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CONTENTS.



IN reporting the budget for Fine-Arts in France for the next year, M. Berger, the reporter, makes some observations in regard to the conduct of the School of Fine-Arts, which derive special interest from the fact that the feeling which he expresses is, and has been for several years, shared by the heads of all the great schools of architecture, and probably of the fine-arts generally. He thinks that the time has come for making the national School of Fine-Arts a place of training only for men of exceptional qualifications. As he says, "the classes of the School are disastrously encumbered with persons of mediocre ability, who come there to see how they like fine-art, just as they might try their hand at any other business; and the result is that instead of preparing a selected company of young men, well endowed by nature, and sufficiently prepared for their work, for high artistic attainment, the School lists are filled with hundreds of names condemned from the outset to obscurity." M. Planat, in *La Construction Moderne*, says of this that it is all very well to long for a school which shall turn out only accomplished and talented artists, but, if the School of Fine-Arts is to restrict itself to these alone, the practical question presents itself of the disposition to be made of the students who have not yet shown their claim to exceptional talent, but whom it would be harsh to exclude altogether from professional training; but M. Berger practically answers this objection by saying that his idea would be to raise the standard of admission to the School, and, particularly, to require for admission such knowledge of elementary science and history as to make it unnecessary to pursue those branches in the School itself. With us, we are sure that the profession, and the directors of professional schools, will agree with M. Berger. Art is long, and three or four years in a professional school is not too much time to give to art alone, without any distractions in the way of what M. Berger calls "spelling lessons." No doubt, the preparatory schools would cry out at the idea of equipping their candidates for the professional schools with a sufficient amount of mathematics and history to last them, without addition, through their professional lives; but it does not follow, because the entrance requirements include a certain thing, that the curriculum of the preparatory schools must also cover it. On the contrary, all university teachers find that, as a rule, the men under their charge know best such subjects as they have taken up of their own accord, outside of their school courses; and the very foundation of the modern system of university teaching consists in leading students to think and study for themselves; so that the very fact of a candidate having done his preparatory school work, and, in addition, made a sufficiently intelligent study, on his own account, of, let us say, the history of art, to pass a creditable examination would go far to indicate his fitness to be enrolled in the number of the select company to whom M. Berger would like to see the advantages of the School of Fine-Arts confined.

ANOTHER decision, though not a very authoritative one, has been rendered in England as to the ownership of architects' drawings. An architect made plans for a building, preparing everything for letting the contracts for the work. Tenders were invited, but the lowest amounted to more than the owner was then willing to pay, and the project was abandoned. The owner paid the architect for his services, and returned to him the drawings. Five years afterwards, the owner concluded to have the work carried out, but not to employ the architect who made the plans. He demanded from the latter copies of the drawings which had been made five years before, but was, as the whole profession will agree, very properly told that he could not have them without a further payment. He brought suit for them, and the judge of the Westminster County Court decided that the drawings belonged to him, and that he was entitled to their possession. It will be remembered that British jurisprudence on this subject is founded on the celebrated remark of the judge, who, when the English Government demanded the drawings of the Parliament-House from Barry's heirs, exclaimed, "I will not hear of it, that a man shall not have what he has paid for;" and the Westminster judge was undoubtedly right in following a precedent laid down by authority higher than his own, whatever he might think of the logical or juristic value of that precedent. However, the present case seems to have been one of such glaring imposition that it might be worth while for the profession to assist in carrying it to the highest court of appeal, to see whether the ordinary view of such matters, that a man is not entitled to have what neither he nor the person with whom he was dealing supposed he was paying for, and which universal custom regards as the property of the other person, has not some claim to recognition.

THE charter for Greater New York proposes to vest the control of building-operations in the new city in a Board of three Commissioners, one to rule over the Boroughs of Manhattan and Bronx, the second over Brooklyn, and the third over Queens and Richmond, that is, practically, over Long Island City and Staten Island. The Commissioner for Manhattan and Bronx is to exercise the functions of the present Superintendent of Buildings of New York; the Commissioner for Brooklyn is to do the same for Brooklyn, and the Commissioner for Richmond and Queens will consolidate such supervision as has hitherto been exercised over the more rural portions of the metropolis. Each Commissioner is to have complete and responsible control over all his subordinates, whom he may appoint and remove at pleasure; and any Commissioner, with the approval of a majority of the Board of Commissioners, is empowered "to vary or modify any existing law relating to the construction, alteration or removal of any building or structure erected or to be erected within his jurisdiction," where there are practical difficulties in the way of carrying out the exact letter of the law, and where its spirit can be observed, and substantial justice done, by such modification. The whole scheme, simple as it is, can hardly be too highly commended. The principle of the responsibility of heads of departments is adopted without hesitation, and the provision for modification of statutes, which it is impossible to make applicable to all cases, by consent of a majority of the Board, is an excellent one. With good appointments, the building affairs of the great American city ought, in future, to be regulated in a more satisfactory manner than they have ever yet been.

THE question of the proper width of stalls for horses, which has recently been discussed in our columns, has attracted attention in Germany. Not long ago, the Ministry of the Duke of Brunswick requested the General Convention of the Agricultural Association of the duchy to consider the matter, and report upon the most desirable width for horse-stalls. That distinguished body, after mature discussion, decided that for stalls divided simply by suspended beams, such as are used here in some livery and express stables, a metre and a half, or fifty-nine inches, was sufficient width; but that, where the stalls were separated by fixed partitions, one and three-quarters to one and four-fifths metres, or sixty-nine to seventy-one inches, was necessary; but, as it might at any time be desirable to replace hanging beams by fixed partitions, they advised that the greater width should be adopted in all cases. The Germans appear to intend to lodge their horses comfortably, but our livery-stable keepers would consider a standard width for stalls of nearly six feet as little short of ridiculous. Probably much depends on the character of the horses themselves. For a livery-horse, which comes home in the evening too tired to move about in his stall, no great width is required, while horses of more nervous and active disposition seem to be more comfortable in a wide stall. Moreover, while our horses in large stables are generally fed from a passage-way running in front of the stalls, or by some overhead arrangement, it may be customary in Germany for the grooms to move about in the stalls beside the horses.

SOME one writes to the *Builder* to ask what practical test can be applied to mortar, to see whether the contractor has put in too much sand, and whether he has used sharp sand. As this is a question which probably occurs to a good many young architects, the answer to it is of some importance. The *Builder* gives two methods of making the test. One is to have a thin section of a piece of the hardened mortar cut, and examined by polarized light through a microscope, which will show the shape of the grains, as well as their proportion to the mass. The other method is to dissolve some of the mortar in hydrochloric acid, which will attack the lime, leaving the sand; but, where cement is used in the mortar, clay from the cement may be left with the sand. A third test which it suggests, but does not recommend, is to pulverize some of the mortar, and throw the powder into a specific gravity solution, in which the lime will be held in suspension, while the sand will sink. While all these methods have their value, we will suggest that a readier and better test consists in rubbing a bit of the hardened mortar with the fingers. If the sand is easily rubbed out, too much has been used. In good mortar, hardened as it hardens in the wall, without the rapid drying which destroys the properties of loose bits exposed to wind and sun, the sand should be firmly held by the mortar. A few trials will enable a young architect to make this test with sufficient accuracy. He will soon find that cement mortar is far more likely to be over-sanded than mortar containing lime. There is a strange superstition among masons, which leads them to suppose, as they claim, that cement will take more sand than lime, whereas, for making mortar, as distinguished from well-compressed concrete, the case is exactly the reverse, few cements, as used for mortar, bearing so much as three parts of sand, while mortar made with good lime is all the better for having five parts of sand to one of the dry lime. The sharpness of the sand is shown to a certain degree by the same test, as mortar will hold firmly a considerably larger proportion of sharp than of water-worn sand; but by putting a few particles of the sand in the palm of the hand, and rubbing it with the finger, the difference between sharp and rounded grains may be immediately detected.

THE director of the Electrical Company of Cologne has made a comparison of the cost of the different sorts of artificial light, reduced to the same standard of illuminating power. As the cost of materials for illuminating varies in different localities, he has taken the price of coal-gas at ninety-one cents per thousand cubic feet; of alcohol, for use in incandescent lamps, at thirty cents a gallon; of coal-oil at fifteen cents a gallon, and of electricity at one and three-quarters cents per hectowatt. Supposing the "mantles" of the incandescent gas-burners to last four hundred hours, and to cost fifty cents each, and other apparatus to have the average life, he finds the most expensive ordinary light to be that from incandescent electric lamps, which costs ten cents per hour for a given amount of illumination. Next comes the light from ordinary gas-burners, with openings in the form of slits, which costs six cents for the same illumination. Argand burners are, light for light, about twenty per cent more economical than the other sort. Next to these come incandescent lamps burning alcohol, which give light at half the price of the ordinary gas-burner. Ordinary coal-oil lamps give light much more cheaply, the cost per unit of illumination being little more than one-fifth that of incandescent electric light; but the modern gas-lights with incandescent mantles are still more economical, furnishing for one and three-quarters cents per hour the same amount of illumination as incandescent electric lamps at ten cents. Electric arc-lamps are about ten per cent more economical still, and are the cheapest sources of artificial light at present known to us.

M. BECQUEREL lately presented to the French Academy of Sciences a very interesting note on the fluorescent rays of uranium. It is well known that uranium and its compounds have the quality of being excited by neighboring lights, so as to glow themselves with a greenish light, and tubes, made of "canary," or uranium, glass, for exhibiting this fluorescence, are common objects in every physical laboratory. The fluorescent rays from uranium pass through metals and other opaque substances, and liberate electricity from a charged body exposed, even at some distance to them, resembling in these respects the Roentgen rays, but with the difference that the uranium rays are reflected and refracted like those of ordinary light. M. Becquerel, in order to ascertain how long the fluorescence of uranium compounds persisted after the light by which it was originally excited was removed, prepared a double box of thick sheet lead. In this were placed various salts of uranium, spread on pieces of glass, which rested on a sheet of black paper, stretched about half an inch above the bottom of the box. Under the black paper could be slipped a lead case, containing a photographic plate; and the whole was enclosed in an outer box, also of lead. This apparatus was put in a dark place, and the photographic plates showed that the radiations from the uranium compounds, after passing through the glass and the black paper, retained strength enough for more than six months to affect the plates, the influence from some of the compounds being perceptible for eight months. As M. Becquerel observes, none of the ordinary phenomena of phosphorescence will account for this persistence of the uranium radiation, and no one has yet been able to show from what source it derives this peculiar energy.

M. V. DARGAUD, in a series of interesting articles on the Ile Saint-Louis, the quiet island in the Seine which lies just above that on which Notre Dame is situated, relates a pretty story of the painter Daubigny and his friends. The decayed palaces of the Ile Saint-Louis have been for a long time favorite abodes for artists, Meissonnier, among others, having lived there for many years. About 1848, a distinguished sculptor, Geoffroy-Dechaume, who became, later, conservator of the museum of casts in the Trocadéro, inhabited one of the houses on the island. Daubigny, with his brother-in-law, Trimolet, also an artist, came to live in the house, and soon afterwards, another, Steinheil, joined them. The four ambitious young men soon made a characteristically French arrangement. It was agreed that each, in turn, should have a year to work for immortality. During that year he should not be expected to contribute toward the household expenses, or to work for money at all, but should be free from all care for anything except carrying out his own inspirations to the best of his ability. Trimolet died not long afterwards, but the "School of the Ile Saint-Louis" had already become famous among artists, and Corot, Dupré, Ribot and Barye found pleasure in their society.

AMONG the curiosities advertised in the foreign papers is something which ought to be useful, if its properties agree with the description of them. This is a preparation sent out by the "Laboratory of Parasitology of the Bourse de Commerce of Paris," and known as "Contagious Virus No. 2." Although the name is, to say the least, somewhat uninviting, the "Contagious Virus No. 2" is, it appears, contagious and virulent only to "large rats, water-rats and surmulots," whatever the last-named animals may be. In order to apply it to the destruction of creatures of these species, a sufficient quantity of the preparation is ordered from the Laboratory of Parasitology, which supplies it in tubes, sealed with tow. About three ounces of water, to which has been added a pinch of salt, are put in an earthen bowl, and boiled for a few minutes. After cooling, the contents of a tube of virus are put into the water, and stirred until dissolved. The next operation is to soak bits of toasted bread, or lean meat, for about a minute in the solution, and put them without delay in the places visited by the rats. In ten or twelve days the contagion will have produced its effect, and the rats will begin to die. If all of them are not killed by the first dose, a second, and perhaps a third, may be given. It seems that the virus is injurious only to rats; cats, dogs, rabbits, pigeons, chickens and cattle, as well as wild animals and children, can eat the infected bread without inconvenience, and the bowl used for preparing the poison needs only to be washed with warm water.

## STATICS OF STRUCTURES. — THEORETICAL AND APPLIED.[1]—III.

### COMPOSITION AND RESOLUTION OF FORCES. — SIMPLE BEAM WITH CONCENTRATED LOADS.

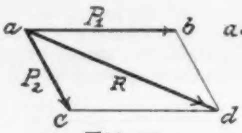

*Fig. 13.*

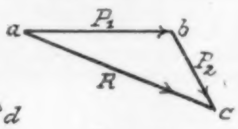

*Fig. 13a.*

47. THE bending-moment for a beam carrying one or more loads concentrated at one or more points of its span can be found either analytically or graphically. While the first method is more accurate, the second, except in very simple cases, is more expeditious, and is therefore the one generally employed in practical work. It is based on the graphical composition and resolution of forces, a few important problems of which we shall, therefore, solve before presenting the method itself. Since these problems form the basis of *graphic statics*, they will also be a preparation for the study of the theory of the truss, the arch, etc.

48. If two forces $P_1$ and $P_2$, whose magnitudes and directions are given by the length and direction of the lines $a\,b$ and $a\,c$ (Fig. 13), both act at the point $a$, their combined effect or *resultant* $R$ will be equal to the diagonal $a\,d$ of the *parallelogram* erected upon them.

49. $R$ can also be obtained as the hypotenuse of the *triangle* formed by placing $P_2$ after $P_1$, as in Figure 13$a$. In employing this latter method, it is of importance to arrange the *components* — as $P_1$ and $P_2$ are called — in such a manner that both will act in the same *sense* or direction around the triangle. Thus, in Figure 13$a$, $P_1$ and $P_2$ act in the sense $a$, $b$, $c$, $a$, while $R$ acts in the sense $a$, $c$, $b$, $a$. It will be noticed that the sense of a force is always indicated by the arrow on it. A line without the arrow only gives its direction and magnitude.

50. By applying this principle of the triangle of forces a given force $R$ may be resolved into two components $P_1$ and $P_2$, of known direction; which is the converse of the first problem; further, the resultant of any number of forces may be found.

Thus let it be required to find the resultant of the forces $P_1$, $P_2$, $P_3$, $P_4$, $P_5$, all acting at the point $a$ (Fig. 14).

We first combine $P_1$ and $P_2$ (Fig. 14$a$), getting as their resultant $R_1$. We are careful to arrange $P_1$ and $P_2$ so that their sense will be the same, and draw the arrow on $R_1$ in the opposite sense. Now, combining this resultant just found, $R_1$, with the third force, $P_3$, gives us the resultant of the three forces $P_1$, $P_2$, $P_3$.

Next we join $P_3$ to $R_1$ in such a way that the sense of $P_3$ will be the same as that of $R_1$, and get the resultant $R_2$. (Sense opposite to that of $R_1$, $P_3$). By proceeding thus, and combining $P_4$ with $R_2$, we get $R_3$ as the resultant of $P_1 - P_4$; and by joining $P_5$ to $R_3$, we get as the last and required resultant, that of all the forces, $R_4$.

51. It is apparent that the same result can be obtained by simply placing the forces after each other, according to location, sense and magnitude, as in Figure 14$b$, and connecting the starting-point $a$

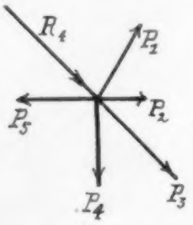

*Fig. 14.*

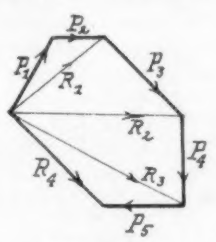

*Fig. 14a.*

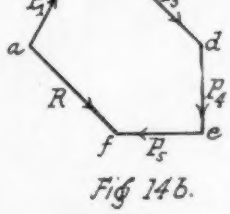

*Fig. 14b.*

with the end of the last force, which gives the resultant as to direction and magnitude, just as before. The component forces must again be arranged so, that, beginning at $a$, and passing along the line $b$, $c$, $d$, $e$ to $f$, all will act in the same sense, while the resultant will have the opposite.

Figure 14$b$ is called a *polygon of forces*, and $a\,f$ its *closing side*.

52. When it is possible to combine a number of forces $P_1 - P_4$, all acting at the same point $a$ (Fig. 15) into a *closing* polygon of forces (Fig. 15$a$), these forces are said to be in *equilibrium*. That is, the resultant of a number of forces in equilibrium is equal to zero. It is to be noticed that a force polygon cannot be considered as closing unless its forces all have the same sense around the polygon. It is immaterial in what order the forces are arranged, as long as their sense remains constant.

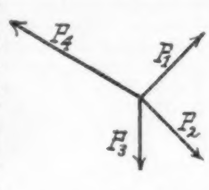

*Fig. 15.*

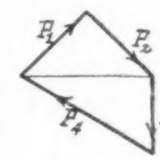

*Fig. 15a.*

53. We can now find a single force which will balance a number of given forces. We need only to draw their force polygon, and make the sense of the closing side the same as that of the components. Thus, in Figures 14 and 14$b$, $R_4$ will balance $P_1 - P_5$, if its arrow is reversed; for then Figure 14$b$ will be a closing polygon, and its resultant zero.

54. All of the forces with which we have dealt so far acted at one point. Let us now solve a more general problem, that of finding the resultant $R$ of a number of given forces $P_1 - P_4$ acting at different points of the same plane (Fig. 16).

We proceed to draw the polygon of forces in the usual manner, which gives us $R$ as to magnitude, direction and sense (Fig. 16$a$). It remains to find its location in Figure 16. For this purpose let us take any point $O$ in the polygon (Fig. 16$a$), and, by drawing $a\,O$, $b\,O$, resolve $P_1$ into the two components 1 and 2. Their sense we indicate by means of the arrows *inside* the triangle $a\,O\,b$.

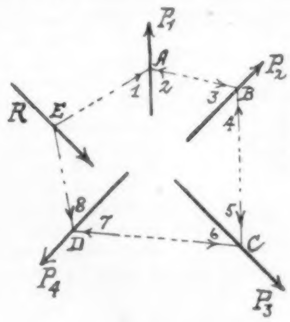

*Fig. 16.*

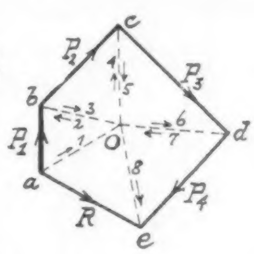

*Fig 16a.*

Now, returning to Figure 16, we take any point $A$ lying in the line of the force $P_1$, and apply to it the two components just found, being careful to give them their proper direction and sense. We can now consider $P_1$ in Figure 16 as being replaced by its components 1 and 2.

Returning again to Figure 16$a$, we resolve $P_2$ into its components 3 and 4, by drawing $c\,O$; the line $b\,O$, already drawn, representing now force 3. We also indicate the sense of these components by placing arrows *inside* the triangle $b\,O\,c$.

The next step is to locate the point $B$ on $P_2$ in Figure 16, by prolonging 2 until it intersects $P_2$. At this point we apply the components 3 and 4, which replace $P_2$. But the components 3 and 2 are, by construction, the same as to direction and magnitude, while opposite in sense; therefore they neutralize each other and can be dropped, leaving 1 and 4 as the components of $P_1$ and $P_2$.

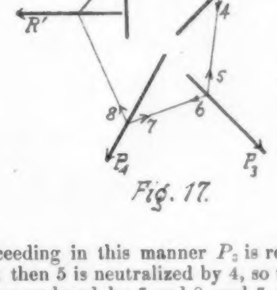

*Fig. 17.*

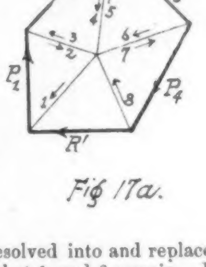

*Fig 17a.*

Proceeding in this manner $P_3$ is resolved into and replaced by 5 and 6; then 5 is neutralized by 4, so that 1 and 6 remain. Finally, $P_4$ being replaced by 7 and 8, and 7 neutralized by 6, only 1 and 8 remain as the components of $P_1 - P_4$. Therefore, they are also the

[1] Continued from No. 1095, page 97.

components of $R$, the resultant of $P_1 - P_4$, and their point of intersection $E$ in Figure 5 is a point of the resultant, the location of which is thus determined.

55. If (Fig. 17) the forces $P_1 - P_4$ are given, as before, and it is desired to find, instead of their resultant, the magnitude and location of the force $R'$ necessary to give equilibrium, we proceed in a

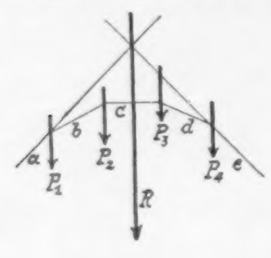

Fig. 18.

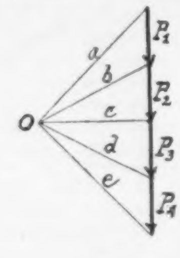

Fig 18a.

similar manner. The force polygon (Fig. 17a) is again drawn, and the point $O$ taken. Then $P_1$, in Figure 17a, instead of being resolved into the two components 1, 2, is placed in equilibrium with them, the sense of the force triangle $a\,b\,O$ being made constant all around. The two forces 1, 2 are then applied to $P_1$ at $A$, causing equilibrium at that point. Similarly 3 and 4 are made to be in equilibrium with $P_2$; then, since 2 and 3 neutralize each other, 1 and 4 will be in equilibrium with $P_1$ and $P_2$. And so we proceed, until finally we have 1 and 8 in equilibrium with $P_1 - P_4$. Therefore their resultant $R'$, which passes through their point of intersection $E$, is also in equilibrium with $P_1 - P_4$; which solves the problem.

56. The point $O$ in Figure 17a is called the *pole; a O, b O, c O,* etc., are *rays;* and $A\,B\,C\,D\,E\,A$ is a *cord-polygon,* because $A\,B$ — $E\,A$ may be regarded as a cord holding the forces $P_1 - P_4$, $R'$ in equilibrium. For this reason it is also called an *equilibrium-polygon.*

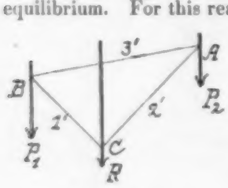

Fig. 19.

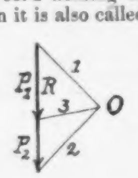

Fig. 19a.

57. If, in the last problem, the forces $P_1 - P_4$ are all parallel, the solution is accomplished in the manner shown in Figure 18 and 18a. Instead of getting a force-polygon, we get a force-line (Fig. 18a), which also represents the resultant, since that, in this case, is equal to their algebraic sum. The pole $O$ is taken arbitrarily; the rays *a, b, c, d, e* drawn in Figure 18, and the cord-polygon $A\,B\,C\,D\,E$ in Figure 18a parallel to them: the location of the resultant is then found by prolonging the first and last sides $A$ and $E$ until they intersect. The resultant passes through this point, parallel to its components.

58. Let us now apply the principle of the cord-polygon to the resolution of forces. This is the reverse of the composition of forces; the latter is "putting together," while the former is "taking apart." We shall consider only such problems as are absolutely necessary to prepare us for the application of the principle to practical work.

Let us, first, resolve a given force $R$ (Fig. 19) into two components or *side* forces $P_1$, $P_2$, parallel to the given force and passing through the given points $A$, $B$.

After selecting a pole $O$ at random, we draw the rays 1 and 2 from it to the ends of $R$. Then, after drawing 1′, 2′ at any point $C$ in the force $R$ in Figure 19, parallel to the rays 1, 2, we connect their intersections with $P_1$ and $P_2$ by the closing side 3′. A parallel to 3′ drawn in Figure 19a, from the pole $O$ to $R$ divides the latter into its two components $P_1$ and $P_2$.

This is proved by going over the operation backwards; for $R$, in

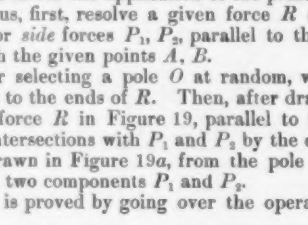

Fig. 20.

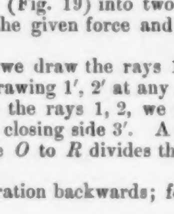

Fig. 20a.

Figure 19a, is then the resultant of $P_1$ and $P_2$, and must, as such, pass through the point of intersection of the cords 1′, 2′ in Figure 19, which it does by construction.

59. Now let us solve the problem of finding the magnitude of two parallel forces $A$ and $B$ that will hold in equilibrium a number of forces $P_1$, $P_2$, $P_3$, $P_4$ parallel to them.

This is virtually the same as finding the reactions at the ends of a beam carrying the four concentrated loads, $P_1$, $P_2$, $P_3$, $P_4$. (Fig. 20.)

We proceed as follows: the forces $P_1 - P_4$ are combined into a load-line (Fig. 20a), and after locating the pole $O$ at random, the rays 1, 2, 3, 4, 5 are drawn. Then the cord-polygon in Figure 20 is drawn, with its respective sides 1′, 2′, 3′, 4′, 5′ parallel to these rays.

The resultant $R$ of all the forces, the magnitude of which is equal

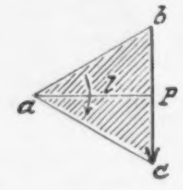

Fig. 21.

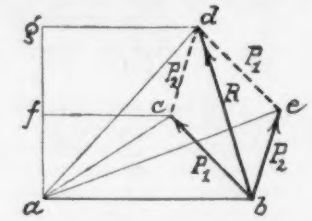

Fig. 22.

to that of the load-line, passes through the intersection of the first and last sides, 1′ and 5′, prolonged, as we found in the last problem.

If the cord-polygon (Fig. 20) is closed by the line 6′, a parallel to it, 6 in Figure 20a, from the pole $O$ to the load-line, will divide the latter into the two required forces or reactions $A$ and $B$; the upper portion being $A$, because it comes between the rays 1 and 6, with the parallels of which, 1′ and 6′, it is in equilibrium in Figure 20; and the lower portion being $B$, because it lies between 6 and 5, with the parallels of which it is in equilibrium.

60. The reactions at the ends of a beam are always vertical, because, first, the surfaces of its supports are always horizontal or level, and, secondly, it is never called upon to support other than vertical loads.

61. In § 3, the moment of a force about a given point or centre of rotation was defined as the product of that force into its distance from the point.

Geometrically, this product is equal to twice the area of the triangle $a\,b\,c$ (Fig. 21), constructed upon the force as a base with the point of rotation as the apex. For the area of this triangle is equal to $\frac{1}{2}\,p\,l$.

62. *The sum of the moments of any number of forces about a given centre is equal to the moment of their resultant about this centre.*

Suppose the forces $P_1$, $P_2$ are given (Fig. 22), and it is to be proved that the sum of their moments about the point $a$ will be equal to the moment of their resultant $R$ about $a$.

We connect $b$ with $a$, and draw $a\,g$ vertical to $a\,b$ at $a$.

Upon $a\,g$ we project $P_1$ equal to $a\,f$, and $P_2$ equal to $f\,g$; while the projection of $R$ is equal to $a\,f + f\,g$, or $a\,g$.

Now, since $f\,a$ is equal to the altitude of the triangle $a\,b\,c$, the moment of $P_1$ about $a$ is

$$M_1 = 2\,\Delta\,a\,c\,b = a\,b \times a\,f.$$

Similarly, the moment of $P_2$ about $a$ is

$$M_2 = 2\,\Delta\,a\,e\,b = a\,b \times f\,g,$$

(since $f\,g$ = altitude of $\Delta\,a\,e\,b$).

And the moment of $R$ about $a$ is

$$M = 2\,\Delta\,a\,d\,b = a\,b \times a\,g,$$

or, since $a\,g = a\,f + f\,g$ and

$$M_1 + M_2 = a\,b\,(a\,f + f\,g),$$

$$M = M_1 + M_2,$$

which was to be proved. By making use of the equilibrium polygon the law can similarly be proved for any number of forces acting at different points and in different directions.

63. Since this demonstration is very much like that applied to Figure 17, we shall omit giving it here and pass on to the methods of determining the moments of a number of non-parallel forces about a given centre of rotation.

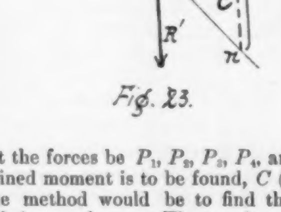

Fig. 23.

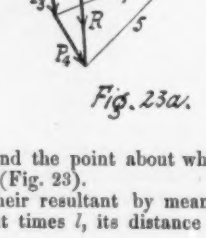

Fig. 23a.

Let the forces be $P_1$, $P_2$, $P_3$, $P_4$, and the point about which their combined moment is to be found, $C$ (Fig. 23).

One method would be to find their resultant by means of the equilibrium polygon. The resultant times $l$, its distance from $C$, would then be the required moment. The second method, very important because it is the basis for the graphic method of finding the bending-moment of beams, is as follows:

After having drawn the resultant $R$ of the force-line in Figure 23$a$, draw the perpendicular $H$ to it from the pole $O$; this $H$ is called the

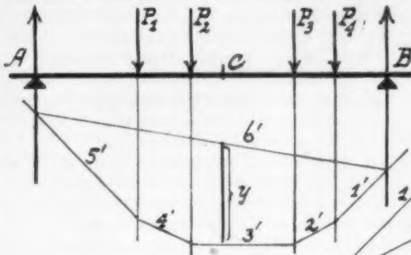


Fig. 24.

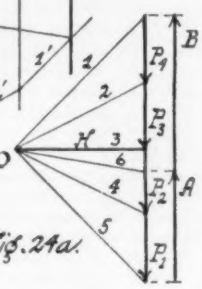


Fig. 24a.

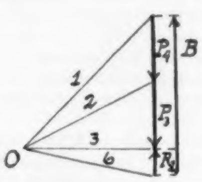


Fig. 24 b.

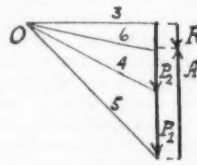


Fig. 24c.

*pole-distance.* Now, in Figure 23, draw a line $y$ parallel to the resultant $R$ in Figure 23$a$, through the centre of rotation $C$, of such length that it will intersect the first side 1′ (prolonged) of the equilibrium polygon at $n$, and the last side 5′ at $m$. This line $m, n = y$ is called an ordinate of the cord-polygon for the point $C$, and the moment of the forces $P_1 - P_4$ about $C$ is equal to the pole-distance $H$ times the ordinate $y$, or

$$M = H y \qquad (12)$$

For the $\Delta\, O\, n'\, m'$ (Fig. 23$a$) being similar to the $\Delta\, K\, m\, n$ (Fig. 23),

$$R : H :: y : l,$$

or, the product of the extremes being equal to that of the means,

$$R\, l = H\, y.$$

But $R\, l = M$, the required moment, therefore, $M = H\, y$.

Equation 12 may be expressed as follows: *The moment of a number of forces about a given centre of rotation is equal to the product of the pole-distance of the resultant of these forces into the length intercepted by the outside sides of the cord-polygon on a parallel to the resultant drawn through the centre of rotation.*

64. We are now ready to find the bending-moment of a beam with concentrated loads. Let the beam be $A\, B$ (Fig. 24), supporting the concentrated loads $P_1 - P_4$, and let it be required to find the bending-moment for the section $C$. We combine the loads $P_1 - P_4$ into the load-line in Figure 24$a$, locate a pole $O$ at random, draw the rays 1, 2, 3, 4, 5, and parallel to them the cord-polygon 1′, 2′, 3′, 4′, 5′ in Figure 24; then a parallel 6 to its closing side 6′, dividing the load-line into the reactions $A$ and $B$; all as first described in § 59.

We next find the ordinate $y$ of the cord-polygon for the point $C$

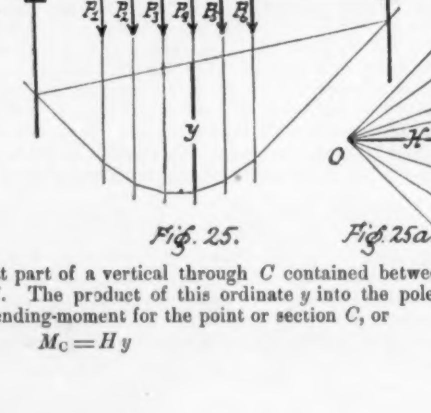


Fig. 25.

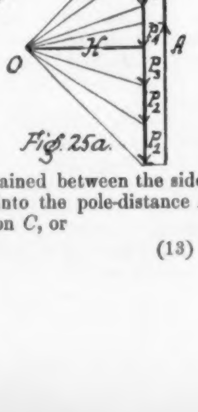


Fig. 25a.

as that part of a vertical through $C$ contained between the sides 6′ and 3′. The product of this ordinate $y$ into the pole-distance $H$ is the bending-moment for the point or section $C$, or

$$M_C = H\, y \qquad (13)$$

65. For, if we bear in mind that the bending-moment at $C$ is the moment of the forces on only one side of $C$ (§ 14), and regard therefore, instead of all the forces, only the group $P_2$, $P_1$, $A$ on the left side, or the group $P_4$, $P_3$, $B$ on the right, we find that 3′ and 6′ are actually the first and last sides of the cord-polygon for either of these groups. This is shown very clearly in Figures 24$b$ and $c$.

It will be noticed that the "first" and "last" sides are always those holding the resultant; thus, in Figure 24$b$, 3 and 6 hold $R_1$, the resultant of that group, while in Figure 24$c$ they hold $R_2$. In other words, Equation 13 is nothing but an application of Equation 12 to a double group of parallel forces.

66. It is customary to regard $H$ as a load, and $y$ as a length. $H$ is, therefore, to be measured with the load-scale, and $y$ with the lineal scale; $y$ is best taken in inches, so as to give $H\, y$ in inch-pounds, as stated in § 25.

67. The bending-moment is positive at all points along the beam as long as all the loads act downward, and the cord-polygon "hangs" from the closing-line; for then the moment of all the forces to the left of any section is always right-turning, as will be seen farther on.

68. The bending-moment becomes a maximum for that point under which the longest ordinate "$y$" may be drawn through the cord-polygon, thus, in Figure 24, under the load $P_2$; while at the points of support it is equal to zero, for there $y$ vanishes.

69. The graphic method can also be applied to beams uniformly loaded, or partially so, as, for instance, beam $A\, B$ in Figure 25, which carries the load $P$ uniformly distributed over part of its span. To apply the method, it is only necessary to divide $P$ into a number of small parts, in this case six; $P_1$, $P_2 - P_6$, each equal to $\frac{1}{6}$ of $P$.

These are then treated like concentrated loads, and the load-line, cord-polygon, etc., drawn accordingly. It is apparent, that the smaller the parts into which $P$ is divided, the nearer will the cord-polygon approach a parabola, which is the form it takes under a load uniformly distributed (§ 23).

70. Before closing, let us briefly take up the analytical method

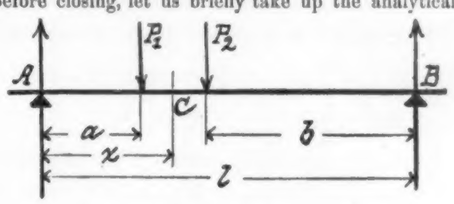


Fig. 26.

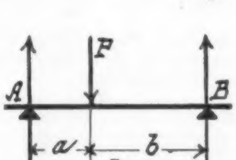


Fig. 26a.

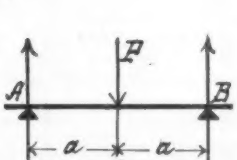


Fig. 26b.

and deduce a few equations for the simpler cases constantly met with in practical work.

Thus, suppose the bending-moment for any section $C$ of the beam $A\, B$, carrying the load $P_1$ at any point to the left of $C$, and the load $P_2$ at any point to the right (Fig. 26), were to be found without drawing a cord-polygon.

To get this moment analytically it is only necessary — as we saw in § 16 — to take the moments of the forces on one side of $C$, with the latter as the centre of rotation; but to be able to do this, the reactions must be known; while we only know their sum. Therefore, in order to find $A$, for instance, in terms of $P_1$ and $P_2$, let us take the moments about the right-hand side of support as a centre, and place their sum equal to zero, which is the value of the bending-moment for that point.

71. Or, with the lettering in Figure 26 (and calling right-turning moments positive, and left-turning ones negative, all as in § 4 and § 16),

$$M_B = A\, l - P_1\, (l - a) - P_2\, b = 0, \text{ from which}$$

$$A = \frac{P_1\, (l - a) + P_2\, b}{l} =$$

$$= P_1 - \frac{P_1\, a}{l} + \frac{P_2\, b}{l}. \qquad (14)$$

Now, the moment for $C$ is:

$$M_C = A\, x - P_1\, (x - a).$$

Substituting in this for $A$ its value as given by Equation 14, we get

$$M_C = P_1\, x - \frac{P_1\, a\, x}{l} + \frac{P_2\, b\, x}{l} - P_1\, (x - a) =$$

$$= \frac{P_1\, x\, l}{l} - \frac{P_1\, a\, x}{l} + \frac{P_2\, b\, x}{l} - \frac{P_1\, (x - a)\, l}{l} =$$

$$= \frac{P_1\, (x\, l - a\, x - l\, x + a\, l)}{l} + \frac{P_2\, b\, x}{l} =$$

$$M_C = P_1 \frac{a\,(l-x)}{l} + P_2 \frac{b\,x}{l}. \qquad (15)$$

This operation appears more complicated than it really is; indeed, when the dimensions $l$, $a$, $b$ and $x$ are given numerically, it becomes quite simple.

72. If $P_2$ is made equal to $P_1$, and $b$ to $a$ (Fig. 26), Equation 15 becomes

$$M_C = \frac{P_1\,a\,(l-x)}{l} + \frac{P_1\,a\,x}{l} =$$

$$= \frac{P_1\,(a\,l - a\,x + a\,x)}{l} =$$

$$M_C = P_1\,a. \qquad (16)$$

This equation is not only true for all sections between $P_1$ and $P_2$, but also for the points at which these loads are applied, as can be seen readily by placing $x = a$. It may be expressed as follows:

*The maximum bending-moment for a beam carrying two equal loads equidistant from the supports is equal to one of these loads times its distance from the point of support.*

73. Another very important case is that of a beam with a single concentrated load (Fig. 26*a*). Again taking the bending-moment for the right-hand support, $B$, we get:

$$M_B = A\,l - P\,b = 0, \text{ or}$$

$$A = \frac{P\,b}{l} \qquad (17)$$

Now, for the point of application of $P$,

$$M = A\,a = \frac{P\,a\,b}{l} \qquad (18)$$

*That is, for the case illustrated by Figure 26a, the bending-moment is equal to the load multiplied by the two segments into which its point of application divides the span, the whole divided by the span.*

74. If $P$ is applied at the centre of the span, *i. e.*, if $a = \frac{l}{2}$ (Fig. 26*a*), and $A = \frac{P}{2}$, then the bending-moment under $P$ is equal to

$$M = \frac{P}{2} \times \frac{l}{2} = \frac{P\,l}{4} \qquad (19)$$

It will be noticed that this is just twice the moment for a uniformly distributed load $P$, which we found to be $\frac{P\,l}{8}$; this shows that a beam will carry only one-half as much when the load is concentrated at its centre, as it would when the load is uniformly distributed over its entire span.

After concluding our study of the theory of the beam with the next chapter, we shall take up a number of examples illustrating the use of the methods and equations just investigated.

O. F. SEMSCH.

[To be continued.]

## BOOKS AND PAPERS.

A HUGUENOT ancestry on the father's side, who endowed all their posterity with a keen sense of humor, and a vigorous constitution; a maternal grandmother most vivaciously loquacious; a maternal grandfather of great learning and of a taciturnity to offset his wife's loquacity, a man who spent years in writing some *magnum opus* and then burned it all without ever allowing any one to know what it was all about; an uncle, wealthy and talented, who in middle life turned his back on the world, gave his property to the church and became a wandering preacher, aiding and comforting the poor; a father who wished to be an architect, but was forced by an unbelieving parent to hide his aspirations under the apron of a jeweller's apprentice; a mother who yielded to her husband's theory that their first and unborn child might be endowed, through loving care and concentration of thought during its prenatal development, with a love for music, architecture and art, all these form a somewhat unusual background against which to set a man's life and give a clue to why and how it happened that John W. Root became, seemingly by sheer force of inheritance and inevitable natural development, a most gifted and many-sided man.

Add to these things a childhood spent in the sunny South, rudely brought to an end by a flight from Atlanta in consequence of Sherman's warning to the citizens that he proposed to burn the town, and later, the exciting experience, for a boy, of running the blockade so that he might go to England in search of that education which the condition of things in the Confederate States made it impossible he should obtain there, and it is easy to find a reason why, when the man's lovable and attractive personal qualities are taken into account, his biographer should choose to style the subject of her memoir a "hero."

The memoir,[1] itself, is one of the most delightful books we have seen for a long time, written simply, frankly, lovingly, and yet with a deep understanding of and a clear insight into the depths of Root's nature, for though there never was a man who on casual acquaintance could be more easily suspected of shallowness, his nature unquestionably did contain depths which it was not easy to fathom. One's delight in the subject is at least equalled by one's admiration for the biographer, and one feels like amending one of the anecdotes by adding the words "or sister-in-law" to Root's answer to a young man at a wedding who had asked him if he did not "pity the bridegroom." Root answered: "Yes Joseph, I pity any man who has not married my wife." This answer and this memoir clearly show that in his home life, Root found that understanding appreciation and sympathetic encouragement without which it is so difficult for a sensitive and artistic nature to expand and fructify.

It is not unnatural that such a biographer should style her hero "great." But Root was not and could not have been great. His nature was too many-sided, his virtuosity was too complex to allow him ever to reach the stature of real greatness in any of the many lines of work and thought in which he was more proficient than most men. Much talent he unquestionably had, and not many would deny that he had genius, but it was genius of the Admirable Crichton order — distributed, not concentrated. Perhaps, if he had devoted himself to the cultivation of only one talent he could have achieved greater fame as a musician than as an architect, for in this direction nature had most highly endowed him. A child who could "sing before he could talk," who at two years of age "never made a discord" on the violin, who, when first introduced to the piano at the age of twelve, "played several airs with apparently no effort," would seem to be marked out by nature for a successful and possibly a great musician. But, apparently, his father's wishes and his mother's prenatal compulsion determined him to adopt a less spiritual and more exacting profession, and while he acquired great skill and proficiency in music, particularly in the manipulation of the king of instruments, the organ, he resorted to music as an aid to thought and self-communing rather as to an end in itself.

Whatever Root accomplished in architecture, and howsoever well his work may prove to stand the test of time, and confirm such measure of praise as now seems to be really his, those who knew him will always feel that the man himself was always more interesting than his works, and it is the man and his many lovable qualities that this memoir so frankly and so charmingly exhibits. In his estimation of himself and his works, Root was honest and free from egotism. "In the rapid growth of his mind, its expansion in creative power, his past work soon ceased to satisfy him. He would turn aside compliments of his most successful designs by saying that no one could tell whether they were good for anything until they had been tried by time. He longed to revise the building of last year by the knowledge of this, and his mistakes became demons which mocked and tormented him from many an edifice, rebuking all temptation of pride. To his instinct, self was not the fixed centre of the universe, but merely a clear medium through which strange forces flowed and ebbed. Any impression which his individual mind might make upon these forces seemed too slight a thing in comparison with infinite possibilities to be worth talking about." This commendable frame of mind was not peculiar to Root, but while there are many architects in this country who share it, the acuteness of the feeling is being gradually blunted by the necessary effect of the detestable modern habit of pouring out on artists of all kinds, and on writers, a constant stream of newspaper adulation and fulsome magazine flattery. Measuring facts by daily printed assertions, and posterity will be forced to believe that the artists of the Renaissance were not "in it" in comparison with the American artists of to-day. As Root was often the object — the victim — of much of this vulgar flattery, he could hardly have remained the simple, open-minded man that he was, unless he was unusually sincere in his appreciation of the real value of his own work. Much of his work was better than its day and his surroundings, but whether much or any of it has the lasting qualities upon which a claim to greatness must depend can be safely left to the future to determine. It is enough for Root's fame with his contemporaries to have it acknowledged that its qualities range far above the average.

The biographer is as honest and frank-minded as Root would have been himself, in acknowledging that the work actually accomplished by the firm of Burnham & Root could hardly have been carried out, if the partners had gone through life each in alliance with some other worker who did not so fully complement his own powers. Mr. Burnham's capacity was confirmed before the world by the way in which he carried out the World's Fair undertaking, and it is possible that Root might, had he lived, have come out of that ordeal without diminished reputation; but even after reading the evidence the book contains, we doubt whether this would have happened, and feel now as we have always felt, that, great as was the loss caused by his early death, it was really better for his reputation and for the success of the exhibition, that it should have been left to other hands to determine the real character of the architectural treatment of that great undertaking.

The account here given of the genesis of the World's Fair makes it clear that Root played a much more important rôle in the initiatory proceedings than we, at least, had understood. It will be remembered that he was the second official appointed — consulting architect, Mr. Olmsted having been appointed consulting landscape-architect on the preceding day, August 20, 1890, — and that it was due to his honesty of purpose and clearness of perception that he

[1] "*John Wellborn Root*": a Study of his Life and Works. By Harriet Monroe. With etchings and drawings by Charles F. W. Mielatz, and fac-similes of designs by Mr. Root. Boston and New York: Houghton, Mifflin & Co. 1896. Price, $6.

and his partner did not, as their rivals feared would be the case, attempt to "hog it all," as Root said, but carried against opposition their own desire that the important buildings should be placed in the hands of competent men by the process of direct selection. This decision more than anything else was the salvation of the undertaking from an artistic standpoint, and it is doubtful whether even Root's power of persuasion and his enthusiasm could have brought these men, once appointed and in consultation one with the others, over to his own point-of-view, for it was his desire that the architecture of the exhibition buildings should be absolutely and unmistakably "American" — of the very best genus and highest species, be it understood. The utmost that could have been accomplished would have been to turn the whole fair into a sort of glorified Midway Plaisance, whose eccentricity of form and exuberance of color could hardly have been whipped into shape even by an eye and mind as naturally sure as were Root's. It is almost a certainty that the task would have been beyond his strength, and his life would have closed with a great defeat rather than at the beginning of a grand success, in which he could rightly claim an important share, for, in the selection of Jackson Park as the site, and suggesting the general scheme of landscape treatment and grouping of the buildings, he seems certainly to have been a leader, if not, indeed, the originator and prime mover.

In the Midway and amongst the State and miscellaneous buildings, the world had chance enough to see what undefiled American architecture looked like in gala attire, and we fancy the world saw in this way quite as much of this sort of thing as it cared for. Even if Root could have carried out his design for the Art Building, which he proposed to make his own contribution to the designing of the buildings, it is not likely that he could have achieved the success that Atwood did with his, though we willingly believe that it would, under the stimulus of the enthusiasm of the occasion, have proved to be the best piece of design he had ever accomplished.

Still, more than in his works, interest centres in the man himself, in his sweet nature, his buoyant willingness to help others, his intelligent companionability and his unusual versatility. When Root died, there passed away the only man we ever knew to whose personality could rightfully be applied, and in its best sense, that rather foreign and distinctively feminine adjective "gay."

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LOTHAR ABEL is well known in Europe as a writer of works on architectural subjects. Most of these are of the practical sort, although written, as in the case of the *Praxis des Baumeisters*, recently reviewed in these columns, with a certain æsthetic discrimination; but in the present book Herr Abel devotes himself particularly to the æsthetic side, not only of architecture, but of sculpture and painting, and landscape design. Although there is a way of talking about the principles of art which is, we think, unprofitable to the artist, who, if he cannot feel what is beautiful and right, will never be able to construct an ideal by the help of principles, a person possessed of the necessary sensitiveness and sympathy may be assisted in clearing away the misapprehensions and false notions — by which every artist is more or less misled — by a judicious consideration of the differences between what all the world acknowledges to be good art and bad art, and, especially, by the presentation to him of a collection of well-selected examples of good work. This service Herr Lothar has set himself to render, and he has accomplished his task with much learning and discretion. Whether we should all agree with his opinion as to the connection of the fine-arts with the elevation of the moral character of the public is doubtful; but good taste is, at least, the sign of intellectual development, while bad taste and bad morals are generally coincident in an individual or a people, if not mutually dependent. However, not much space is devoted to the discussion of this question, the substance of the book being better occupied in the study of actual examples, and architects will find much to interest them in the author's comments on these. The illustrations are well chosen, but, being partly wood-engravings of the ordinary sort, or process-plates from drawings, and partly half-tone plates from photographs, they give the book a certain air of having been patched up from miscellaneous sources, which it does not really deserve; and the publisher's exigency, presumably, which led to the scattering of the plates at approximately equal intervals through the volume, instead of placing them near the pages of text referring to them, is rather annoying to the reader. Nevertheless, the book is an attractive and useful one, and in these days of cheap artistic rubbish, it is gratifying to find something at a reasonable price from which solid æsthetic satisfaction can be derived.

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THE VENUS DE MILO. — It may be of interest to the art world to allude to the documents lately published in Paris, belonging to the Marquis de Trogoff-Lauvaux, upon the much discussed subject of the missing arm of the Venus de Milo. These papers seem to establish two facts, namely, that it was in early March, 1820, that the statue was unearthed, and not in April, and that it was then complete and that "one hand held an apple." Why or in what manner this arm was lost will possibly never be fully known.—*N. Y. Evening Post.*

[1] "*Der Gute Geschmack*," Æsthetische Essays von Lothar Abel, Architekt, Ritter des Kaiserl, Oesterr. Franz Josef-Ordens, Besitzer der Kaiserl, Oesterr. Medaille für Kunst und Wissenschaft, etc. With 129 Illustrations. Published by A. Hartleben, Leipsic, Vienna and Budapest.

## ILLUSTRATIONS

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

GREAT NORTHERN ANNEX, CHICAGO, ILL. MESSRS. D. H. BURNHAM & CO., ARCHITECTS, CHICAGO, ILL.

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

Y. M. C. A. AND STEELE MEMORIAL BUILDING, ELMIRA, N. Y. MESSRS. PIERCE & BICKFORD, ARCHITECTS, ELMIRA, N. Y.

ENTRANCE HALL OF THE SAME.

MAIN ENTRANCE TO THE SAME.

PUBLIC LIBRARY IN THE SAME.

APSIDAL TREATMENT, NO. 3: THE BASILICA OF SAN FREDIANO, LUCCA, ITALY.

THE Basilica of San Frediano, originally built in the sixth century and rebuilt in 690, underwent many changes in the thirteenth century, a new façade being built and the eastern apse taken down and rebuilt on the west end. The twenty-two columns of the interior are mostly antique.

APSIDAL TREATMENT, NO. 4: THE CATHEDRAL, FIESOLE, ITALY.

THE Cathedral of Fiesole, one of the earliest and simplest examples of the Tuscan style, was begun in 1028 by Bishop Jacopo Bavaro, but not completed until 1201. It has recently been restored.

SIDE PORTAL, ST. SERNIN, TOULOUSE, FRANCE.

THIS outer portal, or arch of approach, stands in front of the south portal (the Porte Miégeville) of St. Sernin. The arch is ascribed to Nicolas Bachelier, the celebrated architect and sculptor of Toulouse, whose life is comprised between the dates 1485 and 1572.

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

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XLII: THE CASCADE IN THE BOIS DE BOULOGNE, PARIS, FRANCE.

ACCESSORIES OF LANDSCAPE ARCHITECTURE, NO. XLIII: THE DAIRY: PETIT TRIANON, VERSAILLES, FRANCE.

A GROUP OF MODERN PAINTINGS.

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**[Additional Illustrations in the International Edition.]**

THE LANDESAUSSCHUSSGEBÄUDE (PROVINCIAL LEGISLATURE) FOR ALSACE AND LORRAINE, STRASBURG, GER.: THREE PLATES.

[Gelatine Prints.]

THIS building, the result of a general competition among German architects, is the work of Prof. Skjold Neckelmann, of Stuttgart. It fronts upon the grand "Kaiserplatz" (Emperor's Square), facing the new imperial palace and having the new public library for its neighbor. The hall for the parliamentary sessions of the legislative body, together with the cloak and ante rooms, occupy the entire central portion of the pile. The hall connects, by a lobby of ample proportions, with the lower story of the front part of the building. The latter contains, besides the main vestibule and double stairways, offices, a reading-room, etc., while on the upper floor are located the library, a large reading-room and a number of committee-rooms. Side-entrances leading into the legislative hall are provided in the two low tracts embracing the central body and containing the stairways which lead to the galleries. The rear portion contains offices for Government officials, stenographers and reporters, a room for the Governor and the stairway leading to the gallery for the general public, also cloak-rooms, etc. The façades in Italian Renaissance, with a generous employment of sculptured detail, are constructed of white sandstone quarried in the Vosges Mountains. The sculptured work was modelled and carved by Herr Riegger, of Strasburg. The iron roof-trusses are covered with zinc plate, except the domical portion over the main hall, which has a covering of copper. The total cost of the building, including steam-heating apparatus, electric-light plant, plumbing and architect's commission was $284,000, or $6.50 per cubic metre.

HOUSE AT ASHBOURNE, ENG. MR. LARNER SUGDEN, ARCHITECT.

PRIMITIVE METHODIST CHAPEL, LANDYWOOD, STAFFORDSHIRE, ENG. MESSRS. HICKTON & FARMER, ARCHITECTS.

BEDFORD COURT MANSIONS, LONDON, ENG. MESSRS. MARTIN & PURCHASE, ARCHITECTS.

## COMMUNICATIONS

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

### A CORRECTION: THE BENEDICT PLACE.

NEW YORK, N. Y., January 9, 1897.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

*Dear Sirs,* — In your number of December 26th, we notice in the text that you have given Messrs. Olmsted, Olmsted & Eliot credit for the landscape work at the Benedict Place. This is a mistake, as these gentlemen had nothing to do with this work, and were not even consulted.

We made the entire designs, and feel that while we want the credit, perhaps Mr. Olmsted may equally regret its being attributed to him. Will you kindly correct this error in your paper, and believe us, Very sincerely yours, CARRÈRE & HASTINGS.

[WE regret exceedingly the wrongful ascription of credit, all the more since we are doing what we can to urge architects themselves to give more attention to the landscape setting of their buildings. — EDS. AMERICAN ARCHITECT.]

### "AN IMPROVED SKELETON CONSTRUCTION."

WASHINGTON, D. C., January 12, 1897.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

*Dear Sirs,* — I notice in your last issue, diagrams and a communication from Mr. William Atkinson describing what he evidently thinks is a new mode of fireproof construction, that is, with the supporting columns well inside of the outer wall line. For his information I would refer him to the twelve-story Torrey Office Building at Duluth, by Traphagen & Fitzpatrick, architects, erected four years ago and in which he may see the new theory fully exemplified and in the flesh. Yours, etc., F. W. FITZPATRICK.

## NOTES AND CLIPPINGS

THE "MYSTERY" AT THE SOANE MUSEUM. — Some rather startling suggestions with regard to the opening of the third of the sealed receptacles at the Soane Museum have appeared in the *Spectator*. Nothing, it is said, was found in it but papers, and after referring to a suggestion that it was a "joke" on the part of Sir John Soane, our contemporary hints that perhaps the contents had been rifled, suggesting at the same time that they might have been valuable securities, or something cancelling the gift to the nation. A representative of the *St. James Gazette* calling on Mr. Birch, the curator of the museum, on Saturday, found that the supposed "mystery" was no mystery at all, and that the supposed "hoax" on the trustees had no foundation in fact. It is true that Sir John Soane — not in his will, but in a memorandum he had left behind — indicated three receptacles, one of which was to be opened in 1866, one in 1886, and one in 1896. The first was an old-fashioned knee-hole writing-table, the drawers on each side of which had been securely fastened up by means of a facing of mahogany. The second was a cupboard, the front of which was boarded up without any door, and the third was a bath in an upstairs room — now used by the curator as a sitting-room. The bath had an outer casing of mahogany, with a mahogany top. Many erroneous statements have from time to time been made with regard to these places, the most general being that when they were opened they were found to be empty. As a matter of fact, they were all filled with papers — domestic and professional — and such accumulations as a busy man always makes. The reason why the places were not to be opened was that these papers largely dealt with the well-known quarrels he had with his sons — especially his second son — and his daughters-in-law. There was no doubt that his idea was ultimately to set himself right with the public, and, the opening of the receptacles were so timed that in the ordinary course of time the persons alluded to would be dead. As a matter of fact, this has been so in every case. There was, therefore, no hoax upon the trustees; and the slightest glance at the receptacles themselves dispenses with the suggestion that there had been any rifling of the contents. Then, again, vivid pictures have been drawn of expectant trustees peering into empty places and finding themselves disappointed. As a matter of fact, in 1837 these places were all opened and examined for the purpose of probate. This was done on the advice of Dr. Lushington, and it was done in the presence of Dr. Lushington, three of the trustees and the executrix Having satisfied themselves that no valuables were stored away, the places were sealed up and the seals remained intact until they were more formally opened. The trustees, consequently, knew perfectly well what would be found in these places; there was therefore no disappointment and no hoax. The statement that a will cancelling the gift to the nation might have been hidden and got rid of argues a want of knowledge of the facts. The gift was made by Act of Parliament — 3d William IV — and could not, therefore, be revoked. The Act bears the date April 20, 1833. Power was reserved in one section by Sir John Soane to transfer the gift from his trustees to the trustees of the British Museum, if the latter would keep it intact; but the British Museum authorities would not do so and so this was never acted upon. When it is added that the trustees include Mr. A. Waterhouse, R.A., Sir A. W. Blomfield, A.R.A., Sir W. H. Flower, among others, it is quite certain that there has been nothing done to which objection could be taken. — *The Architect.*

ANCIENT AND MODERN ATHENS. — Ancient Athens spread round the Acropolis, especially on the hills facing the south, which are now uninhabited. The new town lies to the north of the antique citadel — an extension of the cluster of houses already existing at the foot of the rock when the war was ended. Two main intersecting streets were laid out — Æolus Street, starting from below the Acropolis and running northward, and Hermes Street, leading from the royal palace toward the Piræus. The capital was thus designed to lie in the valley between the Acropolis on one side, and Mount Lycabettus on the other. No ambition of future development is traceable in the original plan. The ground chosen, and the width of the main streets tend to show that the founders of the new city little dreamed of its rapid extension. Squeezing herself out of her narrow confines, the city has gradually scaled the foot of Lycabettus and spread beyond the valley on both sides, principally in a southwesterly direction. If the extension had been in a straight line toward the sea, Athens would now be nearing a junction with the Piræus; but both towns, as if avoiding each other, extend in parallel lines, and one must look to a probably distant future for the day when they shall be connected by rows of houses, instead of the long walls of ancient days. The fashionable quarters of the capital are to be found in the new additions to the primitive plan — the Neapolis, as it is called. Large thoroughfares have there been opened, fine buildings erected, both public and private; and Athens, already the finest city in the east of Europe, bids fair to become, if no stop be put to her progress, one of the handsomest cities on the Mediterranean. Under King Otho's reign, progress was comparatively slow. At the accession of King George, in the year 1863, the population did not exceed 45,000. The advance has been more rapid since then, especially during the last twenty years of material prosperity, which has lately been interrupted, let us hope temporarily, by the financial entanglements of the Greek Government. During that period, the immigration of well-to-do Greeks from abroad has not been one of the least causes of this development. In 1879, the census showed a population of nearly 64,000; in 1889, 114,000; and to-day, judging by the vital and building statistics, the number of inhabitants, if it does not exceed, cannot fall short of 140,000. The progress of the newly-created town of Piræus is not less remarkable. From 5,000 to 6,000 souls, which had already gathered there some thirty years ago, its population had grown to 34,000 in 1889, and is now estimated at more than 40,000. Together, the two towns number as many inhabitants as they probably possessed in the fourth century B. C. The sources of information as to the population of ancient Athens are indeed vague; but from a passage of Xenophon giving the number of families as 10,000, and from a passage of Athenæus indicating the proportion of slaves to freemen at the time of Demetrius Phalereus, it may be calculated that at that epoch the population of Athens, including that of the Piræus, was about 180,000. The area included within the walls of both towns seems rather to confirm this estimate. The surrounding country was thickly populated — much more so than at any succeeding period; but it is more than probable that the inhabitants of Athens proper and of her seaport never exceeded 200,000. — *"Public Spirit in Modern Athens," by D. Bikélas, in the January Century.*

A BRICK COUNTRY ROAD. — The first brick country road laid in the United States has been put down in Monmouth township, Warren County, Ill. The road is the culmination of a series of experiments in road-building, and though it is regarded as more or less on probation, the utmost confidence in its success is expressed. When hard road-building began in the township, four years ago, it was decided to expend the money on hand in an experimental way. Monmouth township had long been a sufferer from bad roads. In winter the town had often been completely blockaded by mud too deep for wagons. Even within the town itself the streets were so poor that at times the "bus" lines were obliged to suspend business, and mail and baggage were carried to the railway station on wheelbarrows. The manner in which the roadway was laid is described as follows: The ground was prepared for it by grading and being allowed to stand for two months. It was treated to an occasional scraping, so that it would pack evenly, and when the contractors were ready to lay brick, it was as hard and even as a floor. The first thing was setting the curbing. This was made by 2" x 6" oak plank, set seven feet apart, and held by oak stakes 18 inches long, and put down every 4 feet. Inside this was put a 5' bed of sand. This was evened up, and the single course of No. 1 paving-brick was put down. They were set on edge, and make a fine roadbed. Outside of the curb 2 feet of crushed rock was laid, graded up to make an easy approach. This makes a road 11 feet wide. The earth on each side was graded and worked, making it all 40 feet wide, and affording tracks on each side for use in dry weather. The average cost of the stone roads has been 70 cents per foot. The brick road cost $2,600 for 3,000 feet, or about 90 cents a running foot. — *Boston Transcript.*

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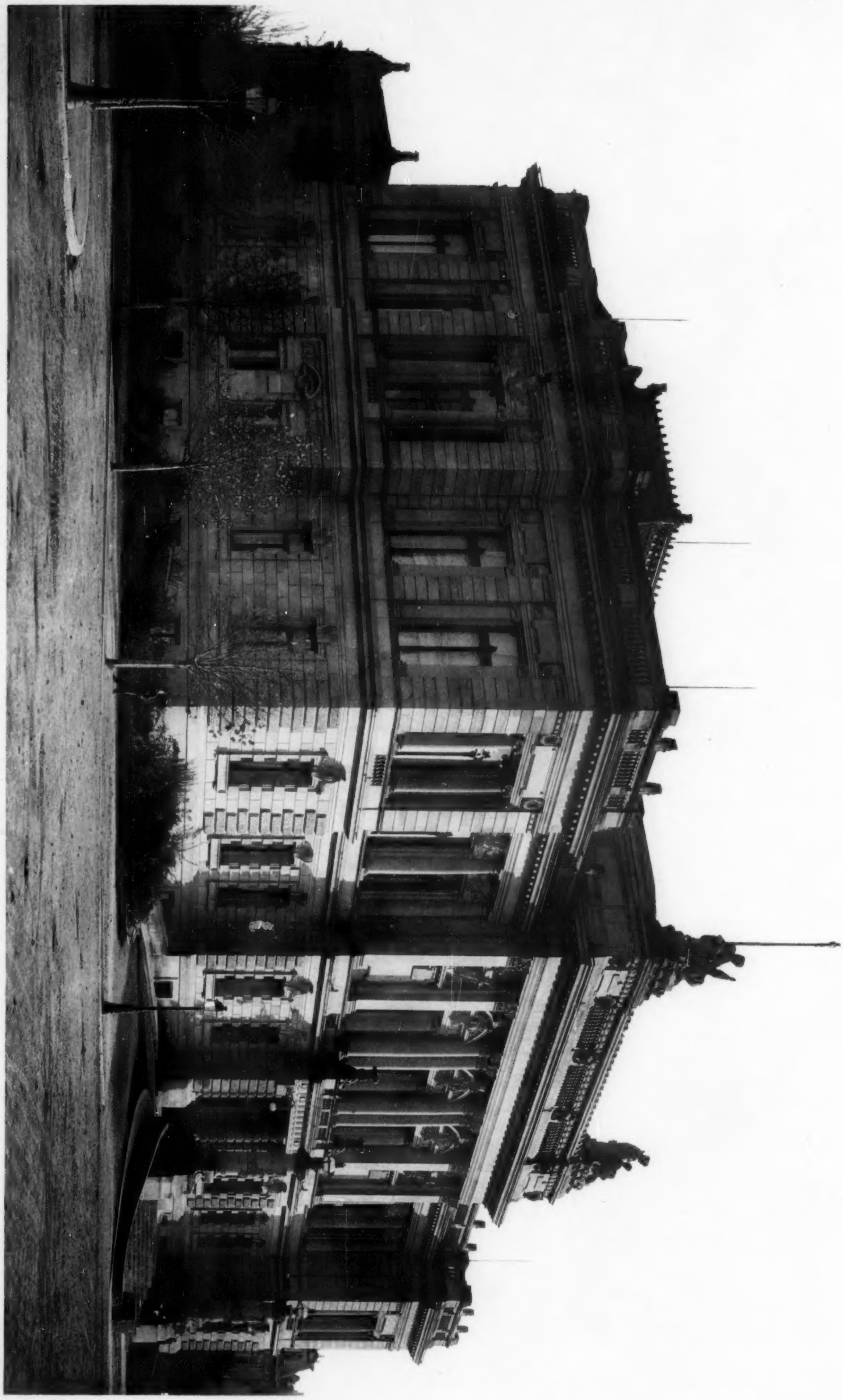

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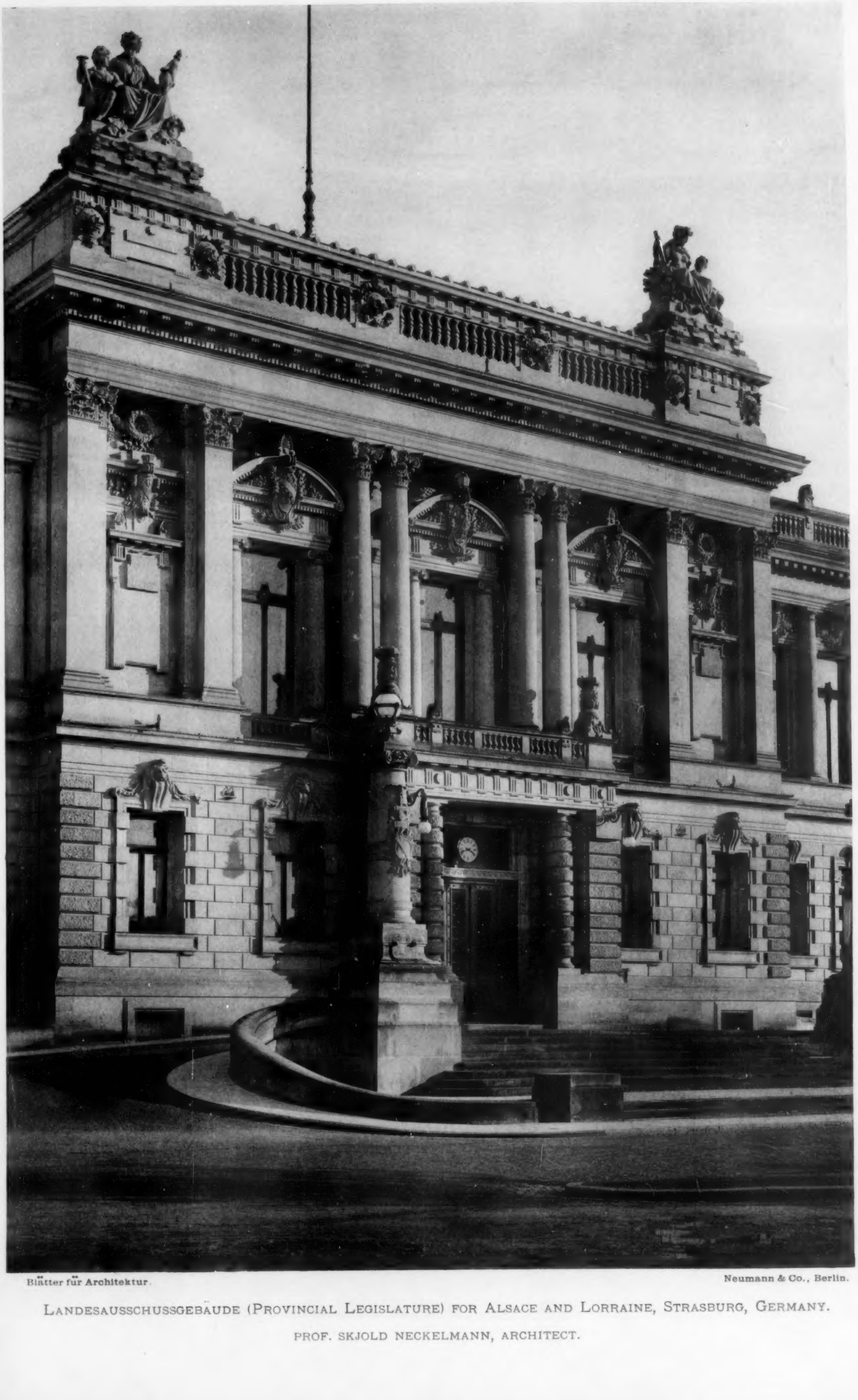
PROF. SKJOLD NECKELMANN, ARCHITECT.



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LANDESAUSSCHUSSGEBÄUDE (PROVINCIAL LEGISLATURE) FOR ALSACE AND LORRAINE, STRASBURG, GERMANY.

PROF. SKJOLD NECKELMANN, ARCHITECT.

Landesausschussgebäude (Provincial Legislature) for Alsace and Lorraine, Strasburg, Germany

Blätter für Architektur

Landesausschussgebäude (Provincial Legislature) for Alsace and Lorraine, Strasburg, Germany.

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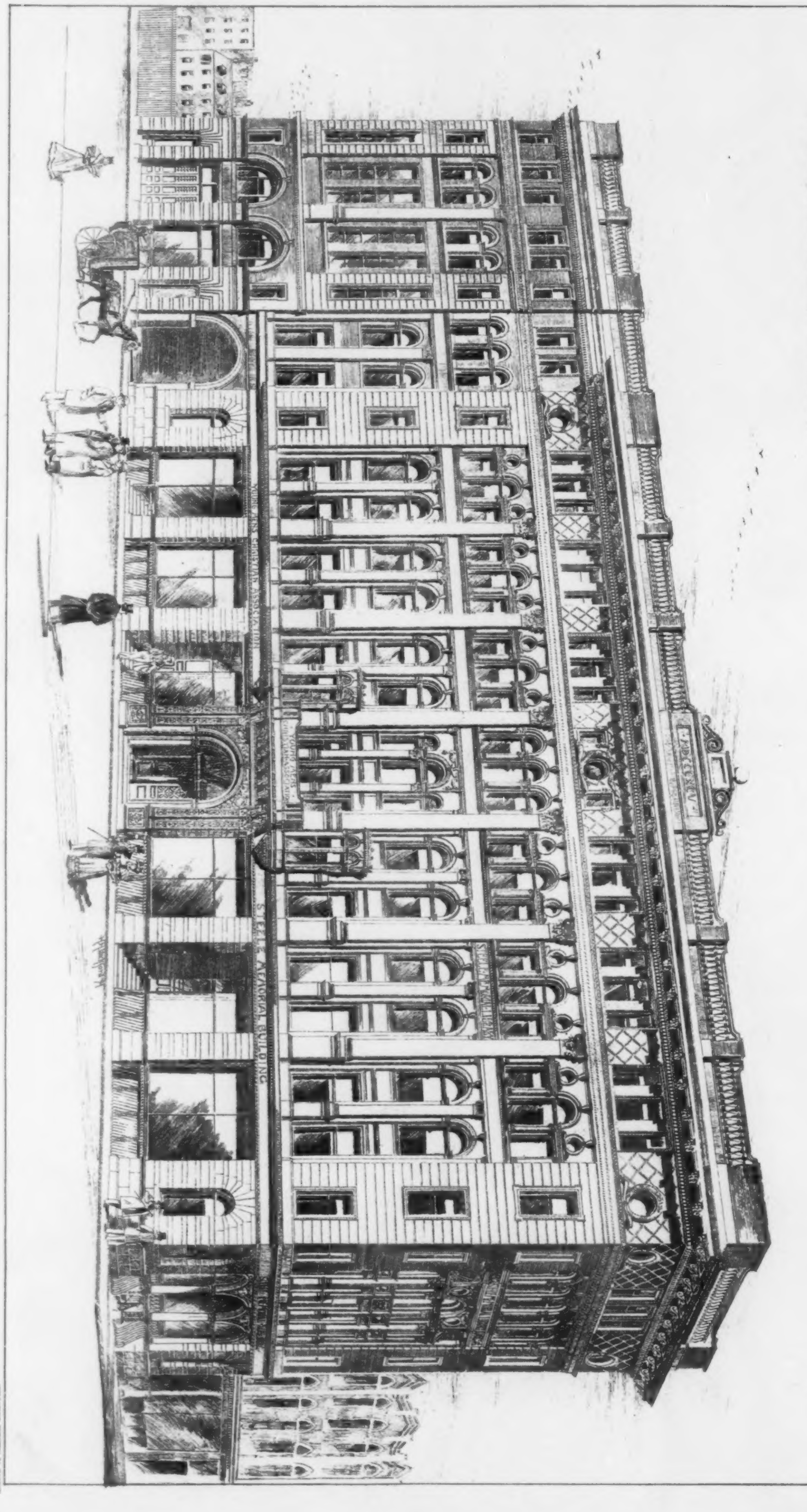
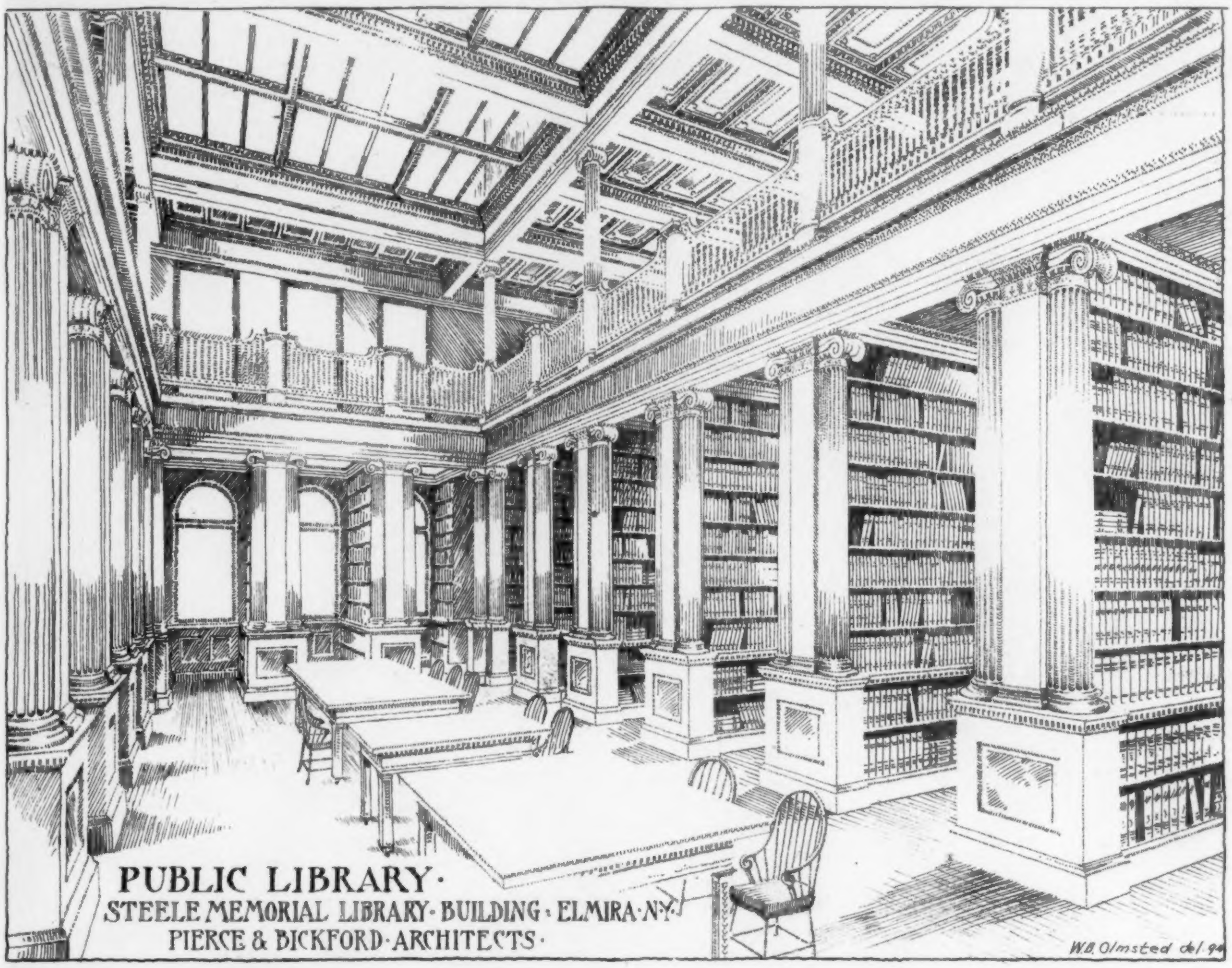



Young Mens Christian Association and Steele Memorial Library, Elmira, N.Y.
Pierce & Bickford, Architects.

AMERICAN ARCHITECT AND BUILDING NEWS, JAN. 16 1897. No. 1099.



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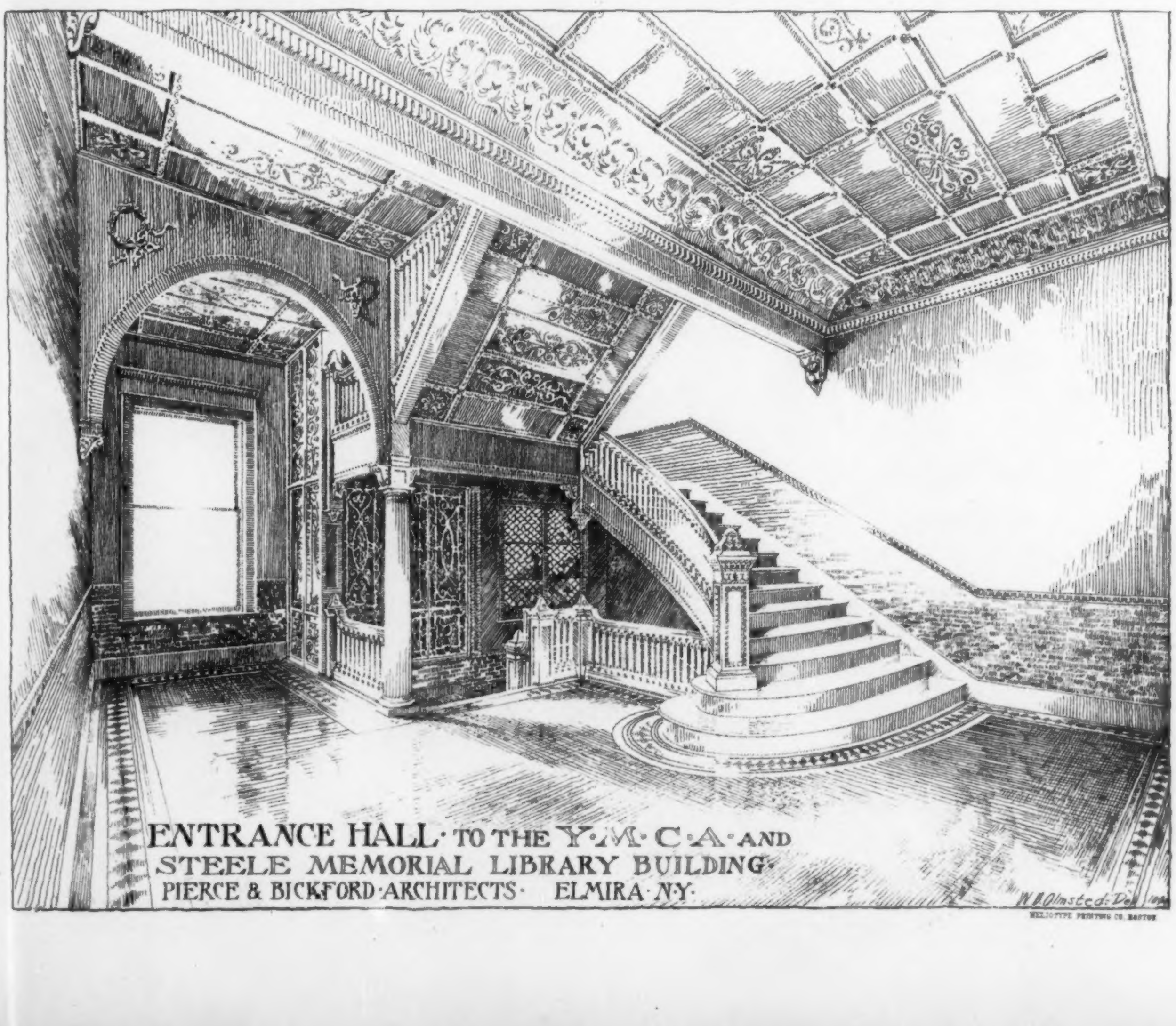


ENTRANCE HALL· TO THE Y·M·C·A· AND
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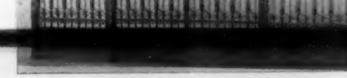
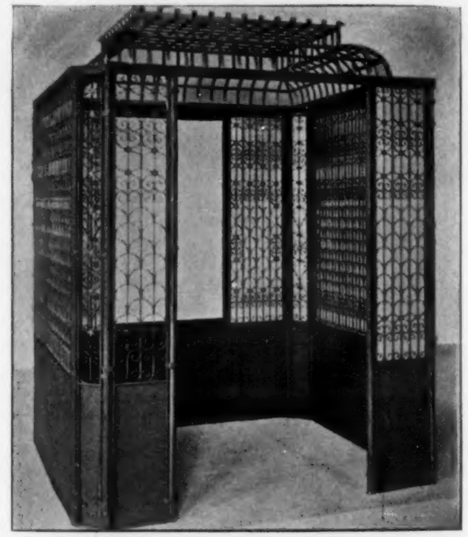
Stairway in Cast-iron, Electro-bronze Finish.



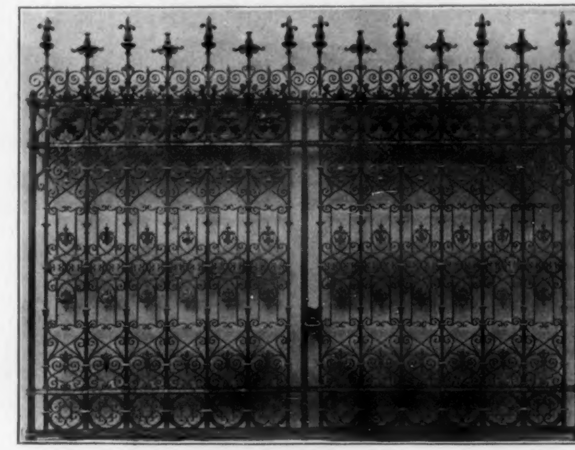
Elevator-screen in Cast and Wrought iron.
Electro-bronze Finish.

Jardinière, 4 feet high, in Solid Bronze, or Cast-iron Electro-bronzed.

Boston Public Library: Dartmouth Street Gates,
16 feet high.

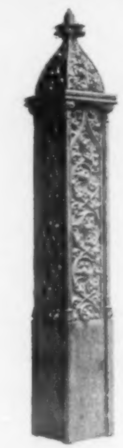


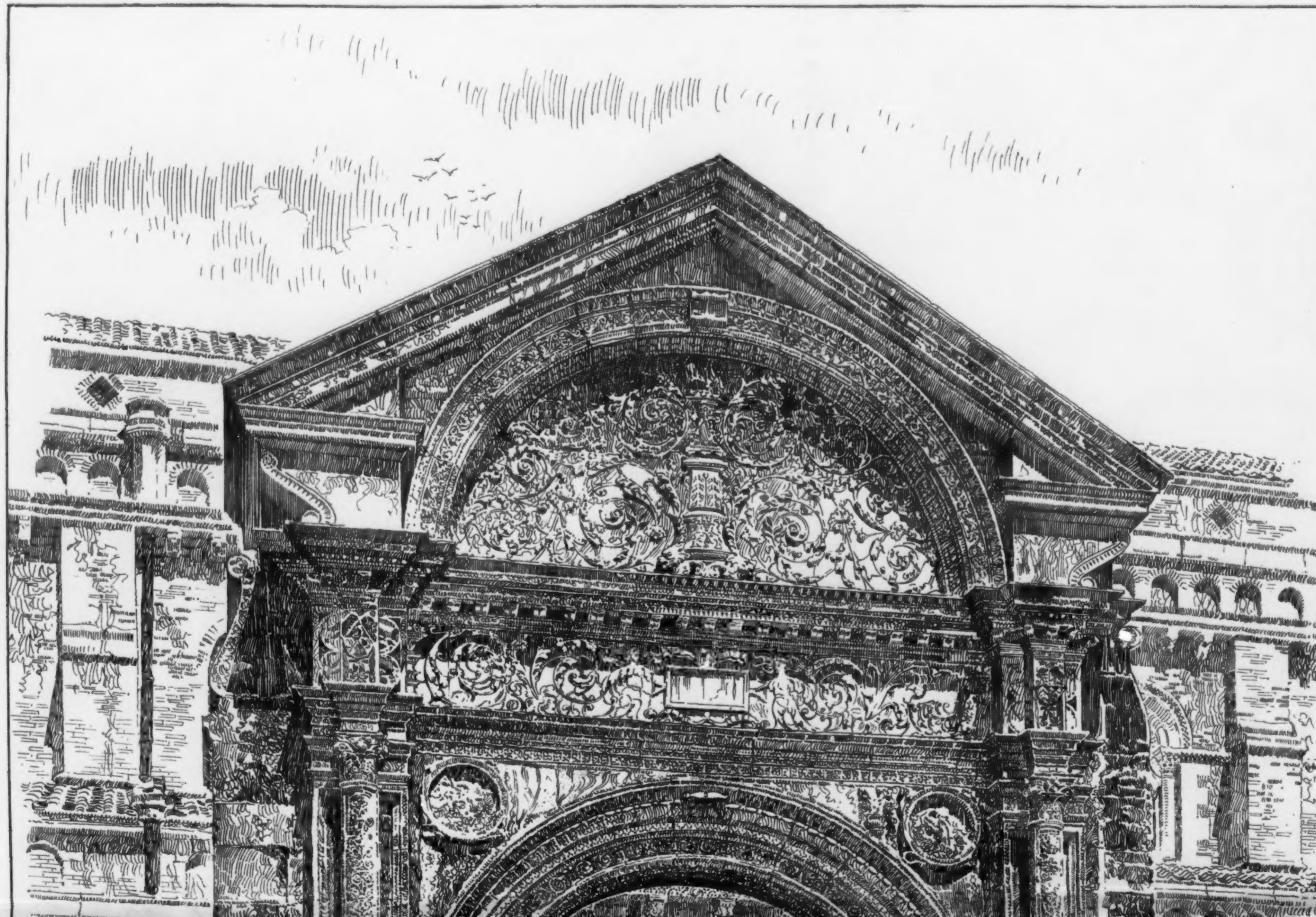
Elevator Cab, finished in Bower-barff.

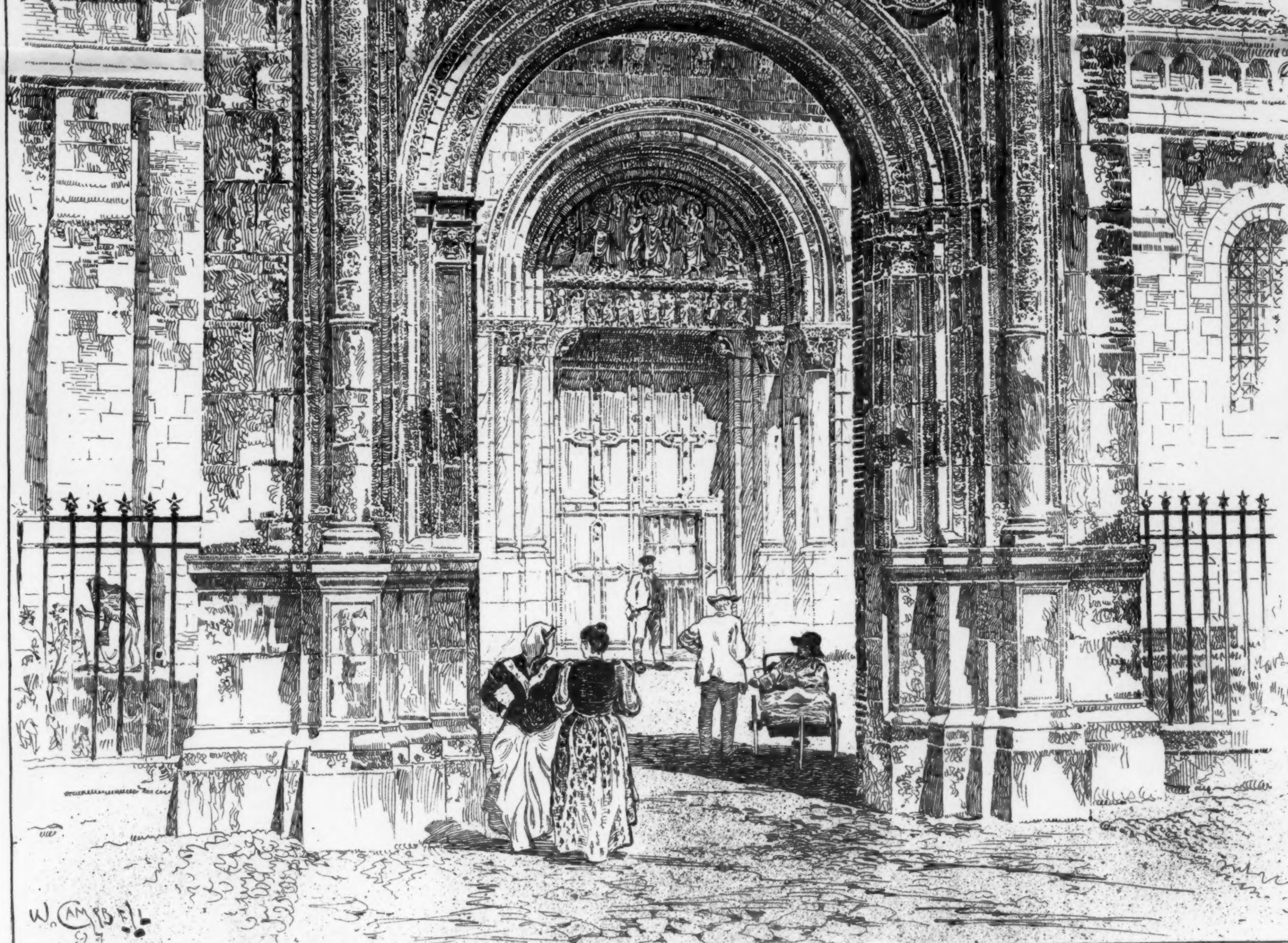


Main Entrance Gate, Philadelphia Bourse:
18 feet wide, 14 feet high.


Name-Plate, 5 feet 2 inches by 3 feet 4 inches, in Hand-forged Wrought-iron,
finished in Bower-barff. Scroll in 5-16″ Plate Copper Repoussé.







SIDE PORCH, ST. SERNIN, TOVLOVSE, FRANCE.

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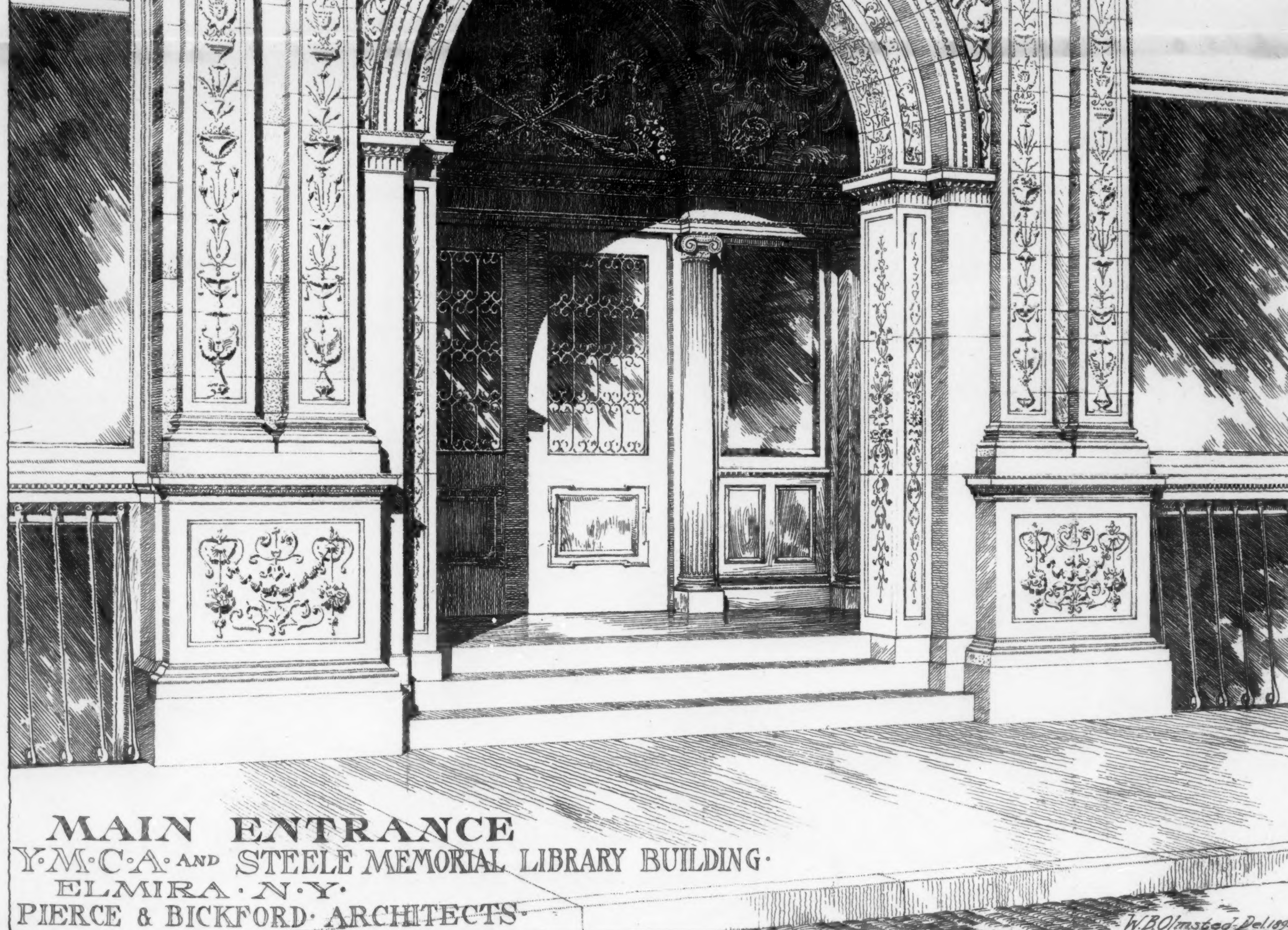
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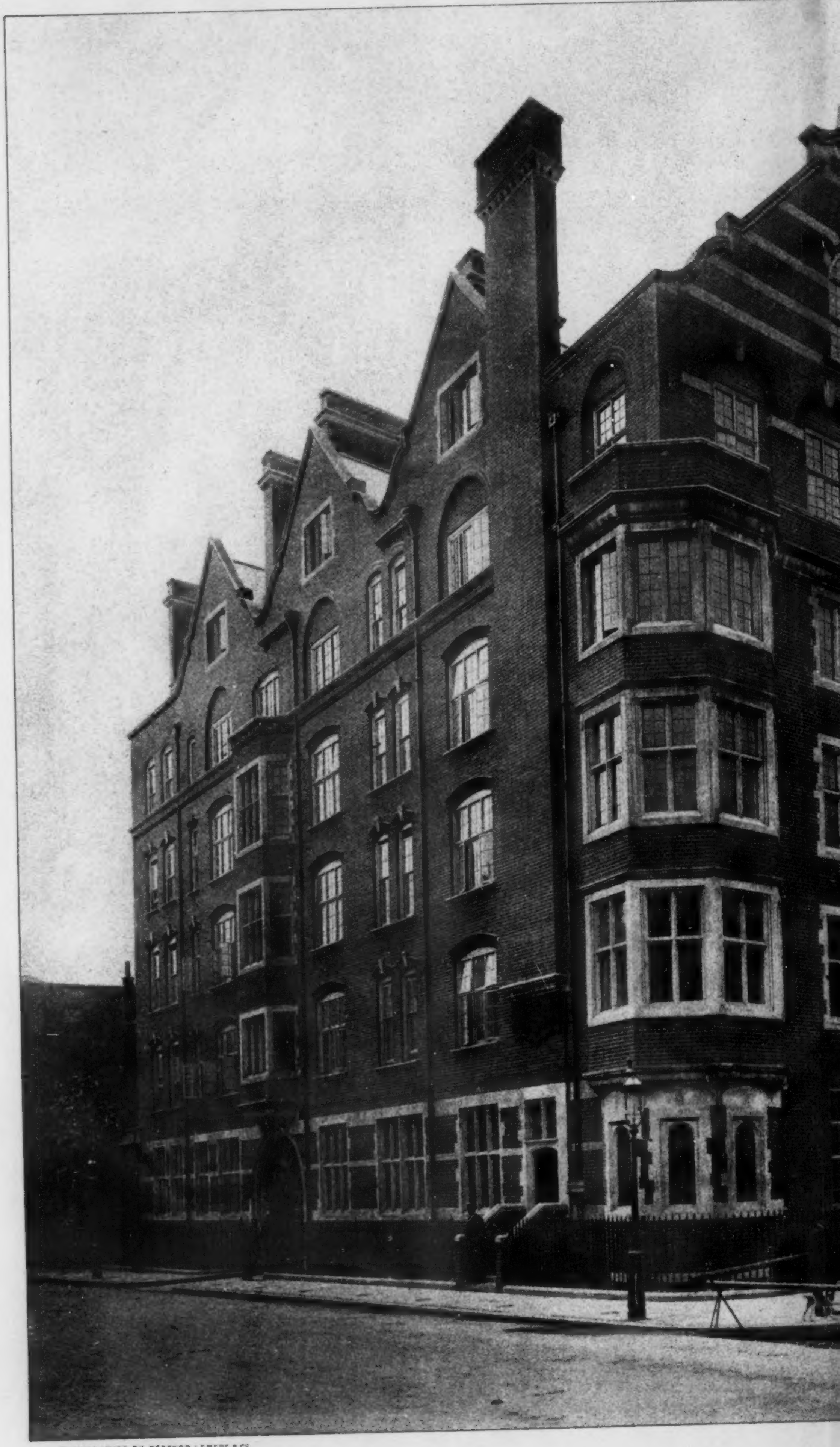

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& PURCHASE, Architects.


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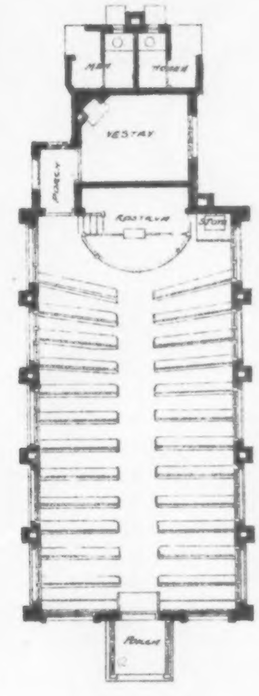
LARNER SUGDEN, F.R.I.B.A., Architect.

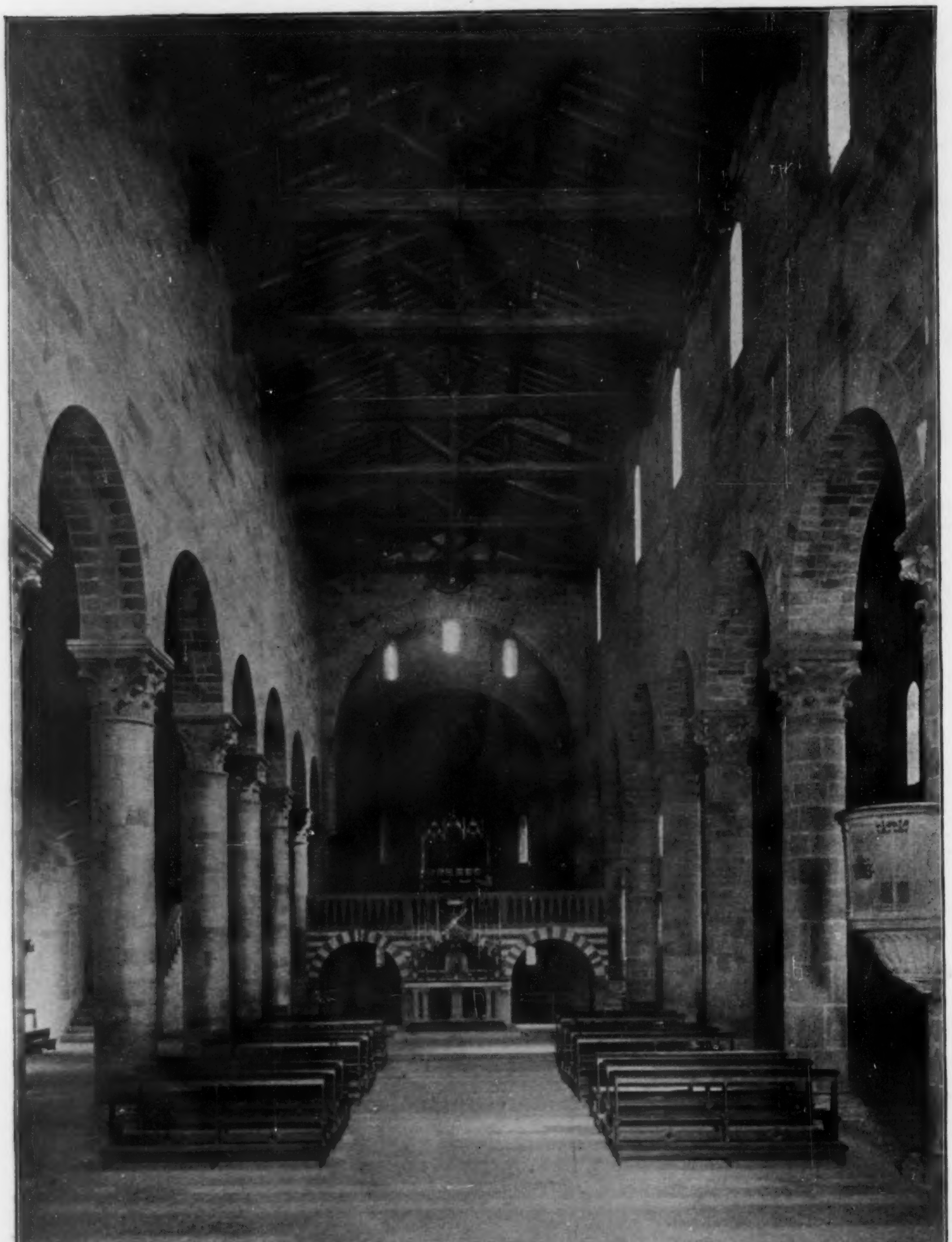
PRIMITIVE METHODIST CHAPEL,

LANDYWOOD, STAFFS.

Messrs. J. H. HICKTON & H. E. FARMER, Architects.




INK-PHOTO. SPRAGUE & CO. 4 & 5 EAST HARDING STREET FETTER LANE. E.C.



Apsidal Treatment, No. 4:—The Cathedral, Fiesole, Italy.

Apsidal Treatment, No. 3: — Basilica of San Frediano, Lucca, Italy.