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VOL. XXVII.

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DECORATION

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WHAT extraordinary phenomenon, which those who read many newspapers sometimes encounter, of the inspiration of two writers following tracks so closely parallel that their effusions are word for word the same from beginning to end, was recently to be observed in the case of the New York *Herald* and the Pittsburgh *Leader*, which published on the same day an article devoted to architects or, rather, to their incomes, which held up these fortunate professional men as objects to be envied, if not by all the world, at least by journalists, many of whom have just now a way of writing about rich men or women which suggests the idea that the journalist himself was brought up in a jail, and sees nothing but the pockets of those whom he favors with his attention. The present writers, after half a column or so of rubbish about the grandeur of American buildings, furnish the New York and Pittsburgh public with the information that "there are in the city of New York at least ten architects whose annual net income is in excess of a hundred thousand dollars, while in Philadelphia, Chicago, Boston and St. Louis there are quite as many who can spend a like amount of money every year without over-drawing their bank accounts." This is certainly very liberal to the architects, but what follows is even more so. "There are," we are told, in addition to the magnates just mentioned, "hosts of comparatively small fry whose annual profits will pass the fifty-thousand-dollar mark." If an architect whose net income is only a thousand dollars a week belongs to the "small fry," what name would these journalists have for the remaining insignificant beings who practise architecture faithfully and skilfully, and thank Providence sincerely if their year's work shows a profit of three thousand dollars? Yet, with a tolerably extended acquaintance in the profession, we are inclined to think that this list includes the greater part of the architects in this country. As to the architects whose usual income from their business is a hundred thousand dollars, they are pure myths. The New York-Pittsburgh authority mentions by name Mr. R. M. Hunt as one of them. As a counterpoise to this piece of information, we will mention what a worthy contractor once said to us about Mr. Hunt. The builders were not, in those days, very fond of our venerated President. He had altogether too many new ideas to suit their conservatism, which looked with horror on anything out of the common way. "The fact is," said the contractor, in a burst of confidence, "Mr. Hunt never could get a living at all if he hadn't a rich wife." By averaging these two pieces

of misinformation, after the manner of the commissioners of statistics, one may, perhaps, get some sort of notion of what a very able and distinguished architect in New York, seconded by skilful and devoted assistants, can make out of his business; but men so successful are extremely rare exceptions in the profession, and the "hosts" of "small fry" whose annual profits amount to fifty thousand dollars, of course, do not exist. It would be a waste of time to notice such ridiculous assertions, were it not that they do a great deal of harm to the profession and the public: to the profession by making people believe that architects are combined to extort an unreasonable compensation for their work; and to the public by spreading the idea that the profession of architecture is just the one in which their sons can become rapidly rich without much trouble. It would be a useful thing to publish here, as is done in England, the value of the estate left at their death by architects of distinction, although in many cases this is greatly increased by inheritance, by marriage, by fortunate investments or by outside employment; but, if this should be done, it would be not less useful to publish also a few true accounts of the early trials and struggles of architects. How many of them have we known who have given drawing-lessons, illustrated books, designed wall-papers, supervised laborers, delivered lyceum-lectures or written for newspapers, happy if they could earn two dollars a day while waiting for a vacancy in the "hosts" of architects with a thousand dollars a week income. How many more, who were glad of the help of their faithful young wives in eking out the living which had love for its principal ingredient. And of those who have persisted until time and opportunity have brought them a comparatively assured, though modest position, how many have found their way to it through architecture? If we are not mistaken, less than half of the trained students in architecture turned out by our technical schools are to be found in the profession six years later. The others, ascertaining, on a closer view, that their expected income of fifty thousand dollars a year is farther off than they anticipated, and that fifty thousand cents is about as much as they can expect for a good many years to come, drift away into other employments, and some of them, no doubt, will be much astonished to learn from the newspaper reporters what they have missed.

WE regret very much to hear of the death of Mr. George F. Durand, Vice-President of the Canadian Society of Architects, which occurred at London, Ontario, last week. Mr. Durand was young in the profession, being only thirty-nine years old, but was very widely and favorably known among architects and the public, both in Canada and elsewhere. He was a native of London, but after spending a short time in the office of the city engineer there, he went to Albany, N. Y., where he was employed by Mr. Thomas Fuller as his chief assistant in the work on the new capitol, which was then in Mr. Fuller's hands. When Mr. Fuller was superseded, Mr. Durand left Albany with him, and, after a year spent in Maine, with a granite company, he returned to his native city, where he soon found constant and profitable employment, having for several years built a large part of the most important structures in Western Ontario. The London *Advertiser*, to which we owe most of our information as to his works, offers to his relatives and friends the sincere sympathy of the public which it represents, and we are sure that the architects of the United States will join with their brethren in Canada in mourning the loss of one who, at so early an age, had conquered for himself so conspicuous a place in his laborious profession.

SOME interesting experiments on concrete arches were made recently, during the construction of the new railway station at Erfurt. Some of the rooms were to be covered with concrete floors, carried on iron beams, while others, of smaller size, were intended to be spanned by arches extending from wall to wall. One of the latter, something over seven feet in width, was covered with concrete, flat on top, and forming on the underside a segmental arch, the thickness of the material at the crown of the arch being four inches, and about eleven inches at the springing. The concrete was made of "Germania" Portland cement, mixed dry with gravel, moistened as required, and well rammed on the centring; and skew-backs were cut in the brick walls at the springing line, extending two

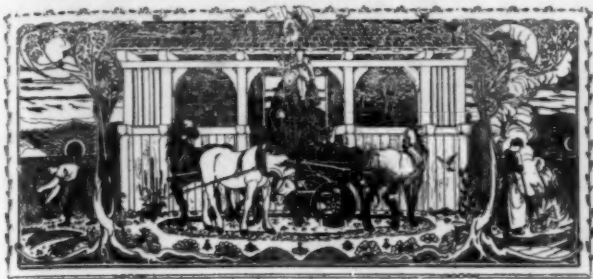
courses higher, so as to give room for the concrete to take a firm hold on the walls. Fourteen days after completion, this floor was loaded with bricks and sacks of cement to the amount of more than six hundred pounds per square foot, without suffering any injury, although, after the load was on, a workman hammered with a pick on the concrete, close to the loaded portion, so as to provoke the cracking of the arch if there had been any tendency to rupture. In the other cases, the concrete arches being turned between iron beams, the strength of the floor was limited by that of the beams, so the extreme load could not be put on; but the curious fact was established that a section of concrete flat on top, and forming a regular segmental arch beneath, was far stronger than one in which a portion of the under surface was parallel to the upper; showing, apparently, that the arched form, even with homogeneous concrete, causes the conversion of a large part of a vertical pressure into lateral thrust, reducing by so much the tendency of the load to break the concrete transversely. This observation is important theoretically as well as practically. It has been of late generally maintained that a concrete arch is not an arch at all, but a lintel, without thrust, and that the common form, flat above and arched beneath, is objectionable, as it gives least material at the centre, where a lintel is most strained. The Erfurt experiments directly contradict this view, and it remains for some students of architecture to render the profession a service by repeating them, and, at the same time, actually determining the thrust, for a given load, of arches of particular forms. Until this is done, the concrete construction, which is likely, we may hope, to become before many years the prevailing one in our cities, will be practised with difficulty and uncertainty, if not with danger. Incidentally, a trial was made of the effect of freezing on the concrete. The floor of a room arched in four bays, between iron beams, had just been finished when the weather became cold, and on the morning after its completion the thermometer stood at twenty above zero. The concrete had not been protected in any way, and the contractor was notified that it had been frozen, and must be removed. This was early in December, and it was about the first of April before the work of removal, preliminary to replacing the concrete with new material, was begun. Three bays had been wholly or partly removed when the hardness of the concrete under the workmen's tools attracted attention, and the arch remaining intact was tested with a load of three hundred pounds per square foot, which it bore perfectly.

THE question how far an architect can be held responsible in damages, in cases where the cost of work exceeds the estimates, is examined in a recent number of *La Semaine des Constructeurs*, and some considerations are mentioned which are new to us. According to Frémy-Ligneville, the most familiar authority on the subject, the architect incurs no responsibility whatever, either for his own estimates or those of other people, unless he intentionally and fraudulently misleads his client by a pretended estimate. In this case, as in that of any other fraud, he is liable for the results of his crime. Except under such circumstances, however, the architect's estimate of cost is simply an expression of opinion, the correctness of which he does not guarantee, any more than a lawyer guarantees the correctness of an opinion, although important interests may depend upon it. The owner can estimate the value of the architect's opinion, as of the lawyer's, by the professional reputation of the man who gives it, and, if he wishes to be more secure, he can go to another architect, as he would to another lawyer, for an independent estimate. Moreover, if the owner of the projected building is still anxious that the cost should be strictly limited to the sum estimated by the architect, he can have a contract drawn by which the builder shall be obliged to complete it for that sum, and can have his plans and specifications examined by competent authority, to see if they include everything necessary. This ought to make him reasonably sure what his house will cost him, provided he does not himself make changes in the plans or specifications. If he has omitted to take this precaution, and, as his building goes on, he finds that it is likely to exceed the estimate, he has another excellent opportunity to protect himself, by ordering immediately such changes in the plans and specifications for the work yet remaining to be done as may reduce the expense to the desired amount, and by doing so he generally suffers no damage, as, if he does not get all he expected to for his money, he gets all his money will pay for.

WITH all these opportunities for revising and testing the correctness of an architect's estimate, the man who neglects to avail himself of any of them, and who allows the work on his house to go on, after it has become evident that it will cost more than the estimate, has, according to M. Frémy-Ligneville, no claim against any one on account of his disappointment. Of course, the architect should be as careful in his estimates as his experience allows him to be, and any conscientious man would try not to mislead a client, but both he and his client must remember that when the tenders of the builders themselves usually vary from fifty to a hundred per cent for the same piece of work, an architect's estimate cannot be anything more than an opinion. Moreover, the architect should not forget that, being an opinion, and not a guaranty, he is not only at liberty to modify it as much and as often as he sees fit, but is bound to do so, and to inform his client at once of the change, when fuller information, or alteration in the circumstances, shall show him that the original estimate is likely to be exceeded. If he does this frankly, although his client may be disappointed, he cannot reproach the architect with trying to deceive him, and there will probably still be time to make the changes necessary for reducing the expense to the desired point. In a case decided in Paris in July, 1855, a man was condemned to pay fifty-four thousand francs for repairs done on a house. He proved that his architect had estimated the expense at seven or eight thousand, but it was shown that the architect had subsequently informed him that it would be necessary to do more work than was at first contemplated, and that he had made inquiries about the matter, and had turned out his tenants so that the work might be done, and had paid the contractors more than the sum originally estimated; and the court thought he had no case at all against the architect.

THE great building firm of Peto Brothers, in England, having been awarded a contract for a large public building, have taken advantage of what, as they say, they consider a favorable opportunity to initiate a system of profit-sharing with their men, in accordance with a circular which is printed in the *Builder*. The system described by the circular is very simple. It is to apply for the present, only to the contract mentioned, but, if it works well, will be extended to future cases. Under the arrangement proposed one-quarter of the net profits of the contract are, when the building is done and the accounts settled, to be divided, as a bonus above their wages, among the men who have worked on it, in proportion to the wages they have earned. The conditions under which each man is entitled to his share are that he shall have worked long enough on the contract to have earned five pounds, at the regular rate of wages; that he shall not have neglected his duty, or misconducted himself, or wasted his time, or in other ways have acted so as to diminish the profits of the contract, or injure the reputation of the firm for good and honest work; and, that he shall not have engaged in any strike for shorter hours, or for wages above the schedule of wages which prevailed at the time the contract was made, and upon which the contract price was based. That the workmen may assure themselves of the fairness with which the division is carried out they are invited by the circular to send a representative to watch the making-up of the accounts by the auditor of the firm, and to sign the balance-sheet. In order to identify the claimants, every man must obtain a printed ticket from the time-keeper, on beginning his work, countersigned by the foreman, and noting the day and hour when his employment commenced, with his name, number and wages. This is to be again signed and countersigned when he leaves, and must be produced to secure a share in the dividend. Unpretending as it is, this bids fair to be one of the most interesting experiments in social science yet tried, and unless the trades-unions in England have forgotten their prowess, it will not be carried out without a struggle. Our readers will remember Mr. Lewis H. Williams's experiences in trying a similar plan with his carpenters in New York, and his final victory, but he had only one union to contend with, and that not a very compact one, while Messrs. Peto Brothers will have all the building trades about their ears at once, and the great question whether men shall be allowed to do only a fixed amount of work in a day, and that amount as small as possible, or whether they shall be allowed to work as they please, will be fairly brought before the parties for decision.

THE APARTMENT-HOUSE.



"THE SURE REVOLVING TEST OF TIME - PAST AND PRESENT"
CARTOON FOR SERRAVALLO BY HEYWOOD SUMNER
From Building News.

MOST people are willing to admit that they cannot afford to pay over twice as much for a thing as it is worth; but few in this country are aware that they do this very thing when they build for themselves an independent city dwelling-house or pay a rent equivalent to or greater than the interest on this outlay.

In the old country the secret of obtaining luxury and economy combined in building has been learned, and rich and poor, fashionable and unfashionable alike live in "flats." In America, people have not yet learned this lesson, but cling to the old and barbarous custom of living perpendicularly in isolated towers, with all the cares and worries that go with isolated management.

Nothing shows more clearly than this, how much man is a creature of habit. In his savage state, the nature of his existence necessitated the isolated hut. As civilization advanced, however, the necessity for, and enormous advantages of cooperation became evident, but

from the "flat" in form) contains a kitchen, pantry, furnace-room, fuel-cellar, laundry, dining-room, china-closet, parlor, eight bed-chambers provided with suitable closets, two bath-rooms, a trunk-room, a front staircase extending from the first floor to the attic, and a back staircase extending from the basement to the third floor. What will these accommodations cost in this form and what in the form of a "flat" in an apartment-house?

The apartment-house contains a public kitchen, steam-heating, ventilating and electric-lighting isolated plants, fuel-cellar, laundry, café, billiard-room, gentlemen's smoking-room, ladies' parlor, small public dining-rooms, and eighty suites, averaging five rooms, a bath-room and closets in each, and with a trunk or storage-room in the basement for each suite; four elevators and four fireproof staircases of iron and marble enclosed in brick walls from basement to roof.

The suites are of different sizes to suit the proposed occupants, and will have from two to twelve or more rooms of varying dimensions as desired. They are partly "housekeeping" suites, i. e., having kitchens and dining-rooms; partly "hotel" suites, i. e., having neither kitchens nor dining-rooms, the occupants preferring to use the public café and dining-rooms; and partly "semi-housekeeping" suites, i. e., having dining-rooms and china-closets with dumb-waiters connecting them with the public-kitchen, but no independent kitchen. The "housekeeping" suites require one more bed-room than the others, to accommodate a private cook.

Assuming now at first in our comparison those conditions which are least favorable to the apartment-house, we will take one of the "housekeeping" suites, having precisely the same number and size of rooms as we find in our independent house or "tower" and compare costs.

The only difference in the accommodation in each case is that, in the "flat," the rooms are accessible to one another without the use of stairs, while in the "tower" six flights of stairs in all are used, constituting in the aggregate a ladder, as it were, of about a hundred steps; also in the fact that in the "tower" the owner has to manage

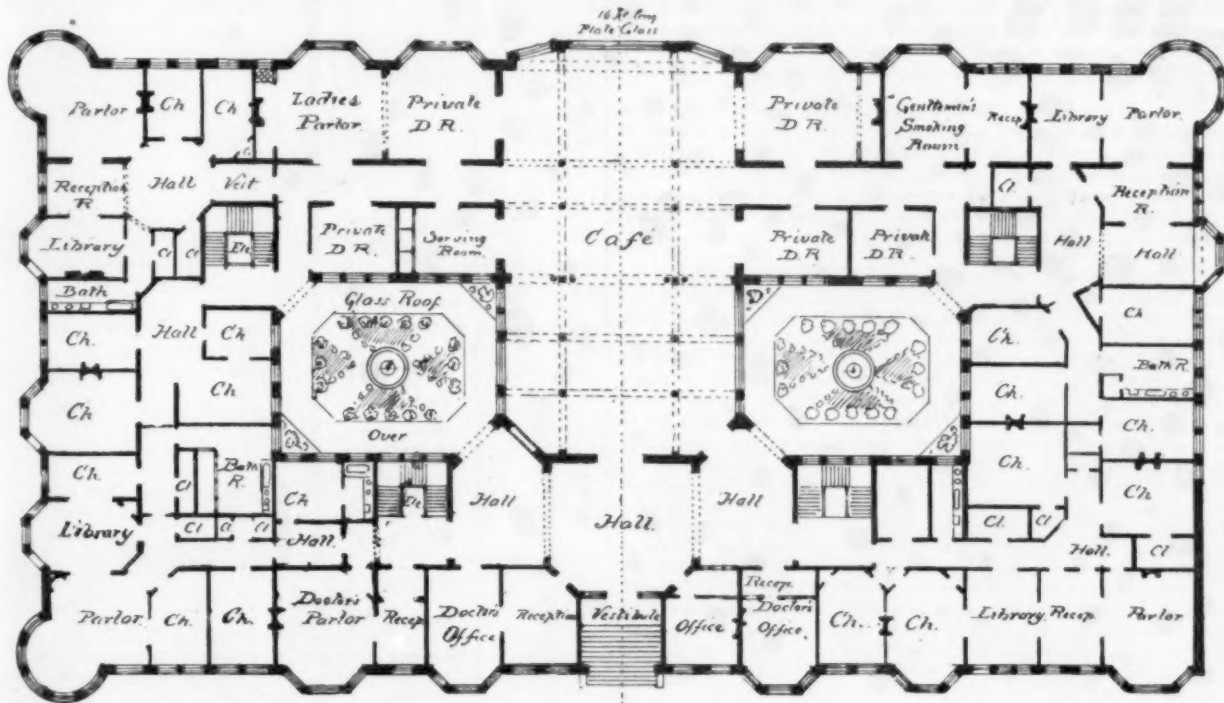


Figure 1.

habit perpetuated the isolated dwelling long after the reasons for its existence had disappeared, and it required centuries for civilized men to learn that cooperation is an element as essential to perfection in the arrangement of their habitations as it is in other things.

A given accommodation may be obtained in the form of a "flat" for less than one-half the outlay required to obtain it in the form of an independent dwelling built on the same land.

The form of comparison herein presented has never, to my knowledge, been heretofore made, and the results are as surprising as they are important and interesting.

The estimates of cost have been made by several competent contractors on scale drawings and accurate specifications, are easily verified and hence may be accepted as reliable.

Figure 1 is one of the plans of our apartment-house which is to be built on the Back Bay, Boston.

Figure 2 shows the floor-plans of an independent house which might be built on the same land. Both figures are drawn to the same scale for convenience in comparing the dimensions. The independent-house (which I shall, in contradistinction to the "flat," designate as the "tower" to mark its prominent point of difference

his own heating, ventilating and hot-water supply apparatus, while in the "flat" this work is done for him; that in the "tower" wooden staircases and no elevators are used, while in the "flat" fireproof staircases enclosing elevators are provided; that in the "tower" the main partitions are often of wood while in the flat they are of brick a foot thick and each "flat" is separated from its neighbor by a brick wall a foot thick and all the floors are completely deadened against the transmission of sound; and finally that in the "tower" no external fire-escape is provided, while the "flat" has convenient external fire-escapes of iron. Otherwise the accommodations are in both cases precisely the same.

The total cost of this apartment-house, including the building-lot valued at, say, \$5 a square foot, has been carefully estimated at \$617,771.

This is the highest of two competitive estimates given by two responsible builders, and comprises general cooking-plant, electric-lighting, steam-heating and ventilating apparatus, iron staircases and fire-escapes, elevators, copper roofing, architect's commission, and, in short, everything required for occupancy and use except wall-paper.

The first floor contains 16,688 square feet of available room. (By "available" I mean room which is directly occupied by, and which must be separately provided for each owner. That is, it excludes staircases, furnace, laundry, etc., which might be used in common by many owners and therefore need not be duplicated for each, and which are only indirectly serviceable to each owner in contributing to the usefulness of those which are directly enjoyed.) The six floors above contain 23,288 square feet of available room each, making a total of 156,416 square feet. Adding 10,880 square feet for basement storage and trunk-room for the suites, and 2,000 square feet in the basement for barber's shop, apothecary, carriage and other offices along the street fronts, we have a total of 169,296 square feet of available room in the entire apartment-house. Dividing the total cost \$617,771 by this figure we have \$3.65 for the cost of each square foot of available room in the building.

Our "tower" measures twenty-five feet front on party lines, by seventy feet deep. Its available rooms comprise parlor, library, music-room, eight closeted-chambers, two bath-rooms, a trunk-room, a dining-room, and we may add a kitchen for those who still believe in having an independent cook.

The area of these rooms is as follows:

Parlor.....	374 sq. ft.	Chamber No. 6.....	286 sq. ft.
Library.....	374 "	Chamber No. 7.....	242 "
Music-room.....	154 "	Chamber No. 8.....	315 "
Chamber No. 1.....	384 "	2 Bath-rooms.....	144 "
Chamber No. 2.....	528 "	Trunk-room.....	136 "
Chamber No. 3.....	170 "	Dining-room.....	408 "
Chamber No. 4.....	252 "	Kitchen.....	384 "
Chamber No. 5.....	162 "	China-closet.....	136 "
Other closets.....	410 sq. ft.		

Making a total of 4,859 square feet of available room in the "tower." Its total cost on a twenty-five foot lot of the average depth on the Back Bay, i. e., 112 feet, the land being valued as before at \$5 per square foot, would be at the lowest estimate \$32,000 at the present prices, the wood finish being equally good with that in the "flat." If we figure, however, for the same style of lighting, heating, ventilating and fireproofing, and provide an elevator and outside fire-escape, the cost could not be put below \$40,000.

The same amount of available space, i. e., 4,859 square feet in our "flat" would cost at \$3.65 per square foot as above estimated, \$17,735.

If now we consider that the management of a private kitchen and an Irish cook does not actually constitute the essence of a home in its broadest sense, but, that on the contrary, it really deprives a home of its greatest charm, namely, peace of mind and rest of body, the kitchen and the cook's bed-chamber may be omitted from our "flat" in view of the public kitchen. The area of our "flat" then becomes 4,475 square feet, which, at \$3.65 per foot, brings the cost down to a little over \$16,000.

Finally, if we omit the dining-room also, with its china-closet, our area becomes 3,931 square feet, and the cost only \$14,350 for the "flat," against \$40,000 for the "tower," the former being but little over a third of the latter.

So much for the saving in the case of a large family and large suite. For a small suite, such as would be required for a single person, or a small family of two or three persons, the saving at once mounts to a very much larger figure; so much so, indeed, as to render the use of the isolated house in such cases a most inordinate extravagance, except for the very rich. Thus a single person, or a family of two or three, could be very comfortably provided for with three or four rooms, and a bath-room in an apartment-house having a good café. Estimating the rooms to measure 18 x 22 feet, their area would be a little over 400 feet each, including closets, and their cost \$1,460 apiece; or for smaller rooms of, say, 14 x 15 feet, or 224 square-feet surface, the cost would be but \$818 apiece. An isolated dwelling, on the same land, of only eighteen feet frontage and fifty feet deep, would cost, including the lot at \$5 a foot, not less than \$18,000 or \$8,000, without the land. Of course, in such an isolated dwelling, electric-lighting, steam-heating, fireproof stairs, and other luxuries of the "flat," would hardly be expected.

By the arrangement of our apartment-house, there are twenty-four corner-suites out of the eighty. These have direct sunlight on either one or both of their exposed fronts, and may be estimated as worth fifty per cent more than the rest. In other words, $\frac{1}{2}$ of the whole available room space is worth fifty per cent more, and $\frac{1}{2}$ correspondingly less than the average price of \$3.65 per foot. Therefore, $\$3.65 \times \frac{1}{2} = \$5.47 =$ price of corner-suites per foot. $\frac{1}{2} \times$ the total area 169,296 square feet = 50,788 square feet $\times \$5.47 = \$277,810$, which, deducted from \$617,771, leaves \$339,961 to represent the total cost of the remaining $\frac{1}{2}$. The total area $169,296 \times \frac{1}{2} = 118,507$ square feet of available space in the inner-suites. Hence $\frac{\$339,961}{118,507} = \2.86 as the price per square foot of the inner-suites, or all suites which are not corner-suites.

Now, as our estimates on the "tower" were made on the basis of its being an inner building in a block and not a corner-house, our estimates for the "flat" should be on a basis of \$2.86, instead of \$3.65, as taken. Therefore, our suite of 4,859 square feet would be but \$13,896 if the "flat" were any other than a corner one, and if the public kitchen and café were used, it would be \$11,242, or but a little more than a quarter of that of the "tower!"

The foregoing figures are easily explained, and their correctness verified by the following simple diagrams and considerations:

In Figure 2 the shaded parts of the plans represent the unavailable room which, under the apartment-house system, are rendered unnecessary, and they are practically wasted. Thus the eighty

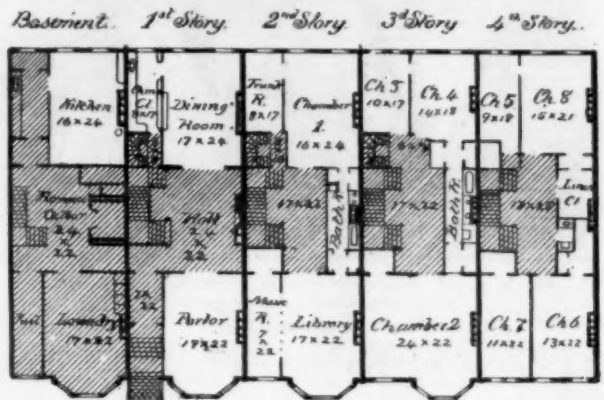
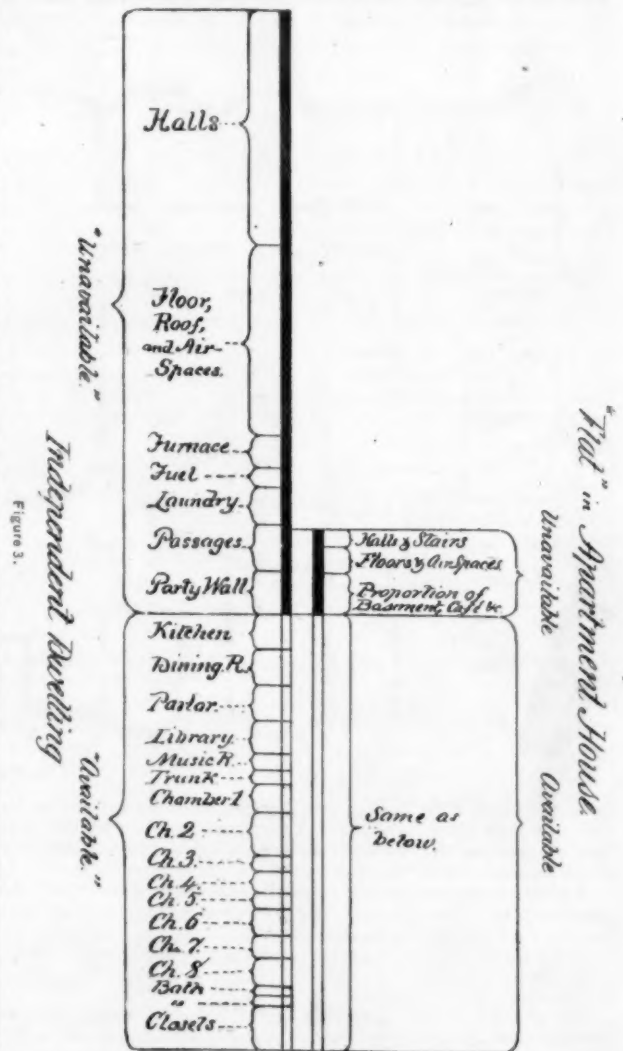


Figure 2.

families, by uniting their eighty homes in one coöperative apartment, save 156 staircases consisting of seventy-six front and eighty back staircases, seventy-eight furnaces, seventy-nine laundries, etc., and nearly all the space they occupy, and the land, foundation and roof they represent.

This waste space may be graphically shown by the diagrams in Figure 3. The large black-and-white line represents the "tower," and the shorter the "flat." The black part of each line denotes un-



available, and the white part available room, the sum of the two denoting the total cubical contents of each dwelling. The white parts of the lines measure the same length in each case, because the amount of available room in "tower" and "flat" is assumed at the outset to be the same. Thus in the "tower," the front and back staircases and halls take up 22,000 cubic feet out of the total 106,000

cubic feet covered by the entire building. In the "flat" the proportional part of the halls and staircases for each suite is represented by a comparatively insignificant quantity as shown.

Again, an enormous waste is shown in the flooring, roof and air-spaces of the "tower," while this item is but a trifle in the "flat." The six floors, each 16 inches thick, and the roofing make up together in the "tower" 12,000 cubic feet, or nearly the equivalent of an entire story. Add to this 12,000 cubic feet of air-space under the roof and over the concrete, and we have in these items a waste of 24,000 cubic feet, against only 4,000 in the "flat."

Thus we see that the waste space in the "tower" actually exceeds the available. Yet it must be paid for at the same rate with the latter. Deducting the waste in the "flat" from that in the "tower," we find the balance of waste space in the "tower" to be equal to the available, showing graphically that the "tower" must cost, in these items alone, just twice as much as the "flat."

Figure 4 shows a block-plan on a very small scale of the apartment-house, and a block-plan on the same scale of 40 "towers"

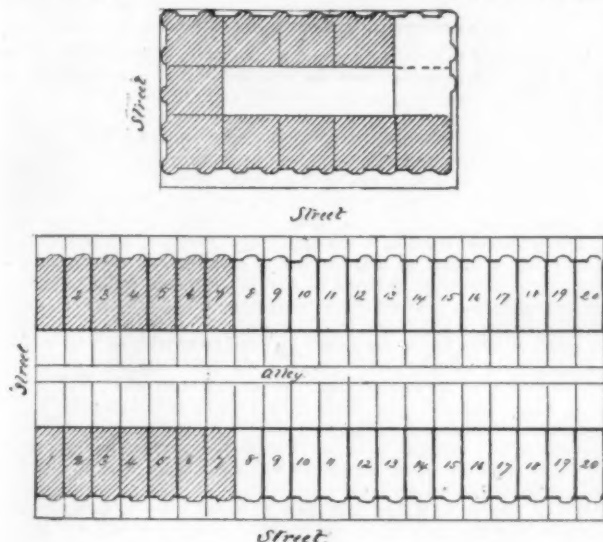


Figure 4.

adjoining each other, and having the same available space as the apartment-house. These plans show how much more land is required to give the same accommodations (minus the conveniences and luxuries of an apartment-house) in the "tower" system than in the "flat."

The shaded portions in each block-plan represent the aggregate of available room in each case. This shows very strikingly what an enormous proportion of land and material is wasted in the "tower" system.

In short, the possible saving in first cost for each family adopting the "flat" system of building lies between \$14,265 and \$28,758, making an aggregate saving for the 80 families occupying the apartment of between one and two millions of dollars.

The annual running expenses are also greatly in favor of the "flat" system when the advantages of coöperation are used to its greatest extent.

Eighty independent Irish cooks give way to a professional chef and half-a-dozen *attachés*. The wages and maintenance of the 80 cooks would amount to an annual sum of not less than \$40,000; those of the chef and his assistants to hardly \$10,000, making in this one item a possible annual saving of \$30,000.

The management of the 80 independent Irish cooks, if possible at all, could only be accomplished by the constant struggle of 80 worried and largely inexperienced owners or their wives. The management of the chef and his *attachés* could more easily be managed by a single person, either selected from among the 80 families and suitably recompensed, or employed as a professional manager at a regular salary. Or the entire control of the *café* and kitchen could be let out by contract to some suitable caterer, if preferred.

Corresponding savings are evidently possible in every other department of housekeeping, including steam-heating, ventilating, laundry-work, lighting and elevator-work. In all of these particulars, coöperation, judiciously conducted, has been shown to yield surprising economies.

But there are other advantages even more important than its economy in favor of the "flat." Freedom from housekeeping cares has already been touched upon. In the "tower," life is spent in training and treating with servants, mechanics and market-men. The private cook is a volcano in a house, slumbering at times, but always ready to burst forth into destructive eruption. True repose is out of the question, and we are told that "the motive for foreign travel of perhaps one-half of Americans is rest from household cares and the enjoyment of good attendance, freed from any responsibility in its organization and management."

Security against burglary and fire is another. In a good apartment-house, trained watchmen stand on guard night and day to protect the occupants, and stand-pipes, hose and fire-buckets are provided in all the halls, and kept in repair for emergency.

The family may leave their apartments for travel summer or winter, knowing that their property is as secure as modern appliances, system and ingenuity can make it. Not so with our isolated dwelling. The cost of providing all these means of protection is too great to make them practicable. The result is that the fear of burglary and fire at all times causes uneasiness, particularly on the part of the wife during the absence of her husband.

Beauty in the architectural arrangement of the rooms is a third advantage of the "flat." In this it has all the advantage of the double house or residence of the immensely rich. The rooms may be grouped in a manner which renders possible the highest architectural effect, whereas in the "tower" the perpendicular arrangement evidently precludes such opportunity by limiting the design to a wearisome and monotonous repetition from basement to attic.

No argument can be sustained against the "flat" on the ground of transmission of sound or want of privacy and isolation, for sound may be as fully deadened as in the "tower" by means of the 12-inch brick separating walls shown in our plan, and the most improved deafening treatment of the floor-joists.

Isolation may be made complete in the "flat," the private halls and front doors of each suite being in every respect the equivalent of those in the "tower"; the only difference being that with the "flat" the outer world begins with the public hall and its elevator, while with the "tower" it begins with the public street and its horse-car.

Add to these advantages the possibility for a greatly enlarged and delightful social intercourse which a properly arranged and conducted apartment-house provides, and we have as near an approach to the ideal of a human habitation as has yet been devised.

J. P. PUTNAM.

ARCHITECTURE IN BROOKLYN.



THE city of Brooklyn has at last waked up to realize her size and importance architecturally. Brooklyn, though growing very rapidly and having many buildings of importance, has really had very little good architecture, for the simple reason that the profession, not being in any way organized, could not, as a rule, receive the treatment due respectable architects. For this reason many young men who would not be capable of practising elsewhere, have flocked to this city, and by various methods, many of which are far from honorable, have succeeded in getting control of most of the work. However, we hope for better things.

The Brooklyn Institute some time ago decided to organize a Department of Architecture, and for this purpose a meeting of architects was called, which led to several more meetings and the attendance at these was exceedingly hopeful for the new department, some forty or fifty architects signifying their willingness to help along in the work; finally a public meeting was held in the Institute on

Friday December 13, at which some six or seven hundred persons were present, and the Department was fully organized; the constitution carefully thought-out at the previous meetings was adopted, and the following list of officers chosen:

President, G. L. Morse; *Vice-President*, Louis De Coppet Berg; *Secretary*, William B. Tubby; *Treasurer*, Gustave A. Jahn; *Committee on Current Work*, Richard M. Upjohn, R. L. Daus and Louis De Coppet Berg; *Committee on Museum and Library*, Walter E. Parfitt, Pierre Le Brun; and Wm. Hamilton Gibson; *Committee on Competitions and Awards*, R. L. Daus, D. E. Laub, Russell Sturgis; *Committee on Professional Practice*, Walter Dickson, Albert F. D'Oench, Richard M. Upjohn; *Committee on Social Intercourse*, H. P. Fowler, Charles T. Mott and General Ingram.

During the necessary intervals of balloting, etc., the President, Mr. George L. Morse, made a short address, setting forth the history of the previous meetings, and congratulating the local architects on the prospect of having a strong and well-organized society.

Mr. Louis De Coppet Berg, of the firm of J. C. Cady & Co., Architects, then addressed the meeting as follows:—

WHEN a young man enters a profession, and particularly the profession of architecture, if perchance he gets an original idea, or a little knowledge, he at once becomes very secretive, tries to keep it all to himself for fear some one else will benefit by it, and marks all his drawings "The property of . . .," and "Not to be copied, or used, without the consent of the author, under penalty of the law." As he grows a little older in his profession he begins to find out that a few others have ideas as well as himself, and know a little something once in a while; and as he grows still older he finds that there are a great many others, who know a great deal more than he does, and who have a great many better ideas than he has; and then it is, that he longs for communication with his professional brethren, and he finds that, in order to get the benefit of their ideas and knowledge, he must freely communicate his own to them. Hence it is that in most of the large cities we find some association of architects; Brooklyn, however, the third city of the Union, is unique in this respect, that it has absolutely no place where professional architects can meet and discuss the different problems of their profession.

To remedy this evil, the Brooklyn Institute proposed to establish a Department of Architecture, and for this purpose called together a large number of local architects.

Now, we have decided that, if we have any Department at all, it shall be a live one; and this reminds me of a squib I read in the paper the other day, telling how, somewhere in Spain, they had unearthed an old painting, which was pronounced a genuine Murillo. It was said that the experts could not as yet determine whether the subject of the cracked and dingy old canvas was a Madonna or a Bull Fight, but that, nevertheless, they did not hesitate to declare that it was a great acquisition to art. Now, that is the trouble with most associations of architects; if the subject for discussion is only old, cracked and dingy enough, they are happy. Nothing delights them more than to spend all their time and energies in discussing Etruscan or other antique architectures, or the exact differentiations between the many styles of architecture. Now, while we value the history of an art, and shall give it all due attention, we propose to remember that the modern architect, besides being an artist, must be one of the most practical and executive of business men.

We admit that our ancestors in the profession designed beautiful castles, magnificent cathedrals and lovely châteaux, but we remember that these castles, these cathedrals, these châteaux were planned without any comfort; that they had no plumbing devices, no methods for cooking, no systems of heating or ventilation, and no way of getting light but the miserable taper; while to-day the architect, besides being a thorough artist, who knows how to design and to color, besides being thoroughly up in the history of his art, must know how to plan for comfort, to construct for strength and stability; must understand all the details of boilers, machinery, dynamos, electric-wiring, heating and ventilating systems; plumbing and sanitation, and lastly must be able to manage the complicated finances of large undertakings.

Now, to carry out these ideas in our work, we shall, in the first place, establish a museum and library, to which we shall welcome all gifts of books, pictures, models, casts, etc., whether illustrating the artistic, or the practical side of the profession. Then we shall have a course of monthly, public lectures by competent authorities, the subjects of which will probably be very largely chosen from the artistic side of the profession. We also propose to have stated meetings of the Department monthly, at which some carefully selected papers will be read by experts, the subjects of which will be given out as long in advance as possible, in order that all may be thoroughly prepared for a full and open discussion; and then, after these meetings, in order to promote sociability amongst the members, and to show how thoroughly practical we are, we propose to have something to eat. We also hope later to establish schools, not only for young men, but particularly for draughtsmen, where they can be taught, not only the art of drawing, but also the many practical branches connected with the profession.

The meeting was also addressed by the Rev. Dr. Chas. H. Hall, President of the Associate Members. He spoke at great length and kept his audience intensely interested by describing his own acquaintance with architecture, beginning with the original negro log-

house down South, then the prim buildings of old Andover and Harvard, and finally how he saw the great former St. Ann's of Brooklyn, the likeness of which, he said, could be seen any day on the piers of New York when they were unloading dry-goods boxes; and how he finally went abroad and saw the beautiful architecture of Paris, which he could not praise enough. He was also unstinted in his praise of the modern beauty and architecture of Washington. He also spoke of his visits to London, and, while he admitted that Englishmen thought their architecture beautiful, he took exception, and claimed that the great St. Paul's, though beautiful to the English eye, was a cold barren building, blacked with smoke inside and out, a place where you could not be comfortable, nor hear the speaker at any distance. We regret that we are not able to give a verbatim account of his witty address.

At the end of Dr. Hall's address, the lecturer of the evening, Professor Russell Sturgis, architect, of New York, addressed the meeting as follows, his subject being "The Study of Architecture," with particular reference to the architecture of to-day.

ADDRESS OF MR. RUSSELL STURGIS.

WITH regard to architecture and all the arts of decoration, there is a strange difference between the practice of them, and such study as looks toward practice, on the one hand, and the history and theory of them, with such study as that involves, on the other. Quite completely are these two studies separated, each from the other. A man may be most active and successful as a practising designer, and successful in an artistic way, too, with no knowledge and little thought of the history of his own branch of art, and with little curiosity as to its philosophy or its poetry. And, on the other hand, a man may be a very earnest student, and a happy and delighted student of the history and criticism of art, and know nothing, and care as little, about the profession or practice of any art, or about studio ways and studio traditions. I do not know that in any branch of human study this distinction is so marked and so strong. This is to be regretted, for many reasons, but it can hardly be done away with so long as the community is generally careless of both the theoretical and the practical—so long as the students and the practitioners alike feel themselves nearly isolated units, floating in a sea of good-humored indifference. This state of things only time can alter. Only time can civilize our new community in intellectual and perspective matters; but there are some other conditions which are more immediately in our power to modify, perhaps—let us see:

It is as true as if it had not been repeated, even to fatigue and boredom, that the arts of decoration have been in a bad way for a good part of the century past, at least among some European and Europeanized nations. I do not imagine that a Frenchman would admit that architecture and the arts of decoration had ever languished in his own society. Your cultivated Frenchman would say that some periods were better than others, but that there were no bad periods; he would say that, to be sure, the style of the First Napoleon's Empire was not a very fortunate style,—too stiff, too absurdly pseudo-classic, unworthy of France, a poor enough successor of the dainty and playful art of Louis XV, or the somewhat more refined and restrained art of Louis XVI: but he would say that it was art still, and the period a not wholly inartistic period; and even of the dull times of the Napoleon of Peace, from 1830 to 1848, while he would confess to a great deal of languor and lack of public spirit of all sorts, except in the struggle which the Romantic artists, headed by Delacroix, waged with the Classicists, headed by Ingres; while he would admit that the abundant wood-cuts and lithographs, the painting and statues much less abundant even in proportion, and the buildings very few and unimportant, were not sufficient to make up a great artistic epoch, that is, for France; yet as for its being an epoch without art,—such a thing as that, he would say France had not known since she was France. And he would be right.

But if said of England it would be pretty nearly true, if it were said that the whole amount of art of the decorative kind that existed in England between 1810 and 1850, for instance, would fill but a small museum, and that its quality would fill but slight requirements, it would require a bold Anglophil to contradict. There came a dull pall, like that of her own black fogs, over social London, and the stucco-fronted languors of Baker Street and Portland Place are no worse than were the dull monotony of the interiors behind them. Veneered and polished mahogany furniture, very much too large and too heavy for the rooms; black haircloth, like the grave clothes of Art, for the covering of everything that could be sat upon; cold, brownish-red curtains, of shiny but not lustrous material; silver candlesticks of monstrous design,—these, and such as these, were the decorative objects which our fathers or our grandfathers admired, or felt that they must admire for want of better, during the unhappy years that I have cited. The delicate carvings that the furniture of a generation just previous had received, were forgotten. People put up with Chippendale chairs in their dining-rooms because they had belonged to their fathers and nothing special was offered to take their place; but there is no record that they cared for them. The richer and more fantastic carvings of Grinling Gibbons had never obtained any general recognition nor availed to modify the woodwork of the domestic interiors of England. The brocades and flowered silks which the eighteenth century had revelled in, and if in England not strong enough artistically to produce them itself, had brought into England from other lands;—these were replaced by the dismal

things I have alluded to, and no vestige of them seems to have remained in the parlors of that unhappy time.

Richness of costume had disappeared with the wars of the French Revolution. Embroidered silk coats had given place gradually to claret-colored and blue broadcloth, and this gave place to black, and all variety in costume had disappeared completely; and now, from 1810 to 1850, fantastically varied and interesting house-furnishing and decoration had followed, as I suppose it inevitably must follow; costume, being, one fears, a necessary part of anything like a prosperous artistic epoch.

Out of this gloomy depression the Anglo-Saxon world, in England and in this country, is trying to emerge. It began its efforts with the perfectly natural conviction that by studying the artistic history of the past, something could be done to benefit the arts of the present. The Gothic revival, which you have heard of so much, and which was followed with real ardor and with unquestioning zeal by crowds of devotees for years, beginning with, perhaps, 1840, was an attempt along the most obvious lines,—along what seemed to be the line of least resistance, to change the metaphor. To develop anew an old art, which had flourished so greatly in the past,—how easy! and how certain! How certain were the enthusiasts of that time, that by earnestly poring over and closely analyzing and heartily loving the buildings of the thirteenth and fourteenth centuries, such buildings, and others like them, could be built in the nineteenth! How happy was the conviction of all these men that it was not more difficult than that! The secret of what had been done was to be found in the phenomena themselves. There, in this parish church, in this cathedral, lay the secret of their charm. Let us analyze first, they said, and let us put together again the ingredients that our analysis shall have discovered, and we will re-create the thing that we are in search of.

In like manner, in the minor arts, the people of 1850 felt, or some of them did, that they did not know how to weave curtains that it was worth any one's while to hang up, except to shut out the light and shut in the warmth; that so far as beauty of texture, beauty of pattern, and beauty of color went, they were powerless to produce anything of any avail. But they saw that the Venetians of the sixteenth century and the Florentines of the seventeenth century and the French of the eighteenth century had produced splendid stuffs; and although there were no museums in those days that condescended to anything so humble, such stuffs were still to be bought of the bric-à-brac dealers, and very cheap, too, and still existed, rolled up in some old garrets. By studying them, surely the art of making others like them could be learned. And so around the whole circle of the arts of decoration, it was believed, and in thoroughly good faith, and with, as it seemed, perfectly good reason, that the study of what had been would suffice, with zeal and patience and good will, to the production of what should be.

Well, the experiment has failed. Archaeology is the most delightful of pursuits, but it is not particularly conducive of good art. The German professor, who knows the most about Phidian sculpture, is as far as his youngest pupil from being able to produce anything Phidian, but, of course, this is not a fair example. The German professor does not profess to be a sculptor. Let us say then, that that sculptor now alive who knows the most, theoretically and historically about Greek art, is as far as his most ignorant contemporary and rival from having Greek methods of work. This is a safe proposition. I do not know who he is, nor can any one tell me. It is not a question of men, but of principles. The study of the monuments of art is one thing, their analysis, their criticism, their comparison, is one of the most attractive, the most fascinating, the most stimulating, the most absorbing of studies, one that I shall never cease commending in the most earnest way to all those persons to whom scholarship is dear and to whom it is a question of recommending a study which is worthy of their most earnest and hearty devotion, but it is not the study of practical art, that is another and a very different thing.

The way to make good sculpture is to let the youth thumb and punch and dabble in wet clay, and see what he can make of it; and the way to make a painter is to give the boy now a burnt stick, and at another time a pin and a back of a looking-glass, and see what he can delineate with such materials as these and with all other materials with which a line can be drawn. To look at the world, and what it contains, and to try and render what is suggested to him,—that is the training for the artist, and it has more to do with our beloved study of archaeology than if they were not concerned with the same subject. This, I say, has been proven. Sad experience, the waste of forty years of work, disappointment and despair, have taught some of our artists what others did not need to learn,—that the way to succeed was not through study of the past. The artist has no primary need of archaeological knowledge; the archaeologist has no need of any fact that the artist can furnish him with.

Suggestions; yes! Each side can furnish the other with suggestions in abundance, and suggestions which each can immediately profit by. An able artist, if a fellow of modesty and frank speech, can hardly talk without giving the student of the theory of art hints which the latter should study over at home before he sleeps upon them; for the secret of much that is vital and essential in his study is to be found in these hints; and on the other hand, I imagine that an artist would be better off, and have more play of mind, and readier and fresher conceptions, if he would now and then listen to what the student of old art has to tell him about what is to be observed in this or

that monument of the past. But beyond that there is no connection between them. I will run two ateliers side by side, one for archaeologists, and one for practical students of architecture and they need never mix.

This will be more readily admitted, perhaps, in the case of the arts of expression than in the case of arts of decoration and let us define these terms. If you will allow me, I will quote from an address delivered a year ago before the New York Architectural League. Any work of art whose object is to explain and express the thing represented, or to convey the artist's thought about the thing represented, is art of representation, or, if you please, art of expression, or if you please, expressional art. I offer these as nearly synonymous terms. But if, on the other hand, the work of art has for its object the adornment of a surface of any sort, as a weapon, a utensil, an article of costume, and if the natural objects represented or suggested are used only as suggestions to furnish pretty lines and pleasant tints, which lines and tints might have been after all represented apart from the object were man's mind more creative than it is,—that is art of decoration.

Now, architecture, you see, is primarily an industrial affair, a method of covering men in from the rain, and admitting light into their protected interiors, and of warming those interiors, and in a few rare cases of ventilating them, and in providing a variety of apartments, communications, and the like for the varied requirements of a complicated existence; and it need not put on any artistic character at all. But as architecture becomes a fine art, it is perforce one of the arts of decoration. It has nothing to do with the arts of expression. Mr. Ruskin and all his life work to the contrary, notwithstanding, the business of building is not to tell tales about the world and its contents, not to set forth the truths of botany or of zoology, or of humanity, or of theology. If zoological or botanical or human objects are introduced, or representations of them, it is not for the sake of information that can be given about these interesting things, nor for the sake of expressing the artist's mind about them, nor for the sake of saying anything whatever in regard to them. It is for the sake of making the building beautiful. When the Oxford Museum stood presenting to the street a flat-fronted wall, diversified with pointed arches, and carvers were set to work bands of rich sculpture around the windows; although Mr. Ruskin had a great deal to do with that edifice, and architects of his own choosing were in charge of it, and clever Irish workmen of his own approval were producing the interesting carvings of those archivolt and tympanums, in spite of all theories, the object aimed at and the object attained by that outlay of time and money and skill was the beautifying of the building, and this was achieved to an extent probably beyond what its planners proposed to themselves, for the effect of well-applied sculpture upon a building is beneficial to an extent that would never be believed by one who has not often watched the changes that can be wrought in this way. They who have said that the Gothic Cathedral is nothing but a work of associated sculpture are not far wrong, and to produce a lovely building, one would rather have the blankest malt-house or brewery in New York, and some good carvers set to work upon it, than to have the richest architectural achievement of our time, devoid as it is and must be of decorative sculpture. For to get decorative sculpture, you must have your sculptors; and they, you know, are wanting. Where are the men who will model capitals and panels in clay, with some sense of ornamental effect? We have the men who can make a copy in relief of an architect's drawings; but then the architect, even if he have the sense of ornamental effect, in the first place can never draw out, full size and with care, all the work required in a rich building, and, in second place, can never design sculptured form aright by mere drawings on the flat. The architects of New York and Brooklyn are employing to-day, I suppose, 3,000 draughtsmen, of which number two or three hundred at least are engaged most of the time in making large scale and full-size drawings of architectural detail, in which sculpture plays a large part. Well, we need as many modellers, who, either in architects' offices, or in stone-cutters' yards and terra-cotta works, shall be putting into tangible form the dreams and thoughts of the designer's brain. "As many," do I say? Once it is found that architectural sculpture can be got promptly and cheaply, and conveniently, it is not 200 modellers only that this big community around the big bridge will need; but architects will engage three or four or a dozen at a time, as they now engage draughtsmen when big jobs come in.

For so the relative success and power to-day of the arts of expression seem to assure us. When we come to look into the subject, we find that modern life, which finds its expression freely in prose and in verse, and to a slight extent in music, finds some expression also in those arts which deal with expression. It is perhaps not a great artistic epoch that we are living in, although, if some one were to rise by and by, and maintain that it was, I would not be sure that he was wrong. It is certainly a kind of novel and in many ways admirable art in the way of expression. Great thoughts have found expression almost worthy of them in painting, in sculpture, in etching, in wood-engravings, in color and in black-and-white; in the single costly work of art and in the easily multiplied and cheap productions of the press. It is true that in these the thoughts are not always worthy of the expression they receive. This is partly because we have nearly lost the desire of talking about our religious beliefs in line and color and modelled form, and that no other subject of equal universal interest has taken the place of the ancient, simple and popular theology.

Patriotism, as shown in scenes of battle and pictures of deeds of

gallantry and self-sacrifice; poetry, as seen in pictures which suggest sweet thoughts of young love and of home affections and of childish grace; the love of wild nature, as seen in our school of landscape art, now nearly fifty years old and flourishing—none of these nor all of them together have quite replaced the priestly theology of the Middle Ages as a subject for art, for none are quite so universal or appeal quite so readily to the untutored eye and mind. And so the uniform is better painted than the soldier very often, and the outside of nature than her inward spirit, and the flesh of the baby or the golden hair of the girl better than the baby nature or the girl nature in each instance. But this is to be stated merely as a drawback from praise which would otherwise be too unmeasured and too universal. The world contains a vast amount of good art of very recent date, and every year adds to the amount. The worst thing that can be said of the time is that it should be capable of producing so incalculably great an amount of bad art at the same time; that the walls of the *Paris Salon* should be so hung with inferior work every year that the important pictures are lost in chaos; and that, while this is true of the *Salon*, it is true to an immeasurably greater degree of the Royal Academy, of the New York Academy and every other exhibition in the world, except where a selected few paintings hang on reserved walls.

And as for sculpture, that is to say expressional sculpture, it is even more true in this case that the poor works terribly outnumber the good ones, though this is less noticed and makes less impression on the public. Our English-speaking communities do not even think of sculpture as a thing to look to for any refined enjoyment. How far the labors of a dozen living men, all Frenchmen but two or three, may have sufficed during the past score of years to change the public mind in this matter, I am not ready to say; but, surely, it has not been the general thought that sculpture is anything more than an expensive and perfunctory way of doing one's duty to a great occasion or a great man. This, however, is temporary. The good sculpture exists and will be recognized. So much for expressional art.

But, as for the arts of decoration, once more, there is not so much to be said. As yet the way to subdue technicalities and enthrone design has not been discovered. The way to produce beautiful buildings is known to none. The way to produce good interior decoration, good furniture, good jewelry, beautiful stuffs, has only been seen by here and there one, and his lead no one will follow. The fact of his having done a fine thing, or of his doing fine things habitually, acts not as an attraction to others, but as a warning to them to keep off. Every artist strives to do, not as his neighbor has done, and better, but as his neighbor has not done. The potteries work no better, because of one pottery which turns out beautiful work. The wall-paper makers still copy slavishly from Europe and Japan, fortunately if they do not spoil in copying, in spite of the occasional production of a wall-paper which an artist has succeeded in. The carpet-weavers caricature Oriental designs by taking out of them all movement and spirit, while their best customers buy the original rugs. If some rich man were to make a museum of modern decorative art, from which he would carefully exclude all that which was not in some way fresh and intelligent, and if not good, at least promising, a room like this one would hold all his trophies, even though he should use his millions to ransack Europe and America. It is nobody's fault, least of all is it the architect's fault. For see what you expect of an architect. He must know about digging deep holes; and about sheath-piling, that he may retain the loose soil and keep it from smothering the workmen at the bottom of his excavation; and he must know the best machines to use for drilling rock and the best method for removing it; he must know about all the stones in the country and the best way of making concrete; he must be familiar with the thousand new inventions, and discriminate carefully and rightly between this range and that, and between this form of trap and the other, between a dozen different steam-heaters and twenty systems of ventilation; he must be prepared to give his owners exactly what they want in the way of windows and chimney-corners, of cupboards, shelves in available corners, and recesses to put away step-ladders and brooms. But observe that if he fails in any one of these things, he will fail in that which his owner really cares about; still more, if he fails in the economical administration of the funds allowed for the building, will he fail in that which the owner most cares about. Less beauty, less success in producing a novel, an original, a thoughtful, a purposeful design will hurt him but little, but insufficient care as to the circulation of hot-water will ruin him.

Now, no man can do all that, and still produce delicate and thoughtful designs. No man can be busy laying out work, superintending work, explaining to contractors and reasoning with employers, and still be producing delicate and thoughtful designs. An extraordinary fellow here and there may surprise us by what he does under such circumstances, but it will be but little and feeble in comparison with what he might do. The community must see its way to paying some to eschew plumbing and stick to design, if they mean to have any design. This has been done, indeed, in the matter of monumental-glass, and to a certain extent in wall-decoration by means of painting; but it must be done in what is more vital yet—in architectural sculpture of all sorts and all grades; of vegetable, animal and human subjects; in low relief, in high relief and in the round; in detached work and associated groups—or no architecture for us. I say, then, that as things are constituted, the architects are not particularly to blame for not having achieved much in

the way of decorative art, either on the exteriors of their great buildings or in the beauty of their interiors. Not much to blame; but yet they are so far to blame as that no one else is to do this work if they do not. The architects and the artists who are associated with them in the work of supplying us with what we call decorative arts of all sorts, form the only class of the community to whom the rest of the community can look to for advancement in this direction. It is probable, then, that what such an associate has to do is twofold; or rather it has two things to do: One is to study the beautiful art of the past, and to study it patiently and lovingly, feeling confident of this that the interests of the pursuit grow more absorbing every day; and the other is to watch the arts of the present, and to keep an open and perspective mind with regard to them, feeling sure of this that they will grow more complex and interesting every day, and that now and again some chance of something good will appear, here and there, giving us great opportunities to help, if we are clever enough to perceive them.

The study of the arts of the past is more entrancing every day because we are so much better informed, because we are daily better informed about them. Archaeology, having gone through a long apprenticeship, is doing wonders to-day; and, although ancient buildings are suffering from the accursed restorer, they are also more thoroughly known, more rightly judged, more sympathetically analyzed than ever before; while monuments other than buildings, those, that is, that are not open to the attacks of the restorer, are preserved in practical safety, and they also are minutely and honestly studied in a way of which our ancestors knew nothing. There is, therefore, more pleasure to be got out of the study of ancient art to-day than ever before, and that condition of things is a permanent one. Our children will have even better opportunities than we.

And, as for the arts of the present, the arts that are being produced around us, they are to be looked at as calmly and temperately; with, on the other hand, as little as possible of that provincial which makes cathedrals out of carpenters' Gothic churches, and, on the other hand, without carping, but with good-natured patience, with a feeling that if things are not very good, they can hardly be expected to be better; that we, in this country at least, are only half-civilized in the ways of cultivation, and we do uncommonly well for such babes as we are in literature and art. With patience then, and with impatience about nothing but this, that we deny ourselves the study of the great works of art of Europe and Asia by thirty per cent and forty per cent and sixty per cent duty, and deny to the author all proper remuneration for his work by the lack of common honesty. No other nation of European blood does these things. It is not a matter of politics. No protectionists so ardent in the Bismarck ranks as to propose to levy a tax on literature and science. No selfish grabber so small, even among peoples whom we consider less honest than we, who approves of stealing an author's books under color of the law. While we send to Washington Congressmen who keep such laws on the statute-books, our community is not "barbarous" so much as savage; for such acts are the acts of savages; that is, of men who have no reasonable motive for their acts, but act impulsively, like grown-up children.

And now, after this evening, let us return from theory and general principles, to practice and details, and see whether we can find out how it is that Indians combine color, how Japanese use natural form decoratively, how Chinamen make porcelain lovely and noble; how Greeks of old time have sculptured and Frenchmen have created Gothic architecture, and Italians have raised painting to the highest heaven of achievement. There is happiness, if study can give it. And for those to whom scholarship is less attractive than action and production, there is sculpture in small and large, in stone, marble, terra-cotta, wax, clay, plaster, bronze, iron, lead, gold and silver; there is inlay of all material and styles, from square tiles to minute glass tesserae; there is painting with all known vehicles and of all sorts; the whole to be devoted to the beautifying of buildings in which we have to live and work and rest. There is a plenty to do for those who know how to begin.

TO PROTECT PLATE-GLASS IN BUILDING.—Passing along Dearborn Street, recently, I saw a crowd watching closely the placing in position of some enormous panes of glass in a handsome new building. The glass was the best French plate, and the workmen handled it as carefully as if it were worth something more than a week's wages. The task of putting it in place was no sooner completed than one of the workmen grabbed a pot of whiting and with a big brush daubed a lot of meaningless marks on it. I thought it about as silly a thing as a man could do, and with the usual reportorial curiosity asked the foreman why he allowed it. The answer was a crusher. "Why," said he, "we have to mark them in that way or they'd be smashed in no time." My look of amazement doubtless prompted him to further explanation, for he said: "You see, the workmen around a new building get in the custom of shoving lumber, etc., through the open sash before the glass is put in. They would continue to do it even after the glass is in if we didn't do something to attract their attention. That's the reason you always see new windows daubed with glaring white marks. Even if a careless workman does start to shove a stick of timber through a costly pane of glass he will stop short when his eye catches the danger sign. That white mark is just a signal which says, 'Look out; you'll break me if you are not careful.'"—*Chicago Journal.*

THE STRUCTURE OF SANDSTONE.¹

AS AFFECTING ARCHITECTURAL AND ENGINEERING WORKS.



THE native stones we Liverpool architects have at command are all sandstones belonging to the geological division called the Trias, or, in older phraseology, the "New Red Sandstone," which lies above the coal-measures. The term "New Red" was given to distinguish these rocks from the "Old Red," which lies below the Mountain Limestone, the lowest division of the carboniferous rocks. It is, perhaps, needless to remark that the "New Red" is not always red; sometimes it is yellow, at others, like some of the Storeton stone, white. These red rocks occupy a large part of Lancashire and Cheshire, and especially in the latter county give the characteristic scenery which distinguishes it. The escarpment of the Peckforton Hills of which Beeston Castle Hill is an outlier, and that at Malpas, farther south, gives rise to some very beautiful scenery; and again at Grinshill and Hawkstone, in Shropshire, we have a repetition of much the same kind of landscape. It will be necessary for my purpose to say briefly that these red rocks have been divided into the "Bunter" and "Keuper"; the lower division, the Bunter, occupying most of the ground about Liverpool; the upper, the Keuper, being more developed on the Cheshire side. All these sandstones are not fit for building purposes, and those that are so used differ considerably in their durability. It is my object in this short Paper to show upon what the perfection or imperfection of the various stones for building purposes depends—a matter of great moment to an architect or engineer who is desirous that his work should last.

Sandstones, or, in masons' language, "free-stones," from the freedom with which most of them are worked when freshly taken from the quarry, are plastic or sedimentary rocks. That is, they are composed of separate particles which have once existed as sand, like that we see on our own shores, or in the sand dunes of Hoylake or Crosby. Sandstones are usually more or less laminated, and are stronger to transverse stress at right angles to their natural bedding than in any other direction, a fact recognized in every architect's specification, which states "all stones must be laid on their natural bed," a direction that unfortunately sometimes begins and ends in the specification. The cause of the superior strength is not, however, generally understood.

I have devoted some considerable time to an investigation of the internal structure of sandstones, which I have communicated from time to time to various scientific societies and publications, and will now briefly explain it in a manner I judge will be most likely to interest architects and engineers. The particles or grains of which the rock is built up are of various forms and sizes, from a thoroughly rounded grain, almost like small shot, to a broken and jagged structure, and to others possessing crystalline faces. These grains, most of them possessing a longer axis, have been rolled backwards and forwards by the tides or by river-currents. The larger grains naturally lie on their sides when freshly deposited, with their axes in the plane of bedding; the smaller and more rounded particles naturally tend to occupy the interstices between the others, and in this way rude divisional planes or laminations are formed. Each layer forms a sort of coarse like coursed-rubble in a wall, and by the necessities of deposition a certain rude geometric arrangement results,

by which the particles of the future rock overlap each other, and thereby gain what is known to architects as bond.

But, so far, this is only like "dry walling," the mass wants cementing together to make it solid. The cementing process happens in this way in our rocks, which are almost purely silicious: Water containing a minute quantity of carbonic acid in solution, which most rain-water does, especially when it comes into contact with decaying vegetation, has the power of dissolving silica to a slight extent. This is proved in various ways, and is shown in the fact that all river water contains more or less silica in solution.

The circulation of water through the sand deposit of which our rocks are made dissolves part of the grains, and the silica taken up is redeposited on others. I cannot explain the chemical reaction that produces this deposition, but that it takes place in the rock during some period of its history is certain. I exhibit a quartzite pebble taken from the Triassic sandstone at Stanlow Point, which, as can be easily seen, was at one time worn perfectly smooth by attrition and long-continued wear, for the quartzite is very hard. Upon this worn surface you will see spangles and facets which reflect the light, and on closer inspection it will be evident that they are crystals of quartz that have been deposited upon the surface of the worn pebble after it became finally enclosed in the rock.

A microscopic examination of the granules of the rock itself will show that many of them have had crystalline quartz deposited upon their surfaces, and in some cases rounded grains have in this way become almost perfect crystals.

An examination of the best sandstones for building purposes shows that they possess more of these crystalline particles than the inferior ones, and a good silicious sandstone shows its good quality by a fresh fracture sparkling in the sun. In addition to these crystalline deposits of silica I believe it exists also as a cement which binds the particles together when in contact.

It certainly is, however, with this secondary silica that the original sand has become a building stone, and the particles have become interlaced and bound together. Thus, in building parlance, the grains are the rubble of the wall, the currents the quarrymen, masons and laborers, and the silicious infiltration the mortar.

And now, when I am on the subject, I may point out that this hard and compact quartzite pebble was also once loose sand. The only difference between the sandstone in which it was imbedded and itself is that in the latter case the process of silicious deposit has gone further, so that all the interstices between the grains have been absolutely filled up with the cement.

It is not possible to see this clearly with the naked eye, but by the aid of a slice of the rock prepared for the microscope the granular structure of the quartzite is made perfectly plain. So much for the mechanical, chemical, and molecular structure of sandstone, all of which affect the strength and quality of the stone; but to architects there is another element of consequence, namely, the color. The rich red of our Triassic sandstones is due to a pellicle of peroxide of iron coating each of the grains. That this is merely surface coloring is shown by the fact that hydro-chloric acid will discharge the color and leave the grains translucent. Unfortunately the most brilliantly colored stone is not the most durable, and it so happens that these brilliant red sandstones are often composed of exceedingly rounded grains. Also some of the very red sandstone has an interfilling of a loose argillaceous iron matter detrimental to the stone as a building stone. The most durable of the red sandstones are those having a paler or grayer hue, like those of Woolton, Everton, and Runcorn. This distinction of color was brought freshly to my mind a short time since in looking at the church of Llandyrnog, in the Vale of Clwyd, a few miles from Ruthin. Some of the dressings, quoins for instance, were of a very brilliant-colored red sandstone, and others of a pale gray or purple red. It struck me that these latter must be of Runcorn stone, which I was afterwards informed was the case. The very red stone was the natural stone of the Vale, originally used for dressings, which were replaced, on the restorations being made, with Runcorn stone. The original stone was aesthetically the best, but the introduced stone the best structurally. The old stone of Chester Cathedral was a very red Bunter sandstone, which decayed badly. It has been replaced in the restorations by Runcorn stone, which belongs to the Keuper division, which has caused the Geological Surveyors to say that the Keuper is a better building stone than the Bunter. In this case it is; but, on the other hand, the Bunter sandstones, or Pebble-beds, as they are called, near Liverpool, are often better than the Runcorn Keuper. The Runcorn building stone lies between two beds of very red loose rock, showing that it is not its geological position, but its structure, that makes it a good durable stone.

It is a remarkable fact that most of the pebbles included in the red rocks are quartzites, or indurated silicious sandstones; and, as showing that their solidity and hardness are due only to a further continuance of the deposit of silica in the interstices, it has been proved that the purple quartzites are purple only by reason of the original coloration of the grains which have been enclosed between the original grains and the secondary silica. Yellow sandstone is colored also by iron, and I have frequently seen the red sandstone shading off to the yellow without any division whatever. The various shades and tints of sandstone are necessarily due to the coloration of the individual grains.

Most of you will, no doubt, have observed the sort of marbling or grain upon the stone of our old buildings, such as the Town-Hall, which I believe was obtained from quarries occupying the site of the

¹ Read before the Liverpool Architectural Society, on the 18th November, 1889, by Mr. T. Meillard Reade, F. S. G. S. Fellow, President of the Society, and printed in the *R. I. B. A. Journal*.

St. James's Cemetery. This is due to what is called current bedding; that is to say, the grains have been arranged along oblique lines and curves instead of in parallel laminae. This stone, which is geologically equivalent to the Storeton Stone, and of the same nature, has stood very well. Some of the Storeton Stone, if free from clay galls, although very soft when quarried, becomes hardened by exposure, and will stand the weather much better than a harder and more pretentious material.

The stone of Compton House is in a very good condition, although the mason told me such was the hurry in rebuilding that they could not stop to select the stone, and also that it is placed in all sorts of positions with respect to its quarry bed. Perhaps the circumstances that the stone is not in parallel laminae may have something to do with its durability, notwithstanding this latter fact.

It would take a long Paper, and several evenings, to exhaust the subject even of our local stones. I may mention, however, that the quarries of Grinshill, between Shrewsbury and Hawkstone, yield a beautiful white sandstone, of a finer grain than Storeton, but of a similar quality.

Most of the public buildings of Shrewsbury are built of it, and I am informed that it was to some extent used in the Exchange buildings. The rocky substratum of a district can be well seen in its ancient buildings, for in old times carriage was so important an item that the old builders could not go far for their stone; hence we see that the old churches of part of Lancashire and most of Cheshire, and a large portion of Shropshire, are of red sandstone. Some of it has stood very well, while some has decayed into shapeless masses. There is a tendency to exfoliate parallel to the exposed or worked surface, in all stones, irrespective of the way of the bed, but more so where the stone is set up on edge, or at right angles, to its quarry bed. It is interesting and peculiar to see in some of the old buildings erected with pebbly sandstone how the white quartz pebbles stand out from the surface like warts. This is due to the greater indestructibility of the quartz pebbles, and the weathering away, or denudation, of the sandstone face.

Before leaving the subject of local sandstones it will be necessary to refer to one quality they have which is of excellent utility as regards the storage of water, but which is decidedly a disadvantage in building stone—that is, their porosity. I have proved by actual experiment that a cubic foot of Runcorn Stone will take up three quarts of water by capillarity, and that it is possible to make a syphon of solid sandstone which will empty a vessel of water into another vessel by capillarity alone.¹ This shows the absolute necessity of damp-proof courses, not only in the main walls of buildings of stone, but even in fence walls, for the continual sucking up of moisture from the earth, and its evaporation at the surface of the stone, make it rapidly decay. I think I could show you this fact in almost any stone building in Liverpool or elsewhere where the stone is in direct connection with the earth. It also shows the necessity of taking care that no stones go through the wall to the interior surface, and of precautions for backing up stone walls with less porous materials, or the introduction of a cavity. If you could suppose such a sandstone wall 40 feet long, 20 feet high, and 1 foot 6 inches thick fully saturated, it would hold almost a ton of water! Of course, it never would be fully saturated, because of the evaporation from the surfaces, but with a southwest aspect, and very wet weather, it might become half saturated. But what does evaporation mean? It means the loss of so much heat and the burning of so much coal to supply its place. From this it will be seen that a pure sandstone wall is a thing to be avoided.

The subject is so wide a one that I have felt compelled to restrict my remarks to local sandstones, but the general principles of structure apply to all sandstones alike.

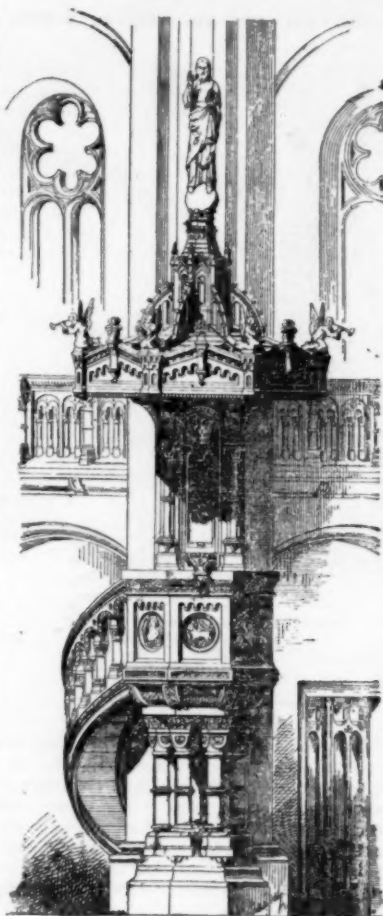
It is difficult by written description to tell you how to select a good stone, but one essential is that there shall be a good deposition of secondary quartz, as shown by the crystalline sparkling on the freshly fractured surface.

It must also be free from very decided laminations, for these constitute planes of weakness and are often indications of the deposition of varying materials, or the same material in various grades of fineness. It must also not be full of argillaceous and iron-oxide infillings. It should possess a homogeneous texture. The best way to study building stones is to study them in old buildings, for nature has then dissected their weaknesses.

WARFARE ON OAK TREES.—"The world seems to have waged a special warfare upon oak trees," says a St. Louis man. "Before iron ships were built, and that was only twelve years ago, oak was the only thing used. When this drain ceased oak came into demand for furniture, and it is almost as expensive now as black walnut. No one feels the growing scarcity of oak like the tanner, and the substitution of all sorts of chemical agencies leads up to the inquiry as to whether other vegetable products cannot be found to fill the place of oak bark. The wattle, a tree of Australian growth, has been found to contain from twenty-six to thirty per cent of tannic acid. Experiments have been made on the Pacific Slope, where the wattle readily grows, and in a bath of liquor, acid was made from it in forty-seven days, whereas in liquor made from Santa Cruz oak, the best to be found in all the Pacific States, the time required is from seventy-five to eighty days. The wattle will readily grow on the treeless plains of Texas, New Mexico and Arizona, the bark of which ought to yield five dollars per acre counting the fuel as nothing."—*Invention.*

¹ This experiment was made before the audience.—T. M. R.

THE BARYE EXHIBITION.



ENTERING the handsome galleries of the American Art Association, one finds the lower floor given up to the Barye bronzes, while the upper rooms are devoted to the "Angelus" and the paintings by Millet and other contemporaries of the great French sculptor. Passing on the left of the entrance the superb, large bronze of "Theseus battling with the Centaur," one is fronted by the great cast of the "Lion and Serpent," which from the centre of the gallery dominates the surrounding exhibits. Both of these are the property of the Metropolitan Museum of Art, the cast having lately been presented to that institution by the French government. Upon the right hangs Bonnat's vigorous portrait of Barye, on the left wall one sees the water-color of the "Tiger Hunt," and all around are cases, groups and isolated pieces of the bronzes.

Here are over 450 works in wax, plaster and bronze, of which Mr. W. T. Walters contributes one-fourth, while the Corcoran Gallery sends its entire collection, numbering nearly a hundred, Mr. Cyrus J. Lawrence loans sixty-two pieces, Mr. James F. Sutton fifty-two and Mr. Samuel P. Avery thirty. Other contributors, who have followed their generous example, are Messrs. R. Austin Robertson, Theodore K. Gibbs, Robert and Richard M. Hoe, James S. Inglis, Richard M. Hunt and Albert Spencer. Of many of the subjects there are several copies, and amateurs can study proofs and patinas to their heart's content. From Mr. Walters's famed collection are the four unique groups modelled for the table of the Duke of Orleans, chief of which is the "Tiger Hunt," where two of the huge cats attack an elephant from whose back three Indians defend themselves with courage. The giant pachyderm writhes his serpent-like trunk in air and plunges forward open-mouthed, trumpeting with pain from the keen claws of the tigers hanging on his flanks. The Hunts of the Bull, the Bear and the Elk are worthy companions of this magnificent bronze, offering wonderfully fine examples of condensed composition in the entwined bodies of men and beasts, and filling the eye with the grand sweeps of their circling forms. The same liberal patron of art also lends his unique piece of a walking lion, in silver, made in 1865 for a racing prize, and a plaster-proof of the little medallion of "Milo of Crotona attacked by a Lion," executed by Barye in 1819 for the Prix de Rome competition at the Ecole des Beaux-Arts. This little gem, worthy of the antique, did not secure the prize, however, which went to a now-forgotten sculptor named Vatinelle. It had often been so before, it has often been so since down to our day (Comerre was preferred to Bastien Lepage in 1875) and doubtless it will be so for who knows how many years to come.

All the phases of that terrific struggle for existence where beast hunts beast, which have been depicted by Barye's genius, are here. Here is the "Tiger devouring a Crocodile" (with which Barye made his first appearance at the Salon, in 1831); the "Jaguar devouring a Hare"; the "Lion devouring a Doe," the "Crocodile devouring an Antelope," the "Python swallowing a Doe," the "Tiger devouring a Gazelle," the "Bear on a tree devouring an Owl" and the "Lion devouring a Boar." What a series of banquets on blood and warm, almost living flesh is here presented! How cruel these creatures are to each other, is the thought that first comes to us, but a second, reminds that it is but their instinct and a necessity of natural law, and repulsion is lost in astonishment and delight at the marvellous fidelity with which the sculptor has rendered these links in the great chain of animal life. Their (as we call it) savage eagerness, their almost blind rage for their appointed food, the tenacity with which they clutch and the ravening anxiety (caused by the dread of losing their prey) with which they tear the flesh of their victims, is por-

trayed to the life. We speak of a death-grip, but here is a death and life grip—death to the victim whose palpitating body furnishes life to its destroyer. It is the hot-cold-bloodedness of nature, the disregard for suffering of the tornado, the earthquake and the avalanche, shown in little in the fangs and claws of these wild creatures. Then there are the battles of the more evenly-matched animals—not always as a result of the need of sustenance—such are the tiger transfixed by the elephant; the python's folds crushing the crocodile; and the bear dragging the bull to earth, or itself, in turn, overthrown by mastiffs. Then comes those groups into which man enters—the African horseman surprised by a great serpent whose formidable folds already enclose his struggling body; the Arabs killing a lion; and the "Theseus overcoming the Minotaur," wherein the calmly irresistible hero is about to bury his keen, short sword in the bull-neck of the gross monster. The success with which Barye has combined the human and bestial characteristics of the minotaur is most remarkable and a similar triumph is won in the hippogriff—the winged horse, with forefeet of claws and beaked nose, which leaps so swiftly over the coiled-shape of the dolphin-serpent, which serves for his pedestal—bearing upon his back the charming, nude figure of Angelica held in the mail-clad arms of Ariosto's hero. To this category seems to belong the "Ape riding a Gnu," the forms, however, being true to nature though appearing fantastic when placed in juxtaposition.

The horse as we know him, and carrying more familiar burdens, is shown in numerous equestrian statuettes, the best of which is the slender, nervous figure of Bonaparte as First Consul, mounted on a proudly-stepping Arab. There is another one of Napoleon, showing him at a later period of his life, and the other equestrian portraits include one of the Duke of Orleans, who looks every inch a gentleman; one of Gaston de Foix, the hero of Ravenna; and one of Charles VII. Then there is a spirited statuette of a Tartar warrior in chain armor sharply pulling back his steed, and a graceful figure of a lady wearing the riding-dress of 1830. A painful contrast is presented by the doomed horse unwillingly carrying a lion whose dreadful gripe his frantic rearing cannot loosen. In addition there are many studies of horses, various in breed and attitude, and the small wax model of a young man mastering a horse which though but a rough "first sketch" has all the "go and fire" possible. It would have been of interest if some illustration of Barye's equestrian monument of Napoleon at Ajaccio could have been shown, and this reminds me that except a photograph of the Château d'Eau at Marseilles, showing the four groups of animals designed by him (which Mr. Cyrus J. Lawrence was thoughtful enough to send), and the two reclining river-gods from the Louvre (sent by Mr. Walters), there is nothing which gives any idea of Barye's public work. Not even photographs of the War, Order, Glory and Peace groups of the Louvre, which could have easily been taken from the copies given by Mr. Walters to Baltimore, now on Mount Vernon Place, are present. But, in face of the admirable collection here gathered together, this may savor of ingratitude, and I will return to the consideration of the remaining sculptures.

Among them are some masterly pieces of decoration, the most important being the superb candelabra made for the Duc de Montpensier. These have seated at their base nude figures of the three chief goddesses of classic mythology, whose noble proportions and purity of outline prove the versatility and completeness of the sculptor's art. Juno is accompanied by her peacock and bears the rod of power; Minerva lifts a sword, and Venus holds the golden apple. The candelabra are further enriched with masks and chimeras, and bear at their top a charming circular group of the three graces, small undraped figures, with arms entwined and faces turned toward each other. The general design and exquisite detail of this work is worthy of the Renaissance. There are some more candlesticks and other works of decorative art, all of which bear the marks of a master-hand.

The humorous side of things is presented by some of the groups: in the ungainly figure of the elephant of Senegal running; in the bear lying on his back in a trough and eating with great gusto some sweet morsel which he holds between his paws; and in the meditative stork standing on the back of a turtle. Some of the animals are shown as sleeping or reclining, and there is a cat sitting, a goat feeding, a deer scratching its side and a pheasant walking, among others, but the tragic note is struck in most of them. Probably the best works are to be found among those pieces representing members of the feline race, which were always the subject of Barye's most thorough study. The sculptures of horses are also very numerous, and it strikes one at first as curious that, after all the rebuffs he received from the academic faction, who recognized no animals but the horse and lion as worthy of representation in sculpture, he should have modelled so many of these creatures. But, after all, Barye's lions and horses belong to an entirely different race from those which the tradition-bound old fogies were pleased with. The collection embraces many admirable bronzes of birds: an eagle holding a dead heron; an owl with a rat; a parrot on a tree, and a strikingly fine composition of a hawk killing a heron; and there are some beautiful studies of dogs, especially a large seated greyhound, belonging to Mr. Walters. There are rabbits, badgers, wolves and camels, but I remember no cows or pigs, and only one group of sheep. Wild life, much more than domestic, touched the sympathies of Barye.

Mr. Walters loans twenty-three of Barye's powerful water-colors

of animals and a fine oil, of unusual size for this artist, of a tiger. One of the most striking of the water-colors shows a great snake swallowing an antelope, whose head is partly engulfed, and it is almost exactly the same as one of the bronzes from the Walters collection. Other gentlemen have contributed water-colors and oil-paintings by Barye, among them being several landscapes at Fontainebleau, and there are various etchings and prints after his works and some of his lithographs, pencil-sketches and autographs, with a copy of the only etching—a stag fighting a cougar—which, according to so good an authority as Mr. Avery, he ever made. These remarkable water-colors alone would suffice to show the genius of Barye, for they are full of the same qualities of truth and originality of expression which we see in his bronzes. Their color is exceedingly fine, and their topics are generally tigers, lions, elephants and serpents. It is a source of wonder how Barye, who never visited the East, could have so well depicted the tropical landscapes in which he has placed these tawny tigers and majestic lions. The drawings, like the sculptures, impress us with their air of absolute veracity, and, even in their most dramatic moments, suggest a reticence behind. Barye does not exhaust himself or his subject, yet he seems to have said the last word in this direction of art, and I cannot imagine that his profound and searching genius will ever be surpassed.

The managers of the galleries announce the exhibition of a hundred "masterpieces" by the contemporaries and friends of Barye, but I do not think that the visitor will find so large a number which can rightly be thus classed. To me it appears that something less than one-half are works of the first order, but among the remainder are many good things worthy of attention. Here again the treasures of Mr. Walters's collection are drawn upon and he sends some twenty-five pictures, prominent among which is the great "Martyrdom of St. Sebastian," by Corot; the "Evening Star," by the same master; Troyon's "Cattle Drinking"; Diaz's "Storm" and "Autumn Scene in the Forest of Fontainebleau"; Rousseau's "Le Givre"; Decamps's "Suicide"; Daubigny's large "Sunset on the Coast of France"; Delacroix's "Christ on the Cross"; and Millet's "Breaking Flax." One of the finest Millet's I have ever seen is here, lent by Mr. Walters. This is the "Sheepfold at Night," which with several others of Mr. Walters's paintings here shown, was in the exhibition of "One Hundred Masterpieces" held at Paris in 1883. In its foreground a line of sheep pass by toward the gate of the fold through which some have already entered under the guidance of the shepherd and his dog, who stand near. The horizon is low, and just above it swings a swollen moon, shaped like a cup, from which floods of pale light fill the scene with color. If this were Mr. Walters's only contribution it would be sufficient to place us under a heavy obligation to him. The "St. Sebastian" is a large canvas, measuring four feet wide by eight feet high, which was first shown at the Salon of 1853, and afterwards twice received important changes at the artist's hands. It shows an opening in a great wood, with the saint reclining on the ground tended by two holy women, while above appear some angels who bear the martyr's palm and crown. Rousseau's "Le Givre" is well described by Sensier, who says in his "*Souvenirs sur Th. Rousseau*," it represents "the hills of Valmondois as seen a mile away across the Oise, along the des Forgets road. The composition could not be more simple. Little hillocks heaped in the foreground are covered with half-melted snow, and the sun, red in the midst of a leaden sky, is seen dying and threatening through the clouds." The "Suicide," of Decamps, shows the body of a young artist stretched lifeless on his pallet in a gloomy room, and is painted with extraordinary force. The "Sunset," by Daubigny, describes a scene on the French coast with some cows near a pool separated from the sea only by a few yards. The foreground is rich in sombre greens and browns, the ocean a glorious blue and the sky tinged with the roses of sunset.

A superb specimen of the lately dead veteran, Jules Dupré, "The Old Oak," is lent by Mr. John G. Johnson, who contributes several other pictures, among them a fine "Going to the Fair," by Troyon, in which is seen a drove of cattle and sheep, with a woman on horseback behind talking to a man. Another still finer Troyon, the "Drove of Cattle and Sheep," which brought \$26,000 at the Spencer sale, is lent by Mr. Cornelius Vanderbilt. It will be recalled as showing a flock of sheep coming along a road toward the spectator, while behind are two cows, one with head uplifted to avoid the threatening stick of the drover—a dumb but eloquent protest against man's cruelty. Corot's lovely "Lake Nemi," the property of Mr. Thomas Newcombe, is here, while Mr. Jay Gould sends his "Evening"; Mr. William F. Slater, of Norwich, Conn., the "Fauna and Nymphs," and Mr. Charles A. Dana his beautiful "Dance of Loves." To the same gentleman the public is indebted for an opportunity to admire Millet's admirable "Turkey-keeper." Mr. D. C. Lyall has Delacroix's splendid page of romance, "The Abduction of Rebecca," and among the numerous paintings which come from Mr. George I. Seney's gallery, is the same artist's well-known "Convulsionaries," a crowd of self-tortured fanatics wildly rushing through the white-walled streets of Tangiers. There are several other works by Delacroix, including examples of his vivid renditions of lions and tigers, and Mr. Slater has here his "Christopher Columbus," Mr. Potter Palmer, of Chicago, lending the "Glaour and Pacha." Gericault is represented by but one picture, a noble couchant lion, but in addition to the "Suicide," there are several other Decamps, notably the magnificently colored "Turkish

Butcher's Shop," which, with a splendid Rousseau, the "Forest of Fontainebleau," comes from the collection of Mr. Henry Graves. The gorgeous blues and crimsons of Diaz's "Coronation of Love," which Mr. Brayton Ives is fortunate enough to own, glow in a corner of one of the galleries — a bouquet of living color. It was pleasant to meet again a familiar picture in Millet's "Waiting," which the writer recalls often seeing at the Boston Art Museum when it belonged to Mr. Henry Sayles. It is now the property of Mr. Seney, and will be at once remembered by any who have ever seen its homely but touching figures of the old mother looking down the road for the coming of her absent son, and the blind father stumbling hastily over the steps to the door. I renewed my acquaintance with the inimitable cat which arches its back, elevates its tail and miaows on the bench outside, its ginger-colored coat relieved against the cool blue-grays of the stone wall. It is the apocryphal story of Tobit and Anna, with the waiting parents made into peasants of Millet's own country, and when it was exhibited at the *Salon* of 1861, the public, of course, passed it by to gaze at the "Plifryne" of Gérôme. Millet has doubtless painted better pictures, but for direct simple pathos it would be hard to surpass this.

Boston, through Mr. Quincy Shaw and other gentlemen, sends to the exhibition some of the best paintings shown. Mr. Shaw exhibits his "Potato-planters," to me the most beautiful in its rosy tones of any example of the artist here; of the same size, a fine "End of the Village of Greville," walled with graystone, its little street monopolized by geese and ducks, and the sea-gulls flying above; and the "Buckwheat Threshers," with two smaller canvases. Mr. F. L. Ames, lends two Millet's, a beautiful Rousseau, "The Valley of Tiffauge," Decamps's splendid picture of an African about to sling a stone at a vulture sitting on some ruins, and the superbly painted dogs of Troyon's "Gardechasse." Dr. H. C. Angell's fine Jules Dupré, "Symphony," is also here.

The Millets number about a third of the paintings and among them is an interesting variation of the "Sower," narrower in shape than the others and with a steeper hillside. It would have been a delight to have seen Mr. Shaw's "Sower" temporarily lifted from its place in the modest house which conceals so many treasures, and brought here, especially as it was not possible to borrow the replica belonging to the estate of the late W. H. Vanderbilt, but such good fortune was not in store for us. A beautiful little nude by Millet, "After the Bath," has been sent by Mr. A. C. Clark. I think it must be the same one which was at the Bartholdi Pedestal Fund Exhibition some years ago, when it belonged to Mr. Erwin Davis. Messrs. Boussod, Valadon & Co., have lent an important and beautiful "November" by Millet, showing a sloping field with a harrow lying on the foreground and a man shooting at a flock of birds from behind a tree at the top of the hill.

The "Angelus," draped with crimson, is given the entire end of the long upper gallery and, I think, proves a disappointment to most, if not all. One chief reason for this is its small size, — it is but about 21 x 25 inches — and then it is certainly not to be compared for painting with half a dozen other Millets which are here. Its sentiment is lasting, however, but it is not new to us, on the contrary it is a household word now, and the painting gives but little more than does Waltner's etching. Mr. Walters loans the crayon sketch for it and one of "The Sower" and the "Sheepfold by Moonlight," with others, and there are some very interesting pastels and water-colors by Millet, Rousseau and Delacroix.

Altogether the exhibition is an extraordinarily good one, unapproached as to the Baryes and not easily surpassable as to the paintings of the Fontainebleau school, and any lover of art would find himself amply repaid by it for a journey to New York.



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

"THE LION AND THE SERPENT." M. A. L. BARYE, SCULPTOR.

[Photogravure issued only with the International Edition.]

SEE article elsewhere in this issue.

AUDITORIUM OF THE PALACE OF THE TROCADERO, PARIS, FRANCE. MM. DAVIOUD & BORDAIS, ARCHITECTS.

[Gelatine Plate issued only with the International Edition.]

AN INTERIOR IN THE CHATEAU DE JOSSELYN, MORBIHAN, FRANCE.

[Gelatine Plate issued only with the International Edition.]

TORRE DEL VINO, ALHAMBRA, GRANADA, SPAIN.

[Grano-chrome issued only with the International Edition.]

RUINS OF THE CHAPEL OF CHARLES V, YUSTE, SPAIN.

[Grano-chrome issued only with the International Edition.]

COOMBE WARREN, KINGSTON, ENGLAND. — GARDEN FRONT. THE LATE MR. GEORGE DEVEY, ARCHITECT.

[Issued only with the International Edition.]

COOMBE WARREN, KINGSTON, ENGLAND. — ENTRANCE FRONT. THE LATE MR. GEORGE DEVEY, ARCHITECT.

[Issued only with the International Edition.]

A GENTLEMAN'S COUNTRY HOUSE. MR. HORACE R. APPELBEER, ARCHITECT.

[Issued only with the International Edition.]

THIS design is founded upon the Francis I style of architecture, though it by no means slavishly follows it. It was required to obtain a house suited in all respects to modern requirements, including such things as sash-windows, and in places plate-glass. These hardly harmonize with the ordinary character of English country-houses of the Elizabethan and Queen Anne types, with their many mullioned windows and lead-glazed casements, nor is the other extreme of heavy Classic with ponderous detail and a portico two stories high at all desirable. The style of Francis I offers a mean between these, giving emphasis to the principal block by a certain amount of symmetrical planning, together with picturesqueness, with rich and refined detail, which a gentleman's country-house certainly requires. The exterior would be of long and thin red bricks, with stone cornices and other dressings, and roofed with green slates. The interior has oak-work and enriched plaster ceilings to the principal rooms, with the exception of the hall, where the ceiling would be of oak. The hall and the staircase would have some stained-glass in the windows. The original drawing was exhibited in this year's Academy.

WROUGHT-IRON GATES, DUKE STREET, CHELMSFORD, ENGLAND.

[Issued only with the International Edition.]

HISTORICAL FIGURES FROM LORD MAYOR'S PROCESSION, 1889. DESIGNED BY MR. JOHN JELlicoe.

[Issued only with the International Edition.]

THESE figure sketches embrace five typical examples from the late Lord Mayor's show, in which Mediæval, Tudor and Stuart costumes were (thanks to the research and artistic knowledge of Hon. Lewis Wingfield) so pleasantly associated. We have selected five, both on account of their diversity and also because of their being representative costumes of different eras in English history. The dresses, for magnificence and accuracy of detail, have rarely been equalled.

HOUSE OF MRS. CHARLES BLAKE, BEACON ST., BOSTON, MASS. MESSRS. STURGIS & CABOT, ARCHITECTS, BOSTON, MASS.

[Issued only with the Imperial and International Editions.]

COMPETITIVE DESIGN FOR THE CATHEDRAL OF ST. JOHN THE DIVINE, NEW YORK, N. Y. MR. GLENN BROWN, ARCHITECT, WASHINGTON, D. C.

ALTHOUGH the selection of material is a matter that can be well dispensed with until the general design has been determined, the architect suggests as in harmony with the treatment, Western, R. I. granite for the body of the cathedral, with trimmings of carved capitals, bases, columns, belts, arches and other ornamental stonework of a Georgia marble. The granite is cream color, with a suspicion of red, and the marble is of the same shade but a trifle darker and more positive. Both from chemical and physical tests they are apparently of equal strength and durability. The colors suggested would not give the building the cold appearance of white marble, or the somewhat sombre appearance produced by gray granite.

The stones are to be laid in square blocks, regular courses and rock-face in the body of the building, with square and sharp corners. The columns, lintels, sills, belts, finials and mouldings are to be close hammered work, with carving where indicated on the drawings.

The different tower roofs are to be fine-hammered or rubbed granite. The distinction between the tower roofs and the body of the building is not brought out clearly in the different drawings, as this would require shading all the granite stonework except the tower roofs, and shading is prohibited by the instructions.

The interior of the church is designed to be finished in marbles of harmonious colors, with carved and other decorated work, as shown in the section. The surface of the floor is to be laid in mosaic tile, the presumption being that fixed pews will not be used in the cathedral. Ample storage can be obtained for portable seats in the cellar.

The floors are laid on terra-cotta arches, built on iron beams, and the beams are protected by terra-cotta casings.

The roof of the building is to be covered with slate [preferably red], laid on terra-cotta and supported by iron trusses and beams; the iron-work to be protected by a fireproof covering. The tower roofs contemplate granite, lapped and jointed so as to be weather-proof, laid on iron beams and supported by iron trusses. If a cheaper covering is desired, slate or tile can be used without affecting the design.

The ceiling is a barrel-vault with large and small arched ribs pierced in each bay by the small vaults in which the clerestory windows open. It may be treated in one of three ways: first, finished in marble; second, marble ribs, the larger surfaces being terra-cotta blocks covered with mosaic tile; third, the larger surfaces frescoed on plaster. The ceiling of the lantern in the centre of the cathedral will be supported by arch trusses, and show metallic ribs on the interior, glazed with cathedral glass.

The screens between the choir and aisles and between the aisle and vestries and chapels are intended to be of wrought-iron, bronze or brass, or a combination. They should be arranged so as to slide down into the cellar and leave the entire building open and unobstructed whenever it might be thought desirable.

The outside doors are to be bronze, with figures on them in low relief.

The size of columns and piers, and the weights imposed upon them, the thrusts of arches and trusses, their proper abutments and ties and other constructional problems have been calculated with a sufficient degree of accuracy to determine the feasibility of the execution of the design according to the drawings.

In the lantern where the frescoing is contemplated the wall will be faced with porous brick, on which the proper fresco plaster can be spread.

The plan is arranged to facilitate the ingress and egress of large assemblages of people, five doorways being provided in the nave entrance and two in each of the transepts. The galleries over the nave and transept vestibules and the triforium have stairways with entrances on the side porches. Including the clergy entrances, fifteen outside doors are planned. The vestibules and porches connect with each other so that worshippers can pass from one to the other under cover.

The arrangement adopted for the central tower allows a central auditorium about one hundred feet in diameter, unobstructed by columns or piers, with the nave transepts and choir opening into it. The aisles are not decreased by this central enlargement, as they deflect through the four abutting towers.

The different vestry-rooms, library or sacristy and the treasury are grouped conveniently to the choir, with separate entrances for the church officials. The meeting-room for the clergy or chapter and the chapel have entrances independent of the church, or by lowering the screen they can be thrown open into the cathedral. Toilet-rooms, custodian's and a committee-room are located on the transept vestibules, as these entrances would most probably be constantly open.

Elevators are placed in two of the supplemental towers, and stairways in the ones adjoining the choir, landing visitors on the triforium gallery, which encircles the building, and in the two galleries which encircle the central lantern. From the lantern galleries visitors can obtain fine interior views of the building, and comprehend the crucial form of the plan at a glance.

TABULATIONS OF APPROXIMATE DIMENSIONS.

	Length.	Breadth.	Height.	Square feet.
Ground-floor including walls height to the ridge of roof.....	400	156 to 230	148	69,000
Lantern or central tower exterior.....	106	106	400	11,236
Nave interior.....	125	50	100	6,250
Transepts interior.....	30	50	100	3,000 for the two
Choir interior.....	95	50	100	4,750
Central tower interior..	88	88	200	
Aisles interior.....		16	40	
Chapel and Chapter....	52	26		
Square feet of auditorium exclusive of aisles, columns and space between columns, triforium and galleries..				20,486
Auditorium including everything except choir.....				48,106

ABBEY OF ABERBROTHWICK: GALLERY OVER ENTRANCE.

ABBEY OF ABERBROTHWICK: THE WESTERN DOORWAY.

THE traveller by sea, along the east coast of Scotland, is liable to be reminded with startling emphasis of the demolition to which the ecclesiastical architecture of the country has been subjected. Leaving behind him on his northward course the fragments of the metropolitan Cathedral of St. Andrews, he crosses a wide arm of the sea, and when he again approaches the shore, the objects most prominent against the sky are the still more disastrously shattered remnants of the great Abbey of Aberbrothwick. One lofty fragment presents in its centre a circle, doubtless once filled with richly moulded mullions and stained-glass, but through which the blue sky is now visible. This vacant circle is the only symmetrical form in these lofty masses that at a distance strikes the eye—all else is shapeless and fragmentary. Around these huge unsightly vestiges of ancient magnificence the types of modern comfort and commercial wealth cluster thickly, in the shape of a small but busy manufacturing town, with its mills, tall chimneys and rows of substantial houses.

The ruins, which are interesting only in their details, scarcely present a more inviting general aspect as they are approached. Nearing them from the High Street of the burgh, the first prominent object is a grim, strong, square tower, the sole remaining complete

edifice of the great establishment, now used as a butcher's shop. It was not perhaps without design that this formidable building was so placed as to frown over the dwellings of the industrious burghers—it was the prison of the regality of the abbey—the place of punishment or detention through which a judicial power, scarcely inferior to that of the royal courts, was enforced by this potent brotherhood; and thus it served to remind the world without, that the coercive power of the abbot and his chapter was scarcely inferior to their spiritual dignity and their temporal magnificence. Passing onward, the whole scene is found to be a chaos of ruin. Fragments of the church, with those of the cloisters and other monastic edifices, rise in apparently inseparable confusion from the grassy ground; but, with a little observation, the cruciform outline of the church can be traced, and then its disjointed masses reduce themselves into connected details. The dark-red stone of which the building was constructed is friable, and peculiarly apt to crumble under the moist atmosphere and dreary winds of the northeast coast. The mouldings and tracery are thus wofully obliterated, and the facings are so much decayed as to leave the original surface distinguishable only here and there. At comparatively late periods large masses of the ruins have fallen down; and Pennant mentions such an event as having taken place just before he visited the spot. This palpable progress towards the complete extinction of the relics of one of the finest Gothic buildings in Scotland, certainly rendered it not only justifiable but highly praiseworthy that the Exchequer should make some effort for preserving so much of the pile as was preservable. Restoration was not to be expected—the preservation of the existing fragments was all that could be reasonably looked for. It must be confessed, however, that the operations, by means of which this service was accomplished, have given no picturesque aid to the mass of ruins, but have rather introduced a new element of discordance and confusion, in the contrast between the cold, flat, new surfaces of masonry and the rugged, weatherbeaten ruins in which they are embodied.

There are few buildings in which the Norman and the early English are so closely blended, and the transition so gentle. The great western door has the Norman arch, with an approach to the later types in some of its rather peculiar mouldings, while the broad and equally peculiar gallery above it—the only interior portion of the church remaining in a state of preservation—shows the pointed arch, with all the simplicity of the Norman pillar and capital. All the material fragments of the church now remaining are represented in the four accompanying plates, from which as full an idea of the shape and character of the remains may be derived as the visitor could acquire on the spot. It will be seen that over the gallery, at the western end of the nave, there widens the lower arc of a circular window, which must have been of great size. The only portions of the aisle windows still existing are on the south side of the nave. None of the central pillars remain, but their bases have been carefully laid bare: and it is supposed, from the greater size of those at the meeting of the cross, that here there had been a great central tower.

Among the tombs of more modern date, in the grave-yard near the church, there are many which bear sculptural marks of a very remote antiquity; and among the ornaments they present, the primitive form of the cross is conspicuous. During the operations for cleaning out the ruins, which were conducted under the authority of the Exchequer in 1815,¹ some pieces of monumental sculpture were discovered, two of which are curious and remarkable. The one is the mutilated figure of a dignified churchman—probably an abbot. The head, the hands—which appear to have been clasped—and the feet, are broken off and lost; but the fragment thus truncated has much appearance of grace in the folds of the drapery and the disposition of the limbs, while a series of rich ceremonial ornaments appear to have been brought out with great force and minuteness. The other figure, still more mutilated, is simpler in the ordinary details, but has attached to it some adjuncts which have perplexed the learned. The feet appear to have rested on the effigy of a beast, the remains of which indicate it to have represented a lion. It has, from this circumstance, been inferred that the statue was that of William the Lion, the founder of the abbey. The figure has, however, been attired in flowing robes, and a purse hangs from the girdle. But the portions of this fragment which chiefly contributed to rouse curiosity, are some incrustations, which had at first the appearance of the effigies of lizards crawling along the main figure. It was supposed that these reptiles were intended to embody the idea of malevolent spirits, and that the piece of sculpture might have been designed to represent a myth, probably in reference to the machinations of the infernal world. But, upon a closer inspection, it was found that these tiny figures represented pigmy knights in armor, scrambling, as it were, up the massive figure. One appears to be struggling with the drapery below; another has reached the waist; and the fracture, which is across the shoulder, leaves dangling the mailed heels of two others, which must have reached the neck. Is it possible that there can be here any reference to the slaughter of Becket, to whom the abbey was dedicated?

HISTORICAL SKETCH.

The historical circumstances connected with the foundation of this monastic institution are remarkable. It was founded and endowed by William the Lion, King of Scots, in the year 1178, and dedicated

¹ New Stat. Account, Forfar, p. 80.

to St. Thomas à Becket, the martyr of the principle of ecclesiastical supremacy, whose slaughter at the high altar of Canterbury Cathedral occurred in 1170, and who was canonized in 1173. This great establishment, richly endowed, was thus a magnificent piece of homage by the Scottish King to a principle which, especially under the bold and uncompromising guidance of its great advocate, had solely perplexed and baffled his royal neighbor on the English throne, and boded future trouble and humiliation to all thrones and temporal dignities. Much antiquarian speculation has been exerted, but without very obvious success, to fathom the motives for this act of munificence. William had invaded those parts of the north of England which were previously held in a species of feudality by the Kings of Scotland, and was disgracefully defeated at Alnwick, and committed to captivity, just at the time when the English monarch, whose forces accomplished the victory and capture, was enduring his humiliating penance at the tomb of the canonized archbishop. Lord Hailes, who says that "William was personally acquainted with Becket, when there was little probability of his ever becoming a confessor, martyr and saint," endeavoring to discover a motive for the munificence of the Scottish King, continues to say: "Perhaps it was meant as a public declaration that he did not ascribe his disaster at Alnwick to the ill-will of his old friend. He may, perhaps, have been hurried by the torrent of popular prejudices into the belief that his disaster proceeded from the partiality of Becket towards the penitent Henry; and he might imagine that if equal honors were done in Scotland to the new saint as in England he might, on future occasions, observe a neutrality."¹ It is remarkable that several of the early chroniclers allude to this friendship between the Scottish monarch, who was a resolute champion of temporal authority, and the representative of ecclesiastical supremacy. . . .

Princes may be induced, by personal circumstances, to change their views, and in the times when they were not controlled by responsible ministers, they gave effect to their alterations of opinion. It is quite possible that at the time when he founded the Abbey, William was partial to Church ascendancy, for his celebrated contest with the ecclesiastical power arose out of subsequent events. This King's disputes with the Church have a somewhat complex shape. The clergy of his own dominions had a spiritual war against the English hierarchy, who asserted a claim to exercise metropolitan authority over them; and it might have been supposed that William, if he sought to humble his own clergy, would have found it politic to favor the pretensions of those of England. But the interests of the two clerical bodies became in the end united. Thus the war which had so long raged in England, passed towards the north, with this difference, that the King of Scots had to encounter not only his own native hierarchy, but the victorious Church of England, just elated by its triumph over Henry. The Chapter of St. Andrews had elected a person to be their bishop, not acceptable to William, who desired to give the chair to his own chaplain. The King seized the temporalities, and prevailed on the other bishops to countenance his favorite. The bishop-elect appealed to Rome. Pope Alexander III issued legatine powers over Scotland to the Archbishop of York, who, along with the Bishop of Durham, after an ineffectual war of minor threats and inflictions, excommunicated the King, and laid the kingdom under interdict. At this point Alexander III died, and the new pope thought it wise to make concessions to an uncompromising adversary in a rude and distant land, who had shown himself possessed of an extent of temporal power sufficient to counteract the power of Rome, even among the ecclesiastics themselves.

It was before this great feud commenced that the Abbey was founded; but during its continuance the institution received, from whatever motives, many tokens of royal favor, as well as precious gifts from the great barons. Among the list of benefactors we find many of those old Norman names, which cease to be associated with Scottish history after the War of Independence. It is a still more striking instance of the community of interest between the two kingdoms anterior to this war, that while we find a Scottish king devoting a great monastic establishment to the memory of an English prelate, we should find an English king conferring special privileges and immunities within his realm on the Scottish brotherhood. . . .

The Abbey was founded for Tyroonian monks, and the parent stock whence it received its first inmates was the old Abbey of Kelso. In the year of the foundation, Reginald, elected "Abbot of the Church of St. Thomas," was, with his convent, released of all subjection and obedience to the abbot and convent of Kelso. The church was completed and consecrated under the abbacy of Ralph de-Lamley, in 1233. Aberbrothwick was one of those ecclesiastical institutions immediately connected with the spread of the Roman hierarchy, which gradually sucked up the curious pristine establishment of the Culdees; and the muniments of the Abbey thus afford some traces of the character and history of this religious body, at least towards the period of their extinction. Thus, while the Church of Abernethy, an ancient seat of the Culdees, is granted by King William to his new foundation, Orme of Abernethy, who is also styled Abbot of Abernethy, grants the half of the tithes of the property of himself and his heirs, the other half of which belongs to the Culdees of Abernethy, while some disposals of a strictly ecclesiastical character are made by the same document. Thus we find an abbot who makes disposal for his heirs—a counterpart to those references to the legitimate progeny of churchmen, which

frequently puzzle the antiquary in his researches through early Scottish ecclesiastical history.

The Abbot of Aberbrothwick possessed a peculiar privilege, the origin of which is in some measure associated with the Culdees—the custody of the Brebennach, or consecrated banner of St. Columba. The lands of Forglan, the church of which was dedicated to Adomnan the biographer of Columba, were gifted for the maintenance of the banner. The privilege was conferred on the Abbey by King William, but as it inferred the warlike service of following the banner to the King's host, the actual custody was held by laymen, the Abbey enjoying the pecuniary advantages attached to the privilege, as religious houses drew the temporalities of churches served by vicars.

It will readily be believed that this, one of the richest and most magnificent monastic institutions in Scotland, numbered many eminent men among its abbots, who from time to time connect it with the early history of Scotland. It is even associated with a literature that has survived to the present day, in having been presided over by Gavin Douglas, the translator of Virgil. The two Beaton, Cardinal David and Archbishop James, also successively its abbots, give it a more ambiguous reputation. At the Reformation, the wealth of the Abbey was converted into a temporal lordship, in favor of Lord Claude Hamilton, third son of the Duke of Chatelherault, and the greater part of the temporalities came, in the seventeenth century, into the hands of the Panmure family.

In a tradition immortalized by a fine ballad of Southey's, it is said that the abbots of Aberbrothwick, in their munificent humanity preserved a beacon on that dangerous reef of rock in the German Ocean, which is supposed to have received its name of the "Bell Rock" from the peculiar character of the warning machinery of which the abbot made use:

"The Abbot of Aberbrothwick
Had placed that bell on the Incheape rock,
On a buoy in the storm it floated and swung,
And over the waves its warning rung.

"When the rock was hid by the surge's swell,
The mariners heard the warning bell;
And then they knew the perilous rock,
And bless'd the Abbot of Aberbrothwick."

The tradition represents a rover, in the recklessness of prosperity and sunshine, cutting the bell-rope, and afterwards returning in foul weather to be shipwrecked on the rock from which he had impiously removed the warning beacon. No evidence of the existence of the bell is found in the records of the Abbey; and on the subject of its wanton removal, the sagacious engineer of the Northern Lights say, "It in no measure accords with the respect and veneration entertained by seamen of all classes for landmarks; more especially as there seems to be no difficulty in accounting for the disappearance of such an apparatus, unprotected, as it must have been, from the raging element of the sea."²

DESIGN FOR A STORE. MESSRS. WAIT & CUTTER, ARCHITECTS,
BOSTON, MASS.



BOSTON SOCIETY OF ARCHITECTS.

RECOMMENDATIONS by the Boston Society of Architects, in regard to practice in obtaining estimates from contractors:

1. Drawings, when offered for final or competitive estimates, should be sufficient in number and character to represent the proposed works clearly; should be at a scale of not less than one-eighth of an inch to the foot, and be rendered in ink or some permanent process.
2. Proper details should be furnished for work that is not otherwise sufficiently described for estimate.
3. Specifications should be in ink. They should be definite where not sufficiently defined and explained by drawings, and every distinctive class of work to be included in contract should be mentioned and placed under its appropriate heading.
4. Contractors should be notified, at time of estimate, if they are to be restricted in the employment of their subcontractors.
5. Sub-bids received by architects should be held as confidential communications until all the estimates in a given class of work have been submitted.
- The principal contractor should add to his bids all these subestimates while in the architect's office, and should sign a tender in which the names of these above-mentioned subcontractors should be enumerated.
6. A subcontractor should not (without his free consent) be placed under a general contractor, and no general contractor should be compelled to accept (without his free consent) the estimate of any subcontractor.
7. Should a contractor decline to assume in his contract the estimate for any work not included in his original estimate, he should

¹ Annals, 1178.

² Stevenson on the Bell Rock Light-house, 69.

not thereby be denied the contract upon the portions of the work covered by his original estimate.

8. Estimates should not be binding more than thirty days after received.

9. Unless previous notification has been given to the contrary in the specification or otherwise, the lowest invited bidder is entitled to the contract. If radical changes are made, the whole competition should be reopened.

10. After bids have been received, and before the award, bidders should not be allowed to amend their estimates.



[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.]

BARYE'S ADMIRER.

NEW YORK, N. Y., December 28, 1889.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—I have just seen a letter from "Anglo-American" in your issue of December 14, in which he calls for the name of the English artist who said concerning the French sculptor, Barye: "Had he been born in Great Britain, we would have had a group by Barye in every square in London."

Théophile Silvestre reports this remark as if uttered in his presence. He says (1856) that the speaker was Mr. Herbert, an artist of distinction. Probably this was Arthur J. Herbert. Your correspondent takes the remark perhaps too literally, when it merely meant to express admiration through a slight exaggeration. Mr. Herbert would have been content to see a few squares only decorated with groups by an English equivalent of Barye, had one existed.

As to the assertion by "Anglo-American" that Alfred Stevens was "an artist not inferior to Barye" it will be shared by few who have studied the works of the great French sculptor of animals and men.

"Anglo-American" is right in saying that my short paper in *Harper's Weekly* errs in giving two bronze groups after Barye to Mount Vernon Square, Baltimore, instead of four. Were I a resident of that city, I could hardly have known this better, and how the error got there puzzles me. Certainly had I been permitted to see a proof of that paper the mistake would have been corrected, unimportant as it is, so far as Barye is concerned. I must compliment your correspondent on the quickness of eye that detected the slip and regret that the proof-reader of *Harper's Weekly* did not know his Baltimore to the same degree. But he is himself in error when he speaks of the "Life and Works of Antoine Louis Barye," written by me and published by the Barye Monument Association as a catalogue. The catalogue is quite another thing from the *édition deluxe*, which is the only edition of the "Life." CHARLES DE KAY.

EVAPORATION OF WATER IN TRAPS.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—In a late issue of your journal an advocate of Trap-venting, says of ordinary S-traps "If the traps are filled even once in two months they will keep their seals intact."

Most persons now agree that S-traps which are back-vented in the ordinary manner require refilling by hand as often as once a fortnight. It is, therefore, clear that the system of back-venting is a very dangerous one. Its original object was to afford security. It is now found (and strangely enough, even by its advocates) that it totally fails in this respect and that it requires an amount of attention which experience and common-sense show us it will never receive.

My experiments on the rate of seal-reduction through evaporation produced by back-venting were made with the greatest care and show a more rapid loss than is generally supposed. If the reports of these experiments are studied, it will be seen that every precaution was taken to secure trustworthy results. Although my experiments on siphonage were made during the same year and on the same system of piping with those on evaporation, it will be seen by studying the drawings and text of the report that the former in no wise interfered with the latter. No experiments on siphonage were made while the water stood high in the traps during the tests for evaporation, and no disturbance of the water seals was made by this or any other cause during the evaporation tests. It would have been exceedingly careless and totally unnecessary to allow of any such disturbance. Moreover, most of the experiments on evaporation were made, as shown, on a stack so connected with the rest of the system of piping that such disturbance would have been impossible. Even had we not so carefully closed the inlet or house-side of the traps.

I found that a warm flue caused the back-vent pipe to evaporate enough of the water from the seal of the trap to break it in less than a week, and I am confident that this often happens in practice.

How short-sighted and foolish is it to endeavor to throw discredit on these experiments which were made with the greatest care and honesty and which were witnessed and subscribed to by impartial experts, and to argue that, because other experiments made under different conditions showed a somewhat slower rate of evaporation, therefore cases could never occur in which the more rapid rate might be encountered in practice.

It is likely that the public will very soon awake to a sense of the importance of investigating this matter for themselves. Their Boards of Health will then find that with a very small outlay they can obtain the truth; and that a vast amount of unnecessary complication and expense can be saved in plumbing and, at the same time greater security be obtained.

When we consider, too, the well-known unreliability of the vent-pipe in other ways and the frequency with which it is found totally closed by grease, it becomes something more than folly to recommend the public to place implicit reliance upon it.

J. P. PUTNAM.



THE DIVINING-ROD.—Professor Ray Lankester, having recently expressed some doubts of the alleged powers of a boy "water-finder," Dr. McClure, who is chairman of the company by whom the boy is employed, has denied emphatically that the boy, whose name is Rodwell, is an impostor. He says that the lad, when tested, never failed to find either water or mineral veins, the lodes having always been found exactly at the places indicated. The divining-rod which he holds only moves in obedience to the muscular contraction of his hands, and a rod of any kind of wood, or even of any material substance whatever, can be used, provided it be a conductor of electricity. Dr. McClure's statements have excited considerable comment in England. The phenomena of tests by the divining-rod are not by any means new. They have never been described from a scientific point-of-view, nor has any philosophical explanation of them ever been advanced, but there is no question whatever of their existence, and of their being now regarded by the most advanced scientists as beyond the region of chicanery and imposture. Mr. W. J. Jenks, in a recent lecture on "The Protection of Electric Light Stations from Lightning," treats the subject very exhaustively, and shows that where the ability to locate electrical or magnetic attraction is vested in an individual the results are absolutely reliable. He instances the case of two gentlemen of Merrimac, Massachusetts, named Prescott, who for several years have given displays of this rare faculty. As an illustration of the certainty with which the Prescott brothers could indicate the location of electrical attraction, Mr. Jenks gives a well-authenticated incident which took place at Amesbury not long ago. Several old citizens were sceptical as to the accuracy of the conclusions supposed to have been reached, and determined on a severe test. Taking twenty or more citizens as witnesses, they requested the Prescott brothers to accompany them, and indicating a stretch of highway before them, some forty or fifty rods in length, stated that some years previous lightning had struck on that road, and wished to be informed as to the exact spot. Proceeding several rods, two cross currents were marked out; both extending for some distance in the travelled pathway and crossed by another at right angles. Testing carefully the roads in both directions, this electrical centre was pointed out as the greatest danger in the vicinity. The party was then invited to examine an ancient volume of official records, where it was chronicled that on the 7th of October, 1802, a man who was driving two yoke of cattle was struck by lightning in that exact spot and, with all his animals, was instantly killed. The occurrence had been deemed at the time so remarkable that the circumstance, with a minute description of the locality, had been recorded, though long forgotten by all but perhaps a few of the oldest citizens.

THE DANGERS OF ELECTRICITY.—The rapid spread of electric lighting in America has not been accomplished without very considerable loss of life. From a list compiled by Mr. Harold P. Brown, of New York, we learn that eighty-seven persons have been killed up to the commencement of this year. This is a very serious total, and if there were any likelihood of the rate being maintained, it would supply ample reason for very stringent legislative control being exercised over all electric installations. Happily many of the accidents may be attributed to the want of knowledge which always characterizes a new manufacture, while numbers of them are also due to the hasty and careless methods of erection adopted in America. Both these causes may be expected to decrease rapidly in the future, particularly if the municipalities insist on the mains being placed underground, instead of being strung on poles in the streets. Mr. Brown is well-known from his persistent opposition to the alternate current system; he never misses an opportunity of insisting upon its dangers, and of comparing it, to its detriment, with the direct-current system. Now as the alternate system is rapidly spreading all over London and also in many parts of the kingdom, this is a question which interests us directly. Are we running special risks by permitting its establishment? As far as lighting currents of fifty or one hundred volts are concerned, it certainly matters little or nothing whether they are direct or alternate, for neither will produce any serious injury on the human frame. When it comes to currents of distribution of two thousand volts, then it is quite conceivable that death is more certain by the alternate current, but unfortunately it is also fairly certain with the direct current, so that there is very little to choose between them. A house in which the fittings were charged to such a potential would be as dangerous as a battlefield. What is wanted is sufficiently good workmanship to prevent contact ever being made between the distributing mains and the

service wires, and this there should be no difficulty in obtaining. Even if a leak should occur the device of putting the service main to earth at one point will prevent it doing any harm. Mr. Brown refers to two cases in which men were killed by contact with a perfectly insulated wire, their death being caused by the static charge. We feel considerable doubt as to the possibility of any one being killed by a static charge under these circumstances; we prefer to believe that the insulator was bad, probably a mere taping of non-waterproof material. Just as the death-rate on a railway varies inversely as the perfection of the signalling appliances, so the fatalities in America from electricity will decrease as better materials are adopted, and more care is expended in erection. — *Engineering*.

THE MONOLITHIC CHURCH OF ST. EMILION.—About twenty miles to the north-east of Bordeaux is Libourne, one of the principal towns founded by Edward I. This flourishing commercial town was the ruin of its neighbor, St. Emilion, which affords a fine field for the antiquary, nearly the whole town consisting of buildings of the Middle Ages. A considerable part of the town wall of the twelfth century remains, with the ditch, now turned into vineyards, and at one corner is a fine house of the same period, which is called the Palace of the Cardinal de la Mothe, who may perhaps have resided in it; but it is at least a century older than his time, and can hardly be later than 1200, as will at once be seen by the details. The French antiquaries say that it was built by the Cardinal in 1302, and speak of it as a remarkable synchronism in art; but the fact appears to me simply incredible. The most remarkable feature of St. Emilion is the monolithic church, which is probably one of the most curious of its class. It is cut entirely out of the solid rock, and is of early Romanesque character. The precise date is uncertain, but it appears most probable that the work was commenced in the eleventh century, and carried on through the whole of the twelfth. St. Emilion is said to have lived in the eighth century. A fragment of an inscription remains, the characters of which agree with the eleventh century; but some of the French antiquaries attribute it to the ninth. Others consider it as merely the crypt of the church above on the top of the rock; but that church is of much later character, and it is much more probable that the subterranean church was first made, and the other built long afterwards, when the country was in a more settled state. This church is 115 feet long by 80 wide. It consists of three parallel aisles, or rather a nave and two aisles, with plain barrel-shaped vaults, if they can be so called, with transverse vaults or openings, and round arches on massive square piers; the impostes are of the plain early Norman character, merely a square projection chamfered off on the under side, but one of them is enriched with the billet ornament. There are recesses for tombs down the sides, and a fourth aisle or passage has been cut out on the south side, apparently for tombs only, as it has recesses on both sides to receive the stone coffins. Still farther to the south, but connected by a passage, is a circular chamber in an unfinished state, with a domical vault, and an opening in the centre to a shaft which is carried up to the surface. Whether this was intended for a chapter-house, or for a sepulchral chapel in imitation of the Holy Sepulchre, is an undecided point. I incline to the latter opinion. This subterranean church or crypt is necessarily lighted from one end only, where it is flush with the face of the rock; and these openings are filled with Flamboyant windows, which are very evident insertions. On the surface of the hill over this church, but with a large space of solid rock intervening, is the tower and spire belonging to it. The tower is of late Norman and Transitional character surmounted by a Flamboyant crocketed spire. There is a kind of well or flue cut through the rock under the tower into the church below, apparently for the bell-ropes. In the church are remains of early painting, and some shallow sculpture, the character of which appears to be of the twelfth century. Adjoining to the church, on the south side, is a detached chapel of transition Norman work, with an apse vaulted with good ribs and vaulting shafts. A considerable part of the old painting is preserved; some of the ribs are painted with zigzags. Under this chapel is a crypt or cave cut out of the rock called the Grotto of St. Emilion, with a spring of water in it. The work is of the same early character as the other vaults. — *J. H. Parker*.

ANOTHER TALL CHIMNEY.—A factory chimney, said to be the highest in the world, is now being erected at the Royal Smelting-Works, near Freiberg, in Saxony. The horizontal flue from the works to the chimney is 1,003 yards long; it crosses the river Mulde, and then takes an upward course of 197 feet to the top of the hill upon which the chimney is being built. The base of the structure is thirty-nine feet square by thirty feet in height, on which is placed a short octagonal transition, from which the round shaft starts. This is 430 feet high, or altogether, with the base 400 feet high, with an inside diameter of twenty-three feet at the bottom, and sixteen feet and six inches at the top. It will take 1,500,000 bricks, and the cost is £6,000. — *Exchange*.

SITE OF A LOCRIAN TOWN.—The site of an ancient city of the Locri in modern Calabria, Italy, is in progress of excavation, under the direction of Dr. Orsi. The modern name of the spot is Gerace. A temple of six columns has been unearthed, and among the prizes is a Greek group in Parian marble, showing a divinity with a fishtail, a horse and a nude youth. The group is supposed to have been placed in the pediment of the west gable. Other finds are awaited. — *New York Times*.

THE WATKIN TOWER.—Four hundred plans have already been received by the committee who offered prizes for the best and second-best plan for the proposed Watkin tower—the English Eiffel. It has been said that it will be so high that all that need be done when fog comes on will be to enter the lift and in a few minutes be up in the clear blue. — *Boston Post*.

PERSIAN COURT ART.—M. Georges Perrot will maintain in his forthcoming volume on Persian art, being the fifth volume of "The History of Art," that the old art of Persia had nothing to do with the Persian

people, being simply official or Court art. The designers and builders, sculptors and artists, were, he thinks, not Persians, but Greeks. The architect of the palaces of Darius was a Greek or a Phœnician. — *New York Times*.

TRADE SURVEYS

THERE are signs of a subsidence of popular hostility to railroad combinations, trusts and commercial and manufacturing organizations of various kinds intended to conserve mutual interests. If the granger spirit had its own way it would, through its control of the legislative mills, grind a good many corporations to powder, and do tenfold more damage by its destructive methods than could possibly be repaired by mistaken remedies. It is, after all, a question whether any form of combination is possible which can very long do much damage to the people at large. These gigantic commercial and railroad organizations with which we have recently become familiar are giant-like efforts of enormous interests to rise up out of old conditions. Progress and development must take place, and the efforts of trusts, associations and combinations by whatever name known are simply the preliminary movements of mighty interests to reorganize themselves upon a broader and higher platform. The people in their jealousy and anxiety to protect themselves have, in some sections of the country, run into the adoption of extreme measures. They are already preparing to retrace their steps, and for several reasons. They are discovering that they have been fighting a bugbear; also, that their legislation against the bugbear cannot legislate. Also, that money stays away from radical communities, that many possible advantages are lost; that combinations properly controlled have, within themselves, the capabilities of accomplishing much good. Despite the threatened damage of these monster combinations prices have been quietly and steadily declining in nearly every direction; railroad freights have slipped down, notch after notch. Association after association has come and gone, and the Interstate Railway Law itself is in danger of being set aside for something better. The people are learning to have less fear of these combinations, and more confidence in themselves and for the underlying laws of trade. The year ends with gratifying results to business men in every avenue of activity. The action of the Treasury Department furnishes a hint to the country that a large supply of currency may soon become a necessity. The evil that would result from an unexpected and prolonged financial stringency cannot be measured. Over five thousand new corporations, firms and business associations have started in the South last year, against something like 3,700 for 1888. Never in our history was there such an incubation of new business ventures. A stringency in money will destroy these by the thousand. Two or three scores of railroad enterprises which have reached the stage of bond-issuing would also be thrown aside, and thousands of enlargements of manufacturing and mining properties would be postponed; but it is useless to borrow trouble, or to paint dismal possibilities, as it is to be presumed that the people and their spokesmen fully understand the question. There is not a single branch of business in which reasonable fault can be found with results, excepting the one general result of very narrow margins. Consuming-capacity, on the whole, has increased. The wage-earners are earning as much as for years past, and are receiving more for their expenditures; that is to say, less of the product of labor in the aggregate is being absorbed by middlemen, or what might be termed non-productive agencies. The production of labor is being more evenly and equitably distributed than ever before. The ideal justice dreamed of by the philosophic socialists is within reach. In short, the wage-worker is better off, has more advantages, greater opportunities, and is yearly becoming a more important factor in the Government.

As long as railway gross and net earnings continue to improve no reaction is to be feared, according to the dictum of Wall Street. There are strong probabilities that the favorable showing will continue. The anthracite coal production for 1889 foots up 35,200,000 tons, as against 38,145,718 tons for 1888. The distribution of soft coal throughout the New England and Middle States for steam-raising and general manufacturing purposes is gradually increasing. Last week's distribution of Connellsville coke reached the unprecedented figures of 125,000 tons. The production for the year foots up over 4,500,000 tons. The expansion and development of industries throughout the Middle and Southern States continues, and hundreds of new enterprises will take shape early in the spring. Iron and steel makers are projecting new furnaces and mills in Pennsylvania, Ohio, Kentucky, Tennessee and Alabama. Some forty or fifty cotton mills are projected between Georgia and Texas. Mining companies representing fully forty million dollars of capital—that is, actual working capital—will begin operations this winter along the eastern slope of the Rocky Mountains. Industrial and building activity will take a fresh start upon the Pacific coast. Among the branches which will be developed will be saw-mill and foundry building. Machinery, engines, castings of all kinds, stoves and small iron and wood work are in great demand all along the coast from the Columbia River to Los Angeles. A great deal of capital and enterprise has been encouraged thither during 1889, and, as a result, manufacturing is greatly stimulated. The Dominion Government is also alive to the importance of developing relations with Asiatic and other foreign countries, and ship-lines are projected from its western seaports to foreign countries. Railroad-building is also being greatly stimulated by private enterprise. A vast amount of capital is drifting into the Rocky Mountain and Pacific coast regions from Eastern cities, and a great empire is being built up there which will be a source of wealth to those who obtain possession of land, timber, minerals and manufacturing facilities before the general enhancement of values takes place. The benefits originally contemplated by the construction of the trans-continental roads are now only being felt in their intensity. Irrigation companies, heavily capitalized, are doing excellent work in reclaiming vast tracts which geographers declared lost to all future utility. Mining engineers who have made a very careful examination and survey of much Western territory in the interest of Boston and New York moneyed men furnish evidences of wealth in those sections, which cannot but bring to them the money and enterprise necessary to their full development. The smaller industries throughout the States east of the Mississippi River are all doing well. Manufacturers are making money, but not as rapidly as they would like. Competition is exercising a healthy restraining influence. Like interests are being drawn together through the spirit of organization. Manufacture and agriculture are evenly balancing themselves. Commercial failures for 1889 show a moderate increase, but, considering the rashness with which ill-equipped persons enter into business and manufacturing, it is surprising that the failures are so few.

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

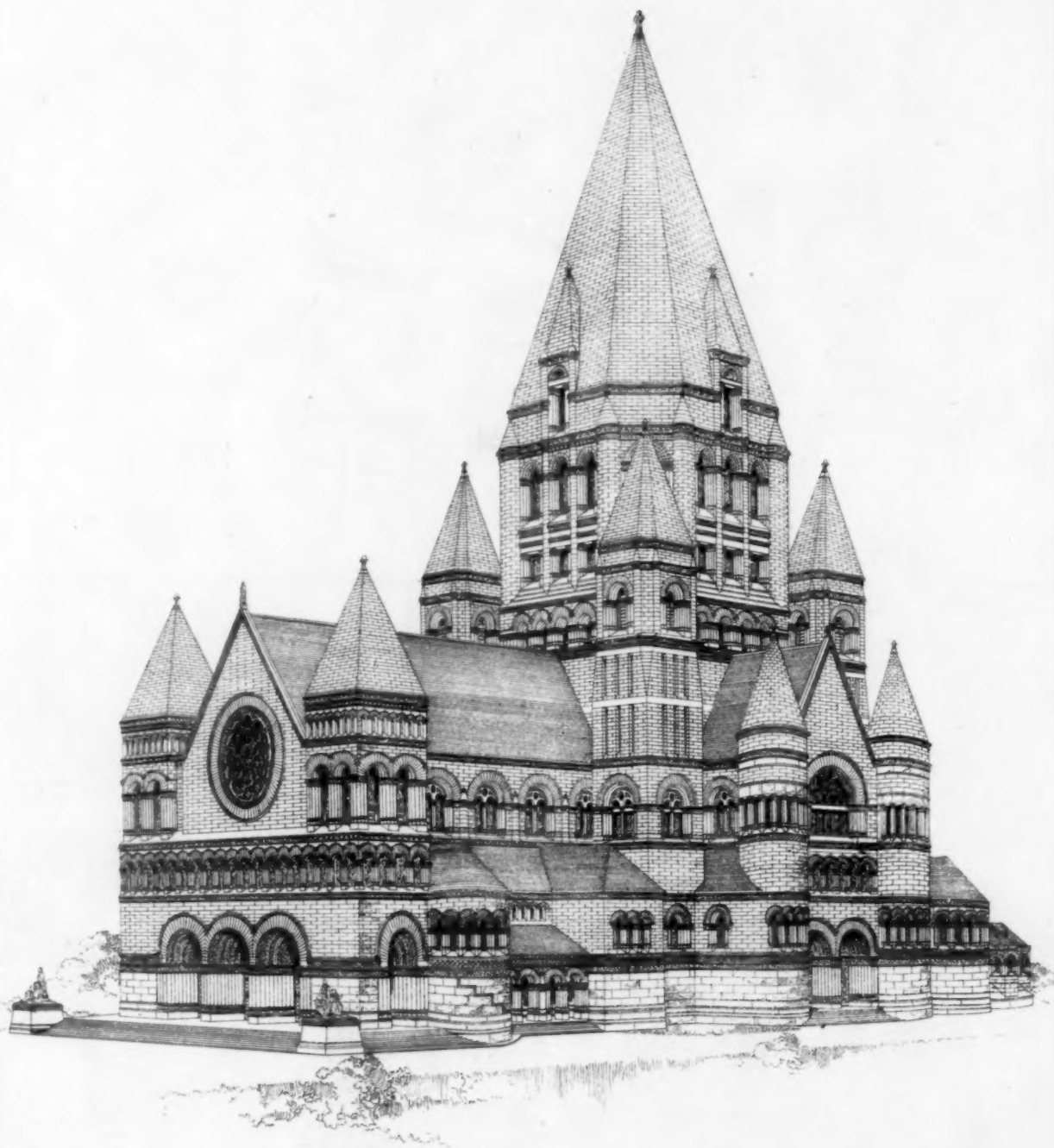
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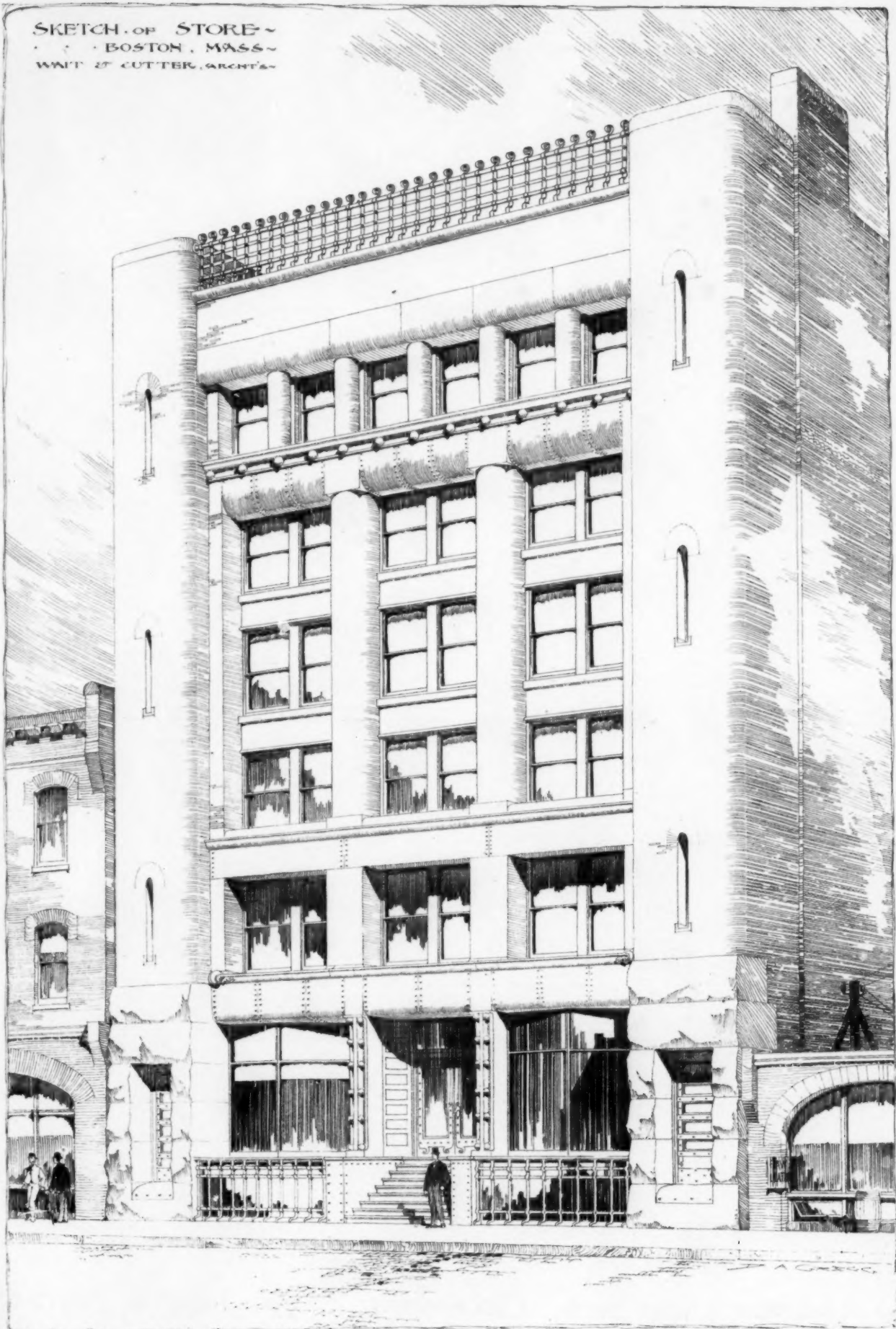
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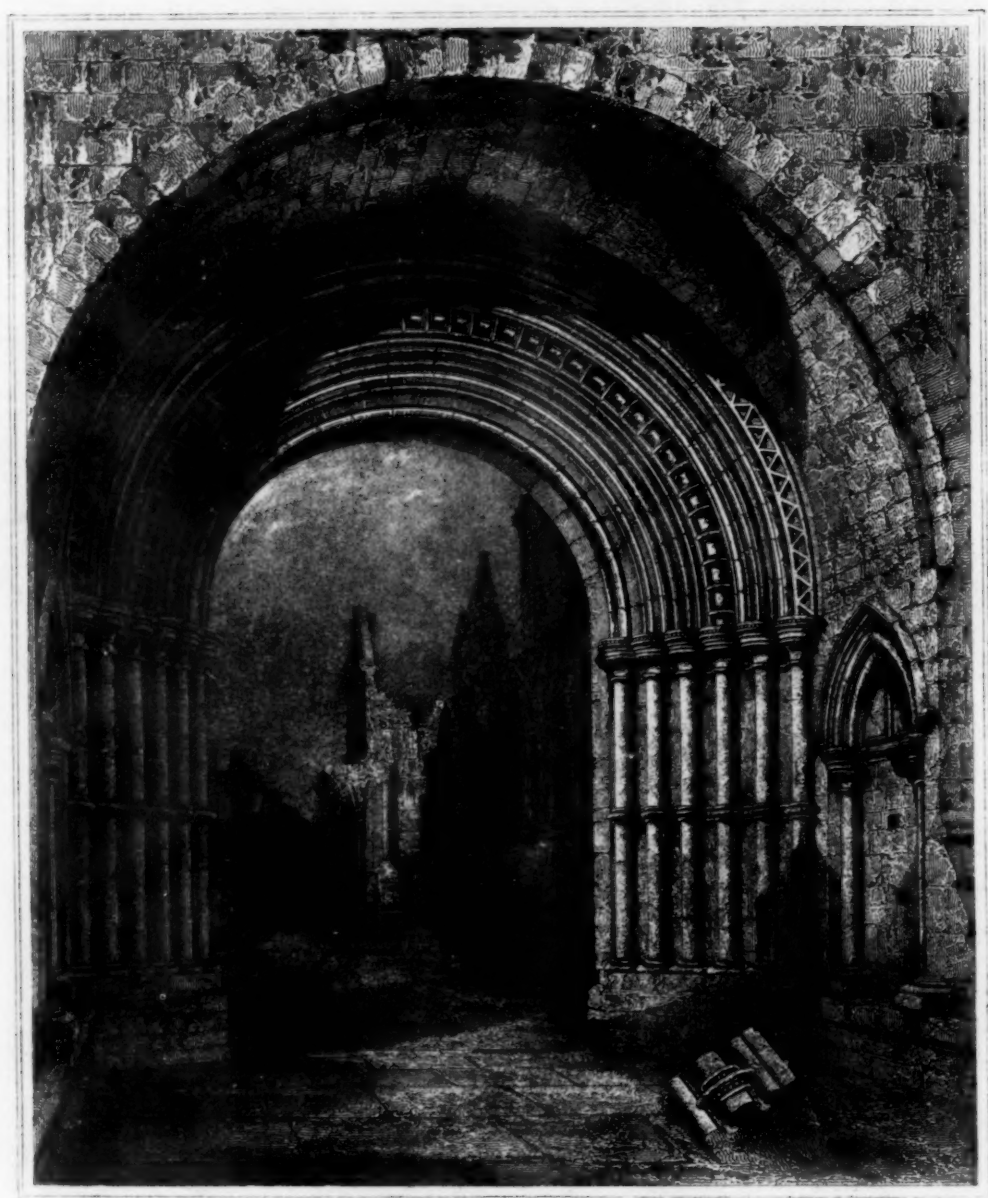


Competitive · Design · for · the · CATHEDRAL of ST JOHN the DIVINE
New York.

CINNY

SKETCH OF STORE-
BOSTON, MASS-
WAIT & CUTTER, ARCHT'S-





Drawn by J. H. B. B. B.

Engraved by J. H. B. B. B.

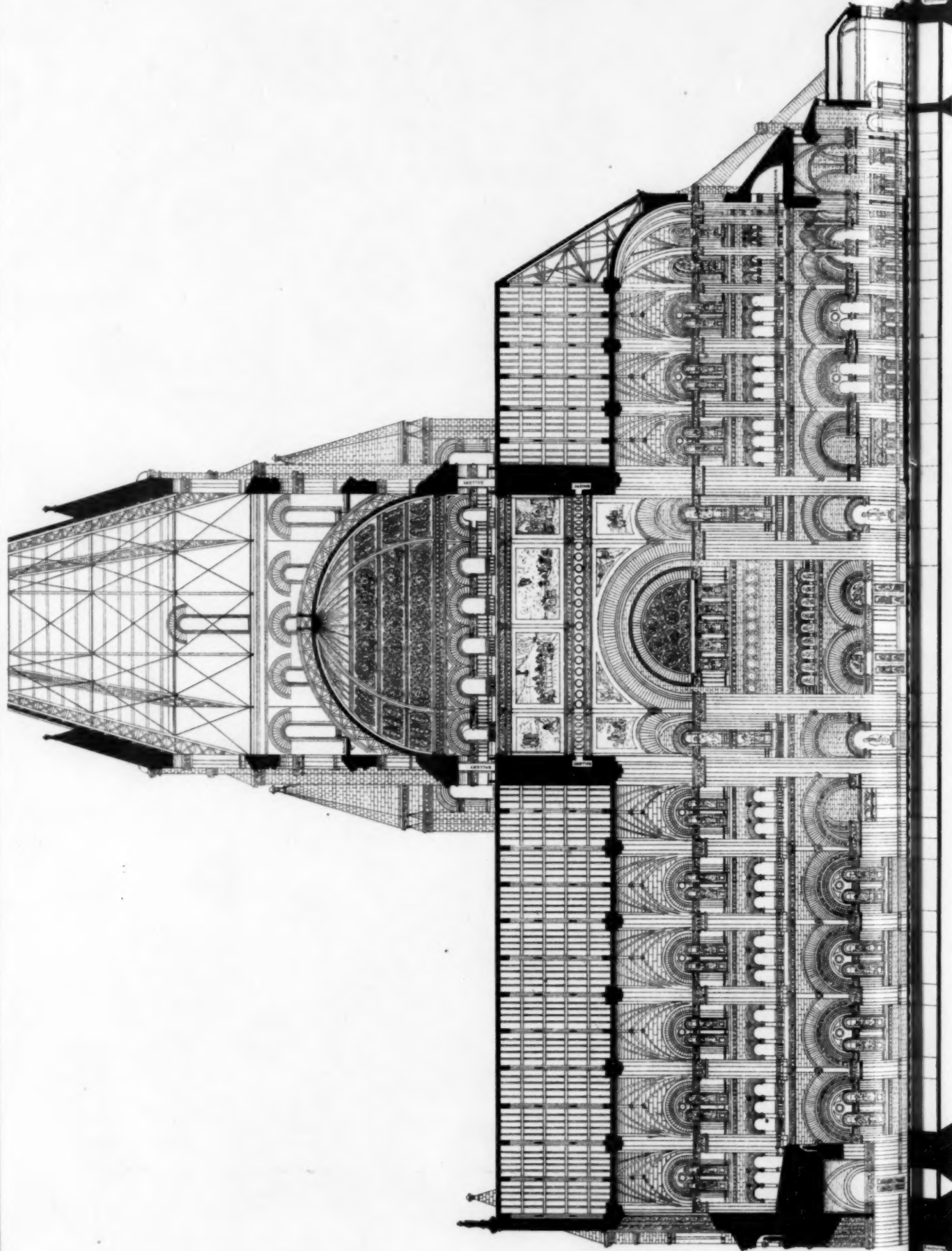
WESTERN DOORWAY - ABERBROTHWICK -



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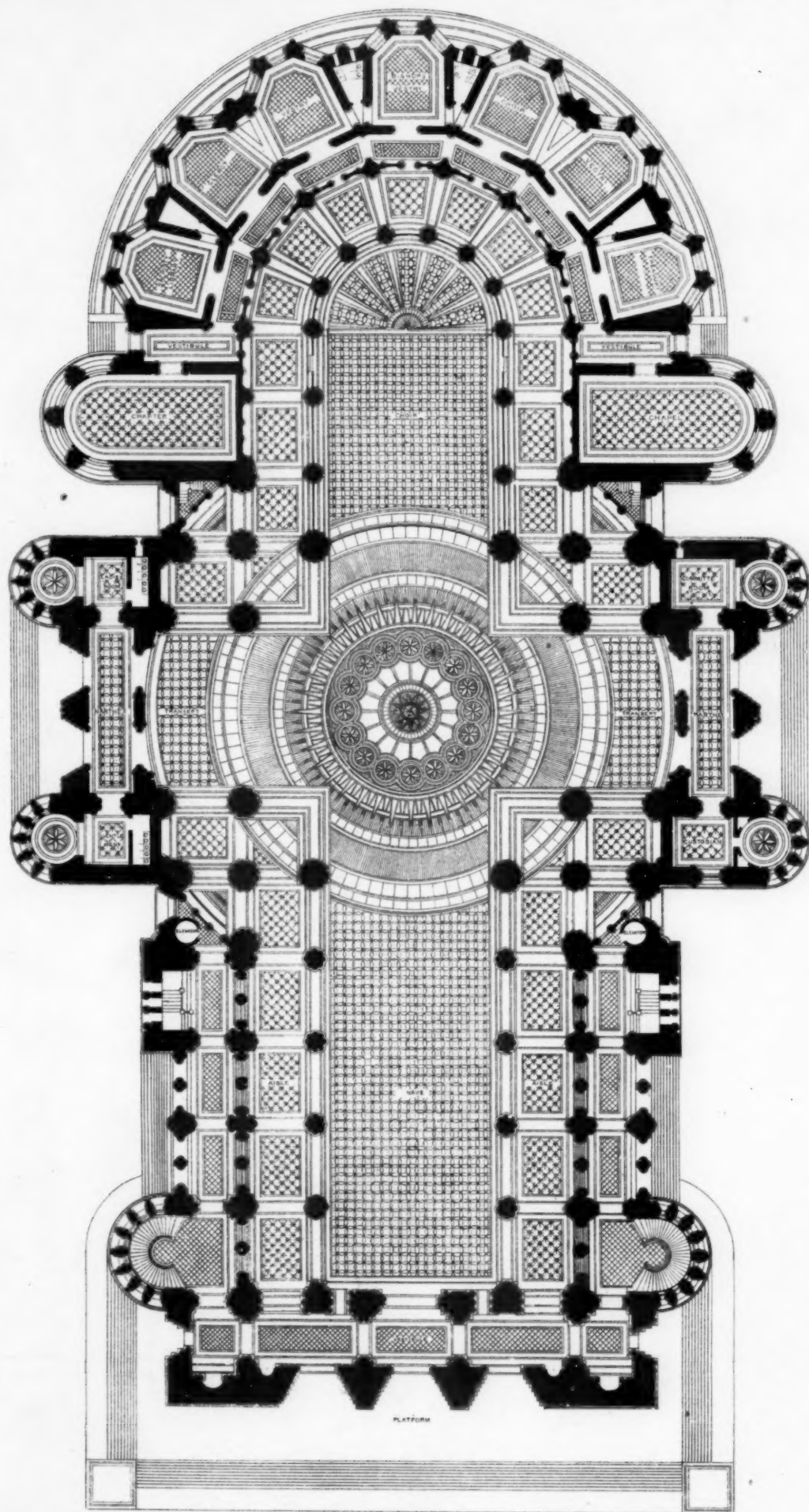
Engraved by John G. Fisher.

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