. The Mediæval masons were particular as to the quality of the mortar they used in their best work. The buildings of the eleventh century in England and France are often massive, the stones large, and the mortar-joints wide; but later on, excellent masonry exhibiting thin joints became more characteristic of the work of the Middle Ages. Whether, however, our British masons elected to build with wide joints or with close ones, they did not neglect to use good mortar. In important or particular work, it is known that the Mediæval masons used an admixture of skimmed milk in the preparation of their mortar. Few instances of English brickwork occur previously to the fourteenth century, and the scant specimens found before that period may be put down to the using up of old material left by the Romans. In the fifteenth century and onwards English brickwork became common, and in the sixteenth and seventeenth century fine specimens of ornamental work in brick material were numerous. The mortar employed in this brickwork was generally of the best description.

George Semple, an architect in practice before the middle of the eighteenth century, and who towards its close, published a treatise on "Building in Water," was one of the first, if not the very first, of our modern architects to suggest, and carry out, foundations by concrete. Semple came of a generation of builders, his father being a building workman in 1675. George Semple's own practice extended over a period of sixty years. Speaking apart from hydraulic mortars, or those kinds specially made for setting under water, Semple said, "I can safely affirm, that good mortar, — that is, mortar made of pure and well-burned limestone, and properly made up with sharp, clean sand, free from any sort of earth, loam, or mud, — will, within some considerable time, actually petrify, and, as it were, turn to the consistence of stone." And, no doubt, it will, under favorable circumstances, though for expeditious building under water and quick setting, the employment of mortar made of hydraulic lime is indispensable. The practice of the older masons in the British Islands employed in the building of churches, castles, and other large structures appears to have been to this effect. After they laid the outside course with large stones in swimming-beds of mortar, they hearted their walls with spawls and smaller stones, and into this body of their work they poured a quantity of boiling or hot lime, liquid, and mixed, of course, with sand. This grouting process was supposed to lead to the incorporation of the mass of small stones together. It was believed that the heat exhausted the moisture of the outside mortar, and united firmly both it and the stones. We have ourselves examined the mortar in several old castles, and the walls of ecclesiastical structures, and we certainly found that a process similar to that we have described must have been more or less followed by our masons, as the mortar and small interior stone-work was in a compact or concrete mass, and the former proved harder to break than the stones. Good ordinary building mortar is composed of one part of lime to three parts of sand, the water being added gradually in such quantities as the tenacity of the mortar requires, and this will be generally obtained when about a third of the bulk of the material has been added; clean river-sand, sharp or angular in the grit is the best; and when pit-sand is used it should be well washed to free it

¹ See Mr. Penrose's work on the Parthenon for a description of the manner in which the close-fitting joints of the drums of the columns were probably worked.

from loam. Sea-sand should of course not be used in domestic dwellings, though it often is. It will do very well for outbuildings. If builders or workmen could be depended upon generally to give sea-sand repeated washings in pure fresh water, thoroughly expose it to the weather and sun, and subject it to constant turnings, there would be less risk in using it. But as this care is not to be generally expected, it is better to discard sea-sand in favor of well-washed pit-sand. When sea-sand is used, on account of the saline matter in it, an efflorescence on the walls within and without the building is certain soon to manifest itself. When such sand is both used in the mortar and plaster work, dry-rot will often make its appearance, to the destruction of the flooring and joinery work.

Though a mixture of clay in all sands is pernicious, it is otherwise a valuable ingredient in limestones, as the burning converts it into a useful agent. In sand, however, the clay causes the destruction of the mortar in a few years. Apart from the hydraulic kinds, lime is divided into two general classes, called rich and poor, according to their constituents. The former, or rich limes, contain little silicate of lime in proportion to pure carbonate of lime, being composed of one part of the former to nineteen parts of the latter. They are termed rich because the stones from which they are procured imbibe a large quantity of water when slaked, thus increasing to a great extent in bulk and weight. The mortar of the rich limes rarely becomes thoroughly hard, but it is useful for inside plastering and other purposes. The poor limes, produced, for example, from oolitic limestones, contain a large percentage of metallic oxides, and insoluble flinty grit. They are called poor because they do not increase in volume to any extent after being slaked. In this respect they are somewhat similar to hydraulic limes, but differing from them in not possessing the property of setting or rapidly hardening under water. Perhaps not one person in a thousand of makers or users of mortar knows what causes its induration or hardening; but though we cannot yet expect building laborers to know the chemical changes that lime and mortar undergo in their preparation, yet our builders generally ought to know a little more about the subject as a body than they appear to do. The hardening of mortar is partly caused by its absorption of carbonic-acid gas from the atmosphere, but chiefly to the combination of part of the water with the lime. A good strong building mortar can be made with three parts of fine sand, four of coarse, and one of quick-lime freshly slaked. Another excellent and enduring building mortar can be made with three parts of fine sand, cement of well-baked bricks three parts, and slaked and unslaked lime, each two parts. Water ought to be used sparingly in slaking lime and making mortar; but where it is made by the hand, free from inspection, the laborer to save himself trouble and brow-sweat in mixing, adds a large quantity of water, and thus the mortar is "perished," or spoiled. In summer, or hot, dry weather, both stones and bricks should be well soaked with water before they are used, as the mortar unites better, and takes a more firm hold. Before pug or mortar-mixing machines or mills were introduced, the old class of respectable builders insisted upon careful mixing, and no stint of what they termed "elbow-grease" on the part of the laborers. Formerly the men used wooden beaters, but though mortar is still extensively made by the hand, yet in all large works the pugging-mill may now be seen in operation. Many ingredients were formerly, and some are still, used for increasing the tenacity and hardness of mortar. Burned bones have been found to improve mortar, by giving it a greater tenacity, but the addition should not exceed one-fourth of the lime. A blue mortar for special purposes is made in London by the admixture of the ashes and iron dust of a smith's forge, which is often used for covering such parts of a building as are much exposed to the weather. Again, certain qualities of fairly good mortar are made up of ground bricks, burned clay, (termed ballast), and the slag from glass and iron furnaces reduced to fine powder by machinery. Here, however, we are trenching upon the subject of cements and special kinds of mortar, apart from the strictly building kinds. Chalk lime slakes very freely, but it possesses much less strength than stone lime in mortar, being much better suited for plastering purposes than for building. As filtered water is good for drinking, so is it for mortar-making, but filtered rain is the best kind of soft water, and next comes that which can be found free from mineral agents. As hot water has been mentioned in writings of antiquity, it has been recommended by some individuals in modern times, but we do not see wherein its special value lies. Few words need be wasted in describing the rubbish called mortar used so extensively of late years by the lower class of speculative builders. This class of operators press almost anything in the shape of clay, vegetable mould, cinder ashes, and road scrapings, into their service. What they call "ballast" is not burned clay, but a libel upon the name; for burned clay well-ground makes a fairly good substitute for sand in mortar-making, with the addition of a proper quantity of lime.

We must stop here, though we may furnish a sequel on another occasion, in further illustration of the mortar of enduring building. — *The Builder.*

DETAIL DRAWINGS.

SAVANNAH, GA., April 15, 1884.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Will you please reply to the following, stating practice as it exists in the New England States.

An architect is employed to prepare plans, specifications, and to supervise the erection of a certain building; the work is not elab-

orate, very much we will say, like that given in the *American Architect* competition for a \$3,000 house.

1. Are details furnished full size, or only on scale sufficiently large to show clearly what is wanted?

2. Are drawings for factory-work made full size, that is, for turned newels, balusters, etc.?

3. In case of moulded cornices (of wood) is the joinery, or several parts of which cornice is composed, and by which it is secured in place, shown or only profile?

SUBSCRIBER.

[The manner of preparing detail drawings for such a building as "*Subscriber*" describes depends largely on the degree of pride the architect takes in his work. If he respects his own fame he will make full-size details of all unusual features of constructive or decorative detail, and inch-scale drawings of such matters as staircase, pantry, bath-room, bay-windows, etc. This is the usual practice of Eastern architects. Nothing so distinctly distinguishes the work of an architect from that of a carpenter as the character of the detail.

Drawings for turned-work must be made full size, or there will be little chance of obtaining the desired results.

A thorough architect will not content himself with simply indicating the profile of his cornices, etc. He will rather indicate minutely its construction, and if he is sure that his method is the proper one will watch carefully to see that the carpenter does not change it for his own rule-of-thumb method.—EDS. AMERICAN ARCHITECT.]

SKETCH-BOOK OF THE ARCHITECTURAL ASSOCIATION OF BOSTON.

PATERSON, April 17, 1884.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Gentlemen,—Can you tell me where I can get the "*Sketch-Book of the Boston Architectural Association*," published this year in three hundred plates, and oblige,

Yours respectfully,

CHARLES EDWARDS, Architect.

[The "*Sketch-Book of the Architectural Association of Boston*" can be obtained of Cupples & Upham, Boston. Price \$7.00. It contains thirty, not three hundred, plates. The edition was limited to three hundred, which probably has caused the confusion in our correspondent's mind.—EDS. AMERICAN ARCHITECT.]

OUR ILLUSTRATIONS.

MINNEAPOLIS, April 9, 1884.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Gentlemen,—Would you kindly inform me through your columns by what process of photography you obtain the effect produced in "*American Architect*" of March 29th (town-hall at Belmont), and greatly oblige the curiosity of

SUBSCRIBER.

[The view of the town-hall at Belmont referred to, and other succeeding prints of a similar character, are the results of a modification of the photographic process.—EDS. AMERICAN ARCHITECT.]

PAMPHLETS ON LIBRARY CONSTRUCTION.

CHICAGO, April 14, 1884.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Gentlemen,—Will you please correct an error in your issue of April 12 (p. 179), to the effect that my recent pamphlet on *Library Construction* can be procured from the Interior Department at Washington. It is published by Jansen, McClurg & Co., Chicago, from whom it can be ordered. Your statement is true of an earlier pamphlet of mine on a similar subject, printed by the Bureau of Education at Washington, in 1881. It was also printed in *American Architect* (vol. 10, p. 131) and *Library Journal* (vol. 6, p. 61).

W. F. POOLE.

THE PROPER USE OF PUBLISHER'S DESIGNS.

CLINTON, Io., 1884.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Gentlemen,—Seeing an article in your paper (the *American Architect*) by Burnham & Root, architects, of Chicago, Ill., in regard to competitions and ownership of drawings, as well as the ideas represented in same, set me to thinking about the matter. The question arose in my mind that if no one has the privilege of using designs published in your paper as a help in designing others (except by paying the architects of the same for the privilege), the architects would be entitled to much money in the way of fees, as I know it is the practice with many architects to make such use of designs published, and if they could not do so would not subscribe for the paper, as this is the main point wanted, and they seem to think it is all right for them to do so.

If we have no such privilege I should like to know it, as I want to do what is satisfactory in this matter.

If you will kindly give us an article in your paper on the subject I shall be greatly obliged.

A SUBSCRIBER.

[The more good architectural work is done throughout the country the more will the public demand such good work, and the more work will fall into the hands of the capable architect, and every such architect probably feels that in allowing his designs to be published he is in a certain sense contributing to the architectural education of the public, which will eventually recoup him for the risk he runs at the hands of unprincipled plagiarists by placing more and more important work in his hands. There is a vast difference between the brutal copying of another architect's published design, and assuming the credit of it, and the studying of its good points for future adaptation and incorporation in another and original designs. Such adaptation being, of course, not a copying of the exact lines and dimensions of any feature. It is much easier to understand intuitively what is the legitimate use a fair-minded man may make of another's ingenuity than it is to define it. It is

fair to assume that any architect who allows a design to be published does so with the full understanding that he is very probably contributing a hint that may be of great value to some other architect, and with a perfect willingness that he should make any proper use of it. And it is equally certain that he would be justified in resenting the erection of an exact copy of his design, or even of a too close adaptation of it. — EDS. AMERICAN ARCHITECT.]

THE COMMISSION FOR STORES.

DES MOINES, IO., April 15, 1884.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Gentlemen, — We have met with a difference of opinion as to whether or no full professional services (including superintendence) is intended in the schedule of Professional Practice and Charges as endorsed by the A. I. A. Where a separate item says, "For stores, three per cent upon the cost, divided in the above ratio."

An explanation of this question may be of interest to others as well as, Yours respectfully, JOSSELYN & TAYLOR.

[The Schedule of Charges, as published by the American Institute of Architects undoubtedly intended to set the rate of commission for warehouses at three per cent for full services, including supervision. It is, however, only fair to say that this exception to the general rule of five per cent should be considered as a reminiscence of an old local custom in New York, dating from a time when stores were built there after a common pattern, with little attempt at design, and still less at deeply-studied construction; and that in these days of artistic façades, calculated strength, and well-lighted, wholesome and airy arrangement, the commissions which paid our predecessors well enough for the services which they were called upon to render are no longer remunerative, and individual architects there, together with all, or nearly all, the professional societies in other parts of the country, have long since ceased to make a distinction between this and other classes of work which has now no reasonable foundation, and should, we think, be eliminated from the Institute schedule at the first opportunity. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS.

THE ITALIAN GOVERNMENT AND THE CASTELLANI COLLECTION. — It is said that the Italian Government, in consequence of the refusal of its offer of 2,000,000 francs for the Castellani collection, will exercise its right (in virtue of a recent law) of claiming any object whatever at the price which it is knocked down at, and its right of prohibiting the exportation of the articles sold.

AN EARTHQUAKE-PROOF CHIMNEY. — In the columns of an architectural contemporary, published on the Pacific Coast, we notice the description of a patent earthquake-proof and fire-proof chimney, said to be in common use in that part of the country. The chimney is constructed of metal and earthen pipes. The lower portion, which is intended to be set directly upon the floor of the building, is made of cast or sheet iron, and is provided with the proper opening for a fireplace. The latter is either built solid with brick or faced with brick, as may be preferred. The weight in ordinary buildings is said to be only eighteen pounds to the square foot. The shaft or flue is cylindrical in shape, and consists of cylinders or pipes, one inside the other. The outside cylinder is made of galvanized sheet-iron, while the one on the inside is of earthen pipe. The angular space between the two pipes is filled with fire-proof cement or other material which is a non-conductor of heat. In the erection of this chimney, as well as others somewhat resembling it in their general features, they are so fastened to the framework of the house as to become integral parts of it. This renders the chimneys far less liable to destruction from earthquakes than those built of brick in the ordinary way. The sheet-iron casing, both of the base and the flue, is relied upon to hold the parts together, while the lining is such as to render the construction fire-proof. — *The Metal Worker*.

HERBERT SPENCER ON BUILDING LAWS. — From these law-produced mischiefs, which were great a generation ago, and have since been increasing, let us pass to more recent law-produced mischiefs. The misery, the disease, the mortality in "rookeries," made continually worse by artificial impediments to the increase of fourth-rate houses, and by the necessitated greater crowding of those which existed, having become a scandal, Government was invoked to remove the evil. It responded by Artisans' Dwellings Acts; giving to local authorities powers to pull down bad houses and provide for the building of good ones. What have been the results? A summary of the operations of the Metropolitan Board of Works, dated December 21, 1883, shows that up to last September it had, at a cost of a million and a quarter to rate-payers, unhoused 21,000 persons and provided houses for 12,000 — the remaining 9,000 to be hereafter provided for, being, meanwhile, left houseless. This is not all. Another local lieutenant of the Government, the Corporation of London, working on the same lines, has cleared four spaces, amounting to several acres; but has unhappily failed to get them covered with the substituted houses needed, and has thus added a farther thousand or two to those who have to seek homes in miserable places that are already overflowing! See, then, what legislation has done. By ill-imposed taxation, raising the prices of bricks and timber, it added to the cost of houses, and prompted, for economy's sake, the use of bad materials in scanty quantities. To check the consequent production of wretched dwellings it established regulations which, in mediæval fashion dictated the quality of the commodity produced; there being no perception that, by insisting on a higher quality and therefore higher price, it would limit the demand and eventually diminish the supply. By additional local burdens, legislation has of late still further hindered the building of small houses. Finally, having, by successive measures, produced first bad houses and then a deficiency of better ones, it has at length provided for the increasing overflow of poor people by diminishing the house capacity which already could not contain them. Where, then, lies the blame for the crying evils of the East End? Against whom should be raised "the bitter cry of outcast London?" — *Popular Science Monthly* for May.

LIGHTNING STROKES IN FRANCE. — M. Cochery, the French Minister of Posts and Telegraphs, has communicated to the French Academy of Sciences an elaborate report on the strokes of lightning which were observed in France during the first half of last year — that is, from the beginning of January to the end of June. The report is the first of the kind, and is due to a resolution of the international conference on electrical units held at Paris in 1882, expressing a wish that an international system of observations on lightning strokes should be organized, each country collecting its own data. M. Cochery framed a list of questions which were distributed to all the post-masters in the various departments, and such agents of railway companies and others as were willing to assist in the work. The questions embraced the nature of the stroke, damage to life and property, and a general description of the conditions and effects. The result is the interesting document presented to the Academy, from which it appears that in January there was one stroke, injuring a man who carried an open umbrella with metal ribs. In February there were no strokes at all. In March there were four strokes, damaging unprotected buildings and a high oak tree. In April there were also four strokes, injuring several persons, some poplar trees, a weather-cock, a bell-tower and an isolated building. In May there were twenty-eight strokes, killing two men, seven cattle, three horses, and injuring several persons, two horses, as well as numerous trees and houses. The trees were oaks, chestnuts, poplars, and several of the strokes attacked the chimneys of the houses. It is notable that a gilt wooden figure of Christ in front of the Church of Bonsecours (Seine-inférieure) was struck, although the church has a lightning-rod on it. During the month of June the total number of strokes largely increased, there being no less than one hundred and thirteen, or from three to four a day. The daily number varied during the month, but was, if anything, larger at the end than at the beginning of the month. Seven men were killed; about forty persons, men, women and children were injured. Some seventy animals were killed, including fifty sheep and a dog. Many trees — oaks, poplars, elms, firs — were struck. A common object struck is the bell of some church, the chimney of some house, or the weather-cock of some barn. Some of the strokes observed were received by the lightning-rods of buildings, and did no damage, except, perhaps, fusing the point of the rod. On the other hand, several serious accidents to buildings, and in one case death to a horse, occurred within a comparatively short distance of a lightning-rod (from fifty to eighty metres). Isolated trees and animals under them appeared to have suffered most. Rain and hail accompanied most of the storms. — *London Times*.

GALVANIZED-IRON WATER-PIPES. — Dr. Von Ehmann, one of the principal technical authorities on the subject in Wurtemberg, has communicated to the *Deutsche Bauzeitung* various details as to the employment and preservation of galvanized wrought-iron pipes for the purpose of conveying water. For many years the use of these pipes has been general in Wurtemberg for conveying water from the cast-iron main pipes in the streets to the taps, etc., in private or public edifices. Before use the pipes are carefully tested for the suitable pressure of water, and also with a view to greater security for a still higher pressure (usually up to twelve or fifteen atmospheres). For branch pipes the use of any other metal is prohibited in most parts of Wurtemberg, so far as pipes of $\frac{1}{2}$ inch to $1\frac{1}{2}$ inch internal diameter are concerned. The regulations in force also define the thickness of the pipes, which should be fully one-sixth of an inch for one inch internal diameter. The galvanizing is on both sides, and the pipes are not allowed to be used until the official tests as to the pressure of the water have been held. The results of this system would seem to have been satisfactory as to the soundness of the pipes and their preservation. Thus it is recorded that after having been for several decades in use, pipes which were examined were found perfectly good and almost totally free from either internal or external incrustations. An exception, however, is made as to those situations in which the pipes have been exposed to influences of a character specially affecting their durability. This would seem to be especially the case in large stables, chemical factories, etc., where solutions of nitric acid, ammonia, etc., would come into immediate contact with the pipes. In such cases it is thought advisable to use iron pipes (whether galvanized or not) as little as possible. The pipes of the description referred to by Dr. Ehmann are also said to have been objected to in various quarters, in the same manner as other kinds of pipes have been treated from time to time. The experience of their use is considered, however, to have refuted in a satisfactory manner any assertions of a prejudicial character. — *The Builder*.

THE WELLINGTON STATUE. — On dit that the Wellington statue is to go by safe and easy roads to Aldershot, and be set up on a site overlooking the North Camp. This is perhaps the best destination that has been proposed for it. From its colossal size, the statue would be out of scale with any site surrounded by buildings on which it might be placed, while on an open space this difficulty will be got rid of. We have all along said that to melt down the statue, which, whatever its defects, was modelled from the living man and the living horse, would have been a mistake; and it is gratifying to hear of a site being found for it, which will be unexceptionable in regard to association, and about the best-circumstanced site in regard to effect. — *The Builder*.

THE DECORATIONS FOR THE HOTEL DE VILLE, PARIS. — The Prefect of Paris names the following artists to decorate the new Hotel de Ville: For the *Escalier d'Honneur*, Paul Baudry, subject, Peace; appropriation, 50,000 francs; for three ceilings, Messrs. Bouguereau, Bonnat and Bonlangier; subjects, Science, Arts and Letters, respectively; reward 25,000 francs each; for the *Grand Salon*, J. P. Laurens; subjects, from the life of Etienne Marcel, at 35,000 francs; for the dining-room, J. Duval and Felix Baillias; subject, *Bucolic*, at 20,000 francs. Besides these, Gervex and Maserolle will be employed for paintings, and eight sculptors are to furnish statues of various kinds.

RAPHAEL AS AN ARCHITECT. — A book on Raphael as an architect, written in Italian, by Baron Enrico di Geymuller, will soon appear in Milan.