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NOVEMBER 15, 1890.



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A NEW idea in exhibition buildings has been developed in Germany, which we commend to the notice of the Chicago architects. It is proposed to hold a universal exhibition at Berlin a year or so hence, and some South German enthusiast, reflecting that Berlin, which is situated in the middle of a vast, sandy plain, lacks landscape interest, has hit upon the plan of supplying this, and accommodations for the exhibition, by one operation. In brief, he proposes to build a mountain and a lake in the suburbs of the city. The mountain is to be composed of the material dug out of the lake, and is to be hollow. There will be three peaks, one of which is to represent a volcano, by uniting in it all the smoke-stacks from the steam-boilers, blast-furnaces and other coal-consuming apparatus. The skeleton of the mountain is to be of masonry or concrete, with enormously high, vaulted ceilings, sustained by piers or columns, and light is to be admitted by large openings, situated in the bottom of ravines, and invisible from the plain below. Beautiful cascades will rush down the mountain sides, fed by the steam-pumps on exhibition, which will draw the water from the lake, into which it finally returns. The lake itself will serve for aquatic contests, and the display of many interesting objects, and on the shore is to be situated a reproduction of an old German town, with its narrow streets, and carved-oak houses, in which will be accommodated the side-shows, which now form so large a part of an exhibition of the kind. Of course, electric cars will transport passengers to all parts of the buildings and grounds. Notwithstanding the absurdity which the *Wiener Bauindustrie-zeitung* finds in the idea of the "Span-dauer Aetna," there is more than one valuable suggestion in it. Even if the steam-pump cascade did not prove very imposing, it would be a refreshing change from the tenuous iron and glass construction of the ordinary exhibition building to find something with at least a concrete base, and a few substantial piers. We have always thought that the future Chicago buildings might, with a little judicious expenditure for concrete terraces and similar works, be made much more imposing than those of any previous exhibition. There is likely to be plenty of room at Chicago, as there was at Philadelphia, and this makes it all the more advisable, as an artistic matter, to connect the buildings by terraces, balustrades, colonnades, or something of the kind, so as to avoid the impression suggested at Philadelphia,

that the various structures had been prepared by the inhabitants of different planets, and rained down at random on Fairmont Park.

THE city of Washington is suffering from an embarrassment of riches. It has just received a fine new statue of Lafayette, and has no place to put it. Lafayette Park, which fronts the White House, would naturally be an appropriate place for a statue of the person whose name it bears; and a foundation has been actually put in for the monument there; but at the last moment, some one called attention to the fact that the new statue would cut off the view of Mills's statue of Jackson, which occupies the centre of the Park, from people promenading in front of the White House. It is not certain that this would have been an unmixed evil, but the patriotism of the Tennessee delegation, and of other people who felt that they had an interest in General Jackson's reputation, took fire at once, and an order was passed to suspend operations on the site already chosen, and look for another position for the Lafayette figure. Since then, the unfortunate Frenchman, or his friends, have been seeking in vain for a place where he may rest his foot. A proposition was made to put him in the Treasury reservation, but permission was refused by the Treasury authorities. Meanwhile, the statue is ready to set up, and waits, packed in boxes, until the claims of patriotism shall have been adjusted so far as to grant it a quiet resting-place.

A VERY remarkable movement in the way of architectural education seems to have begun in England. Our English correspondent has repeatedly mentioned the important decision of the Architectural Association, to provide for its members a systematic course of professional instruction, and, since the decision was made, not only has great interest in the plan been shown by the younger men, but persons outside the profession have already offered liberal aid in extending the resources for instruction possessed by the Association, one person sending a hundred guineas, to be used in improving the library; while another has guaranteed fifty pounds a year for three years, to be used for the general advantage of the course. More encouraging even than this, is, however, the fact that the example of the Association has set architects in places outside of London to thinking about the provision of local schools. The architects of Edinburgh have presented a memorial to the commissioners for the Scotch Universities, stating that the Association scheme would give students of architecture in London, an advantage over those in other places, and praying that a course in architecture might be added to the curriculum of the University of Edinburgh. In London itself, it appears that the architectural department of Kings' College, which has been a long time in existence, shows, this year, unwonted life, and the course is to be revised and improved at once.

THE Greek Institute will hold fortnightly meetings at Athens from December until Easter, and during the same period Dr. Dörpfeld will give demonstrations on the spot on the buildings and topography of Athens, with Eleusis and the Piræus. The second secretary, Herr Wolters, will give practice classes in the examination of antiquities in the museum at Athens; and during the spring and summer there will be an expedition through the Peloponnesus, under the personal supervision of Dr. Dörpfeld, and another, later, to the sites of Pergamos, Troy, and other places not yet determined.

THE *Builder* publishes the programme of the public meetings and lectures of the German Archaeological Institute, both at Rome and Athens, for the coming season, which will be of interest to American architects and others, who speak German, and are disposed to employ a part of a winter vacation in Europe in serious work. In Rome, Dr. Petersen, the head of the Roman Institute, will, besides conducting the regular meetings, hold, from December to April, classes in the various Roman Museums, for instruction and practice in the archaeological examination of monuments. Dr. Hülsen, the sub-secretary, will give demonstrations on the spot on Roman topography, from November 15 to December 20, and will repeat the course in the following April and May, if it should be sufficiently supported. From January to April, the same instructor

will hold practice classes in epigraphy; and in the summer an eight-days' course of lectures will be given by Herr Mau at Pompeii.

THE French Government has recently had its attention called to the inaccuracy of the common domestic apparatus used for weighing, such as spring-balances and steelyards, and has collected evidence that the inaccuracy of their indications is used to facilitate serious frauds. With characteristic French decision and common-sense, the Government, on hearing these complaints referred them to the national Bureau of Weights and Measures, which inspected samples of the ordinary commercial articles, and reported that, while such instruments, if well made, might be accurate for a time, they were not likely to remain so, and should not be employed for weighing. In consequence of this opinion, the Government has now issued an order, under which the use or sale of spring-balances and steelyards, with either straight or curved arms, is to be prohibited from and after January 1, 1891. What the dealers in such articles will do with their stock remains to be seen. Spring-balances are much used here, and for certain purposes, such as weighing sashes, to get the proper counter-balance, they are satisfactory enough; and it seems not impossible that the rejected French instruments may find a market here.

A PECULIAR accident took place not long ago in London. A little north of the Farringdon Street Station, on the Metropolitan Railway, is a bridge, which carries the Clerkenwell Road, not only over the Metropolitan tracks, but over those of the Great Northern and Midland railways, which are separated from those of the Metropolitan by a heavy brick pier, which helps to sustain the bridge. The Metropolitan Railway had utilized the space between this pier and its tracks for the erection of a lean-to wooden shed, for the storage of naphtha. Overhead, between the iron girders of the bridge, run two immense gas-mains, one four feet in diameter, and the other three feet, both constantly filled with gas under high pressure. One hot Sunday, the naphtha shed was closed as usual. It had no ventilation, and the vapor, more copiously given off than usual, on account of the heat, accumulated. Monday morning the man in charge of the shed opened the doors, and immediately afterward, for some reason, lighted a match. A tremendous explosion followed, bursting the barrels, and lighting a violent conflagration which filled the whole neighborhood with smoke. The flames enveloped the bridge-girders above, twisting them so as to strain, and finally to break, the gas-mains supported by them and adding a flood of gas to the fuel. Nothing could be done to the fire, but, by prompt measures, the gates in the gas-mains were shut, cutting off the supply, and, after setting guards in the neighboring streets, and on the railways, the naphtha was allowed to burn itself out.

WE have described the new system of railway management, put in operation in Hungary a year or more ago, by which the whole territory served by the State railroads was divided into zones, with a tariff of fares, by which a passenger from any zone could travel to any other zone, at a fixed price for each zone traversed. The zones in the less thickly settled portions of the country were purposely made much wider than those in the more popular sections, so as to encourage travel in the wilder regions, and fill up the trains in that part of their route, by the temptation of fares, low in proportion to the distance traversed. This is the exact opposite of the ordinary system, under which the fares in populous districts, even where there is no competition, are nearly always low, while those in remote places, where passengers are few, are very high; but it has a reasonable foundation, in the observation that the trains on the outlying lines, which hardly pay for the expense of running them, even at high rates, owing to the scarcity of passengers, might be run at a profit, at much lower fares, if the number of passengers could be sufficiently increased. After a year's trial, the practical wisdom of the new system appears to be demonstrated. While the rate of fares, for the vast majority of passengers, who use the short lines in the neighborhood of the large cities, was not materially changed, and the regular suburban movement was probably not much affected, an enormous, and almost incredible, increase took place in the travel over the long lines, so that between August

1 and May 1 of last year more than ten million passengers were carried, against something over three and one-half millions during the same period in the year before. This increase of traffic, which far exceeded anything that the promoters of the new plan had anticipated, much more than made up for the difference in rates of fare, and the total receipts from passengers during the first nine months of the new system were twenty-one per cent greater than during the corresponding period of the preceding year. How great was the increase in net profits, we are not informed, but it was probably considerable, and the railways will apparently make a very large indirect gain, by the encouragement given to settlement and development of the country dependent on its remoter lines. The circumstances of some of the great railroads in our own country are so much like those of the Hungarian lines, that it seems probable that a similar system might be adopted on them with advantage. Nothing is so valuable to a railroad as a prosperous, well-settled country along its own lines, which will give paying business to every mile of the road, and is not liable to be interfered with by competing lines, as the traffic of important single points usually is. The experience of Hungary shows how powerful an impetus can be given to settlement by a judicious and systematic reduction of local fares, and there would certainly be no great difficulty or danger in trying the experiment.

LE GENIE CIVIL, which has interested itself considerably in cryptography, or the art of sending secret messages, describes a new cryptograph, patented by M. Ch. W. Kronberg, which seems to be easier to use than most things of the kind, while the messages written with its help appear almost completely indecipherable, the peculiarity of it consists in making the key itself variable. We all know the ancient cryptograph, which consisted in a piece of card, with holes cut through it irregularly. Each party to the correspondence had a similar card, and messages were written by placing the key-card first on the paper, writing the words of the real message through the openings; then taking off the key-card, and filling in the blank spaces with unmeaning sentences. The receiver of the message would apply his key-card to the paper, and would read at once, through it, the communication intended for him. The Kronberg cryptograph is not very unlike this, but the key is movable, and admits of almost infinite changes. It is very simple, consisting of five discs of pasteboard, with a pin stuck through the middle. Each disc is a little smaller than the one under it, and radii, drawn from the central pin to the circumference of the largest disc, divide the visible portion of each into twenty-six equal parts. In the divisions of the exposed part of the largest disc are marked the letters of the alphabet, in order. The next disc bears numbers, from 01 to 26, each number being written with two figures. The third disc has numbers from 27 to 52; the fourth those from 53 to 78, and the smallest has numbers from 79 to 00, with four blank spaces to spare. To use the apparatus, the parties to the secret correspondence to be carried on with it, agree upon a number in each of the inner rings which shall be set under the A of the outer ring. The numbers which then fall under each letter of the alphabet are used in place of that letter, employing the number in the ring nearest to a letter for that letter, the first time it occurs in a word; the number in the next ring for the second occurrence of the letter in a word; the number in the third ring for the third occurrence; and that in the inner ring for the fourth occurrence.

THUS, supposing that 01, 27, 53 and 79 are the numbers chosen to set under A, and it is desired to write "Alabama." The first A is represented by 01; L by 12; the second A by 27; B by 28; the third A by 53, M by 13, and the fourth A by 79. The word will then read, 01122728531379. It would be quite possible, it seems to us, to use the cryptograph by choosing at random any of the four corresponding numbers to represent a given letter, and such a method would have the advantage over the one described by the inventor of not betraying how many times any letter occurred in a word, which gives a dangerous clue for deciphering the message, if it should fall into hostile hands. As all the discs are readily movable, the possessor of each should be careful never to leave it set at the proper key. He can readily carry in his mind the agreed order of numbers, and set it afresh whenever he needs to use it.

AUSTRIAN ARCHITECTURE.¹—VI.

GOTHIC ART IN AUSTRIA.—III.

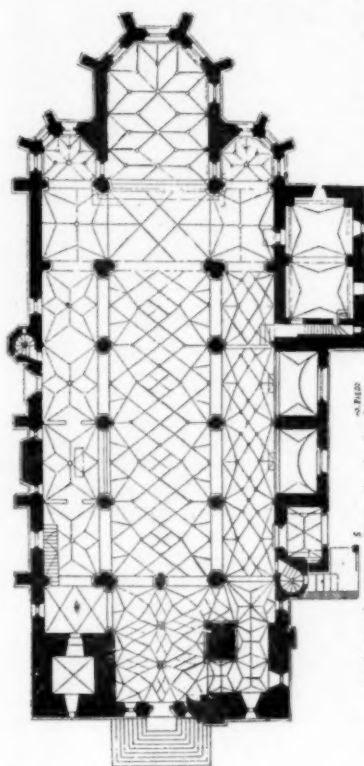


Fig. 13. Plan of the Church of Maria Saal (Carinthia).

IN Carinthia, also, the Romanesque remains are considerable; and Romanesque traditions are found perpetuated here during the Gothic period. One of the oldest Gothic constructions in the province is the church of St. Leonhard, belonging to the end of the fourteenth century and the beginning of the fifteenth. Here, too, we sometimes see, as at Murnau, a wholly Romanesque basilican disposition, clothed in Gothic forms. Even the rhythmic alternation of the pillars and columns is Romanesque.

The church of Maria Saal (Figures 13, 14, 15), erected in the fifteenth century on the foundation walls of a Romanesque construction, the two western towers of which are still preserved, closely resembles in its ensemble the church of St. Leonhard.

One group of fifteenth-century Carinthian churches, shows the adoption of a Renaissance constructive element; the vaults are barrel-vaults, with a coating of plaster imitating the arrises



Fig. 14. View of the Church of Maria Saal (Carinthia).

of the Pointed style. The aisles are of equal height. Such are the parish churches of Villach, St. Stephen, Kötschach and St. Hermagor, in the valley of the Gail.

The same construction occurs in a few aisleless churches,

¹From the French of H. Semper, in Planat's "Encyclopédie de l'Architecture et de la Construction." Continued from page 81, No. 716.

among which may be noted, on account of their harmonious proportions and beauty of details, the two churches of Laas and Maria Feucht, of the fifteenth century.

At Salzburg, we see, likewise in the conventual church on the Nonnberg [fifteenth century], a Romanesque plan similar to that of St. Leonhard, while in the construction of the vaulting the same imitating system is employed which was noticed above.

More original is the conception of the Franciscan church at Salzburg [fifteenth century], which reproduces the system adopted in the Cistercian church of Zwettl, or, in a certain measure, that employed in the French church of Pontigny. The aisles of the Franciscan church date from the thirteenth century and belong to the German transitional style. The effects of light and shade and the combination of lines

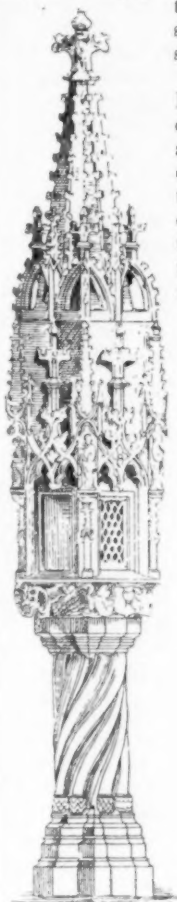


Fig. 15. Ciborium from the Church of Maria Saal.

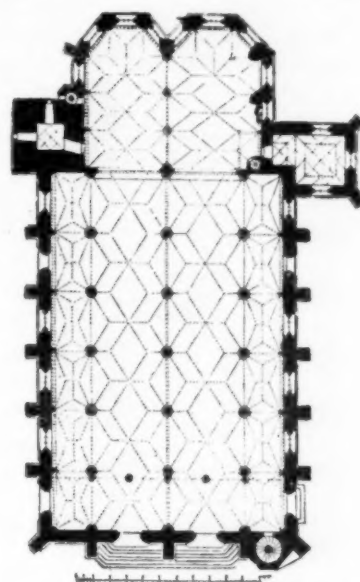


Fig. 16. Plan of the Church at Schwatz.

in the choir, as one looks toward the darkened nave, are marvellous.

A choir of the same type may be seen in the parish church of Botzen in Tyrol; similar effects of contrast are obtained here adown the low gloomy aisles; these aisles were constructed about 1340, on a Romanesque plan, though they are of the same height. The church is adorned with a beautiful tower in the flamboyant style, with a pyramidal spire of open fretwork. It was constructed in the sixteenth century by the youthful architect Hans Lutz, of Schussenried.

The choir in the hospital church at Meran [1486] also reproduces the Botzen conception, and is noted for its rich sculptural details. The same method of treatment is discernible in the details of the parish church of Meran and suggests that the same hand directed both works; in both edifices, lofty,

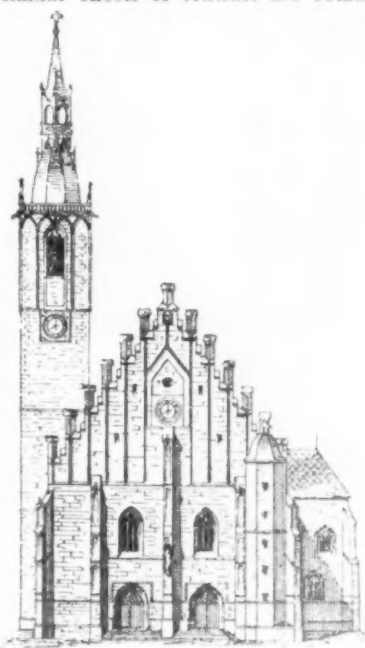


Fig. 17. Church at Schwatz.

circular columns support the aisles which are of the same height; but the side-aisles terminate in polygonal apses instead of bending around the choir. The façade of the Meran church is constructed of brick and buttressed; it is adorned with niches in the Pointed style, and crowned with a pediment *à gradins*, the whole being capped by turrets and battlements; the type is a common one in Tyrol, and seems to belong to civil or military rather than to religious architecture.

Similar façades are seen in the churches of Schwatz (Figures 16, 17), Rattenberg, and Hall in the valley of the Inn, all of which date from the fifteenth century; their aisles are of the same height, a disposition which prevailed throughout Tyrol at this period. The churches of Rattenberg and Schwatz have only two aisles and each terminates in a choir. All of these churches, to which the Franciscan church at Schwatz must be added, are apparently the work of the same master; they certainly belong to the same school.

The parish church of Feldkirch is another two-aisled church; but it has only one choir; this is divided by four columns into three aisles.

In the parish church of St. Paul [sixteenth century], near Botzen, the system adopted for the choir of the parish church of Botzen is found repeated.

In Tyrol, more than in any other province of Austria, the predominating type is that in which the aisles are carried up to the same height. I find it in the parish churches of Sterzing, Seefeld, Imst, Kufstein, and in the Franciscan churches of Boren and Innsbruck. The only churches with the naves higher than the aisles are those of Landeck and Lienz, of the

fifteenth century. The last is remarkable for the wealth of its details, in a fine flamboyant style; especially in the decorations of the pretty little crypt beneath the choir. The aisleless church at Obermauern, with beautiful vaulting ribs, is doubtless attributable to the same master.

Churches in which the nave forms a single hall without aisles are common in Tyrol; they often contain interesting architectural solutions and charming details, but we have not space to name them.

In Galicia there are only two Gothic churches of sufficient importance to merit notice here. They are both at Cracow, we recognize in them the influence of the school of Breslau. The Cathedral of Cracow was founded in the twelfth century; nothing remains of it except the crypt beneath the choir. The choir was constructed under King Ladislaus, about 1320;

it was made much longer than the aisles themselves because the edifice was to serve as the coronation church of the kings of Poland. They assembled here on these solemn occasions, with all the court, and the nobles and representatives of the kingdom. It was for the same ceremonial purposes that the aisles of the choir, which was separated from the three bays of the nave by a transept, were carried on around the rectangular sanctuary.

The irregularity of the plan is further augmented by chapels along the side-aisles. The position of the two fantastic towers is also wholly irregular. The pillars of the naves are strengthened by a species of buttress attached to them, which have

made it possible to dispense with exterior flying-buttresses; the ribs springing from pillars, which are destitute of capitals, are well profiled. The windows in the upper wall of the nave, flanked by imitation pointed arches, are also interesting.

In the Dominican church at Cracow, which was founded in the thirteenth century, but rebuilt in the fifteenth, the choir is rectangular and the nave is loftier than the aisles. The pillars are buttressed in a similar manner to those in the Cathedral. The church is built of brick like St. Mary's at Cracow (Figure 18). The latter is constructed on a plan which is often encountered

in Austria; the aisles form almost a square, and the sanctuary is of the same length and breadth as the nave. Both churches have side-chapels.

In Hungary, we find in the Benedictine church at Edeburg a plan nearly identical with that just described. The church was built at various periods of the fourteenth and fifteenth centuries by German masters. The gallery, running around the nave above the side-aisles and giving access to a tower on the northern side, dates, like the ribbing of the nave, from the end of the fifteenth century, but the former ribs

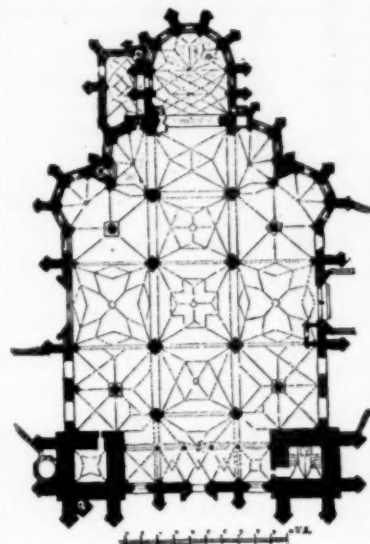


Fig. 19. Plan of the Cathedral of Raschau.

and the archivolt, as well as the aisles and choir, still exhibit forms belonging to the finest types of the radiating style. Owing to its slender and noble proportions and the elegance of the tower the edifice presents a charming silhouette, notwithstanding its simplicity.

The church of St. Michael at Edeburg, erected by the Emperor Frederick III, at the end of the fifteenth century, is a fine example of the flamboyant style. It has a transept of the same height as the nave, and galleries over the chapels on both sides of the choir. There is a projecting tower in the centre of the façade, the open basement of which forms the porch of the church.

The most important Hungarian Gothic church is the Cathedral of Raschau (Figures 19, 20), of the fourteenth and fifteenth centuries. Its interesting but complicated plan shows the influence



Fig. 20. View of the Cathedral of Raschau.

of such French and Rhenish constructions as St. Yvo's at Braisne and the Church of our Lady at Trèves; but the architect undertook to combine a central and a basilican disposition, without, however, fully succeeding; the whole was spoiled mainly by the unfortunate placing of the two towers. The illustration makes a more detailed description unnecessary. The defect of the interior disposition is clearly revealed in the façade, notwithstanding the decorations; the broken appearance

is further augmented by the huge buttresses with which it is divided. However, the magnificent portals and the noble architecture of the choir, which is in the most beautiful radiating style, command our admiration.

In Croatia the Pointed style is unrepresented except by edifices of an advanced period, which bear the impress of the German Gothic. We will cite only the Cathedral of Agram: here also the plan, with three naves without a transept, and three apses, probably dates from the Romanesque period of its reconstruction, about 1242; to this period we must also attribute the two towers of the façade, only one of which has been completed. The choir and the adjacent sections of the side-aisles belong by their pure, pointed forms to the end of the thirteenth century and to the fourteenth century, while the three western bays of the aisles date from the end of the fourteenth. The vaulting ribs and the choir windows show even the flamboyant style of the fifteenth century.

[To be continued.]

APARTMENT-HOUSES.¹—II.

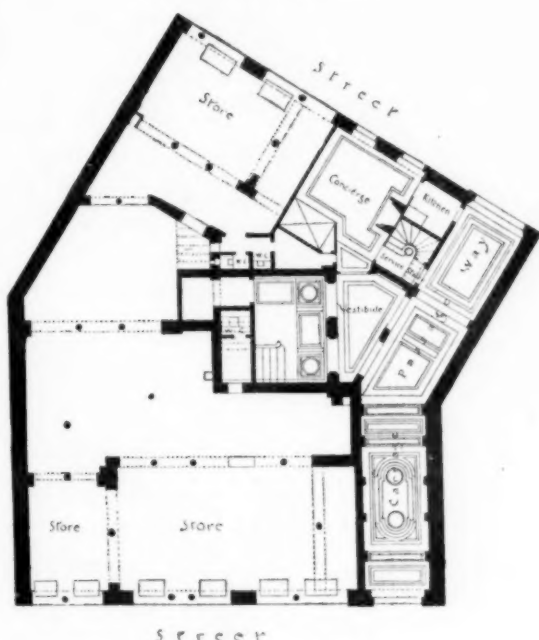


Fig. 4. Apartment-house in Paris with Carriage Passageway. MM. Lemonnier & Vergnon, Architects. Street Plan: After *La Construction Moderne*.

CURIOUSLY enough, the first inspiration for the improvement of these buildings in this country came from Paris, through the adoption by our architects of some of the ideas which they found in travelling abroad, and in studying the French architectural publications; and the tenements in which some regard was paid to providing light and air for the bedrooms were for a long time distinguished as "French flats."

The means adopted here for this purpose were not at first very successful. To break up the outline of a plan as the Frenchmen did was too great an innovation to be thought of; and what illumination the bedrooms received was derived from "light-wells," the *courrettes* of the French architects; but, instead of masonry, our courrettes were surrounded by walls of wooden studding, lathed and plastered. The light which penetrated through them to the lower stories was feeble, though better than nothing; but the wooden wells had the serious objection that they conducted the flames almost instantly from story to story, in case a fire broke out anywhere in the building. Many fatal disasters showed that a change must be made in this respect, and the architects attacked the problem once more, adopting finally the French system, of varying the line of the outside walls, so as to have the rooms defended by solid masonry from any fire that might find its way into the courts or courrettes. Having reached this point, they began to develop rapidly a system of American apartment-house planning which, if not generally so skilfully carried out in detail as the work of the French architects, is more original, and more successful from a hygienic point of view. In order to comprehend this system thoroughly, it will be found advantageous to study first some French plans, which not only show similar requirements more simply met, but contain suggestions which have not yet been utilized, and may some time prove very valuable. The court-yard, for example, of the Paris houses is as yet almost unknown here, a few apartment-houses only, such as the Dakota, in New York, possessing

¹Continued from No. 770, page 195.

a dreary substitute for the most attractive part of a Parisian building; yet the advantages in planning offered by the court are very considerable. It gives a safe, pleasant and sheltered place, under the eye of the janitor, where tenants can enter, but thieves cannot, and where children can play, out of the street; and last,

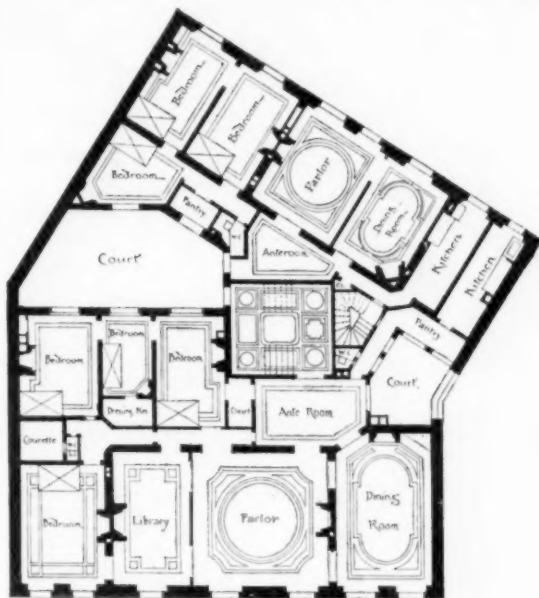


Fig. 5. Apartment-house in Paris. MM. Lemonnier & Vergnon, Architects. Plan of Upper Stories: After *La Construction Moderne*.

but not least, if it is furnished, as it should be, with a "loge de concierge" opening out of it, it affords an abiding-place for the janitor, who is an essential attachment to a modern American apartment-house, but who generally, for want of any other place to go to, has to lurk about in the boiler-room, where he is neither comfortable himself, nor particularly useful to any one else. It is not at all necessary to have a carriage-drive into the court, and many Paris

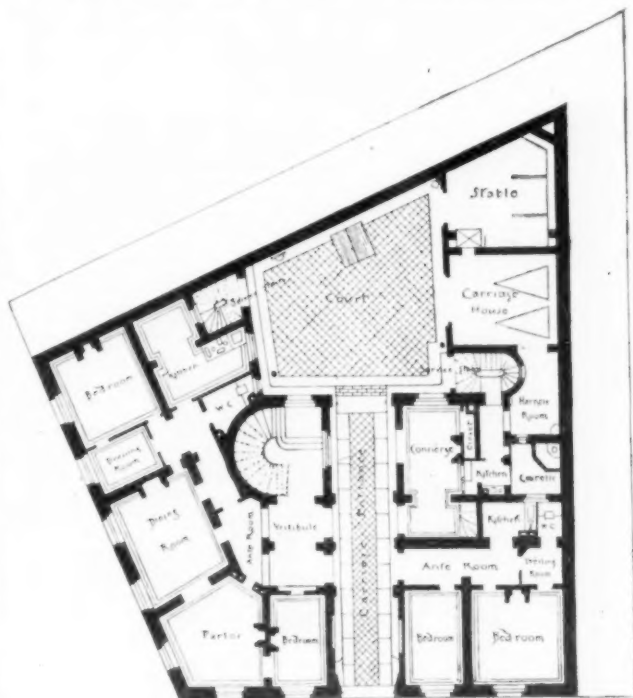


Fig. 6. Apartment-house with Carriage Entrance and Court. M. Vaudremer, Architect. Plan of Ground Floor: After *L'Encyclopédie d'Architecture*.

houses are not so arranged; but it is certainly desirable to have a porte cochère of some sort, by which people may enter and leave their carriages in comfort and under shelter, instead of being obliged to pick their way, often through a rough crowd, across a filthy sidewalk, to the waiting vehicle, as is now the rule here. The clever plans, Figures 4 and 5, by Messrs. Lemonnier and Vergnon, for a house near the intersection of two streets, show a convenient

passage-way for carriages, extending through the building from street to street, covered by a skylight at the main vestibule, and serving also the kitchens beyond. As it is not required to turn around in the passage-way, it does not take much space out of the building, and the court proper, which is entirely enclosed, is put in



Fig. 7. Apartment-house in Paris. M. Vaudremer, Architect. Plan of Upper Stories: After *L'Encyclopédie d'Architecture*.



Fig. 8. Carriage Entrance to a Parisian Apartment-house. M. Dainville, Architect: From *La Construction Moderne*.

another place, where it better suits the plan of the rooms above. Before leaving these plans, notice should be taken of the skill with which one handsome front staircase, and one service staircase, are made to answer perfectly for the two suites on each floor; and the ingenuity with which all the rooms are lighted. A defect in the plan,

which might easily have been avoided, is the opening of one of the chambers out of another. The servants' rooms in this house, by the way, are all collected in the attic.

In houses on a larger scale, a court-yard large enough to turn a carriage around in is the most economical arrangement, and this court-yard, guarded by one or more concierges, is often made very attractive. Figures 6 and 7 give two plans of a well-arranged house by M. Vaudremer, with two small suites on the entrance floor, and one handsome one on each floor above. Here, one side of the court-yard is occupied by a stable for three horses, and a carriage-house for two carriages; a very convenient arrangement, whatever Boards of Health may think of it. In houses of still greater dimensions, extraordinary ingenuity is displayed in keeping the court-yard attractive and private. Figure 8 gives a view of one of the two entrances, and Figure 9 a view of the interior of the court-yard, of one of the largest apartment-houses in Paris, built on the site of the Jardin Mabille, by M. Dainville. Figure 10 gives the plan of the ground-floor, a marvellously skilful piece of work, which we earnestly commend to the attention of architects. From this it will be seen that the court-yard is guarded by eleven concierges, of whom two are stationed at the two entrances from the street. More than this, however, although provision is made in the building for a great number of private carriages, no carriage drives across or through the court-yard, except to take up its proprietor, or his guests, at his door, which, if not situated under an archway, is covered by an iron and glass awning, or *marquise*. All servants and tradesmen, likewise, by a wonderful piece of planning, are excluded from the court-yard; every service stairway, for the eleven suites on each floor, being reached by a special path, well lighted and ventilated, which can be entered at either end of the building, and communicates, unobserved, with every part.

Figure 11 gives the plan of the upper stories of this remarkable structure. It will be observed that the apartments are provided with lifts, an unusual novelty in a Parisian house; but there is not yet a passenger elevator, a luxury which an American would consider indispensable in such a house, but which the Parisian is content to find only in hotels. Particular notice should be taken of the apparent simplicity of the plan, the symmetry of the court-yard, the cleverness



Fig. 9. Court-yard of Apartment-house in Paris. M. Dainville, Architect: From *La Construction Moderne*.

with which its outline is arranged to give light to the rooms in the inner corners, always the points of greatest difficulty, and the ingenuity with which a symmetrical, or at least a pleasing outline, is given even to the irregularly-shaped rooms. The arrangement, like all very thoroughly studied work of the kind, looks, and is, simple, but

if any one thinks that such a plan is easy to make, he had better get a piece of paper and try one for himself.

As an instructive contrast to M. Dainville's work, we present next a German plan, that of a house on the Kaiser Wilhelm-strasse, in Berlin, Figure 12. Here the architect, as will be observed, has been signally defeated by the difficulties of the interior angles. Not only are they abandoned to large, dark and useless spaces, but there seems to have been no way thought of for getting around them, or even around the

But if this plan does not show the best work of the German architects, it is far from exhibiting the worst. Figure 13 gives the second-story plan, which we borrow from the *Wiener Bauindustrie-Zeitung*, of a house at Linz, a large city in Austria. Anything more artless than the arrangement it would be difficult to imagine. The parlor is on the corner, it being well known that a corner room, particularly when it has a bay-window in it, is very pleasant for a parlor. Singularly enough, the walls of the parlor do not intersect happily with



Fig. 10. First Story of Apartment-house in Paris. M. Dainville, Architect: After *La Construction Moderne*.

rooms next to them, and the consequence is, that, as will be seen, in the corner suite six rooms, which we mark "P," out of the ten rooms which compose the suite, are simple passage-ways to the rooms beyond them. Some German planning is better than this, and a few of the modern apartment-houses, in which French models have evidently been studied, are very well arranged; but the practice of making the larger rooms vestibules to the smaller ones beyond them is very prevalent all over Germany, and particularly so in Berlin.

the corridor walls, and the consequence is that there is no way of getting a door from the corridor into the room. However, such misadventures must be expected in such difficult work as house-planning, and the people who wish to get into the parlor can go through one of the adjoining rooms. Rather unfortunately, as we should think, the adjoining rooms have also their destination fixed, the small one being marked "Arbeitszimmer des Herrn," or "Work-room of the Master of the House," while the large room on the other side is

the "Eltern Schlafzimmer," or "Parents' Bedroom;" so that visitors have to choose whether they will get into the parlor through the room where papa sits, comparing the monthly bills with his bank account, or by penetrating the seclusion in which Madame may be preparing her toilette for the festivities of a later hour.

Worse than this, the same "Eltern Schlafzimmer" forms also the only passage-way to the "Speise-zimmer," or dining-room, except

At the other end of the apartment we find a state of affairs hardly less eccentric. Next to the master's workroom is the "Wohn-zimmer," or sitting-room, and beyond this, in the corner, is the "Mädchen-zimmer," or young ladies' bedroom. Adjoining this, again, is the "Knaben-zimmer," or boys' bedroom. The latter has an entrance from the corridor, but the singular fatality which attends planning has ordained that the young ladies' room should be without



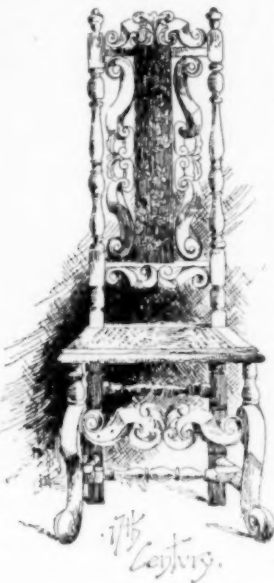
Fig. 11. Upper Stories of Apartment-house in Paris. M. Dainville.
Architect: After *La Construction Moderne*.

through the kitchen; so that, as there are no closets whatever in any of the rooms, guests who stay to dinner must get from the Salon, or the corridor, either through the parents' bedroom, where they can study on the way the fashion of mamma's dresses, and count the number of papa's pairs of pantaloons, or through the kitchen, where, if they are so fortunate as to escape the fury of the cook, they can have the gratification of learning what they are going to have to eat.

an outside door, and entrances are made to it from each of the adjoining rooms, with the result that if one of the occupants wishes to take a bath, she must get to and from the bath-room, which opens from the corridor, either through the family sitting-room or the boys' chamber.

[To be continued.]

ON THE USE OF GALVANIZED-IRON IN CONNECTION WITH DRINKING WATER.¹



The following are the results of my examination of the water: Composition —

	Parts per 100,000.
Free ammonia.....	0.4730
Albuminoid ammonia.....	0.0080
Chlorine.....	0.80
Total solid matter at 100° C.....	15.50

Nitric Acid.—Only faint traces by the acid phenyl sulphate test in 100 cc. in column seven inches in height in a colorless glass tube.
Sulphuric Acid (qualitative).—Small traces or none at all.
Injurious Metals.—Large amount of zinc in solution; identified by several appropriate tests.
Appearance.—Clear and colorless, there being no turbidity, no sediment deposited until exposed to the air for several days, when white flakes were observed at the bottom of the bottle.
Taste.—After-taste, very slightly astringent.
I subsequently determined the amount of the zinc in the remaining portion of the same sample, and found it contained 3.9 grains of the

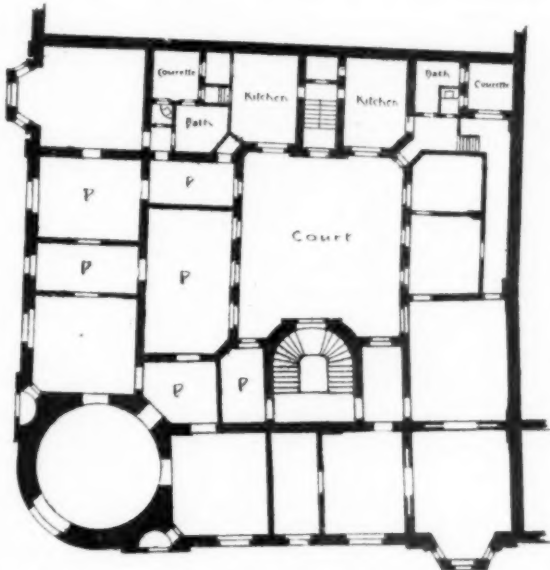


Fig. 12. Apartment-house in Berlin. Plan of Upper Stories: After the *Deutsche Bauzeitung*.

oxide of zinc per gallon, equivalent to 3.12 grains of metallic zinc. As this portion of the water was small, only one-quarter litre, I was unable to make a complete analysis, but in the following statement have supplied by calculation the amounts of sodium and carbonic acid, assuming that all the chlorine was combined with sodium only, and that zinc calcium and ammonia existed wholly as carbonates;

¹ A paper by Reuben Haines, read before the Chemical Section of the Franklin Institute, September 16, 1890, and published in the *Journal* of that Institute.

the small traces of sulphuric acid, nitric acid and magnesia, if present, being neglected altogether. This, I think, must be at least approximately correct, as the evaporated solids yielded considerable carbonic acid on treatment with HCl. The results are as follows:

	Grains per gallon.
SiO ₂ , Al ₂ O ₃ , and Fe ₂ O ₃	0.85
NaCl.....	0.77
CaCO ₃	1.30
(NH ₄) ₂ CO ₃	1.25
ZnCO ₃	6.52

Total solids..... 10.69

The total solids by actual weight in this portion were equivalent to 10.56 grains per gallon dried at 100° C.

In the above analysis it will be observed that the free ammonia is the only positive evidence of organic contamination in this water. The albuminoid ammonia, however, while scarcely excessive for a medium quality and usable surface-well water, seems rather too large

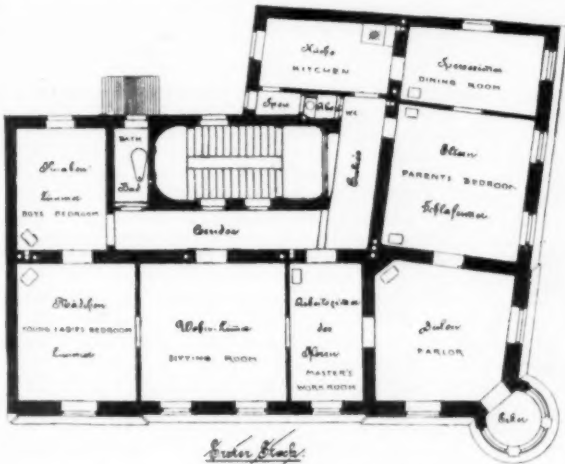


Fig. 13. Apartment-house, Linz, Austria. Plan of Second Story: From the *Weiner Bauindustrie Zeitung*.

for a deep well in the rock. The albuminoid ammonia should not exceed 0.0050 parts per 100,000, and is frequently not more than 0.0030, if the water is absolutely secure from contamination. The amount of chlorine is not more than is natural for many pure and soft well waters. The freedom from nitrates is rather remarkable, there being less than is found in some of the purest spring waters.

I ascertained that there was no cesspool drain, manure heap, or any other source of contamination within 200 feet of this well. At that distance there is a stable, but the stalls are drained by a cemented terra-cotta pipe, which is carried to a considerable distance further away from the well. As regards surface drainage, the well is favorably situated, being on higher ground than the stable. The nearest source of contamination on the adjoining premises is at least 500 or 600 feet distant.

In every respect, therefore, so far as known, the well appears to be properly protected as regards location. As, however, the well is deep and the amount of water abundant, it is reasonable to conclude that a water-bearing stratum draining a very large area, or perhaps a strong flowing underground stream has been tapped. Hence, the water may have become contaminated by sewage at a very great distance from the well. Such instances have been known to occur. In this way I am inclined to account for the free ammonia in this water, which has possibly been increased by reduction of nitrates previously present in the water, induced by contact with iron and zinc.

There can be no doubt that the water has been, somewhere in its course, contaminated with a large amount of nitrogenous organic matter, probably animal sewage.

A peculiar feature of this water is the large amount of zinc which it contains, and the fact that the whole of it is in solution. On heating or partial evaporation, the zinc separates as a film on the surface of the water.

That water has a solvent action upon metallic zinc has been known for a long time. As early as 1778 it was alluded to by M. de la Falie, a French physician and chemist. Thenard and Gay Lussac, and, in 1813, Vanquelin and Dryeux reported upon it to the French Academy of Sciences. Chauffele, in 1848, and Payen and Chevallier, in 1854, confirmed it experimentally as regards ordinary water and even distilled water. Similar results have been reported by others since that time. In most of these cases, only traces or very small amounts of zinc were dissolved. Prof. W. R. Nichols, of Boston, some fifteen years ago, stated that he always expected to find zinc in water which passed through galvanized-iron pipe. He found that Lake Cochituate water, which had remained undisturbed in pipes at the Massachusetts Institute of Technology for thirty-six hours, the pipes having been in use for eight or nine years, contained a small amount of zinc in suspension, and 0.062 grain per gallon in solution.

In another case, when the analysis of the water gave suspicious evidence of contamination with sewage, he found a trace of zinc in suspension, and 0.843 grain per gallon in solution.

The mode of action of common potable water on zinc is understood to be, first, the formation on the surface of the metal of a coating of oxide of zinc, which is then acted upon by the carbonic acid generally present in the water, converting it into a mixture of oxide, carbonate, and, according to Pettenkoffer, an oxyhydrocarbonate, or as now termed, hydrated basic carbonate, which gradually becomes more or less separated from the metallic surface and is carried in suspension or forms a film on the surface of the water, while a small part dissolves.

In the case before us, I think the oxide and carbonate of zinc have combined with the carbonate of ammonia to form the double carbonate of zinc and ammonia, which is insoluble in water, but very soluble in carbonate of ammonia, the excess of carbonate of ammonia in the water, thus holding it in solution. This combination of salts is decomposed by boiling water or by heating on the water bath.

I found that both commercial zinc and chemically pure zinc, each in the coarsely "granulated" or feathered condition, were rapidly acted upon by a cold dilute solution of carbonate of ammonia, from which, after twenty-four hours' contact with zinc, a copious precipitate of zinc sulphide was thrown down by H_2S after acidifying with acetic acid.

It is not unusual to find considerable zinc in suspension either as hydrated oxide or carbonate in waters, for instance, that have been retained for some time in galvanized-iron "circulating-boilers" in dwellings, especially in the case of new boilers.

I once had in my possession a piece of lead pipe which had connected a "circulating-boiler" to the "water-back" of the kitchen range, and which at one point was almost completely stopped up with a reddish-white deposit; and this deposit proved to be composed principally of oxide and carbonate of zinc, derived, no doubt, from the galvanized-iron boiler.

I have also observed in one instance a scum or film of zinc hydrocarbonate almost completely covering the surface of the water in a cedar tank after the water had entered this tank through several hundred feet of galvanized-iron pipe leading from a spring-house. The spring water had been until near that time quite pure, but was contaminated, during heavy rains, by a shallow well a few feet distant, which contained decaying vegetable matter and the water of which yielded a large amount of free ammonia, but gave no evidence of sewage pollution.

There can be no doubt that, like the case of the artesian-well before us, the excessive amount of ammonia in the spring water had a solvent action on the zinc coating of the galvanized pipes, but that on free exposure to the air in the tank the hydrocarbonate of zinc was separated, as it appeared in a crystalline film on the surface of the water.

The amount of zinc thus carried into the water, either in suspension or in solution, appears to depend not only on the impurities in the water, but also upon the quality of the galvanized-iron; both as to whether the process of coating with zinc has been properly done and as to the purity and texture of the zinc itself. If, for instance, the iron has been allowed to become spotted with rust, even if the rust is apparently well cleaned off before dipping the iron surface into the zinc bath, a more rapid corrosion, it is said, is liable to occur when the zinc article is immersed in water.

As regards the injurious effects of potable water containing zinc, the zinc oxide or carbonate carried in suspension in any large amounts would not be likely to cause trouble to health, because most people would usually refuse to drink any water so turbid without filtering it. Hence, only the smaller amounts of suspended zinc and that which is in solution need be considered.

While it is true that in the case of the artesian well described in this paper no chemist would be likely to advise the use of this water on account of the strong suspicion of sewage contamination, yet it is suggestive of possibilities where the water is not submitted to a chemist for examination.

An interesting paper on the use of zinc or galvanized iron for the storage and conveyance of drinking water was contributed by Dr. W. E. Boardman, of Boston, to the Fifth Annual Report of the Massachusetts State Board of Health, 1874, the object of which was stated to be to determine, if possible, whether such use of this material was attended with danger of zinc poisoning, this having been asserted in the Boston *Journal of Chemistry*, in commenting upon cases of illness occurring at Spot Pond, Melrose, Mass., in 1871.

To this paper I refer as a concise statement of the opinion of numerous distinguished authors from 1795 to 1872.

"From this *résumé* of opinions and facts," says Dr. Boardman, "it may be confidently asserted that the oxide of zinc as it occurs in drinking water is absolutely harmless."

With regard to the carbonate of zinc, he says: "The almost universal testimony appears to point conclusively also to the innocuity of this compound."

The above conclusions are in regard to that which is in suspension only. As regards the effects of zinc in a soluble form, Dr. Boardman says: "Admitting, then, that water which has been stored in reservoirs or drawn through pipes of galvanized-iron always contains zinc in solution in the form of one or more of its salts, the innocuity of those salts in the quantities in which they occur is attested by the experience and experiments of the various distinguished observers to

whom we have already referred. While they admit the deleterious influences which may be occasioned by the soluble salts of zinc when taken internally in sufficient quantity or for a long time, they are unanimous in the recommendation of the use of zinc for the storing and conveyance of water." [*The italics in the above quotations are the writer's.*]

In most of the cases considered only a very small amount of zinc was found in solution; and Dr. Boardman expressly states that he does not include in his consideration the effects of waters obviously unfit for drinking on account of sewage pollution or other abnormal qualities.

Dr. Boardman, in the above mentioned *résumé*, has followed the older writers on *Materia Medica*, but since the publication of his paper, opinion seems to have become somewhat modified.

Dr. Bartholow, in his work on "*Materia Medica and Therapeutics*" (3d ed., 1880, p. 229, *et seq.*) says of the physiological action of the salts of zinc: "The preparations of zinc are active in proportion to their solubility and power of diffusion. The chloride, sulphate and acetate are the most active, and in the order in which they are placed; the carbonate and oxide being insoluble have very feeble diffusive power and possess consequently very slight activity."

"Long continued use of the sulphate, even in small medicinal doses, may excite ulceration of the mucous membrane. The oxide and carbonate, although insoluble and inactive, slowly produce systematic effects."

"All of the salts of zinc when long continued may produce a train of symptoms not unlike those caused by lead, viz: Emaciation, pallor, loss of strength, constipation and colic, muscular weakness and trembling, paralysis, etc."

"The oxide in large doses and used for a long period has produced wasting, and fetid breath, gastro-intestinal catarrh, weakness and feeble mind."

"The zinc salts manifest much less tendency to accumulate, and are excreted much more rapidly than mercury, lead and copper."

The symptoms above described by Dr. Bartholow are, of course, to be understood as produced by very much larger quantities of zinc than ordinarily occur in water. Nevertheless, the older opinion of the almost absolute innocuity of the more insoluble forms appears to be seriously questioned, and our sense of security is correspondingly somewhat disturbed.

That zinc may also occur in a soluble form in drinking-water in quantities which may be almost called medicinal is shown by the analysis of this artesian-well water. It is now well known that as regards lead, the long continued daily use of water containing a small fraction of a grain of the metal in a gallon has had distinctly marked effect upon the system, and the chemist is advised to condemn a water carrying more than one-tenth of a grain per gallon. This is largely in consequence of the cumulative power of this metal. Zinc not possessing that power in so great a degree is proportionately less injurious.

It is true that large communities have been accustomed to drinking water slightly contaminated with zinc without any effects being apparent that could be attributed to it. Thus we may instance a large experience in this city and vicinity.

And, again, I find in *The Analyst* (vol. iv, p. 51), an abstract of a paper by E. Hylins, in which he says that the presence of minute quantities of zinc does not seem so injurious to health as is generally believed. That author analyzed a sample of spring water from Tuttendorf, in Germany, and found it to contain 0.007 grams of zinc oxide per litre, equal to 0.49 grains per imperial gallon; and he was assured that the water had been drunk by the population for about a century.

This sort of evidence is, however, not conclusive by itself, for many obscure symptoms which may really be caused by small amounts of metallic poisons are liable to be attributed to a variety of other causes. The same argument may be used with regard to a public water-supply from a river decidedly polluted with sewage. In the absence of an epidemic, it is often very difficult either to prove or disprove the precise deleterious effects of sewage-polluted water-supply on a large city.

In the same manner it has been shown that in the case of a town in Scotland, supplied with water containing a very large amount of sulphate of lime, the inhabitants did not appear to suffer any injurious consequences from drinking such a water. Yet it is a well-established opinion among sanitarians that excessive amounts of sulphate of lime in drinking-water are undoubtedly productive, as a general fact, of diseases of the digestive organs.

Still it must be conceded that the weight of practical opinion is decidedly on the side of the innocuity of the use of galvanized-iron for water pipes. Thus, as a result of a discussion at a meeting of the German Society of Gas and Water Engineers, H. Bunte collected in 1887 information to show that the use of galvanized pipes should be in no way detrimental to health. Dr. V. Elmann, late Director of the Water-supply of Würtemberg, stated that objection to such pipes cannot be taken on sanitary grounds, and he considered them peculiarly suitable for use in the interior of buildings.

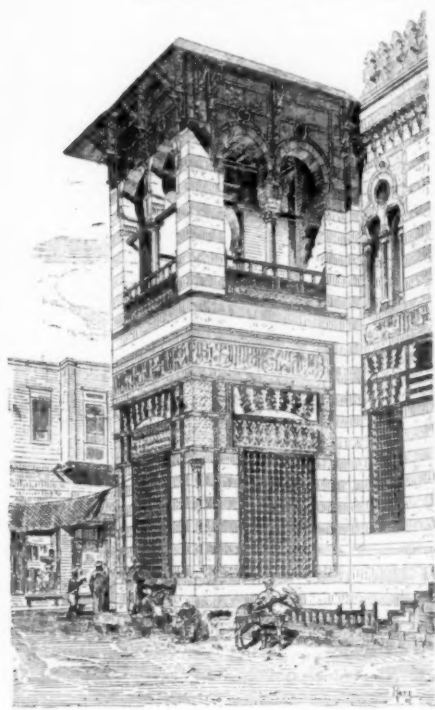
English authors on sanitation have always been opposed to the use of zinc for roofs which are to be utilized for the collection of rain-water for drinking and culinary purposes.

Neither should lead or lead-coated sheet iron, called *terne plate*, for roofing purposes be used under such circumstances. Sheet copper is equally objectionable. All these metals or metallic combinations,

if unprotected by a suitable paint, will be corroded by the free acids frequently found in the atmosphere of rural localities as well as of cities; and, also, by the ammonia always more or less present in rain-water, which exerts a solvent action upon copper. The corrosion of copper by the impurities of rain-water is known from practical experience with copper-roofed buildings in Europe.

In conclusion, therefore, it may be said that while under usual conditions of water-supply with pure water, galvanized-iron pipe may be advantageously used for its conveyance without detriment to health; yet, too much confidence should not be placed upon it. All the conditions under which the zinc pipe is to be used should be carefully considered, including a chemical analysis of the water; and, in the presence in the water of considerable amounts of certain saline substances, such as ammonia salts, chloride of sodium and nitrates, as well as very small amounts of free mineral acids, etc., galvanized-iron should not be used at all. Under such circumstances, only pipes coated with a non-metallic interior surface should be used.

ANCIENT RUINS IN AFRICA.



Wall of the Sultan Ghouri, Cairo. From *Architektonische Rundschau*.

THE discovery of architectural ruins in unexpected places, the *London Spectator* says, is apt to excite the imagination a little too much. The discoverers jump too quickly to the idea that civilized races, of which all trace has been lost, erected the buildings, and then in some grave catastrophe, whether of war, or famine, or pestilence, passed suddenly away. So deep and abiding is the sense of the transitoriness of human affairs, that we all incline, without knowing it, to believe that there may have been many civilizations of which nothing has remained except a few edifices, or, as in Polynesia, a few arrangements in stone, or a few

figures hewn in some imperishable material. It is, at least, as probable that the civilizations of which we do know something threw out offshoots to distances greater than we fancy, and that the ruins which so excite our wonder are really the work of colonists who have been exterminated or withdrawn, like the people who founded Silchester and built the Roman Wall.

If we had lost the history of Rome, or had never known it, antiquaries would indulge in strange theories of the early history of Britain, and would seem, too, to produce good evidence for their dreams. Buddhism did not rise self-generated in Java, for all the testimony of the temples; and if we knew the history of Mexico as we know that of India, we should probably find that a conquering colony from Anahuac had, not two centuries before the Spanish invasion, carved the mysterious monuments of Yucatan. It is not our topic to-day, or we think we could show that the learned have made much history unintelligible by underrating the maritime adventurousness of the earlier races, and assuming, in spite of evidence like that obtainable in Madagascar, that the Hindoos were the only antique people who conquered far-distant transmarine countries, and, then under the operation of some unrecorded impulse, ceased to go to sea.

It may be that the bewildering account, published in the *Times* recently, of the Cyclopean ruins discovered in Mashonaland, indicates the existence there in ages before history of a comparatively civilized people, of whom we have lost all trace; but it is, at least, as probable that they were erected by an expedition or a colony sent out by a people of whom we have heard, to collect gold. The ruins are evidently those of a fortified camp or station, established, it can hardly be doubted, to control the enslaved population who worked the gold mines, and to protect the abler but scanty people who coerced and directed them, and took away, like the Spaniards in Peru, all transportable fruit of their labor. The choice of the knoll or headland; the long and mighty walls at its feet, broad enough for archers to walk on; the tall towers for observation; the huge walled court, or "place of arms," eighty yards in diameter,

where the garrison exercised in safety — all alike point to this object, the one on which, except their tombs and temples, the early conquerors spent most. Who they were may remain uncertain, but there is no reason which makes it peremptory that they should have been indigenous.

The Hindoos who conquered and held Java for generations could just as readily have ascended the Zambesi and organized some black tribe into a race of expert miners, and have guarded themselves in these buildings against their despair at their cruel and unending labor. So might the Malays who conquered Madagascar, and who remain to this day among the boldest and most adventurous of all maritime peoples. So might, and much more probably, the Arab people who founded the Sabæan Kingdom, who were certainly traders, and who would be drawn, as their descendants still are, by an irresistible attraction to the great and immensely wealthy continent just opposite their doors. And so, above all, might the Phœnicians. We do not know how far that adventurous and cruel race had reached southward along the coast of Africa; but we do know that Solomon's agents, who can only have been Phœnicians, brought back gold and ivory from some place which must have been in Africa, or "India" in its large sense — the elephant not existing elsewhere — and we do know that the Phœnicians made voyages almost as distant and far more dangerous.

They reached Cornwall and the Canary Islands, and may easily have reached Delagoa Bay. We know, too, that they were experienced metallurgists: that they hunted their world for profitable mines, in Sardinia, in Spain, and even in Britain; and that they kept the stories of their successes as strict trade secrets. They might have heard from some trader that there was gold in a country below the Zambesi, and so hearing would have followed up their clue for generations, as, ages after them, the merchant-nobles of Italy pursued their commercial adventures. With ships like theirs, which could carry but few adventurers and armed men, they must have worked their mines by indigenous slave labor, and, cruel as they habitually were, would have needed, as they worked, just the fortifications we have found, from the top of which, it is mentioned, the whole country can be surveyed. Why they should have built with dressed stones, yet without mortar, with the use of which they must have been familiar, is not clear; but we may remark that this method admits of greater speed, and that the architects, whoever they were, made no blunder as to the strength and durability of their structures. There they are now, probably three thousand years after their erection, practically unhurt except by the jungle; whilst our scientifically constructed edifices in the tropics fade usually in three generations. It is a wonderful story, though not perhaps the pleasantest in the world for Englishmen, who have just taken the Phœnicians' place; but it is not wonder-exciting, like the dream that there was once in Mashonaland, in the very heart of Africa, a civilized indigenous race, which has for some unknown reason passed away. The negroes, or their race crossed with others, certainly never produced such a people, and who else can have inhabited Mashonaland?

The question we are raising, in far too slight a fashion, as to the work which has been done, or may be done, by colonies of the known races, is of grave historic importance. It is probable, more than probable, unhappily, that neither this generation nor any other, unless helped by a revelation, will ever penetrate the deep cloud which hangs over the earlier history of humanity, or ascertain beyond doubt even so much as the colors of the early emigrants who founded what we now know as divisions of mankind; but every limitation to the range of inquiry is some little help towards the completion of the task. The monuments which survive, such as they are, will give us some aid, if we can only be sure who made them; but if we are to imagine new races, inquiry becomes practically futile. We might almost as well accept the theory — Mr. P. H. Gosse's, was it not? — that Satan arranged the strata of the earth in order to deceive mankind, and then begin studying geology.

We can quite understand the fascination which induces many acute men to dream that existing races are but the débris of others which have passed away, that we know little more of the history of the planet than of the history of the universe, and that we may even yet make discoveries which will upset all prevalent notions as to all that has happened here below; but those dreams do not help rational investigation. If we find any evidence of extinct civilization higher than our own — say, a buried city in Australia, with proofs in it of forgotten sciences and arts — let us consider it with open minds; but pending its arrival we get no help from these far-reaching fancies. What we know is that a few people, all probably crossed with the blood of the white family which has shown such exceptional power of accumulating knowledge, slowly developed the arts, and acquired the self-restraint and power of consecutive thinking which are the bases of civilization; and what we have to do is to follow up, step by step, the traces of their influence in human history, how they spread, how their victims fled before them, what was the degree of intelligence to which they attained, and why in many instances they receded, or even passed away. That is an inquiry as fruitful and as interesting as geology or astronomy; but to be productive it must go on step by step from the known to the unknown, not in jumps dictated mainly by desire for the luxury of wonder.

In the course of the investigation, we may have from time to time to include new races, as displaying evidence of the power of growth, but every such addition is a new burden, not a new aid, to thought.

Take, for example, the civilization of the Peruvians, that singular people in which the power of social and intellectual advance seemed at first to have been self-developed on absolutely independent lines. Their story, as usually written, is a sort of break or flaw in the continuous history of mankind; but if, as the most thoughtful students now believe, it can be proved that their civilization was taught them by early Chinese navigators who wandered or were driven to their coast, it is again relinked to the general course of affairs, and we know where to search and for what to inquire. We cease, that hypothesis once established, to be guessing, and guessing so much at random that even preposterous theories require patient examination before dismissal. The inquiry becomes, in fact, limited to the means by which and the time at which Chinese junks can have reached the Peruvian coast; where, as is now believed to be certain, derelict Chinese junks still arrive.

In a similar way, if we can prove, of course after due inquiry, that the Phœnicians, in their immensely long history, twice as long at least as our own since the Battle of Hastings, did reach and make settlements in Mashonaland, we know more alike of Africa and the Phœnicians, and know where to search for further knowledge; but if we are compelled to assume that a race capable of building round towers of dressed bricks of granite, laid securely without mortar, was self-developed in the heart of Africa, and then perished without a trace, the historian obtains from the new discovery nothing but a new and an enormous perplexity. He may, of course, be compelled by evidence to endorse it; but it is not gain to his work, but rather loss.

CAPTAIN BURTON.



CAPTAIN BURTON was once asked by a friend why he persisted in living on the fourth floor. "Because there is no fifth floor" was the characteristic answer; and he meant it. A man of more prodigious energy one could scarcely hope to find. It was a luxury to him to run up and down

the hundred and twenty steps between the street and the spacious apartments which for many years were his home. Nor did his friends who knew him well enough to appreciate him murmur at the labor, which was amply rewarded when once they reached him. But a thousand and one strangers, idle curiosity-seekers, were by those tedious stairs discouraged and debarred from intruding upon him; and this was to him a great gain: for, hospitable as he was to friends, he detested the professional tourist, and liked to feel that he was secure from such annoyance, and alone with his wife and his books. And then, his modest flat allowed him so much freedom. "If I had a campagna," he once said, "and gardens and servants, horses and carriages, I should feel tied, weighted down, in fact. With a flat and two or three maidservants one has only to lock the door and go. It feels like 'light marching order,' as if we were always ready for an expedition; and it is a comfortable place to come back to. Look at our land and sea scape. We have air, light and tranquility; no dust, no noise, no street smells. Here my wife receives something like seventy very intimate friends every Friday, an exercise of hospitality to which I have no objection save one, and that is met by the height we live at. There is in every town a lot of old women of both sexes who sit for hours talking about the weather and the cancan of the place, and this contingent cannot face the stairs."

The Burton household was a most interesting place, however, despite the deprecating tone in which its head always spoke of it. The ten rooms, or most of them, were a unique museum of the spoils of travel in every quarter of the globe, all arranged with the consummate skill of the artist and archaeologist combined. In the corridor the visitor might imagine himself to be in a convent, for the most conspicuous objects were a picture of the Saviour, a Madonna, and a statuette of St. Joseph, with a lamp perpetually burning before each. Lady Burton was one of the Arundels of Wardour and, of course, a devout Roman Catholic. They used to say that Captain Burton was a Mohammedan; which he was not, save for a purpose on that famous trip to El Medina and Mecca. But one might think so from the appearance of the chief drawing-room. It was bright with Oriental hangings, with trays and dishes of gold and silver, brass trays and goblets, chibouques with great amber mouthpieces, and all kinds of Eastern treasures mingled with family souvenirs. There was no carpet, but a Bedouin rug occupied the middle of the floor, and vied in brilliancy of color with Persian enamels and bits of good old china. There were no sofas, but plenty of divans covered with Damascus stuffs. In fact it was a purely Oriental room, save for a piano and a case full of European books, which presented a striking but not unpleasant contrast to their surroundings. On the walls were countless medals, diplomas of honor, etc., of all which Captain Burton probably prized most the "brevet de pointe" earned in France for swordsmanship.

Nor was the master of the house an incongruous figure in such a place. He appeared, indeed, a typical Arab chieftain. His deli-

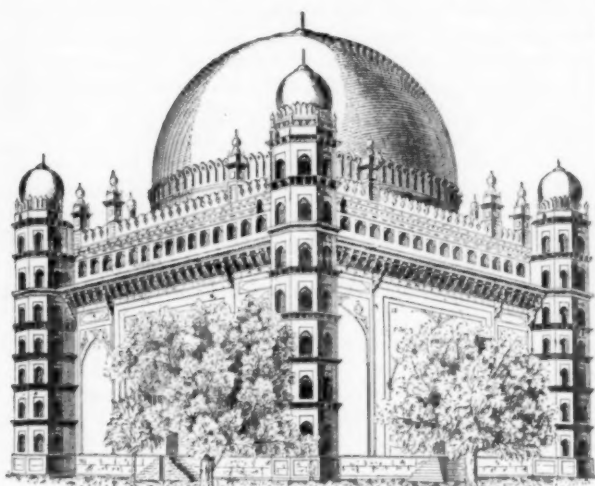
cately small hands and feet and airy grace of movement half concealed the tall stature and giant muscularity of his British frame. His bronzed complexion, black mustache, stern expression and gypsy-like eyes completed the illusion, and when he spoke it might be in purest Arabian or in the English of Macaulay. One was as easy to him as the other. In his study were a thousand or more volumes; in every European language—in Arabic, in Persian, in Hindoo, and various other tongues. But the four books which were his inseparable travelling companions, which lay on a table at his bedside, and with which he was most familiar and to which he was most devoted, were the Bible, a Roman Catholic breviary, Shakespeare and Euclid. The table by the bedside and, indeed the dozen or more other tables scattered through the rooms, were odd enough, among all the Oriental splendor. They were all made of white pine, in the simplest manner, and perhaps cost fifty cents apiece. At these Captain Burton and his wife read, wrote and entertained their friends. The beauty of them was, Lady Burton explained, that they cost little, so that they could have as many of them as they liked; and then to upset an inkstand on one of them did no especial harm.

Captain Burton lived at Trieste as British Consul for many years; a strange experience for one whose life had been so restless. For he was really the most versatile traveller of the age. Where did he go? Almost everywhere, from the Equator to the Arctic Circle, in peace and in war. He discovered Lake Tanganyika and scaled the mountains of Iceland. He explored Somaliland and visited Salt Lake City. He surveyed the heart of Brazil and was the guest of the King of Dahomey. He fought in the Crimea and discovered the Land of Midian. It is a wonder that he did not go to the North Pole. And he was singularly successful in his expedition. For instance, notice that memorable journey to the Land of Midian. The expedition left Suez on December 10, 1877, and returned there on April 20, 1878. During four months of hard travelling and voyaging upward of 2,500 miles they lost only one soldier, who died of fever. They brought home some twenty-five tons of geological specimens to illustrate the general geological formation of the land; six cases of Colorado and Negro ore; five cases of ethnological and anthropological collections—such as Midianite coins, inscriptions in Nabathean and Cufic, remains of worked stones, fragments of smelted metals, glass and pottery; upward of 200 sketches in oil and water-colors; photographs of the chief ruins, including catacombs and of a Classical temple, apparently of Greek art; and, finally, maps and plans of the whole country, including thirty-two ruined cities, some of whose names can be restored by consulting Strabo and Ptolemy, besides sketches of many ateliers where perambulating bands like the gypsies of ancient and modern times seem to have carried on simple mining operations.

But it would take too much space to tell here of all his journeys and adventures. He has told the story of them himself in his books, which all the world has read. Sir Richard's own life—he was Sir Richard, though we always think of him as Captain Burton—his own life, in its later years of retirement at Trieste, is less familiar to the world, yet full of interest. It was delightful to see the good comradeship that existed between the husband and wife. "She and I," he once said, "are like an elder and younger brother living *en garçon*. We divide the work. I take all the hard and scientific part, and make her do all the rest. When we have worked all day, and said all we have to say to each other, we want relaxation. To that end we have formed a little 'mess,' with fifteen friends at the table d'hôte of the Hôtel de la Villa, where we get a good dinner and a pint of the country wine, made on the hillside, for a florin and a half. By this plan we escape the bore of housekeeping, and are relieved from the curse of domesticity, which we both hate. At dinner we hear the news, if any, take our coffee, cigarettes and kirsch outside the hotel, then go homewards to read ourselves to sleep; and to-morrow *da capo*." They would fence for an hour each day together, with broadswords, rapiers, or scimeters, she wielding the weapon with almost as much dexterity as he. They would swim together in the sea. They would tramp about the city and its environs together, like two schoolboys on a holiday. Great as was the contrast of this existence to his former wild adventurousness, Captain Burton did not repine. On the contrary, he was happy and contented in his lusty old age; and his age was lusty and vigorous, in body and mind, to the very last.—*Correspondence of the N. Y. Tribune.*

EGYPTIAN OBJECTS IN WOOD.—A special feature of all collections of Egyptian antiquities is the excellent preservation of the objects in wood. Not only are the tools and implements in almost the same state as when last used by the artisans or husbandmen, but delicate little articles for the toilet or for some ornamental purpose retain their carving in all its pristine freshness. Thus we have handed down an admirable example of the archaic type of the Hathor head in a mirror handle of the twelfth dynasty, which when compared with those of a later period will serve as a useful illustration to the student of the history of Egyptian art. Representations of animals carved in wood of the same period show the careful study of nature of the early Egyptian artists, while the truthful rendering of form testifies that their system of technical education was sound and thorough. What would have been one of the most interesting specimens of wood carving is unfortunately in a damaged condition; this is a palm-leaf capital from one of the private houses. In its original state it was probably painted; in its present state, however, it is valuable as a proof of the antiquity of this form of capital.—*The Athenæum.*

THE TOMB OF SULTAN MAHMOOD, BEEJAPORE.



TOMB OF SULTAN MAHMOOD, BEEJAPUR

THE view shown in the sketch is an unfortunate one, as the point of sight is opposite the corner, and the two sides of the building appear symmetrical about a central axis. But the sketch was taken in a hot July sun and the only shelter available was a small ruin, from whence the view is exactly as shown. This tomb was built by Mahmood Adil Shah, who reigned at Beejapore from 1627 to 1656. Fergusson has written a very complete and well-known description of the building, and its method of construction. It is only necessary, therefore, to add a few facts which are not given in Fergusson's history. The foundations are laid on solid rock, which here crops up to the surface of the ground. By his judicious selection of a site, the architect has avoided all chance of settlement in the structure. The sub-base or plinth is about six feet high, and is built of slate-colored stone. The walls of the main building are of roughly dressed stone laid in lime mortar plastered over both inside and out. The ornaments being cut out of the plaster-work. The unfinished northern apse (which does not appear in the sketch taken from the southwest) is alone built of carefully dressed stone left visible both inside and out. "At the height of eighty-three feet," says Fergusson, "a cornice projects twelve feet from the wall, or nearly twice as much as the boldest European architect ever attempted." The cornice was certainly conceived on a grand scale, and had it been carefully and scientifically constructed, there is no reason why it should not have lasted for centuries. But the work bears evident traces of hurry; as I suppose the architect was anxious to push on with all speed, so as to get the building finished during the lifetime of the monarch for whom it was intended. The jointing is painfully coarse



and careless. The natural result is, that (with the exception of a few places here and there where it still remains intact), the cornice has fallen in and perished. I have shown it in the sketch as if still existing, as the building loses greatly in effect for want of the deep shadow thrown by the cornice. I do not know how the vast central dome was constructed, as it remains intact, being coated over with plaster on both surfaces. But there can be no doubt as to the construction of the unfinished dome over the northern apse, which remains to this day as left by the builders. This dome was being built without centering, there was merely a rough scaffolding inside for workmen to sit on and place the stones. The put-log holes are there and two of the scaffolding timbers are still in position. The interior shell is of dressed stonework laid in alternate headers and stretches in the same course, notched into each other as shown.

The interior face and the notched joints are carefully cut, the rest of the stone being left rough as it came from the quarry. The outer surface of the dome would have been completed by a backing of concrete, plastered over. The hand of time has treated the tomb most unkindly. The rain of two centuries has turned the dome to a dirty black color. And the delicate shadows which so charm the eye in the marble dome of the Taj at Agra, or of Humayoon's tomb at Delhi, are here lost in great measure owing to the dark stains which disfigure the dome. The tomb to be really appreciated should be seen at the end of September during the close of the rainy season.

Bejapore is then famous for its glorious sunsets. I have seen the tomb so transfigured in the golden glow of the setting sun, as to be perfectly charming. The stains which disfigure the building are lost

in a golden haze, and the graceful curves of the shadows then reveal the true form of the vast dome. — J. Wilcocks, in *Indian Engineering*.

THE CORINTH CANAL.



bridging of the Hellespont is an event still of the uncertain future. The French company stands ready to begin the work at once, having the plans ready and the money in hand. But will the Sublime Porte grant a charter? There is the rub. The probability is that permission to build will not be granted, and that not until Mr. Gladstone's famous "bag and baggage" policy is an accomplished fact will this huge, single, iron span connect the shores once linked by Xerxes's bridge of boats. In order to secure a concession for the most trumpery piece of modern engineering from the Sultan, companies have pressed into the service of their ambition all the wiles and manoeuvres of diplomacy, all the devices of corruption, all the resources of eloquence, expostulation and sanguine prophecy, and have often employed even these methods in vain. That permission will be given for a work that might be of great political and military importance to the foes of Islam is scarcely to be expected.

But another work of modern enterprise in an equally historic place is being rapidly pushed to completion. That is the Corinth Canal, which will sever the Peloponnesus from the mainland of Greece, and will permit the largest ships to pass directly from the Gulf of Athens to the Gulf of Corinth, and let the commerce of the Aegean, the Euxine and the Danube reach Western Europe without the trying voyage about Cape Matapan. Now, all the vessels trading between the Mediterranean ports of France, Spain, Italy and Austria and the ports of Greece, Turkey, Asia Minor, the Black Sea and the Lower Danube are obliged to round Cape Matapan, thus going out of their course, first two degrees south, and then two degrees north again. By making the canal through the Isthmus of Corinth, the route for goods from Adriatic ports will be reduced by 185 nautical miles, and from the Mediterranean by ninety-five miles. The canal intersects the Isthmus of Corinth in a straight line at its narrowest part, its total length being about four miles, and it follows exactly the line of Nero's project, joining the Gulf of Corinth with the Gulf of Athens.

The work was begun some eight years ago, and, of course, by a French company. It was to have been finished in 1887, but various troubles delayed it, and now 1895 is named as the earliest date on which it can be opened for traffic. According to the original estimate, the total excavation was to be 12,865,000 cubic yards, including about 2,400,000 cubic yards for slips or eventual enlargements. The nature of the strata had, however, not been sufficiently investigated, the region being volcanic. When the cuttings had reached some depth a large number of faults were encountered, and a considerable disturbance of the layers of deposit of the tertiary strata was revealed. The maximum depth of cutting to the bottom of the canal is 284½ feet, and the mean depth for a length of two and one-half miles is 190 feet. With this mean depth, the amount of actual excavation will probably not exceed one and a half times the quantity originally estimated. It has been found necessary to protect the sides of the canal with masonry in hydraulic lime or cement mortar for a height of thirty-three feet along a length of from two and one-quarter to two and three-fifths miles, to preserve them from erosion; to form a bench not less than five feet wide on each side of the canal six and one-half feet above sea-level, to enable the walling to be carried out, and to ease the slopes at certain parts of the cutting to insure their stability. The engineer estimated that this necessitated 2,355,000 cubic yards of additional excavation, and an increase in cost of \$2,000,000.

This canal has, of course, no locks, but is level from end to end, and perfectly straight; so that one will be able to see from one end to the other. It is to be ninety-six feet wide and thirty-six feet deep. At the Corinth end it is crossed by a railroad bridge 164 feet high, under which the tallest ships may pass without lowering their topmasts. With the exception of about 200 yards in the centre, the channel has already been excavated almost down to sea-level, and water has been admitted for about half a mile at the Corinth end, and half that distance at the other. The total cost of the canal is reckoned at \$14,000,000, or about \$3,500,000 a mile. Whether it will pay fair profits on such enormous cost is a problem. It is assumed that about 300 vessels from Trieste and Fiume, and as many from Italian ports, will pass through the canal annually, while it is calculated that 730 Greek ships will use the canal. This would give a total of 1,230 vessels annually, of an average tonnage of 1,500 each. It is proposed to levy a toll of twenty cents per ton on vessels coming from the Adriatic, and ten cents on all other vessels, besides twenty cents for every passenger. This is estimated to yield an annual revenue of \$300,000, which would not allow a very generous dividend to the bondholders. The working expenses, however, will not be great. The cost of keeping it clear will be next to nothing, as neither drifting sand, falling earth nor silting up at the extremities is to be feared. In order to disturb the surface of the water as little as possible during the passage of vessels, it is proposed to employ stationary cable haulage. By this method of transport, also, vessels will be kept fairly in the middle of the canal, and its sides will be

little liable to damage. A new town, Isthmia, has been founded at the eastern end of the canal, and another, Posidonia, at the western. — *Athens Correspondence, of the New York Tribune.*

TO OUR SUBSCRIBERS.

A YEAR ago we broached the question of the possible publication of an International Edition of this journal and asked our subscribers to take immediate and final action on the suggestion, as, the size of the edition being once fixed, it would not be possible to change it, since upon it would be based the contracts made for the necessary supplies. This consideration makes it necessary to revert to the matter at this time, as it now becomes of importance to know how far new accessions to our subscription-list will make it necessary to revise and enlarge these contracts for supplies. We accordingly lay the following facts before our readers for their consideration and invite them to give us early notification of their decision.

The first year's [1876] issue of the *American Architect* contained 424 pages of text and the equivalent of 208 single-page illustrations — not including extras.

The current year's issue of the Regular edition of the *American Architect*, will, probably, contain 816 pages of text and the equivalent of 312 single-page illustrations — not including extras.

That is, in fifteen years, the text-matter has been increased 100 per cent, and the illustrations 50 per cent, yet the subscription price has remained the same! We did not at the outset make any promises as to growth and we make none now as to the possible growth of the

INTERNATIONAL EDITION.

We simply ask that these facts of actual increase of matter and relative reduction of cost may be borne in mind by those who may elect to support our endeavor to improve and develop this edition. How far we may be able to do this cannot now be foreseen, we only ask our subscribers to believe that in the employment of the funds which come to us in the form of subscription payments, we are likely to be as faithful trustees in the case of this as in the case of the original edition.

The year is not yet closed, but the contents of this year's issue of the INTERNATIONAL EDITION will probably consist of 816 pages of text and four complete indices, and the equivalent of 941 single-page illustrations — not including extras.

In the production of 728 of these pages of illustration different forms of photo-lithographic process printing have been employed. The remaining 213 plates have been produced by various more expensive and perfect methods of printing, such as heliotype, helio-chrome, and by photogravure, etching, and engraving upon copper plates, and to this list we hope to add collotype printing before long.

The subscription-price of the INTERNATIONAL EDITION being rather more than four times the subscription-price of the original edition, it would be fair to assert that it should contain either four times the gross amount or four times the real value of the original edition.

As to the amount by which the text falls short of being four times the original amount, we believe that the cuts in the text pages — which number from 700 to 1,500 per year — which had no counterpart in the original form, fully balance this shortage in the eyes of most architects. Moreover, the increase in the subscription-price was predicated originally only on the addition of illustrations.

Four times the original number of illustrations would call for the equivalent of 832 single pages, a total which is almost balanced by the 728 photo-lithographic pages already mentioned; but offsetting the 832 with an equal number, and we still have a balance of 109 pages in excess — if of equal value only. In reality this balance is represented by plates produced by the best and most expensive methods of reproduction known to the modern printing world, the cost of which to the publisher in comparison with the photo-lithographic plates varies between 6 and 10 to 1 [disregarding entirely the far greater cost of the photogravures issued] according to the process used. Reduced to a common measure through the medium of average cost and these 109 plates may be said to represent 872 photo-lithographic plates, which makes, we think, a very fair balance of value rendered!

Compared with the necessarily vague promises stated in our circular a year ago, we find that our performance has been this:

The increase of text under heading (E) in our second circular has been made good by an addition of 33½ per cent to the reading matter, and it does not detract from the fulfilment that the necessity of simplifying editorial and administrative work compelled us at our own cost to add a similar enlargement to the other editions. The promises under heads (B) and (C) have also been fulfilled.

Under head (A) we promised an increase of 200 photo-lithographic pages and 150 gelatine plates [at that time we did not intend to publish etchings and engravings] while we find that actually the year's issue will contain an increase of 302 pages of photo-lithographic work and 108 gelatine plates to which must be added 50 pages of etchings and copper-plate engravings, which are certainly more costly, to say the least.

In one respect only have we not kept, no, more than kept, our promises.

Under heading (D) we offered to publish a certain number of competitive designs, but with a distinct proviso which pointed out that the promise could not be kept unless the subscribers would lend their aid.

Practically, this promise has not been kept for the simple reason that our subscribers would not lend the assistance upon which fulfilment was conditioned.

It appears then, that while we promised a total of upwards of 734 pages of illustrations, with a contingent of 96 for competitive designs, that is 830 in all, the year's illustrations will consist of 941 pages — not including the few competitive designs and other extras we have printed. It seems, then, that in the matter of mere quantity we have done far better than we promised, while by employing printing-processes we did not then think of using, we have added greatly to the value and variety of the result.

That there have been defects in quality we freely admit, and naturally, our attention will be turned first to curing these.

The point we lay stress on is that it is only reasonable to assume that the year now closing is for the INTERNATIONAL EDITION, what the year 1876 was for the journal in its original form, a starting-point, that is, from which to develop. As to what is to be its future development we do not intend to make any definite promises. We do not promise that the same processes of reproduction will be employed, we do not promise that the same distribution of product between the several processes will be preserved, and we do not promise that the same gross amount of material will be published hereafter. We simply do promise that up to the limits of our own comprehension, this edition shall not retrograde in merit any more than has the journal from its first up to and including its seven hundred and seventy-seventh issue.

Take down and examine the first and the twenty-ninth volumes and compare them, side by side, and then apply the same measure of difference to the present INTERNATIONAL EDITION as indicating its possible development, and consider whether it is not worth your while to share in and aid to bring about such a result by making known your intention to subscribe for this edition for the years to come.



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

HOUSES OF MRS. MACOMBER AND MRS. ANTHONY, BEACON ST., BOSTON, MASS.

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

THESE two houses adjoin the two which were published in our issue for October 18.

CAPITALS FROM THE CLOISTER AT MOISSAC, FRANCE.

THE famous abbey of Moissac, round which are grouped the earliest houses of the town, was founded by St. Amand, a particular friend of King Dagobert. It was devastated by the Saracens and did not recover its ancient splendor until the time when Louis, son of Charlemagne, became king of Aquitaine. In 1053 it was allied with the brotherhood of Cluny. After having

undergone numerous vicissitudes which by turns augmented or diminished its prosperity, the ancient abbey was secularized by Pope Paul V in 1618 and a chapter of canons replaced the monks of Cluny. This chapter was abolished at the time of the French Revolution. The church of Moissac, dedicated to St. Peter, was constructed towards the middle of the XVth century, on the site of a church built in 1063 by the Abbot Durand de Bredon and destroyed at some unknown date. The nave offers nothing of interest, but there also remains of the ancient basilica, beside a heavy square fortified tower, a beautiful and richly sculptured portal. This door, which is of the XIIIth century, is a veritable museum of Romanesque sculpture. The cloister, which one enters through a door opening to the right of the choir, is one of the most remarkable monuments of the kind which remain in France. It was built between the years 1100 and 1108. The arcades are narrow, with pointed arches which are supported by beautiful small columns, alternately single and double, whose large sculptured capitals represent Biblical episodes or stories, each of which is explained by an inscription engraved on the abacus. At the pillars at the angles are placed statues of the twelve apostles and of the Abbot Durand who dedicated the church in 1063. Beyond the cloister extend some buildings, remains of the ancient dependencies of the abbey, and near by is seen some debris of the fortifications erected in the 13th century. Moissac, which is situated on the right bank of the Tarn, lies on the railway from Bordeaux to Certe, seventeen miles from Montauban, and is now a busy town with an extensive flour trade. It was taken in 1188 by Richard Cœur de Leon, and in 1212 by Simon de Montfort. It owes its origin to the abbey which has made it celebrated.

HOUSES AT BRIDGEPORT, CONN. MESSRS. LONGSTAFF & HURD, ARCHITECTS, BRIDGEPORT, CONN.

THIS block, lately built, is in the form of a crescent. The materials are Longmeadow brownstone, red brick with terracotta ornaments; domes of copper. The owners are Mr. Edwin G. Sanford and Mrs. Nellie F. Shepard, both of Bridgeport.

HOUSE OF W. N. OOTHOUT, ESQ., FRESNO, CAL. MR. A. PAGE BROWN, ARCHITECT, SAN FRANCISCO, CAL.

CALVARY CHURCH AND CHAPEL, WEST 116th ST., NEW YORK, N. Y. MR. R. H. ROBERTSON, ARCHITECT, NEW YORK, N. Y.

[Additional Illustrations in the International Edition.]

A WINDOW OF THE HOTEL RAISIN, TOULOUSE, FRANCE.

[Copper-plate Etching.]

THIS window forms the angle feature in a group of six windows, each one of which differs from the others.

NEW BARRACKS, DRESDEN, GERMANY.

[Gelatin Print.]

WE have only the assertion of our droshky driver to offer in support of the fact that this large and costly building is merely the home of the conscripted cohorts of the Emperor William's army. Yet there is abundant corroborative evidence to be found in buildings of similar architectural importance devoted to the same use which can be found in other European cities; so we believe that no one will challenge our ascription so far as the character of the building is concerned, though some one may be able to give it a more definite name and the name of its designer.

A DOOR AT MONREALE, SICILY.

[Gelatin Print.]

HOUSE AT WIMBLEDON, ENG.: DRAWING-ROOM. MR. E. J. MAY, ARCHITECT.

ST. MARK'S PARISH HALL, SURBITON, ENG. MR. GODFREY PINKERTON, ARCHITECT.

HOUSE AT NUTFIELD, SURREY, ENG. MESSRS. J. W. & R. F. BEAUMONT, ARCHITECTS, LONDON, ENG.

THIS house, together with large stabling, entrance lodges, etc., has been erected for Mr. James Hudson, and is situated on high ground, commanding extensive views over the country. The elevations are faced with Bracknell red bricks and Corshill-stone dressings, and the roofs are covered with Brosely tiles.

CADER IDRIS. FROM A DRAWING BY JOHN SELL COTMAN.



ARCHITECTURAL LEAGUE OF NEW YORK.—GOLD AND SILVER MEDAL COMPETITION. 1890-1891.

FOLLOWING are the conditions of the Fourth Annual Competition for the gold and silver medals of the Architectural League, in connection with the Sixth Annual Exhibition of the Architectural League of New York.

1st. The competitors must be residents of the United States, and under the age of twenty-five; and

2d. The drawings shall be made in conformity with the following programme, and, in all parts and portions, entirely by the hand of the competitor.

The drawings will be judged by the jury appointed for that purpose.

The successful drawings, and such others as may be thought worthy, will be hung at the exhibition, the first and second prize drawings being so indicated, and these latter shall thereupon become the property of the League.

PROGRAMME.

An heroic statue of Zeus, standing nine feet high, has been secured by an American citizen, from one of the excavations now going on among the ruins of Greece, and presented to one of our large cities.

The municipal government, fully appreciating the value of the gift, propose erecting a loggia for its reception and protection.

This pavilion is to be located upon a plot of ground formed by the conjunction of two avenues with a boulevard, the form and size of which is shown on the accompanying plot.



The structure should be of marble and must be Classic in treatment.

Each contributor is required to exhibit two sheets of drawings; one to contain the front elevation, drawn to a scale of one-quarter of an inch to the foot and rendered at will; and the other to contain the ground-plan, section, and such other drawings as may be necessary to explain the design and construction, and drawn to the most convenient scale for the purpose and rendered at will.

A small perspective sketch, rendered fully at will and taken from a point marked "A" on the plot—six feet high, can be shown upon either of the two sheets.

Each sheet to be cut to the uniform size of 24" x 32" and to be white card or Bristol board, or Whatman paper mounted on stretcher. No colored borders, frames or glazing will be allowed.

Each sheet must be distinguished by a motto or cipher. A sealed envelope, bearing the same motto or cipher, must contain the name, full address, place and date of birth of the author, and must be mailed to the Medal Committee, No. 47 West 42d Street, New York, on or before December 10th, 1890.

Drawings are to be delivered flat, carriage paid, at the same time and place. They will be returned at the close of the exhibition at the expense of the contributor.

BRUCE PRICE,
CHARLES I. BERG,
THOMAS HASTINGS, } Medal Committee.

RULES AND CONDITIONS.

1st. The Exhibition will be open to the public on Tuesday, December 23, 1890, and will continue for three weeks, closing January 10, 1891.

2d. The galleries will be open for the reception, by card, December 22—Press: 10 A. M. to 4 P. M.; and reception in the evening.

3d. The Exhibition will consist of drawings, etc., not before publicly exhibited in New York, representing as far as possible the present condition of architecture and the allied arts. All kinds of works are admissible, such as:

Architectural designs embodied in plans, elevations and sections, or shown in perspective; designs for decoration, furniture and the like; photographs of executed work; cartoons for stained-glass, full-size drawings for ornament and the like. Models of executed or proposed work; completed work, such as carving in stone or wood, wrought-iron, mosaic-glass, stuffs and furniture; sketches, drawings and paintings of architectural or decorative subjects.

4th. Works will be received only at the Fifth Avenue Galleries on the 12th and 13th of December, 1890. No works will be received before or after that date.

5th. The League will collect and return all works in the city, at the expense of exhibitors, if the Secretary is notified when the blank is returned.

6th. The blank form attached to this must be filled and sent to the Secretary by the 5th of December.

7th. A card must be attached to the back of each drawing or exhibit, giving the title, name of exhibitor, the address, and where to be returned.

8th. All works intended for exhibition will be at the risk of the owners.

9th. All rules customary at exhibitions, and not above mentioned, will be considered to apply equally to this exhibition.

47 West 42d Street. EDWARD T. HAPGOOD, *Secretary*.

FRAMES, ETC.

All drawings and photographs must be framed or mounted. Exhibits will be catalogued by title with name of exhibitor, and it is especially desired that the name of the draughtsman may appear; any other data may be on margin.

COMMUNICATIONS

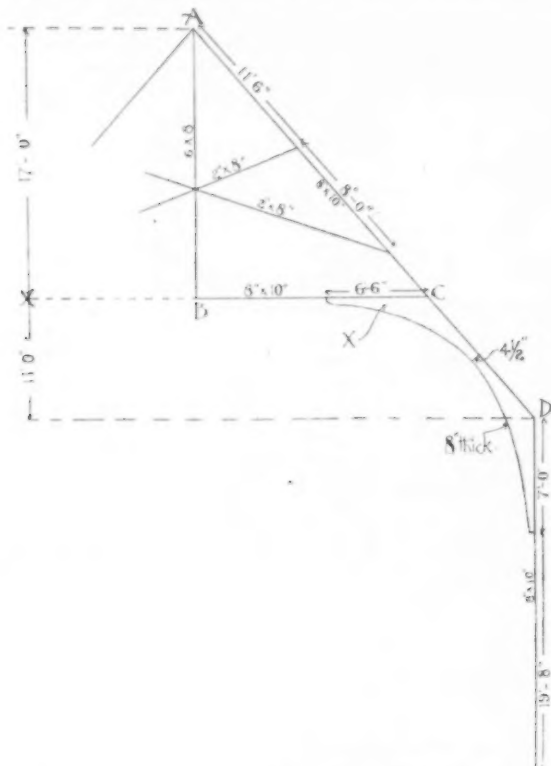
[The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.]

DEFECTIVE TRUSSES.

SYRACUSE, October 29, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Inclosed find sketch (figured) of a truss which has been put into a building in this city. Please look it over and advise



us if it is safe. *It is not of our design*, and we only ask your opinion to reinforce our own in the matter.

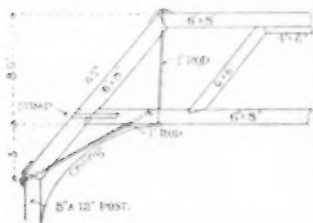
An early reply will oblige, BUELL & TABER, Architects.

[The truss is weak and objectionable. Just how weak it is, or what is the weakest point, we cannot say without knowing more about the dimensions and joints, and how, if at all, the cross-ties are fastened to the king-post. — EDS. AMERICAN ARCHITECT.]

MINNEAPOLIS, MINN., November 3, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—The truss represented by the sketch is in a small wooden church, two such trusses of white pine supporting a shingled, hipped roof and lath and plaster ceiling over a room 32' by 40', the span being 32'. Will you kindly state, through the *American Architect*, what you consider the objections or defects to be in this truss.



A STUDENT.

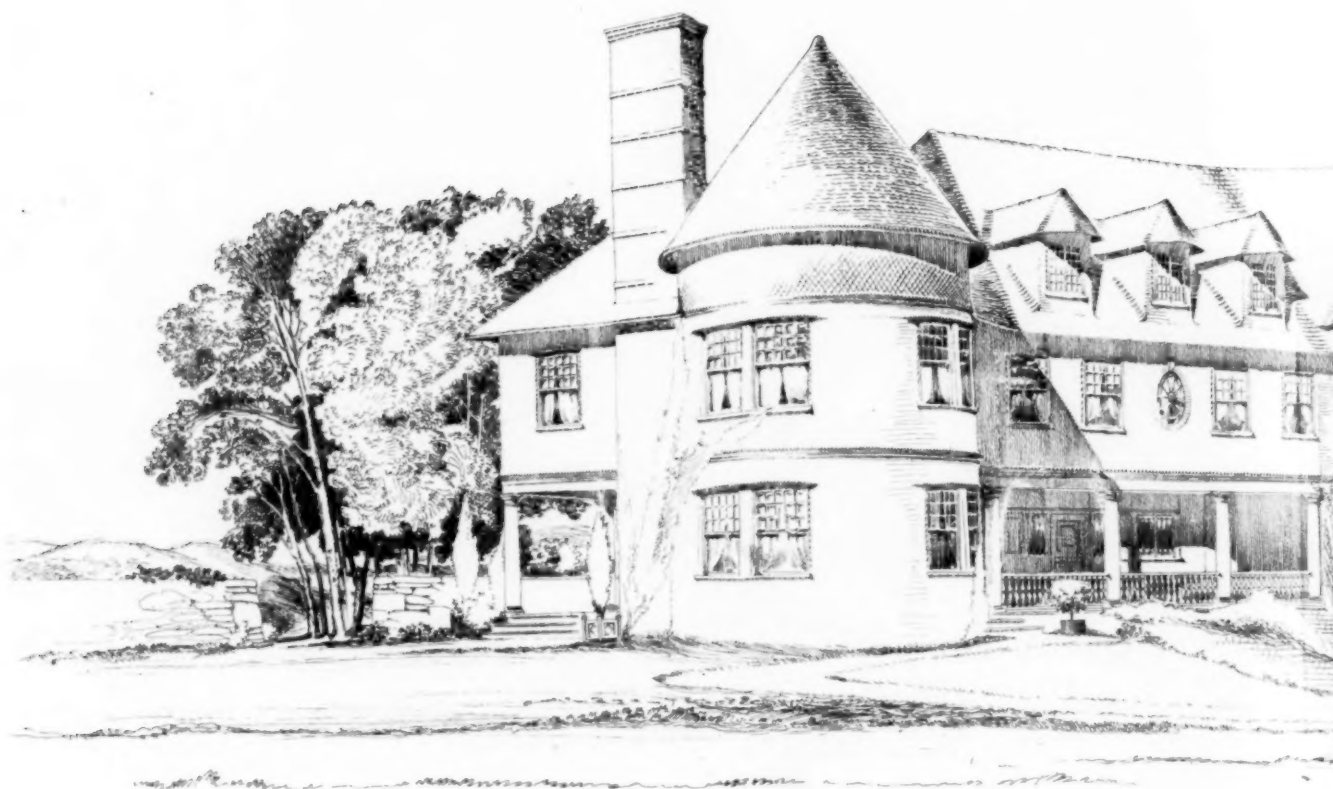
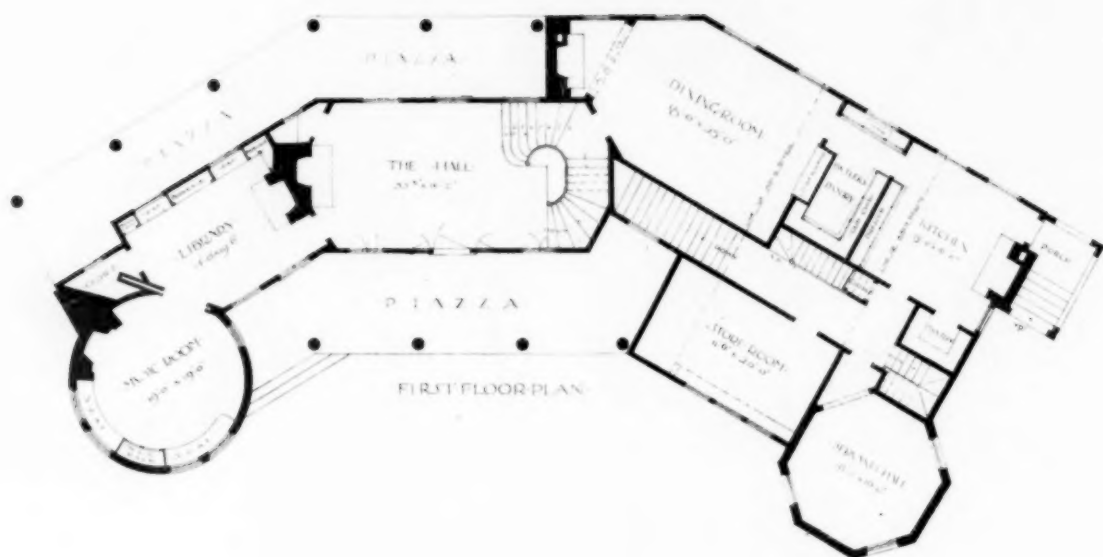
[The design of the truss brings a severe bending strain on the rafter, at the point of application of the strap, and on the lower chord, at the foot of the strut. The bending strain on the rafter is partly, but insufficiently, resisted by the one-inch rod across the angle.—EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

PROPOSED EXPANSION OF THE LOUVRE COLLECTIONS.—A gigantic scheme, having for its ultimate object the appropriation of the whole of the Louvre and Tuileries to artistic and antiquarian services, is mooted in Paris. This plan advocates the removal of the Ministry of Finances from the Louvre (Rue de Rivoli) to the Hotel des Invalides, which is now only half occupied, and the occupation of the Pavillons de Marsan and de Flore by the staff of the museums. At the present rate of increasing fervor with which the ruins of the ancient world are being ransacked (though the result is often the exhumation from the sites of provincial cities of matters of doubtful value), not ten Louvres would suffice to hold the booty of the antiquaries. The fact is that in too many cases we are collecting rubbish. Is not one secret of the error that book-scholarship obtains where art-scholarship ought to rule? — *Philadelphia Telegraph*.

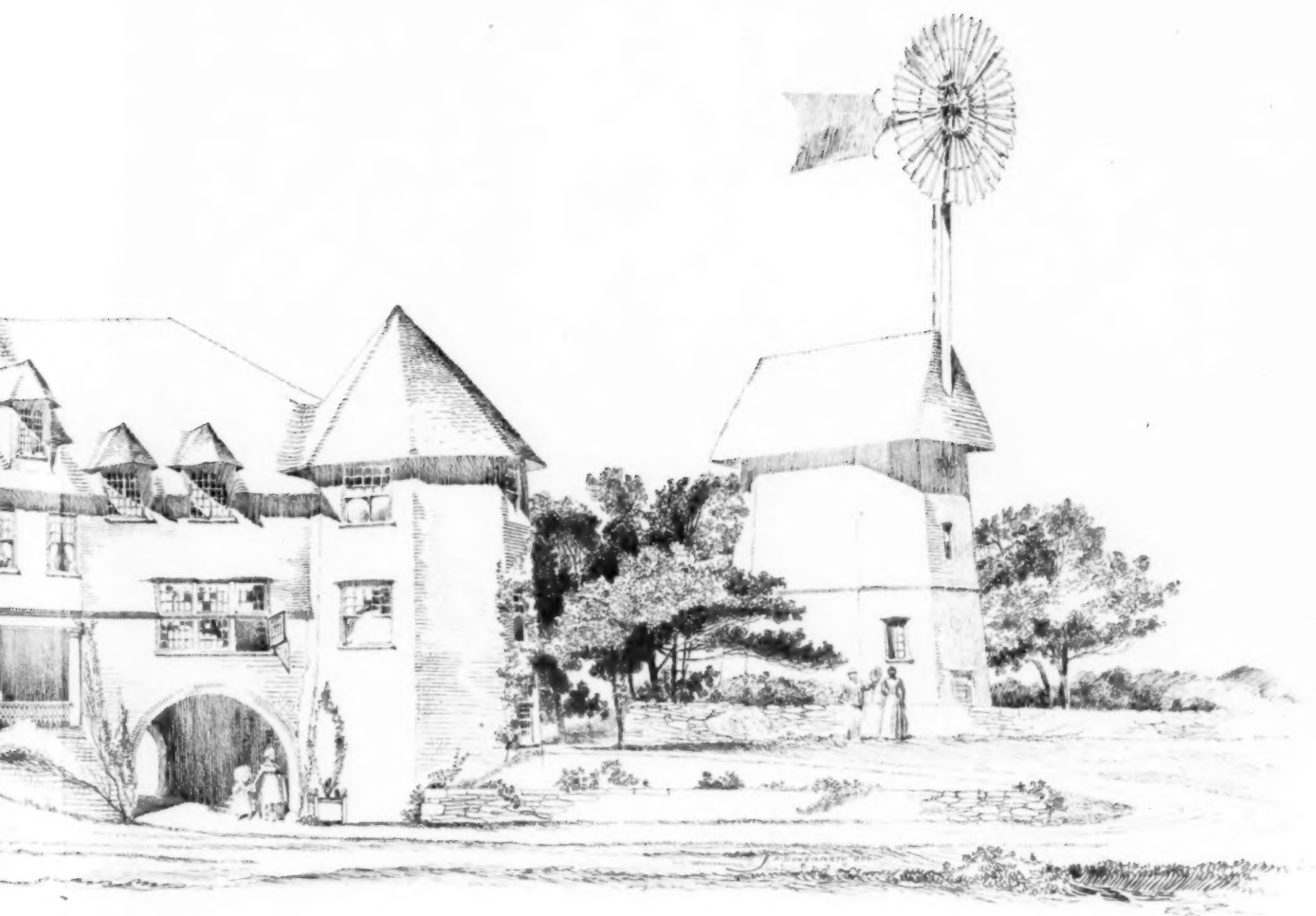
RECONSECRATION OF ST. PAUL'S—The Bishop of London on October 13 performed a special reconsecration service in St. Paul's Cathedral to purge the edifice from the defilement caused by the suicide which occurred in the building September 28. According to old traditions of the Church the shedding of human blood in a place dedicated to God deprives the building of its sacred character, which can only be restored by a new consecration. A service similar to the one just performed is unprecedented in the history of the cathedral. — *N. Y. Times*.

A COMMERCIAL or business sentiment or conviction is springing up and manifesting itself in many ways that the business interests of the country must exercise a stronger and more direct control over the political policy of the Government. This tendency has been pointed out heretofore. There is a determination showing itself that politicians shall be limited in their power to do harm. There is a growing demand for settled policies, for fixed principles, for something definite, so that those who have the control in a greater or less degree of the business interests of the country will feel safe in whatever plans or enterprises they engage in or lay down. Business men are seriously asking themselves the meaning of these recurring stringencies, the occasion of these little temporary depressions. This time the cause comes from London, we are sagely informed, and is the result of extraordinary outlays of money in colonial and other foreign undertakings of British capitalists. While this is not the cause, it will do very well as a starting-point for the investigators. The same distribution of home capital is going on in more than a score of States, but this fact alone does not explain our liability to financial stringency. The world has simply outgrown its old clothes, and the new conditions created by railroad construction and ship-building demand radical changes in many other channels and fields of activity. Those who are supposed to direct or lead public opinion in these directions are sadly in need of the light they should shed on others, and, as a result, the business world is simply standing still and beholding the rising up of problems, questions, emergencies, requirements, opportunities and necessities, concerning which they know but little. The instincts of the people in the meantime are leading them blindly in the right direction. As heretofore stated, a new class of public men is needed, who will measure duty and responsibility by different standards. These men will come. While one set of politicians may laugh and another cry, the great body of the people look and see farther, and have in their mind's eye certain radical reforms or new conditions which they wish somehow or other to bring about. The temptations to the rapid development and accumulation of wealth have developed a set of energies and capacities which have been latent in all except a fractional part of the industrial population. Where twenty or forty years ago there was an opportunity for one, there is now an opportunity for five or ten to achieve more than ordinary success. This is the motive power behind all the extraordinary activity visible. Necessities are crowding upon the people, and new men will ere long rise to supply them or to develop the agencies through which they will be placed within the reach of the people. The manufacturing interests are employed to the extent of their facilities. If there was an upward tendency imparted to prices by the action of Congress in certain economic legislation, it has been reversed by the recent elections, and the tendency is now rather in the other direction. Production will now and for months to come be more carefully guarded than ever. Merchants and manufacturers have had notice served on them that prudence will be the better part of commercial valor. Competition will probably develop itself to the advantage of buyers. Reactionary legislation will be threatened from this out, but never executed. The people at large are thoroughly in earnest for good government, even prices and healthy markets at home through the diversification of industries, and they will not allow their temporary occupation of punishing their would-be masters to interfere with this grand purpose. The winter will be an exceptionally active one in nearly every branch of trade. Textile manufacturers see the promise of better days. Makers of textile machinery are crowded with work; in fact, the demand for machinery and motive power extends into every sphere of mechanical activity. This year's volume of business has been figured out to be nine per cent in excess of last year's business to this date. Railroads are quite generally overrun with traffic, cars are scarce, and car-builders are busy. New works are projected, and will be built this winter, for the manufacture of heavy and light machinery, and especially for the manufacture of all manner of electrical equipments. Ship and boat builders during the past two weeks have been requested to furnish figures for large amounts of tonnage. The great requirements for the near future will be the increase in the supply of transportation facilities and in the increase in the supply of machinery. The cheapening of steel will materially contribute to this end, and the obtaining of greatly increased efficiency in fuel and in motive power will also be an important factor. While the good of the masses is the last thing thought of in all this present activity and spasmodic activity, the benefits of the best service of the brains of the world will be realized by the people, and, as these benefits come, they will fly from their old haunts into new lands, to find better development under new conditions.



RESIDENCE W. N. OOTH

A. PAGE BROWN ARCHITECT



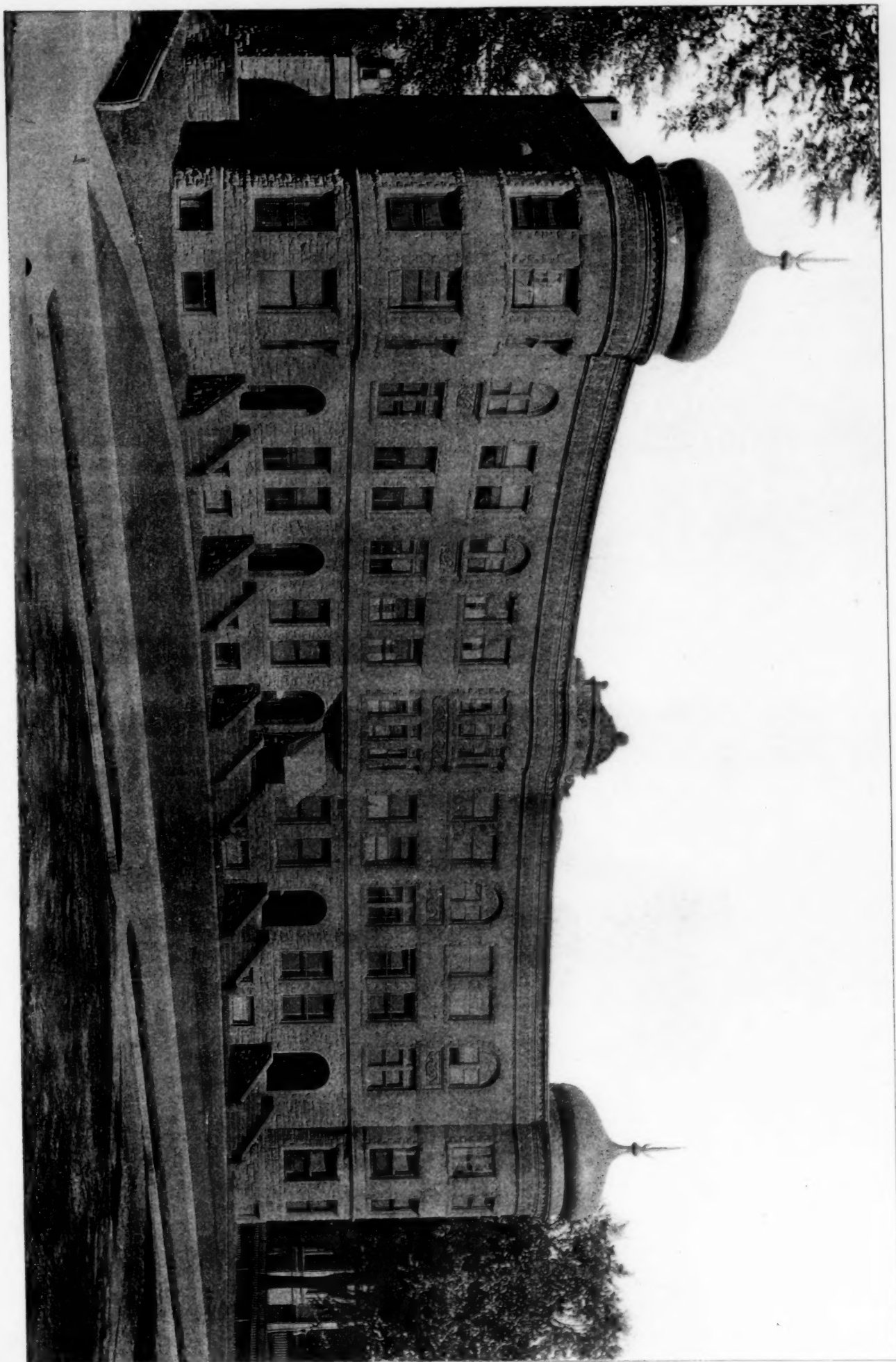
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ARCHITECT NEW YORK & SAN FRANCISCO

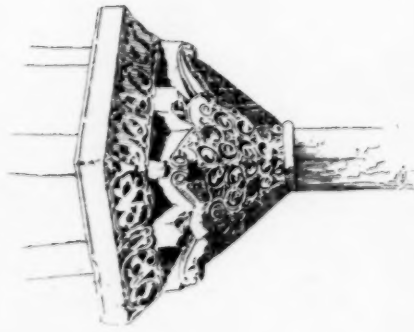
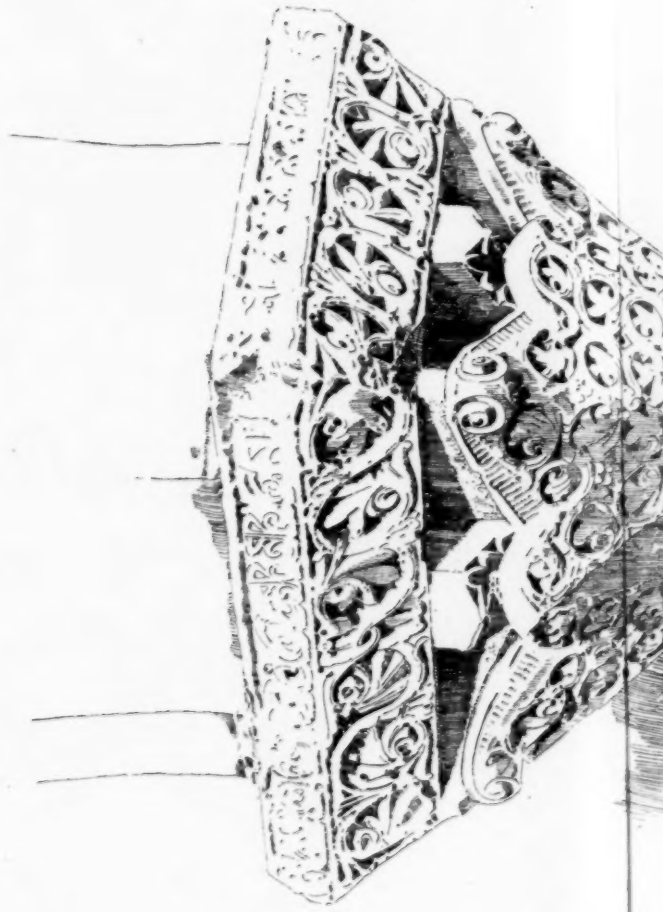
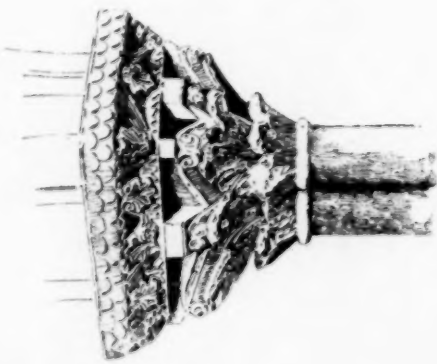
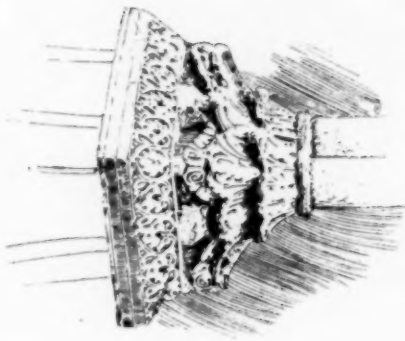
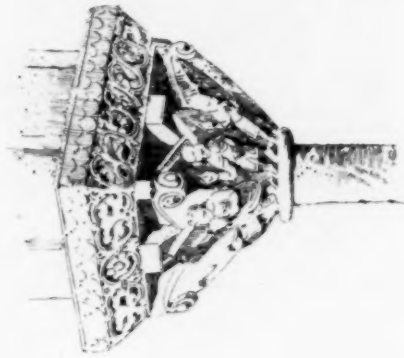
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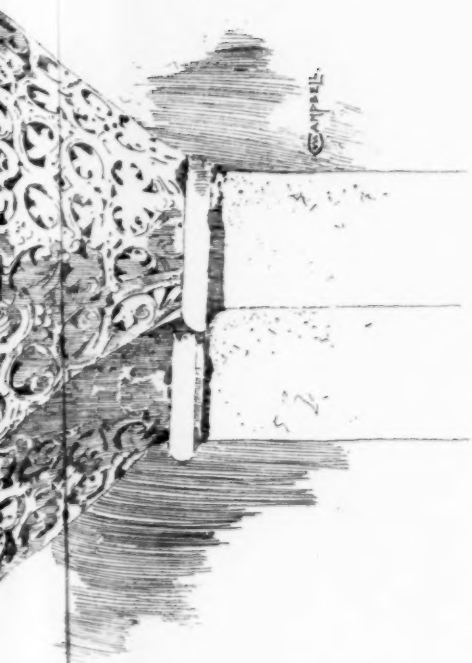


CALVARY CHURCH and CHAPEL West 116th Street New York.



HOUSES AT BRIDGEPORT, CONN. LONGSTAFF & TURNER, ARCHTS.





MOISSAC

