

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. IV.]

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[No. 137.]

BOSTON, AUGUST 10, 1878.

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IN the *American Architect* of June 29th we had occasion to express the hope that, in the interest of good building, the management of the Department of Buildings in the city of New York would continue to be an object of public criticism, to the end that its vigilance might be kept alive and its abuses, if any, abolished. Since then an attempt has been made in the Board of Aldermen to institute a thorough investigation into the alleged neglects and delinquencies of the Department; the failure of this attempt encourages the idea that this important office is really under the protection of politicians, that it may serve as an easy and comfortable asylum for their relatives and friends at the public expense. Happily, however, a provision has been discovered in the city charter under which, on application of any five citizens who are tax-payers, a judge of the supreme court of the district may order an inquiry into the conduct of any officer of the corporation, so far as relates to misapplication of funds, violations of law, incompetence, neglects, or misdemeanors. In accordance with this wise provision we now learn that the matters of the Department are at last to undergo an exhaustive legal examination, in which the instigators of the inquiry expect to prove numerous wilful violations of the city charter and the building laws; a reckless and dishonest management; the employment of large numbers of incompetent men in sinecures with fat salaries; the concealment of such delinquencies and neglects under false and deceptive reports, through which unnecessary and extravagant appropriations have been granted; and the diversion of a large part of these appropriations to illegal uses. The expenses of the department, since Mr. Adams took charge of it, have aggregated, it is said, more than \$550,000; the citizens who are interested in procuring this investigation expect to show that the work for the same period could have been honestly done for less than \$100,000. We understand, also, that the abolition of the department and the transfer of its duties to the fire-department is advocated as a measure of public economy and safety.

SINCE the advent of Kearney in New England, where he is naturally an object of noisy curiosity, and where he obtains an enthusiastic following among those workmen who are more interested in blasphemous denunciations of society than in logical arguments, the question of communism has again been revived, and again this foreign scarecrow has been set up to affright the frugal, the industrious, and the prudent. We naturally turn to the Old World to learn what is the present attitude and aspect of the modern Guy Fawkes on his own ground. Two great congresses of workmen have lately been held, at Lyons and at Gotha. While at the German congress it appeared that the foundations of society must be uprooted before the German agitators will be satisfied, in the French congress the communistic element failed to show itself in any form. In a notable article in the last *Fortnightly Review*, Mr. Frederic Harrison draws attention to the remarkable fact, proved by this

gathering of French malcontents, that communism in France no longer exists; that in the twelve days' discussion at Lyons, no systematic socialism was discussed, and the great majority of the meeting maintained the usefulness of property as an institution, made no attack upon capital, brought forward no crazy scheme for the regeneration of society by legislative or revolutionary means, and in short gave utterance to no such rubbish as may be heard in the agitators' meetings in this country, where the talk is much wilder and much more unreasonable than among the older children of discontent. Of course the French workmen claimed that the condition of labor is radically wrong, that the economic relations of society are inconsistent with the advance of true civilization, and that no confidence is to be placed in any party or in any person now in public life. Unlike the English workmen's party, which accepts the representation of their interests in Parliament by such capitalists and gentlemen as Messrs. Brassey, Mundella, Forster, Thomas Hughes, and Lord Litchfield, the French artisans accept as leader no one in the legislative chambers. They propose in some way to work out their own salvation, but not by revolution or other political crime. The intelligent mechanics and laborers of New England who attend to their business, vote according to their conscience, go to church, and invest their earnings in savings-banks and in United States' bonds, as thousands of them do, form a class in which the vulgar Jack Cade of the republic will find no recruits, a class which will redress what grievances it may have after no imported fashions of violent subversion, and according to no theories of communism. They will not be behind the best of their French and English brethren as members of a civilized community, and will not put themselves in the hands of dreamers, doctrinaires, or demagogues, whether from America, Germany, or Ireland.

AT a public meeting in Memphis on July 26th, it was resolved that a convention should be held in that city on the 12th day of November next, for the purpose of considering what can be done to relieve the Mississippi in times of flood, and to provide means of constructing the Barataria Canal, with locks at the upper end and sea-walls at the lower, and of such a size as to admit the passage of the largest ocean steamers. The attractive resolution that the convention should proceed bodily down the river in steamers, for the purpose of arriving at a better understanding of the situation, was also passed. The Secretary of War was invited to cause a survey of the proposed route, and an estimate of the cost of its construction, to be made. The meeting furthermore indorsed the scheme of Captain John Cowdon, to the detailed explanation of which it had just given attention. As far as we can make out from the account that has reached us, Captain Cowdon thinks that what has been done, as well as what is doing, are not the means that will be most likely to achieve the desired results. He believes rather in relieving the river by providing it with more outlets, and by the shortest possible routes, arguing that the effect of thus increasing the discharge will be to diminish the volume of water, while at the same time it increases the velocity of the current, and consequently the scouring capacity of the stream; so that in course of time the river will wear for itself a permanent channel, to which it will return after a flood, and being thus confined to a narrower space the formation of the ever-changing sand-bars, which are due to the sluggishness of the stream in the broad parts, will no longer be possible. This theory is supported by the facts that since the establishment of the Bonnet-Carre Crevasse, by which it is estimated one twelfth of the volume of water escapes through Lake Ponchartrain into the Gulf, distant less than eighty miles, while the mouth of the river is distant one hundred and sixty miles, the high-water mark at New Orleans, where the usual rise is seventeen feet, has fallen three or four feet, while at Natchez, where the rise is nearly fifty feet, a decrease of eight feet has been recorded, a similar proportionate subsidence having been observed at other places farther up stream.

THE practical utility of such artificial outlets having been proved by observations taken during five years, Captain Cowdon proposes that other outlets shall be built, and notably an opening shall be made into Lake Borgne, a little farther down stream than Lake Ponchartrain, which shall be ten or twelve feet deep, one mile wide, and about six miles long. This, it is

calculated, will draw off another twelfth part of the river water, and cause a corresponding lowering of high-water level; so that even as far up stream as Memphis, where the present level is about thirty-five feet, a fall of four or five feet will be established. Besides this outlet, he proposes to open the Pass Manchac and the Plaquemine, the Goules, the False River, and the Latanche Bayous, just below Baton Rouge, which will aid in carrying off the waters of the lesser floods. A still more important factor of his scheme is the diversion of the course of the Red River, which now empties into the Mississippi about halfway between Baton Rouge and Natchez. To effect this the river is to be made to pass through the Bœuff, which is about twenty miles in length, and into the Calcasieu River, by which, after a course of some hundred miles, it will reach the Gulf. In this distance the river will have a fall of about eighty feet, which is as much as the Mississippi has between its junction with the Red River and its mouth, although the distance is about five hundred miles. If these projects are ever carried into execution they can hardly fail to be of the greatest benefit to the States through which this river flows, and particularly to Louisiana, whose lowlands, now annually exposed to destructive floods, the proposed operations will allow to be reclaimed and cultivated.

THE interesting question of the decoration of the interior of St. Paul's Cathedral, London, has again been brought up by the action of the Dean and Chapter on the 6th of July in authorizing the preparation of full-sized cartoons of two of the ribs of the dome, and of all the architectural features between them, comprising one sixth of the whole domical area; these cartoons to be colored and gilt in imitation of real mosaic, and temporarily fixed in place, so that the effect of the actual work may be realized. The design of the late Mr. Alfred Stevens, the architect of the Wellington Monument, lately completed and erected in the cathedral, is to be followed substantially according to the model prepared by him. Mr. Stannus, a favorite pupil of Mr. Stevens, is to prepare the cartoons for the ribs; Mr. Leighton is to make the design to occupy the proposed great circle between the ribs (probably just above the springing of the dome); and Mr. Poynter will compose the other figure-subjects of the composition. It is proposed to decorate the dome with subjects from the visions of the Apocalypse, reserving the pictorial and dramatic scenes from the Old and New Testaments for the lower parts of the building. The general disposition — the emotional and poetic above, the historical and didactic below — is one which must commend itself as singularly appropriate to the place and occasion. Although by the use of bright colors upon a gold ground in the Byzantine manner, as proposed, the serious defect of the extreme darkness of the dome will doubtless be partially obviated, the mysterious and solemn splendors of the mosaics in the Italian domes enjoy reflections from far brighter skies than can ever prevail in gloomy London; the subcommittee therefore ingeniously recommend the introduction of metallic reflectors, so placed within the external peristyle of the dome as to be invisible from any point of sight outside or inside of the building. By this means Mr. Penrose, the architect of the Chapter, calculates that the amount of light at present introduced through the twenty-four windows in the drum of the dome will be doubled. The committee estimate the total cost of the decoration of the dome according to this scheme to be about fifty thousand pounds sterling, the Messrs. Powell, of Whitefriars, having offered to do the sixteen thousand square feet of mosaic in the dome at the rate of from thirty to thirty-five shillings per foot. The estimate of the Murano company was forty shillings.

MR. EDMUND OLDFIELD, a member of the executive committee for the completion of St. Paul's, it may be remembered, in his book, "St. Peter's and St. Paul's," published two years ago, entered into a careful investigation of the color decorations of certain typical Italian buildings of the sixteenth and early part of the seventeenth centuries, with a view of ascertaining what features of them were capable of application to the English Metropolitan Cathedral. In this interesting work of comparison, the description of the decoration of St. Peter's is probably the most complete that has been published in England. The lesson drawn from this great example by Mr. Oldfield has been very intelligently applied in the development of the new scheme for the decoration of the English dome, the main points being the adoption of a formal or geometrical distribution, keeping the

most important subjects in the lower parts — both domes being prolate hemispheroids; the multiplication of figures, to give an idea of great space; the adjustment of their scale, so that they shall be large enough to secure distinctness, but small enough not to dwarf the vault or to be so spread over the spherical surface as to distort their drawing; a severe and statuesque but not archaic treatment of the figures, and their execution in coarse tesserae, without the minute elaboration of the Vatican mosaicists; and, finally, the use of gold backgrounds, contrary to the common cinque-cento practice, thus securing flatness, like the vault surface itself, and reflections which most effectually and beautifully illustrate the constantly changing surface of the hemisphere. Mr. Oldfield also obtained from the church of St. Vittore at Milan an idea as to the treatment of panels in piers, which he recommends for adoption in St. Paul's. The portion of Mr. Burgess's remarkable scheme for the decoration of the English cathedral which elicited the most vigorous and probably the most justifiable remonstrances, a few years ago, was his proposition to cover entirely the Portland-stone piers of the nave with a veneering of fine marbles. In this regard the hints derived from St. Vittore are interesting for their adaptability not only to the case of St. Paul's, but to other and less monumental examples. In the Italian work in question white stucco figures appear in very low relief upon the flat tinted ground of the panel, without interference with the structural character of the pier, the natural material of which is properly exhibited in the styles. This use of stucco admits of great freedom of treatment, and belongs strictly to the most approved period of Renaissance decoration, having been adopted not only by Raphael at the beginning but by Alessi at the end of the sixteenth century. As a reminder of the conditions which must guide the English designers in their work we reproduce in this number a sectional view of the interior of St. Paul's.

THE *Architect* of July 6th contains a noticeable article on the question of Domestic Architectural Style as it now prevails in England, and, with a natural but uncertain reflection, in our own country. Accuracy of reproduction of old forms has never been so faithfully pursued as by the English architects of the present day. Archaeological correctness in every detail, from the architectural outlines outside to the fashion of tables and chairs and the color of walls and fabrics within doors, must be carried to such an extent that the occupant of the house may well imagine himself "somebody else somewhere else," and by no means an Englishman of the nineteenth century at home. The tendency of domestic style is therefore, as the *Architect* cleverly puts it, to be histrionic, with all the appointments in keeping; so that, naturally, the dwellers in the new Queen Anne houses of Turnham Green, or St. John's Wood, as we remember reading not long ago, may be seen in the lanes thereabout seriously masquerading in Addisonian bag-wigs, cocked hats, and smallclothes, in order to keep up the pleasing illusion; and we are credibly informed that the fairer sex, with that exquisite power of adaptation for which they are noted, are not slow to follow suit with brocades, hoods, hoops, and farthingales, and the decorative patch upon their faces. English life seems therefore ready to meet English architects half-way, and were it not for the autocratic decrees of the *modistes* of Paris, which constitute an element hard for the female mind to go counter to, we might see the court of the good Queen Anne reenacted in high life, and not confined to narrower fields among the families of artists and *littérateurs*. In like manner, in the days of the Gothic revival we might have seen in certain select English circles a reproduction of the costumes and attitudes of mediæval saints, more or less grotesque, often graceful, but always highly significant of the power of histrionic architecture. Mr. Norman Shaw and his followers nearly make us believe that

"All the world's a stage,
And all the men and women merely players."

This is a new function for architecture. Perhaps it needs only a little more pushing of the "Old Colonial" derivative in this country, on the part of our clever young architects, to bring about some corresponding form of revival here. Who knows what stately virtues of the Province may follow on the reintroduction of slender orders and broken pediments, urns and festoons, heavy sashes, small panes, and delicate mouldings; what fine manners may come back in front of tiled chimney-pieces, and panelled wainscots, and under the wooden modillions and dentils of the parlor cornice!

DOUBTLESS the logical result of designing accurately according to precedent must be literal imitation, carried to extremes sooner or later, and in England there seems at present to be small chance of setting aside this unwholesome subservience to archaeology. "Granting all this," the *Architect* proceeds to say:—

"We" (Englishmen) "must perhaps be permitted to advance in the direction of histrionic accuracy until some other principle comes to assert itself. Such a form of art is not by any means to be despised, inasmuch as that which preceded it may be affirmed with no little reason to have been no form of art at all. It is obviously better to copy thoroughly well and enjoy the success of it than to go into chaos and have nothing at all to enjoy. In other words, if we cannot achieve anything in the nature of characteristic style, except by accepting a histrionic—or say historic—mode, this is at least better than being content to sacrifice the enjoyment of style altogether."

Our own conditions are more favorable for the achievement of characteristic style, as the fashions which come to us from Europe are not powerful enough to overthrow the practical influences which our architects must obey; influences which come from local habits, materials, climate, and usages, from the new life of the New World; influences which have grown with our growth, and must have expression in our art in spite of all our efforts to play parts in borrowed costumes. We are not permitted to forget that we are Americans and not Englishmen, and that our comparative freedom from the tyranny of archaeology is a national privilege. We may master it, but it cannot master us. It is too far off.

As the downfall of Eddystone Lighthouse, if not imminent, is at least inevitable, and a matter of measurable time, owing to the disastrous effect which the leverage of the slightly swaying shaft has had on the House Rock upon which it is built, Trinity House has occupied itself with the question of what must be done to replace it. A survey showed that the rock was at once too small and too decayed to allow of building a second shaft upon it,—for it is a *sine qua non* that the present lighthouse shall stand until the lamp is lighted in its successor,—and that a light at this particular point was a better protection against the rocks and reefs lying inshore of it than a light placed in any other position would be. It was suggested that the necessity of any lighthouse could be done away with by removing the rocks, and so great has been the progress in submarine engineering that, although the survey which was made in pursuance of this suggestion showed that many million cubic feet of stone would have to be removed, the enterprise would doubtless have been undertaken, had it not been that the abolition of the light would necessitate a considerable and costly revision of charts, and the determining of new "ranges" for the guidance of ship-masters, to say nothing of the temporarily increased danger to the lives and property of those to whom for many years the Eddystone Light has been so great a reliance, marking, as it does, an important landfall to incoming vessels from the Atlantic. In view of this necessity of maintaining a light, it has been determined to build a new lighthouse on the South Reef, one hundred feet distant from Smeaton's decaying masterpiece; and as the lowest tender amounted to \$525,000, Trinity House has decided not to do the work by contract, but to have it done by the day, under charge of its own engineer, Mr. J. N. Douglass, whose estimate was only \$450,000.

THE natural difficulties presented by the new site are about as great as those encountered by Smeaton; for though the South Reef is not uncovered until half-tide, and some of the foundation courses must be laid under water, while the site on House Rock was always above half-tide level, and a portion of it above high-water level, yet the new site is in a more protected position. In the actual construction of the lighthouse, nothing novel is to be attempted. The now common practice of dovetailing each stone into those above, below, and by the sides of itself, as well as, in the case of the lowest course, into the living rock, is to be followed. The lowest twelve courses, which will rise twenty-two feet, and will carry the shaft three feet above high-water level, are to be forty-four feet in diameter, and are to have no diminution from bottom to top. At this level the shaft proper will begin with a diameter of thirty-six feet; thus there will be formed at this level a circular landing stage four feet wide. In form the new shaft is to be a concave elliptic frustum, its least diameter, eighteen and a half feet, being about one hundred and twelve feet above the landing stage, from which level it increases again, until at the top it measures twenty-three feet. The lantern level is one hundred

and twenty-two and a half feet above high-water level; that is, the new light will shine at a height fifty-five feet above the present light. Up to twenty-two feet above high water, the shaft will be built of solid granite; above this the walls will vary in thickness from eight and one half feet to two feet and three inches, which will allow of rooms varying from eleven to fourteen feet in diameter.

PAPERS ON PERSPECTIVE.

XII. THE PERSPECTIVE OF CIRCLES CONCLUDED. CONCENTRIC CIRCLES.

243. WHEN a portion of a circle is to be put into perspective it is generally best to construct the ellipse which represents the whole circle, and then to use so much of it as may be required. This is especially the case in sketching from nature or from the imagination, where it is difficult to determine the character of the perspective curve without aid from geometrical considerations. In drawing pointed arches, for instance, the character of the intersecting arcs is best ascertained by completing the circles of which they form a part, as in Fig. 52. An inspection of the figure shows that when the arch is above the eye the nearer half is represented by the part of an ellipse at which the curvature is the most rapid, near the extremity of the major axis; and the further half by the flattest portion, near the extremity of the minor axis. When the circle is below the eye the nearer part is the flattest.

This figure also shows that when a row of circles are put into perspective their major axes are not parallel, their inclination to the trace of the plane in which the circles lie diminishing as they recede from the eye.

244. Fig. 53 illustrates more fully the sub-contrary section spoken of in the previous paper and shown in Fig. 44. $A'A'$ shows the circle in its own plane, with its centre beyond the axis of the cone; $B'B'$ shows its perspective in the plane of the picture pp , with the centre of the cone of rays below its centre, and the pole a , representing the centre of the original circle, lower still; $E'E'$ shows the real shape of the cross-section $E'E$, taken at right angles with the axis of the cone. This is an ellipse, whose centre coincides with the axis of the cone of visual rays, the centres of both circles appearing as poles of the ellipse, one on one side and one on the other. The projections of the respective centres are shown in each case at a , b , and e .

The line DD , parallel to AA , shows that a horizontal section of the cone taken at this place must be a circle like $A'A'$; and since the sub-contrary section at BB is symmetrical with it, about the axis of the cone, it follows that $B'B'$ also must be a circle.

245. It is to be noticed that the ellipse $E'E'$ is the appearance that the circle would present from the station point S . It would not appear as a circle, though its perspective is a circle. But neither does this perspective circle appear as a circle. It, too, is foreshortened into an ellipse in the sight of a spectator at S .

246. In fact, unless a circle is situated just at the centre of the picture, the ellipse which represents it in perspective is of a different shape from the ellipse which it presents to the eye. Horizontal circles, for instance, always present to the eye horizontal ellipses; ellipses, that is to say, whose major axes are horizontal. But in perspective such circles, unless just above or below the centre C , have their axes inclined, as we have seen in Fig. 47. Yet these oblique ellipses when seen from the proper position, the station point in front of C , are themselves apparently changed by the effect of perspective, and foreshortened into horizontal ellipses.

This apparent distortion in the perspective, which makes the outline of the drawing of a different shape from the apparent outline of the thing drawn, will, as has been said, form the subject of the next paper.

247. Figs. 54, 55, and 56 show three different ways of drawing concentric circles. Since concentric circles have the same centre, the ellipses which constitute their perspectives have of course the same pole and polar line; but the ellipses have not the same centre, nor are their axes parallel.

248. The first method is shown in Fig. 54; it is applicable to the case where the perspective of a circle is obtained by means of a circumscribed square or polygon. A second circle, concentric with the first, is easily obtained by means of a concentric polygon, as shown.

249. Fig. 55 shows how the second ellipse can be found when the first has been already determined in any way. Let a line of measures be drawn through the pole which is the perspective of the centre of the circle, parallel to the polar line or trace of the plane in which the circle lies. If now any chord aa , representing a diameter of the circle, be drawn through this pole, and lines be drawn from its extremities to any point V upon this trace or horizon, it will cut the line of measures at two points, a' and a' , whose distance from the pole is the same. If now two other points, b' and b' , be taken, also equidistant from the pole, and lines be drawn through them, the points b and b , in which they intercept the same chord, will be points of an ellipse which represents a circle concentric with the given circle, and as much smaller as $b'b'$ is smaller than $a'a'$. In the figure the radius of the smaller circle is one half the radius of the larger one, $b'b'$ being one half of $a'a'$. It is obvious that since the lines

meeting at V are parallel in space, the lines aa and $a'a'$ are divided proportionally. Any number of points can be obtained in the same way as b, b' .

250. A third method of putting concentric circles into perspective is shown in Fig. 56, — a figure which, like Fig. 47 in Plate X, shows three equal circles, A A, B B, and D D, lying in parallel planes and equally distant from the picture, the last of which stands *edge-wise* to the spectator, so that it coincides with a portion of T R Z, the trace of the parallel planes. In the figure it is supposed that A A is the given circle, concentric with which it is required to draw another circle E E.

To effect this the circle D D is first found by cutting off from T R Z a portion equal in height to A A, this height being measured above and below a line passing through the centres of the three circles. Parallel to this line let a second line be drawn through any point, 1, of the circle A A, to the corresponding point, 3, of the circle D D; and upon this line let any convenient point, as 2, be taken as the corresponding point of a third circle B B. If now a fourth point, 4, be taken upon the line through the centres, the line 4 2 5 will be an element of a cone whose vertex is at 4 and whose base in the plane of the circle A A is a circle concentric with that circle. The intersection of the line 4 2, prolonged, with a radius of A A drawn through the point 1, fixes the point 5, in the circumference of the circle E E. By drawing other lines, parallel to the line 1 2 3, through other points of A A, any number of other points in B B and E E may now easily be obtained.

The radii of the circles E E and A A (or B B) are obviously proportional to the distance of the point 4 from the centres of E E and B B, and also to the chords drawn through the common centre of A A and E E parallel to the trace T R Z, that is, to D D.

251. It will be noticed, 1st, that this method not only gives the means of finding a larger circle concentric with A A, and lying in the same plane, but also of finding an equal circle, B B, lying in a parallel plane; 2d, that it makes no difference in what direction the axis of the cone passing through the three centres is originally drawn, provided it is parallel to the plane of the picture; and 3d, that this method is as serviceable in drawing a concentric circle smaller than the given circle as in drawing a larger one; for if E E were the given circle a reversed process would give A A.

252. As to the figures 45, 50, and 51, the publication of which in connection with the paper which they illustrate was accidentally prevented, it is unnecessary to add anything to what was said in that paper. But it is perhaps worth while to say that the excessive distortion apparent in them is due simply to the fact that the station point, or proper position of the spectator, is in each of them within two or three inches of the page. This is within the limits of distinct vision. But by looking through a pin-hole in a card the prints can be distinctly seen when held even at the end of one's nose; and when so viewed it will be seen that not only the ellipses in Fig. 45, but the parabolas and hyperbolas in Figs. 50 and 51, look like circles, as they should. The apparent distortion entirely disappears.

253. Fig. 57, a, b, c , shows three different ways of obtaining certain points in a circle by drawing intersecting lines from the sides of a circumscribing square, and d shows that either of these methods may be used for finding the perspective of a circle.

THE PANATHENAIIC FRIEZE.¹

As our concern is now rather with the technical sculpture than its subject, it is sufficient to mention, as is well known, that this band of low-relief represents the procession which with pomp conducted a peplos or robe dedicated to Athene, the goddess of the people and city. As the enclosure of the Acropolis was entered, the subordinate or west front of the Parthenon was first approached, and the sculptures represent the divided procession advancing along the north and south flanks of the temple towards the eastern entrance. On the frieze over the eastern entrance are represented two groups of divinities, heroic ancestors, male and female, seated, of larger scale, and apparently watching or waiting for the procession. Between them, and central over the doorway, is seen a priest, who delivers the folded peplos to a youth, and a priestess, who is committing a charge to maidens. The procession consists of men ordering its course, others bringing along the oxen and sheep for sacrifice, ranks of girls, musicians, water-bearers, then chariots, and, above all, a long train of the mounted youth of Athens. It is in the treatment of this part of the procession that the sculptor has displayed the utmost indifference to difficulty, the most consummate judgment and skill and daring and invention, and has successfully evoked the most engaging beauty from under the very ribs of difficulty and confusion.

The height of the frieze itself, as of its position above the eye, was limited by architectural proportion, and a limit was thus imposed on the sculptor for the height of an erect figure; he availed himself of what space was given to him to the utmost, and there is but moderate room to spare above the heads of the few young men who are standing erect. The height at which the frieze was elevated, and the oblique view from the narrow ambulatory below which alone commanded it, made this imperative if a diminutiveness was to be avoided which would preclude finish and recognizable features and

expression. Another consequence of these conditions was that a liberty had to be taken with nature in respect of the scale of the horses of the mounted cavaliers, which was disproportionately reduced. The riding figures are in some degree reduced, as compared with those on foot, and quite without reference to perspective, but this difference is trifling, and although something more is gained for the size of the horses within the limit of height by their extended action in most cases, the horses are still unnaturally small. They have the characteristics doubtless of a small and sturdy breed, but it is clear that the artist deliberately ventured the incongruity. The alternative to reduce the stature of the men was inadmissible, and he had just confidence that even if the spectator noticed the disproportion, which many do not, he would, if a worthy spectator, willingly compound for it by a sense of the energy of the composition, which would be adequate expression of any amount of vigor. An over-sized rider in nature seems to oppress his steed, but such lightness and spirit are thrown into the animals of the frieze that not even where disproportion might be feared as salient is there any suggestion that the load is not carried with abundance of strength to spare.

The costume of the riders is varied for the sake of variety, of contrast, and of composition, but for such reasons alone, with no intention to snatch applause for naturalism. Some are nude but for a flying cloak, and are seated like the rest on bare-backed horses; others have tunics, which, if it is thought instructive, may be called chitons, as the cloak a chlamys. Here and there irregularly is a cuirass, different in every case. Heads are usually bare, but sometimes covered by cap or helmet, in one or two cases by the broad-brimmed Thessalian hat. Such sparseness in equipment might seem to throw back the representation to the traditional heroic, or even to still earlier mythical epochs; but there is no reason to think that heroic habits were otherwise interpreted than as subserving the idealization of a familiar contemporary celebration.

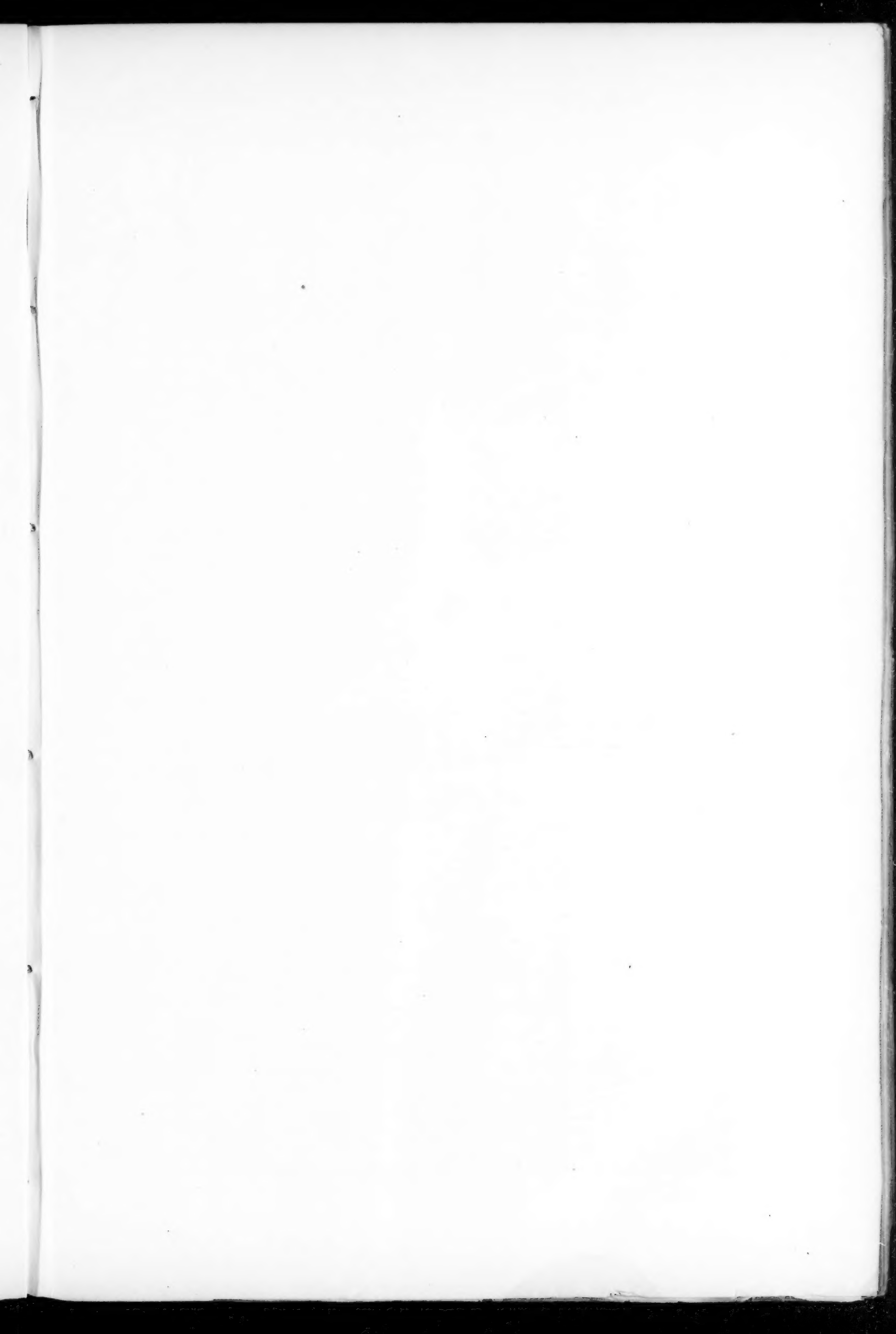
The style of relief is not without a certain analogy to that of some of the Assyrian representations of hunts and battles by the king in his chariot. The Assyrians set an example of moderation in prominence or projection, but the very despair of clumsiness is displayed by them in their management of figures moving in two planes, and of which some are partly covered by others to their front. The majesty of Assyria bends his bow as he stands in a car drawn rapidly by three horses yoked abreast, like those of so many Homeric heroes. The horses' heads are seen advanced one beyond another, but the twelve legs of the animals are left to be assumed on the insufficient evidence of three fore and three hind legs in like parallel presentation. The Assyrian, it may be thought, has as much right to conventionalize as the Greek; but a convention for the advantage of expression is one thing, and resort to it as a cloak for a difficulty not beyond the reach of skilfulness to overcome is something very different. The Greek challenged and vindicated his right to another license in disregarding perspective diminution, even when he represented so many figures retiring one beyond the other that the remotest must needs be at considerably greater distance. By the manner in which the knees of the four seated female divinities or heroines on the eastern frieze advance in succession beyond each other they are declared as occupying receding planes, but the actual proportions of all are identical, and the legs of the seats rest on the same ground line. It is the same with the cavalcade, where the ranks are repeatedly composed of as many as seven horsemen advancing abreast; the same ground line receives the hoofs that touch ground of the near and the remote alike. Chiefly from the obstructed view of the marbles, but not slightly in consequence of the disintegration of surfaces confusing outlines even where slabs are complete, it is not easy to appreciate the marvellous skill of these combinations at the museum² without the bestowal of steadily attentive consideration. It is worth while for those who are interested to take a preliminary view of the restored groups, as they may be seen in Pall Mall, below the cornice of the Athenæum Club. Here it is salient how the full flank of the near horse of rank after rank accentuates the series, and gives the key which makes simple the relative positions and movements of all those beyond it.

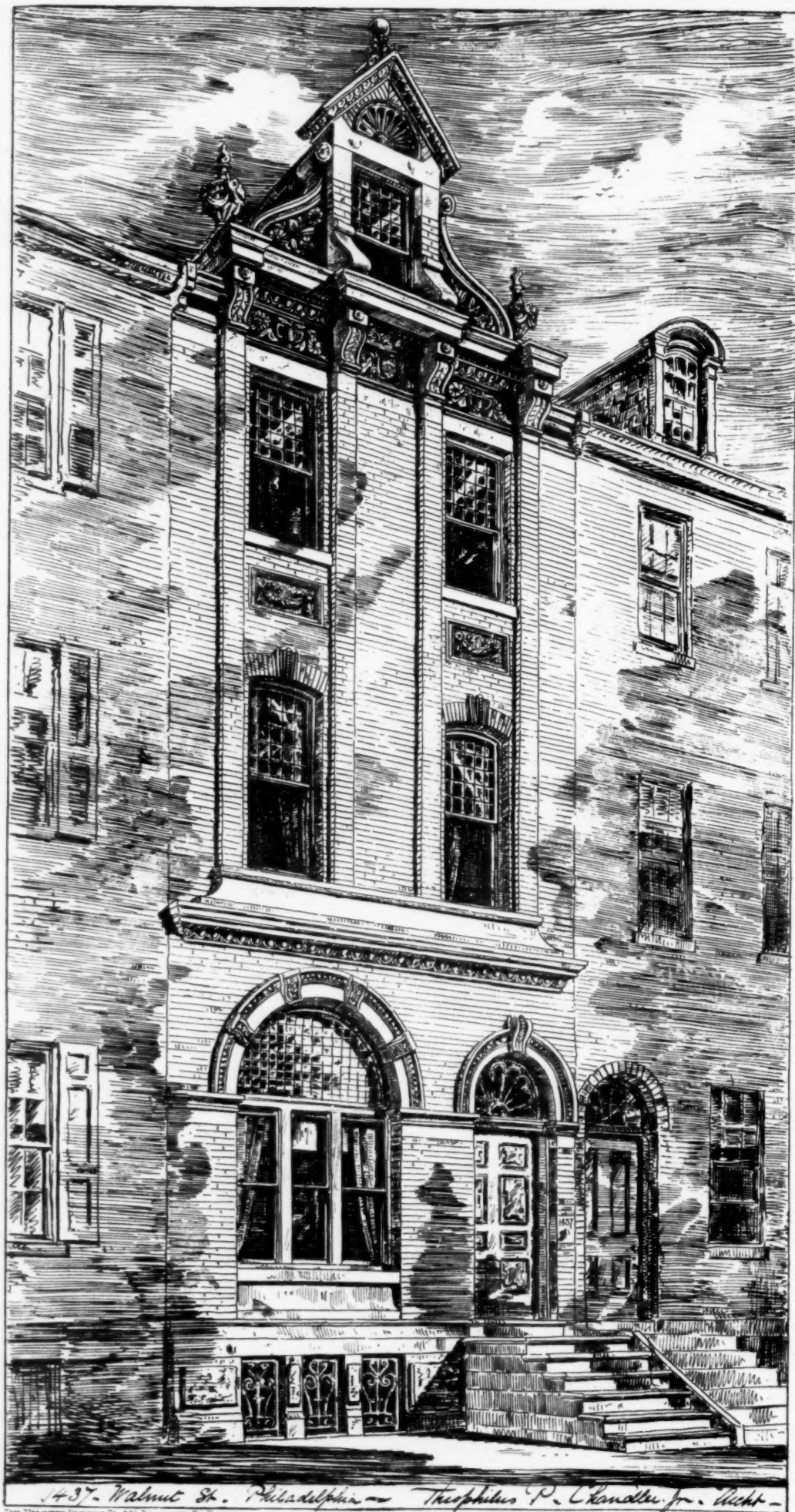
It will be observed that in the foregoing brief note of a part of the action the exposition followed from the west eastward, as if following on with the procession. There are several circumstances which render this important and imperative. Whatever may be the reason, moving objects are more easily and comfortably observed as they are moving past or away from us than as directly advancing upon us; the action of the horses as seen from the rear is explained best — and is especially required to be so, when only observable under so oblique an aspect as was available — by the broad flank of the near horse, the seat of the rider and his bearing on the rein, and the posture of the hind-quarters of the animals, the fulcrum of propulsion. Certainly as we follow on with the frieze in this direction we seem to be in harmonious sympathy with the general movement of the celebration.

But there is something more in the matter, — something that may escape observation generally, but will be palpable when pointed out. If we pass along in the reverse direction, as if meeting the procession we are sensible not only of confusion, but of a certain harshness which is easily explained. We find that we are moving, so to say,

¹ From an article in the *Architect* by Mr. W. Watkiss Lloyd.

² The British Museum.





1437 Walnut St. Philadelphia — Theophilus P. Chandler Jr. Archt. —
THE HALLOTT & PRINCE CO. 150 DEVEREAUX ST. ENGLAND

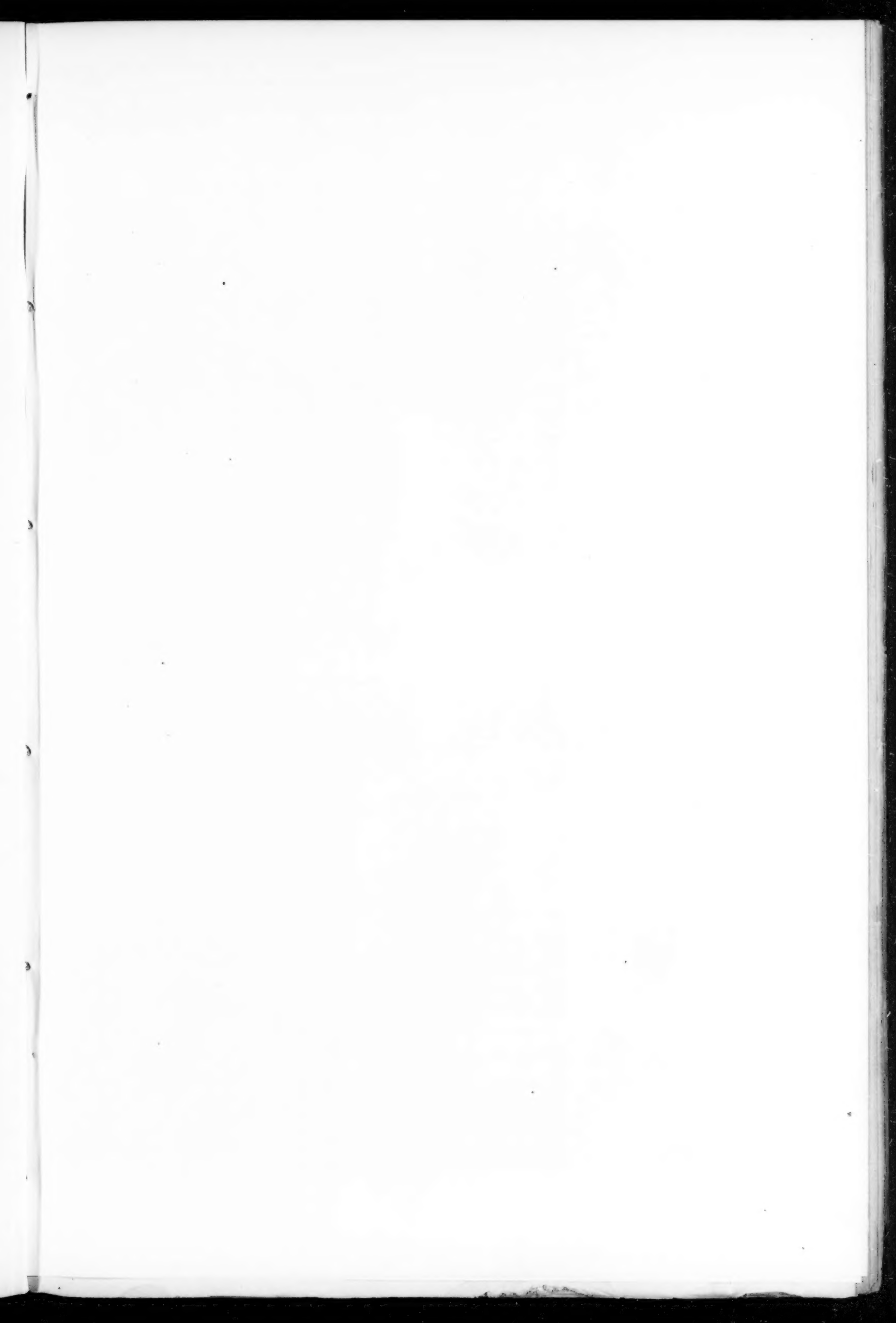
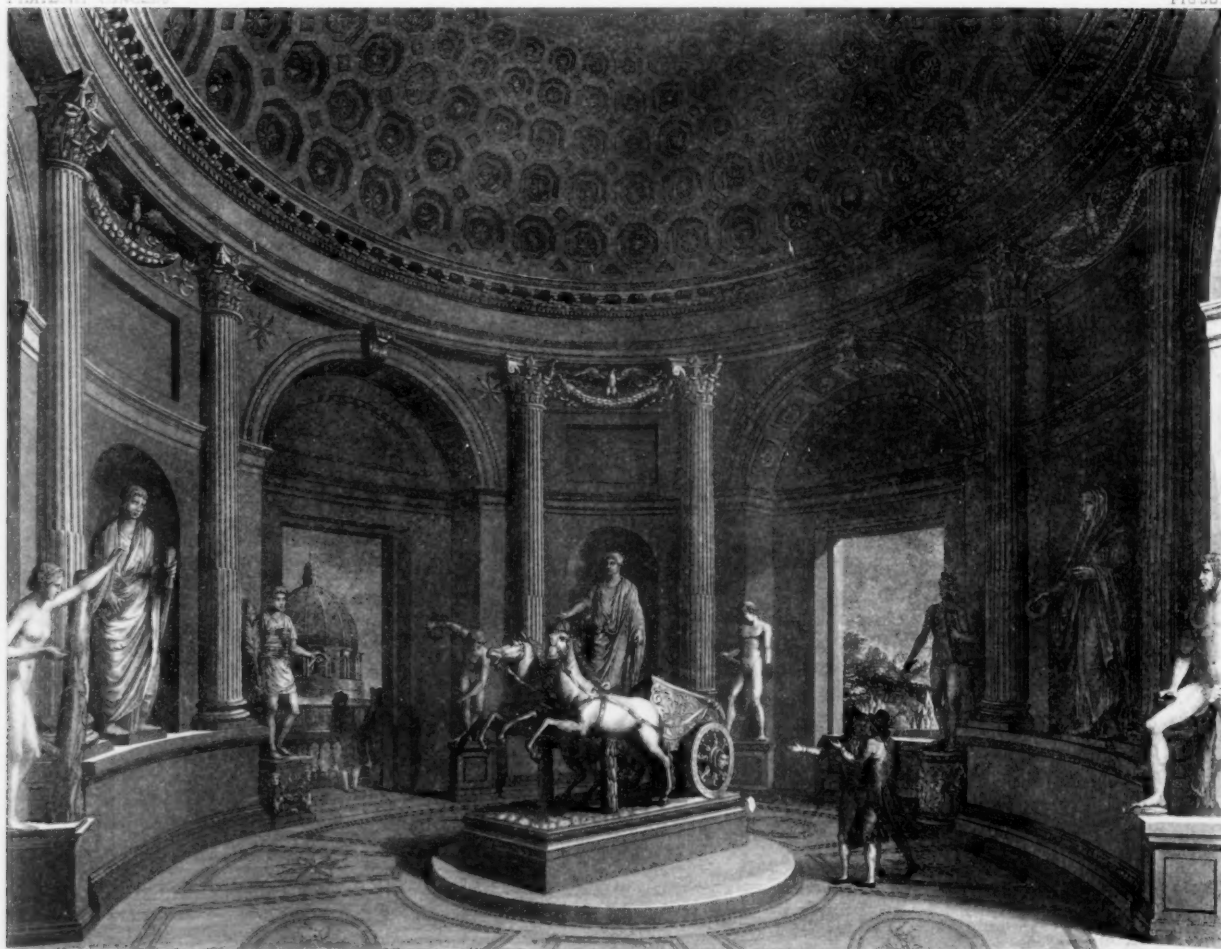


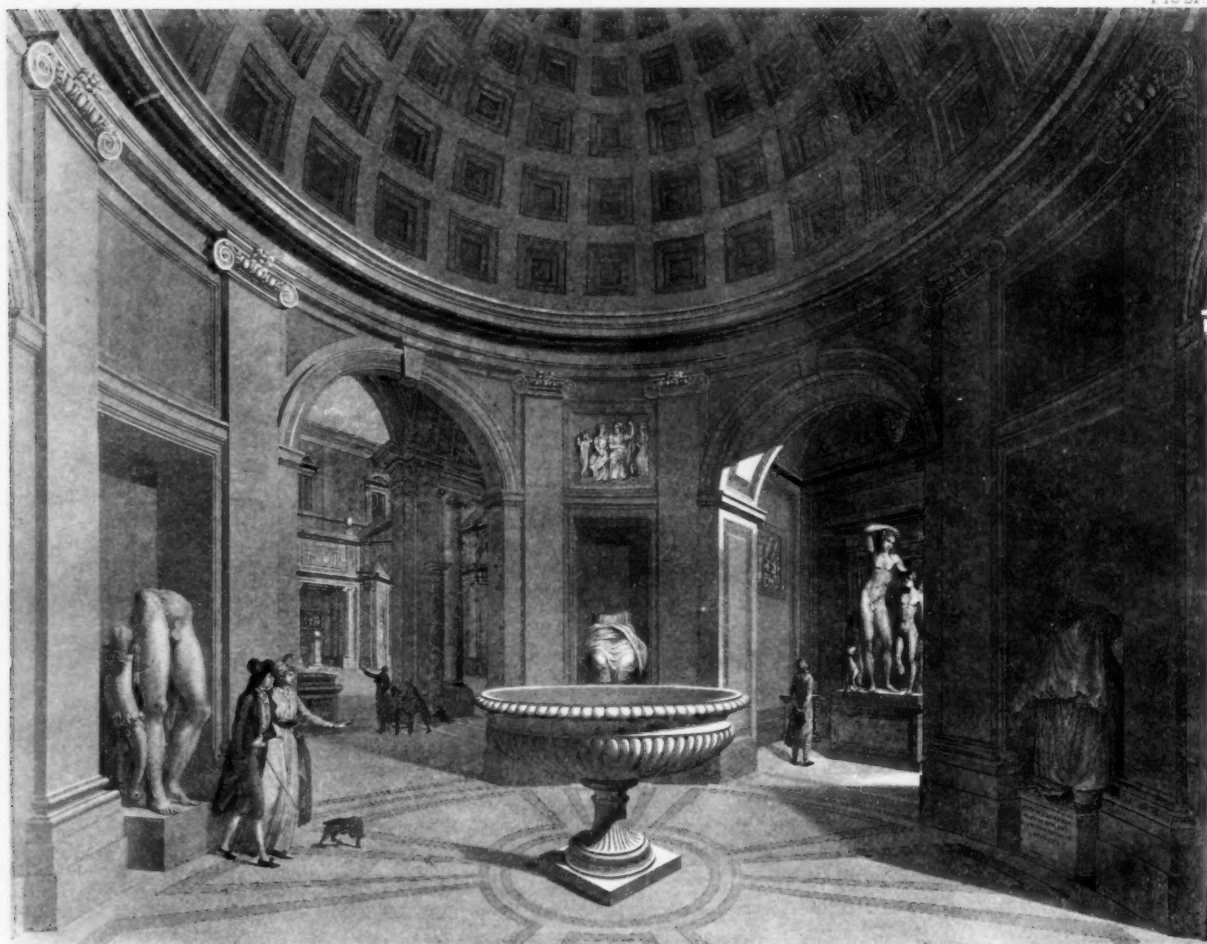
PLATE III. CONTINUED

FIG. 50



THE HALL OF THE BIGA, IN THE VATICAN MUSEUM

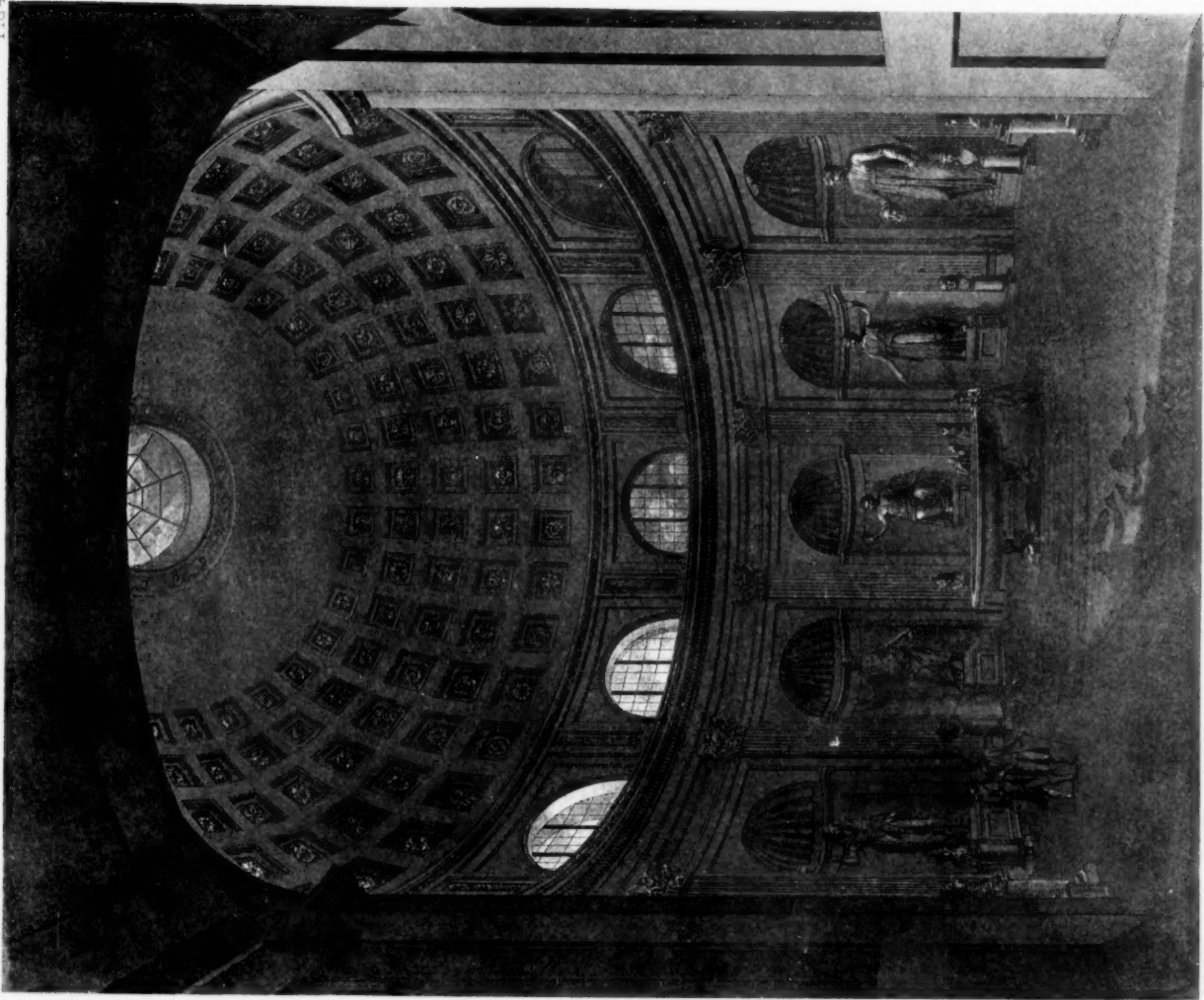
FIG. 51



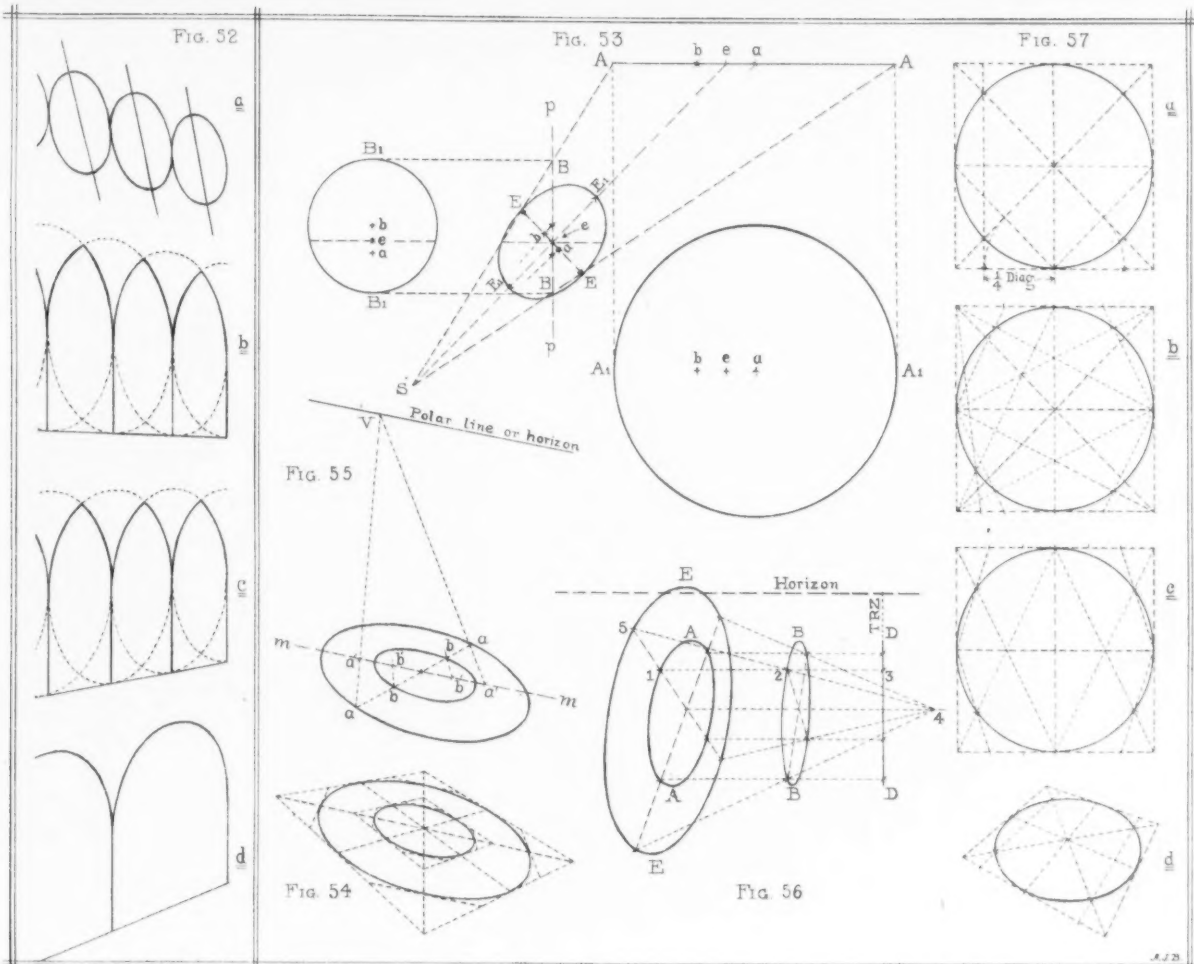
THE HALL OF THE VASE, IN THE VATICAN MUSEUM

Fig. 45

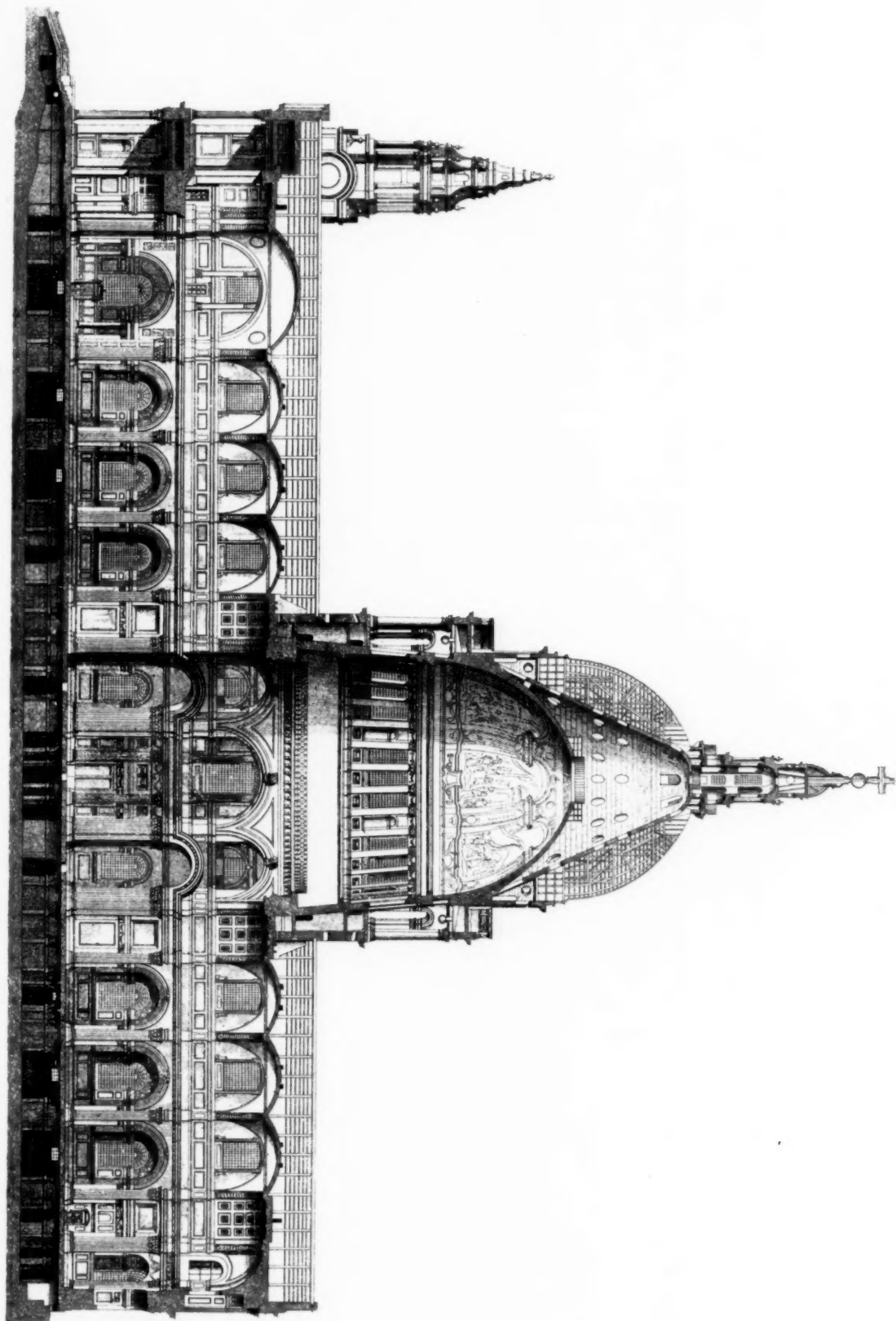
PLANET. CIRCLES



THE ROTONDA IN THE VATICAN MUSEUM.



F. Arundell del.



0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370 380 390 400 410 420 430 440 450 460 470 480 490 500 510 520 530 540 550 560 570 580 590 600 610 620 630 640 650 660 670 680 690 700 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000

— ST. PAUL'S CATHEDRAL —
— LONDON —

THE PUBLISHERS: PUBLISHED BY THE PUBLISHERS, 120 DEVEREAUX ST. BOSTON

"against the hair," or rather upon rough edges. In fact, the rear outlines of the horses and groups generally fall in most cases towards the plain slab at a blunt angle, or are gradually rounded towards it. But with the front outlines the rule is in contrast; a quicker descent is given to the contours, — they meet the slab very constantly at a right angle, and in very important parts are even notably undercut. The forward outlines in consequence are relatively strengthened by shadow, and so far an element of decision and definition is introduced, like that given by thickened strokes expressive of shade in an outline drawing. But one consequence of this is serious, and the result is manifest, and nothing less than that the effect of the frieze as followed in one direction was deliberately sacrificed by the sculptor for the sake of enhancing it when contemplated in order from another.

He could, indeed, scarcely have adopted so elaborate a scheme of composition under any other conditions. Low-relief demands that the heads of the figures should be usually in profile, but they could not be set with outlines flattened on the plain slab consistently with relation to the space which had to be indicated for horses and ranks. Hence the profiles of the riders are constantly undercut; then cases occur in which the lower half of a face is in front of a horse's mane and neck, and the upper part above them, and free. The management, then, of the relation of both to the background is peculiarly awkward; and into all these unhandsome recesses we have to look if we persist, against the first warning incongruity, in meeting the course of the cavalcade. This is a great aggravation of the confusion which is presented when we come first upon the sight of the crossing legs of prancing horses, of which we do not know the distinct action till we pass farther on; but the sculptor was manifestly indifferent to the aggravation which would do him good service by warning the spectator away from a false aspect, as well as by supplying a contrast to the aspect which he was chiefly concerned about. In the groups at either end of the naos, which were naturally seen directly in front, and, indeed, from a wider pavement, the order of the figures is open, and the requirement for this special adjustment is avoided and ignored.

The development of the ranks of horsemen, by spreading them fan-like, so that the seven cavaliers successively are shown in advance of each other, most certainly simplifies the arrangement to the spectator, but goes little way to relieve the difficulty of the sculptor's problem. The planes which are required to account for the overlapping limbs are still most numerous. A near fore-leg of a horse will be relieved directly upon the leg of a rider beyond, as that upon the fore-quarter of the horse he rides, which is relieved again upon the limbs of more than one horse beyond before we arrive at the plain surface.

The general system on which the composition was designed and executed appears to have been this. We are led to infer that the design was drawn carefully in outline on the still smooth slabs, it must be supposed after a more finished drawing, which expressed by shading the refined surface depressions and undulations; it must then have been understood that the nearest portion to the front of every figure was to be expressed by the chisel with as little depression below this surface as possible; these highest and least rounded parts of each figure are in consequence maintained at a high uniform level, so that an applied flat surface would touch them all. There is a certain limit, scarcely two inches at most, to which the slabs are cut into below this plane, a distance which has to be economized and distributed among the superposed members — economized where necessary, and, where not, apportioned freely. It was thus imperative that the knee of a rider by a horse's flank should have very slight relief, in fact be almost flat, but where his leg extends in front of the haunch of a horse beyond and the open background it takes more rounded relief inwards. Where many surfaces have to be accounted for, as must be the case with the crossing limbs of men and horses in ranks, even the strictest economy in graduated distribution calls for help, and then considerable liberty is taken of sinking the background beyond the average depth; but this is chiefly in recesses and small bounded spaces, where the stratagem escapes notice among the shadows.

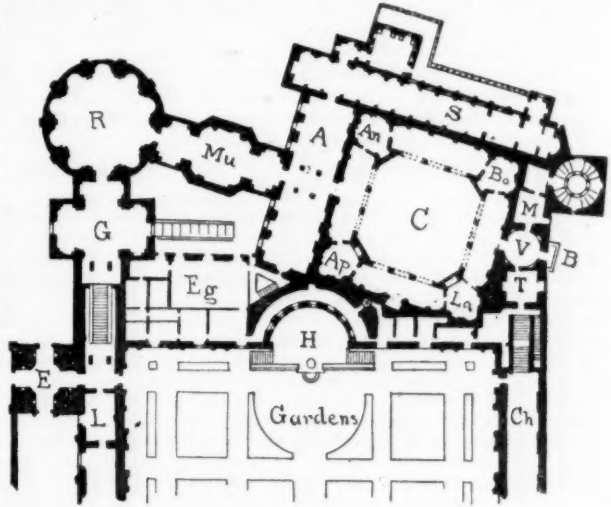
Although the faces are usually in profile, other presentations occur, and even that of the full face: this variety is a relief of the greatest value, and seems to bring the spectator into more immediate and sympathetic relation to the gallant parade. It may also be remarked that the frieze preserves evidence sufficient in a number of completely preserved heads, male and female, to correct a hasty inference from the simple *chevelure* of the Dionysus (Theseus) of the pediment, that the elaborate treatment of the hair was posterior to Phidias. There are sufficient examples here to give indication of a mastery of an easy detail indeed, but of one which has its value in the expression of age especially, and even character. Indeed, the record of the ambrosial locks of his Olympian Zeus should settle the question.

THE ILLUSTRATIONS.

ILLUSTRATIONS OF PAPER ON PERSPECTIVE. PLATES XI. AND XII.

FIGURES 45, 50, and 51 are reproductions of some old engravings representing that portion of the Vatican Palace called the *Museo Pio-Clementino*. It was erected about a hundred years ago by Pope Pius VI., during his long pontificate of twenty-four years, to contain the collections formed by Julius II., Leo X., Clement VII., Paul

III., and his own immediate predecessor, Clement XIV., — collections to which Pius himself added more than two thousand pieces. This irregular mass of buildings occupies the summit of the Vatican Hill, at the northern end of the gardens which separate it from the papal apartments, the Sistine Chapel, and the galleries and chambers decorated by Raphael. The rooms and passages shown upon the plan are the end of the long gallery of the Museo-Chiaramonti (Ch) arranged by Canova for Pius VII.; the Hall of the Torso (T), formerly a chapel, in which stands the famous Torso of the Belvedere; the Hall of the Vase (V), from which opens to the south the Balcony (B), the splendid view from which, extending over Rome and the



Campagna, from the Apennines to the Alban hills, has given the name of Belvedere to this portion of the palace; the Hall of the Melager (M); the Hall of Statues (S), at one end of which is the celebrated Ariadne; the Hall of Animals (A); the Hall of the Muses (Mu); the Rotondo (R); the Hall of the Greek Cross (G); the Egyptian Museum (Eg); and the entrance to the outer gardens (E), which brings us to the long gallery of the Library (L), enclosing the inner garden on the north as the Chiaramonti gallery encloses it on the south. Above this entrance hall is the Hall of the Biga; at the end of the garden is the Hemicycle of the Pigna (H), built by Bramante for Julius II. In this stands the great pine cone, eleven feet high, supposed to have formed the summit of Hadrian's Mausoleum. The quadrangle behind, between the Hemicycle and the Hall of Statues, is the Cortile of the Belvedere (C), also from the designs of Bramante, in the four corners of which stand the Belvedere Apollo (Ap), the Antinoüs (An), now generally admitted to be a Mercury, the Laocöon (La), and Canova's Boxers (Bo).

The Rotondo, Fig. 45, is sixty-one feet in diameter, and was built by Pius VI., from the designs of Michael Angelo Simonetti. The floor is formed of a mosaic pavement, found at Ostia in 1780, representing Centaurs and Lapithæ in the border, with a head of Medusa in the centre. Around the whole are black and white mosaics found at Scrofano, representing some of the adventures of Ulysses, and others of marine monsters found near the Baths of Caracalla. This hall was built to contain the great vase of red porphyry, more than fifteen feet across, found in the Baths of Titus, which stands in the centre. On either side of the entrance are the well-known colossal busts of Tragedy and Comedy, which stood at the entrance to the theatre in Hadrian's Tusculan Villa. Opposite is a seated statue of Nerva, crowned with a bronze wreath of oak leaves. Of the other statues the first on the left is a Juno Lanuvina, armed and wearing the ægis; the second, the famous Barberini Juno; the third, beyond the Nerva, a Ceres, from the Theatre of Pompey; and the fourth, a Muse, in place of which now stands the bronze Hercules, discovered in Rome in 1864, and purchased by the late Pope for \$50,000. The five niches shown in the plate occupy half the circumference, the other half being taken up with three similar niches and two doorways.

Fig. 50 shows the Hall of the Biga, built after the designs of Camporesi. The two-horse chariot from which it takes its name formerly stood in the Temple of the Sun. The wheels and pole are modern, the body of the vehicle having long been used in the church of St. Mark at Rome, as an episcopal throne. The horses also are modern, except the body of the right one.

The statue in the niche on the right is of Greek marble, and represents a Pontifex Maximus, or high priest, veiled, with a vessel in his hand, in the act of offering a sacrifice; on his right is an Apollo Cytharæus, playing upon a harp. It has for a pedestal an altar adorned with female figures, sacrificing; on the other side is a statue of Alcibiades, found upon the Cælian. In the niche on the left is the figure of a philosopher holding a scroll, supposed to represent Sextus of Cherson, the uncle of Plutarch; on his left is an Auriga, or charioteer, in costume, with the palm of victory in his right hand, and in his left the fragment of the vine, which he has already cut with the curved knife that hangs at his belt. Nearer the front of the

picture is the Apollo Sauroctonus, or Lizard Slayer, now in the Hall of Statues, a marble copy of the celebrated bronze of Praxiteles. In the niche at the back of the room is a statue sometimes called Phocion, sometimes Epaminondas; on either side are ancient copies of the well-known Discobuli, or Quoit Players, of Myron and Nau-cydes. Through the window is seen the dome of St. Peter's.

Fig. 51 shows the Hall of the Vase, with the Hall of the Meleager beyond, and on the left the Cortile of the Belvedere. In the centre of the room is the large basin of Pavonazzetto marble, nearly six feet across, from which it takes its name. The three square niches on the sides of the room are filled with fragments of sculpture, apparently Greek. The drapery of the one on the right was much admired and studied by Raffaele. Above the further niche is a bas-relief representing Cupid and Psyche before Pluto and Proserpine.

The Hall of the Biga is about thirty feet across, and that of the Vase about twenty.

HOUSE NO. 1437 WALNUT STREET, PHILADELPHIA, PENN. MR. T. P. CHANDLER, ARCHITECT.

LONGITUDINAL SECTION THROUGH ST. PAUL'S CATHEDRAL, LONDON.

In order that our readers may appreciate the importance of the decorations of the dome, of which we speak elsewhere, we here reproduce from Gaillihaud's "Ancient and Modern Architecture" a section of the cathedral taken longitudinally. The decorations here shown so sketchily represent the scenes from the life of St. Paul, painted by Sir James Thornhill, which have been destroyed by the smoke and damp of the London atmosphere. The inner dome is of brick-work, two bricks in thickness, and having in every five feet of rise a course of headers eighteen inches long, which bond the work together. The outer dome is, as is well known, supported on a brick cone, whose wall is eighteen inches thick, and which, moreover, is the direct support of the lantern, said to weigh seven and one half tons. The inner dome was built on a centering which rested upon the projecting cornice at its springing, and was left in position for the use of the painter, who was paid only forty shillings per yard for his work. The difficulty and cost of erecting the necessary scaffolding for any new decoration has been no inconsiderable deterrent to the undertaking.

THE SEWAGE SYSTEM OF PARIS. II.

THE normal distances between the underside of the masonry and the street levels are as follows for the different types, except No. 1:

Type	No.	Ft.	In.
Type No. 3	.	16	6 $\frac{3}{4}$
" No. 5	.	15	10 $\frac{1}{8}$
" No. 6	.	13	6 $\frac{1}{8}$

The gallery under the Boulevard Sébastopol may be taken as a type of one of the branch collectors. It was constructed between 1855 and 1858 under one of the side avenues of the boulevard from the Boulevard St. Denis to the Quai de la Mégisserie; from this point it extends with type section No. 6 under the Boulevard de Strasbourg, as far as the Rue du Château d'Eau. In ordinary work this gallery serves as a collector for the flat district known as the Marais; during heavy rains it discharges the overflow direct into the Seine, and renders impossible the floods which used to be common in the Faubourgs St. Martin, St. Denis, Montmartre, etc. In this gallery are laid the two great water mains which receive their supply from the Ourcq. The following are the principal dimensions of the gallery:—

	Ft.	In.
Length	5074	0
Width at springing of arch	16	0 $\frac{1}{8}$
Height from sidewalks to top of arch	11	11 $\frac{1}{2}$
Width of side walks	2	7 $\frac{1}{2}$
Width of channel	3	11 $\frac{1}{2}$
Depth "	4	3 $\frac{3}{4}$
Height of side walls	3	11 $\frac{1}{2}$
Thickness of arch at crown	1	7 $\frac{1}{8}$
" " " springing	2	11 $\frac{1}{8}$
Thickness of cement lining	0	1 $\frac{1}{8}$
Distance apart of ventilators	164	0
Distance of street connections	328	0
Height of branch to street traps	6	6
Width " " " "	2	7 $\frac{1}{2}$

The edges of the sidewalks of this gallery, as well as of all except the largest sections, are furnished with rails, along which the wagons run which are employed for cleaning out the channels. These wagons consist of a light frame running on wheels and furnished with a movable dam turning on an axis in the wagon, and being manipulated by a winch. Its form corresponds to that of the channel. When it is desired to remove any obstruction in the channel the dam is lowered, backing up the water behind, which being suddenly released carries with it the accumulation of sand, mud, etc. For the larger sections, boats are employed instead of the wagons. These are built of iron, and carry a movable dam in front similar to that attached to the wagons. Projecting from the boat are two arms carrying guiding wheels, which pressing against the sides of the channel keep the boat in the centre. When the dam is lowered the water behind it forms a head of from 6 inches to 12

inches, which is sufficient to produce the desired effect. The deposits accumulating below would quickly form a bank that would stop the progress of the boat, if the water in escaping through the spaces between the sides of the dam and the channel, and by small openings made in the former, did not drive the sand and mud constantly in advance of the boat. The rate of progress is very slow, as it takes from eight to ten days to traverse the five miles of the grand collector. In returning up stream movable dams are placed in the channel about every 600 yards, to reduce the speed of the current. Safety chambers for the workmen are placed at intervals of 650 feet. This precaution is very necessary, since in periods of heavy rains the collectors are quickly flooded, as, for instance, on the 27th of July, 1872, when in five minutes the Sébastopol collector was filled to the roof, and several workmen were drowned. There are about 7,000 points of egress for the workmen in case of necessity. The number of men employed in cleansing the sewers is about 700.

By means of the collectors nearly all the sewage water is discharged into the Seine far beyond the limits of the city. But this is done at the expense of the river lower down, chiefly on account of the great deposits of material held in suspension, since, as we have seen, the house sewage proper is not admitted into the collectors, but is removed from the cesspools by carts. Dredging operations are constantly necessary, and about 120,000 tons of *débris* are removed annually from the Seine, at a cost of some £6,000. To obviate this evil, sewage utilization works have been established for some years on a comparatively small scale at Gennevilliers, and larger ones are now in contemplation.

A commission was lately appointed by the Prefecture of the Seine to examine into a project for the construction of irrigation canals which should take the sewage water from the collectors and distribute it upon suitable land in the vicinity of Paris, with the object of improving the soil and also to convert the impure waters into an effluent that might filter gradually into the Seine. It will be observed that this project is an extension of the sewage utilization scheme already carried on at Gennevilliers. The new project includes the construction of a main irrigation canal extending from Clichy to the Forest of St. Germain, of six secondary branches, and of a large number of channels which collectively should irrigate an area of 16,000 acres.

The total length of the principal channel would be about 18,000 yards. It would be circular in section, 6 feet 6 inches in diameter, and would traverse the Seine three times by cast-iron siphons. The pumping station would comprise five engines, collectively of 1,200 horse power, of which two are already at work in pumping the sewage for the Gennevilliers irrigation. The estimated cost for these works is £160,000 for the pumping station and irrigation canal, etc., £40,000 for the secondary branches, or £200,000 for all, not including the outlay made at Gennevilliers, which has reached about £65,000.

The sewage utilization works at Gennevilliers were commenced in 1869 upon 14 $\frac{1}{2}$ acres of ground, and have gradually developed until at the present time about 600 acres are under treatment. This land receives about 600,000 cubic feet of water per acre per year. The use of this water is quite optional, no cultivator is obliged to take it, and each may use what quantity he wishes, and apply it in whatever way he judges best. There are no data indicating the quantity taken by each farmer, so that only the average results are known.

The irrigated soil is generally laid in ridges separated by trenches; the trenches receive the water, and the ridges are reserved for the plants. The vegetable crops are here in advance of all others, but a number of fields are occupied by potatoes, beet-root, cereals, lucerne, etc. When it is desired to have the soil less broken, it is intersected by small trenches only, generally parallel, and placed about 9 feet apart. The general appearance of the crops is most satisfactory. The vegetables, the quality of which has been much criticised, are excellent. The Horticultural Society of Paris, which has followed with the greatest interest the development of the sewage farm at Gennevilliers, has spoken of the success obtained in numerous reports. At the bottom of the open channels by which the sewage is distributed there is a blackish deposit, formed by substances held in suspension, mineral and organic. At the moment of its formation this deposit seems impermeable; but after having been exposed some time to the air it has the appearance of a felt composed of hairs and vegetables and other *débris*. This deposit is left at the bottom of the trenches during one crop, and is afterwards worked into the ground. Stony ground, of which there is a considerable quantity in Gennevilliers, is much improved by the deposits of insoluble matters, mineral and organic, which the sewage waters leave on its surface, and the amount of fertile soil is thus gradually increasing from year to year.

The scheme for the extension of the sewage utilization as elaborated by the late M. Belgrand is as follows:—

At present two 400 horse power engines raise part of the sewage water from the collector at Asnières. Two other engines, established near the first pair, would be sufficient to pump the rest of the sewage. The invert of the St. Denis is at a much higher level, and could be discharged in the plain of Gennevilliers by gravity. From the pumping station at Clichy to the forest of St. Germain, for a length of 16 kilometers, the water would be pumped through a main; this conduit would pass by the plain of Colombes, across the Seine,

in a siphon, at the Island of Marante, would go through Bezons, Houilles, Sartrouville, then a second time over the Seine, and would enter the northern portion of the forest of St. Germain, where there are 3,750 acres of sterile ground, which irrigation would fertilize; afterwards the water may be sent in a channel to Achères, where the irrigation would be extended over 1,600 acres. The irrigable surfaces are approximately as follows:—

	Acres.
District of Gennevilliers	2,500 to 3,000
District of Nanterre, Colombes, Reuil	2,500 to 3,500
Districts of Carrières, Bezons, Argenteuil, Sartrouville	3,500
Forest of St. Germain	3,700
District of Achères	1,750

The largest of these territories, that of the forest, would be at the disposal of the municipal service, and would constitute an immense regulator, over which the waters would run, and by which irrigation of the other districts might be controlled. For this reason this large area constitutes one of the chief advantages of the scheme.—*Engineering.*

CORRESPONDENCE.

THE NARROWNESS OF CITY HOUSE FRONTS AND THE ABUSES THAT HAVE ARISEN IN THEIR TREATMENT.

BOSTON.

RETURNING to town after some weeks spent in a New England country town of the best class, where the houses are all mansions, square, broad, and generous, befitting the broad valley in which they lie, I am struck, as often before, with the narrowness and petty subdivision of the street architecture of the city, where, with tenfold cost and ambition, the result is so much less in respect of dignity, repose, and refinement. The complaint is perhaps a foolish one, but it seems to me there is a needless smallness and fussiness in our city dwellings. We cannot, it is true, expect to plant the country mansion in city streets, and we cannot, with our ineradicable taste for individual homes, emulate, except here and there, the broad façades of Continental cities. The subdivision is, I fear, unavoidable. But there are certain respects in which the American cities do needlessly belittle themselves, and cast behind them the opportunities which are offered for good building, and one respect at least in which this is especially true of Boston. Here the admirable but preposterously over-worked bay-window is responsible for much of the narrowness of which I complain. The bay-windowed front is the natural outgrowth of the "swell front," so called, of the last generation, a feature long characteristic of Boston houses, and almost unknown elsewhere. The modern development of it is no improvement. A front of twenty-five feet, more or less, has five vertical divisions, crowded with four rows of windows. Repose is impossible in such a composition, but as if to express our contempt for a quality so un-American we commonly load these windows with the attributes which belong to Italian architecture in the broad, unbroken walls of Rome or Florence. Heavy projecting cornices are jerked round these frequent angles, only to be brought up hard and fast at either end against that new feature, — the most frightful, perhaps, ever invented by modern utility, — the corbel of the fire-wall. Modern style requires the entrance door to this little front to be as wide and high as the doorway of a palace, and to be approached by a flight of imposing and massive steps, which generally occupy a third of the width of the lot. Enough more is consumed by the passage to the basement door to take up a full half of the frontage by the entrances alone, leaving the other half for a scanty pinch of green turf, which is commonly fenced by a stone balustrade massive enough for a park wall. Taken altogether, I am inclined to think this type of city dwelling the most pretentious and the least respectable which has ever appeared. Repeated as it is once in every twenty-five feet, or oftener, through nearly all the newer streets of the city, each house differing from its neighbor on either side in material, design, and height of stories, and agreeing only in the perpetual squirm of its front line, so that in the perspective of the long streets we can rarely find a horizontal line more than six or eight feet long, the complacency with which we regard this surprising creation, the steadiness with which we go on reproducing it, and the fondness with which we lavish upon it every decoration known to ancient or modern art make it one of the architectural wonders of the day.

Such as it is, however, it has made good its title to supremacy. I am not foolish enough to suppose that the belief of the resident of the Back Bay in his bay-window could be shaken by any argument which the united profession (if it ever could be imagined united) could address to him. It will continue to increase and multiply, and the only remark I am moved to make further concerning it is this: Let us learn to treat it simply, — seeing that to load its miserable little faces with architectural features which require space and elbow-room for their due effect is wasteful and ridiculous excess. Let us gradually reduce the projection of the bay, and thus mitigate the violence of the frequent changes in the direction of the lines. Let us try, by all means, to induce our clients to consent to stop the bay below the main cornice, so that the cornice itself and the roof may be straight, and that there may be so much at least to redeem the general uneasiness of the design.

One thing more. We know not whether it is reasonable to expect

that many more houses will be built in Boston. Dismal prophecies begin to be heard of the end of the good things which in past days have fallen to our share. But there are sanguine persons who believe that the present hard times will have an end, and that there shall yet again be cakes and ale. We know, at least, that there is a hundred-acre park preparing among the outlying swamps, and that miles of new streets will be laid out to surround this pleasure-ground, upon which the prosperous citizens of future generations, and perhaps even of this generation of which we are, will be asked to purchase house-lots and build themselves houses. Must these new streets all be divided up into the everlasting twenty-five foot lots, and sold at two to five dollars the foot? Is there any warrant in the rate of increase in the population or wealth of Boston for continuing in these suburban regions the condition of things which prevails in the city streets? It seems to me that not only from the picturesque and artistic, but also from the financial and speculative point of view it would be for the advantage of buyer and seller alike that the broad avenues which are to surround the new park should be made properly suburban avenues, and should be divided into lots of say a hundred feet frontage, and sold at reasonable prices which would encourage the building of generously planned houses with gardens about them. We can all remember such streets, generally it is true in the smaller cities, — Portland, Springfield, Providence, Syracuse, Cleveland, — where, though the houses may not be particularly attractive architecturally, yet they are made eminently so by their surroundings of green grass and trees and flowers. Such streets afford opportunities, which the close-built streets of the city deny, to the architect, the passer-by, and most of all to the fortunate dwellers, and they contribute, perhaps more than we are aware, to the encouragement of an elevated and refined taste among all classes of people. A.

A MINING ACCIDENT IN NEVADA.

THE Virginia City *Enterprise* of July 13th gives the following interesting description of an accident at the Ward Mine:—

The Ward Mine was yesterday the scene of a great deal of excitement and some four hours of suspense that to many persons was torture almost equal to that of the rack. About eleven o'clock, as the tank which is used in bailing water from the shaft was being hoisted to the surface, the engineer on duty, by some mischance, allowed it to be run up into the sheave. The tank, which is of six hundred gallons capacity, was full of water, and when it struck the sheave the clevis by means of which it was fastened to the steel wire cable was broken. The tank was of wood and ran on guides, the same as a cage. It was a big, clumsy, water soaked affair, and very heavy, to say nothing of the water it contained. When it parted from the cable it went down the shaft like a leaden plummet, a distance of thirteen hundred and fifty feet to the water at the bottom.

When he saw what had happened the engineer was almost wild with excitement, as he knew that seven men were somewhere at the bottom of the shaft, and could not hope that all had escaped with their lives. He ran out of the works and shouted for assistance till his voice was heard at a great distance.

The hoisting tank fell down the south compartment. The next compartment north is the one in which the cage is used. The cage was down at the time the tank fell. The first move was the attempt to hoist this cage to the surface. A move was made to do this, but no sooner had the cage been started than a signal came up from below to stop. This showed those on the surface that there were some men below who were alive. The men below then struck twenty bells. No one above knew what this meant, though it is now said that this is the Cornish death signal. Not knowing what to do those above again tried to hoist the cage, when sharp and unmistakable came the signal to stop. Again came up the twenty bells. These were followed by other signals that could not be understood. Several times it was thought that those below might be ready to have the cage hoisted, and careful attempts were made to move it up, but each time came up from below the peremptory "Stop!" All this was exceedingly perplexing and ominous. It was finally concluded that some one was wedged in between the cage and the timbers of the compartment, and no further attempt at hoisting was made.

As the news of the accident spread, people came from all directions and crowded into the works. Among these were the wives and children of some of the men who were in the shaft, and the friends and relatives of others. How many men were killed, and who they were, were questions that were torturing all present.

As the cage could not be moved, an attempt was made to communicate with the men and learn something of the situation at the bottom of the shaft. By direction of Superintendent Thayer a rope was lowered, to which were attached two lanterns, a bit of board, and a pencil, so that those uninjured below might make their wants known. After allowing it to remain a few moments it was hauled up. One lantern was gone, the other extinguished, and it was clear that it had failed to reach its destination. This failure greatly increased the distress of those above. Although this effort at communication failed, repeated signals on the bell were struck by those below, but could not be understood.

What now seemed necessary to be done was to make a descent into the shaft. In order to allow this the cable attached to the cage

in the depths had to be anchored to the surface so securely that its entire weight would be sustained, and then detached from the reel. This was done and the cage put in place. As soon as all was ready—and it took hours of preparation to complete everything—John Oswell, foreman of the Julia and Ward, took two companions, tools, lanterns, etc., and started for the depths. The guides and timbers in the shaft had been so badly damaged by the descent of the tank that it took forty minutes for this cage to reach the bottom of the shaft.

It had been agreed upon between Superintendent Thayer and the foreman that if any men were dead he should, as soon as the cage reached the bottom, ring six bells, and then one for each death. When at last the cage stopped and no signal came up, the suspense of all at the surface was terrible. What to make of this silence of the bell no one knew. At last the bell began to strike and all present began to count. No death signal was sounded, but instead, clear and unmistakable, the signal to hoist.

As the cage came to the surface five men were seen on it,—the three who went down and two others, one of whom was supported by his comrades. The joy of all present was great when it was announced that the two men on the cage were the only ones hurt, not dangerously; that all left below were sound and well.

It was soon ascertained from the men that the lucky escape was owing to the fact that all the men in the bottom of the shaft were in the north compartment, out of the way of harm, except two. They were in the tank compartment, and must have been instantly killed had they not heard the tank coming down the shaft. They instantly dashed into the middle compartment, in which was the cage with a car upon it. They tumbled into and over the car and cage just in time to escape the falling tank, but were injured as above stated either by striking their heads against the timbers or the car, or by fragments of the tank.

When the cage struck the concussion was terrific. Every light was instantly extinguished. Mr. Rochford says the concussion deafened him for a time. The reason the men below would not allow the cage to be hoisted was that they supposed it upheld a mass of timbers, or in some way protected them. They wanted their situation made no worse than it was.

NOTES AND CLIPPINGS.

ACCIDENT.—On August 2d the smoke stack of Slaffin and Miller's mill factory, Brooklyn, fell through the roof of the building, and caused such a panic amongst the female operatives that four of them jumped from the second story windows, fortunately receiving but slight injuries.

FALL OF A PIAZZA.—One of those unforeseen building accidents for which no one can be held responsible happened lately at Silver Lake, in Wyoming County, N. Y. The County Pioneer Association, numbering some twenty thousand persons, was holding its annual festival at the lake on Thursday, August 1st, and when during the afternoon a thunder-storm came up, the crowd rushed to the hotel and adjoining houses and sought shelter there. The piazza, which extends along the whole front of the building, was quickly crowded to its fullest capacity, and then, after a short resistance to the unexpected weight, about half the floor gave way, and dropped the struggling crowd to the ground, some twelve feet below. The panic caused by the accident was such that the crowd in an adjoining building, by its excited movements, caused the floor there to give way; but a billiard-table in the room below received the ends of the broken joists, and so formed an inclined plane over which the crowd slid in comparative safety. Other floors were strained, and partially gave way, and altogether the buildings appear to have been as badly wrecked as the crowd was rudely tumbled about.

THE CANDY FACTORY EXPLOSION.—The remarkable statement is now made that one James Gresham had an office in Greenfield's factory on Barclay Street, New York, where he had specimens of a powerful explosive which he was manufacturing by a secret process for the exclusive use of the Russian government. The explosive, more powerful in its action than dynamite, is said to be made by treating powdered asphaltum with electricity. If there is any truth in the report, it is singular that the fact that there was such a destructive substance in the building has not transpired before.

BRICK-MAKING BY STEAM.—Evidently there are in this country those who do not share Mr. Barry's belief that "iron is the building-material of the future," but have greater faith in the qualities of burned clay, and show their faith by their works. There has been established lately in Baltimore the second factory in the country for making bricks by steam,—the other establishment being in Washington,—which is said to be able to make two hundred thousand bricks each day. The clay, after it has been passed through iron rollers which pulverize the small stones and reject the large ones, is carried to the top of the building and thence falls into the disintegrator which makes four hundred and fifty revolutions per minute. Here it is reduced to a fine powder and passes off into a pipe where by the addition of steam it is moistened enough to give to its particles the proper cohesiveness. This pipe feeds a wheel furnished with moulds which, in the two revolutions it makes each minute, turn out two hundred and thirty-two bricks. As the wheel revolves the bricks drop out on to an endless belt which carries them to a shed some fifty feet away, where they are loaded by hand upon small cars, which are rolled into drying ovens and allowed to dry there during five hours, the dampness in these ovens being constantly withdrawn by an exhaust fan. After this they are stacked in kilns and fired.

HERCULANEUM AND POMPEII.—Preparations are now making to celebrate at Pompeii next year the eighteen hundredth anniversary of the destruction of Pompeii and Herculaneum.

THE EXPLOSIVENESS OF FLOUR DUST.—Professors Peck and Peckham, of the University of Minnesota, have been making an extensive series of experiments to determine the cause of the recent flour-mill explosion at Minneapolis. The substances tested were coarse and fine bran, material from stone ground wheat; wheat dust, from wheat dust-house; middlings, general mill dust, dust from middlings machines, dust from flour dust-house (from stones), and flour. When thrown in a body on a light, all these substances put the light out. Blown by a bellows into the air surrounding a gas flame, the following results were obtained: Coarse bran does not burn. Fine bran and flour dust burn quickly, with considerable blaze. Middlings burn quicker, but with less flame. All the other substances burn very quickly, very much like gunpowder. In all these cases there was a space around the flash where the dust was not thick enough to ignite from particle to particle; hence it remained in the air after the explosion. Flour dust, flour middlings, etc., when mixed with air, thick enough to ignite from particle to particle, and separated so that each particle is surrounded by air, will unite with the oxygen in the air, producing a gas at high temperature, which requires an additional space; hence the bursting. There is no gas which comes from flour or middlings that is an explosive; it is the direct combination with the air that produces gas, requiring additional space. Powerful electric sparks from the electric machine and from the Leyden jar were passed through the air filled with dust of the different kinds, but without an explosion in any case. A platinum wire kept at a white heat by a galvanic battery would not produce an explosion. The dust would collect upon it and char to black coals, but would not blaze nor explode. A piece of glowing charcoal, kept hot by the bellows, would not produce an explosion when surrounded by dust, but when fanned into a blaze the explosion followed. A common kerosene lantern, when surrounded by dust of all degrees of density, would not produce an explosion, but when the dust was blown into the bottom, through the globe and out of the top, it would ignite. To explode quickly the dust must be dry. Evidently when an explosion has been started in a volume of dusty air, loose flour may be blown into the air and made a source of danger.—*The Scientific American.*

THE SANITARY CONDITION OF BOSTON HOUSES.—During the past year the Massachusetts State Board of Health has caused to be investigated blocks of buildings in the following sections of the city of Boston:—

- Section 1—Beacon Hill, near the State House.
- Section 2—Back Bay, near the Public Garden.
- Section 3—South End, near Chester Park.
- Section 4—West End, near the Lowell Depot.
- Section 5—South Boston, between Eighth and Ninth streets.
- Section 6—Between Harrison Avenue and Albany Street.
- Section 7—South Boston, near Independence Square.
- Section 8—Monument Hill, Charlestown.
- Section 9—Northerly Hill, East Boston.

The object of the investigation was to determine their sanitary condition as regards (1) drains, (2) soil pipes, (3) traps, (4) air-boxes, (5) cellars, (6) yards, and the result is shown in the following tables:—

	Section								
	1.	2.	3.	4.	5.	6.	7.	8.	9.
Houses in the block	28	50	43	72	28	38	29	49	46
Houses examined	26	45	35	72	26	34	24	49	40
DRAINS.									
Houses with defective drains	4	14	23	47	22	20	3	26	30
Houses without defective drains	22	31	12	25	4	14	21	23	10
SOIL-PIPES.									
Houses with soil-pipe ventilated	2	19	—	—	—	—	—	—	—
Houses with soil-pipe not ventilated	24	26	34	10	20	8	24	38	21
No soil-pipe, vault used	—	—	1	62	6	26	—	11	19
TRAPS.									
Houses with traps	26	43	7	14	—	5	5	23	—
Houses effectively supplied	14	23	7	2	—	2	5	21	—
Houses without effective traps	12	20	28	70	26	32	19	28	40
AIR-BOXES.									
Number with passable location	18	45	20	—	—	—	18	11	—
Number with bad location	4	—	13	—	—	—	6	12	—
Houses without a furnace	4	—	2	72	26	34	—	26	40
CELLARS.									
Cellars found passably light, including basements which are used as cellars and kitchen	24	45	34	67	20	30	13	45	35
Found quite dark	1	—	1	5	6	4	11	4	5
Found damp or wet	7	3	2	27	13	23	9	12	11
Found clean	20	42	33	62	7	34	—	46	35
YARDS.									
Number of passably clean	24	45	35	64	24	29	24	47	38
Number of passably dry	25	45	35	71	26	30	24	48	40
The others were wet, or unclean.									

THE GILBERT SCOTT MEMORIAL.—It has been decided that the personal memorial, which it was voted should be placed in Westminster Abbey, shall take the form of a brass, which is to be placed over the grave in the Abbey nave. The task of designing the brass has been assigned to Mr. G. E. Street.

A CONCRETE BRIDGE.—The *Polytechnic Review* says that there is spanning an open cutting, through which passes one of the London railways, a bridge which in form is a flat arch of seventy-five feet span, and seven feet six inches rise in the centre, where the concrete is three and one half feet in thickness, increasing toward the haunches, which abut upon the concrete skew-backs. The material of which the bridge is made is formed of gravel and Portland cement, mixed in the proportions of six to one, carefully laid in mass upon close boarding set upon the centering and inclosed at the sides.