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DECORATION

211 TREMONT ST.

CONSTRUCTION

BOSTON MASS.

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SUMMARY:—

Look out for Dangerous Legislative Revisions of the Building-Laws.—The New Art Commission for Greater New York.—The Public Art League and its Objects.—The Education of the Architect.—Further News relating to the Pennsylvania State-house Scandal.—A misplaced Decimal-point in a Bidder's Estimate.—Mr. Crowninshield's Reform Club Address.—Geological Information up to Date.—An interesting Competition. 49

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the official censorship of art is under renewed discussion. Mr. F. Edwin Elwell, a well-known sculptor, and a man whose opinion is of value, has written to the Mayor, to oppose the appointment of painters and sculptors as judges of the work of other painters and sculptors. As he says, artists are generally influenced by professional prejudices, which make them bad critics, and he thinks it would be better to appoint the Directors of the Metropolitan Art Museum and the Public Library, the President of Columbia University, the Mayor, and the President of the Board of Alderman, to act as the Art Commission, than to commit such interests to practising artists. Mr. Elwell says, we know not from what evidence, that the tendency of societies or commissions, formed to control the public tastes in matters of art, is to defeat their own object, and "to divert the public mind and money to other channels where there is freedom of action"; and it is certain that the jurisdiction of such censors, to be of real use, should be exercised with the utmost caution, and without a shadow of suspicion of its perversion to personal ends.

ONE of the New York papers makes the ridiculous assertion that "leading members of the Federation," by which, we suppose, is meant the New York Fine-Arts Federation, "have taken steps intended to bring about the passage of an act of Congress providing for the appointment of an art commission to pass upon every work of art to be acquired in connection with the erection of Government buildings, and to pass upon all works presented to the Government." "This Commission," the article goes on to say, "is to be appointed from lists submitted from the Federation in several of the leading cities of the country"; and it says that the "Fine-Arts Federation's opponents declare that the purpose is to form a trust to stifle competition." As the article must, apparently, refer to the Public Art League of the United States, which is endeavoring to secure the passage of a law requiring that works of art to be purchased or accepted by the Government, or issued by it, shall be approved by competent experts, it should be observed that this organization has nothing whatever to do with any Fine-Arts Federations, in New York or elsewhere, except that some of its members probably belong to other associations of the sort, and it has never proposed that the expert judges of such work should be selected, directly or indirectly, by any such federations. On the contrary, its main purpose, instead of "stifling competition," is to secure for the artists of the country the opportunity, which has hitherto been practically denied them, of securing employment in public work in accordance with their artistic merit, instead of their political influence; and, although it is necessary to have expert judges to decide upon relative degrees of merit in competitions, the measures proposed by the League have always provided for the freest and fairest possible choice of judges for each occasion.

MR. RUSSELL STURGIS, in the February issue of the *Atlantic Monthly*, has a most interesting paper on the "True Education of an Architect," which all students of architecture, and a large part of the public, would do well to read. Mr. Sturgis's main point is the one which cannot be too often impressed upon the young architect—that he must express his ideas, if he has any, in stone, brick, mortar and wood; and that, in order to express himself successfully, he must know these materials thoroughly, visiting the quarries, to make sure of the resources of color, strength and texture that the different ones afford; haunting the brickyards, to ascertain for himself what can be done with brick and clay; and experimenting on his own account with mortars and cements, with wide joints and close joints, so that he can have at command the endless variations of strength, thrust, color, texture and effect obtainable with these materials. To design with the drawing-board is only half enough, and the step over the narrow line which, in all the arts, divides great work from mediocrity, can only be taken by the man who has studied his materials of expression to the utmost. We do not quite agree with Mr. Sturgis, that "lifeless and thoughtless designing" is characteristic of American architects generally, nor do we think it judicious to speak too indiscriminately about the "glory and beauty" of ancient architecture; and, as it seems to us that it is possible, by an overdrawn comparison of ancient and modern architecture, to discourage those who have to practise the

AS usual at this season, assaults are being prepared, more or less covertly, against the building laws of different States. The private interests involved are so considerable, and the technicality of the subject is so great, that legislatures are easily misled, unless a watch is kept over proposed legislation, in behalf of the public, by persons qualified to understand the intent and probable result of proposed modifications of such statutes. Just now a determined attack is in prospect, from several directions, upon the statute passed in Massachusetts last year, requiring that tenement and apartment houses shall be fireproof. Naturally enough, the owners of land suited for cheap tenements, who find that they cannot sell it for first-class buildings, and consider it too valuable for ordinary dwellings, have opposed the law, and, apparently, have now decided to try to accomplish its repeal. In the interest of the public, it is to be hoped that they may not succeed. The individual, although, as we believe, in most cases imaginary, hardship inflicted by the law should not be allowed to weigh a moment against the general safety. Although the building laws of Boston might possibly be safely relaxed in some details, they are not yet strict enough in their requirements for protection against fire. It is only a few days since six firemen lost their lives at the burning of a warehouse built within a few years; and the progress of the city toward solid and safe construction is too slow, rather than too rapid. It should be remembered that the cost of first-class, or fireproof, construction, as compared with ordinary cheap building, diminishes every year, and will diminish still more rapidly as materials and processes are simplified and improved. Already, the difference in cost, for small buildings, is not very serious, and the difference in the value of the investment to those who wish to hold the property, instead of selling at or before completion, is greater than that in the cost; while the value to the community of a solid and resistant building, and, still more, of a mass of such buildings, is incalculable.

UNDER the new charter of New York, the Mayor is required to appoint six persons, from a list of eighteen names submitted by the Fine-Arts Federation of New York, whose consent shall be necessary to the acceptance of works of art by or for the city. The Federation has submitted its list of nominees, but the Mayor's selection has not yet been made; and, in the meantime, the whole question of

latter, we would remind Mr. Sturgis that there are many ugly, coarse and vulgar examples of real mediæval and Renaissance architecture, just as, undoubtedly, many of the contemporaries of Raphael and Ghirlandajo painted ugly and vulgar pictures; and one reason why we admire the mediæval and Renaissance work which has come down to us is that the best pieces, those done by artists who would have built beautiful buildings in any age, or in any style, are those which have, for the most part, been preserved; just as we estimate the Classical school of Italian painting from the work of a few masters,—not from that of the multitude of men whose pictures have long ago found their way to the rubbish heap. So in this country and this age; while only half a dozen architects in a generation can hope to be remembered in the next as accomplished artists, those less happily endowed by nature need not, and should not, be unduly discouraged. To our mind, the average work of American architects may already be favorably compared with that of their brethren in any country in the world. The Americans have never been reproached with lack of originality, but this originality is now in process of being tempered in the best American work with a refinement which, so far as we know, is not found in any other modern architecture, and which recalls the quality of the true Renaissance. There is no doubt that the process of development would be hastened by the application of Mr. Sturgis's excellent suggestions, but we cannot help feeling that the day of great American architecture is not very far off, and that some of our young architects, if they will treat their work, as many of them are now beginning to do, as a fine art, and who will qualify themselves for its practice with the necessary earnestness, may assist at its dawn.

A NEW chapter seems to have been begun in the history of the Pennsylvania Capitol. It will be remembered that the Capitol Commission recently voted to build the structure of white marble, rather to the surprise of those who remembered the very modest limit of the appropriation for it; but it now appears that the money for the marble is saved by economies in the other details of the building which are more astonishing still. The plans and specifications are ready, and bids have been invited for the work by public advertisement, so that any one can see what is contemplated. According to these official documents, it is proposed to face two walls only of the building with marble, the other walls being left in rough brick; all the stairways and the main entrance to the building are of wood; in place of the imposing dome shown in the published drawings is to be put a flat roof, of wooden trusses, covered with boards, tarred-felt and gravel; all the doors, both inside and outside, are to be of "second-quality pine"; all the exterior balustrades and carved stonework shown on the drawings are to be omitted; there is to be no plastering in the Senate and House chambers or the rotunda, and the elevators are to be enclosed with "fencing-boards" seven-eighths of an inch thick. It is a little curious to turn back to the preceding chapter of the story, and read that the designs selected in competition were thrown out because they could not be carried into execution with "materials worthy of the State of Pennsylvania," as a commentary upon the manner in which the Capitol Commission proposes to execute its trust.

OF course, it is explained that the work for which tenders are now invited constitutes only a portion of the completed building, and that the "second-quality" woodwork with which it is to be fitted-up is only a temporary affair, to be replaced later with permanent, and more "worthy," material; but none of the competitors were informed that the statute and the programme might be so interpreted; and Governor Hastings, in a vigorous letter of protest, declares that the Commission is not authorized by law to build any temporary structure, or to make the building under its charge a fractional part of a larger one, which cannot be completed without further appropriations; the statute expressly requiring that the new Capitol shall be fireproof, shall be completed in time for the meeting of the next Legislature, and shall not cost more than five hundred and fifty thousand dollars. Although the Governor's protest is interesting, it does not yet appear that it will have any result. People who have to do with public officials soon find out, often to their cost, that it is the officials, and not they, who interpret the law; and legislatures have convenient and effective ways of smothering inquiry into their own acts, or those of their representatives.

A CASE of what appears to be an innocent mistake of a contractor for a public building has come up in New York; and, although it will probably be settled honorably, and without controversy, it would be interesting to know the view that the law would take of it. Bids were invited for a school house, to cost nearly three hundred thousand dollars, and the contract was awarded to one Mahoney, who gave a bond for its performance. Before the work was begun, Mahoney discovered that his clerk had misplaced a decimal point in making up the estimate, adding in the cost of the bricks at seventeen hundred dollars, instead of seventeen thousand. His bid was less than any other by about seventeen thousand dollars, so that, even if the mistake should be rectified, he would still be the lowest bidder, and the question brought before the Board of Education a few nights ago was whether he should be held to his contract, and thereby ruined. As Mahoney is known to the Board as honest and faithful, a resolution was adopted delaying the matter until the new Board, which will soon supersede the present one, can act upon it; and if Mr. Mahoney can prove the mistake to the satisfaction of the new Commissioners, it is to be hoped that he may be allowed to withdraw his bid. To authorize him to raise it, in correction of his mistake, would probably be beyond the legal powers of the Board, and its natural course would be to invite new tenders.

M. FREDERIC CROWNINSHIELD writes us to say that we were in error in attributing to him, on the strength of a newspaper report, friendly sentiments toward the Emperor Nero. In fact, as he says, the address which we noticed did not refer to Nero at all, but simply mentioned the Roman porticos, as useful and beautiful shelters from the weather, which might with advantage find a counterpart in modern cities. So viewed, the suggestion is certainly a good one; and, although we are not sure that a public portico in a rough democratic city like New York would present the same attractions as one in ancient Rome, it might be possible to give a more refined and substantial character to the railway-entrances, and similar places, than they now possess.

AN extraordinary display of chemical action is, according to the "Associated Press" despatches, going on in Arizona. It seems that there is in that Territory a mountain composed of successive strata of "lime, lava and volcanic ashes." Through this mountain a tunnel has been made, for the use of the Santa Fé Pacific Railway, lined, apparently, with wood. Not long ago the casing took fire, and water was used to extinguish the flames. Then followed remarkable results. As we are told, the water thrown on the fire, together with the natural moisture of the soil, "started the lime in the mountain into slaking." It appears that "The lime as it is slaked is dissolved into gas, liquid and ashes, which, falling out of place, release the stratum adjoining of volcanic ashes and lava. These fall down, catch on fire, and add to the conflagration." As the formation consists entirely, according to the account, of these combustible kinds of limestone and lava, it is obvious that the process bids fair to continue until the material is all burned up; and, in fact, we are assured that "it is really the mountain that is being burned." As chemistry suggests no means for extinguishing the flames of burning limestone and lava, or even of "volcanic ashes," and the application of water seems only to make them rage more violently, the moral is that railway companies which have tunnels through formations of Arizona limestone or lava should be very cautious about allowing smoking or the carrying of matches in their vicinity; but it may be a consolation to them to reflect that, judging from this experience, they will hereafter, in providing for future extensions in this geological district, not be obliged to go to the expense of making tunnels, as any mountain which happens to be in the way may, apparently, be easily levelled by kindling a little fire on it, just enough to start the "slaking" of the limestone, and its consequent conversion into "gas, liquid and ashes."

ALTHOUGH it can hardly escape attention, we will point out that the programme of a very interesting competition is to be found in the Supplement to this issue and not in that part of the paper where competition notices are usually published. Apart from its own merits, the enterprise is interesting because it is not often that business men seek artistic enlightenment after what may be styled the coöperative method.

THE EVOLUTION OF DECORATIVE MOTIVES.¹—II.

BUT if the question of the actual origins of decorative art must remain for the present unsolved, it does not follow that the study of such works of savage and primitive art as we have the opportunity to examine is without profit or interest. Both from the artistic and ethnological point-of-view, the ornament of many savage tribes is full of suggestion and of instruction. The art of decoration is the one department in which they have equalled, and, in some cases, surpassed, the performance of civilized people. In the carving of paddles and clubs, in the weaving and printing of mats and fabrics, in the use of simple colors and simple motives to produce highly decorative effects, the untutored savages of the South Seas often exemplify the most advanced principles of ornament-design. When we set the artistic excellence of these works over against the intellectual destitution and poverty of those who produced them the question of the genesis of their design, of the spirit and purpose which controlled its evolution becomes insistent.

All the forms and patterns of savage ornament are readily divided into two classes: those having a pictorial or representative character, whether naturalistic or symbolic, and those which are, at least in appearance, purely conventional. Modern theorists as to the birth of ornament are divided into two camps, champions, respectively, of the claims of these two categories to precedence in the order of development. One theory would assign to all ornament-motives, even the most purely geometric and conventional, an ultimate derivation from primitive efforts to represent natural objects, under the dominion of fetishistic and animistic notions. The other supposes the art of ornament to have sprung from the primitive industries of weaving, plaiting and pottery, in which the processes of manufacture themselves suggest decorative combinations of line and color. According to the first theory, primitive man hewed and carved the *simulacra* of those powers and objects in nature which he feared or adored, before he dreamed of ornamentation by patterns; and these gradually came into use as a kind of shorthand decorative and repetitive version of the original natural form. According to the second, primitive ornament was evolved previous to, or at least independently of, fetish representations of beasts, flowers or monsters; pictorial and sculptural art, even the rudest, being a later development than the earliest patterns based on processes of industrial manufacture.

The controversy is perhaps academic rather than practical, and whatever conclusion is finally accepted must be, after all, merely speculative. There is no possible way of learning what was the actual process by which the earliest civilizations—those of Chaldæa and Egypt—were developed. We cannot even be certain whether civilization has grown from a single nucleus or from several. The propensity to worship unseen powers, and the propensity to decorate one's person and one's belongings, appear alike in the lowest forms of humanity, as if they were both instincts or natural endowments of mankind—and who shall demonstrate that either precedes the other? The chain of argument from contemporary savage tribes lacks the essential link of proof that these tribes, with their arrested development, are truly primitive and not degenerate. Nor is the fact that in many cases the savage identifies his ornament patterns with fetish and totem forms, or even that certain of these patterns are demonstrably derived from "biomorphic" or "zoomorphic" originals—forms of fishes, serpents, men or beasts—by any means conclusive proof that savage ornament has in the beginning originated in the representation of objects of fear or of worship. It simply proves that the modern savage follows the habits of his kind in inventing myths to account for every fact, even for the forms of his ornament; or, at most, that certain fetish and totem forms have in the course of time undergone a decorative transformation.

This is far from demonstrating that all ornament has had its origin in the primitive religious sentiment, or in fetish and totem representations. I cannot refrain from quoting here a passage from a paper by W. H. Holmes on the "Origin of Form and Ornament in Ceramic Art" in the "Reports of the Bureau of Ethnology":²

"There are those who, seeing these forms already endowed with symbolism, begin at what I conceive to be the wrong end of the process. They derive the form of the symbol from the thing symbolized. Thus the current scroll is, with many races, found to be a symbol of water, and its origin is attributed to a literal rendering of the sweep and curl of the waves. It is more probable that the scroll became the symbol of the sea long after its development through agencies similar to those described above, and that the association resulted from the observation of incidental resemblances. . . . It is probable that any symbol-using people will find in the features and phenomena of their environment, whatever it may be, sufficient resemblance to any of their decorative devices to lead to a symbolic association." Cushing expresses a like opinion; both of these authorities are keen and profound observers of the life and thought of the aborigines, and their warning carries great weight.

Upon the question of the origin of ornament the evidence even of the relics of the Stone Age is inconclusive. During the Cave Period the men of certain parts of Western Europe had developed a pictorial art of the most artistic kind. Their drawings or etchings and carvings of animal life, on bits of bone and ivory, are surprisingly vigorous, lifelike and correct. But not a vestige of decorative art applied to

useful objects has been found with these pictures; while the Neolithic Age, which appears destitute of pictures, has bequeathed to us examples of conventional decoration in chipped flint admirable in design and execution. What are we to conclude from these facts? That the attainment of a high degree of pictorial skill preceded all conventional decoration in the primitive history of man? What then of the beads of the Drift Period, which antedate the Cave pictures? What other inference is justifiable than simply this, that the survival of pictures from one age, of beads from another and of flint arrow-heads from a third has been due to accidental circumstances and to the materials used, and that of all the products of these ages in perishable materials we know nothing at all? As Balfour justly observes, we find marked periods in prehistoric art, but its history is impossible as yet.³

Reasoning from the analogy of the Australian and Tasmanian aborigines, whom he characterizes as in "a primitive state of culture," "absolutely in the Stone Age," "survivals from almost the earliest periods of human development," Mr. Balfour, in the work cited, traces three distinct stages in the evolution of patterns. In the first, which he calls the Adaptive, the savage simply exaggerates natural peculiarities, such as the knots or joints of his wooden club or bamboo spear-shaft. In the second stage there is conscious imitation of natural forms, which are copied and recopied. The third stage is that of variation, conscious or unconscious, in which, by minute modifications covering long periods of time, conventional or fanciful patterns are finally produced out of realistic representations.

That some such sequence of development accounts for many of the patterns and motives of savage art is extremely probable, but I cannot believe that any such simple and convenient formula is of universal application. It cannot be proved that the evolution of decorative art has been everywhere the same, or that primitive man has in all ages, under widely diverse conditions of climate, environment and race, thought, felt and acted in the same way.

The phenomena of modern savage decoration are suggestive but not conclusive. The two categories of ornament-motives to which I have alluded—those derived from natural and chiefly from living objects, called by Haddon *zoomorphic*, and those derived from the manipulations of primitive industry, for which he has invented the term *skeuomorphic*—are found side by side in all ornament, both savage and historic. It is not easy to believe that they both have a common origin in fetish and totem representations, or that everywhere there has occurred precisely the same succession of developments. Nothing is easier than mistaken inferences from resemblances in ornament. The same motive used in widely separated localities is known to have different symbolic meanings, and may have had a totally different history, while patterns having no superficial resemblance whatever may sometimes be traced to a common original. But if we bear in mind these cautions, we may find in savage ornament-motives much that is suggestive as to the decorative instincts and powers of mankind in a state of arrested, and, possibly, of primitive, development: we shall find that it is by no means so simple or easy of analysis as might at first appear, and that the history of such patterns is wrapped up with the religious beliefs and superstitions, the totems and tribal customs of the people. They are not, among savages any more than among civilized peoples, the products of mere fancy and caprice.

A. D. F. HAMLIN.

(To be continued.)

SOLUBLE GLASS IN HOUSE-CONSTRUCTION.

A MATERIAL suitable for rendering walls impervious to dampness and presenting a smooth close surface is somewhat of a desideratum in house-construction. Paints and varnishes to a certain degree have supplied such a want, but with time these materials are apt to deteriorate.

In Europe the use of soluble glass for such a purpose has met with considerable success; its use for fixing mural painting has also commanded the praise of artists.

Properties of Soluble Glass.—For an intelligent and successful use of soluble glass it is necessary to be acquainted with the properties of this material, so as to avoid the often-occurring disappointments and the inability to remedy defects.

When soluble glass is evaporated to a certain degree of concentration a pellicle is formed over the surface of the solution which, however, on being forced through the mass is again dissolved. If concentration is carried on to a higher degree chilling takes place and the mass turns to a jelly.

A diluted solution of potash soluble glass is rapidly decomposed by carbonic acid in the air. Such a decomposition, however, becomes much slower with a solution of 1.25 density. If reduced to powder and left to remain a long while exposed to the air, it cannot be completely dissolved and effervesces in contact with acids: this is in consequence of absorption of carbonic acid from the air.

Soluble glass when dried by a moderate heat gives a vitreous and transparent mass, which can be redissolved completely in boiling-water. When sufficiently heated to a low red heat to expel the water completely, soluble glass gives a residuum which is soluble in part in boiling-water, abandoning silica, which is separated.

The composition in the soluble part corresponding to 2 Na. O 3 Si O₃ would seem to indicate that with a red heat there is no possibility of a combination of the soda with a larger proportion of silica.

¹Continued from No. 1153, page 35.

²Annual Report, Bureau of Ethnology, Vol. IV, Washington, 1886.

³Balfour: "The Evolution of Decorative Art," p. 12.

An experiment on soda soluble glass has given:—

Separated Silica.....	12.47
Soluble part { Silica.....	32.07
{ Soda.....	15.98
{ Water.....	38.66
	99.18

Soda soluble glass is precipitated from its solution by chloride of sodium, alkaline carbonates, etc. Alcohol also precipitates it under the form of a white flocculent mass, which can, however, be completely redissolved in water. This property gives a means of purifying potash soluble glass from an excess of alkali. As to soda soluble glass, it behaves in a different manner according to its tenor in silica; alcohol has but little effect and does not precipitate it completely but simply transforms it into a mucous mass.

With earthy bases—lime, magnesia,—also oxide of zinc, a true chemical action takes place in solutions of soluble glass; a part of the silica is precipitated and the precipitate contains alkali. Metallic salts completely precipitate silica; hydrochlorate of ammonia has the same effect and causes ammonia to escape.

A solution of soluble glass mixed with caustic lime assumes rapidly the form of a viscous paste—such a paste, on desiccation, hardens but little, splits up, and falls to an efflorescent powder under the influence of an alkaline carbonate.

Pieces of chalk repeatedly immersed in a solution of soluble glass become very hard, without, however, reaching a point equal to marble. Such a phenomenon is solely attributable to the desiccation of the solution absorbed by the chalk, no chemical action taking place.

Soluble glass has a similar action upon most materials used in construction—cut and rough stones, bricks, pottery, etc.—increasing in a certain measure their character, hardness and resistance.

Application of Soluble Glass.—Though soluble glass as a concentrated silica solution has remarkable properties, the manner in which it acts in a double view point, physically and chemically, and its easy preparation have led to the belief that it would find many applications in industry, yet its use has had a slow growth. We owe much of its success to the persistent efforts of Mr. Kuhlman, of France, who has introduced it practically upon a large scale by various processes which he discovered.

Soluble Glass for Fireproofing.—One of the first uses of soluble glass, after its discovery, has been for fireproofing, and one of the causes that suggested its use was the burning of the Munich theatre. In the reconstruction of that edifice soluble glass was used as a coating on woodwork and scenery, as recommended by Fuchs. It must be admitted, however, that soluble glass used for such a purpose on combustible materials has but a limited value. Wood, fabrics, paper, etc., covered with coatings of soluble glass, when submitted to the action of fire offer but little security. The action of the flames causes a cracking, the coating falls off, the flames reach the inflammable volatile products evolved from the inside and combustion takes place. The same action takes place with other materials.

Soluble glass cannot be used with good effect in connection with an oil-color. On several materials, but especially on wood, soluble glass, through its alkaline reaction, produces a brown color, quite deep, causing the disappearance of the natural color. With resinous woods, such as pitch-pine, a uniform tint cannot be obtained, many spots appearing; this effect is much less on ash, oak and similar woods. Though the brown tinge imparted by the use of soluble glass mixed with a suitable color may not be of itself an objection, yet in most cases it must be rejected, owing to other considerations. However, wood covered by a coating of soluble glass is in a better condition than with a bare surface, being protected from air and dampness. When a coating of soluble glass is properly applied on wood it is proof against washing. Applied to paper and cloth, these substances become somewhat stiff but not sufficiently to prevent rolling; folding, however, or plaiting, destroys such a coating.

The only rational way of applying soluble glass is by repeated coatings with sufficiently diluted solutions. A single application of a concentrated solution invariably gives unsatisfactory results.

Silicization of Building Materials.—The use of soluble glass for the purpose of protecting constructive materials against atmospheric agencies is of much more importance and value than its use for fireproofing. This is of special value in protecting such materials as are apt to scale off in the air or such as cannot resist the effects of outside influences. The beneficial effect of soluble glass in such application depends entirely upon the manner in which it has been applied and to what depth it has penetrated into the materials. This naturally indicates that concentrated solutions are not suitable. From numerous experiments made in practice, it is shown that a solution of 35° B. diluted with twice its volume of water gives a solution adapted to the hardening of stones.

In new houses such a solution can be applied at once, but in old houses the walls should be first thoroughly cleaned with a hard brush or washed with caustic potash. It becomes sometimes even necessary to scrape the surfaces. When large surfaces are to be covered, the injection is produced with pumps having a head to spray the material. Care should be taken to save the drippings, to be used over again.

For carvings and certain parts of buildings soft brushes are used. Experience has demonstrated that three applications on three successive days are sufficient to harden stone properly. The quantity

of solution absorbed varies according to the nature of the stone and its porosity; for the most porous stone the expense does not exceed twenty cents per square yard.

When operating on small materials, like brick, when new they are simply dipped into a bucket. With plaster the action of the soluble glass is very rapid and is apt to give birth to sulphate of potash, which, when crystallizing, has a tendency to scale off. Consequently, in such cases, only diluted solutions should be used, so that the action may be slower; but the combination should be sufficient, however, in order to avoid the crystallization of the sulphate of potash.

It has been objected that by covering walls with a coating of soluble glass their porosity disappears, and the air which can penetrate through ordinary walls is stopped, thereby preventing its renewal from outside. This seems to have little weight, because ventilation that depends upon the porosity of walls must, of necessity, be very small, and modern constructions have provided more certain means. Again, it has been said that the soluble glass coating, though preventing dampness from penetrating from outside, also prevents the inside dampness, which would naturally pass through the walls, from reaching the outside. For the reason just mentioned, this objection has no importance.

The action of an alkaline solution upon porous calcareous stone is slow and accomplishes a gradual hardening on the silicious molecules. With plaster it is quite different, the action being quite rapid, almost instantaneous, producing quite a swelling on the mass and making it very porous and causing scales to fall off.

Coloring Stones with Silicates.—Soluble glass can be used for imparting to stones certain colors by mixing a coloring-agent into the solution. By using certain double silicates, useful applications may be made with good effect. For instance, with the double silicate of manganese and potash, a dark solution is obtained which is recommended for use on too white calcareous stones. By dissolving in a silicious solution sulphate of baryta, made artificially, a solution is obtained for bleaching stones of too dark a color. The effect is produced by the small quantity of sulphate which penetrates into these stones with silica.

Porous calcareous stones submitted to boiling in metallic sulphates of oxides insoluble in water have imparted to them colors to a certain depth which are entirely set by a combination with sulphate of lime. With sulphate of iron a more or less red color is obtained; with sulphate of copper a fine green, with sulphate of manganese various browns.

Silicious painting.—As far back as 1847 Fuchs suggested the application of soluble glass for the preservation of mural paintings. The first application was made by the celebrated painter Kaulbach to the fresco paintings then made in the Berlin Museum. Since then applications have gone farther, and at the present day soluble glass is used as a medium for applying colors direct to walls with a brush.

Since oil and essences cannot be used in connection with soluble glass, it became necessary to find out the colored bases which could be substituted. White lead, having the tendency to form a silicate of lead very rapidly, had to be discarded. Oxide of zinc gives very satisfactory results by mixing it with a strong proportion of artificial sulphate of baryta, producing a very good white of a very bright and transparent quality. Further experiments have demonstrated that this white could be made by sulphate of baryta alone, if applied in successive coatings, by means of a mixture of starch with the silicious solution.

For all colored mineral matters, it was discovered that all those capable of being altered by alkalies should be discarded. The following can be used: zinc white, chrome green (oxide of chrome); cobalt green (Rinman's green); chrome red (lead chromate); zinc yellow, oxide of iron (light red, dark red, purple and brown); sulphate of cadmium, ultramarine, ochre (light, skin color and gold ochres); Sienna earth, umber, lamp-black, calcined manganese oxide, etc. It was also discovered that colors ground in a concentrated solution of silica can be applied more regularly upon stones which have been silicated than those that have not been subjected to this treatment; in the latter case it is advisable to impregnate the surfaces with a weak silicate solution.

The use of soluble silicates has given birth to a new style of painting, destined to replace the old style of fresco-painting known under the name of *stereochromy*. The main object of this process has for object the protection of mural painting from the action of its dread enemy, efflorescence. Its importance is especially great in protecting such paintings as are exposed to atmospheric influences, to rain and air, when painted on outside walls.

Experience has demonstrated that for a proper foundation or grounding for the preparation of the coloring elements, and their preparation with soluble glass, it requires many studies and care in manipulation to insure satisfactory results.

For a grounding, mortar may be used, but care should be taken to let it dry thoroughly and absorb a sufficient quantity of carbonic acid to transform the hydrate-of-lime into carbonate, thus preventing any further action upon silicates. A ground can also equally be prepared with a mortar of soluble glass, i. e., a mixture, in suitable proportion, of dolomite in powder, of pulverized quartzose, and pulverized and soluble glass. The colors are to be applied upon this ground, which should not be either vitreous or polished, but should remain sufficiently granular and susceptible of being impregnated.

It must be said, however, that soluble glass used as a medium for

applying colors has some drawbacks; it is preferable to substitute pure water and simply use it for setting colors after being applied.

Ordinary soluble glass saturated with silica as much as possible has a tendency to cloud the painting and produce spots, on account of the partial decomposition resulting from contact with the air. For this reason, a glass should be used not being saturated with silica, as stated before. A solution obtained by a mixture of four to five parts of a concentrated solution of soluble glass with a dissolution of flint liquor, also concentrated (one part carbonate of soda and two parts pulverized quartz), this is called the *setting soluble glass*.

The following mode of operation gives very good result in applying colors:—

The first coat, or grounding, is put on with a lime-mortar, and should not be used until the action of the air during a few days has made it dry and it has absorbed carbonic acid; cover then with soluble glass with a soda or potash base. When this grounding has solidified, the upper coating for receiving the painting should be put on. This coat should be about one-eighth of an inch thick and be as smooth as possible. When dry it should be made even, by rubbing with a sandstone to remove the small skin of carbonate-of-lime, formed while drying, as this would prevent the absorption of the solution of soluble glass, and also to give to the surface the desired hardness.

When the bottom coat is quite dry it should be impregnated with soluble glass, in order to give it the proper consistency and unite it to the subjacent coating. The colors are now applied upon the outer or upper coating, by means of pure water, which is sprinkled upon it frequently. The colors being applied, there now remains the operation of setting them; this is done with the so-called *setting solution*, described before.

Owing to the fact that the colors adhere but slightly, preventing the use of a brush, this solution is projected upon them by means of an atomizer in the shape of a mist or a fine powder. When the colors are set the painting is finished, but it improves the appearance and insures the permanency to wash the walls with wine-spirits two days after.

Colors for stereochromic painting when applied in this manner have a soft and bright appearance which cannot be obtained by the old style of fresco-painting. C. COLNÉ.

EXTENSION OF THE LIVERPOOL DOCKS.¹

HERE are now in progress and in contemplation extensions and improvements in the Liverpool dock system which, it is estimated, will cost over \$21,500,000. The cost of the improvements now progressing will be over \$5,500,000, and they include the construction of a new dry (graving) dock 920 feet long, with an entrance of 94 feet, and of a large tobacco warehouse. The contemplated new scheme of extensions and improvements, in addition to the above, will cost \$16,500,000. This new scheme includes the enlargement of a dry-dock now 475 feet long to 1,000 feet long and 90 feet wide, and the construction of two additional dry-docks, one 630 feet long and 80 feet wide and the other 620 feet long and also 80 feet wide, in lieu of two present small dry-docks; the enlargement of a number of wet docks, so as to provide berths for any number of vessels 800 feet long and for a limited number 900 feet long, and one dock is to be made sufficiently large to accommodate a vessel 980 feet long. The entrances for these larger docks are to be made 100 feet wide.

Some idea of these proposed dock enlargements can be had when it is borne in mind that the "*Teutonic*" and "*Majestic*" are only 565 feet long and 57 feet wide, the "*Lucania*" and "*Campania*" 625 feet long and a little over 65 feet wide, and the new German ship "*Kaiser Wilhelm der Grosse*" (the largest ship afloat) 649 feet long and 66 feet wide.

The Liverpool docks at present are the largest and the most substantially built in the world, and the authorities seem determined to maintain their supremacy. Commodious, however, as the Liverpool docks are, it is recognized that there is a demand for enlargement to meet the ever-increasing size of ships. The enterprise of rival British and Continental seaports, manifested during recent years, has had a stimulating effect upon both the dock authorities and the public of Liverpool. When the Manchester Ship Canal was built prophecies were made that the shipping interests of Liverpool would fall off; but that result has not followed. When the American line was taken to Southampton, in 1893, the dock authorities, partly, no doubt, in response to a strong public sentiment, made a number of improvements in harbor and dock facilities. Since then London, Hull, Plymouth and Bristol have improved their shipping facilities, with the special object in view of capturing some of the Atlantic trade which hitherto has come to Liverpool. It has just been determined to expend \$7,500,000 for dock and harbor improvements at Bristol. The growing ports of Hamburg and Antwerp are active competitors with Liverpool, and much of the Continental transit passenger and freight traffic that formerly came by way of Liverpool now goes direct to and from Antwerp and Hamburg, and this is especially true of the transatlantic trade. The report has been quite widely circulated that within the last two years Hamburg has distanced Liverpool as a seaport. This, however, is an error, and the error has arisen from the fact that in the figures given as to Hamburg the coastwise trade is always included, while it is not included

in the figures usually published as to Liverpool. Great as has been the increase of the shipping trade of Hamburg, Liverpool is still the second largest seaport in Europe, being exceeded only by London. In 1896 the number of arrivals at Hamburg, including coastwise vessels, was 10,477, with a registered tonnage of 6,445,167; while Liverpool in 1896 had 20,212 arrivals, including coastwise vessels, with a registered tonnage of 8,715,424, an excess in favor of Liverpool over Hamburg of 9,735 vessels and of a registered tonnage of 2,270,257. The very life and existence of Liverpool depend upon her shipping interests, and there is, consequently, a hearty public approval of the projected scheme of enlargement and improvement. This approving public sentiment has back of it the newly-awakened appreciation of the danger to the English export trade in manufactures from both the United States and the European Continent. Indeed, for some months past, the most prominent subject of discussion in the British press and in British commercial circles has been that of ways and means for meeting the conceded inroads of this competition; and a factor in the struggle, regarded as of the greatest importance, is the condition of shipping facilities. The proposed enlargements and improvements in the Liverpool dock system have therefore attracted attention and have been commended all over the United Kingdom.

It is a peculiarly interesting fact that Liverpool boasts of having had the first wet dock ever constructed. This was about 1720, and, to this day, all tidal data at Liverpool are based upon the level of the sill of this original dock.

By an Act of Parliament of 1857, the control and management of all the docks at Liverpool (including those across the Mersey at Birkenhead) and of the harbor clear out to sea, as far as Holyhead, were vested in the Mersey Docks and Harbor Board. This board consists of twenty-eight members, twenty-four of whom are elected by "dock ratepayers"—that is, ship-owners, etc.—the other four members being appointed. The members do not receive any compensation. It is claimed that this public board, or trust, has no parallel in the world, either in importance or magnitude. The total number of the Liverpool docks (and this expression always includes those at Birkenhead) is ninety, of which sixty-seven are "wet" and twenty-three are "dry" (or graving). The material used in construction is almost entirely Scotch granite, taken from the Dock Board's own quarries. The masonry is superb, and it has been truthfully said that the docks and entrances are like fortresses in strength. The docks have a river frontage of about seven miles, and the total length of the Dock Board's property is eight and one-fourth miles, not including certain undeveloped lands and fore shore. The area of the Dock Estate, exclusive of wet and dry dock space, is about 1,000 acres. The smallest wet dock is about 160 feet long and 120 feet wide, and the largest wet dock (the Great Float, at Birkenhead) is 3,300 feet long and 600 feet wide. There are between six and seven miles of warehouses, owned partly by the Dock Board and partly by individuals and private corporations. Running parallel, on the other side of a thoroughfare, is also a line of warehouses, belonging to railroad, canal and other corporations. These vast storehouses are constructed mostly of a dark and coarse, but very strong and durable, brick. So far as possible, all of these structures are practically fireproof.

The cost of the docks has been enormous. It is estimated that the entire property now owned by the Dock Board has cost \$200,000,000. Since the system has been under the present management, dating from 1857, parliamentary authority has been granted to borrow \$112,058,429; and of this, \$107,139,997 had been expended up to July 1, 1897, leaving \$4,458,043 as a balance of unexpended borrowing powers. Since 1859 \$13,925,260 have been transferred from the general-receipts and general-expenses account to the sinking-fund account. The total general receipts for the year ended July 1st last amounted to \$6,804,738, and the general expenditure to \$5,937,934, and, by statutory requirement, \$486,000 was, on the 1st of July, carried to the sinking fund.

Next to the docks, the most interesting and important feature of the port and harbor is the dredging. The harbor is a wide and deep roadstead in the narrow part of the estuary of the Mersey. From the mouth of the river up for five miles there is convenient and safe anchorage for the largest class of vessels to practically an unlimited extent. This roadstead has been approachable from the sea at all times of the tide since the improvements on the Mersey bar, effected by the dredging operations, commenced in 1890. The docks at Liverpool are, owing to the range of tide, only accessible from the roadstead at high-water twice in the twenty-four hours. The range of tide in the Mersey is very considerable, that at equinoctial spring-tides being about 32 feet and at low neap-tides about 11 feet 6 inches. The Mersey River has an abnormally large outlet, due to the great area of reservoir existing immediately above Liverpool, and from which a vast amount of tidal waters flow each tide. Opposite Liverpool the river is comparatively narrow. At low-water, long stretches of sand are exposed at the mouth of the river. The flow of an average tide at the entrance of the river is estimated at 500,000,000 cubic yards, and the volume of fresh water delivered into the estuary is estimated at between 2,000,000 and 3,000,000 cubic yards in twelve hours. It is to these physical peculiarities that the deep-water channels are owing. The scouring operations of the fresh water and the action of the tidal current prevent the "sanding-up" of the bay, and one of the deep-water channels is sufficient to admit the largest vessels at all times. Eleven miles seaward, stretching across the mouth of this main channel, is the bar, a sandy ridge, with a long, sloping

¹ Extracts from the report of James Boyle, United States Consul at Liverpool.

fore shore on each side, of inconstant position. This bar, under natural conditions, was 10 or 11 feet below low-water of spring-tides. While there was ample water over the bar at high-water for any class of ships, there was a growing inconvenience in waiting for the tides. Hence the necessity for dredging at the bar; and this dredging is, it is believed, on a larger scale than at any other port in the world. With the exception of a small operation in 1838, of uncertain practical value, nothing was done up to 1890 to cut and maintain a channel across the bar sufficient for the passage of vessels of the greatest draft at any stage of the tide. After very careful study and investigation, it was decided to adopt the centrifugal-pump class of dredger. While the system was not entirely original with the Liverpool authorities, it had never been utilized before on such a gigantic scale. . . .

From 1890, the time of the commencement of the operations, up to the end of 1896, there had been removed from the bar a total of over 17,000,000 tons of sand. While before dredging was commenced, the depth on the bar at dead low-water of spring-tides was only 11 feet, now there is, under the same conditions, between 24 and 25 feet. The average width of the buoyed cut or channel through the bar is 1,250 feet. The quality of the material dredged from the bar varies from fine sand, mixed with mud on the outer slope of the bar, to coarse sand on the inner slope. Both the "Brancker" and the "G. B. Crow" can dredge successfully in gravel. The shoals and projections of sand-banks in the main sea channels have been dredged, and up to the end of 1896 there had been 8,000,000 tons of sand removed by the pump-dredgers. It was found that a considerable portion of the fine sand was carried overboard with the overflow of water on the dredger after being pumped up. To meet this difficulty, a steam-tender was fitted with a water-jet eroding apparatus. This ingenious contrivance is worked backward and forward along the sea face of the bar, and disturbs the lighter particles of the deposit so that they are moved seaward by the ebb current, not only increasing the depth of the bar directly but leaving the sand for the pump-dredgers comparatively free from silty matter, and therefore in a better condition for pumping by centrifugal pumps.

A notable feature of the Liverpool dock system is what is known as the floating landing-stage, used for the embarkation and disembarkation of ocean and coastwise and ferry passengers. The ocean ships load their cargoes and embark emigrants at their docks, but go to the landing-stage for the saloon passengers. Arriving ocean steamers disembark all their passengers at the landing-stage and afterwards go to their docks to unload their cargoes. Until two years ago, saloon passengers embarked and disembarked by tender, the ship lying in the middle of the river. Some of the most powerful dredgers owned by the Dock Board are kept constantly in use, maintaining a sufficient depth of water to allow the largest size Atlantic liners to come alongside of the landing-stage at low-water. This landing-stage is an immense floating pier, about three-fourths of a mile long, with a width varying from 80 to 100 feet, supported on iron pontoons. The stage rises and falls with the tide, which, as above stated, is sometimes as much as 32 feet. Hinged bridges for vehicles and foot-passengers connect the stage with the shore. . . .

It should be borne in mind that the Liverpool docks are not maintained primarily for the profit of any individual or business corporation, but for the general good of the district, and particularly of Liverpool. The dock charges are so rated that, with the other sources of revenue, they maintain the docks and harbor, pay interest on the indebtedness, and meet the requirements as to the sinking fund. So well financed is the estate that not only are the items indicated above always met, but there is a gradual diminution of dock and storage rates.

The management of this vast and important public trust is conservative, but enterprises when undertaken by the board are distinguished by wisdom of conception and thoroughness of execution. The board has an exceptionally high record for financial ability, and there is not even the suggestion of a suspicion as to its absolute honesty. . . .

Closely identified with the dock system, but yet under an entirely separate management, is the overhead (elevated) electric passenger railroad, which runs along the entire line of docks on the Liverpool side. It was built four years ago, and is satisfactorily successful financially. The electric current is carried by a central "third rail." This line is used not only by business and laboring men whose occupations are in connection with the docks and shipping interests but by the general public, as a quick and convenient means of transit from one end of the city to the other. It affords an admirable view of the docks. It is thought that this is but the beginning of an overhead "belt line" around the city, after the example of a number of American cities.

THE AMERICAN EXPLORATION OF CORINTH.

THE latest exploration undertaken by the American scholars bids fair to eclipse all their previous achievements in Greece. Not only is the vast site of ancient Corinth of exceptional interest and of great archaeological promise, but the work is, fortunately, in the hands of Professor Richardson, the present director of the school, who, as shown more than once in these articles, has given proof of sound scholarship and of that scrupulousness in research which is an essen-

tial in all scientific work. . . . In default of any fixed point, save the columns of the temple, Professor Richardson decided to dig trenches in its vicinity and in other promising spots, in the hope of lighting upon one of the buildings mentioned by Pausanias; otherwise, it was groping in the dark. Altogether twenty-one such trenches were sunk, most of them with lateral openings, and all about three metres wide and from four to seven deep. The first trench, though it supplied no certain indication, revealed thirty-one Ionic columns and parts of columns used as foundations for later buildings. In the second trench, thirteen rock-cut graves were found, with a considerable quantity of common red ware. The third trench was more encouraging in its results, since it laid bare a broad paved way of fine workmanship, with water channels on either side of it—evidently one of the streets of the ancient city, leading, as is conjectured from traces met with in other trenches, to the agora. The most important discovery, and the one which decided the value of the exploration, was made toward the end of the season, when, on May 19th, after a whole week's fruitless digging in trench No. 18, a succession of stones appeared arranged stepwise. On the trench being laterally extended, these proved to be the remains of the theatre. Five flights of steps, innumerable seat foundations and two seats *in situ* left no doubt as to the significance of the discovery. These remains are much shattered and damaged; and the steps, in some cases, are deeply worn by footprints. The interest in this fortunate find was heightened when it became evident that a later Roman theatre had been built on the remains of the old structure. A reliable starting-point was thus established, and, from its position relative to the seven Doric columns, Professor Richardson supposes the latter to be the Temple of Apollo. Beyond this temple, to the east, another trench brought to light a magnificent stoa, or passage, which also is believed to lead to the agora—the great centre of the city and of its chief edifices.

The minor finds of this season's work comprise a considerable number of sculptured fragments, four heads of statues, and a Dionysiac group in marble, about half life-size, representing Dionysius between Pan and a nymph. Some inscriptions, mostly Roman, four of them being practically entire, a large quantity of terra-cotta fragments and nineteen whole vases, found in a cluster of prehistoric tombs—which in themselves are of great archaeological interest—complete the list.

The complete, thorough and systematic excavations of Corinth will be an achievement surpassing even that of Olympia in point of historic interest, archaeological and artistic importance, and in the number and value of the finds that may be reasonably expected from it. Brilliant as the work of the young American School has been thus far, an opportunity for even greater distinction now lies before it at Corinth. Prof. B. I. Wheeler thinks it will be "altogether the most important contribution made by any American excavation to archaeological and topographical knowledge."

The people of Greece cheerfully give every facility, while the Greek Government is again ready, in the case of Corinth, as Professor Richardson affirms, "to buy for us just as much or just as little land as we desire, paying a percentage of the price." But much is needed beyond this. To lay bare the entire site—not in a haphazard manner, incompatible with the requirements of science and injurious to the repute of the workers—several seasons of labor will be necessary, and a large sum of money required.

Which American Cæsus will earn for himself a fame more enviable than that of the Cæsus of old, by supplying the necessary funds for a work noble in itself and promising him lasting renown? The erection of no institution, the endowment of no foundation at home, can compare in object and result with this exploration of Corinth by the American School at Athens. It will be a service rendered to every branch of science; it will be an achievement known to and discussed by the whole world; it will be the resuscitation of the *lumen totius Græciæ*. The name of the Mæcenas who confers this benefit on science and civilization will ever remain connected with the imperishable fame of Corinth; while his munificence will add to the honor and prestige of America.—*J. Gennadius in The Forum.*

BOOKS AND PAPERS

THE last month has, of course, been raining Christmas numbers and annuals, good, bad, and indifferent. *Figaro illustré* belongs to the first class, and so does the *Art Annual*,¹ containing the life and work of William Q. Orchardson, R. A., that great painter who now stands almost alone in British art as at once an admirable craftsman and a perfect stylist. Few of Mr. Orchardson's contemporaries know so well what to do in a picture, and, still more, what to leave out, for therein lies this painter's greatness. The vulgar public complains of his "canvas to let"—those large spaces of carpet or wall quite innocent of ornament. But how would such a picture as "Napoleon dictating his Memoirs" gain by filling-up the wall with pictures or drapery? It is the bareness of the background, the quiet, so to speak, which gives such force to the figure of the Emperor. He seems to possess for the moment all the old vigor of the

¹The *Art Annual*. Virtue & Co., 2s 6d. London.

successful general. Another characteristic of the painter is style. How exquisite is the *pose* of the girl turning over the leaves of her music in "Music, when soft Voices die, vibrates in the Memory"; and that gentlemanly brute in the "First Cloud" is, equally with his elegant wife, full of characteristic distinction. One sees the whole story, as in the "Mariage de Convenience." What wreckage of happiness which might have been! The tale of woe is suggested, that is all.

In composition, too, Mr. Orchardson excels. Each figure, each chair, or curtain or screen is exactly in its right place. And what a master he is of still life! Could anything be finer than the painting of the glasses, the wine and the fruit on the "Young Duke's" table, or in the "Voltaire"? Occasionally there is some slight affectation in his women, as in the "Farmer's Daughter," who is scarcely a woman of the soil.

Perhaps one of the most beautiful compositions is "Trouble," not yet exhibited. A young man sitting at a table with his head buried in his arms, a girl fondly turning towards him as she walks away, and an open letter on the table — that is all; but the beauty of that girl's *pose* and expression have not been surpassed by any artist, nor equalled by many.

The illustrations, which are many, are excellent reproductions; and the volume is a fit successor to the Leighton and Millais ones of former years.



DETROIT ARCHITECTURAL SKETCH-CLUB.

THE first of the series of papers in the History of Architecture, being given under the auspices of the Detroit Architectural Sketch-Club, met with a gratifying success on the evening of January 24th. As more than two hundred people crowded into the small lecture-hall of the Museum of Art, it was decided to make arrangements to give the next talks in the main gallery of the Museum.

In introducing the speaker, Mr. Hill, our President Mr. Lorch stated that the Club hoped, through a consideration of the older styles, to lead to a more general appreciation of the conditions, constructional and artistic, involved in the work of the present day. It is his wish next year to devote several evenings to each style, thus allowing a more detailed study of the sculpture and polychromy of the earlier periods, as well as the architecture itself.

Mr. Hill's paper proved to be most interesting, and, taking into account the wealth of material Egypt offers, very satisfactory. It was illustrated by photographs, chalk-drawings, a large drawing of the Temple of Kohns by J. A. Gillard, and a well-selected lot of lantern-slides, among them being views of the work at Edfou, Karnac and Dendera.

ALEX. BLUMBERG, Secretary.



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

THE ARCHITECT OF "ERASMUS HALL."

LINCOLN BUILDING, UNION SQUARE,
NEW YORK, N. Y., February 7, 1898.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—The design published in *American Architect*, February 5, 1898, for Erasmus Hall, Brooklyn, was submitted in competition, but is not the design accepted. Will you kindly make this insertion, as the title of drawing is perhaps misleading. Mr. J. Graham Glover, of Brooklyn, was the successful competitor.

Very truly yours, F. P. DINKELBERG.

THE LOWER ANIMALS AS DESIGNERS OF ORNAMENT.

PELHAM, N. Y., February 2, 1898.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—The interesting article in your issue of January 29th entitled "The Evolution of Decorative Motives," by Professor Hamlin, contains a statement which I beg leave to question. Mr. Hamlin says: "No animal except man produces ornament, or anything that can properly be called decorative design, and man, who has been defined as a 'worshipping animal,' is quite as distinctively the one animal that designs decoration."

In answer to this I would point out that Darwin's hypothesis as to sexual selection being the result of aesthetic taste, and, consequently, of the consciousness of organic beauty in mammals and birds, has been well established as a fact, and the same deductions include evidence of design on their part in displaying beauty. Amongst birds, especially, there are many cases to the point, e. g., the Baya-bird, of Asia,

which decorates its chambered nest inside and out with fire-flies, —the habits of bower-birds and the African hammer-head. There appears, however, to be one great difference between the decorative sense of man and that of the lower animals, inasmuch as the latter seem to design with intention — as a means to an end — rather than for mere sensuous gratification.

Faithfully yours,

FREDERICK WILSON.



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

UPPER PORTIONS OF THE STATE CAPITOL, ALBANY, N. Y.

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

THE architects connected with this costly monument to political jobbery have been Thomas Fuller, H. H. Richardson, Leopold Eidlitz, I. G. Perry, Archimedes Russell and perhaps others.

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THE decoration of the lunette, which is shown in full, was painted by Mr. W. L. Dodge.

PUBLIC SCHOOL NO. 45, INDIANAPOLIS, IND. MESSRS. VONNEGUT & BOHN, ARCHITECTS, INDIANAPOLIS, IND.



Entrance to Public School No. 45, Indianapolis. Vonnegut & Bohn, Architects.

FOUNTAIN IN THE PIAZZA DI TERMINI, ROME, ITALY.

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

PORTE EXTERIEURE DE L'HÔTEL VOGUÉ, DIJON, FRANCE.

HOUSES AT VANNES, BRITTANY, FRANCE.

This and the preceding plate are copied from Baron Taylor's "Voyages pittoresques."

PUBLIC SCHOOL NO. 45, INDIANAPOLIS, IND. MESSRS. VONNEGUT & BOHN, ARCHITECTS, INDIANAPOLIS, IND.

[Additional Illustrations in the International Edition.]

DETAIL OF MAIN STAIRCASE: LIBRARY OF CONGRESS, WASHINGTON, D. C. ARCHITECTS, MESSRS. SMITHMEYER & PELZ; P. J. PELZ; E. P. CASEY. SCULPTOR: MR. PHILIP MARTINY.

[Gelatine Print.]

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NORTHAMPTON INSTITUTE, CLERKENWELL, ENG. MR. E. W. MOUNTFORD, ARCHITECT.

LARGE HALL IN THE SAME BUILDING.



INFLUENCE OF SEA-WATER ON MORTARS. — M. E. Caudlot, in a recent paper, describes the action of sea-water on mortars, and his investigations in the harbor of La Rochelle since 1856 are of much value, as they extend over a period of forty years. Blocks of sixty centimetres in length were exposed to the open sea from 1856 to 1875, and were above the water-surface at low tide. The mortars were of hydraulic limes of different origin, of natural cements from Pouilly, Vassy, etc.; of artificial pozzuolanas mixed with lime and sand; of trass from Andernach, etc. Nearly all blocks had completely lost their cohesion after different periods. The few blocks of Portland cement experimented upon were in good condition; but blocks of neat cement (English and French) were decomposed. From these tests Viennot draws the following conclusions: (1) Neat cements are destroyed more rapidly than mortars of a certain composition; (2) mortars made of one volume of cement to one of sand, and, again, of one volume of cement to two of sand, are those which offer the greatest resistance to sea-water. They will last for twenty, thirty-six, and thirty-eight years. Thurninger commenced new tests with blocks of masonry, and concrete made of lime and Speil mortar, with a length of edge of forty centimetres. In 1895 the masonry blocks disappeared, their destruction having commenced four years after their exposure, and out of thirty-two concrete blocks only twenty-six remained, but they were in advancing decomposition. In 1880 other tests were commenced on blocks submerged, of various limes. Many of these have perished. "Out of thirty-one masonry blocks laid in Portland cement mortar, and submerged between 1881 and 1892, twenty-three are still intact, while some have commenced to disintegrate." Viennot points to the following conclusions: (1) Mortars of hydraulic lime, mixed in any proportion, in most cases commence to disintegrate after one or two years' immersion in sea-water; they crumble into pulp after periods varying in length, but apparently not exceeding fifteen years. (2) Concrete resists better than masonry, owing to the greater density imparted to it by ramming. (3) Rapid-setting cements may commence to disintegrate after six or eight years, but may last longer than thirty-eight years without crumbling. (4) The mortars offering the greatest resistance are those consisting of one part cement to one or two parts of sand. This mixture corresponds to the weight of cement required to fill the spaces between the grains of sand. These, therefore, are the least porous mortars. — *Building News*.

A MONSTER BOG OAK. — An extraordinary discovery, and one which is just now exciting considerable interest in antiquarian circles in Lancashire and Cheshire, has been made at Stockport. During the excavations in the construction of sewage works for the town some workmen came across what has since proved to be a massive oak-tree with two immense branches. Prof. Boyd Dawkins, the well-known antiquary, is of opinion that the tree is one of the giants of prehistoric times, and he says that the tree is certainly 10,000 years old. The Corporation of Stockport are at a loss what to do with the gigantic fossil, which is supposed to weigh about forty tons, and, as it is necessary that it should be removed, a proposal has been made to blow it up with dynamite. This has aroused the indignation of a large section of the public, who have presented the following petition to the Corporation: "That there is a valuable tree of old oak at present lying upon and exposed in the gravel on and within their property. That the quality in color, grain, and solidity is better than any that can be bought in the open market. That for artistic work alone it is greatly to be treasured, for nothing in this country is at present grown which can come up to its dimensions. That it contains within itself sufficient material to make the furniture for any public building or town-hall which may be erected for the public benefit within our borough. That it only requires lifting from its bed, which, in the opinion of competent geologists, may be roughly estimated as 15,000 years of occupation. That private effort has failed to achieve its removal. That its destruction would be a public loss and an artistic calamity. That your representatives in Council be and are hereby requested to conserve for the borough this grant of Nature to her sons and daughters, whose signatures are hereby affixed." The Corporation have reserved their decision, and in the meantime efforts are being made by local antiqua-

rians and others to bring pressure to bear upon the Council to preserve the tree for the benefit of the town and the country. — *Illustrated Carpenter and Builder*.

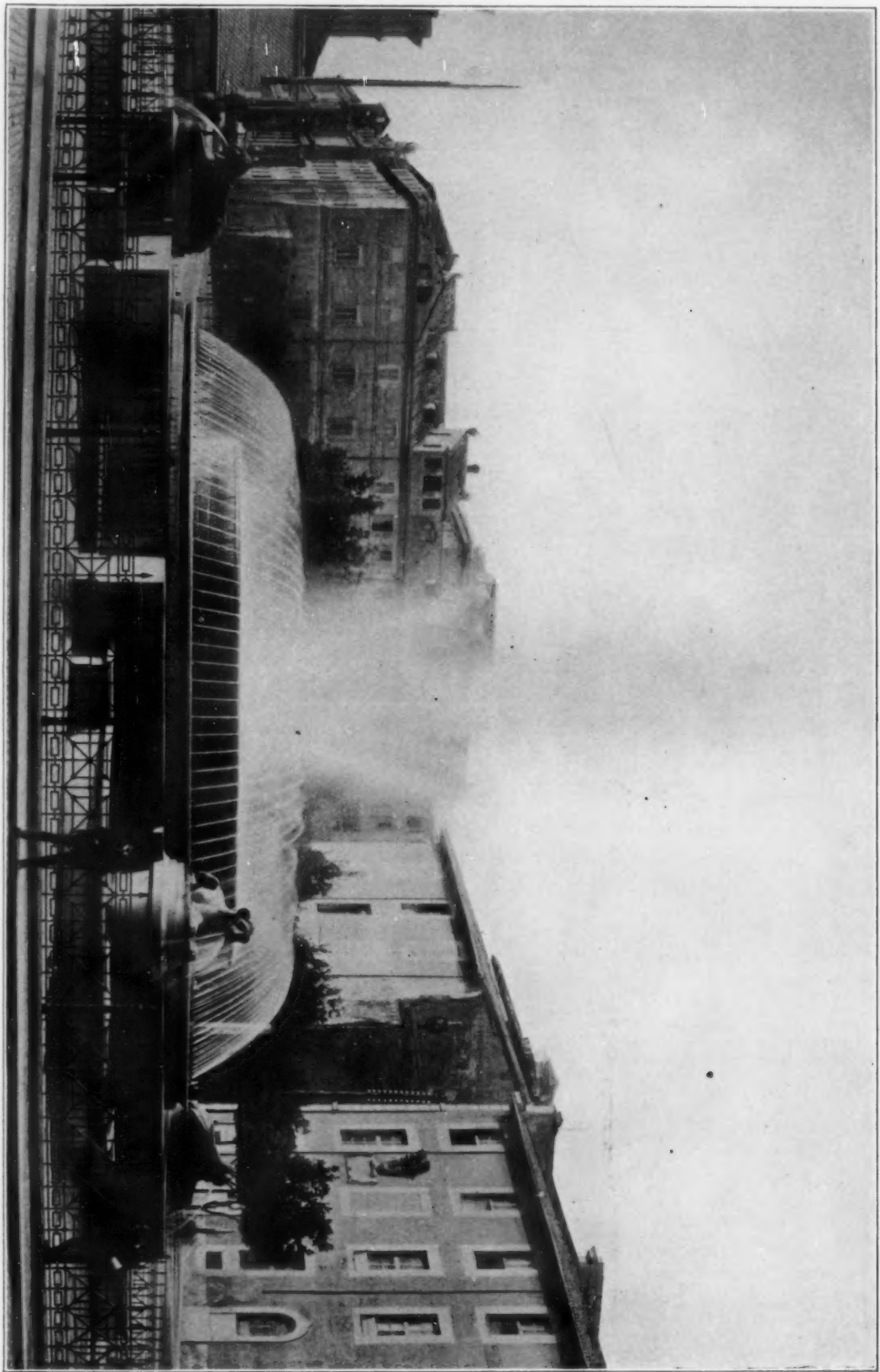
THE LARGEST STORAGE-BATTERY. — The biggest storage-battery on earth, to be built at a cost of \$100,000, is to be installed by the Chicago Edison Company. A few years ago such a battery was considered an impossibility, the idea prevailing that, while electricity might be generated to almost any limit of power, if the machinery were only powerful enough, this power could not be practically applied by a storage-battery except on a small scale. The battery to be installed by the Edison Company will weigh about 500 tons, or 1,000,000 pounds. It will consist of 166 cells, each weighing 6,000 pounds, and it will produce light, when fully charged, equal to the light given by 25,000 sixteen-candle-power lamps in an hour. The battery is being installed to meet the increased demand for electric light at this season of the year. To supply this demand by the ordinary method additional machinery would have to be put in, which in the summer time would simply occupy space and be so much dead capital. The storage battery can be charged at such times as the existing dynamos are not overworked, and the power fed to customers as required. — *Chicago Inter-Ocean*.

THORWALDSEN'S LION INJURED. — Very unfavorable reports having been in circulation some years ago about the condition of Thorwaldsen's famous monument, the "Lion of Lucerne," a Zurich correspondent sends to the *London Times* the following: A commission of experts was appointed to make a full report as to the damage which the grotto and monument had already suffered from frost, rain, and natural decay, and certain measures of repair and protection were then adopted. It is now unfortunately the case that, owing to the excessive rains of the past year, the monument has been much injured, and shows serious signs of cracking and crumbling away in many parts of its structure. The injury is chiefly due to the action of water trickling through the living rock out of which the lion is carved, and the experts have decided that the figure and its background must be completely isolated from the main body of the sandstone cliff, and that an extensive draining and drying of the rocky surroundings must also be carried out, so that the progressive decay of the monument may be reduced to a minimum. These works are already in progress. Thorwaldsen's memorial to the memory of the Swiss guards slain in defence of the Tuileries on August 10, 1792, was modelled in Rome, and the execution of the work was intrusted in 1821 to a Swiss artist, M. Lucas Ahorn, of Constance.

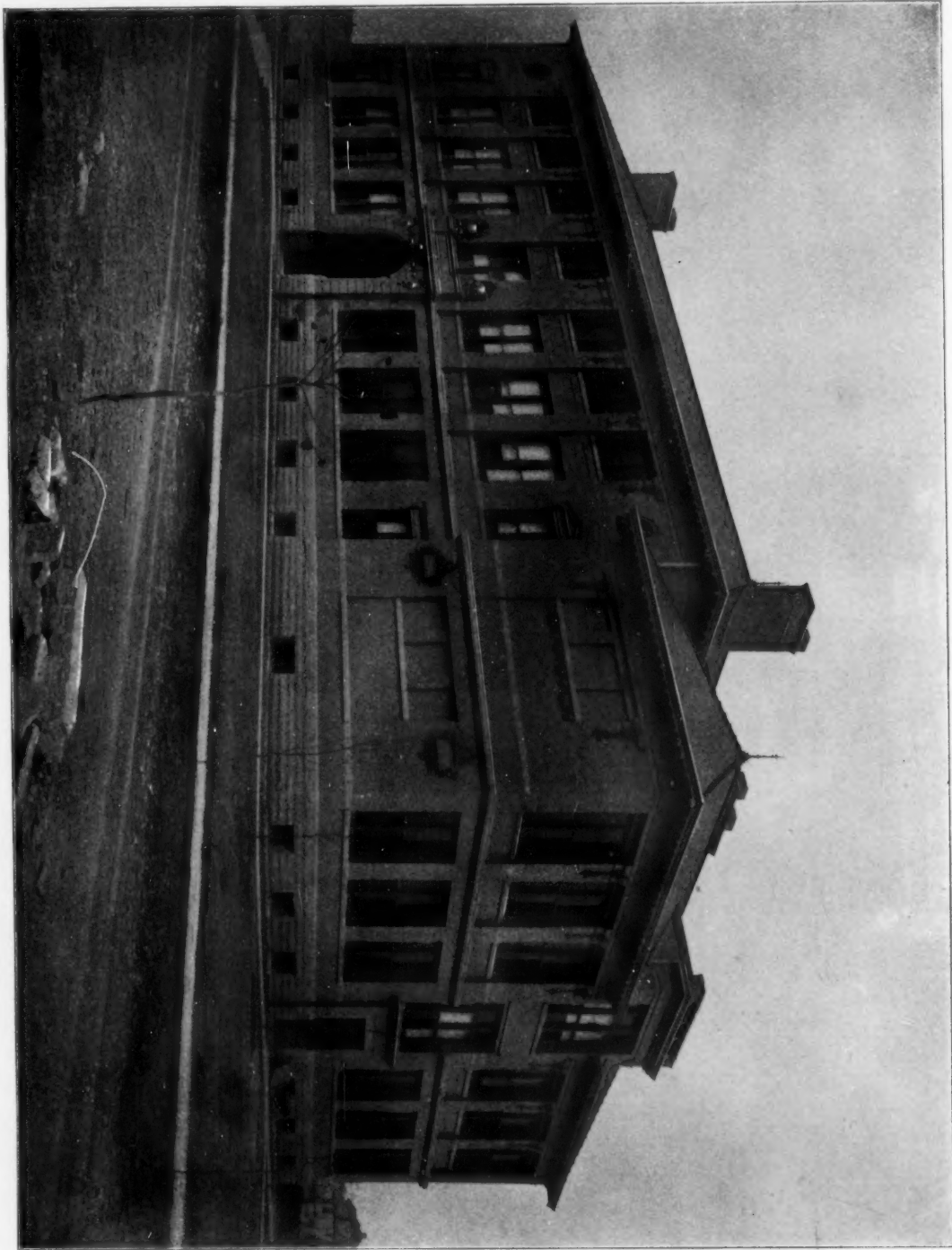
THE THEATRE AT GUADALAJARA, MEXICO. — Probably the most costly, and certainly the most modern, of the city's great buildings, is her mammoth Degollado Theatre, to which belongs the distinction of being the largest exclusively theatrical structure on the continent. Its corner-stone was laid in 1856, and although at the present day it is not entirely completed, some \$3,000,000 have been expended in its construction. It is four stories in height, and covers an area of 11,127 square feet. Extending across the front of this superb edifice is a grand portico consisting of a massive superstructure, supported by a colonnade of lofty composite pillars. The interior plan is copied after the great Parisian playhouses, the boxes being arranged in tiers about three sides of the auditorium, while the fourth is entirely taken up by the stage, which has a length of 155' x 55' in width. From a strictly financial standpoint, the Degollado Theatre would not be considered a profitable venture, for although the refined classes of Guadalajara are liberal patrons of the opera and drama when given the opportunity to enjoy them, the infrequent visits of the high-class companies cause it for a greater portion of the time to remain idle. Yet, as a monument to the progressive tastes of an ambitious people, it stands without an equal. — *Exchange*.

PAYING BETTERMENTS BY INSTALMENT. — A suggested provision of a new city charter under consideration in St. Paul is that assessments for street improvements may be paid on the instalment plan, the time-limit being ten years. There are two obvious arguments in favor of the provision, one that it would tend to increase the number of those holding real-estate, and the other that it would lessen the opposition to public improvements, which is often based on an alleged inability to pay a burdensome assessment. Indiana has a law permitting this method of meeting assessments, and it is said to work satisfactorily. It is provided in the Indiana statute that before the property-owner can take the benefit of paying his assessment in instalments he must sign an agreement that he will raise no objection to the validity of the assessment and that he will promptly pay the annual instalments. Its other main provision is that if the property-holder fails to pay any annual instalment the whole sum will become immediately due and payable, and must be collected in the usual way, by judgment and sale. — *N. Y. Evening Post*.

ANECDOTE OF PUGIN. — In his life of Cardinal Wiseman, Mr. Wilfred Ward gives this tale about Pugin: He visited Sant' Andrea delle Fratte, the scene of the miraculous conversion of Abbé Ratisbonne, the Jew. Abbé Ratisbonne entered the church a Jew and came out a Christian, having seen there, he stated, a vision of Our Lady. "The story," Pugin said, after seeing the church, "is demonstrably false. The man could not have said a prayer in such a hideous church. Our Lady could not have chosen such a church for a vision. The man could have had no piety in him to have stayed in such a church at all." The friend to whom his remarks were addressed replied: "As I heard the story, Ratisbonne was not at the moment praying, but thinking of the uncouthness of the architecture of the place." Pugin's whole face changed: "Is that so? Then he was a man of God. He knew what true Christianity was, though he was a Jew. I honor him. Our Lady would have come to him anywhere. The story is demonstrably true."



NEW FOUNTAIN IN THE PIAZZA DI TERMINI, ROME, ITALY.



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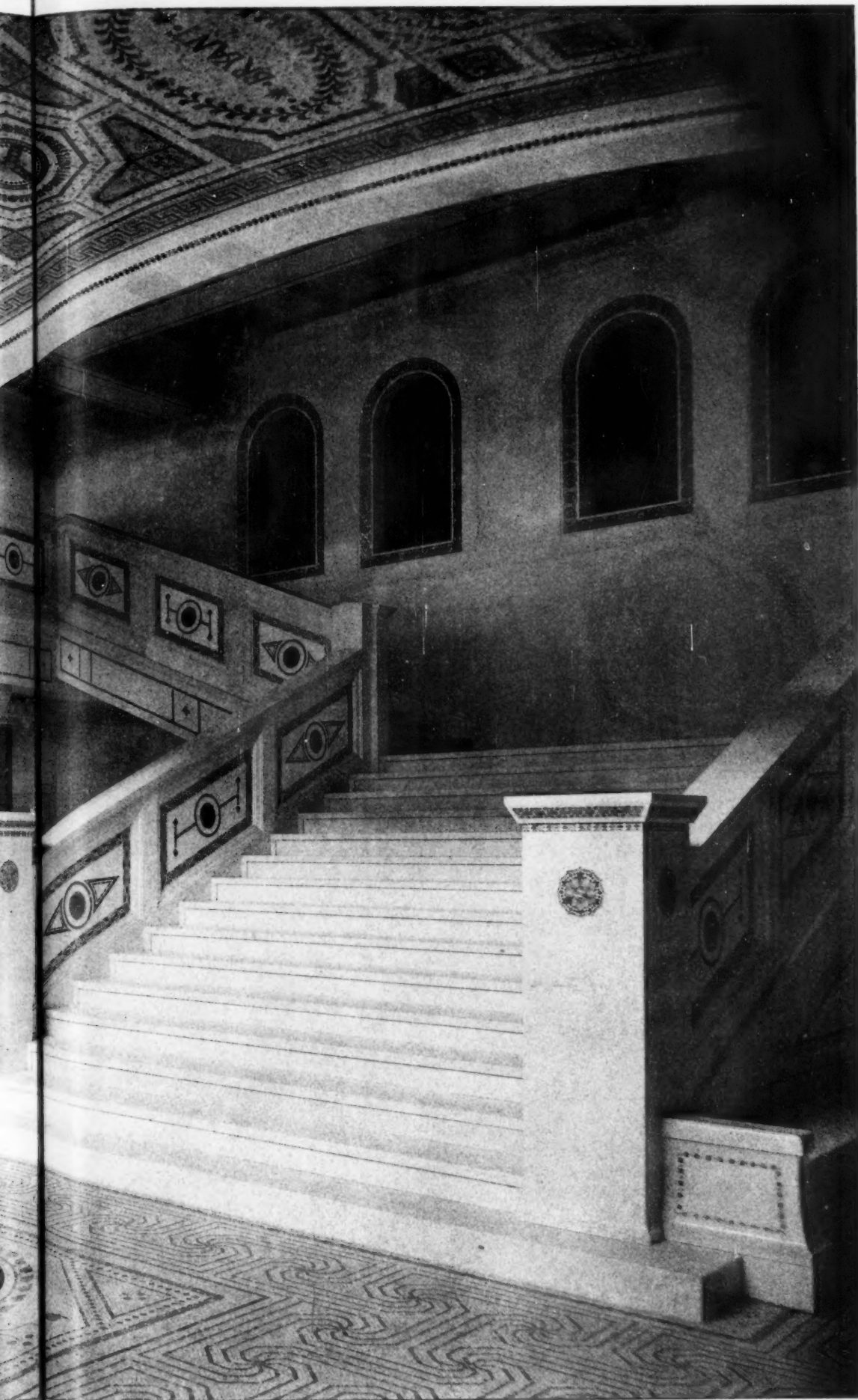
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