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CONTENTS.

SUMMARY:—

The Chicago Custom-House Investigation.—Letter of the Supervising Architect.—The Qualifying of Architects.—Mr. Corcoran's Academy of the Fine Arts at Washington.—The Punishment of an Obstructive Architect 197

AMERICAN VERNACULAR ARCHITECTURE. III. 198

PAPERS ON PERSPECTIVE. X. 199

THE ILLUSTRATIONS:—

The Rhode Island State Prison.—Country House, Newark, N. J.—Lantern Standards.—Designs for a Wall-Decoration.—Study in Perspective 201

CORRESPONDENCE:—

Letter from Baltimore.—Letter from New York.—Letter from Boston 201

COMMUNICATIONS:—

The Qualifying of Architects.—Common Councilmen as Architects 203

NOTES AND CLIPPINGS 203

SUPERVISING Architect Hill's letter to the Secretary of the Treasury concerning the complaints against his office in the administration of the Chicago Custom House has been published in full in some of the papers. He recalls the facts that the contracts under which stone for the building was furnished and cut by Mueller were contracts dating back some years before he came into office; that the fifteen per cent contract for cutting, which has made the chief trouble, was of a kind against which he had especially protested, and most of which he had succeeded in abrogating. This particular contract was not abrogated, because the greater part of the work it called for had been furnished, and because the alterations that he had been required to make in the design of the building made it necessary to recut a large amount of stone which the Government had already received and paid for: to adjust a new contract so as to cover the working over of this stone would have called for a great deal of difficult computing and valuation, involving a serious delay of the work; so that on the whole the lesser disadvantage seemed to be in going on as before. The cost of the work done in this way he thinks has been excessive, though not more so than under other similar contracts, except at the very last, when the men carefully nursed their work, with the feeling that "it would be no worse to be discharged for loafing than to work themselves out of a job." The cost could not be known at the Supervising Architect's office until it had been paid for by the disbursing agent (the Collector, Mr. Smith himself), whose duty it was to refuse payment if he suspected anything wrong. To guard as much as possible against overcharge practical stone-cutters were engaged as time-keepers, one to every hundred cutters employed, under orders to "remain at all times during working hours in the sheds, and see that each and every mechanic is constantly and efficiently employed; to remain on the work until the termination of working hours, and be able to satisfy themselves [and the superintendent] that each and every employee had remained until the close of working hours. The superintendent was further instructed to keep himself informed of the efficiency of the men employed, and insist on the discharge of any whom he found neglectful or idle, with the understanding that the Department would hold him responsible for the cost of the work.

As to the sawing of the stone, about which great complaint has been made, the letter recalls, what was overlooked by the Collector and Attorney-General in their accusations, that the contract which allowed thirty-five cents per foot superficial for sawing, to be substituted for cutting at the discretion of the superintendent, at the same time cut off the allowance of an extra half inch in dimension for quarry size from the faces sawn, whereby, as Mr. Hill computes, a saving equivalent to five and a half cents per foot was made, practically reducing the cost of sawing to twenty-nine and a half cents. The question was, he adds, not whether contracts could not now be made under which the stone could be more cheaply cut, but whether under the existing contracts, which had been sustained by the law officers of the Government, and by which he was therefore bound, the stone would be worked more economically to the Government

by sawing or by cutting. Of this the superintendent was made the judge, being instructed to allow and pay for only such sawing as he considered economical, and this he claims to have done. Examination of the schedule-books shows, if we understand the letter rightly, that the cost of working was on the average less for the stones which had sawing upon them than for those that had none. The accusations of the District Attorney that the supplementary contract was unreasonable and therefore fraudulent, whereby Mueller, who had contracted to deliver the uncut stone at the site, required additional payment for hauling it to the building when under his second contract he had cut it, the letter characterizes as either careless or disingenuous. It says that the demand for extra compensation was at first refused, on the ground that the contracts were essentially one, and that if Mueller was bound to haul and deliver the stone uncut he was bound to haul and deliver it when cut. This position, however, was overruled by the Attorney-General, who decided that the obligation of the first contract did not cover the second, and that Mueller's agreement was simply "to cut the stone which the United States may supply him for that purpose out of that which under the first contract he has delivered and they have received." The supplementary contract for hauling was therefore prepared under Mr. Potter's administration, and executed immediately after by Mr. Hill with the approval of the Secretary of the Treasury and the Solicitor of the Department.

THE flood of letters, despatches, and reports which this investigation has let loose in the papers, especially in those of Chicago, is voluminous and weary reading. The effort to sift it displays to the full the difficulties of what has been properly called trial by newspaper. The right apportionment of blame and responsibility among the many persons concerned with it is only to be got at, if at all, by the examination of details accessible perhaps to the proper officers, but beyond the reach of newspapers. Two or three points, however, declare themselves very distinctly. One is the enormous difficulty which is laid on the Supervising Architect's office by such a system of contracts, which requires that an army of men, working and shirking in their own and the contractors' interest, shall be watched by a corps of time-keepers, assistant-superintendents, and superintendents, each depending on those below him. With contractors and men conspiring to make easy work the utmost vigilance in the superintending corps could be only half efficient. An inefficient or unfaithful officer at any point in the series would spoil its working, and even the best result would be likely to be far from economical, though it might have the recommendation of securing workmanship of the first class. Another point is the easy adroitness with which the contractor in this case has managed to draw his profit from all the circumstances that favored him, notably the astute way in which he took advantage of the unlucky lapse in his second contract; apparently compelling the Government to choose whether it would let him deliver the stone which he was bound to bring uncut to the site, and then pay him for hauling it away, cutting it, and hauling it back again,—or leave him to dump it at a convenient spot and pay him for cutting and hauling once. The officers of the Government are at disadvantage enough under any system that calls on them to spend their chief energy in resisting the impositions of those who do its work. It is at least desirable to devise a system which shall do this work as simply and directly as possible.

WE are glad to infer from the communications touching the Qualifying of Architects which appear in this number of our journal and in our last but one, that the subject appeals to a general interest in the profession, as it certainly concerns its welfare as much as it does that of the public. Our correspondent of to-day asks, "While we are struggling to learn all we can, and build as safely and as well as we may, is the time quite ripe for drawing such sharp lines?" The trouble, however, is not with those of us who are struggling to learn all they can, but with those who, without waiting to learn any thing they can help, are struggling more or less successfully to get control of important work; and with the public which unsuspiciously employs them because at present there is nothing to show the difference between those who struggle to learn and those who do not. "The

public often insist upon employing quacks and charlatans," says our correspondent justly. There is a part of the public that naturally gravitates to the patronage of quacks in every avocation; for this part not much can be done. But the larger part would welcome any means of distinguishing between the competent and the incompetent. The first step toward such distinction is naturally to give them some idea of what knowledge architects ought to have; of who among architects neglect this knowledge, and who acquire or at least assume to acquire it. We cannot agree with our correspondent that there is as good opportunity to judge of charlatans in our profession as in another, — that is if "another" means any other; nor if this were correct would it determine the question. The older professions of law and medicine are at least hedged about in most of the United States with restrictions which fix a minimum of preparation for them. The minimum is necessarily very moderate, but it makes a clear distinction between those who have attained it and those who have not, and the tendency is to increase it; witness, for example, the new regulations of the New York bar; whereas in architecture there is absolutely no point of ignorance at which a man is marked off from the profession.

WE do not know how serious a purpose underlies our correspondent's lively enumeration of the qualifications of an architect, but may take it for granted that he means to imply the impracticability of enforcing by individual scrutiny any standard of thorough competency. We do not fly at so high game as this; the profession and the country are both too new for it. For what discrimination the time — that is to say the community — is ripe it is not easy to say until we have tested it. A few years ago, when there was no architectural instruction to be had in the country, it would have been idle to propose any qualifications. Now that such instruction is provided, it will be reasonable to say that henceforth those who fail to take advantage of it shall be recognizable to the public; so that if it chooses to put its lives and property into their hands it may do so wittingly. If any considerable number of architects could be induced to submit to such an examination as Mr. Eidlitz proposed in our last number but one, it would no doubt tell strongly in raising the standard of the profession. But if not, it would be worth something to have any standard of acquirement publicly recognized, however modest, below which inadequate preparation should be stamped as inadequate. The limit, once established, may be expected to rise with the gradual improvement of the profession, which will certainly continue. A clear definition of professions and trades may fairly be counted one of the civilizing influences to whose progress our correspondent looks for the remedy of wrong selection among them.

WE have before this intimated our distrust of the national capital as a suitable soil for the growth of art, yet it is impossible to withhold our sympathy from such public-spirited endeavors as those of Mr. Corcoran. Not satisfied with having spent a quarter of a million of dollars upon the gallery at Washington which he has presented to the public, a like sum on the collections which it contains, and a million upon its permanent endowment, Mr. Corcoran is resolved to go farther, it is said, and carry out his plan of founding a complete academy of fine art, which he hopes to make the chief centre of artistic inspiration in the country. The curator of the Corcoran Gallery, Mr. McLeod, in a recent address, said that the scheme for such an academy had long been matured, and was only waiting the removal of a certain obstacle, which is believed to be the difficulty of purchasing the land that adjoins the present gallery on Seventeenth Street. This difficulty overcome, there would follow the establishment of "a free school of art, with every facility for the study of drawing, painting, modelling, wood-engraving, photography, every branch of the art of design, and for the promotion of the industrial interests of the land. . . . From this proposed academy will go forth [it is expected] not only painters and sculptors, but skilled artificers and draughtsmen fitted to fill the wants of the Government in its various departments, to supply which it has been necessary to send to Europe." A scheme of magnificent proportions certainly, even if a little mixed in idea, and one which its energetic projector might be expected to carry out in its main purpose as far as endowment and organization could carry it out. Yet when one remembers with what stubborn inertia the capital has resisted every effort to develop it, and most of all in any artistic direction, how hostile its whole atmosphere, social, political, and moral, is to the

spirit of art, one cannot refrain from wishing that this splendid liberality could be persuaded to spend itself on some more genial ground.

A QUEER case lately decided in London illustrates at once the danger to which an obstinate architect may expose himself, and the extraordinary penetration, amounting almost to clairvoyance, of a British jury. A certain decorative painter had been employed upon a house which, according to the London custom, was repaired by a lessee at his own expense, subject to the approval of the landlord. The principal parties, lessee and landlord, were represented by their respective architects, and the painter contracted to do his work to the satisfaction of both of these. When the work was finished, including a certain amount of "extras," it was accepted by the architect of the landlord and rejected by the lessee's. The lessee therefore refused to pay the balance which would have been due if the work had been approved. The painter sued him, and recovered the amount of his bill of extras; but his claim under the contract was disallowed, on the ground that the architect had refused to accept the work. Not discouraged, the painter then brought suit against the architect for the unpaid balance, alleging that he had done his work properly, and moreover that the architect had admitted to him that the work was satisfactory, though he refused to approve it. The judge laid it upon the jury to determine the state of the architect's mind, charging that if he really was dissatisfied with the work the plaintiff could not recover, but that if he only pretended to be so he must pay the bill. The jury decided that the architect was satisfied, and awarded the painter the balance of his claim. In the light of this case it appears important for an architect to know his own mind. If he does not, an intelligent jury will find it out for him, and may make him pay severely for his uncertainty. There is apparently no remedy, unless the client should come to the rescue and pay the architect for work for which he had refused to pay the painter; for it is not likely that the architect could recover judgment for work that he had himself refused to approve.

AMERICAN VERNACULAR ARCHITECTURE.

III.

THE journals and periodical literature of the day are noticing Mr. Holly's new book on *Modern American Dwellings*¹ with more or less of such shallowness of comment as is usually vouchsafed to architectural matter by the general critic. In all books, which, like this, undertake to record a phase of reform or transition in any branch of architecture, there are essential points which can hardly be reached by a lay observer; but in the proper consideration and analysis of these points lies a part of contemporary history.

We lately (p. 182) referred to the second volume of Woodward's "National Architect" as a fair record of the condition to which domestic architecture has attained in this country; we claimed that the architectural critic had no right to dismiss it with a sneer because of its obvious vulgarities and because of the absence of certain qualities which should commend it to the artist and the scholar, but that it is on the whole as fair a statement of our progress in this respect as has been set down in any book, and that it is, therefore, a safe point of departure for architectural development.

We believe it to be true that any design, especially in domestic work, which does not recognize some such vulgar starting-point, must be a mere architectural masquerade, interesting perhaps to the antiquary but without significance as a mark of architectural progress. No revival of old forms in new art is of any value, except in so far as it revivifies modern ideas with certain ancient forgotten virtues, and thus gives new strength, health, and interest to art, or at least serves as a justifiable experiment in that direction. But in studying any era of architectural development with a view to making use of its suggestions in modern work, it is difficult for the architect not to be fascinated by the style which he is considering, — difficult for him to avoid the temptation of introducing into his new work features full of the peculiar charm of ancient days without regard to any sacrifice of essential comfort which they may involve. Thus the neatness and precision of workmanship, which are the result of improved mechanical processes and belong especially to our era, are, under the impulse of this fascination, apt to give place to an affectation of the ruggedness and imperfections of old work; the modern clean-cut roofs with their smooth water-shed and straight ridges are displaced with a difficult imitation of the picturesque but leaky crookedness of the roofs of our ancestors; the comfort of weighted sashes, large lights, plate glass, and outside blinds, which modern ingenuity has given us, is obliged to yield to the sentiment and in-

¹ *Modern Dwellings in Town and Country*, adapted to American Wants and Climate, with a Treatise on Furniture and Decoration, by H. Hudson Holly. New York, Harper & Brothers, publishers 1878.

convenience of swinging casements, transoms, hoods, and small panes, as if the function of the architect was simply to furnish the scenery and accessories of a play.

It must be admitted that Mr. Holly, in frankly taking the position that the only prospect of a healthy advance in our domestic architecture is in reviving the essential features of the "Queen Anne Style," has managed to avoid many of the pitfalls which beset the architect of poetic feelings and delicate sympathies. His designs for country houses are plainly a development of the vernacular. This is their greatest praise and in this resides their most conspicuous usefulness as a contribution to the progress of art in this department. Our methods of wooden construction, our verandas, our eave-sheltered walls, our smooth, workmanlike roofs, are all retained (although our outside blinds are not recognized in the drawings or reconciled with the new things), and with them are combined the galleries, the great chimneys, the balustered porches, the panellings and the conventional sun-flowers attributed to the earlier Georgian era, so as to make up a whole not destitute of a certain air of originality and piquancy, — a whole which is distinctly American and not English, — a sublimated derivative from the Dutch or Yankee wooden farmhouse. The plans are nearly all ingenious — some of them exceptionally so — and their idiosyncracies are on the right side. Large habitable halls well opened into the adjoining living rooms, stairs almost always very cleverly contrived with embayed and orielled landings, dining rooms in every case connected with the kitchens by a direct passage through the butler's pantry (a clear concession to American habits), — these are the distinctive features of the plans; but we do not remember any mention in the text, nor any especial indication in the plans, of the arrangement of rooms according to the points of the compass — a most important and difficult part of planning; the question of exposure to morning or afternoon sun, of protection from prevailing winds, of aspect in short, in all its bearings, is not touched upon even in the chapter on Site, — an omission not surprising in a layman but hardly to be expected in an architect of Mr. Holly's experience. The roofs, however, are always well composed and interesting as a part of the design, and the verandas and balconies are ample and convenient, although, as we have said, their relation to aspect and view is apparently not considered.

Each design is illustrated by a ground-plan and a perspective sketch, and accompanied by an estimate of cost with a descriptive chapter. These are interspersed (without any especial relationship however) among a series of chapters, which are in the nature of brief essays, devoted to such subjects as Country Life, Site, Plans, Building Materials, Specifications, Framing, Roofing, Glass, Chimneys, Costs, Architect's Duties and Charges, Plumbers' Blunders, Heating and Ventilation, and Alterations. There is but one town-house given, and this is explained in a chapter on City Architecture. These chapters are addressed to laymen, and set forth the commonplaces of information, such as professional men are most frequently called upon to give to their clients. This part of the work is done in a homely straight-forward fashion, and embodies a desirable explanation of the functions of the architect.

The greater part of this book, it will be remembered, appeared in *Harper's Magazine* two years ago, and we are glad to see that Mr. Holly, in the chapters relating to interior decoration and furniture, has taken pains to give his authorities as promised in his letter, quoted in these pages two years ago (vol. 1, pages 218, 234); we do not wish to seem captious upon this point, but it seems to us, so far as relates to the drawings borrowed from the *Building News*, from Dresser, Talbert, and others, that the acknowledgment should appear in each case in company with the title thereof, so that that vast majority of readers who derive their impressions of a book not from reading it, but from turning over the pages merely for the sake of the prints, may appreciate the authorship of these prints, just as the small minority does, which reads and inwardly digests the full text and finds the credit duly given therein in its place. This is a matter not only of courtesy but of custom.

The chief value of the chapters on Interior Decoration and Furniture resides in the hints given as to the proper relationship of the architect to the client in respect to these parts of the work. These chapters are thus brought into keeping with the rest of the book. But after Dresser and Talbert and Eastlake and Viollet-le-Duc, on the other side of the water, and the admirable popular summary of the whole question by Mrs. Spofford on this side, the treatment of the subject generally by Mr. Holly is meagre and insufficient. Even as a mere summary of the question, inserted in the book to give it symmetry and a more complete conclusion, the interior finishing should have been treated, we think, in a manner to give the reader an impression of mastery. Whereas our author too frequently allows himself to speak rather like a *dilettante* than like an architect, and when he ventures to enunciate principles, they are not only not original, which they might well have been from the point of view of his profession, but they embrace many of the narrow exclusions which were formulated by Eastlake, but to which an architect would not submit himself if loyal to those which control architectural design in its largest sense.

The function of architects in respect to interior decoration and furniture needs to be explained with great care, and the excellent opportunity here offered has not been properly availed of. But we are glad to see the first book on domestic architecture which gives due place to this important part of the subject.

PAPERS ON PERSPECTIVE.

X. THE PERSPECTIVE OF REFLECTIONS.

191. LET us now consider how things look in a mirror, whether in an artificial mirror, or looking-glass, or in the natural mirror formed by the surface of still water. The question is obviously a little more complicated than those we have been discussing, inasmuch as a new element is introduced. We have now to consider not only the position of the picture, and its relation to the position of the object reflected and to the mirror that reflects it, but also the relation of the object reflected and of the reflecting surface to each other. Either of these may be parallel, perpendicular, or inclined, to the others.

Given, the position of the spectator, that of the picture, that of the object, and that of the mirror, it is required to depict not only the lines and surfaces of the object itself, with all their vanishing points and traces, but the reflection of the object in the mirror, and the vanishing points and traces of the reflection.

192. In reflections, however, as in shadows, and as everywhere in perspective, the various problems of the point, the line, and the surface are all comprised in the problem of the line. How to draw a given line through a given point is the only question. For the perspective of a point can be got only by finding the perspective of a line, or of two lines passing through it, and a surface is drawn in perspective by drawing the perspective of the lines that enclose it.

The problem of reflections then is this: to draw the reflection of a given line in a given mirror. The position of the centre of the picture, C , is of course known, and the distance of the eye at the station point, S , in front of it; and the vanishing point of the line and the trace or horizon of the plane of the mirror; with the position of some point in the line and of some point in the mirror.

193. Let us first take the most general case, that of a line inclined to the picture, at any angle, taken at random, reflected in a mirror which is inclined to the plane of the picture and to the horizontal plane, in any position, taken at random.

This disposition is shown in Figs. 39, 40 and 41, which illustrate three successive steps in the solution of the problem.

In each of these is shown two sides of a room, making an angle with the plane of the picture, on one of which a mirror hangs at an angle with the wall. The plane of this mirror we will call, in pursuance of the system of notation adopted in these papers, the plane $L M'$, since its horizontal element is obviously parallel to the floor-boards whose vanishing point is V^L , and its line of steepest slope descends to the right, in the general direction we have called M' . $V^{M'}$ will be below V^L , and $T L M'$, the trace of the plane of the mirror, will pass through $V^{M'}$ and V^L , as shown. The position of the mirror is fixed by that of its lower edge where it intersects the plane of the floor.

The line whose reflection in this mirror we are to find slants upwards to the left nearly in the direction we have called N ; but as it is not parallel to the plane $L Z$, we will call it O , its direction being given by its vanishing point V^O . Its position is fixed by that of its nearest point, whose distance above a point on the floor is shown.

Let us also call the direction of lines at right angles to the mirror, that is to say perpendicular, or *normal* to it, by the letter T , *norma* being Latin for T-square. They will be parallel to the *axis* of the mirror, and their vanishing point will be V^T .

194. It is obvious from the inspection of either figure that the reflection or *image* of the line will look like just such another line as far behind the surface of the mirror as the line itself, or object, is in front of it; and that a line drawn from any point in the object to the corresponding point in the image, that is to say from any point to the reflection of that point, will be normal, or perpendicular to the mirror, and will have its vanishing point at V^T .

All these normal lines together, moreover, make up a normal plane, also at right angles to the mirror, which may be called the plane $O T$. And as the trace of any plane passes through the vanishing points of all the elements of the plane, $T O T$, the trace of the normal plane $O T$, passes through V^O , the vanishing point of the given line, and through V^T , the vanishing point of normals.

And as, conversely, every line that lies in a plane has its vanishing point in the trace of the plane, O' , the image of O , must have its vanishing point, $V^{O'}$, also in the trace $T O T$.

Finally, it is plain that the line I , in which this normal plane intersects the plane of the mirror, seems to lie equidistant between the given line O and its image O' , and to bisect the angle they make with each other; and that since it lies at the intersection of these two planes its vanishing point must be at V^T , the intersection of their traces.

195. The problem of reflections is solved when the line I is fixed, and the point V^T . For the image or reflection of every point in the given line lies on a normal passed through the point, at a distance beyond the line I equal to that of the point itself on the hither side of it. This equal distance can be obtained, as shown, by means of the method of triangles, using a line of measures drawn parallel to $T O T$ and an auxiliary vanishing point. But for a complete solution of the problem it is necessary to determine also $V^{O'}$, the vanishing point of the image.

Fig. 39 shows how V^T and consequently V^L are determined; while Fig. 40 and Fig. 41 show how I itself and V^O are obtained.

196. The first problem is how to find V^r , $T L M'$ being given; that is to say, given a plane or system of planes by its trace, to find the vanishing point of the axis of the system, i. e. its vanishing point of normals.

The solution of this problem depends upon the principle already illustrated in Fig. 29, Plate VII., that "if a line is normal to a plane its projection upon a second plane intersecting the first is perpendicular to the line of intersection." For if we pass through the station point S , at a distance in front of C equal to the line $C S_1$, a plane parallel to the mirror, it will intersect the plane of the picture in the line $T L M'$; and if we pass through the same point a line normal to that plane and parallel to the lines normal to the mirror, it will pierce the plane of the picture at V^r ; for if from the station point one looks in a direction parallel to the lines of any system he will see the vanishing point of that system. Now since the projection of the station point on the plane of the picture is at C , the projection of this line will be $C V^r$, and this line will be perpendicular to $T L M'$ at the point a . A line aC , then, drawn through C perpendicular to the trace of any given plane, will pass through the vanishing point of lines normal to that plane.

197. If now a line be drawn from the station point to the point a , it will be at right angles to the line drawn from the station point to V^r . A $S V^r$ is accordingly a right-angled triangle of which a V^r is the hypotenuse, and if this triangle be revolved into the plane of the picture about a V^r , S will fall at S_2 , and a line drawn at right angles with a S_2 will give V^r at its intersection with a C prolonged.

198. V^r being thus ascertained, $T O T$, the trace of the normal plane, is drawn through V^r and V^o , and V^i is obtained at its intersection with $T L M'$ (194).

199. Fig. 40 shows how the line I , at the intersection of the normal plane with the mirror, is determined in position; its vanishing point V^i being already found, it is necessary only to determine one point in the line I , upon the surface of the mirror. The line can then be drawn through this point and the point V^i .

But it is plain, from an inspection of Fig. 39, that if the line O were prolonged until it touched the mirror its reflection O' and the line I lying between them would be prolonged also, and that all three lines would meet at the point where O pierced the surface. This point, then, would be a point of the line I , such as we are seeking.

The problem resolves itself then into that of finding where a line pierces a plane, both being given in perspective.

200. To find where in the figure (Fig. 40) the line O pierces the plane of the mirror $L M'$ we pass a vertical plane $O Z$ through the line O ; its trace is $T O Z$. The point e is a point common to the plane $L M'$ and to the plane $O Z$, that is to say, it is one point of the line in which the vertical plane through O intersects the surface of the mirror, the point f , where the traces of these planes intersect, being the vanishing point of this line of intersection. The line $f e$ prolonged is then this line of intersection itself, and the point g , where the line O prolonged meets the line $f e$, is the point where it pierces the mirror.

201. But the point g being also a point of the line I prolonged, a line drawn through g and the vanishing point V^i , gives the indefinite line I which we are seeking. Normals drawn through the extremities of the line O to V^r , cut off from the indefinite line I the finite portion required.

202. Fig. 41 shows how V^o , the vanishing point of the reflection of a given line, may be obtained, V^r , V^i , and I having already been determined, and O and V^o being given.

It is plain that O , I , O' , and T , in Fig. 39, are all in the same normal plane, and that if from the position of the eye at the station point S in the air, in front of C , lines are drawn to the vanishing points V^o , V^i , V^o' , and V^r , these lines will lie in the plane which, passing through the eye, intersects the plane of the picture in the trace $T O T$. The lines $S V^r$, $S V^o$, $S V^i$, and $S V^o'$, will all lie in the same plane and will be parallel respectively to T , O , I , and O' , and will make the same angles one with another. But since I bisects the angle made by O and O' (194), so must $S V^i$ bisect the angle at S made by $S V^o$ and $S V^o'$. If then in Fig. 41 we revolve the plane triangle V^r , $S V^i$, into the plane of the picture, the trace $T O T$ and all the vanishing points upon it will remain where they are and S will fall at S_4 . For the real distance from the station point to the trace $T O T$ at b is $b S_4$, the hypotenuse of the right-angled triangle of which $C b$ is the base and $C S_4 = C S$ the altitude. This distance $b S_4$ laid off upon a perpendicular drawn through C , to the trace $T O T$ at b , gives the point S_4 .

203. From this point lines drawn to the several vanishing points on $T O T$ make the same angles one with another, as do the lines O , I , O' and T , and since I bisects the angle between O and O' , V^o is easily ascertained by drawing a line on one side of $S V^i$ at the same angle that $S V^o$ already makes upon the other side of it.

204. In these figures the mirror stands at an angle with the plane of the picture, and also at an angle with the ground. The case is somewhat simpler when the latter angle is 90° , the mirror being upright. The trace of the mirror becomes vertical, and the normal lines are horizontal. If in Figs. 39, 40, and 41 we imagine the mirror set back into a vertical position, it is clear that V^r will move so as to coincide with V^s , S_2 with S_1 , and $T O Z$ with $T L Z$; f will be at an

infinite distance, and the line eg will be vertical. But the essential conditions of the problem will remain unchanged, and the trace of the normal plane, the point where the given line pierces the mirror, and the vanishing point of the image will be obtained as above.

205. If the object reflected is a plane surface, its reflection must be found by finding the images of the lines that bound it, and their vanishing points. These vanishing points will of course lie in a straight line, the trace of the reflection of the plane; this trace can be drawn as soon as the vanishing points of any two of the elements of the plane are ascertained. It is convenient to take one of these elements parallel to the mirror. (207.)

206. To obtain the reflection of a point, a line must be passed through it, and its image obtained as above. The reflection of every point in this auxiliary line, including the point in question, is then easily found. But it simplifies the problem, as we shall presently see, to take the auxiliary line either parallel to the mirror or perpendicular to it. (209.)

207. For the reflections of lines which are parallel to the mirror, being in every part as far behind the mirror as the lines themselves are in front of it, are also parallel to the mirror and to the line I , in which the normal plane intersects its surface. They are accordingly parallel to their originals, and have the same vanishing points.

It follows that if a plane is parallel to a mirror, all the lines in it retain their vanishing points, so to speak, in the reflection, and the plane retains its trace.

208. The images of lines perpendicular to the mirror also seem to retain their vanishing point, which is the vanishing point of normals, V^r . But it is more exact to say that the other vanishing point, 180° away, is reflected so that its image coincides with V^r . It follows that the reflections of planes perpendicular to a mirror have the same traces as the planes themselves; for the vanishing points of the parallel elements and of the normal elements are alike unchanged.

209. It appears then that the reflections of lines and planes parallel or perpendicular to the reflecting surface have the same vanishing points and traces as their originals, whatever the position of the reflecting surface.

210. The general problem of the reflections of lines and planes, whether parallel or inclined to the mirror, having thus been discussed, it only remains to consider the special cases in which the mirror itself is parallel or perpendicular to the picture. In both these cases the problem is a very simple one.

211. When the mirror is perpendicular to the plane of the picture, as in Figs. 42 and 43, the normals are parallel to the picture, their vanishing point is at an infinite distance, and the trace of the normal plane is at right angles to that of the mirror. The trace of the plane of the mirror passes through the centre C ; the plane drawn through the station point S , intersecting the picture in this trace, is perpendicular to the picture; and lines drawn from the station point to the vanishing point of a line and to that of its reflection strike the picture at equal distances from this trace.

The vanishing point of the image of a line, then, inclined to the face of a mirror which is perpendicular to the picture, is as far on one side of the trace of the mirror as the original vanishing point is on the other, on a line at right angles to the trace.

If a line is parallel to the picture, so that its vanishing point is at an infinite distance, the image is inclined to the trace of the plane of the mirror at an equal angle on the other side.

212. If a plane is inclined to a mirror that is perpendicular to the picture, one element of the plane will nevertheless lie parallel to it, and that element will retain its vanishing point, which will lie in the trace of the plane of the mirror (209); every other element will, so to speak, shift its vanishing point to the other side of the trace of the reflecting plane (211). The trace of the image will then cross the trace of the mirror at the same point with that of its original, making equal angles on the other side.

213. When the mirror is parallel to the plane of the picture, having the vanishing point of its axis at the centre C , a line or system of lines inclined to the mirror has the vanishing point of its image as far from the centre C in one direction as that of the line or system is in the other, on a line drawn through the centre. If a line goes up and to the right, its reflection will of course seem to go down and to the left, at equal angles.

214. It follows that if a plane is inclined to a mirror set parallel to the picture the trace of its image is parallel to that of the plane itself, on the opposite side of the centre C , and equidistant from the centre.

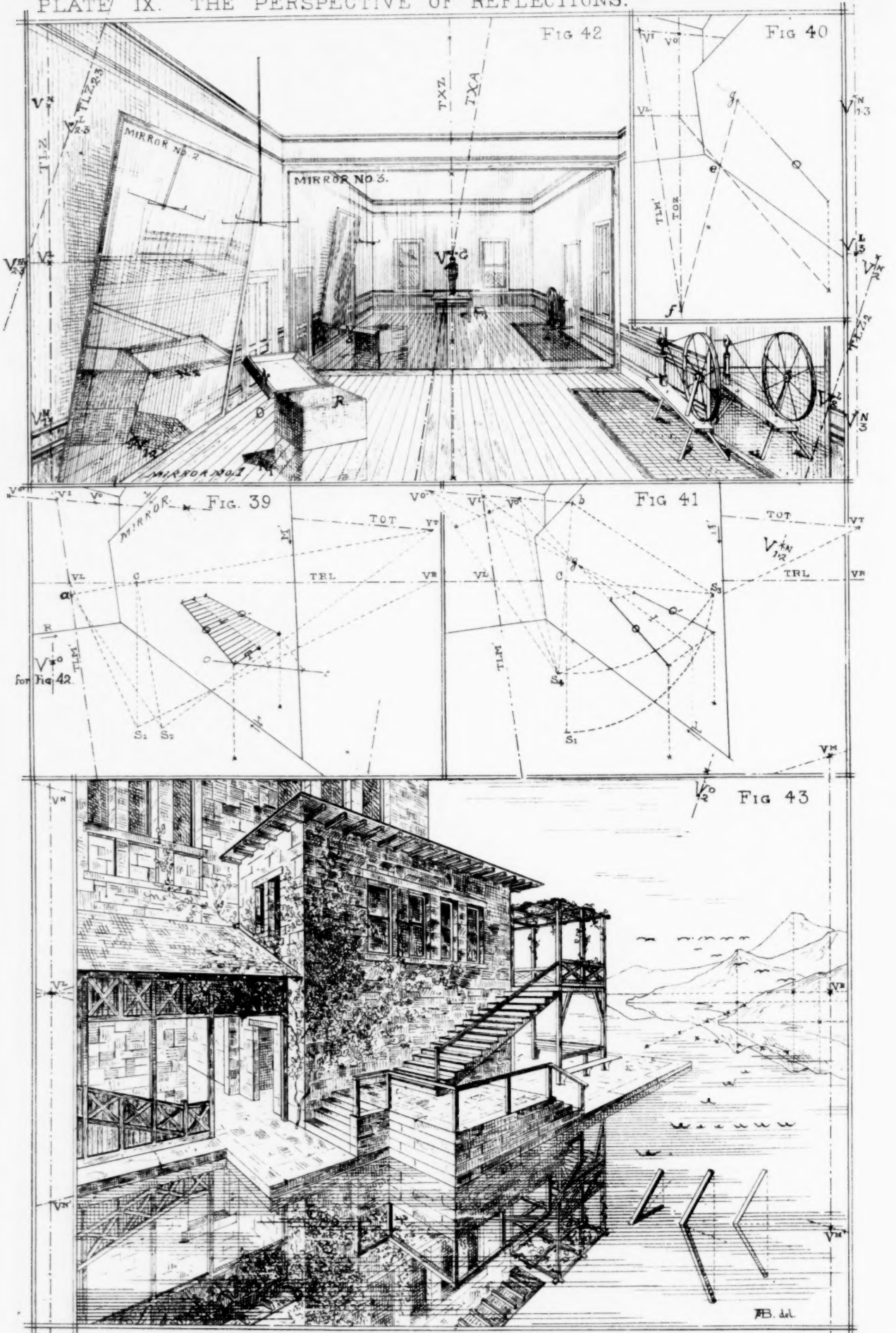
215. These points are illustrated in Figure 42. The spokes of the spinning wheel are parallel to the right-hand mirror, the axle is perpendicular to it. All retain their vanishing points.

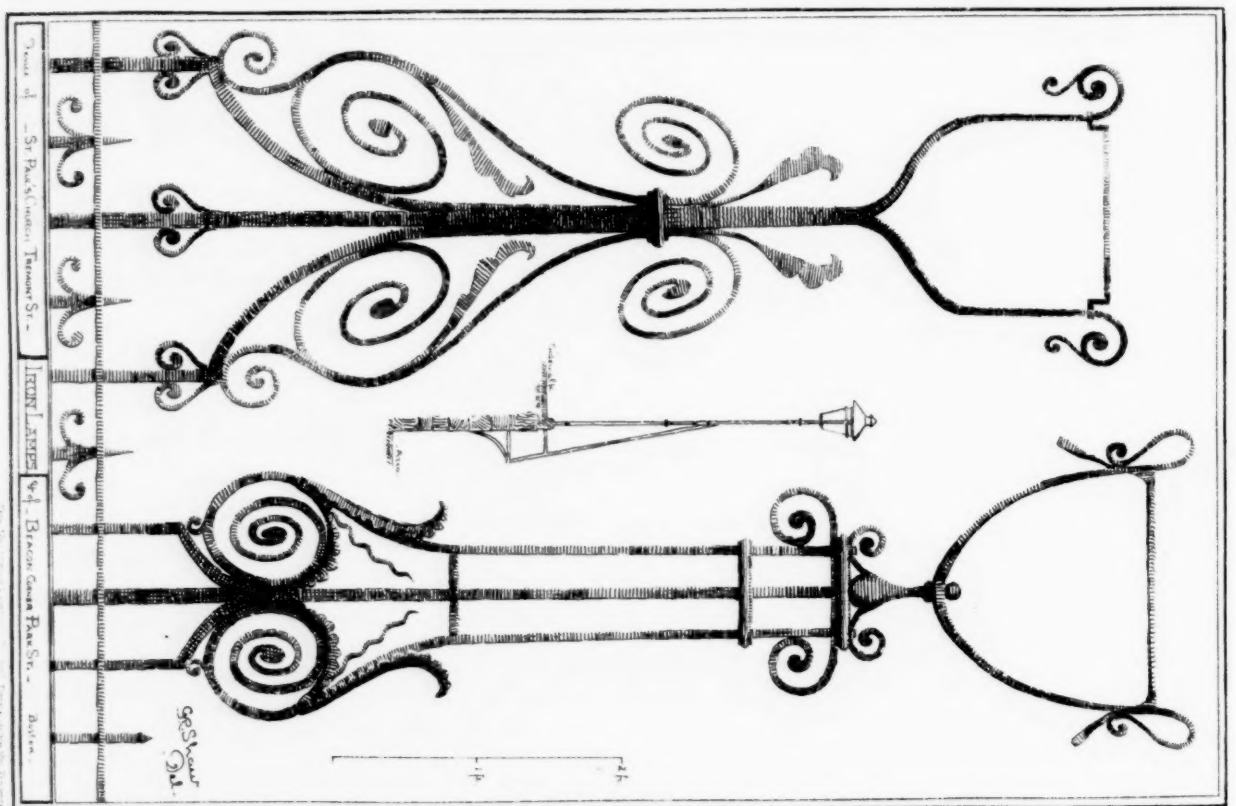
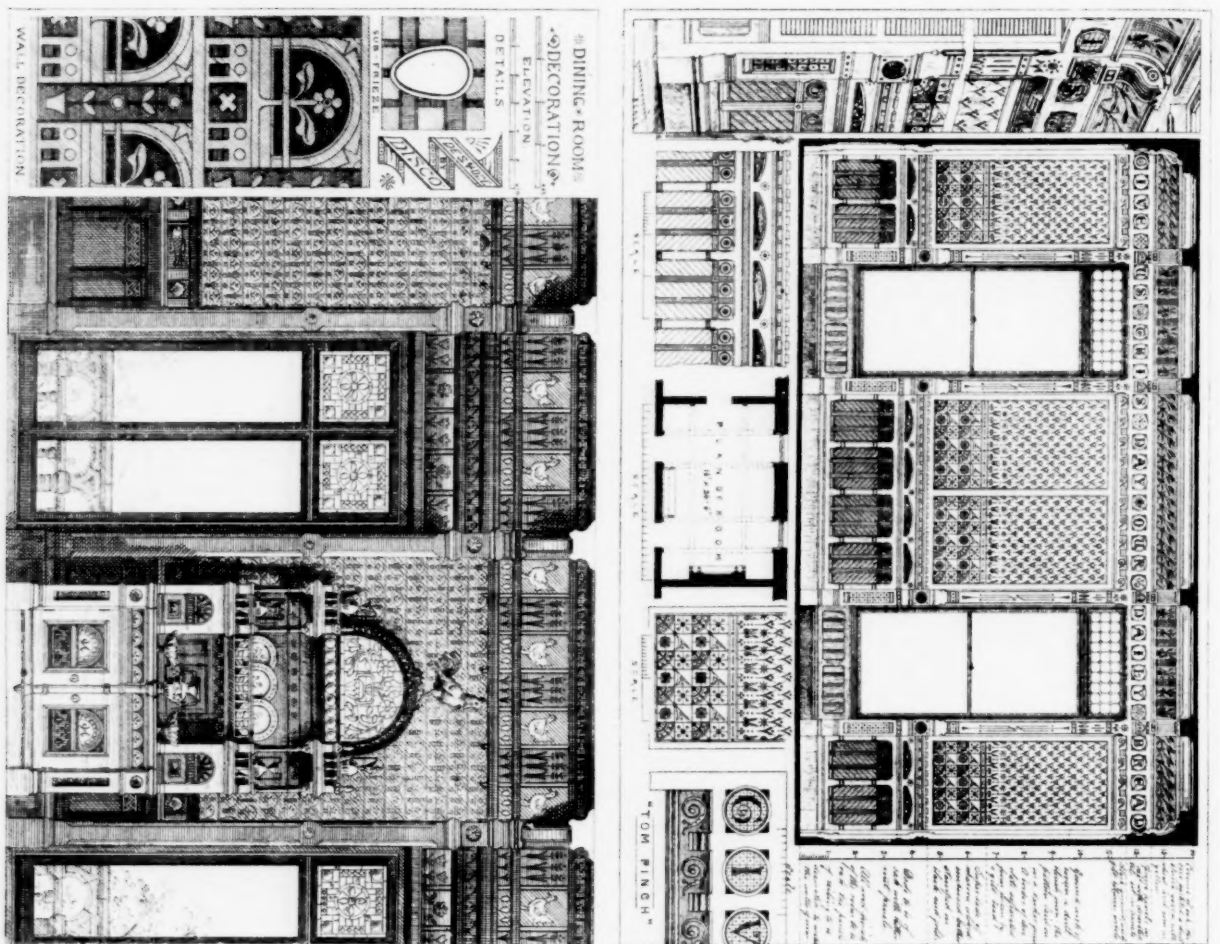
The box on the left, with its cover, presents four systems of lines, two horizontal, L and R ; two inclined, N and O . The reflection in the floor retains V_L and V_R , but exchanges V_N and V_O for V_{N1} and V_{O1} , on the opposite side of the Horizon.

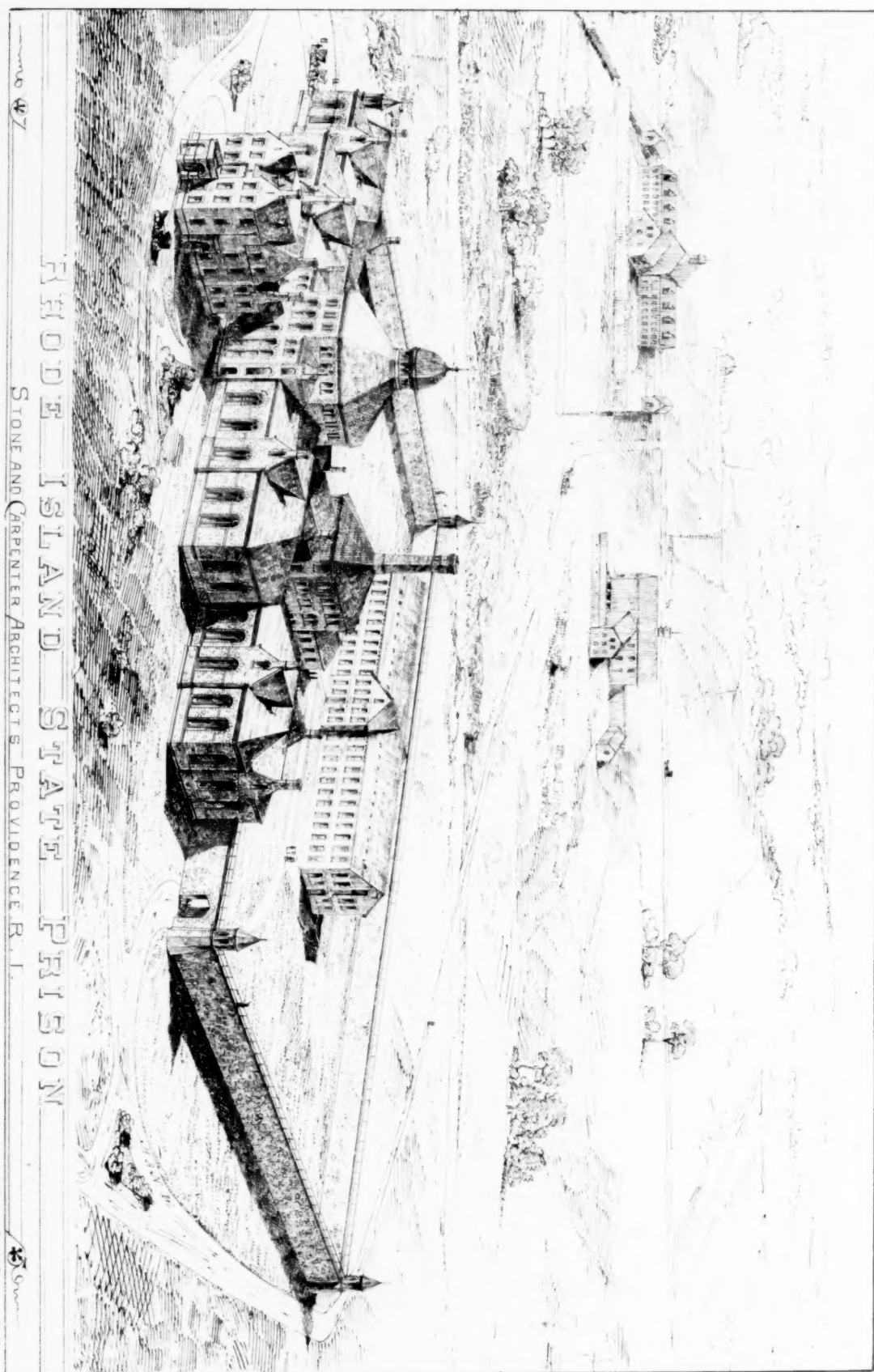
The reflection of the box in the second mirror, on the left, has for vanishing points V_L^1 , V_R^1 , V_N^1 , V_O^1 , across the trace of the mirror $T X A$, the plane $L Z$ having $T L Z^1$ for its trace, inclined to $T X A$ equally with $T L Z$. (212.)

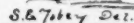
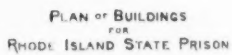
The third mirror, parallel with the picture, in like manner gives

PLATE IX. THE PERSPECTIVE OF REFLECTIONS.









VIEW of PROPOSED NEW DWELLING FOR D SMITH WOOD : NEWARK N.J.

V_3^1 , V_3^2 , V_3^3 , and V_3^4 for the vanishing points of the main lines of the reflection of box. (213.)

216. The reflections are themselves reflected just like their originals, as in mirror No. 2. V_{12}^1 is the vanishing point of the lid of the box, reflected first in the polished floor and then in the inclined mirror.

217. Fig. 43 illustrates these principles by the phenomena of reflections in water, a mirror perpendicular to the plane of the picture.

The steps have their vanishing point at V^1 and V^2 , their reflections at V'^1 and V'^2 , respectively.

218. It is to be observed that the phenomena of reflection enable us to determine the real distance of isolated objects, such as birds or distant mountains, the point on the plane of the water directly below them being midway between the object and the image. The distance of this point is the horizontal distance of the object.

It is also to be noticed that the different size and inclination of the sticks in the foreground, which are not very obvious in themselves, are made conspicuous by the difference of their reflections, as it would be indeed on solid ground by the difference of their shadows. These objects exhibit very clearly the relation of a line and its reflection to the normal plane in which they lie, and to the line in which this plane intersects the mirror.

THE ILLUSTRATIONS.

RHODE ISLAND STATE PRISON. MESSRS. STONE AND CARPENTER ARCHITECTS, PROVIDENCE.

WROUGHT-IRON LANTERN STANDARDS. DRAWN BY MR. G. R. SHAW, ARCHITECT.

These examples of wrought-iron work are possibly as good examples of old iron work as are to be found in Boston.

DESIGN FOR A COUNTRY HOUSE AT NEWARK N. J. MR. W. H. WOOD, ARCHITECT.

DESIGNS FOR A WALL-DECORATION. — COMPETITION NO. III.

We have decided that it is perhaps worth while to publish two more designs which a more considerate inspection shows to be well-studied schemes and worthy of attention.

STUDY IN PERSPECTIVE. — PLATE IX.

See "Paper on Perspective," in this number

CORRESPONDENCE.

DECORATIVE ART SOCIETY. — A PRIVATE COLLECTION. — THE BUILDING LAW.

BALTIMORE, May.

FOLLOWING the good example of New York, Baltimore is at this moment organizing a Decorative Art Society, with a constitution and purpose similar to those of the one now in operation in the "metropolis;" the chief subjects to be handled being china-painting, artistic draperies, furniture decoration, and needle-work. A large majority of both the working and passive members are to be women, while one fourth of the members only is to be men. For the last few years so much amateur interest and talent have been shown in the city in these branches of artistic work that there is every prospect of success for a society of this kind; but it seems absolutely necessary that it should start with a well-systematized instruction department, to control and guide the somewhat erratic taste of enthusiastic patrons, and to select work of real merit from much that will be either simply commonplace or ridiculously grotesque.

The private picture-gallery and collection of Japanese and Eastern art of Mr. W. T. Walters, at his residence on Mount Vernon Place, have lately been thrown open, but are now closed for an indefinite period. The pictures are well known, as this gallery is frequently opened to the public, tickets being sold for charitable purposes; they are entirely of the modern school, and as a whole this is one of the most valuable private collections in the country. The gallery itself is very attractive in all its arrangements, containing only original works, and among the well-known artists represented on its walls are Gérôme, Bonheur, Détaillé, Fortunay, Jules Breton, Cabanel, Delacroix, Meissonier, and many others.

Mr. Walters has gradually converted almost his whole house into an art museum. The drawing-rooms are furnished with either original pieces or careful reproductions of the most artistic styles of the Queen Anne and the Louis Sixteenth ages, and the cabinets contain many exquisite gems of porcelain from the factories of Dresden, Sèvres, Worcester, etc., and also many beautiful bronzes and specimens of old silver. The dining-room, wainscotted to the ceiling in light wood, is ornamented with a wide frieze painted on canvas, representing, in the form of a continuous landscape round the room, the low, marshy banks of the Chesapeake Bay, with their thick growth of reeds and flags, among which are seen all the various species of water-fowl, with which they abound, — the game Baltimore is so famous for, — very carefully and beautifully drawn. This was executed in Paris, specimens of the birds being sent over as models. The rooms in the upper stories of the house are not usually shown to visitors to the gallery, but recently, upon the com-

pletion of the classifying and arranging the Japanese collection, invitations were sent to a small number of persons known to be particularly interested in art matters, and these rooms kindly opened for their inspection. A small bedroom is first seen, fitted up entirely *à la* Marie Antoinette, with original or faithfully copied details, pretty and luxurious, but more commonplace and less interesting than another bedroom in the old Dutch style, with a small, stiff, uncomfortable four-posted bedstead two hundred years old, a huge old wardrobe aged about two hundred and fifty years, a large trunk or chest loaded with brass clamps and complicated locks, and tiles, plaques, jugs of old Dutch blue china about the mantle and shelves, and the window hangings and wall covering of embossed leather, copies of actual work of that period.

By far the most valuable and interesting room, however, is that for the Japanese and Chinese porcelain, lacquer ware, bronzes, ivory, etc. Mr. Walters has been for the last twenty years gathering together and arranging these articles, and the result is a collection in many respects surpassing all others of the kind; so much so that during the Philadelphia Exposition some of the Japanese artists visited this room for the purpose of studying and sketching some of the specimens rarely found even in their own country. Specially interesting is the blue and white ware of both China and Japan, the lacquer work, and the exquisite workmanship of the sword-hilts and medicine caskets, the only articles of jewelled ornament worn by men of rank of that nation. One magnificent vase in green and yellow is remarkable for the design of the *five-clawed* dragon, which was allowed to be put only upon articles specially manufactured for some member of the imperial family.

Work has recently been resumed on the building of the Young Men's Christian Association; the interior is now to be completed and fitted up. The exterior is principally notable for its size, unsuggestiveness, and commonplace details.

As a result of investing in cheap, contract-built houses, we have lately heard of one, 20' by 70', with white marble front, purchased for \$11,500 in fee. Subsequently it was discovered that there was not a single trap to the soil-pipes, and the entire plumbing had to be reconstructed. The purchaser had taken a "bond of indemnity" from the builder, freeing the house from all workmen's claims; but the builder proved irresponsible, and the house is now covered by numerous liens.

The corner-stone of the Roman Catholic Church in memory of Pius IX., Mr. George A. Frederick, architect, was laid lately, with elaborate ceremony. The church will be of Falls blue stone and white marble, and will cost something like \$100,000.

The building law, which the Baltimore chapter has been laboring for several years to have passed by the city council, has recently received an additional blow in the shape of a protest signed by various builders, on the ground that it is too binding and strict; rather a remarkable objection, as the law is the mere skeleton of those already in operation in several other cities.

W.

BUILDING ACCIDENTS. — NEW BUILDING FOR COLUMBIA COLLEGE — THE LEGAL DEFINITION OF A STOREHOUSE.

NEW YORK.

THERE has been a great deal of clearing out and tearing down in New York property during the present season; the old-fashioned, low, and in general poorly built structures are found expensive when cumbering property in the business portion of the city and liable to heavy assessments. A few historic buildings have come down. The old Gotham on the Bowery and the Park House on Beekman Street had about them many an interesting bit of history, and the old New Yorkers have been busy telling odd and curious tales of years ago. Many old wooden rookeries have fallen before the wreckers' bars and axes, though the architectural improvement in the iron structures which take their place is not very marked. When so much might be done in adding to the beauty of our streets, it is disheartening to see commonplace edifices going up one after another on every thoroughfare.

In the tearing down, the best of caution has not been shown, and the result has been a loss of several lives by falling walls. In the Loubat Building in Mercer Street, the work of demolition had reached the second floor, when, in prying out a beam which the workmen did not know was a trimmer-beam on one side of an old hatchway, long before boarded over, the beam fell; others went with it, pulling over a section of wall. A half dozen workmen were buried; one was taken out dead, and others fatally injured. The day following a report came that a floor in the Sixth Avenue Railroad Depot had fallen, with loss of life, as has already been described in this journal.

Turning from such obtrusive and unpleasant incidents, one or two new pieces of work promise to leave the spring not altogether bald of interest. The Morse building, by Farnsworth and Silliman, architects, will be an important addition to the lower end of the town; and now Columbia College has entrusted to Mr. C. C. Haight the building of a new wing to the academic department. The new building will be about 200 ft. x 55 ft. on the western end of the college green. The outer walls are to be of face-brick, in black pointing, with the light-tinted Potsdam sandstone as finish. The style might be called the Oxford mode, or very late Gothic, best seen in much of the collegiate architecture of the English university towns. The building will be low and long, having above a high basement, three stories and an

attic. The western flank will have no entrance, but opens upon the inner or quadrangle face, in the centre of which is a broad, projecting porch with groined ceiling, while over it is an oriel window, corbelled out into a conspicuous feature, and rising up into the attic story. Besides this central projecting pavilion are simpler ones at either end of the building, the roofs over these portions presenting gable fronts. The windows are broad, mullioned ones, arched in the lower stories and with square-headed lintels above. Within, the halls and class-rooms will be finished in brick of a light tint with a strongly contrasted pointing. The entire construction it is intended shall be fire-proof, with iron beams and Teal-block filling. The wood finish will be in oak, with iron frames. The heating will be by indirect radiation, though heat by direct radiation will be gained by two fireplaces in each class-room. These fireplaces will be made important features in the angles of the rooms where they occur, while the chimney stacks throughout are skilfully employed to break up the length of the building. The cost of the whole will be \$200,000.

A rather novel decision from the counsel to the Department of Building promises to render null much of the effort of the Superintendent towards rendering storehouses secure. The law requires that in every warehouse or storehouse, the weight which the floor can safely carry shall be calculated and the figures posted up in a conspicuous place, and any overloading to be summarily punished. It is now decided that a storehouse is one in which goods are placed to be kept and removed again without breaking bulk. Places where they are kept for sale or for exhibition, counsel decides not to come within the rule, and it is precisely this class of structure that needs the most watching. Under this ruling the Sixth Avenue Railroad Depot break might have gone on without posting, and in a thousand buildings where coffee, flour, paper, and other heavy goods are kept the precautionary rules will not apply, though the power given the Building Department to see to it that all buildings within the city limits are of proper strength will not relieve it from blame in case of accident through neglect.

W.

THE BOSTON PARK PLANS.

—BOSTON, June, 1878.

THE Park Commissioners have gratified the very natural curiosity concerning the designs for the proposed Back Bay Park by placing the designs on exhibition in the large committee-room at the City Hall. They have been inspected with more or less intelligent interest by a large number of persons, and we venture to guess that the commissioners themselves and the successful competitor are the only ones who have not been astonished at the award. Indeed we are by no means sure that Mr. Grundel himself did not feel a mild surprise when he saw the other designs, and found his own preferred to all of them. We presume it would be too much to expect the commissioners to give the inquiring public a reason for their extraordinary choice, but we should be glad to know what were the merits which they discovered in Mr. Grundel's plan which in their judgment entitled it to the preference.

Two courses were open to a man setting himself to study the capabilities of this little patch of marsh. One was to create at great cost of time and money, a diversified surface of hill and valley, of land and water, of wood and lawn; to reproduce in miniature all the scenery of a "lake district;" and to fill in all the nooks and corners cunningly with terraces and belvederes and boat-houses, casinos, bridges, and arbors, and all the devices known to the professional landscape architect. This is the method of the Central Park of New York, and is not unreasonable in a tract of land covering two or three thousand acres, upon which the possible expenditure was limited only by the resources of a treasury which even the Tammany Ring could not exhaust.

The other course was to confess frankly that this park was but a small affair, and to decline the attempt to make it imposing, or to include in it all the features of the natural landscape, but to so vary its limited and flat surface with alternating land and water, and so dispose the masses of such foliage as it was reasonable to expect in such a place, as to create an agreeable pleasure-ground at a small expense, and trust for effect to the unfailing beauty of broad surfaces of water and broad spaces of lawn, when skilfully broken by trees. The one method is simple; the other is ambitious. The one park is inexpensive to make and to keep; the other is costly at the outset, and demands a great annual outlay. Either might be intelligently chosen and consistently carried out.

Mr. Grundel has chosen neither. He has given a considerable proportion of the space at his disposal to the pond, and has made it wriggle the whole length and nearly the whole breadth of the park, so that there is at no point land enough left between it and the boundary to make a respectable lawn. But he has neutralized all the advantages of a large and fine sheet of water which he might be expected to secure by such a course, by tormenting his shore line, so as to form a distracting and absurd succession of gulfs and peninsulas and islands, which everywhere contract the breadth of the pond, and which would infallibly prevent any free circulation of water, either salt or fresh. Boylston Street and the railroad chop brutally across the territory without attempt at concealment or management, and the only flight of fancy or invention anywhere indicated consists in a rustic summer-house or two dropped at random in spots no more suggestive of repose or of prospect than any other, and in half a dozen

bridges of similar design thrown across the narrow straits, which separate the peninsulas aforesaid from the main land. No massing of foliage is attempted.

In strong contrast with this rather childish plan are the three projects of Messrs. Lee and Curtis, Messrs. Bowditch and Copeland, and Mr. Adams of Medford, all of which have been studied and elaborated with evident care and skill, though in obedience to varying theories.

The plan of Messrs. Lee and Curtis is the most beautifully drawn of all in the room. It is also, if we mistake not, the only one which has recognized the unwisdom of encumbering this little space by a carriage-drive. It has as an offset made the surrounding streets into an attractive drive by giving them a breadth of a hundred feet or so, and sinking the surface of the park from five to twelve feet below them, and so allowing them to command pleasant views over its surface. The pond here occupies, as in Mr. Grundel's plan, nearly the whole length of the park, and towards the north end has a breadth of some eight hundred feet. This would be a fine feature, but purchased, as it seems to us, at too great a sacrifice of lawn, since it nowhere allows any breadth of grass greater than four hundred feet, and this only at a single point. Some pleasing architectural features are introduced, as a terrace in two levels, at the termination of the Westland Parkway, looking across the water at its broadest part, with a boat-landing over against it, and a lookout-tower raised on a wooded hill thirty feet above the water. The ugly but unavoidable feature of the railroad is concealed by grading up the surface on either side above the level of the track, and by thick planting. Boylston Street, as in most of the plans, is deflected from a straight line by a gentle curve to the north, but without materially raising the grade. The crossing of Commonwealth Avenue is peculiarly treated; the avenue being contracted into a bridge eighty feet wide across two square basins. The approaches or parkways, with the exception of that from Beacon Street, are treated as broad malls with from four to eight rows of trees. That from Longwood Avenue is particularly imposing.

The plan submitted by Messrs. Bowditch and Copeland is artificial and sophisticated beyond any other, but is intelligent and well studied. Boylston Street is here carried across the park on a viaduct, with a tall watch-tower at the end of it, — the line being curved as in the plan last noticed. This viaduct is bordered on one side by a labyrinth, that stupidest of all the devices of the formal gardens of the eighteenth century, and on the other by the lake, which is, as in both the plans before noticed, extended to nearly the whole length of the park, but contrives to make room in the middle for a straight cascade some nine hundred feet long, with a foot-path on each side. What small remnant of grass is left by this treatment is cut up in all directions by the inevitable driveway, with its high-sounding *concoirs* for carriages. There are thus no broad spaces either of land or water. A tunnel is built over the railroad and covered with grass. The intersection of Commonwealth Avenue is laid out as a square, turned diagonally with the avenue, with a circular fountain and a *gasolier* (odious word) in the middle. The parkways are gardens. This plan is accompanied by an admirable water-color drawing, showing a bird's-eye view of the park, with the river and the shore beyond.

The plan of Mr. Edward P. Adams, of Medford, is hung so high on the walls that it cannot be studied without difficulty, particularly as the execution is delicate rather than strong. But it well repays a careful study. It is perhaps the simplest plan in the room. It is also, to our mind, the one best adapted to the conditions and requirements of the case. It has less water than the plan of Messrs. Lee and Curtis; but what it has is made the most of, and is so placed as to allow of two great stretches of lawn, one called "the North Green" and the other "the South Green," the one perhaps a thousand feet each way, the other longer and narrower. On these the foliage is indicated as massed broadly and effectively, so as to enhance their apparent size. The driveway is carried near the boundary of the park, and is not allowed to encroach on the broad lawns. The Commonwealth Avenue crossing is laid out as a *rond point* with radiating paths, and the parkways are shaded malls. Boylston Street is coolly brought to a full stop at the boundary of the park, which would be greatly to the advantage of the park, but a sad disappointment to Boylston Street, and which would, we presume, not be permitted by the city government. Mr. Adams has refrained, wisely as it seems to us, from any of the artificial and architectural features which have done so much for some of the other plans, and his plan is perhaps on this account inferior in elegance to some others; but we think his park would not be the less beautiful, while we are certain it would be much more suited to the present condition of affairs, when every outlay of the public money is watched and ought to be watched with a jealous interest by all well-disposed citizens. Besides, we are to remember that this little park is but the first of a chain which we hope eventually to see stretching from the Common far out into the suburbs and around the city, and it would be absurd to lavish upon it all the resources of the landscape gardener, and leave no surprises for the visitor who goes further.

A.

Every workman on the Paris Exhibition building has received a present of a Bible in the French language.

NATAL POTTERY.—Fragments of ancient pottery found in Natal bear a very close resemblance to the pottery made by the ancient British.

THE QUALIFYING OF ARCHITECTS.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — The communication in your late issue, and other papers on the same subject, seem to treat rather of the proper tests for determining the amount of qualification in given cases, than of fit systems of training for professional work. Such tests even would be imperfect and delusive if not repeated at frequent intervals and made to include many matters not treated of in books. The ability of any one to build well, in every sense, depends upon many qualities and attainments beyond the reach of school and college manuals, and often not to be gained by any teaching.

The world and the profession are supposed to move. The art and science of to-day are beginning to sneer at the infallibility of the past. The knowledge that would have served an American architect very well twenty years ago would now prove an uncertain reliance. No one claims that the builders of the antique world, whose works are beyond cavil and whom all agree to worship, had much more than the inspiration of genius and masons' traditions, or the "rule of thumb" to guide them. "The inspired mechanic" of the future might have a better chance in competition with an uncertified architect than with a certified one.

Professional success depends upon daily changing conditions; one's powers, habits, and knowledge vary with time — what was true yesterday may be false to-morrow. Examinations, to be of value, should not be restricted to the limited field indicated. As a groundwork of any professional success, a university or scientific-school education is important; and to the thorough study of architecture a knowledge of the principal languages, living and dead, is an essential aid. But all the learning implied in such education, in order to attain eminent practical success, must have added to it great natural qualifications and life-long study. It is difficult to determine in advance the direction in which one's practice may lead, and which of the branches of science and art may be most useful in actual work.

An architect's experience ranges over an immense field, and he must be prepared in all parts alike. His destined work is building; and his success is to be determined by the success, in all particulars, of what he builds. In such labor there becomes necessary a thorough knowledge of "business" and "affairs," and of what is known as "administration;" a familiarity with building and real estate law, with special reference to the law of contracts, and a general acquaintance with land surveying. As his business is to treat with clients, and direct and control men of all classes, in him more than in most is needed great patience and power of self-control, an intimate knowledge of human nature, and an instinctive power to command and lead men; and this should be united with gentle and attractive manners; for when he cannot command he must be competent to persuade. These qualities are as essential in the control of an office as in intercourse with clients and the superintendence of building. An architect may make or mar his work by his treatment of subordinates.

Moral qualities should be allowed due weight. A dishonest man, and still more one of generally bad character, is not fitted for important professional trusts. Buildings may fail as much from the criminal recklessness as from the incompetence of their designers. Few would claim that the most of our railroad bridge builders are not able to build strong enough if they choose, or are paid to do so. A proper examination should surely not omit a thorough investigation of character.

An architect should know how to write both accurately and concisely, as well as gracefully. His contracts and specifications, his correspondence with distant clients, his reports and written explanations and directions, all demand these qualities in a high degree of perfection.

At least an elementary practical training in all branches of mechanical work that are likely to come under supervision are essential to proper qualification. A knowledge of geology, botany, and mineralogy is essential. A thorough study of old work, and an equally thorough practical study of new building processes and materials in new work, such as can only be gained by extensive foreign and home travel, cannot be omitted from one's preparatory studies; and these studies, to be intelligent, should come after preliminary education, and even after some office experience. Nothing of scientific or practical acquirement can be said to come amiss to the architect; or even may not at any time be essential to the competent treatment of some particular work, and it would be a mere waste of words to prolong the list of items.

In artistic qualifications for success there is even less limit than in the scientific and practical. Drawing, painting, etching, modelling, carving, all can be pursued with profit, with many variations and to an indefinite extent.

"Life is short, art is long;" and the weary youth aspiring to reach the gate which shall open to him rich pastures of architectural practice, where he may browse in ease with his certificate of competency pinned on his back, may find himself with barely time remaining to design his own monument.

To be serious, — while we are all struggling to learn all we can, and build as safely and as well as we may, is the time quite ripe for drawing such sharp lines, and do other new professions in a new country do the like? And are there not crying abuses in our daily practice requiring more earnest attention than this demand for

"certified qualification?" There is no such thing as absolute perfection in this world. The public often insist upon employing quacks and charlatans, and they have as fair a chance to judge of such among architects as in another profession. The consequences of wrong selection injure both the profession and the people, but the evil can be only fully remedied by the general progress of civilizing influences.

JOHN A. FOX.

COMMON COUNCILMEN AS ARCHITECTS.

MILWAUKEE, May 27, 1878.

EDITORS OF THE AMERICAN ARCHITECT:

THE Board of Public Works of this city has recently advertised for proposals to build a city hospital, which is intended to be used chiefly for cases of small-pox and other contagious diseases. The plans for this hospital were prepared under the instructions of a committee selected from the Common Council. As is usual with plans thus prepared, they are totally unfit for the purposes intended.

Dr. O. W. Wight, the Health Commissioner of the city, a gentleman of culture and ability, in a lecture delivered before the Popular Science Class, on Thursday evening last, drew attention to this miserable arrangement called "a plan for a hospital." The newspaper press has heartily supported the views of the Commissioner, and it now remains to be seen whether the buildings will be erected according to the present plan, or another be chosen, more in accordance with the intelligent ideas and methods in hospital matters seen elsewhere. Should this building be erected, it will be simply one more proof of the error which appoints committees from such bodies to control the plans for public buildings. Usually they have not sufficient knowledge to understand that they know nothing about it.

This plan is so bad that it can receive only condemnation. Every requisite for a building for hospital purposes is ignored. Fortunately the building is neither large nor expensive, the present cost being limited to \$8,000. This amount nevertheless might as well be expended judiciously as otherwise. The action of the committee in this case is inexcusable. Sketches were prepared and submitted to the committee which combined all the requirements set forth by the best authorities upon hospital building. The pavilion plan was of course the basis, but the sketches showed a variety of methods in the arrangement of administration buildings, pavilions, etc., of both one and two story pavilions. These sketches were, as they should be, extremely plain and simple in an architectural point of view; but our wisacres could see no further into their merits than a resemblance to a "lot of barracks," while their classic souls aspired to an imposing building. The aspiration met its satisfactory response in a Greek cross, and a draughtsman was straightway engaged to draw it for them. In this cross the committee behold with delight every hospital requirement according to its ideas, from the administration building to the small-pox ward, — the sewage of the building emptying into a dry well outside. It is very likely if the room could have been made for that dry well inside the building there it would have been. Eight acres of ground are to be devoted to this hospital; therefore it will be seen that this crowding was imperative.

[We give place to this communication on its own merits, not knowing anything of the plan in question except what the communication tells us. On the general principle involved we agree with the writer; for to plan a hospital properly, even a simple one, is a matter of special skill and knowledge, and it is a hazardous thing for anybody to attempt who has not acquired these by special study. The only two points in the plan that are described seem to be rightly criticised. Absolute isolation of contagious wards is one of the first principles of hospital planning; and to drain such a ward, or indeed any ward, into a dry cesspool is a blunder which in the present state of sanitary science is at least unnecessary. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS.

LIGHTNING CONDUCTORS AND EARTH-CONTACT. — The importance of a perfect earth-contact for lightning conductors is shown by an accident at Nottingham, in 1868, which is mentioned by Dr. R. G. Mann in the *Journal of the Society of Arts*. A copper lightning conductor four tenths of an inch in diameter was attached to the weathercock, one hundred and fifty feet from the ground, upon the spire of a new church, and was carried in an unbroken line to the ground, and probably at first had a good earth-contact; but after the accident an investigation showed that some thief had drawn it out of the ground and carried away all that was more than six inches below the surface. On October 16, 1868, the church was struck by lightning, the fluid passing quietly until within about six feet of the ground. Had there been a good earth contact, all would have gone well, but at this point it was drawn from the conductor to a gas-pipe on the inside of the wall, although separated from it by four and one half feet of solid masonry. The lightning then passed along the pipes to the gas-mains and off into moist ground; but on its passage it totally destroyed a short piece of pipe near the gas-meter and allowed the gas to escape, which, by the way, caused another accident on the following day, when a lighted lamp was carried into the cellar by the person sent to look up the leak. At the point where the electric fluid passed through the wall from the conductor to the gas-pipe, the stone work was splintered into fragments through an area of about a square yard on either face of the wall, while the centre of the wall for a thickness of about a foot was entirely uninjured.

A WHISPERING GALLERY. — The old round-house at Worcester, now being torn down, possessed the same peculiarities of transmitting sound around its walls that makes the whispering gallery at St. Paul's such an attraction to travellers.

WOMEN AS ARTISTS. — The numerous societies of decorative art, conducted and supported by ladies, that have come into being since the Centennial Exhibition, might lead people to suppose that in this country, at least, women had never done anything practical in the way of works of fine art. Laying out of the question instances of individual prowess in this direction, there have been in existence for some time schools of greater or less extent and completeness of organization as at Cincinnati and Boston, and particularly at New York, as one of the departments of the Cooper Union. Here under the direction of Mrs. Susan N. Carter, drawing and painting are taught in their various branches, and in such a way as to enable the pupils to profit immediately by their skill; for it is stated that during the past six months the ladies of this department have realized \$11,000 by the sale of their work and by the salaries they receive as drawing-teachers. As we find that there are one hundred and twenty-six pupils the average monthly gain per pupil was about \$14.50, which is far from a poor average for off-time work. It would be interesting to know whether the products of the school were sold on their own merits as works of art, or as the work of ladies. But it would still be difficult to determine how much gain was due to the compassionate purchaser who wishes to encourage female enterprise, or how much loss was due to the unscrupulous dealer who systematically underpays because it is a woman's work that he is purchasing.

MILLIONS IN IT. — Perhaps the smallest foundation for bringing a civil suit for damages is that which Carl Pietsch urges against Henry Soeffler of Brooklyn in a suit for \$300 damages, because the defendant has built on the plaintiff's land to the extent of two inches at the surface, the encroachment increasing to six inches at the foot of the foundation wall. If the plaintiff gains his suit it will be for the advantage of impecunious landholders to examine their title deeds with the expectation of finding a similar chance to turn an honest penny.

THE MISSISSIPPI JETTIES. — A despatch from Washington says that the bill introduced in the Senate May 16 by Mr. Windom, amendatory of the act approved March 3, 1875, authorizing James B. Eads and his associates to create and maintain a wide and deep channel between the South Pass of the Mississippi River and the Gulf of Mexico, provided that when a channel shall have been obtained by the action of the jetties and auxiliary works authorized by said act—24 feet in depth and not less than 150 feet in width—there shall be paid \$750,000; provided said channel shall then be 200 feet wide by not less than 22 feet deep. When 25 feet in depth, and not less than 150 feet in width, \$750,000; provided the channel shall then be 250 feet wide by not less than 22 feet deep. When 26 feet in depth, and not less than 150 feet in width, \$500,000; provided the channel shall then be 300 feet wide by not less than 22 feet deep. When 27 feet in depth, and not less than 100 feet in width, \$375,000; provided the channel shall then be 200 feet wide by not less than 24 feet deep. When 28 feet in depth, and not less than 100 feet in width, \$375,000; provided the channel shall then be 250 feet wide by not less than 24 feet deep. When 29 feet in depth, and not less than 100 feet in width, \$250,000; provided the channel shall then be 250 feet wide by not less than 24 feet deep. When 30 feet in depth, and not less than 100 feet in width, \$250,000; provided the channel shall then be 200 feet wide by not less than 26 feet deep. The bill requires that the remaining \$1,000,000 of the compensation provided in the act of 1875 shall be due and payable from time to time as therein set forth, when the maximum channel described in this amendment shall have been obtained.

THE WELLAND CANAL. — Canada is proposing to spend \$30,200,000 in enlarging the Welland canal, — which, some thirty-five miles in length, connects lakes Erie and Ontario, — and in removing obstructions in the St. Lawrence River. This is to be done with the hope of drawing Western trade into Canada and away from the United States. Already contracts to the amount of \$12,860,000 have been concluded, and it is probable that this important step toward making Canada a really prosperous country will be carried through with energy. Lobbyists and others are making of this fact a handle to urge an increase of the appropriation for the improvement of Harlem River.

ARCHÆOLOGICAL DISCOVERIES IN ROME. — The discoveries which have been made by the Roman Municipal Society have of late been very numerous. During the past year statues of Silenus, Melpomene, and Mercury have been discovered; also busts of Faustina and of Flavia Maxima Faustina, wife of Constantine, together with many bas-reliefs. More lately have been discovered in the Via Santa Gregorio, at a depth of thirty feet, fragments of a frieze some twenty feet long, which bore on it life-size figures in high relief. At the same place were found pieces of an equestrian statue in bronze gilt. In the cemetery of Santa Lorenzo three marble statuettes have been unearthed: one a child in the attitude of a discobolus, another a child with a dove, while the third is headless. The most important finds seem to have been made at the Palatine, between the House of Augustus, which is yet to be explored, and the buildings built by Septimius Severus. Here were found many architectural fragments, such as drums of columns in red and black granite and marble capitals, bases and fragments of cornices; but besides these several statues were found, of which the most beautiful is a female figure of heroic size, but without head or arms. This statue, which is thought to be of the time of Hadrian, is said to be of more than ordinary excellence, and is thought to represent an empress. Perhaps the discovery that has awakened most archaeological fervor is the finding of the pedestal on which rested the statue of Cornelia, the mother of the Gracchi, which Pliny mentions as standing in his day. It was not destroyed at the time of the burning of the Portico of Octavia, A. D. 80, but stood until the days of the *prefecti urbis* of the Lower Empire, as is proven by the mark, still to be seen on the pedestal, which at that time was usually affixed to the works of art then existing in the city. With such particulars before one it is easy to believe the statement that works of art are now discovered so rapidly in Rome that there are not places enough to put them in, and that they are perforce stowed away in cellars and storehouses, where at some future day they may have another resurrection.

EDUCATIONAL VOYAGES. — We believe we are right in saying that the Woodruff Expedition, which presented itself to the public with such an attractive programme, an account of which will be found on page 214, vol. ii., has been indefinitely postponed, if indeed it has not been definitely abandoned by its projectors. A similar expedition is however, likely to take place, this time under French auspices. The *Picardie*, a vessel of 1,560 tons and having engines of one thousand horse-power, has been obtained by the Société des Voyages autour du Monde, and is advertised to sail from Marseilles on the last day of the present month on an educational voyage around the world. The details of the scheme we are ignorant of, but its general purport is the same as that of its American prototype.

CEMETERIES IN EUROPE. — The story goes that a Frenchman who had lost his wife ordered a stone-cutter to make him a suitable tomb-stone and on it cut the single word *regrets*. The stone-cutter respectfully hinted that *regrets éternels* would be a more appropriate inscription. "Alas, no, sir!" said the gentleman. "I have hired the grave for five years only." The story may very probably be a true one, for it is a common practice in several European countries to hire graves for a term of years and renew the lease when the first one expires, if the friends of the dead have the money, or the loving respect that would keep their remains undisturbed; but if there are no means of renewing the lease, or if the relatives are forgetful, or the family extinct, the remains are taken up and buried again in a common trench, or relegated to a catacomb, as the case may be. In some of the burial grounds of Paris the condition of things is really frightful. Here the ground has been used over and over again till it has lost not only all its original antiseptic properties but has become a distinct source of corruption. It is no uncommon thing for the grave-diggers whose unpleasant duty it is to exhume the bodies which have been buried for a longer or shorter period to be asphyxiated by the gases arising from the graves they are opening, and it has been more than once suggested to the municipal council of the city that these men be furnished with pure air while at their ghoully work, by the same kind of apparatus that serves for submarine divers.

A GAS CONSUMERS' STRIKE. — Gas-monopolists in this country have had their pretensions restrained in many different ways, but we cannot remember a case quite parallel to the treatment to which the gas companies at Barcelona, in Spain, have been lately subjected. It seems that the various gas companies have assessed a municipal tax on the consumers. The payment of this tax became so irksome that by concerted action no gas was burned by the inhabitants during forty-three nights. The city officials tried to compel the shop-keepers who were closing their shops at sundown to keep their shops open, and a proclamation was issued to this effect. The Minister of the Interior supports the action of the city authorities, and this has given the opposition a text for making an active demonstration against the Government, and at one time there seemed to be every chance that at some time in the future a Spanish republic might celebrate the blowing up of a gasometer as we Americans do the tea-making in Boston Harbor.

THE HOT-WATER WELL AT PESTH. — One of the curious features about the hot-water artesian well at Pesth, in Hungary, which we have described (see page 8, ante), is the adaptation to it of automatic machinery for boring, the water power for which is supplied by the well itself. By this means the boring has been conducted at double its previous rate. The notion is entertained that the abundant supply of warm water may be used in cultivating tropical plants in the gardens of the neighborhood.

PEWS. — The first seats provided in churches are seen in some Anglo-Saxon and Norman edifices still standing in England. They consist of stone benches which project from the wall around the whole interior excepting on the east end. In 1319 the congregations are represented as sitting on the ground or standing, and it was at this period that the people introduced low, rude, three-legged stools promiscuously over the church. Not until after the Norman conquest were wooden seats brought into use. In 1287 a decree was issued, in regard to the wrangling for seats (which had become a decided nuisance), that no one should call any seat in the church his own except noblemen and patrons, each person taking the nearest empty seat he could find, as he entered the church. From 1530 to 1540, as we approach nearer to the Reformation, seats were more generally appropriated, their entrance being guarded by cross-bars, and the initial letters of their owners engraved upon them. But directly after the Reformation the pew system commenced, for there is extant a complaint from the poor commons addressed to Henry VIII. in 1546 referring to his decree that a Bible should be in every church at liberty for all to read, because they feared it might be taken into the "guyre" or some "pue." Galleries in churches were not known until 1608. As early as 1611 luxurious arrangements were considered essential in church pews, and they were baized or cushioned all over their sides, and the seats furnished with comfortable cushions, while foot-stools were also introduced. Next, the sides of the pews were made so high that they entirely concealed the occupants from view. This is said to have been a device of those who desired not to be seen by the officers, who reported all who did not stand up and bow low when the name of Jesus was spoken by the clergyman. Fire-places [?] were also built in the pews, and every possible convenience added for the comfort of the highly-favored few. But the services were often so long and tedious that the listeners fell asleep and frequently nodded their approbation of the minister's sermons, while they were totally oblivious of its teachings. Swift's lines, which we quote, allude to the prevailing fashion of church upholstery: —

"A bedstead of the antique mode,
Compact of timber many a load,
Such as our ancestors did use,
Was metamorphosed into pews,
Which still their ancient nature keep,
By lodging folks disposed to sleep."

With the reign of Charles I. the reasons for the heightening of the sides of the pews disappeared; and from the civil war they declined to their present height. — *Springfield Republican*.