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ENGINEERING

DECORATION

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CONSTRUCTION

BOSTON, MASS.

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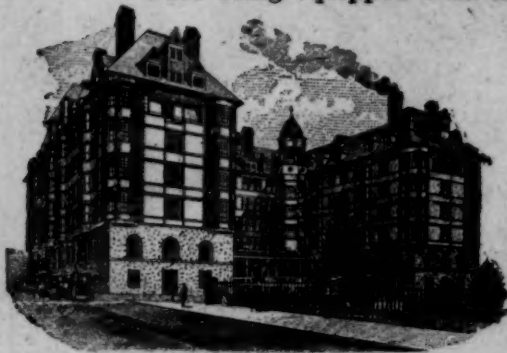
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MAY 6, 1893.



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THE instructions we have given to Mr. C. D. Arnold, the official photographer of the World's Fair, have been so stringent and precise and his personal desire to accomplish satisfactorily what he has undertaken to do for us has been so stimulated, that the unexpected result has been achieved, that while other journals mark the opening of the Fair with illustrations of the work in various stages of incompleteness, we can offer our readers but a single print. This untoward delay will only make more certain that the series of prints begun last October will eventually be thoroughly worthy of consideration.

THE people of Boston are to be congratulated on the success of the friendly competition arranged by the Boston Society of Architects for designs for the treatment of Copley Square. Although the prizes offered by the Society probably amount to a small fraction only of the actual cost of making the drawings, so that there was nothing to be gained but the approbation of their fellow-architects, and the consciousness of having done a good and public-spirited action, many of the best and busiest architects in the city entered the contest, and the result of their work shows how much help in solving such problems is to be expected from the trained taste and ample resources, in the way of acquaintance with precedent, of professional architects. The prizes, which were all of equal value, were awarded by a jury consisting of Professor Ware, of Columbia, Professor Chandler, of the Massachusetts Institute of Technology, and Mr. Wheelwright, the City Architect of Boston; the design of Messrs. Walker & Kimball being placed first, that of Messrs. Rotch & Tilden second, that of Messrs. Andrews, Jacques & Rantoul third, that of Mr. H. Langford Warren fourth, and that of Mr. W. G. Preston fifth.

ON the whole, we are disposed to think that the jury in expressing a preference for the design submitted by Messrs. Walker & Kimball gave undue weight to the necessity of conciliating a purely imaginary utilitarian need. We can perceive no reason why the so-called beginning of Huntington Avenue must be at some variable point on Boylston Street rather than at the southwest angle of the square itself, and

Bostonians are so used to progressing by devious paths that it seems absurd that a right line must be insisted on in this case. The most interesting, because the least commonplace, or rather the most unexpected, solution was that offered by Messrs. Rotch & Tilden in their scheme for a sunken garden, which we incline to think would be satisfactory to the greatest number, since it contains the elements of most of the other schemes and in addition the charm of novelty which none of its companions has. Critics in the daily papers attack those schemes which require the use of flowing water, because this feature is inoperative during certain months of the year; but in those months people are not in the streets in search of the beauties of art and nature, and even if they were, it is no reason why during the summer months citizens should be debarred of the sight of falling water, than which few things are more refreshing. As to the difficulty of keeping the sunken garden, or any of the arrangements where shrubs and trees are required, in a tidy condition, why, if the City of Boston finds the problem too costly and difficult a one to grapple with, there are hundreds of citizens who would gladly pay the wages of the single gardener whose labor would be all sufficient to keep the place immaculate.

THE German-American Insurance Company, of New York, offers a prize of one thousand dollars in gold for the best plans and specifications for an improved warehouse for the storage of cotton, with a view to lessening or eliminating the fire-hazard, and to facilitating the storage and handling of the cotton. Three committees, selected by the Cotton Exchanges of New Orleans, Memphis and New York, are to form the jury to decide upon the merits of the plans and specifications submitted. Each committee consists of three members, one being a cotton factor or warehouseman, one a fire-insurance expert, and the third an architect; so that every important point can be intelligently studied. Competitors are left entirely free to work out the problem in whatever way seems to them best, but they are requested to make their ideas as clear as possible, both by description and drawing. Further particulars may be obtained from Mr. James A. Thomas, General Agent of the German-American Insurance Company, Nashville, Tennessee.

AN award of prizes for painting was recently made in New York, under rather peculiar circumstances. Some years ago a bequest was made to the National Academy of Design, in accordance with which three premiums, to be known as the Hallgarten Prizes, of three hundred, two hundred and one hundred dollars respectively, were to be given each year for the best three pictures painted in the United States by American artists under thirty-five years of age; one condition, however, being that a certain number of competitors should apply for the award. It will be readily understood, by those familiar with the ways of artists, that the Academy did not undertake the task of making these awards with much enthusiasm, and the painters themselves showed so little interest that for the last three years there have not been competitors enough to secure the award of the prizes under the terms of the bequest. This year, however, the income of the bequest having accumulated for nearly four years, the amounts available for the prizes, being almost four times the usual sums, were sufficient to tempt any artist. The prizes are awarded by the exhibitors at the Academy exhibition, a quorum for the purpose being fifty, and, this year, more than eighty assembled on the appointed day. According to the New York Sun, a good deal of canvassing for votes was done by friends of some of the more prominent candidates, and a certain picture-dealer, who had invested money on a picture by an eligible artist, is said to have been active in urging the claims of his favorite. After several ballots, the first prize was awarded to Mr. C. Morgan McIlhenney, for his picture named the "Gray Morning"; the second to Mr. E. A. Bell, for a picture called "The Fire Dreamers," and the third to Mr. Henry Prellert, for a small picture called the "Prodigal Son." It seems to be generally agreed that the system of awarding the prizes by ballot is unsatisfactory, and the exhibitors, before adjourning, instructed the Council of the Academy to arrange for the future to have the award made by a jury, it being understood that the consent of the Hallgarten heirs has been obtained to a change in the bequest, by which this will be permitted.

EVERY one who knows or cares anything about the history of art, or of architecture, will regret to hear of the death of Professor Wilhelm Lübke, whose books have for nearly a generation been almost as familiar to English as to German readers. Professor Lübke's death took place at Carlsruhe, in Baden, where he had for several years held the chair of History of Art in the Technical High School. Although he was well advanced in age, being sixty-seven years old, and had long suffered from a painful disease, he pursued his literary work almost to the last. Among the many writers who have tried to popularize the history of the arts, he has been probably the most successful, and his clear and simple yet learned books will long make his name familiar to students.

THE New York Municipal Art Society has opened its campaign in favor of better public art with commendable vigor. A few days ago, a committee, consisting of the principal officers of the Society, called upon the mayor, and explained its views and intentions, illustrating both by criticisms of some of the existing adornments of public places in the city which they think objectionable. Mayor Gilroy listened to the discourse of the committee with much interest, and promised the Society his earnest coöperation, both personal and official. As now organized, the Society is to be governed by a Board of Control, consisting of nine members, three of whom are to be architects, three artists, and three laymen. At the annual meeting, each year, a jury of forty members is to be elected to serve during the year, and by this jury one or more artists will be selected, usually by competition, who are to be commissioned to execute works of sculpture, painting, mosaic or stained glass, for the adornment of some specified public place. The character of the work will depend upon the resources at the command of the Society, but something is to be done every year. The Board of Control for this year is yet to be chosen, but the permanent officers have already been elected, Mr. Richard M. Hunt being President; Mr. Edward H. Kendall, Vice-President; Mr. E. N. Bell, Secretary; Mr. William B. Bigelow, Treasurer; and Messrs. Will H. Low, W. A. Coffin, Howard Russell Butler, Joseph Evans, J. G. Brown, W. S. Allen, James H. Ward, Frederic Crowinshield and E. H. Blasfield, Trustees.

IT is announced that definite arrangements have been made, by which M. Puvis de Chavannes will execute a considerable part of the interior decoration of the new Public Library, in Boston. Negotiations to this end have been going on for some time, but the great French painter is said to have been disinclined to undertake an important commission at so great a distance from home, and his final acceptance is of very recent date. As is well known, Messrs. Sargent and Abbey have the cartoons for their work in the same building well advanced, and the present summer will probably see much of the decoration completed. Although the beauty and interest of the painting in the Hotel Waldorf, in New York, have already shown the American public what real artists can do in the way of decorating a building, the Boston Library will be the most notable piece of work of the sort yet attempted in this country, if we except William M. Hunt's ill-fated Assembly Chamber at Albany. Mr. Sargent's painting alone would make any structure interesting, and Mr. Abbey's work is said to be little, if at all, inferior; while M. Puvis de Chavannes has been for many years at the head of the most noted school of French decorative painting. How Mr. Sargent's notions of color and composition will suit the correct balance, and chalky, fresco-like painting of the Puvis de Chavannes school, remains to be seen, but there is no doubt that Boston is to be endowed with a building of extraordinary interest, at least, which will, we are sure, furnish suggestions and inspiration to many of the young artists who are, in the next generation, to raise the name of American decorative painting to a high place in the history of art.

THE various modern processes for removing phosphorus from melted cast-iron, in the Bessemer or other converter, have been interfered with by the difficulty of procuring a material for lining the converter, or furnace, refractory enough to resist the intense heat required. The old processes used linings of fire-brick, or silica, but silica is a strong acid at a

high temperature, and converters for steel are now usually lined with alkaline material. Lime has been most employed, but it is quickly destroyed, and the relining of the furnaces, or converters, is a troublesome operation. Magnesia, which is very refractory, has been proposed as a basic lining, but pure magnesia is a rare mineral, and magnesian limestone, or dolomite, has been used. The bricks of dolomite used for linings have, however, the defect of shrinking enormously in calcination. A brick of dolomite measuring, when made, a thousand cubic centimetres, is said to be reduced, after use, to one hundred and fifty cubic centimetres, or about one-seventh of its original bulk. The consequence is that the linings fall to pieces, and it is, of course, impossible to form an arch with such bricks. Quite recently, a deposit of pure carbonate of magnesia has been discovered on the Island of Eubœa, and M. Negris, a Greek mining-engineer, has commenced the manufacture, from the new material, of bricks of pure magnesia, expressly for basic linings. The magnesia bricks are burned in a Hoffman kiln, at a temperature which is carried to the melting-point of platinum. As no other material would answer for lining the kilns exposed to such heat, magnesia bricks are used for this purpose, and show no signs of failing. The finished magnesia bricks have the density of ordinary granite, and shrink very little, if at all, in their subsequent use. With such refractory material for linings, the temperature of the melted metal can be carried very high, so as to produce with certainty a steel which can be welded. At present, although steel that can be welded is very desirable for boiler-tubes, no establishment, according to the *Revue Industrielle*, will accept an order for it, for the reason that it is always uncertain whether a sufficiently high temperature can be obtained in the converter to produce it; but with the magnesia linings there is no fear of melting the converter, and the conditions necessary for producing with certainty a welding steel are easily secured. At present, the cost of the magnesia bricks is twenty-seven dollars a ton, but it is susceptible of reduction. Another use to which carbonate of magnesia can be put is that of making cement, the pure calcined carbonate, without admixture, being, according to the books, the strongest cement known. There is said to be a deposit of native magnesian carbonate in Massachusetts, which has for many years furnished material for gluing together particles of emery to make emery-wheels. If, besides its rather limited use for this purpose, it could be sold as a matrix to artificial stone-makers, and made also into bricks for lining Siemens-Martin and Bessemer melting-furnaces, the product of the Massachusetts quarry ought to be valuable.

THE Boston Manufacturers' Mutual Fire Insurance Company has sent out a circular, calling attention to the qualities of window-glass of different sorts in regard to the diffusion of light. It is often very desirable, in factories, to use glass which will diffuse the sunlight. If plain glass is used, the sun striking directly through it often causes great annoyance to those working near, while, if the direct rays are shut out with curtains, other portions of the room may be unduly darkened. Under these circumstances, an excellent purpose is served by a thin ribbed, or fluted, glass, with small ribs close together. Although sunlight striking on this glass is almost completely diffused, so that there is no need, in most cases, of covering it with shades, the obstruction to light is very little greater than that offered by ordinary sheet glass. The ribbed side, in setting this glass, should be inward, not only for better diffusion, but to prevent the glass from being obscured by dust and dirt, which often collect in the spaces between the ribs.

THE propositions advanced in another column by Mr. Frank Sewall contain so much of practical good sense, and their presentation to the public is so timely, in view of the interest which will surely be excited this summer by the World's Fair buildings, that it does not seem to be too sanguine to hope that at the next session of Congress a bill, properly prepared and with backers ready to support it in both Houses, will be presented. The persistent effort of the American Institute of Architects has already accomplished so great an advance in securing the passage of the bill regulating the designing of future Government buildings, that it might well hope that similar efforts directed to accomplishing this broader achievement might be crowned with similar success.

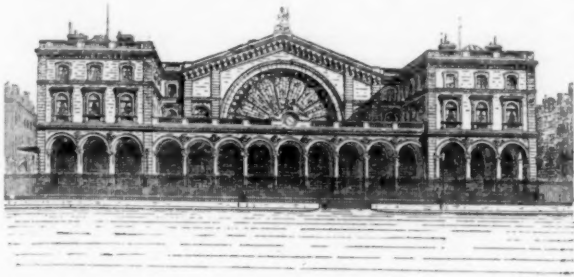
RAILWAY-STATIONS.¹—I.

Fig. 1. Gare de l'Est, Paris.

THE French term *gare*, here translated "railway-station," was first applied to the basins constructed near rivers or narrow waterways in which boats can be stationed to allow of free circulation or for the purpose of protecting them from the damaging effects of ice and inundations. Such is the Gare de l'Arsenal at Paris, at the intersection of the Canal Saint-Martin and the Seine. By extension, it is used to designate the ensemble of constructions erected along rivers or on wharves for the storage of goods or to facilitate the work of repairs. For a treatise on this subject, the reader is referred to the word "Dock."

In railway phraseology, a *gare* is the place where a multiplicity of tracks makes it possible so to dispose the trains and the cars that travel is not impeded or restricted. This will naturally occur at points where the traffic, whether passenger or freight, is important; consequently, at such spots buildings are erected, and these have also been included under the same appellation.²

Railway-stations are either intermediate or terminal. The latter present a special difficulty: when trains are once in

complication in the passenger and freight service; this is the case at Tours and at Orléans; it is certainly an honor to a town to possess a station of this kind, but, to reach it, the traveller must change cars at a small intermediate station on the main line; even at Paris, and notwithstanding concerted



Fig. 3. Gare du Nord, Paris.

action between the companies interested, difficulties are encountered when it is attempted to run passengers from the North onto the Paris-Lyon system without transferring them. The disposition of the station of Sceaux, where the tracks form a loop, suggests the only practical solution of the problem; but this is not feasible except in connection with the Arnoux car-system, the only one that can be used on short curves: this system is now abandoned.

The tendency is toward giving up the construction of terminal stations and transforming the existing ones into regular intermediate stations. In laying out a railroad, the selection of the station sites is a delicate and difficult matter; it is, of

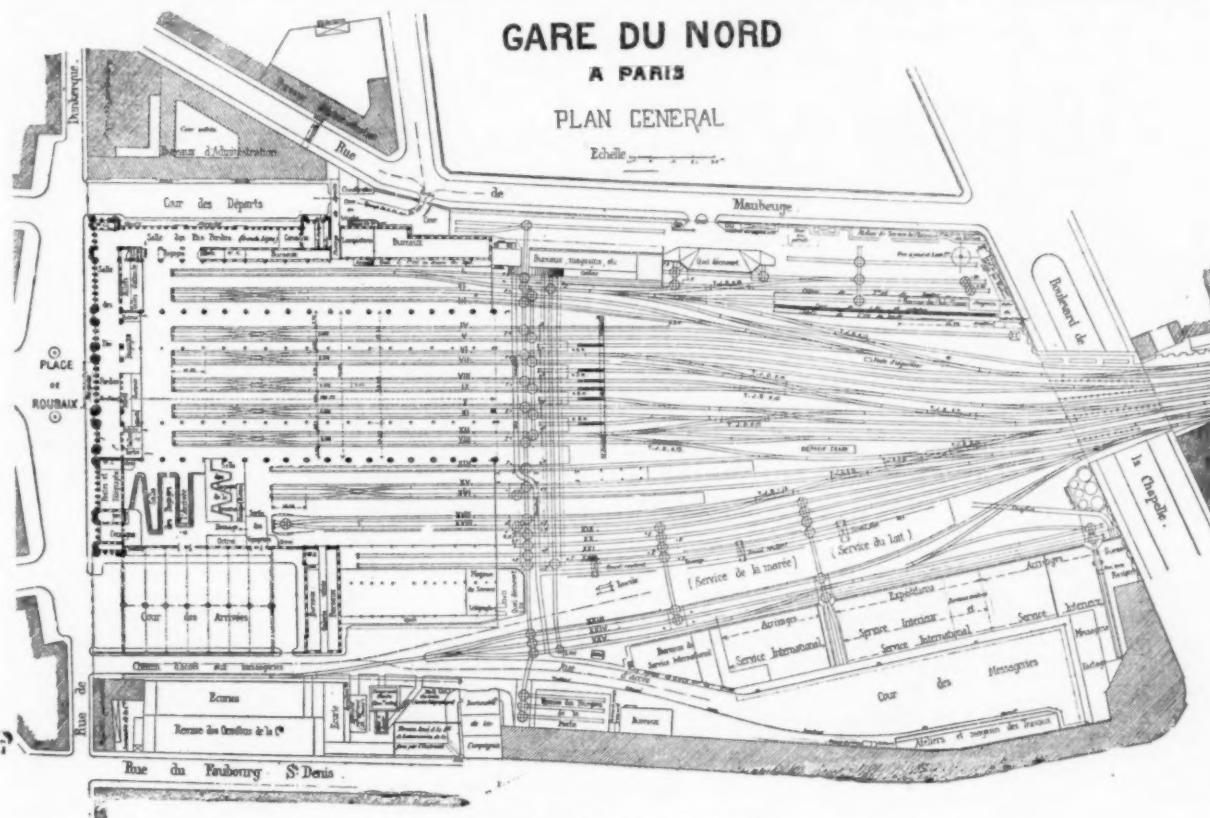


Fig. 2. Plan of the Gare du Nord, Paris.

them it requires a quite complex mechanical operation to get them out. The existence of such stations always leads to a

¹ From the French of Léon Benouville, in Planat's *Encyclopédie de l'Architecture et de la Construction*.

² In general, if there are no buildings about the tracks, the ensemble is styled *garage* or siding; the word *gare*, therefore, becomes applicable rather to the buildings than to the tracks themselves. The small structures along the main lines of transportation, at which trains stop for only a short time, are more properly termed *stations* than *gares*.

course, very convenient for the public to have a station centrally located, but there is a double obstacle in the way of accomplishing this: first, it is necessary to secure, in the heart of the town, the requisite space for the buildings, and, secondly, tracks must be laid from these to the main line. To give some idea of the expense involved in this, let us note that the land between the Pont de l'Europe and the façade wall of the

Gare Saint-Lazare at Paris represents a value of about sixty million francs; if to this be added the price of that between the Pont de l'Europe and the tunnel, the whole runs up to fully one hundred millions. Again, the mean cost of constructing the Vincennes railroad, although it passes through suburban districts, was 1,600,000 francs per kilometre, which makes the cost per kilometre in Paris itself three millions, at least. The metropolitan railway of Berlin was built at the expense of eighty-four million francs for twelve kilometres, or seven millions per kilometre, while the maximum outlay per kilometre outside of cities is not more than 600,000 or 700,000 francs; at some points it drops to 120,000. An estimate may thus be formed of the immense cost of constructing important central stations in large cities; in addition to this, the tracks, if at street-level, cut up the city: placing them underground is not a very tempting solution of the problem, for this closes the door to all expansion, makes the working of the roads difficult and dangerous, and entails the outlay of vast sums in the execution of the works. The right solution, the only practicable one, is to raise the tracks above the streets; this is the plan adopted on the railway from Vincennes to Paris. It was

II. *Incoming Service.*—1. Control of the tickets, discharging of passengers and freight. 2. Unloading of baggage and control of national and municipal customs. 3. Stationing of public carriages and omnibuses; loading of vehicles and provision for their easy egress.

III. *General Service.*—This includes accommodations for the station-masters and their subordinates, agents, employés of various kinds, oilers, etc.; the lamp, car-heating and order services; lavabos, water-closets, restaurant, news-stand, bar, tobacco-shop, post-office, telegraph-office and inspector's office; also the express and freight service. Often, too, in large stations, there are the offices of the division superintendents of the different departments. Lastly, in the most important stations we find the offices of the general administration. The engine-houses and freight-depots are nearly always independent of the station proper.

We will take up the discussion of the most important of these structures first; as they are, in France, terminal stations, we begin with a description of the dispositions of the latter. The stirrup form, with the outgoing service on one side and the incoming on the other, was long admitted to be the most rational.

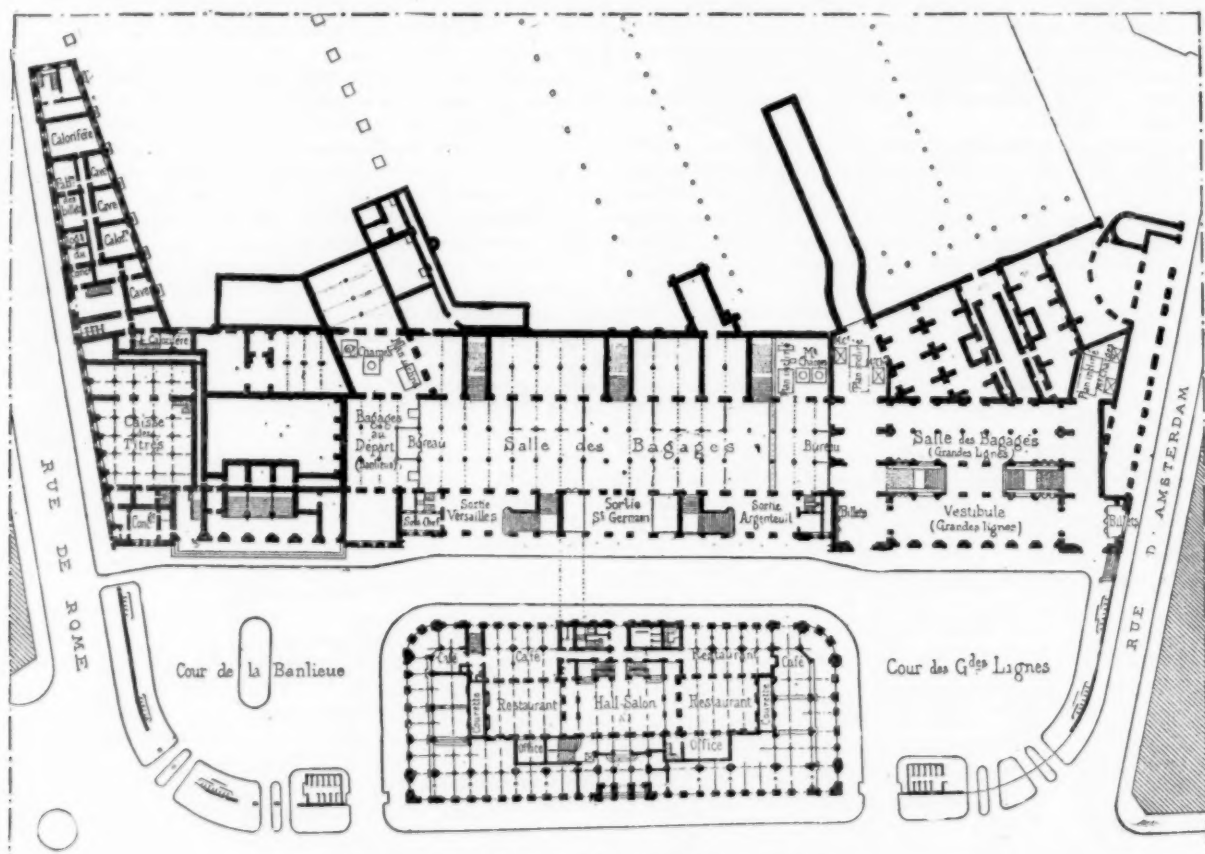


Fig. 4. Gare Saint-Lazare, Paris: Plan at the Level of the Courts.

copied from the metropolitan railroad of Berlin,¹ where, however, the decorative requirements have not, perhaps, been satisfactorily met. We shall have occasion to speak farther on of the very clever disposition of the stations on this road.

The discussion of the principles on which railway-tracks can and must be laid does not come within our province here; we therefore confine ourselves to a description of the general disposition of the buildings.

The station services may be classed under three heads:

I. *Outgoing Service.*

II. *Incoming Service.*

III. *General Service.*

I. The *outgoing service* must be so organized as to secure: 1. Easy and sheltered access to the buildings for passengers or for the unloading of baggage. 2. The distribution of tickets. 3. The registration of the baggage or freight. 4. To insure the greatest comfort possible to passengers waiting for their trains. 5. To make the embarkation of passengers, baggage and freight easy and convenient.

¹See the interesting work of Gaudin and Zuber.

The Gare de l'Est, at Paris, the façade of which is represented in Figure 1, has been considered a masterpiece of the type; the general disposition is quite free and the arcading in the train-house is of noble aspect; but, and it is this "but" that condemns the plan, the space within the buildings is not broad enough; new tracks have been laid terminating at the end of the two branches of the stirrup; all this is insufficient; therefore, despite the admiration which the entire administration of the Compagnie de l'Est profess for this monument, its fame is a thing of the past and it will have to be torn down before long, to make way for something better. We cite it here only as a matter of curiosity.

The Gare du Nord, at Paris, is much better arranged than the Gare de l'Est for enduring the repairs and modifications which the constant developments in railways forces the constructor to provide for; the crosspiece of the stirrup (Fig. 2) is much longer and the sides are shorter; this admits of the construction of tracks terminating at their extremities.

The main tracks from I to III are reserved for trains leaving on trunk lines; tracks XIV to XVI are for incoming trains on

the same lines; the tracks from IV to XIII are devoted to the suburban service; however, the outer ones of these also take trains from the great lines. Tracks XVII and XVIII are used by the train-tramway running between Paris and St. Denis.

Suburban passengers and baggage have ingress and egress directly on the Place de Roubaix; a large Salle des Pas-Perdus contains all the ticket-windows. Travellers enter and

XVI, which take the international trains; on the other hand, trains from within France enter on tracks XII and XIII, the platform of which gives access to the main baggage-room.

At the Gare du Nord the incoming baggage goes to one place, the outgoing to another.

In the large French cities, the railway-stations are now broken up into two: one for passengers and for goods sent by rapid or express trains, and situated near the centre of the

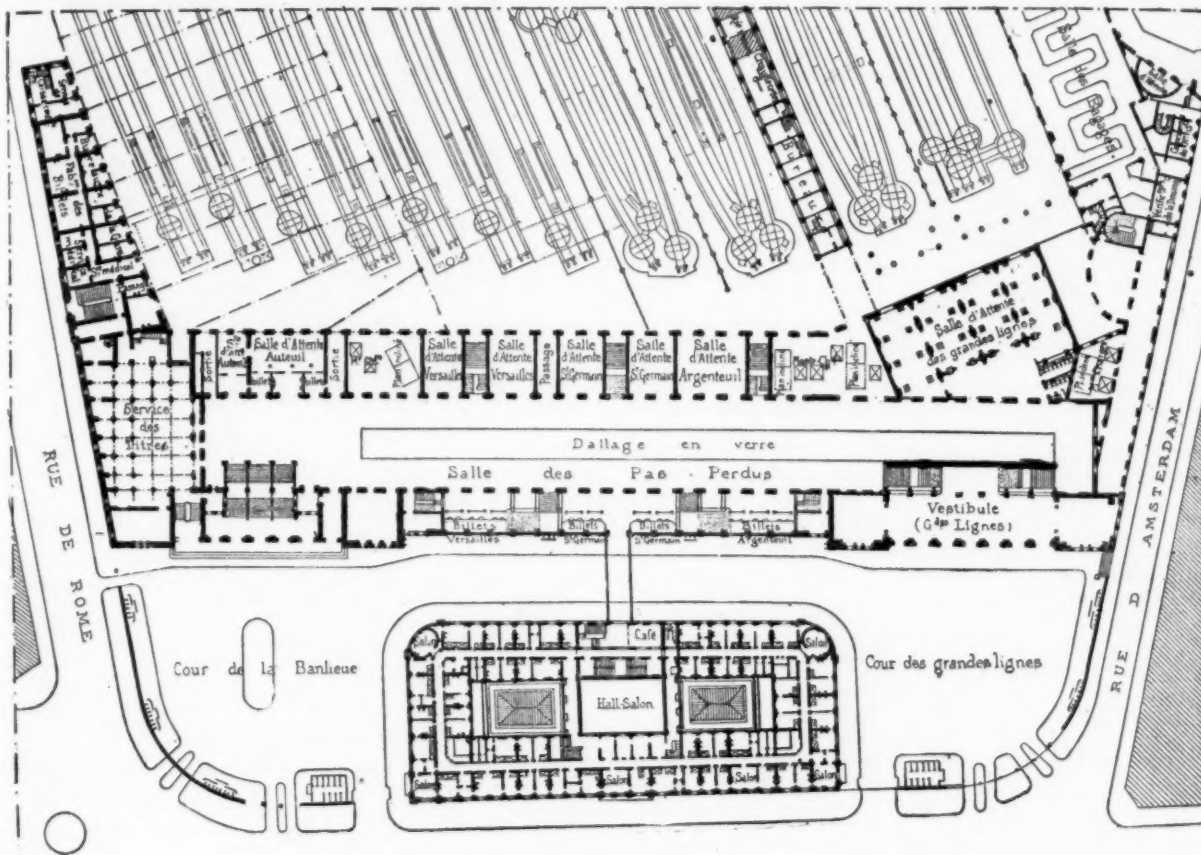


Fig. 4a. Gare Saint-Lazare, Paris: Plan at the Level of the Tracks.

leave by the platform at the end of the tracks. It will be remarked that as the amount of baggage for suburban trains is very small, only a few carriages at a time are stationed in the Place de Roubaix, and then not for long.

On the other hand, for departures of trunk-line trains, a special court has been reserved for the unloading of baggage; for the Salle des Pas-Perdus, the distribution of tickets and the registration of baggage, the disposition is the same as for the suburban service. The introduction of dial-scales here has greatly simplified the baggage system. The intentionally

town; the other in the outskirts, designed for heavy freight like iron, stone, coal, ore and so on. At the Gare du Nord, the express service is located in the triangle formed by the principal tracks for incoming trains and the Rue du Faubourg Saint-Denis. The offices of the central administration are separate buildings, at the left of the entrance court for trunk-line passengers.

The main façade of the Gare du Nord, reproduced in Figure 3, is by Hittorf; it is almost the only thing that remains of the original structure, which has been repaired and rearranged

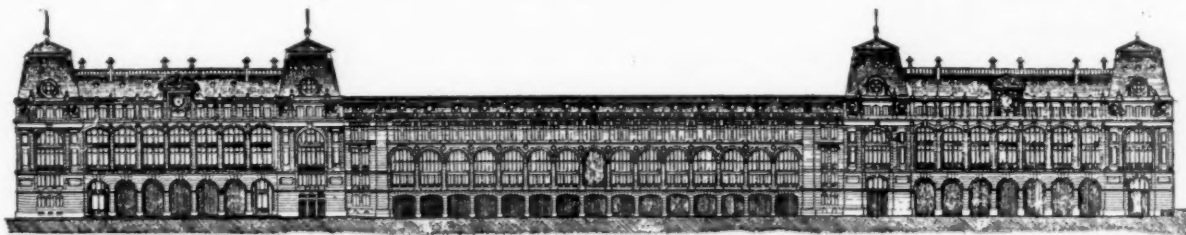


Fig. 5. Gare Saint-Lazare, Paris.

small size of the waiting-rooms will be noted; in fact, as is well known, the cars are placed at the disposal of the public so early that they now serve as waiting-rooms themselves. Access to the platform is had at the intersection of the right branch and the crosspiece of the stirrup; so that passengers are never obliged to cross the tracks.

For incoming travel, the baggage-room used as a custom-house is at the end of the platforms of tracks XIV, XV and

at different times, the last quite recently. It is evident that other modifications must be made in the near future. From the alterations continually going on in the more important stations, one is not to infer fickleness or lack of foresight on the part of any one; they are due to the constantly increasing demands of a service which is daily changing and growing; on the other hand, the travelling public are becoming more and more accustomed to comforts; to procure for them such ease

as they have a right to insist upon, it is necessary to make frequent improvements in the rolling-stock, and these lead to changes in the permanent way and the constructions.

The builders of railway stations forty years ago could not have foreseen the immense growth that has taken place since then; but to-day it is the duty of the managers of railway companies, in all their enterprises, to heed not only the development of the past, but to provide for that of the future.

Our criticism on the Gare Saint-Lazare, at Paris, is that it is unsuited to any development whatever. These luxurious buildings seem to have reached their full limits; we criticise the architect also for having paid too much attention in his plan (Figs. 4, 4a, 5) to certain old construction, the patching-up of which was quite as costly as rebuilding would have been. This undue respect for the masonry work and for the henceforth legendary old halls of the former station has destroyed the harmony of the plan, produced the peculiar arrangement of the waiting-rooms for passengers on trunk lines and has led also to a disposition of curved train-stalls where there are not two trusses alike, a costly disposition and one not to be commended; and again, the ticket-windows for suburban travel are placed unfortunately in an entirely new part of the structure in front of the Salle des Pas-Perdus, on a level with the tracks; so that passengers going to the waiting-rooms meet those on the way to buy their tickets. On the other hand, all arrangements for the service of travellers with baggage are most excellent; the rooms are disposed on a level with the Rue Saint-Lazare, so that the Salle des Pas-Perdus is not obstructed by baggage-porters. The suburban platforms communicate with the basement by stairways which furnish an easy exit.

Trains on the trunk lines enter another part of the station, on the side toward the Rue d'Amsterdam; the carriage-stand court is too small.

The local administration offices are above the waiting-rooms. The central offices are on the entrance court, over the stairways, and finally in buildings situated on the Rue de Rome.

As for the express service, it is located near the Pont de l'Europe, and, by a system of elevators, loaded cars can be lifted from the level of the tracks to that of the unloading platforms.

To sum up, although these new buildings represent a considerable improvement on the old condition of things, they are not without their imperfections; but the severest strictures that might be made bear on the working of the roads themselves, and have, therefore, no place here.

Much fault has been found with the selection of the site for the Hôtel Terminus which conceals the façade of the station



Fig. 6. Charing Cross Station, London.

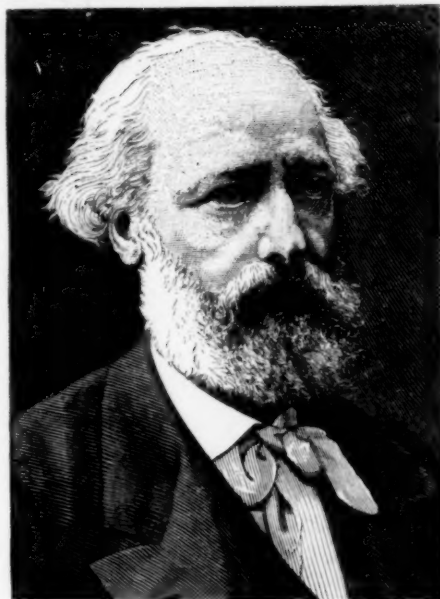
and cuts it in two, while it would have been easy to adopt the plan followed at Charing Cross, in London (Fig. 6) where the hotel occupies the left wing of the station itself.¹

[To be continued.]

ELECTRIC-LIGHTS FOR LIGHTHOUSES.—In the good old times when oil was used in lighthouses, a 6,000 candle-power lamp was considered immense. The latest electric-light house built in France (Hève, at Havre) will have the power of 2,500,000 candles — *New York Evening Post*.

¹ While we are on this subject, let us remind the reader that at Charing Cross, as at most other English stations, carriages are found on the arrival of trains at the same pavement where the passengers and baggage are set down. This is certainly a great convenience, but it would necessitate in France a change in the method of registering baggage.

SIDE LIGHTS ON VIOLLET-LE-DUC.²—II.



E. Viollet-le-Duc. From *Le Monde Illustré*.

EUGÈNE EMMANUEL VIOLLET-LE-DUC, born at Paris, January 27, 1814, died at his chalet, La Vedette, at Lauzanne, September 17, 1879. He was a Grand Cross of the Legion of Honor. In his "*Entretiens sur l'Architecture*," he gives us a typical view of his infancy. It is the description of one of the forms in which art makes itself felt on the mind, and the following anecdote is an example of it, which he drew from his own experience:

"I yet retain the recollection of a childish emotion, still quick and fresh to-day in my mind, although the occurrence must have taken place at an age when one usually retains but vague remembrances. I was often left to the care of an old domestic, who made me walk wherever his own fancy led him. One day he made me enter the Church of Notre Dame, taking me up in his arms because the crowd was great. The Cathedral was draped in black. My eyes fixed themselves on the stained-glass in the southern rose-window, through which were passing the sun's rays colored with the most brilliant hues. I still see before me the place where we were stopped by the crowd. All at once the grand organ made itself heard, and for me it was the rose-window which was before my eyes which was actually singing. My old guide vainly tried to undeceive me. Under this impression, growing more and more strong, I came at length to believe that a certain panel in the window produced the bass note, while a certain other one produced the treble, and I was seized with such terror that he had to lead me out."

In this does he not describe himself? Does he not depict his own temperament by this single impression? And it is under such auspices as these that this child became an architect. But for the architect, it is not only needful to have impressions. There must be a practical side, in order to be able to carry them into execution. These impressions Viollet-le-Duc possessed in the highest degree, and translated them with the talent of an extraordinary draughtsman. Who is ignorant of the prodigious facility in drawing which he enjoyed, and what artist is there who has not been stupefied at the rapidity of his workmanship? The engravers Sauvageot and Gaucherel and the great painter Gérôme, while sketching with Viollet-le-Duc, used to say, "Scarcely had we selected our subject and were ready to begin, when Viollet-le-Duc was seen coming towards us, his sketch-book open, his sketch precise, correct, finished in every respect, and saying to us, 'Have you seen this bit as I saw it?' Then," says Gérôme, "we used to shut up our note-books without drawing a single line, and pick out another position, where the same scene was repeated." "Drawing," Viollet-le-Duc tells us, in his "*Reponse à M. Vitet*," "is something other than the mere handling of the pencil and the material representation of forms and bodies. It is thought, conception, character;" and then, further on, "There is only one way of learning to draw, namely, to learn to see Nature, to learn to see her under her most lofty aspect, to learn to choose, to contract the habit of engraving upon the brain whatever one observes, and rendering the hand docile enough to reproduce on paper whatever impression has been made by observation. If we pass on to practice, there is," continues Viollet-le-Duc, "but a single method, to wit, that of developing the sense of observation in the pupil, of opening his intelligence to the always new spectacle which Nature presents, of analyzing the appearances which she offers, of decomposing the ensemble that she furnishes, of making separate studies of all the details, but insisting upon heed being paid to their relative

² Extracted from "*Viollet-le-Duc et Alphonse au Siège de Paris*" by Massillon Rouvet, Paris. Librairies Imprimeries Reunies, 1892. Continued from No. 905, page 67.

places and values. Take care that, through practice, drawing becomes a means of constant translation of the thought or impression, just as the word or the pen translates the thought or impression of the orator or the man-of-letters."

This is the way in which Viollet-le-Duc understood and practised drawing. We have even had the honor of seeing him putting his own counsels into practice. At the moment he was going on with the publication of his "*Dictionnaire du Mobilier*," interrupted by the war, and was drawing in reverse, without hesitation or correction, the wonderful engravings on the wood itself, which the engraver then took away to cut. He had before him neither sketches nor preparatory drawings. It was without hesitation, without misgiving (the light white coating covering the wood would not have admitted much rubbing and scraping) that all his drawing was executed, the leading lines first and next the details with the shadows and the true values. The artist, far from being fatigued, seemed to be merely amusing himself as he drew. My eyes, fixed on the point of his pencil, I used hardly dare draw a breath. I was overcome by this facility, and it was always with a new sensation of pleasure that I saw him make a drawing. One day, moved more than usual by his expertness (he was then drawing Plate 8 of the fifth volume), I made known to him my feelings, and asked how he could, without sketches or models, make drawings so exact, so firm, and with values and tones so well understood. "This confounds me," I said. "When," replied he, "you wish to draw something, you think of it I suppose, and in your brain is formed a very clear image of that which you desire. Well, when you have summoned this image, where is the difficulty in bringing it to the point of your pencil, and following it out with the contours and shadows?" "But," said I, "then you trace, or you draw with the camera-lucida." "You are right," he said. "The camera-lucida is the brain. It is the conception which comes before the drawing." He did not stop his work while giving me this explanation, except to look into space for the fugitive image, and to indicate to me the movement of summoning it to the point of his pencil. He continued the work on his plate, and half an hour after having begun it, the work was ready for the engraver.

Such was Viollet-le-Duc, draughtsman, observer, creator, in a word an artist in the broadest acceptance of the word. Endowed with such qualities as these, he was seen as a young man tramping with slender baggage, his album and pencil, through Italy, Spain, Portugal, Germany, and so on, but particularly all over France. Not a commune, not a country town, not even an interesting farm was there that he did not seek out or which he did not sketch. Here a console or a capital, there a cornice and frieze, or a bas-relief; farther on a cross, a ruin, or an *ensemble*. To these sketches, so firm, so clear, he added written notes and the date. Then after each trip, when he had returned home, he methodically examined this artistic harvest and classified it. What was he going to do with it all? He gave himself no trouble about that. He sought only to study Nature. He desired to make comparisons. He wished to reason upon his art; and in order to reason about and comprehend it, he must have as many examples as possible. This work of analysis unveiled to him our different schools of architecture, their limits, their characteristics, the rules of their construction and decoration, and at length gave birth to that publication which is still unique, the "*Dictionnaire Raisonné de l'Architecture Française*." That monument, erected in honor of our national art, — an art misunderstood and badly used up to that time, made despicable by that legendary, inappropriate word "*gothique*," that is to say, "*barbarian*." Thus Viollet-le-Duc made known the history of France, through its civil, religious and military architecture.

It is thus that the apostle or master, the man of genius, reveals himself everywhere. Those who followed his works pressed upon his footsteps. Eminent architects, his contemporaries and friends, having already passed the age when they could be called pupils, nevertheless enrolled themselves under that name. He made deductions, which seemed absurd even for architects, become clear, precise and easily understood by ordinary men. It is not only the architect or archaeologist who understands and possesses one of the thirty thousand copies of the "*Dictionnaire*," it is also the well-read man, the ordinary householder, the entire public, in a word. To be able to discuss architecture and construction is no longer restricted to a special class. Everybody is now permitted to talk about it.

What pressure there was to induce Viollet-le-Duc to give instruction in his art? With the exception of the Académie des Beaux-Arts, everybody begged him to teach it. But a determined contest against the master was set up by those of his contemporaries who did not follow him. They classified him; they put him in a pen by himself; they said "he is a 'Gothic' architect; he wishes to teach us 'Gothic' architecture; he wishes to bring us back to that barbarous art." The pupils of the academic architects espoused the quarrels of their masters and chucked sous at him at his first lecture. The chair was only occupied once; but, thanks to this opposition, the lecture-course became much larger and far more complete. It was no longer addressed to the young architects. It was for the public that he wrote his "*Entretiens sur l'Architecture*," and the public admire it.

"I love study," said he, "and I detest strife." And farther on he said, "Examine everything," said St. Paul, "and remember that which is good." That is my motto, and I shall be faithful to it. Those who do not know me have attacked what they do me the honor to call my 'doctrine'. I will only answer by a little instruction.

If it holds good, nobody hereafter will give themselves any concern about the anticipatory criticisms directed against this teaching, or the *procès de tendance* that are brought against me. If one must be forgotten like so many other things, what is the use of answering attacks directed against a doctrine of which no one is going to retain a remembrance?"

Nevertheless, two responses in pamphlet-form were made to refute interested criticisms, one of which was addressed to M. Vitet, the eminent Academician. But without going into this, it may be said that this instruction, for those who did not believe in it, was revolutionary and radical, but in spite of this, or, perhaps, because of it, the master held his ground. The furrow opened by him became the bed of an impetuous torrent.

It is difficult to say whether Viollet-le-Duc excelled more in his architectural creations, so original, so sincere, so well thought out and genial, than in his restorations, which, in the eyes of the public, are above all praise. This is easy to understand. The public can only judge of the execution. Technical men who can appreciate the other side are still too near his time and generation to exalt him; but the day will surely come to it, as we thoroughly believe. The work will live longer than the man. It will remain like the renaissance of an art engulfed during many years. His admirable restorations are too many in number to cite them all. Nevertheless, we will mention the first one that he carried out, the Church at Vézelay. He began it with an extraordinary amount of assurance, and achieved a remarkable success. Then Notre Dame de Paris, where numberless difficulties might well occupy the entire life of an architect, was restored with a happiness and activity which astonished his contemporaries. Pierrefonds, a formless mass of ruins, emerging from the midst of underbrush, was comprehended, discovered, redesigned and brought to life again from under the soil, which had become level about its walls. The ramparts of Carcassonne, those of Avignon, the Cathedral of Rheims, that queen of French cathedrals, the Cathedrals of St. Denis, of St. Cernin of Toulouse, of Clermont-Ferrand, and twenty other works, were carried on abreast by him, unaided: for he made all his own drawings, his apparatus, his details, his cartoons for the painters. He had no office full of designers and assistants. At each structure undergoing restoration he spent several days, during which he would draw out whatever was called for by the condition of the work. Each sculptor received his definitely determined drawing, accurately figured in every particular, and in the same way the decorator received his model. Once his explanations stated and understood, he went on to the next field of work. Returned home, he would draw upon wood for his publications, and those marvellous compositions of jewel-work, like the altar for the Cathedral at Clermont-Ferrand, or he worked at his writings, so full of vitality and so attractive, or he made his tours as Inspector-General of Diocesan Buildings, or prepared his reports for the Commission of Historical Monuments, and during ten years he prepared for and delivered his lectures on composition at the École Nationale de Dessin.

Viollet-le-Duc was not satisfied to be an architect and artist. He was a lecturer, a publicist held in high esteem and a popular writer most pleasant to read. It seems hardly necessary to mention his publications prepared for young people — books that are charming and full of instruction. It is the "*Habitation Humaine*" in which, from a broadly philosophical point-of-view, he causes to pass before us the constructions of all races with their principles and types; the "*Histoire d'une Maison*," is a story full of practical advice; in the accounts of a "*Hôtel de Ville*" and of a "*Cathedral*," the struggles for municipal freedom are disclosed, while explaining the typical transformations undergone by these edifices in France; the "*Histoire d'une Fortresse*," in which are described the military art of attack and advance, the arms and engines, forgotten in our day, but in which lie modern science and future theories, is still useful to consult when considering our threatened frontiers; and the "*Histoire d'un Dessinateur*," with its drawings so artistically rendered, is the "*Emile*" of instruction in industrial art.

But for him theory was not the only thing in the domain of military art. What did he not do at the siege of Paris? This side of his character, unknown to all, we are going to develop in this book, and it will be a task not the least requiring care, not the least perilous to undertake.

Mt. Blanc excited his curiosity and study. Is not the following phrase, which we quote, a veritable prophecy against himself, for nothing will free us of the thought that these repeated excursions at fifty degrees difference of temperature did not advance the fatal *dénouement*: "In these vast laboratories of the upper world, man is an intruder. Everything that surrounds him seems to say, 'What do you do here? Return to your fields, to your rivers, to your valleys, for you were made to live there. If you do not, then only find fault with yourself if misfortune befalls you. In these upper regions we obey laws that are too imperious for your puny self. Go, dig dikes along the rivers, barriers to hold back the waters of your rivulets, cast up promontories of stone upon the coast, pierce the bases of mountains, so as to pass from one valley into another. Go, it is allowed you to do all these things. Here you are nothing, you can do nothing. Leave us.'"

All these things paint the portrait of the real Viollet-le-Duc — his infant self before the singing stained-glass window; his youth devoted to observation, his young manhood spent in travelling over the whole continent, sketching and taking notes, especially in France;

his manhood spent in sorting out the relics of five or six centuries of architecture, coördinating them, knitting them together one with another without difficulty, without shock, deducing from them changeless principles unknown to that time, incidentally discovering unknown engines, broken arms and armor, and by the aid of certain gold-foil obtained from sepulchres, by the aid of almost indecipherable manuscripts and fables resuscitating the society of those times, with its usages and customs. This master of modern art causes to live again in his stone bas-reliefs, put together with admirable synthesis, the histories, the customs, the means of defence and the methods of attack that passed before him in a thousand naïve and poetic legends. And, if there is call for it, he will create a legend to show you how the education of a prince of the fourteenth century was conducted. Or he will compose the "*Fable of the fox and the hen*," that simple story, so well interpreted by the master's brush before being reproduced in stone. As for his compositions, is it more than necessary to mention the *flèche* of Notre Dame de Paris? so admirable in construction and so elegant that to describe it would be as if to re-tell the tales of the Arabian Nights; but a true story, since it has an existence.

Everything points him out to us as an uncommon man, an incomparable one. His innovating science particularly proceeded from his perfect knowledge of the style and the origin of methods of construction amongst all races. How many times did we have the pleasure of seeing him develop his theories of styles, at once so simple and so clear! He was in no degree patronizing, but like an impeccable guiding philosopher who aided you with an all-supporting staff, knew how in each case to indicate the salient character.

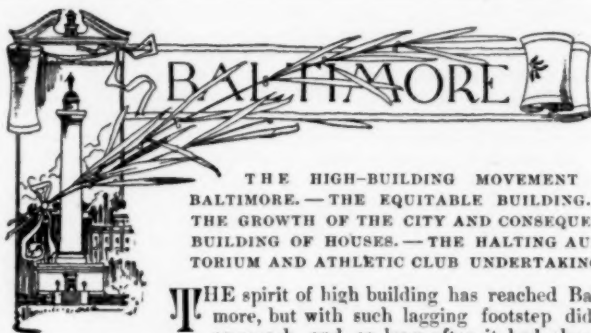
Viollet-le-Duc, in the midst of all his constructive work, his researches, his writings, his constant contentions, his remarkable works on the historical monuments, every morning received his confrères — artists, engineers, contractors, manufacturers, inventors — who consulted him, and whom he often saw for the first time, and by his advice and his opportune sketches simplified their tasks. The Municipal Council of Paris, who counted him amongst their members, knew how to appreciate his well-matured, practical and precise reports, and appointed him to make a report whenever it was possible; and just as in the case of his geological studies on Mt. Blanc, nobody else had a finger in them. His prodigious fecundity, his ability, his capacity for work, allowed him to carry all these things on abreast. One is actually taken aback, and one now perceives that this innovator has opened all alone a path which is only at its beginning, and which will be profitable in the end, instruction bringing about a revolution in the art of construction. This revolution is clearly established in his "*Entretiens sur l'Architecture*." In the first volume he reviews the constructions of every race; in the second, taking the essence of their principles, he derives new conceptions full of originality and good practical sense.

I had not the honor of knowing Viollet-le-Duc when certain pages of his second volume happened to fall under my eye. I read them over more than ten times consecutively, astonished to understand, to clearly comprehend for the first time a language of such clearness, in which good sense and reason dictated the laws. This instruction is, moreover, opposed to that in vogue up to that time, the point of departure of which is fantasy. This, according to Viollet-le-Duc, is, "only the appanage of the epochs of the Decadence." That which he taught started from the opposite principle: "To satisfy the needs, to conform to the economic and social exigencies of the place in which one is to build; that is to say, one can produce a work of art with the resources of the country whatever they may be. To do this, employ the materials judiciously; make the decoration proceed from the construction, which is always truthful and sincere; if you employ iron, wood, marble, rubble, do not disguise it; if you add sculpture, let it be appropriate in motive to the place and the use it is put to. To vindicate logic and reason, to make closer tie between structure and form are principles which must never be lost sight of."

How many times has he repeated, when we asked his advice, such aphorisms as these: "Wood, which has fibres, straight filaments, cannot be cut on a curve, or its resistance is destroyed. Sculpture in metal allows greater delicacy than sculpture in marble or a less-resisting stone. These principles, as you will see by studying the constructions of the Middle Ages in France are unchangeable and universal. With them design in Russian, Egyptian, Greek, Roman, etc."

The crowning work of this instruction will be the Musée du Trocadéro, the creation and posthumous work of Viollet-le-Duc. Gather together the finest Greek and Roman works, place them side by side with French works of the epochs corresponding to their development and far from these latter losing in the comparison quite the contrary result is produced. It was more than revolution. It was to audaciously turn back the current of things already attempted and beyond discussion. It was nothing more than to make the river flow backward to its source. It was not enough to secure drawings and photographs, as they might be accused of inexactitude. It was necessary to have the objects themselves, the full-size monuments. This is the dream realized to-day where French architecture at one stroke takes the first rank. Not only this instruction is practical, but it also discloses a sentiment of patriotism with which Viollet-le-Duc was penetrated and which he alone was capable of realizing. It is in this way that the work of Viollet-le-Duc should be studied, and we do not believe that it can be understood in any other manner.

[To be continued.]



THE HIGH-BUILDING MOVEMENT IN BALTIMORE.—THE EQUITABLE BUILDING.—THE GROWTH OF THE CITY AND CONSEQUENT BUILDING OF HOUSES.—THE HALTING AUDITORIUM AND ATHLETIC CLUB UNDERTAKINGS.

THE spirit of high building has reached Baltimore, but with such lagging footstep did it approach, and so long after it had already become a familiar and essential feature in even much smaller cities, that, did we not unfortunately feel more certain that a lack of confidence and enterprise had much more to do with the matter, we might almost have felt that a sense of discretion and fitness hesitated to thrust the new and doubtful innovation upon us, with our unrestrained capacity for lateral extension, and our old existing types of low and broad architecture. However, it is present with us now, in a mild form comparatively to the prevalence of the epidemic in other places, but with most of its important features; and while the lateness of its arrival may bring the mitigating circumstance that fewer of the abnormally high buildings will be erected before a reaction of opinion and restricting ordinances begin to control excessive height, it may also have the unfortunate result that those which shall have already sprung into existence will stand isolated, conspicuous and hideous, destroying all symmetry and uniformity, and lacking even the somewhat impressive effect of continuous and uniform bigness that may be attained in the streets of some other cities. The marked architectural feature of last year in Baltimore was undoubtedly the advent of this style, as shown by several large office and bank buildings and one or two apartment-houses, and the one building that is unquestionably more worthy of note than the others is "The Equitable," on the site of the old Barnum's Hotel. This building, as a type, would easily be ranked among the other best ones of the same class, of about similar dimensions and cost, erected in the last few years in many of our larger cities, the conditions to be met resulting in a good deal of similarity of arrangement and of exterior design, with like merits and defects, to large extent, appearing in all of them. The form of construction is, of course, the usual iron and steel skeleton method that now universally obtains. Two points are worthy of note in regard to the contractor's work: one being that among the eight or ten contractors who were the original bidders the average of those from out of town was about one hundred thousand dollars less than that of the Baltimore men, on a total cost of less than one million; another point attracting public attention was the diligence and systematic method with which the work was done, and the absence of obstruction outside the lines of the building itself, in favorable contrast with the inconvenient occupation of a large portion of the adjacent street in most cases where work of any extent is in progress. The building is a ten-story structure of granite, buff brick and terra-cotta, an agreeable mass of color, with as satisfactory disposition of solids and openings as the requirements of a huge office-building usually admit of, and with rich Renaissance details, appropriately treated in the different materials of both exterior and interior. As to the strictly architectural impression produced — the result seems very much the same as that of other similar buildings, even the most successful, throughout the country. The lightness of walls that are only screen-work, filling in the construction, and not the real building itself, produces shallow reveals and lack of shadow about all openings that give a general appearance of thinness and weakness, the more evident the larger the building. The difficulty of designing a cornice as a grand crowning feature in proper proportion to the immense wall-height below it, and to admit of the practical requirements of the upper story, is also felt, as well as the question of varying the exterior treatment of so many similar stories with any intelligent reason that may not seem a mere fancy, and with a design that will take its proper place in the whole scheme. The substitution of numerous elevators for a grand staircase in buildings of this class is certainly the loss of a great architectural feature, which ages of tradition and a certain sense of fitness and completeness still call for, in the name of Architecture and Art, and refuse to be satisfied by the replies of mechanical theory and practice, and, indeed, the extremely subordinate place to which the staircase in many of these buildings is relegated appears to us, from the most practical point-of-view, almost a criminal error, in the event of possible emergencies when the elevators would be almost useless.

Let us award to this style of building — "style," if we must, *faute de mieux* — all possible merit that the best of them can claim as actually good, because actually representing the spirit of the age. Is this a real architectural merit that we are recognizing after all, or is it not rather that the spirit of the age does not ask for architecture but only engineering, with the largest financial returns for the amount expended and space occupied, and only such architectural features superficially applied as will satisfy the vulgar taste for ornament and ostentation, equally satisfactory to the majority of the public

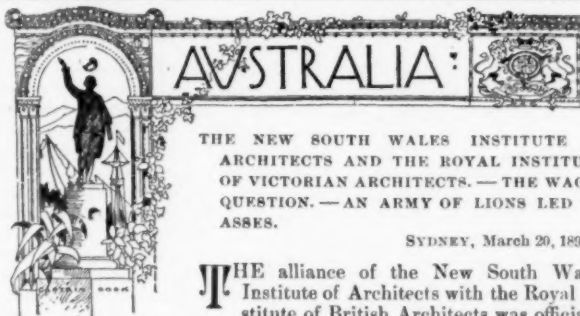
when used by an ignorant charlatan or when designed by a cultivated and intelligent artist? If truth is the standard to judge by, then the best of these tall buildings are those where these falsely-applied architectural proportions to the wall-surface are frankly abandoned—as being “an outward and visible sign of an inward and spiritual grace” of a real construction—and where the wall-surfaces that fill-in the spaces of the concealed metal structure are simply pierced with openings that sufficiently give access and light to the interior and tell the true story of the building’s purpose. We do not say that appropriate ornament may not be found to give beauty to these wall-surfaces and openings, or that the principal perpendicular and horizontal lines of the structure beneath might not be, to a certain extent, indicated on the exterior in the true spirit of design. Nor do we say that this method of construction is not, from many points-of-view, a very excellent practical way of housing the people of the nineteenth century, with a certain impressive effect about it from mere bigness, but we must admit that if all that which we have learned to call Architecture, from prehistoric times till to-day, and which attained its epitome of perfect beauty of fitness and proportion in Greece, is one thing, then the modern ten or twenty story building is another; if Athens and Rome and the Middle Ages and the Renaissance and Paris is one thing, in their monumental dignity, symmetry and repose, then New York and Chicago and the spirit of the age is something else which is not dignity, symmetry nor repose; nor, in spite of apparently vast new sources of knowledge, can the average humanity of to-day claim any great physical, intellectual or moral superiority, or greater capacity for real happiness, or any nearer approach to heaven on the top of the Eiffel Tower than in the shadow of the Parthenon.

Baltimore will probably never have a rival to either of these typical expressions of their times, but she is said to have expended fifteen million dollars in her building-operations for the year 1892,—in no one edifice specially worthy of note, beyond the one already mentioned, but, to help house her thirty-six thousand new inhabitants gained in the same year, she has built her usual number of small and characterless dwellings, with here and there an individual house cropping up, marked by the effort to assert itself in somewhat larger dimensions and more expensive materials—and a very large amount of carved ornamentation. The majority of these designs seem to come from the same source, and, while not degenerating to the point of an “aberration,” are without artistic reserve or architectural interest; the florid ornamentation is applied as an after-thought and not as an essential part of a scheme, and with a painful disregard of the proper scale or application of details. These houses, however, seem to meet with popular approval.

Among the buildings whose completion will probably mark the current year, two that are prominent are the Hebrew synagogue on Eutaw Place, and the “Stafford” apartment-house on Washington Place, both among the largest and most expensive of the structures now in progress, but still too incomplete to admit of much comment. The “Auditorium,” or new Music-Hall, scheme, that started under an auspicious beginning, a satisfactory competition, has not continued to progress so favorably. It was found that the accepted design could not, by a very large amount, be built for the sum stipulated: no one with any accurate knowledge or experience in such matters ever supposed it could. Things, therefore, remained *in statu quo*, while efforts were made to raise a number of additional thousands of dollars, and the effort is apparently not yet successful. Moreover, the design, which is now shown to the public in a very attractive sketch, and which makes a very good music-hall of moderate size, and a very architectural building, does not comply with the conditions named in the competition, as to either arrangement or dimensions, and, while appearing as a pretty picture in the sketch, the peculiar form of the adjacent lots on either side, with the probable character of the future improvement being entirely ignored, the unfitness of the design for the location does not appear. Meanwhile the proposed site remains in use as a lumber-yard and Baltimore waits impatiently for its greatly-needed auditorium.

Another important scheme, for which the initiatory steps were taken some time ago with flattering prospects of completion, and which still hangs in the balance between success and failure, is the proposed building for the Athletic Club. The preliminary drawings were already made and an option secured on a very desirable site, while subscriptions to stock were being secured, but as the committee made it one of the conditions that work should not be begun, nor any portion of the money used, until a certain amount of stock was taken and that amount never having been quite reached, further proceedings are awaiting further subscriptions, while the Baltimore athletes with their friends in adversity, the musicians, are mutually condoling with each other and striving to possess their souls in patience.

THE STUDY OF THE ARTS IN ENGLAND.—Gradually we are wiping out the reproach, thrown at us as a nation in the past, that we do not care for art. According to the last report of the Science and Art Department, there were in existence under its auspices in 1892 no fewer than 207 art schools, with 47,316 art students; 1,063 art classes, with 52,715 students; and 6,212 elementary schools, at which 1,170,340 children are taught drawing. Considering that Great Britain, in both American as well as European eyes, is a very insignificant sort of a place at best, the importance of the preceding figures should be all the more striking.—*London Correspondence of the Collector.*



THE NEW SOUTH WALES INSTITUTE OF ARCHITECTS AND THE ROYAL INSTITUTE OF VICTORIAN ARCHITECTS.—THE WAGES QUESTION.—AN ARMY OF LIONS LED BY ASSES.

SYDNEY, March 20, 1893.

THE alliance of the New South Wales Institute of Architects with the Royal Institute of British Architects was officially announced by the president of the former Institute at a largely-attended meeting last week. This alliance is probably intended to act as a counterblast to the somewhat presumptuous position aspired to by the Institute in Victoria; which, according to the recent utterances of its retiring president, aspires to the leadership in architectural matters throughout Australia. The jealousy which exists between Victoria and New South Wales has become a by-word; it has hitherto proved a bar to the federation of the colonies, and it seems, unfortunately, likely to exist for many a long year yet. One who is virtually a cosmopolitan may be pardoned, perhaps, if he records it as his opinion that the fault lies mainly at the door of the southern colony. A natural sense of elation at the marvellous progress of their colony has caused the Victorians to enormously magnify their own importance, and they are only now realizing the fact that it is possible to go ahead too quickly. But, at any rate, our petty jealousies in small things have interfered, and continue to interfere, with our coöperation in greater ones; and the realization of the dream of an Australian Institute of Architects is, perhaps, farther off than the political federation of the Australian colonies. The only claim the Royal Institute of Victorian Architects can advance in support of its claim to preëminence is its comparatively large membership-roll. The date of its foundation is practically identical with that of the Institute in the elder colony; and it certainly cannot point to any work which will bear comparison with the excellent Code of Professional Practices and Charges issued by the New South Wales Institute.

The Builders' and Contractors' Association of New South Wales have at last recognized that they must, perforce, comply with the inexorable law of supply and demand, and they have accordingly tabled a motion for the reduction of wages. As I have before mentioned, the wages in the building-trades are precisely the same now as they were five years ago, when everything was prosperous and buildings were being erected everywhere; and now—though it is stated that during last month fully 4,000 persons received relief from the State and the various charitable institutions, and though the building-trade is practically moribund, the trade-unions will not allow those associated with them to accept less than the standard rate of wages fixed by themselves. Only last year the Government offered laborer's work to the unemployed at the rate of six shillings per day, and, though the men were clamoring for bread at the time, they indignantly refused the offer. The Australian workman is, individually, generally well-informed, and intelligent above the average, but collectively he is the most stupid and unreasoning being imaginable. “An army of lions led by asses” was the phrase applied to those engaged in the great maritime strike here, a couple of years ago; and it is perfectly marvellous to witness the unquestioning way in which the lions follow where the asses lead.

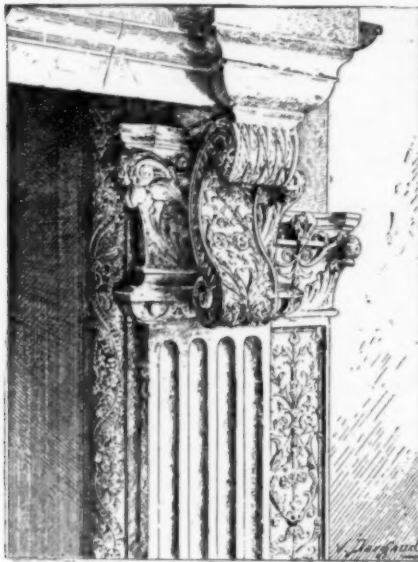
There is little being done in Sydney—or, in fact, in Australia—so far as architecture is concerned.

It is recorded that a critic once said of a book he had been asked to review, that he had found many good and original things in it; but, unfortunately, he went on to say, what was good was not original, and what was original was not good. The same criticism might, with perfect justice, be applied to some of our recent and most ambitious attempts in the building way. An excellent and picturesque range of shops and offices now adorns one of the principal of our Sydney streets, which would, I am afraid, seem strangely familiar to Mr. Colecutt, if the architect of the Imperial Institute should ever visit the antipodes; and another fine and later erection, not many miles from the General Post-office, would be greeted by the readers of the *American Architect* as an old friend. The architects concerned can hardly hope to hoodwink any one as to the real authorship of these designs, and it is, therefore, hard to account for these unblushing attempts at deception. The architects of both the buildings referred to have already given abundant evidence of their ability to produce good original work, and one would fancy that they would be more jealous of the reputations they have acquired.

It is hard to be forced to agree in anything with the omniscient Lord Grimthorpe; but one is compelled to admit that in Australia, at least, architecture is not always looked upon as an art or a profession, but as a trade; and *kudos* seems to be ranked infinitely lower than commission, in the minds of some of our architects.

A LARGE TUSK.—A mammoth tusk was recently found in a mine at Schöningen, Brunswick, which, although broken off at the point, measures twelve feet in length and two feet in circumference, and weighs 224 pounds.—*Exchange.*

A GOVERNMENT BUREAU OF PUBLIC BUILDING.



Detail of Fireplace, Hotel Lallemand, Bourges, France.
From *La Construction Moderne*.

A BILL has recently been enacted by the United States Congress which provides for an open competition among the architects of the country in furnishing plans for the design and construction of the public buildings, heretofore erected under the sole direction of the Supervising Architect of the Treasury. This is a step of no little significance, whether regarded in the light of public economy or of the advancement of the artistic culture of the American people. It is particularly timely just now, when the necessity of new public buildings in Washington is becoming an urgent

one, and measures will soon have to be enacted on which will depend very largely the future architectural growth and aspect of the national capital.

When it was stated in the Senate not long ago by Senator Vest that the Government is now paying rent annually to the extent of some \$180,000 for office-room outside of the Department Buildings, the question naturally arose, How comes it that a country so wealthy as the United States and possessing a capital city of such magnificent dimensions cannot erect its own office-buildings, but must put up with inconvenient accommodations, including many that are characterized as unhealthy and unsafe, such as can be hired here and there from private owners? It is not strange that another senator called attention to the anomaly exhibited by the United States Government voting \$100,000 for a post-office in a rural town of 3,000 inhabitants and at the same time paying rent for its own office-accommodation in the capital city of the nation.

It is quite evident that the policy of renting Government office-rooms will not be regarded much longer as consistent with national dignity or public economy. Hence must arise and is already arising a movement for the erection of new Government buildings in Washington, and this movement, having, as it will have, an immediate and controlling effect on the architecture of Washington and the aspect of the city's chief thoroughfares for generations to come, cannot be regarded otherwise than with deep concern by all who feel a patriotic pride in the appearance of the nation's capital city.

To regard the matter of the erection of public buildings in Washington as one that may settle itself piecemeal as each demand for further accommodation presents itself is not in keeping with the judicious forethought which belongs everywhere to wise legislation. Least of all does not such a course seem consistent with the Government of a people favored as our nation is with a capital originally laid out by the Founder of the Republic, and owing its present beauty and future promise to the wise and magnificent project conceived in his mind. One has but to imagine what the city might now have become without Washington's plan, and left to the chances of speculation and trade, and the conclusion is clear as to what risk the city now incurs in its coming architectural development should the Government now omit to exercise a similar foresight in projecting the future building of the city so far, at least, as concerns the location and style of the public buildings and the general architectural and ornamental aspect of our great public thoroughfares and spaces. Unless some such wise forethought is exercised by Congress now, before the most suitable sites for Government edifices are improved with expensive private structures, erected with no view to unity or breadth of design, or before the several new Department offices are located here and there, wherever an attractive real-estate bargain seems to offer, the result will be either the loss for long years to come of all that prestige and dignity which Washington might have claimed among the cities of our country in the beauty and fitness of its architecture, or else the ultimate purchase by the Government of these preoccupied sites and the reconstruction of these buildings at an enormous sacrifice of the people's money.

It is but just to the people of this country, whose money is to be spent on these buildings and who all have a patriotic pride in the worthy development of their national Capital, that their representatives in Congress should feel the responsibility that rests on them for that economy that consists not so much in the withholding of money as in the exercising of a wise foresight that shall secure its

expenditure to the best result. Buildings erected by the Government at immense cost, but of unworthy design, and calculated to bring ridicule on our national culture and to be a means of constantly depraving instead of elevating the public taste, are simply a gross abuse of the public trust such as no enlightened nation should submit to; and yet our people have had to helplessly face such proceedings more than once, and to meekly pay over the money to foot the bills. The same is true of public monuments conspicuously placed, whether on streets and parks or in the corridors of the Capitol, on whose merit there has been no competent judgment passed as to either the design or the location. The people pay their money and bear the ridicule, and draw a sigh of relief that the thing is no worse than it is, and at the same time are exhorted to admire the diligence and sound common-sense of their legislators in Congress, who have no time to devote to such "trivial matters" as architecture and art. But why should the American citizen be at such disadvantage beside the Englishman, Frenchman or German, who knows that no public building or monument could be erected in any public space in those countries without passing the ordeal of a criticism by a Government Art Commission or Bureau of Public Works, which calls into exercise the best professional skill the nation possesses? Is that a genuine economy, is it even an honest dealing with the people's money, that allows the vast sums appropriated for public buildings, not for Washington only, but for the whole country, to be under the control, practically, of a single Supervising Architect of the Treasury, the emolument of whose office is so small that no architect of prominence in the country could afford to accept it, and yet to whose brain and those of his subordinate draughtsmen the country must look for the architectural invention which shall give shape to the Government buildings of half a continent? This is not a matter that our legislators are justified in neglecting on the plea that greater practical questions preclude them from giving attention to such minor details. It is no minor detail with a man who is building a house for himself at a large cost to secure the very best design and location for his house; and if he is aware that his own taste and education are defective, he is all the more careful, if he is a man of wise economy, to secure the judgment of a skilled and accredited architect.

On what principle of justice or economy can Congress do otherwise in the expenditure year after year of millions of dollars of the people's money? And how can it administer such a vast expenditure as that which is required for public buildings of the United States without a suitable bureau or commission composed of the ablest men the country affords, who shall perform a service for the American taxpayers analogous to that which the Office of Works and Public Buildings does for the English nation and the Ministry of Fine Arts does for the Republic of France? It is not the individual private notion of a few persons here and there that sees here a great public need, such as a truly economical Congress, and one legislating for the real interests of the people ought to give serious attention to. The creation of a Commission of Control has been urged upon Congress in recent years by some of our wisest and most experienced legislators.

In 1886 Senator Hoar introduced and carried through the Senate a bill creating a commission which should pass judgment on designs of buildings and monuments to be erected, and on works of art to be purchased by the Government. The bill failed to find sufficient support in the House. Meanwhile, the usual haphazard and wasteful policy has been pursued, resulting in mortifying blunders and ridiculous expenditures which space does not admit of here enumerating, but of which the shifting about of the location of the Lafayette Monument, causing the construction of two costly foundations within the space of six months, is only the most recent example. So glaring in the eyes of intelligent people is this offence becoming of having public buildings and monuments erected without their designs and location being first approved by adequate professional skill and taste, that already one of the States in the Union, Massachusetts, has taken the initiative steps looking to the creation of a State Art Commission. The city of Boston had already previously accomplished the same important end in its municipal jurisdiction, and has thus set an example worthy to be followed by our own Congress, whether as legislating for the nation at large or only for the capital city of Washington.

The Art Commission of the city of Boston which was brought into existence in the year 1890, consists of five members who hold their position *ex officio*. These five are: the Mayor of Boston, the Presidents of the Museum of Fine Arts, of the Boston Public Library, of the Massachusetts Institute of Technology and of the Boston Society of Architects, these members serving without pay. Their functions are confined to the exercise of the veto power, the enabling act declaring "that no statue, fountain, ornamental gateway, monument or memorial of any kind shall be erected in any public street, avenue, square, place, common, park, or municipal building in the city of Boston, unless the design and site for the same shall have been approved in writing by a majority of the commissioners."

In Senator Hoar's Bill which passed the United States Senate in 1886, the Commission was only enabled to pass judgment on such designs for buildings, monuments and works of art as should be submitted to them by Congress. The Commission was also in part constituted of members *ex officio*, and was to consist of the President of the United States, the Architect of the Capitol, the Engineer

Commissioner of the District of Columbia, the Librarian of Congress, and a certain number of sculptors and artists of acknowledged ability and two non-professional citizens skilled in matters of art. They were to be appointed by the President and to serve without pay. The Architect of the Capitol was to be the Secretary of the Commission.

These measures, while looking in the right direction, all fall short of what the United States Government needs; namely, a Bureau of Public Building, attached, it may be, to the Department of the Interior, but as complete in its establishment as the other Bureaus of that Department. It should be borne in mind that the function of this Bureau would be purely administrative; it would not interfere in any way with the legislation of Congress in regard to public buildings, the determining what building should be erected, or at what places or at what cost; nor would it abolish the work of the office of the Supervising Architect of the Treasury, but rather embrace this as one of its chief features. It would constitute a means of bringing out the best architectural ability of the nation through competitive designs for public buildings, of exercising a careful and skilful supervision over all the work being carried on by the Government and of preventing unworthy structures being erected and the wasting of the money of a generous people in the purchasing of bogus works of art. Finally such a Bureau could be made the instrument by Congress of securing the architectural development of the City of Washington upon a plan of broad magnificence, dignity and symmetry such as cannot be secured by any amount of random legislation at odd intervals, giving license to the ambitious ventures of any single Government employé or to spasmodic exhibitions of "economy" by some Congress bidding for votes. Such a Bureau should consist, of course, of practical engineers and architects, as well as of men of acknowledged judgment in works of art, and these should receive pay for their services proportionate to the time and labor required for the performance of their respective duties.

Mention was made above of the need of such a Bureau of Public Building as being an urgent one at the present time. This is in view of undertakings now in progress or likely to be begun in the immediate future, the direction of which will very considerably control the aspect of the Capital's most conspicuous avenue. Besides the Congressional Library and the District Post-office, buildings now under construction, there are bills before the present Congress for the erection of a new city-hall for the District of Columbia, and of a new building for the Government printing-office, the largest establishment of the kind in the world. The new District Post-office is located on an imposing site occupying an entire block on the south side of Pennsylvania Avenue at the intersection of D Street. The building is to be of granite, eight stories in height, with a tower. It will stand about midway on the nation's great thoroughfare leading from the classic porticos of the Capitol at the one extremity to the grave and beautiful front of the Treasury at the other. The building itself is wholly without ornament or grace, we might almost say devoid of style of any kind. Without condemning it in the least as a building suited for commercial or manufacturing purposes in a crowded business thoroughfare, one can hardly help feeling that here an opportunity has been lost for gracing our broad national avenue with a building of distinguished beauty, in harmony with the other Government buildings, and capable of lending itself to a comprehensive architectural scheme for the adornment of the entire avenue. We do not know who is immediately responsible for the selection of this design, but we cannot help regarding it as somewhat singular that the style of a building of such imposing dimensions and so conspicuously placed should be left to the choice of any single official of the Government, and decided upon without any opportunity being given for the hearing of suggestions or criticism from experts of the profession, or from the popular judgment.

In the erection of the District Office Buildings now contemplated and likely soon to be begun, it is probable that another central and spacious square on the south side of the avenue will be converted into a permanent and conspicuous architectural feature of the city. In considering the style to be adopted, will any regard be had to its combined effect with other buildings likely to follow, or to the possible architectural unity of the avenue as a whole? Such a unity can, of course, only be secured by the pursuance of some broad and comprehensive scheme which may worthily match in architectural grandeur the splendid design which Major L'Enfant furnished to General Washington for the laying out of the city. Among the plans suggested for this building is one which looks like a feeble imitation of the War, State and Navy Building, a style of architecture, which, whatever be its merits or demerits, is sufficiently represented by that extensive structure without needing a duplicate.

But the main question is not what style shall be adopted for this or that building that the government may be called on to erect, but what shall be the grand total effect aimed at in the building up of Washington as the capital city?

Shall there be any such final effect in view?

How can the vast sums of the people's money here to be expended in Government buildings be made to produce results that will compare most favorably with government architecture in the national capitals of other lands, and justly meet the demands of the patriotic pride which every American should feel?

The question will arise, if not for the present, then for some Congress soon to follow, of providing buildings for the now temporarily

and poorly housed Census, Education, Indian, Railroads, Geological, Labor and other Bureaus. Why should not the design for these buildings enter now into some comprehensive scheme whose realization is wholly feasible and economical, provided the scheme and its execution can be entrusted to a permanent and efficient board or bureau, and not left to the hazard of changing administrations and occasional political jobbing?

A series of buildings of the dimensions of the Patent Office alone, would, if arranged continuously in a single façade instead of being built into a quadrangle, occupy the front of four entire squares on Pennsylvania Avenue. These together with the squares above mentioned as already appropriated and those devoted to the Botanic Gardens would comprise a very large proportion of the south side of the great thoroughfare from the Capitol to the Treasury. Let the reader imagine the imposing effect that might be produced under competent architectural direction by such a continuous line of buildings. How many decades will pass by before the increased demands for office-room and for great national institutions, such as schools and conservatories, museums, galleries and libraries, will require a similar occupation of the squares on the north side of the avenue? Should not these be included in the prospective design for the avenue's architectural completion? Not hidden from view by the narrowness and darkness that characterize the chief thoroughfares of the cities of the Old World, the magnificent breadth of the avenue would bring out and display a noble range of palatial buildings such as few cities, ancient or modern, could rival. And yet the possibility of this thoroughly feasible achievement under suitable government control is being hazarded, if not irretrievably lost, by the present policy of random special legislation and the absence of a permanent organization entrusted with the carrying out of any general scheme.

The motive that has inspired the present writing has been mainly a desire to see secured under the auspices of the Government a worthier development of the architecture of the nation's capital. But the principle here advanced applies equally to all the government buildings wherever erected, excepting those belonging to the Departments of War and the Navy, which for obvious reasons should be under a separate control. Whatever requires that the buildings erected by the government at the national capital should be models of good taste and good workmanship requires the same wherever a building is erected under the auspices of the government; it should not only be a specimen of honest building and convenient to the purpose for which it is erected, but it should exhibit in every respect the best achievement of which the architecture or taste and skill of the whole country is capable. No reflection is intended, in the present article, on the present management of the work of the office of the Supervising Architect of the Treasury. It is the utter inadequacy of the office itself in view of what this vast national interest demands that is here complained of. What is true of every government building throughout the land is true not only of the several government buildings in Washington viewed by themselves, but of the city as a whole, since the city itself may be regarded as largely a national outgrowth, the product of the united means, legislation and artistic ability of the people of the United States. To enable the city to accomplish its destiny as such, it is manifest that nothing short of a government commission will suffice. The late postmaster-general in his report to Congress a year ago said: "What Washington needs is a Commission of citizens, engineers, members of Congress, and perhaps cabinet officers to suggest how some wise economical and far-seeing plan for the erection of needed public buildings might be accomplished according to a definite, artistic, business-like plan. It would mean a saving in the end of \$20,000,000, perhaps, and meantime the architectural hodge-podge whose only merit is its infrequency, would disappear and the executive departments would be housed in buildings owned by the Government and forming part of a splendid whole."

Words so wise and inspiring that one might almost have hoped to find in them the initial impetus of a greatly needed government reform—and yet note the result! A more strange and unlooked for example of the evil here described could hardly have been furnished, than is to be found in the recommendation embraced in the same Ex-secretary's Report of the Post-office Department for the present year. This is nothing short of a proposition than which nothing could be more abhorrent to the good taste and the historic reverence of all who have at heart the beauty and the dignity of our public buildings in Washington. It is that the present General Post-office, a white marble building in the Corinthian style, a structure of singular beauty of proportion, and long regarded as the purest specimen of its type of architecture to be found in this country, should, to increase its office-accommodation, be enlarged by the addition of a superstructure of some three stories in height, culminating in a mansard roof, of the conventional Mullett order. When we add that this monstrous proposition comes with the endorsement, if not at the original suggestion, of the present Supervising Architect of the Treasury, we have shown how little we may "put our trust in princes," and how real the need is of a Bureau of wise, disinterested and impartial judges to whom may confidently be committed not only the selection of the style and location of future buildings and monuments ordered by the Government as well as the prevention of what is unworthy, but also the preservation from disfigurement and abuse of the few truly noble buildings that already adorn the capital city.

FRANK SEWALL.

REPORT ON THE COPLEY SQUARE COMPETITION.

TO THE COMMITTEE ON THE COMPETITION FOR THE REMODELING AND EMBELLISHMENT OF COPLEY SQUARE, BOSTON, MASS.:

Gentlemen, — We have carefully examined the twenty-two designs for the treatment of Copley Square sent in in response to the invitation of the Society of Architects, and have found most of them deserving of serious and respectful consideration. These designs present four essentially different methods of treatment.

1. Of these the scheme which most commends itself to our judgment is illustrated by only one set of drawings, that presented by Messrs. Walker & Kimball. It shows the central area in the centre, measuring about 270 feet square, occupied as a garden with trees and seats, intersected by diagonal streets fifty feet wide.

This treatment has the three great advantages that it leaves the present line of Huntington Avenue virtually unchanged, that it affords shade and coolness at a point where they are specially to be desired, and that it offers a straightforward solution of the difficulties of the problem instead of endeavoring to evade them. Its merit, moreover, lies in the idea itself, and is quite independent of the way in which it is worked out. While it permits any amount of expense and richness in the way of fountains, statues, and other architectural embellishment, it requires for its satisfactory execution only a moderate expenditure of money.

The jury consider that with the general scheme presented by Mr. Walker a central fountain is not essential, even if desirable between the two street-car tracks. This central feature might be wholly omitted, and interest added by fountains placed at the cardinal points of the circumference of the circle. The jury also consider that a formal architectural treatment of the trees would perhaps be more suitable in this location than the natural growth suggested in Mr. Walker's perspective sketch.

2. Almost all the other schemes contemplate turning aside the Huntington Avenue tracks along Boylston Street. Of these the scheme of Messrs. Rotch & Tilden is much the most interesting. It presents a sunken area, treated with steps and balustrades, seats and fountains. It is picturesque and handsome, and its architectural features do not compete in size or interest with the buildings by which it is surrounded.

3. The two schemes of Messrs. Andrews, Jaques & Rantoul and Mr. H. L. Warren occupy the centre of the square with an octagonal or circular area decorated with seats and statues, the principal feature being a large monumental fountain in the axes of the Public Library and of the Museum of Fine Arts. There is little to choose between the two. Mr. Warren's offers a larger area of grass-plot and shrubbery, but Messrs. Andrews, Jaques & Rantoul's presents a long, narrow landing-place opposite the Library which might have some practical advantages.

4. A very large proportion of the designs presented show the centre of the square occupied with a column or other lofty monument, instead of a fountain. This seems to us a less commendable treatment of the problem than those already mentioned, but among those which adopt it we have no hesitation in placing the scheme by Mr. W. G. Preston as the most satisfactory.

We add some explanatory passages taken from the papers with which the drawings were accompanied.

The explanation accompanying Messrs. Walker & Kimball's design is as follows:

"First.—Employment of trees. There are no trees between Clarendon Street and Dartmouth Street Bridge. The present square is hot and dusty, and without shade.

"Second.—Huntington Avenue is not cut off at its starting point. Huntington Avenue is the highway to Brookline and Roxbury, and also serves to take traffic from the only continuous cross-town road in Boston, West Chester Park. Its length, its size and its importance claim the right to a proper entrance, and not that it shall lead into a *cul-de-sac*. The car-tracks are not complicated or made to more than slightly curve from their present lines.

"Third.—It is not necessary to make a considerable detour to reach the corner occupied by the New Old South Church from the southwest corner of Trinity.

"The travel is in most cases diagonally across the square and will continue to be so in future, especially if the Boston & Albany R. R. builds an uptown station on Huntington Avenue. Shade is therefore desirable in the midst of the square as well as at its borders.

"The Library and the Art Museum are at their best when seen near at hand. Especially is this true of the Library, which loses scale when seen at a distance. Trinity would not lose by trees at its base, but would probably gain.

"The square is not now, and is not likely to be a metropolitan square like Post-office Square, but has more the general character of Madison Square in New York. It would give scale and certainly would gain charm by being made a similar square.

"Fourth.—The footways on the axes of the Museum and of the Library will lead to both and accent their centre motives. The Library axis will nearly centre upon the north door of Trinity.

"Fifth.—Vistas—Diagonal—Looking towards Huntington Avenue sufficient of Huntington Avenue will be seen to show that a large

avenue enters at this point. In the other directions, the M. I. T. buildings are nearly on axes.

"The other diagonal has the Old South tower at one end and the new or future M. I. T. buildings at the other.

"Sixth.—The central fountain is to be low to accent centre of square, and appears in all the vistas, and affords a waiting-place for passengers for cars, which does not now exist.

"Seventh.—The central circle gives a sufficient opportunity for statues."

The explanation accompanying Messrs. Rotch & Tilden's design says:

"Copley Square is important enough to bear monumental treatment, but an adequate monument raised in the centre would dwarf the surrounding buildings. The square is large enough to reserve a portion for decorative treatment, but too small for a park. That the view should be unbroken across it and yet relieved of an arid effect, we suggest a Sunken Garden in a paved square. This would add to the apparent area of the square.

"Easy communication for traffic requires a circular form on the axes of the Public Library and the Art Museum. This leaves the greatest width in front of the Public Library and on Boylston Street, where the car-tracks are concentrated.

"The banks of this garden should be planted with flowering shrubs or flowers, while rhododendrons or dwarf trees should be massed symmetrically against the steps.

"This scheme gives a brilliant point of interest to the square, the light and shade of the balustrade, with its flower-pots, the glimpse of the verdure and the tall jet of the fountain having a vivid decorative value without obstructing travel or obscuring the surrounding buildings. It affords rest and recreation, and is an admirable spot for sculpture (rarely sufficiently isolated and enshrined in our crowded cities), for on the landing of the steps are exedras for seats and statues. A flagged walk encircles the fountain, which is a wide basin with a half-submerged group surrounding one great jet, for here, again, a raised central figure would be out of place.

"The car-tracks from Huntington Avenue and Dartmouth Street are gathered into the Boylston Street line. This deviation from the Huntington Avenue line in passing before the Public Library is slight, and should not be considered an obstruction to travel. Every large city in the world has far greater obstruction to its traffic by its squares, and New York, with an unrivalled rush up and down town, turns aside its Broadway cars at Madison Square to leave that intact."

The description of proposed improvement by Messrs. Andrews, Jacques & Rantoul is as follows:

"The improvement which we have suggested in the accompanying drawings consists in removing the two triangles at present in the square and extending the Trinity Church property north, leaving Boylston Street to the north of the church eighty feet wide, as proposed by the outline plan approved by the Society of Architects.

"The statue of Phillips Brooks will stand in a proper place in the lawn thus gained.

"In the centre of the square, at the point where the axis of the Art Museum extended north crosses the axis of the Library extended east, is placed a monumental fountain, the basin of which is fifty feet in diameter. This is surrounded by four exedras facing towards the four points of the compass. These are tangent to the circumference of the fountain at the axial lines before mentioned, and are terminated by four groups of statues. Upon the front of the plinths supporting these four statues are placed drinking-fountains for public convenience. The platform at these exedras is raised two steps above the outer platform of the fountain, which is octagonal in shape and measures one hundred and fifty feet from side to side, and is raised three steps above the general level of the square. On the southwesterly and northwesterly sides of this octagon, and projecting from it, are two drinking-basins for horses and other animals.

"Between the fountain and the Library, and extending in a direction north and south, is placed a Refuge, measuring 200 feet in length by 25 feet in width. This is virtually a sidewalk raised a single step above the street grade, and is intended to make possible a safer passage across the square to those passing north and south along Dartmouth Street. It is also expected to serve as a cab-stand, the cabs standing on the side towards the fountain, where there is likely to be very little through driving. This leaves a space of seventy feet between this refuge and the curb in front of the Public Library at the narrowest part, which is the same width as Dartmouth Street on the north side of the square. This feature serves to establish another horizontal line in front of the Library, and adds to its dignity. It might be embellished at either end with monumental flagstaffs similar to those in front of St. Mark's in Venice.

"The street-cars are supposed to follow along the north side of the square until reaching Dartmouth Street, when they turn south and thence into Huntington Avenue; or they might equally well run around the other two sides of the square if this were desirable. No provision has been made for posts to support the trolley-wires, it being held that this nuisance in our streets will not long be tolerated.

"The space in front of Trinity Church is enlarged by bringing its curb to the line of the street running east of the Museum of Fine Arts. This leaves a distance between the fountain and the curb in front of the church of about 88 feet.

"It has been considered desirable to reduce the street-area proper of the square to a size which shall be in accordance with the amount of traffic through it.

"The platform about the fountain affords an excellent standing-place for citizens at times when the square is frequented on occasions of public interest.

"The basin of the fountain is elevated and protected by the shrubbery indicated, so that there is less liability of sticks and paper being thrown into it than if it were at or only just above the natural grade of the ground.

"In the fountain we have aimed to make the feature of falling water the principal thing, and to secure to the whole an air of dignified and quiet unpretension."

The description of the design submitted by H. Langford Warren, says:

"The design herewith submitted shows a circle of 150 feet in diameter, the centre of which is at the junction of the produced axes of the new Public Library and the Museum of Fine Arts.

"This circle is surrounded by a sidewalk, above which it is raised by five steps. In the centre of the circle is a fountain of octagonal plan, whose principal basin is again raised five steps above the general level of the circle.

"The fountain is kept of moderate height in order not to dwarf nor obstruct the view of the surrounding buildings of the square. Trees or any lofty objects have been avoided, as anything which would prevent the whole square being taken in at one view would seriously interfere with the dignity and simplicity of the square and its surroundings.

"The circle about the fountain is divided by four paths running from the centre parallel with the sides of the square, the intervening space being occupied by shrubbery. At the four cardinal points of the circle, opposite Trinity Church, the Art Museum, the Public Library and the north side of the square (which is the best site in Boston, could it be obtained, on which to erect a new Music Hall) are placed seated statues, symbolic figures of heroic size, of Religion, Art, Letters and Music, facing the buildings devoted respectively to these noblest activities of the human mind. The square would then become symbolically what in a sense it already is actually, the intellectual and spiritual centre of Boston, its decorative treatment typifying the high uses to which its buildings are devoted.

"The main practical element in the problem was to preserve uninjured the use of the square as a thoroughfare. The central circle seemed to afford ample facilities for circulation on both sides of it, both for horse-cars and other traffic, and while large enough to give the requisite dignity and scale to the treatment adopted is not made so large as to prove a hindrance to the amount of traffic which could possibly pass through the square from the various streets leading into it. That a slight diversion of the horse-car lines (which could be made even less than shown on the plan) is not a serious objection is evident by comparison with the turning aside of the Broadway tracks at Madison Square and Union Square, New York, where the traffic is vastly greater than it is ever likely to be at Copley Square. It seemed important indeed to keep the tracks away from the centre, which should be reserved as a place of quiet and repose from which the noble aspect of the square could be enjoyed."

Signed by the jury,

WILLIAM R. WARE.
EDMUND M. WHEELWRIGHT.
FRANCIS W. CHANDLER.

THE BIRTH OF A PROFESSION.¹

[WITH the substitution of the words "architecture" and "architects" for the words "engineering" and "engineer" wherever they occur in the following extracts, these remarks of Mr. Johnson's may be usefully digested by the members of that profession which is too often held in less esteem than it deserves by members of his own. — Eds.]

THE engineer is one whose business it is to make new and useful applications of the materials and forces of nature to the needs of society in a safe, economical and scientific manner. The man who makes only old and familiar applications of these materials and forces is called a "mechanic." The inventor makes new attempts at such applications his particular business, but he cannot be trusted to do this with the certainty of producing an economic success. The unscholarly engineer solves his new problems in a tentative and unscientific manner, reaching success through expensive failure or through an extravagant use of materials, with great uncertainty as to its factors-of-safety. Scientific knowledge which is limited to

one's own experience is extremely meagre and inadequate. It is the greatest conceivable folly and waste of energy and time to try to gain by experience what has already been proved beyond a peradventure and which is taught in all the schools. When a century of laborious experimenting may be learned in an hour under good instruction, it is nothing short of stupidity that would lead one to forego the instruction and to rely on personal experience. No amount of personal experience, or of native genius, can take the place of scholarly acquirements, neither can such acquirements replace the knowledge of methods, men and things which comes only by experience.

That a great deal of an engineer's ordinary business can be learned by experience there is no question, but by experience alone one would never become an engineer. He can become a mechanic, but without such a knowledge of principles as would enable him to solve safely and economically new problems, I would not call him an engineer. . . .

If engineering is to become a full-fledged profession its duties must be such as to demand scholarship for their satisfactory performance. If the engineer is expected to make new and useful applications of the materials and forces of nature in a safe, economical and scientific manner, then surely the satisfactory performance of his duties does call for very extended scholarly acquirements. And if engineering has not as yet reached a very high professional standing in this country it is simply because engineers themselves have had too low an ideal of professional accomplishment. In this country nearly every man finds his level, and surely every class of men is estimated very nearly at its true relative worth.

In comparing the standing of engineers in America with their status in European countries it is well to remember that this is a new and self-made country; that every man has been the architect (or engineer) of his own fortune, and that the training our capitalists have had in making their way in the world has given them confidence in their judgments in all things material, so that they always stand ready to call in question any decision their engineer may render. Abroad it is very different. Capital is almost wholly inherited, and the capitalist knows little of the practical adaptation of material means to industrial ends. He is, therefore, wholly at the mercy of his professional advisor, and so the engineer comes to be a sort of autocrat, whose judgment is not to be questioned. But this ability, or assumed ability, of the employer is probably wholesome medicine for the engineer, who is thus held to more strict economic requirements, very much to the benefit of the practice, on the whole. Perhaps no one thing has been a greater factor in the development of current engineering practice in this country than the necessity, which has been nearly always imposed, of producing fair results with what would be regarded by the foreign engineer as wholly inadequate means. . . .

The public in this country has always confused surveyors with civil engineers. A few years ago I dropped in on the annual meeting of the Association of Engineers and Surveyors in one of our Western States and I there learned the sharp distinction between these two classes. I found that a civil engineer was one who had used, or thought he could use, either a level or a transit, as in laying out town-lots, or in fixing the grade of a street or ditch, while the surveyor was one whose knowledge and confidence was confined to the needle-compass and a Gunther's chain. This distinction was soberly and sharply drawn in their discussions and proceedings, and, since such were the only "engineers" they had in their association, it must have been generally held. This comes from calling the surveyor of a country village the "City Engineer." Since it is his official title, he is evidently warranted in using it.

In analyzing the status of the engineering profession in America, therefore, I conceive that we may divide the embarrassments under which we labor into two classes, — those conditions outside our own ranks, and those inside. The most embarrassing external conditions are:

1. The universal confusion of mind on the part of the general public as between a surveyor and a civil engineer, or between a mechanic or mechanical draughtsman and a mechanical engineer, or a mining superintendent and mining engineer, or between an electrical mechanic and an electrical engineer.

2. The confidence that all our capitalists have in their own judgments on all kinds of engineering questions, and their usual preference for a "practical" man who is not likely to try anything new. Their want of faith in new things comes from various and sundry losses resulting from having fallen a prey repeatedly to over-confident inventors and to patent-sharks. The idea that new problems may be successfully solved without large primary losses has gained little credence as yet in the minds of the public.

The chief embarrassments from within from which our profession suffers are, as I conceive:

1. Too low an idea of professional accomplishment. Engineering is looked on as a trade to be learned rather than as a business requiring the continuous exercise of scholarly acquirements. And after having learned a trade we begin to demand the consideration usually given to learned professions. When we have, as a class, acquired these accomplishments, and have shown by our works that we can be trusted to solve new problems safely and economically, be sure the over-credulous American public will quickly respond with its generous recognition.

2. The failure, heretofore, to give due weight to both theory and practice in the young engineer's apprenticeship. The question has

¹ Extracts from an address by J. B. Johnson, retiring President Engineers' Club of St. Louis. Delivered December 21, 1892.

been either a course in an engineering-school or a few years of any sort of hap-hazard engineering or surveying practice. Until we come to see that both a well-rounded course of school-training and a symmetrical but varied line of experience are necessary for all young engineers, until such time our engineers will be unsymmetrical, lop-sided, partial successes. Some will have much theory which they cannot use, others will know how to do things in the old way, but will halt and hesitate, and only partially succeed when they venture to do something new. It is true the engineering-schools are doing a noble work for us, and our various engineering societies are kneading and cementing the members of this newly-fledged profession into something like a professional body, but until our young graduates generally succeed in serving a sort of varied apprenticeship after leaving college—a kind of *wanderjahre*, in which they will gain a varied and symmetrical experience—they cannot hope to gain that full stature in the profession which is desirable and really essential to successful designing in new fields. The better class of engineering-schools are doing all that can be done with profit in school. They all have shops and laboratories and drawing-rooms where the students themselves use the tools and the various testing-machines; they go for weeks into the field and make surveys and lay out railroads in a more or less business way, but the methods of actual practice cannot be learned to any great extent except in actual practice. Every young engineering graduate should, therefore, change his employment for several years as fast as he clearly learns the theory and practice of the work on which he is engaged. One of the worst things he can do is to immediately obtain a long and steady job. This will fix him in a rut from which he can with great difficulty extricate himself. I do not mean he should scatter overmuch, but he should fairly cover the various lines of work in some one field of engineering practice. . . .

As a proof of our approach towards a full-grown professional status, however, I wish to call attention to the recent rapid growth of the number of engineering-schools of the United States and the annual number of graduates from the same, as furnishing an astonishingly large amount of suitable material from which to make our ideal engineers, and also to the rapid formation of new engineering societies over the country, as indicating a strong and increasing desire for coöperation and association, and as promising a united body of professional workers before many years.

Until after the close of our civil war, or previous to 1866, there were turned out of all the existing engineering-schools in this country not more than fifty graduates per year, and these were almost exclusively civil engineers. From that time, and as a result of the great development of our railroad interests and of the Act of Congress donating the proceeds of the sale of public lands to the several States for the purposes of industrial and technical education, there has been a marvellous growth in the number of engineering-schools and in the number of graduates from them, until, in 1892, there were graduated from fifty of the leading schools over 900 incipient engineers in the four lines of civil, mechanical, electrical and mining engineering. All these had taken courses of instruction of four or five years of nine months each after having passed entrance examinations in the ordinary subjects required in our scientific colleges and universities. This total annual number of engineering graduates is now increasing at the rate of 150 per year, with no present signs of its decreasing for many years to come. The number of young engineering graduates now turned out annually in this country may, therefore, be said to be over one thousand.



THE T-SQUARE CLUB, PHILADELPHIA.

THE last meeting of the T-Square Club, previous to the summer vacation, was held on Wednesday evening, April 19, 1893.

In the competition for "an entrance to a large office-building," the first mention was awarded to Lloyd Titus, the second to M. B. Medary, Jr., and the third to Charles Bachman.

In the scheme of "color decoration for a dining-room," the first mention was awarded to Louis C. Hickman, and the second to Albert Kelsey.

Messrs. James H. Cook and Percy Ash, the judges appointed to award the prize scholarships in the T-Square Club, open to students of the School of Architecture of the University of Pennsylvania, reported that they had awarded the Sophomore Scholarship to H. L. Duhring and the Junior Scholarship to Harvey T. Hauer.

The prizes for the highest number of points received in the different competitions throughout the year were also awarded. The first prize to Percy Ash, and the second prize to James H. Cook.

As several members tied for the third prize it was not awarded but will be given later.

The result of the examination for the Travelling Scholarship offered by the Trustees of the University of Pennsylvania to draughtsmen of the State, was also announced—James P. Jamieson, a well-known member of the Club being the fortunate man. Honorable mention was also given to Percy Ash and William C. Hays.

PERCY ASH, Secretary.

THE WORLD'S CONGRESS AUXILIARY OF THE WORLD'S COLUMBIAN EXPOSITION.

CHICAGO, ILL., May 1, 1893.

TO THE ARCHITECTS OF ALL COUNTRIES:—

Greeting.—Among the congresses to be held in Chicago during the exposition season under the auspices of the World's Congress Auxiliary, is an International Congress of Architects, to convene during the week commencing July 31, 1893, in the permanent memorial art palace, on the lake park front of Chicago, near the centre of the city. The object of this congress is to bring together the eminent architects of all countries for friendly intercourse, comparison of methods and results, and the promotion of their mutual interests in the profession.

What is more particularly desired from the leading architects of each country is a clear and graphic presentation of the progress, achievements and special development in architecture. To this end the following subjects have been selected:

Workingmen's houses; modern apartment-houses; ancient apartment-houses; laundries in houses, health effect; kitchens in houses, health effect; modern stables, large and small; responsibility of architects in constructional matters; responsibility of architects as to plans; responsibility of architects in decorative matters; sculpture and architecture; painting and architecture; the client's right to service, as to drawings; ownership of same, specifications and details as to supervision, etc.; mechanical engineering in architecture, and the architect's responsibility therefor; modern steel construction; fire-proofing of building to date.

The above-mentioned subjects will be presented by the most eminent architects of the world.

The World's Congress Auxiliary takes pleasure in extending to you a cordial invitation to attend this congress, and begs the favor of an early acceptance.

Address all communications to Robert Craik McLean, Secretary, 19 Tribune Building, Chicago, Ill.

Very truly yours, D. H. BURNHAM, Chairman.



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

HOUSE OF GEORGE F. BOUVÉ, ESQ., LONGWOOD, MASS. MR. S. EDWIN TOBEY, ARCHITECT, BOSTON, MASS.

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

COMPETITIVE DESIGNS FOR THE REMODELLING OF COPLEY SQUARE, BOSTON, MASS. SUBMITTED BY MESSRS. WALKER & KIMBALL, WILLIAM G. PRESTON, H. LANGFORD WARREN, ANDREWS, JAKES & RANTOUL AND ROTCH & TILDEN, ARCHITECTS, BOSTON, MASS.

IT must be borne in mind that the somewhat imperfect character of these reproductions arises from the fact that the competitors were furnished with an outline bird's-eye perspective view of Copley Square printed in gray, the object being to emphasize the features introduced by the competitors though making the surrounding structures less conspicuous. Drawings made in this way are not adapted for successful reproduction and moreover in each case the handling was sketchy, hence the resulting prints are rather more ragged than is desirable.

[Additional Illustrations in the International Edition.]

VESTIBULE OF THE FISHERIES BUILDING, WORLD'S COLUMBIAN EXHIBITION, CHICAGO, ILL. MR. HENRY IVES COBB, ARCHITECT, CHICAGO, ILL.

[Gelatin Print.]

TWO VIEWS OF A VILLA AT NICE, FRANCE. M. O. MASSELIN, ARCHITECT.

[Copper-plate Etchings.]

COPLEY SQUARE EMBELLISHED WITH A CENTRAL FOUNTAIN. MR. H. LANGFORD WARREN, ARCHITECT, BOSTON, MASS.

COPLEY SQUARE EMBELLISHED WITH A SUNKEN GARDEN. MESSRS. ROTCH & TILDEN, ARCHITECTS, BOSTON, MASS.

COPLEY SQUARE EMBELLISHED WITH A CENTRAL FOUNTAIN. MESSRS. ANDREWS, JAKES & RANTOUL, ARCHITECTS, BOSTON, MASS.

CATHEDRAL CHOIR-SCREEN, LICHFIELD, ENGLAND.

TRINITY U. P. CHURCH, POLLOCKSHIELDS, GLASGOW, SCOTLAND.
MR. W. G. ROWAN, ARCHITECT.

NEW BUSINESS PREMISES, WATERLOO STREET, WESTON-SUPER-MARE, ENG. MR. SYDNEY J. WILDE, ARCHITECT.

THESE business premises have recently been erected in Waterloo Street. The facework of building is executed in Corsham Down freestone, the pilasters being of red Mansfield.

DESIGN FOR CLOCK-TOWER, CITY OF NEW SARUM, ENG. MR. JOHN W. RHODES, ARCHITECT.

THIS design was submitted in the competition for the new clock-tower to be erected partially upon the old town-wall, shown in light tint at plan level A. No bell was permitted, and height of illuminated dial restricted. The elevations were to have been in Chilmark stone, coverings in red flat tiles, and aprons, flashings, drips, weather-cock, etc., in copper.

CATHEDRAL, RATISBON.



THE BLACKPOOL TOWER. — The tower now being erected at Blackpool by Messrs. Heenan and Froude, Manchester, is to be 500 feet high, and although not so gigantic as the Eiffel Tower, it yet will be the highest structure in this country, and the conditions under which it is built present features of interest not met with in the French tower. The town of Blackpool, situated on the west coast of Lancashire, is visited in the summer by enormous crowds of excursionists from all parts of the district and the surrounding counties, and is an eminently suitable position for a tower of this character. The tower has been designed by Messrs. Maxwell and Tuke, of Manchester, the architects of the Manchester Royal Jubilee Exhibition, and their scheme includes a fine block of buildings, from the centre of which will rise the tower, commanding extensive views of the country on the one hand, and of the sea, as far as the Isle of Man, on the other. In preparing the contract-plans, Messrs. Maxwell and Tuke have been ably assisted by Mr. R. J. G. Read, Assoc. M. Inst. C. E., of Westminster, who has had considerable experience in the erection of iron structures. Before receiving tenders, the architects, on behalf of the directors, submitted the drawings to Mr. Max am Ende, M. Inst. C. E., Westminster, who checked the calculations, and reported the tower as amply strong enough to resist the strains likely to be sustained by it. The contract for the steel structure has been placed with Messrs. Heenan and Froude, engineers, of Manchester, who have already erected about 1,100 tons of iron and steel out of a total estimated at 2,200 tons, and the work is being steadily pushed forward so as to be ready for visitors this season. The foundations are sunk in the boulder clay, an extensive formation of varying thickness underlying the shore sand. The level of the ground at the tower site is, we may note, about 12 feet above high-water mark. The foundations consist of four independent blocks of concrete, each 34 feet square and 12 feet thick, laced with 12 inches by 6 inches rolled-steel joists placed under the four corners or legs of the tower. The width of the tower at the base is 98 feet, and the surface of each concrete block slopes towards the centre of the tower so as to afford a bearing at right angles to the axis of the inclined leg at that point. On the top of the concrete blocks are placed the base girders. These are alike for each of the four legs, and consist each of four box-girders crossing each other like the sides of an Oxford frame, at the intersection of which are placed the columns forming the four corners of each leg. These box-girder frames are set on the rolled joists imbedded in the concrete, and held down by 18 steel bolts 3 inches in diameter, passing down through the concrete to cast-iron plates below. Each of the four legs of the tower, therefore, consists of four columns inclined towards the centre, but running straight and parallel to a height of 85 feet. These columns are braced together with a single system of lattice bracing, so as to afford room for entrance and exit doorways through the legs from the rooms and staircases in the adjoining building. The space between the tower-legs on the ground-floor is to be used as a circus, and provision is made for carrying a gallery around it at a height of 20 feet above the ground. The ceiling to the circus forms the floor of the elevator hall, at the height of 55 feet. This floor is formed of concrete between rolled joists resting on the girders, and from it will start the lifts, which will rise straight to the top platform. Access to this hall is obtained by means of two 10-foot staircases and two spacious lifts arising from the entrance hall on the promenade. — *Engineering*.

THE PRODUCTION AND USES OF PLATINUM. — Since the introduction of the incandescent electric lamp in 1880, the consumption of platinum, not only in the United States but in Europe also, has increased rapidly, although improvements made from time to time have greatly reduced the amount used in each lamp. The New York *Engineering Journal* says that the gross amount of platinum used in the United States and in Europe in the manufacture of electric lamps has steadily increased from almost nothing in 1880, to about 55,000 ounces in 1892. There are at present two other uses for platinum, which are even more important than its use in electric-lighting, namely, the construction of stills for the concentration of sulphuric acid, and the wires by which artificial

teeth are firmly fastened to a plate. The amount used for stills varies widely from year to year, being greatly dependent upon the number of new plants started each year, but it has been estimated that the average amount so used during the last few years is about 80,000 ounces. The manufacture of sulphuric acid is sure to increase, and, although glass concentrating vessels are now used to some extent, it is believed that this industry will continue to supply a constantly increasing demand for platinum. For dental purposes platinum will always continue to be used, being the only metal which possesses the required properties of infusibility, ductility and strength. In the United States 35,000 ounces, and in the United Kingdom 25,000 ounces, are annually used in this industry, and this amount will, it is said, probably increase at the rate of 2 or 3 per cent per annum. The other uses of platinum, such as chemists' crucibles, jewelry, plating, etc., consume about 20,000 ounces annually, making the entire consumption about 215,000 ounces. Of this amount about 30 or 40 per cent is old or scrap platinum. For many years the Siberian Urals have supplied the greater part (92 per cent) of all the platinum used in the world, but it is questionable whether its output can be maintained at its present high level for many years. According to the official statistics of the Russian Department of Mines, the output of platinum in that country reached its maximum in 1887, 4,400 kilogrammes. It dropped afterwards to 2,700 kilogrammes, and so remained until 1891, when, owing to the abnormally high price of the metal, the production amounted to 4,226 kilos. It is believed that the above figures represent the maximum output of the country. Next to Russia the most important sources of platinum so far known are Colombia, British Columbia, and the United States. At present Colombia only produces about 125 kilogrammes of platinum per annum, entirely the result of native washing. The platiniferous area, although of low grade, is, however, very extensive, and in part suitable for hydraulic mining. A large quantity of American capital has already, it is said, been invested there, and it is expected that Colombia will become an important producer of the metal. The only platinum deposits of importance in British Columbia are found on the Talameen River. The total production in British Columbia is about 65 kilogrammes. In the United States much prospecting has been done to find platinum in paying quantities, but so far without success, and to the present time all the platinum produced has been incidental to the production of gold from various auriferous gravels in California and Oregon. — *Journal of the Society of Arts*.

THE WATER-STORAGE OF HEAT. — We commented some time ago on the use of water for storing the heat of exhaust steam from non-condensing engines where the steam is used for dye-tubs which are operated intermittently. The use of water for a similar purpose has recently been suggested by Mr. Druit Halpin and referred to in a lecture by Professor Unwin, of London, for electric-power stations and other plants where the work is of an extremely varying character, and the proposed system possesses novel features. In most electric-stations the boiler capacity must be such as to supply the demand for steam when the maximum amount of current is being generated, and the time which this lasts bears but a small proportion to the total time in which the plant is in operation. The average work for the whole time is far below the maximum noted. A single boiler might possibly be sufficient to supply the steam for a large portion of the time, while for the short period referred to it might require three and four boilers to do the work. During much of the time the boilers are either worked at an extremely low rate of capacity or the fires in a portion of the boilers are banked, and under these circumstances the steam is generated with loss of fuel, which the proposed system seeks to overcome. The suggestion is made to employ only a sufficient number of boilers representing the average work of the day, and in connection therewith a large storage-tank containing water under a pressure considerably higher than that of the steam supplied to the engines. The boilers would be used for heating the water contained in the storage-tank, and the steam generated from this water would be the steam employed in the work. When more steam was required at the engines than the equivalent of the heat supplied by the boilers, the pressure in the storage-tank would fall, the heat stored in the large body of water would be called upon, and a sufficient amount would be re-evaporated to supply the demand. When the engines required a less supply than the boilers furnished, the heat would accumulate in the storage-tank and the pressure would gradually rise. The large body of water would by this means alternately store and restore the heat required to drive the engines, and the boilers would thus be enabled to work at a uniform and economical rate. We do not understand that this system has been subjected to a practical test. It possesses interesting features, and it is hoped that it may be put to trial. — *Engineering Record*.

THE PARIS WATER-SUPPLY. — The Prefect of the Seine, in opening the Montretout Reservoirs to-day, gave an interesting account of the Paris water-supply. In 1613 Louis XIII laid the first stone of the Arcueil Aqueduct, but these springs, utilized by the Emperor Julian for supplying his Palais des Thermes, proved a disappointment, that aqueduct bringing only 1,000 cubic metres a day at ordinary times and less during drought. Half a century afterwards pumping-apparatus was established near Notre Dame for supplying Seine water. In 1822, a canal from the river Oureq to La Villette brought 10,000 cubic metres of what was then considered excellent water. Next came the Belleville and the Près St. Gervais Aqueducts and the Grenelle artesian-well. In 1865, an aqueduct, eighty miles long, brought 20,000 cubic metres from the Dhuiss. In 1875, an aqueduct, 206 miles long, brought 100,000 cubic metres from the Vannes, near Troyes. The Arve springs will now bring 26,000 cubic metres. The total supply being now 710,000 cubic metres, Seine water can be dispensed with. Paris, according to M. Sauton, President of the Municipality, has now 290 litres (a litre being rather more than a pint and three-quarters) per head of the population, while London has only 155, Edinburgh 180, Leipzig 150, Vienna and Brussels, 100 and Berlin 75. He hopes that visitors to the 1890 exhibition, by which time the springs of the Loing and Lunain will be utilized, will find Paris a capital second to none, not merely in splendor, but in healthiness. — *Paris Correspondence London Times*.

THE SO-CALLED CANALS OF MARS.—As to the so-called "canals," which are so much spoken of now and are supposed to be the work of human beings, Mr. Lockyer has already shown in a very interesting paper how the incorrect translation of the Italian *canali* by "canals" instead of "channels" has created a misunderstanding as regards their real nature. The fact is that the continents of Mars—which are easily distinguished by their brighter reddish color from the darker and greenish seas—are intersected by many sinuous lines which may be considered as floods and inlets, as well as by straight lines, which at a certain period of the Martian year have been seen as double lines by so clever an observer as Schiaparelli, and as single lines at other periods. That these lines, which run for immense distances parallel to each other and 150 to 200 miles apart, cannot be "the banks of artificial canals" is almost self-evident. And, after all that has been written upon the subject, it becomes more and more certain that Schiaparelli did not take a simple optical illusion for a reality. It also seems difficult to admit that the double lines represent parallel rivers or inlets, which periodically are freed from snow or become filled with water—the lines are too straight and regular to be rivers or floods like ours. So the explanation is still to be found, and new hypotheses are now being discussed. According to one of them, the lines, both single and double, which intersect the continents may be crevices of the solid crust; similar crevices have been obtained in our laboratories, when experiments have been made with rocks and glass, in order to imitate the crevices and mountain-chains of the earth's surface. In such case the channels would be natural crevices, widened by the immense masses of water which pour into them during the thawing of the snow-caps; they would be a sort of cañon, periodically filled with water. One fact is, however, certain: The same double channels have been seen this year by Perrotin, who remarks that no unprejudiced observer could fail to recognize them; but their positions and the shape of Schiaparelli's "Sea of the Sun" seem to differ from what they were in 1877.—*Prine Krapotkin in the Nineteenth Century.*

WIND-BRACING.—The wind-bracing of high buildings exercises the ingenuity of several of our American brethren. One authority suggests forty pounds per square foot of exposed surface, others think thirty pounds is a safe assumption; but both of them forget that great wind-pressures occur occasionally, and that stable low buildings of masonry are sometimes—happily not often—swept away. The plan of a single system of diagonals, each story having a diagonal running from floor to ceiling, is a good one, utilizing the cross-floor girders as posts or ties and the wall-columns as chords. By this single system of diagonals passage-doors can be placed at one side of each room. Mr. Just, who has developed this system, shows a skeleton building twelve stories above the ground-line, each of twelve feet high, with a basement of two stories. The wall-columns stand opposite each other, and are spanned at twelve feet (centres) in the plan. In the first story, he calculates a diagonal stress of 38.5 tons produced by a forty-pound wind-pressure. The columns and girders of such a building would have to be proportioned to meet the compressive or tensile stresses caused by the wind on either side of the building, as on the windward side there would be a considerable tension at the foundations and a proportional compression on the leeward side, and these stresses would have to be added to the compression caused by the weight of the structure. Rigid floor-connections are indispensable. These structures, looked at in vertical section, represent an open diagonal girder placed upright, the chords represented by the walls or columns and the floor-posts. If it is necessary to build to such extraordinary heights, which we question very much, of course the masonry wall-structure is quite inadequate to meet the pressure of a high wind, and an iron-framed structure such as that here indicated is necessary.—*The Building News.*

IRON FROM JERSEY BOG ORE.—The "raising" of this ore and the manufacture of iron therefrom were the leading industry of South Jersey during the early part of this century. Charcoal was the fuel used and coalings were common throughout the "Pines." An active coaling is now seldom seen. Shells were hauled by wagon or rowed and poled by scow from the seashore for a flux, the oyster then being of more value for that purpose than for food. Better oysters could be picked from those shell heaps than can be bought at the stands to-day. In a memorandum kept by the "master ore-raiser" for one of the largest furnaces there are many interesting notices of large quantities of clams and rum bought and sold, but the oyster is never mentioned. These account-books were decorated with the pictures of soldiers and war-ships, showing well the prevailing thought of those days. There was then an extensive trade between South Jersey and the West Indies, exchanging lumber and iron for rum, sugar and molasses, in spite of the pirates who were ever at home in the thoroughfares, bays and crooked channels of the coast. Scattered here and there along these streams are the remains of what were once centres of a flourishing industry. In some places the furnaces and forges have been completely obliterated and forgotten; in others only bits of black slag remain; while in others the ruins are still standing. At the head of the Tuckahoe River there is a crumbling stack, at Allaire there are ruins, and at Weymouth the course of a canal may be traced by which the ore was brought to the furnace from the bog.—*The Popular Science Monthly.*

THE NEW ARVE AQUEDUCT FOR PARIS.—The most notable incident of last week was the inauguration of the Arve aqueduct, by which Paris is henceforth to be supplied with good, clear water from sources in the Departments of the Eure and of Eure et Loire. The water-supply hitherto has been from the Vanne and the Dhuis, which, however, yielded a supply so limited that the balance had to be obtained, especially during the summer months, from the Seine, with the result that innumerable epidemics arising therefrom were of annual occurrence. Henceforth the population of the city of Paris will be able to dispense altogether with Seine water, the pure supply from spring sources being considerably in excess per diem and per head to that of either

London or Vienna. The length of the aqueduct just opened is sixty-six miles, and brings a supply of spring-water into Paris amounting to some 10,000,000 cubic feet per day. Of course, the suburbs are still left unprovided for, and will have to remain content for some time longer with the poisonous Seine water, the water-works projected by the City of Paris being by no means completed. It may be of interest to add that the first supply of spring-water to Paris was brought by the Arcueil aqueduct, the foundation-stone of which was laid by King Louis XIII. The Second Empire turned the Dhuis from the Department of the Jura to the Menilmontant quarter of the metropolis, at a cost of nearly \$50,000,000; its reservoirs, of which there are but two, are near Père Lachaise Cemetery, but they are much less extensive than those opened last week. The south side of Paris has for some years been supplied from springs of the Boulze, near Fontainebleau, but they have neither the purity nor the quantity of those of the Arve.—*N. Y. Tribune.*

SEWAGE-FARMING AND POLLUTION OF WATER.—The influence on health of the farms which receive the sewage of Berlin is attracting much attention among German medical men, and is a question that concerns cities everywhere. It has been alleged that an outbreak of typhoid fever in the vicinity of these estates was due to the pollution of drinking-water by the sewage. An inquiry into these cases, however, does not seem to have justified this charge, and has led Professor Virchow to declare that the public health on these farms is very good, and that the system of sewage-irrigation involves no danger. An interesting fact concerning this system is that the sewage passes into drains only a few feet below the surface as perfectly clear water, but in this fishes thrive so surprisingly as to indicate some influence of organic matter that filtration through the soil has not removed.—*Invention.*



THE business of the whole world is subject at present to influences which are new and phenomenal in many respects. Much of this new condition is the product of rapid progress, which has developed new requirements for which no properly-organized agencies exist. This feature is overlooked by many of the people who write on existing disturbances. The world's business has broadened out. New countries are being opened up. The flow of capital to some of them has been something fearful to contemplate, especially when it is remembered how much of it has been unproductive, or worse. All methods have been changed, expanded, improved, except our banking and financial methods. As to changes in these, the strongest opposition would be made if attempted. The reason for the opposition would be and is that the value and earning power of existing wealth and the interests of the annuitant or dividend-drawing classes would be impaired or jeopardized. The other side is not as carefully considered, viz, the possible or probable benefits that might come from increased power to produce and exchange wealth to be created. The former interests are well organized and represented, the latter not. This opposition of mighty interests contains the elements of great commotion in the near future, and party lines must be drawn with reference to it. It matters but little what are the daily and weekly fluctuations in the business world. The real causes are far back of the apparent causes. Gold exports have temporarily ceased. Money seems plenteous, but the hindering causes near and far below the surface remain. The money-lenders and those who profit by the necessities which expanding energy and capacity create are regarding the necessities as evidence of weakness instead of strength, and are blindly holding on to what they have. This means that trouble is brewing. In the commercial and manufacturing channels there is great activity. Prices maintain a remarkable uniformity. As yet no great discouragement has been suffered among promoters, builders and pushers generally. Easier money markets are greatly needed, but the work goes on, nevertheless, and its volume is enormous. No branch of industry is in a depressed condition. Next week, a contract will be placed for thirty thousand tons of railroad, bridge and elevated work for the New York Central Road, five thousand tons for the Manhattan Building, New York City, and about eight thousand tons in smaller orders. There are large orders about to be placed in the West. Railroad companies, in anticipation of good passenger-traffic returns this year, are ordering important and much-needed additions to rolling-stock. By June 1st work will begin on a large amount of railroad construction, but the iron and steel requirements from this source will not crowd mills. Word this week from textile manufacturing centres strengthens all that has been said favorably regarding the healthful conditions in that industry. Mills are generally crowded. Distribution is equal to production. Stocks are small, except among importers, who are carrying even larger stocks than usual. Foreign textile-goods manufacturers have pushed production without reserve, and warehouses abroad are now as well stocked as they have been at any time for years. In trade circles, there is a belief that higher wool and cotton prices will come in a few months, but this expectation is not based on accurate knowledge of intentions of producers in those lines. One very observable factor worth mentioning is that, with some unimportant exceptions, the foreign trade of all countries having any export trade whatever is increasing. The stimulus to increased industry from this is small, but it is destined to grow, because of cheapening rail and water freights to all parts of the world. Ship-building interests in Great Britain indicate clearly the activity of the forces at work in this direction. The ship-yards of the future will represent greater activity than ever in the past, and international exchanges of services will expand out of all proportion to past experience. Cost of transportation will, of course, decline when, in the progress of mechanical skill, new devices for creating motive power at reduced cost become more general. The possibilities in this direction have never been comprehended. Latent energies that could never be stimulated by desire for food or raiment from home surroundings will be called into action, in order to acquire and enjoy what can be provided from other lands. It must be by such steps that civilization and its attendant benefits will be brought to millions now beyond reach. In short, the world is to be industrialized, and tools, instead of guns, are to be the means of advancement, and the shop, instead of the barracks, will be the pivot of activity. Quicker motion, cheaper cost, smaller investment per ton of freight, are all being worked out in the brain of the delving magicians of this century, who are making steam and electricity to serve them in so many ways.

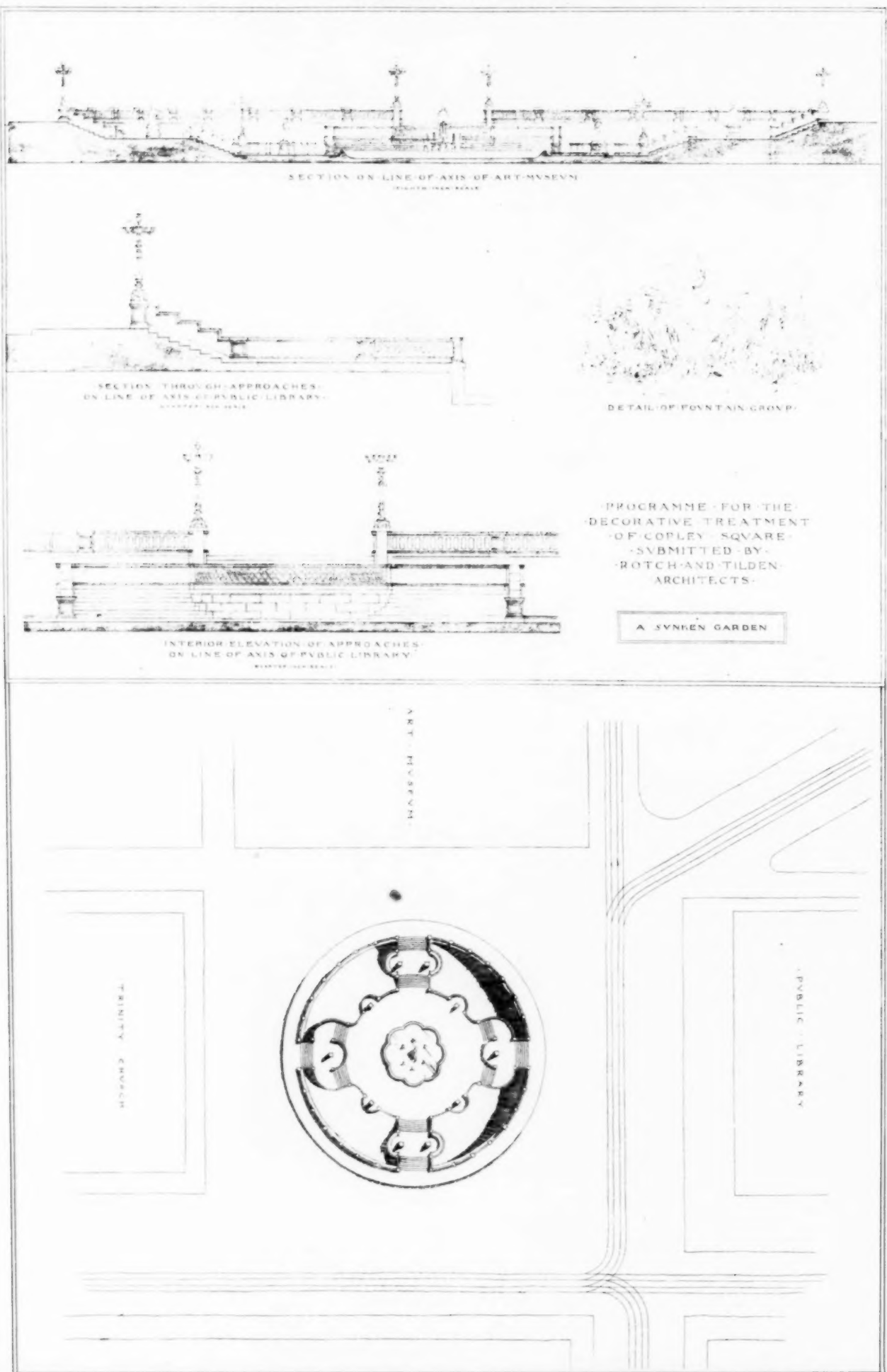
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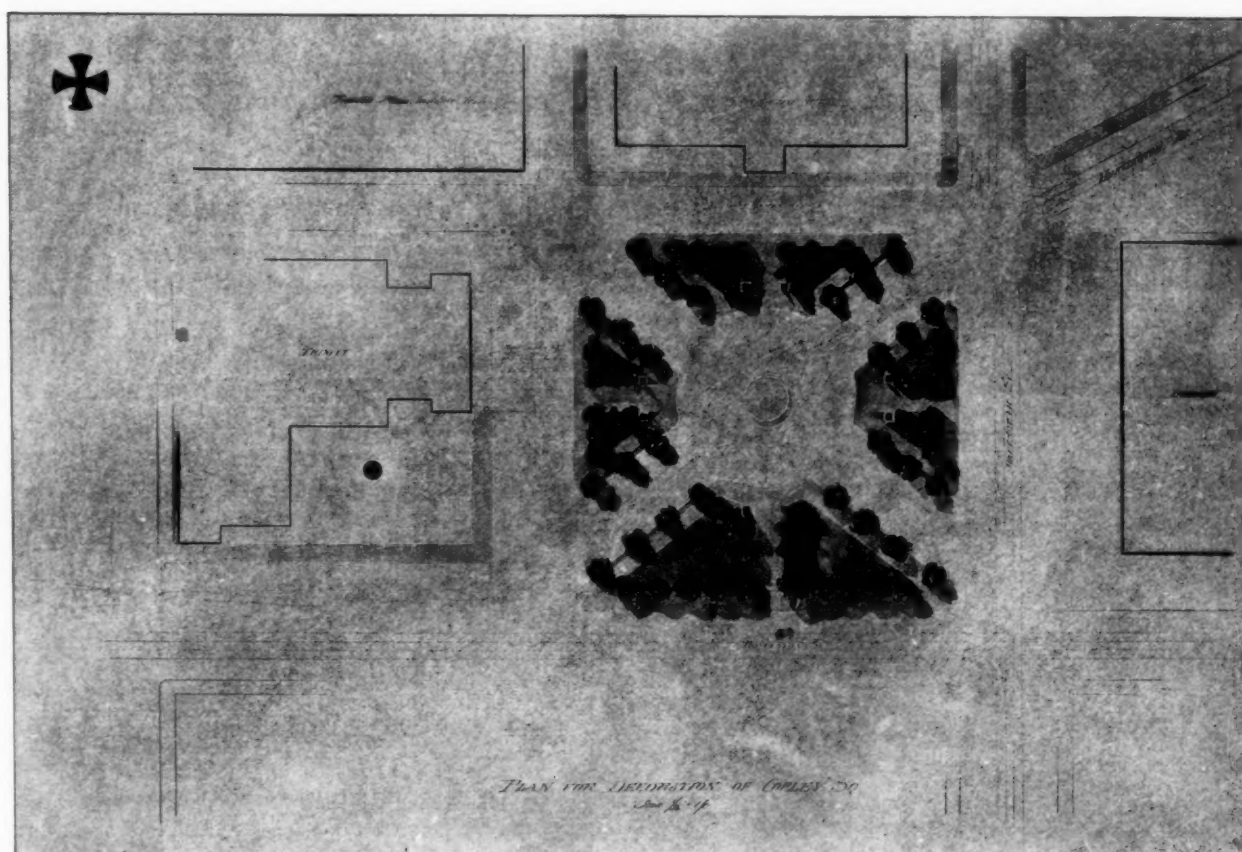
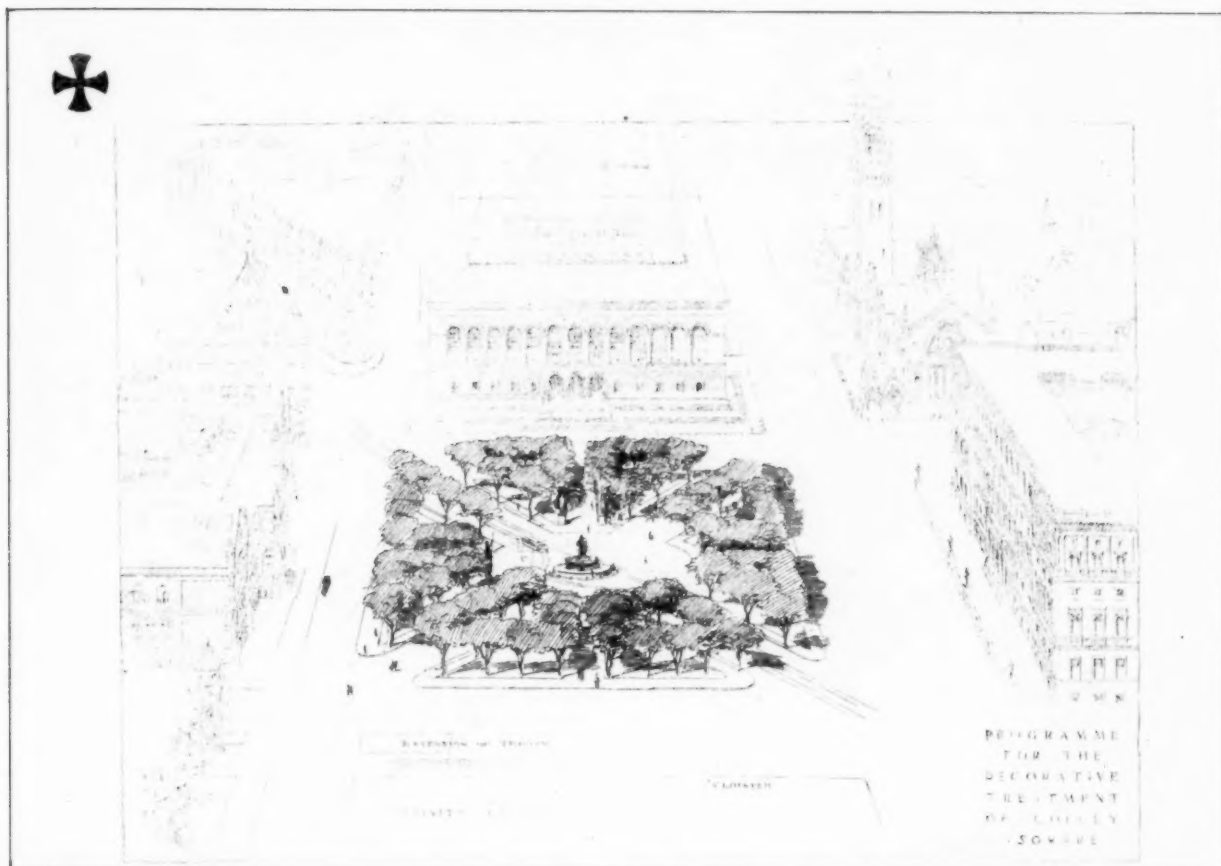
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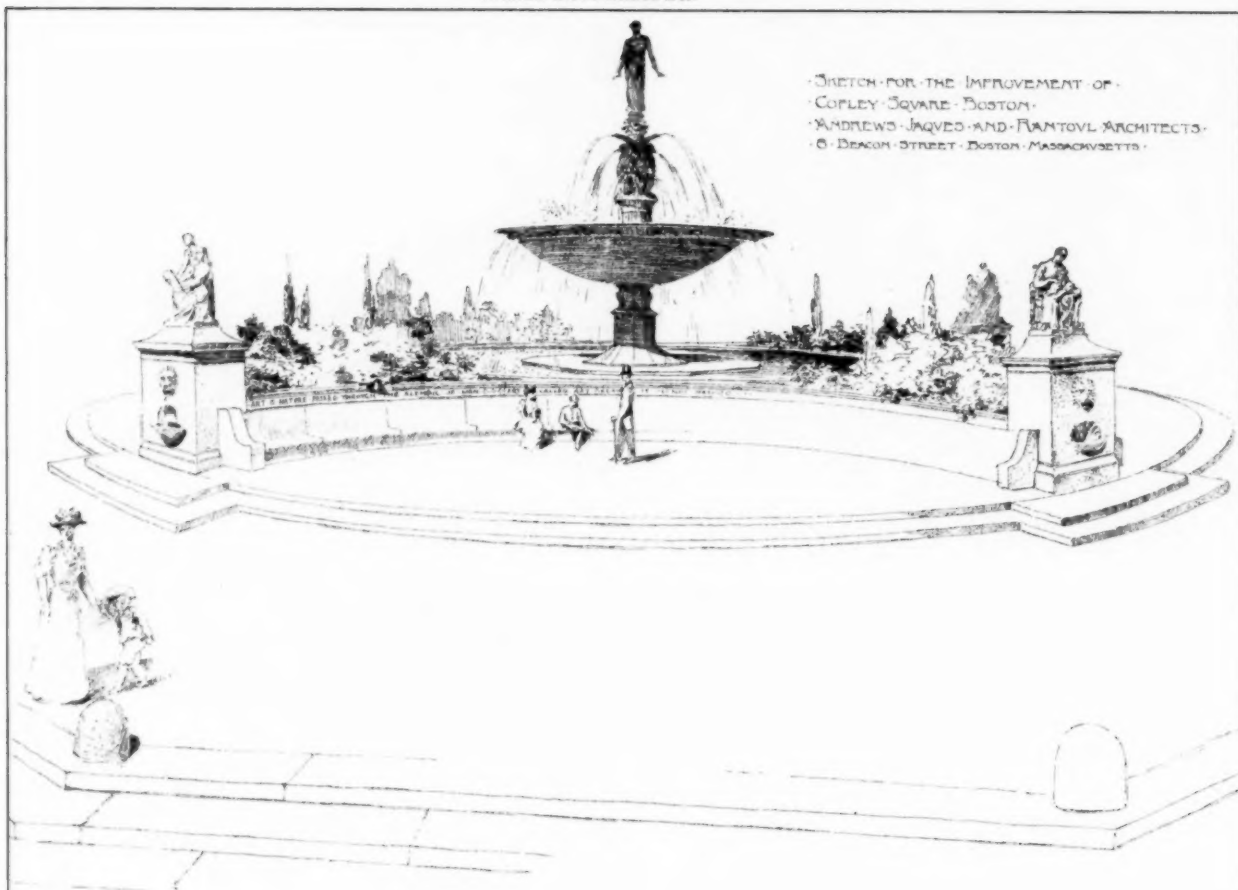
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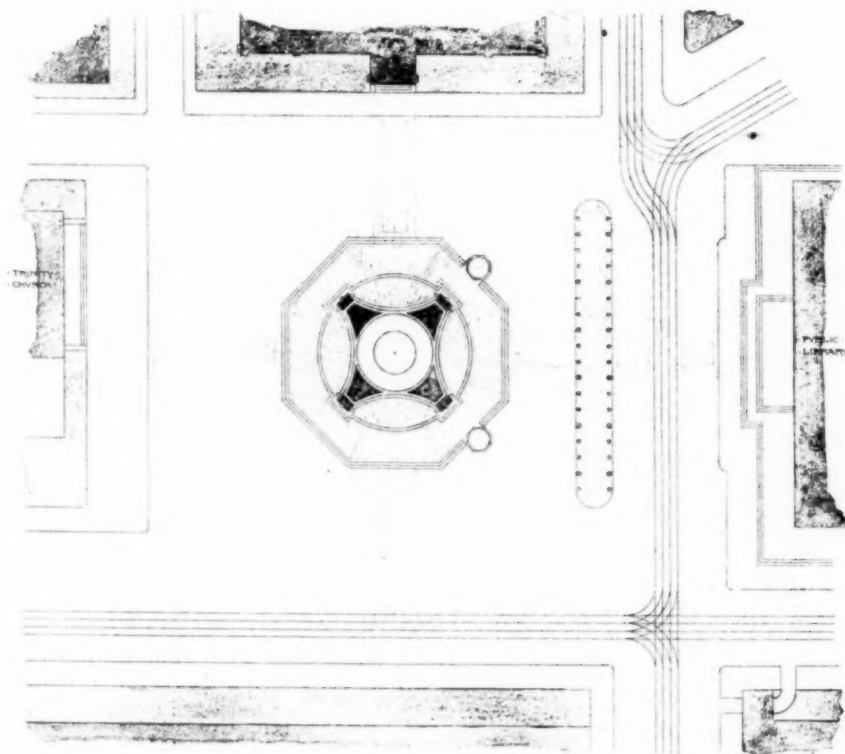
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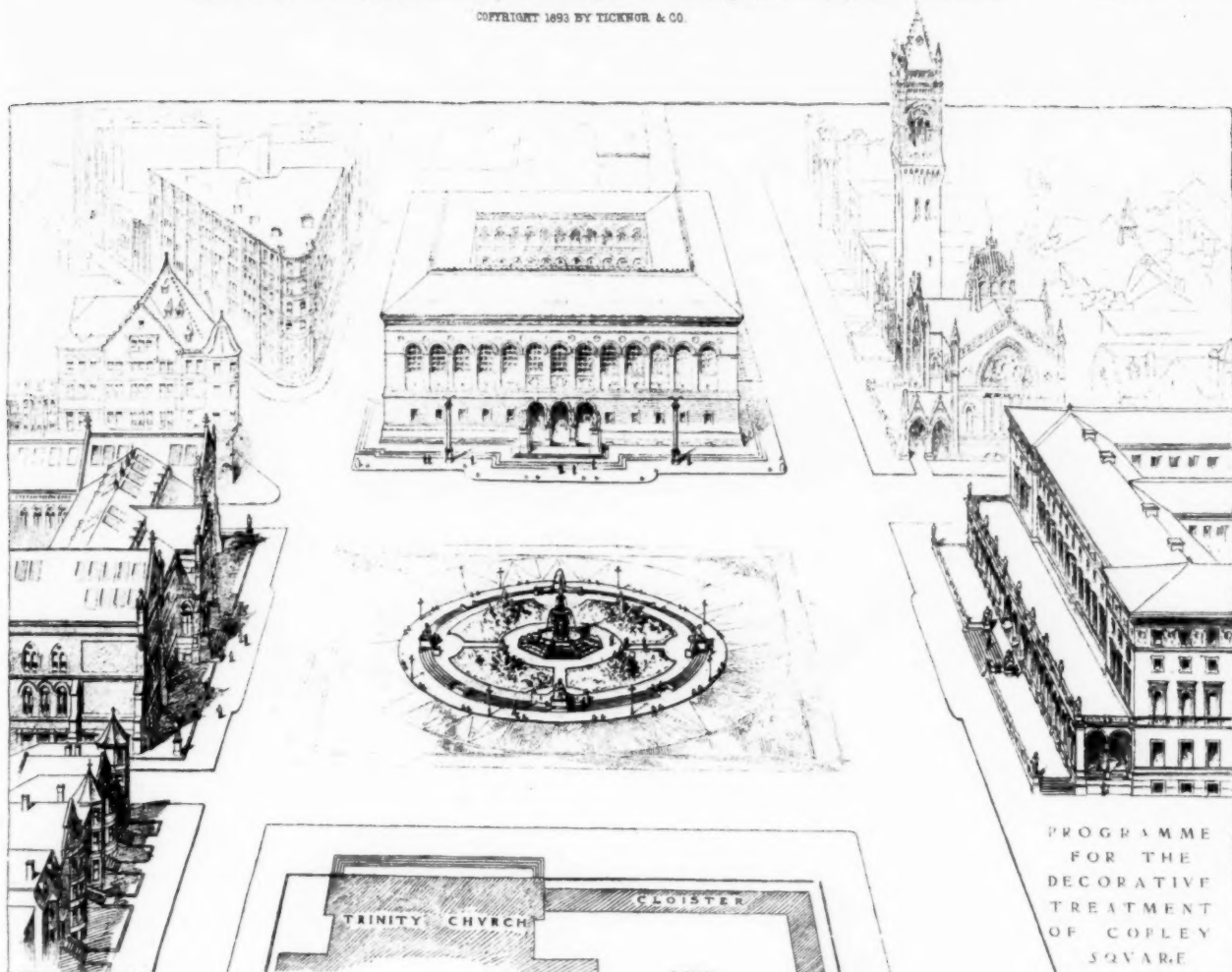
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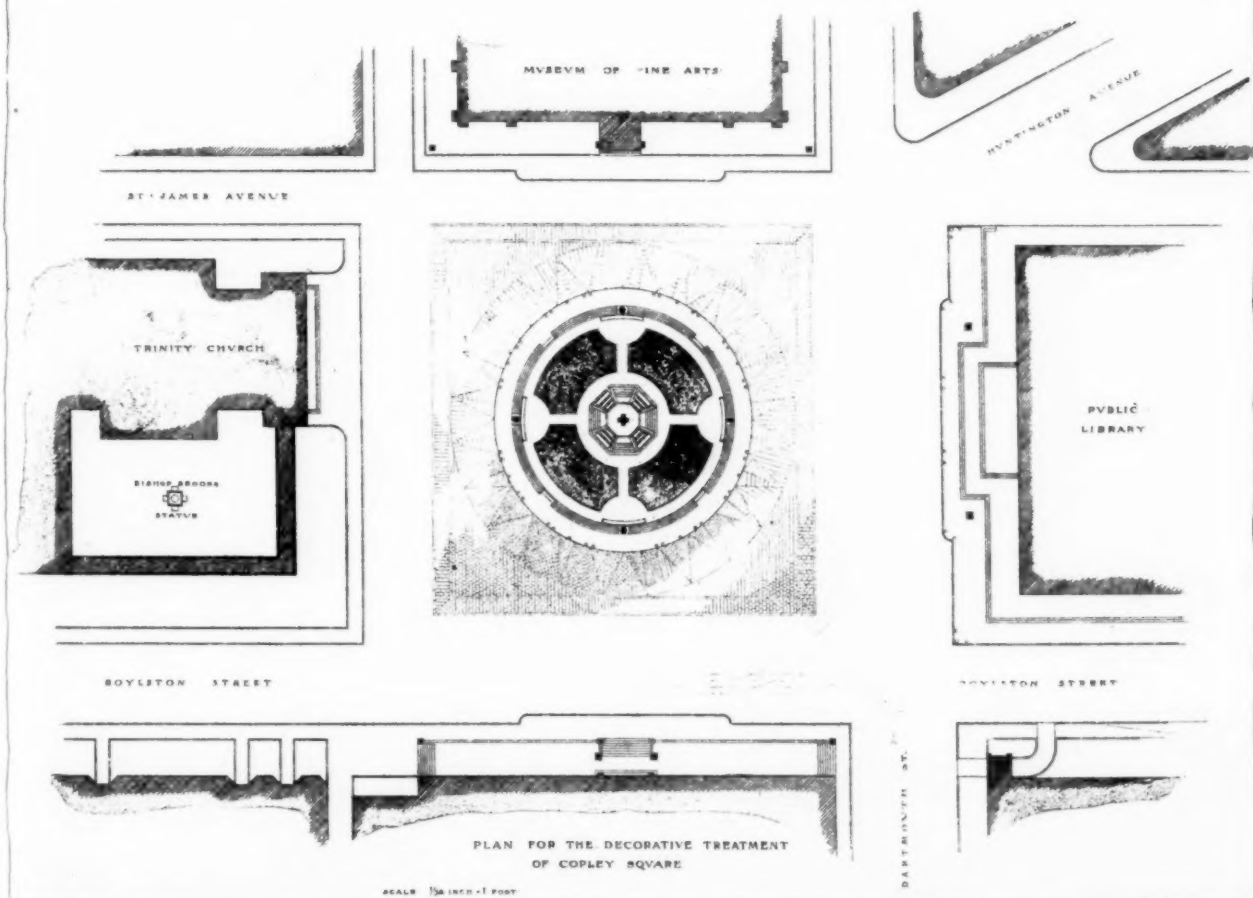
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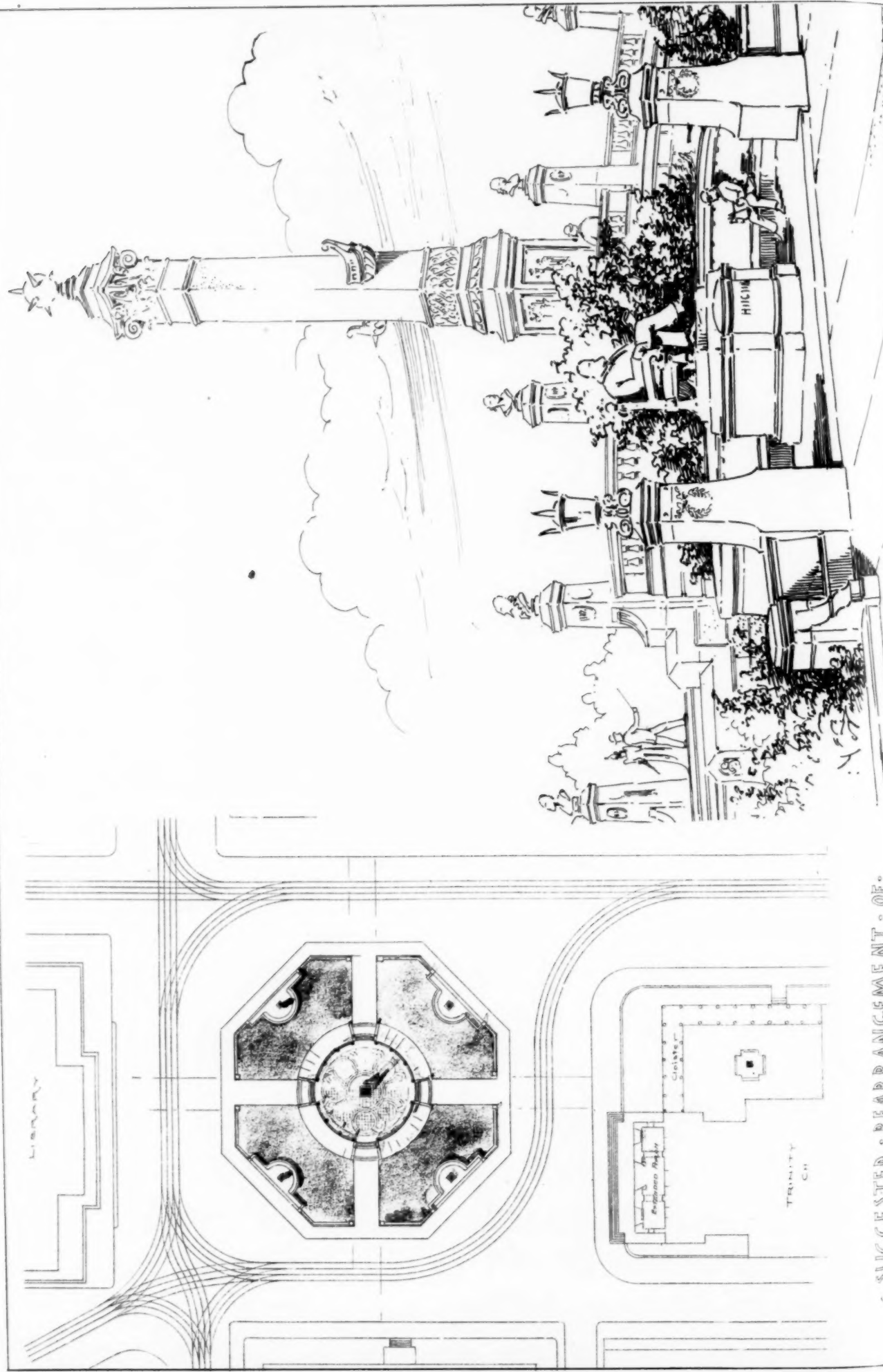
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