

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. III.]

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[NO. 108.]

BOSTON, JANUARY 19, 1878.

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At the annual meeting of the American Social Science Association in Boston, last week, the secretary read a paper on "Homes for the People." He said that, in pursuance of an act of the Massachusetts legislature, presented by some members of the association, and passed last spring, to legalize Co-operative Saving Fund and Loan Associations, after the manner of those in Philadelphia, some six or eight of such associations had been formed in the State, chiefly in Boston, Cambridge, and Lynn, and were prospering. Inquiries made in Philadelphia had shown that the associations there had borne the pressure of hard times very well, — better, it was said, than most of the savings-banks of the country, — in spite of the hardships and difficulties which their members had met. There were signs of improvement in the condition of tenement-houses in Brooklyn; and in New York a plan was on foot for raising some hundreds of thousands of dollars to be invested in building such houses, after the example of Mr. White of Brooklyn (of whose successful experiments in this way we have more than once spoken). The secretary quoted from Mr. White an account of the financial success of this undertaking, wherein it appeared that about seventy thousand dollars, invested in the course of the last two years in two buildings for the housing of eighty families, had this year borne a net income of seven and a quarter per cent. This confirmed him in his opinion that "decent, healthy houses in flats (the ground being too dear for small houses) can be provided on New-York Island, paying a reasonable interest, — six per cent or more." He had, however, confined his attempts to Brooklyn, where he was building a block two rooms deep and two hundred feet long, and was expecting to invest some two hundred thousand dollars with confidence of a return.

THE details of Mr. White's investment are instructive. The "Home Buildings" on the corner of Hicks Street and Baltic Street, Brooklyn, are two blocks, one fronting on each street, and occupying together a lot of land 105 by 152 feet, whose cost was \$10,500. The Hicks-street building cost (allowing for its share of the land) \$39,485. It contains forty tenements, or dwellings, whose rent for nine months was \$2,742.50; and four shops, which have been rented seven months for \$865. This is at the rate of \$5,122 per year. The annual outgo, including taxes, water-rates, janitor's and other running expenses, and an allowance of one and a half per cent on cost for repairs, is set at \$2,072, leaving \$3,050, or nearly seven and three-quarters per cent, for the return. The Baltic-street building, apparently finished later, and containing likewise forty dwellings, will yield eight per cent. It appears from this trial, that to have a net income of seven per cent requires twelve and a quarter per cent in gross receipts. The rents for the tenements of three rooms are from \$1.40 to \$1.90 per week, those in the upper stories being the cheapest; for four rooms, from \$1.90 to \$2.70 per week. For similar tenements in New York, Mr. White estimates that it would be necessary to charge a quarter more, or, for three rooms, from \$1.66 to \$2.26 per week, and for four rooms from

\$2.26 to \$3.21, — prices which he thinks would at once bring the rooms into demand. The shops in the Hicks-street building rent for from \$25 to \$40 per month. The most conspicuous part of Mr. White's success is his success with his tenants. Among fifty-three families that held rooms in the Hicks-street building during the ten months that it was occupied, there were only thirteen changes; and only four failed to pay their rent promptly. Their behavior and their reasonable care of lodgings are indicated by the fact that only one family was ejected for disorder, and only two for damage done, and by Mr. White's recent note, that "repairs to water-works, etc., have not yet cost me one cent." A system of discount to those who paid their rent for several weeks at a time — presumably in advance — resulted in nearly two-fifths taking advantage of the discount. These things, of course, show that such houses attract a better than ordinary class of tenants. So far, this too is an encouragement to capitalists, and it certainly will be an immense gain when these classes are fully provided for. Yet, when the demand of the thrifty and well-behaved is supplied, the provision of such houses as a paying investment must stop; and then the question remains, whether, in the interest of public health and order, any thing can be done for the unthrifty and disorderly.

THE Superintendent of Buildings in Chicago not long ago rendered his annual report. In it he said that he had made a survey of all the theatres, public halls, schools, and churches in the city, and had served notices on the lessees and managers of theatres and halls, directing what should be done to make them safe for the public. While some of the managers complied with the requirements of the superintendent, others refused; and there was no law to compel them. He therefore urged the speedy passage of laws to regulate the planning and construction of such places of amusement, but apparently with no great hope, for he added, "I fear they will remain in their present unsafe condition until some public calamity similar to the burning of the Brooklyn Theatre occurs, when public sentiment will be aroused, but too late to save valuable lives and property, the loss of which must inevitably result, in case of fire in some of our theatres or public halls." The subject has been brought before the city government, and we are reminded of the astuteness with which the Chicago inn-keepers staved off the impending legislative restrictions upon them after the fatal burning of the Southern Hotel some months ago; for it appears that the board of aldermen has contumeliously rejected the ordinance for the security of theatres. The ordinance was apparently well drawn, and contained the minimum restrictions that are recognized as necessary for safety, — the provision of proper exits and stairs, of stand-pipes and hose, of a brick fire-wall next the stage, and a prohibition against putting auditoriums too high up in buildings. But the committee which reported on it directed its attention to the dangerous condition of the audiences rather than of the buildings, declaring that "the fashion of trailing dresses has more to answer for in the frightful calamities that have happened to panic-stricken assemblies than any fault in the construction of buildings." No law regulating dress was enacted, however, it would appear; and the building ordinance failed to pass; so that the audiences of Chicago are left without protection; the aldermen thinking, perhaps, that the fashion of a dress would outlast even a fire-proof theatre, and that if people will get into a fright, and upset each other on the floor, they may as well be burned there.

THE building of the Indiana State Capitol seems to have been looked upon, from one side or the other, as likely to furnish a golden opportunity, or a dangerous provocation, for some kind of hoecussing. The legislative act to secure plans for the building surrounded the competition with a net-work of difficulties in which, we should think, no honest and discreet architect would have dared to risk entangling himself. This, however, did not deter Mr. John W. Blake from distributing the seductive letter to architects, which we printed in our number of June 2, 1877; and now we read that a similar letter (anonymous this time, it is said) has

been honorably exposed to the State House Commissioners, by Mr. Meyers, an architect of Detroit, to whom it was addressed, in which the writer offered to use influence to get Mr. Meyers's plan adopted. The commissioners have thereupon incontinently dismissed their secretary as the guilty person, without waiting for his examination, which is to follow. The path of the architect must be thorny in a State where it is necessary to put him under enormous bonds to insure the perfection of his plans, and the accuracy of his builder's estimates; and where the prospect of this indulgence is enough to stimulate such profuse offers of underhand assistance.

We alluded in our last number to the studies which the prize students in architecture at the French Academy in Rome are required to make and send home to Paris while they are maintained at the government expense. In the last-numbered number of *La Semaine des Constructeurs* we find the report of the academy on the *Envois* returned by the students in 1878. "The academy," says the report, "attests with great satisfaction the superiority of the *Envois* of the resident architects in this year over those of past years. It is long since it has been able to receive work of this kind with such entire praise, — praise from which the slight reservations it has made are no deduction." The study of the first year's student, Mr. Paulin, is of the portico of the Pantheon at Rome, and of several buildings at Pompeii. It is singled out for special commendation. Those of the other students, or resident architects, as it will be seen that the report calls them, are the Temple of Castor and Pollux and the Temple of Concord at Rome, a restoration of the Erechtheum, and another of the Mausoleum at Halicarnassus, with some smaller studies of Renaissance work, chiefly of the civic palace at Brescia, the work of Sansovino and Palladio. It will be noticed how strictly the academic tradition is maintained. The whole labor is spent upon classic work, excepting for a few slighter studies in the stricter Renaissance. Not a glance strays in the direction of mediæval archaeology or architecture, a notable contrast to the activity of their fellow-architects on the opposite side of the channel. And here we may suggest that the establishment of travelling scholarships in architecture is one of the things which Americans might well undertake. There are no artists, especially no architects, who need travel so much as Americans, because there are none who have so little to study at home. Private or corporate liberality could do nothing better to help the education of our profession than in founding such scholarships. It is not likely that their work would be of great value, except to themselves and to students like themselves; nor is it important that it should. It would not for a long time, perhaps, add to the stock of archaeological knowledge, or bear such splendid fruit as has the work of the French *pensionnaires*; but its direct and indirect influence in education might be very great.

A curious case has lately come before the English courts, likely to call out the sympathy of all artists in behalf of one of their calling who has appealed in vain for the protection of the law against forgery. Mr. Herbert, R.A., was one day waited on by a picture-dealer, who told him that he had bought from another picture-dealer a painting bearing his signature, and requested him to authenticate it. The price actually paid for the picture was ten or twenty pounds; but, accepted as the work of Mr. Herbert, it would be worth two hundred and fifty, for which reason the dealer was naturally anxious to have it acknowledged. Mr. Herbert at once declared it a forgery, and insisted that the dealer should sign an agreement not to sell it as genuine. This, however, the dealer refused to do, asserting that the picture was genuine, and maintaining his purpose to sell it as such; whereupon Mr. Herbert seized it, and detained it as a forgery, leaving the dealer to his remedy at law. The dealer sued to recover the picture, with damages for its detention. The Court, after a full hearing, decided, not apparently without indicating its sympathy with the painter, that the picture was the property of the dealer, and must be returned to him uninjured, even to the false signature; that the defendant was liable for its value if it was not so returned; and that it was for the jury to determine the value, and the damages to be

awarded for illegal detention. The jury appraised the picture at ten pounds, and awarded one shilling damages for the detention, leaving to Mr. Herbert, apparently, the option of destroying and paying for it, or seeing it go forth to be sold under his name, and, in either case, the pleasure of paying his own lawyer's fees. It thus appears that English law (and, we suppose, American) gives an artist no protection against counterfeiters. He might secure it, we presume, by copyrighting a trade-mark, and affixing it to his pictures; but, if he is unwilling to do this, he must submit to be blackmailed, like Mr. Herbert, when any one thinks it worth while. If he would suppress counterfeits, he must do it at his own cost, by seizing them when he can (like the Academician who had, it was whispered, in a previous instance broken one over the head of a dealer), and paying damages therefor; and, failing this precarious remedy, he must submit.

A WORD TO CONTRIBUTORS.

The beginning of a new year gives us an opportunity to make acknowledgment to the many friends who have helped the interest and usefulness of our paper with their contributions. This acknowledgment is especially due to those whose assistance has been unsolicited, — assistance of which the welcome is not to be measured by the scanty recognition of it which it is possible to give in individual cases. We wish, once more, to remind our readers how much the value of our work may be increased by their co-operation. As we have said before, it is impossible for us to know where all the material is to be found that would be valuable to us, and we must depend, therefore, in a good measure, upon what may be voluntarily offered. This is especially true in regard to matter for illustration. The topics and news which it is worth while to touch upon can be discovered and collected with fair success by a reasonable effort of editorial diligence, though here, too, help from without is always valuable; but in a country so wide, and cities so scattered as ours, it is impossible for us to be on the watch for all that would serve us for illustration, and we must rely in a good degree on spontaneous assistance. There is, in fact, no other means by which we can make our paper what we should like to have it, — a sufficient record of the best work that is done in American architecture. It does not need the comments of foreigners to remind us that the greater part of such work goes unrecorded at present; and, from our point of view at least, it is very undesirable that this should be the case. We therefore invite our readers once more, wherever they may be, to favor us with designs or drawings of any important work they may have in hand; and we shall be glad if correspondents, regular or occasional, will bring to our notice work that it is desirable to illustrate in our pages. The difficulty of purveying for ourselves is increased in the case of work which is not where it can be publicly seen, especially decorative work and furniture, of which we should like to publish more than we do, but which it is impossible for us to search out in the private places where it exists.

We should not ask assistance from our readers, if we did not know that it is no less in their interest than in that of editors to make their technical journals as good and as catholic as possible. There is, nevertheless, one difficulty which must necessarily arise, and has occasionally been brought to our notice with some emphasis. It is not possible for us to publish every thing that is sent; and, ungracious as it may seem to ask for things when there is a possibility that we may not use them, we are obliged to claim indulgence in this respect, and to beg those who find that we have no use for what they are good enough to send to take our return of their contribution in good part. We now and then receive letters of complaint, sometimes of indignant complaint, from subscribers whose contributions we have had to return unused. We must therefore qualify our general invitation by saying, that, glad as we are to receive such help from all sides, we do not invite it from persons who are not willing to leave us the option of declining it, and without offence, if we do not find it suited to our purpose. To agree that subscription to our paper, or other favors, should confer a right of representation in its pages, would be to abdicate the editorial function altogether. Our friends will certainly not wish to deprive us of the semblance of authority, when we cannot divest ourselves of responsibility. It is the aim

and expectation of any journal to render in itself an equivalent for its subscription-price: without this expectation, it would be unreasonable to ask for subscribers. Those of our friends who give assistance other than their subscriptions will give it, we are assured, from interest in the cause we represent, — the support and improvement of our profession and its allied arts, — not as a favor to the editors or the publishers, and therefore not as involving a right of control over them, for that is what a right to insert contributions must really imply. An editor must perhaps resign himself to encounter now and then those who find an affront in the return of their contributions, or even make it the occasion for an accusation of favoritism. But they know little of his position, who are not aware that it is one of its chief gratifications to discover new contributors, as it is one of its chief surprises to learn how many people there are to whom it is incredible that an editor could by any honest possibility fail to admire their productions, or to find them useful.

For ourselves, we are as far as possible from claiming infallibility, or from supposing that we do not make mistakes. The gradations about any line of selection are necessarily close, and it cannot be supposed that different people would quite agree concerning them, nor can we hope to altogether avoid errors of judgment. Nevertheless, selection is an absolute necessity; and we may say frankly that we believe our faults to have been on the side of acceptance rather than of rejection. This is not an inviting topic, and we do not propose to continue it, but only to assure our friends that we mean to be impartial; that we wish to make our paper as good as we can, — an object which is of more importance than any personal favor, — and that it is always a satisfaction to an editor to welcome a new contributor, — a satisfaction which is more likely to lead him into errors of leniency than is any personal admiration to mislead him into exclusion.

PAPERS ON PERSPECTIVE.

II. — PHENOMENA RELATING TO THE PICTURE.

In the last paper we considered the phenomena of perspective in nature; that is to say, certain appearances of the geometrical lines and surfaces with which perspective has to do.

Let us now — leaving till another day all question of magnitudes and of the exact determination of forms — consider in like manner the principal phenomena, the main characteristics, of a perspective drawing.

In so doing we will leave all quantitative determinations till by and by, and assume, or guess at, any dimensions or other data we may need; or determine them by judgment, or by the eye. But as this is just the way that such data are always determined when sketching either from nature or from the imagination, it follows that these considerations are specially interesting to the artist and the amateur, since they comprise almost every thing that he needs in his own work.

16. The picture is supposed to be drawn upon a plane surface called the *plane of the picture*, and so drawn that if the picture were transparent, every point and line of the drawing would cover and coincide with the corresponding points and lines of the objects represented, as seen from a given position, the station point; the plane of the picture being at a given distance and in a given direction.

17. The distance and direction of the picture are taken upon a line passing through the station point, at right angles with the plane of the picture. This line is of course an axis of that plane (4). It is called the *Axis*. If the Axis is horizontal, the picture is vertical, and this is the usual position. But if the Axis is inclined to the horizontal plane, the plane of the picture is at an angle with the vertical direction, as sometimes happens.

18. The point in the plane of the picture nearest to the eye, or Station point, S, is called the Centre of the picture, C. It is the point where the Axis pierces it. The distance from the station point to the Centre is the length of the Axis.

19. The representation in a perspective drawing of a point, or line, or of the vanishing point of a line or system of lines, or of the vanishing trace, or horizon, of a plane or system of planes, is called the *perspective* of the point, or line, or vanishing point, or trace.

Figure 1 represents the picture-plane, PP, as a transparent plane on which are drawn the perspectives of the lines behind it. The perspectives of the lines drawn on the vertical plane behind it, and which are consequently parallel to the plane of the picture, are parallel to the lines themselves, whether horizontal, vertical, or inclined, and though shorter, they are divided proportionally to them. The lines in the planes at right angles to the plane of the

picture, however, appear changed both in magnitude and direction. This illustrates the following propositions.

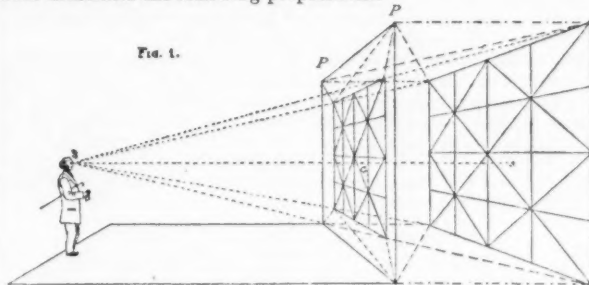


FIG. 1.

20. Lines parallel to the picture-plane, whatever their direction, have their perspectives drawn parallel to themselves; that is, in their real direction. The magnitude of the perspective of any such line is less than that of the real line, according as the distance of the line itself from the picture is greater, but its parts are proportional to the corresponding parts of the line represented.

21. When such lines belong to the same system of parallel lines they have their perspectives parallel to each other, and to the lines themselves.

22. The perspectives of lines not parallel to the plane of the picture are not parallel to the lines themselves, nor to each other, but are drawn converging towards a point which is the perspective of their vanishing point. In this case, as the real lines *seem* to converge towards their real vanishing point, so their perspective representations *do* converge towards the perspective of their vanishing point.

23. Hence if the picture-plane be vertical, as it usually is, the perspective of the horizontal lines that are *parallel to the plane of the picture* will be horizontal and parallel, that of inclined lines parallel to the picture will be parallel and inclined at the same angle with the lines themselves, and that of all vertical lines will be drawn vertical and parallel. All other systems of lines will have their perspectives converging to the perspective of their vanishing points.

24. Of the two vanishing points belonging to every system of lines (5) one will, in general, be behind the spectator, and one in front of him; this last will be behind the plane of the picture, and its perspective will be somewhere in the plane of the picture, and at a finite distance. But if the lines of the system in question be parallel to the plane of the picture, the perspective of both vanishing points will be at an infinite distance upon it, in opposite directions; and lines drawn to them will, of course, be parallel.

25. It is often asked why the apparent convergence of vertical lines is not represented by the convergence of their perspectives, just as much as that of horizontal lines. It is, just as much. For it is only those horizontal lines which are inclined to the picture whose perspectives are drawn to a vanishing point. The perspectives of lines parallel to the picture are drawn parallel to themselves, just as those of vertical lines are. And when the Axis is inclined so that the plane of the picture is no longer vertical, and vertical lines are no longer parallel to it, they, too, are drawn converging, one of their vanishing points, either the zenith or nadir, being now behind the picture, and its perspective at a finite distance upon it.

This case will be discussed hereafter.

26. Moreover, although lines parallel to the picture, whether vertical, horizontal, or inclined, do seem to converge towards a distant vanishing point just as other lines do, it is not necessary to represent this convergence, since their perspective representations in the plane of the picture also seem to converge as they recede from the eye, and in the same degree, covering and coinciding with them. The perspective lines are themselves foreshortened and the space between them diminished by distance.

27. To obtain this effect, however, in due degree, as, indeed, to obtain the just value of all other perspective effects, the eye of the spectator must remain at the station point. From other points the picture necessarily looks inexact or distorted. These distortions increase from the centre outward; and since it is so inconvenient as to be practically impossible to keep the eye always at the station point, it is best, in order to keep this distortion within reasonable limits, not to extend the picture more than 60°, i.e., not to make it wider than its distance from the eye.

Some other phenomena relating to perspective drawings are represented in Figure 2 (Plate I.).

In this plate, though a variety of objects are indicated, only one direction of each kind is employed. All the right-hand horizontal lines belong to a single system, and all the left-hand lines to another. This of course would not happen to this extent in nature; but we have imagined, for simplicity's sake, that in the scene represented all the buildings are parallel, and that all the roofs are of the same pitch.

The Centre of the picture, C, the point nearest the eye and opposite the station point, S, is here not exactly in the middle of the pic-

ture, but considerably to the right, being just below the church on the hill. The station point is about six inches from the paper; and the eye must of course occupy this position in order to make the things represented appear of their proper shape and size. This picture subtends an angle of more than 80° .

28. In this plate, the following notation is adopted, a notation that will be adhered to throughout these papers. Each direction is indicated by a single letter, the direction of each system of planes by two letters, which give the direction of two elements of the system; each vanishing point by the letter V, with the letter denoting the direction of the lines to which it belongs written after it; and the trace of each set of planes by the letter T, and the letters denoting the plane.

Lines and their Vanishing Points.

Lines.	Their Direction.	Their Vanishing Points.
Z.	Vertical. (To the zenith, or nadir.)	[V ^z] Vanishing point of vertical lines.
R.	Right hand horizontal.	V ^r " " " " Right hor. lines.
[i.e., horizontal lines going off to the right.]		
L.	Left hand horizontal.	V ^l " " " " Left " "
M.	Right hand inclined upwards.	V ^m " " " " Right Incl. "
M'.	" " " downwards.	V ^{m'} " " " " " "
N.	Left " " upwards.	V ⁿ " " " " Left Incl. "
N'.	" " " downwards.	V ^{n'} " " " " " "
P, Q	{ Inclined lines formed by the intersection of planes.	{ V ^p , V ^q }
P', Q'		{ " " }

If there are several lines having the same general inclination they may be distinguished by figures, as R¹, R², R³, etc. Special vanishing points may be indicated as V¹, V², V³, etc.

Planes and their Vanishing Traces (or Horizons).

Planes.	Their Direction.	Their Vanishing Traces.
RZ.	[Any plane of the system which contains, or is parallel to R and Z, i.e., right-hand vertical planes.]	TRZ. Trace of the right-hand vertical planes.
LZ.	To L and Z, i.e., left-hand vertical planes.	TLZ. Trace of the left-hand vertical planes.
RL.	To R and L, i.e., horizontal planes.	TRL. Trace of horizontal planes (i.e., The Horizon).
RN.	To R and N, " Inclined up to the left.	TRN. Trace of the planes RN.
RN'.	To R and N' " " down " " "	TRN'. " " " " RN'.
LM.	To L and M, " " up " right.	TLM. " " " " LM.
LM'.	To L and M' " " down " " "	TLM'. " " " " LM'.

29. The position of the various vanishing points, as well as the dimensions of the various objects, are supposed to be obtained, in this picture, as they would be obtained in a sketch from nature, or from the imagination.

If we place the eye at the station point, and look in the direction followed by a system of lines, we shall see their vanishing point (8); and if the picture is supposed to be interposed we shall see the perspective of the vanishing point in the same direction, covering the real vanishing point. Hence the perspective of the vanishing point of any system of lines is found by passing through the station point an element of that system. The point where it pierces the picture-plane is the perspective of the vanishing point of the system, coinciding with and covering the real vanishing point.

30. As M and M' are equally inclined to the horizontal plane, one looks up towards V^m at exactly the same angle that he looks down towards V^{m'}. V^m is accordingly just as far above the Horizon as V^{m'} is below it.

The same is true of Vⁿ and V^{n'}. But although M and N make the same angle with the ground, the distance of their vanishing points above the Horizon is not the same. For the eye at S, six inches in front of C, is further from V^l than from V^r, L being less inclined to the plane of the picture than R is. Looking up, then, at the same angle, though the eye sees the real left-hand upper vanishing point at the same height as the right-hand one above the real Horizon, it sees its perspective, Vⁿ, higher up on the paper.

31. In like manner the perspective of the trace of a plane or of a system of planes is found by passing through the station point an element of the system. The line where it intersects the plane of the picture is the perspective of the trace, or horizon, of the system of planes.

For if the eye is at the station point, and glances along the element of the system passing through it, it will see the trace upon the plane of the picture covering and coinciding with the distant trace or horizon.

32. And as the horizon of a system of planes passes through the vanishing points of all the lines that lie in it or are parallel to it, so does the perspective of the horizon, or trace, pass through the perspective of their vanishing points; and as all lines lying in or parallel to the system have their vanishing points in this horizon, so do the perspectives of all such lines have their point of convergence or vanishing point in this trace.

33. The propositions 12 a, b, c, d, e, are thus as true for the perspectives in the plane of the picture as for the real lines and planes, vanishing points and horizons, as is exemplified over and over again in this plate. All the traces shown pass through several vanishing points, and every vanishing point lies in the trace

of some system of planes. Every line which lies in two planes, as most of these lines do, has its vanishing point in both traces, that is, at their intersection; and the traces of all the planes parallel to any one of these lines meet at its vanishing point.

34. It is specially to be noted that the lines of the hips and valleys lying at the intersection of two planes of the roofs have their vanishing points at the intersection of the traces of these planes.

Thus the lines P, P', Q, and Q', being at the intersection, respectively, of RN and LM, RN' and LM', RN and LM', and RN' and LM, we have V^p at the intersection of TRN and TLM.

V ^{p'}	"	"	TRN'	"	TLM'.
V ^q	"	"	TRN	"	TLM'.
V ^{q'}	"	"	TRN'	"	TLM.

V^q, the vanishing point of Q, is off the paper, being at the intersection of the traces TRN and TLM'; and so in like manner is that of Q' at the intersection of TRN' and TLM.

On most of the roofs the planes LM' and RN', being on the further side, are out of sight. But the roof in the extreme foreground shows all four slopes. It has accordingly been selected for lettering.

35. This plate shows also that if the picture is vertical the trace of a vertical plane, such as LZ or RZ, is a vertical line. For it must pass through the vanishing point, V^z, of the vertical lines that lie in it, and this point is the infinitely distant zenith.

Besides, it is the line in which that plane of the system which passes through the eye intersects the plane of the picture; and as both these planes are vertical their intersection must be vertical.

36. Hence the hips and valleys, PP', which lie in parallel vertical planes, and accordingly have their vanishing points V^p V^{p'} in the trace of the system to which those planes belong, lie in a vertical line, one exactly above the other. As P and P' are equally inclined to the horizontal plane, V^p and V^{p'}, as well as V^m and V^{m'}, or Vⁿ and V^{n'}, are equally distant from the Horizon. These relations are indeed sufficiently obvious from the symmetry of the figure.

The vertical trace TPP' is not shown in the plate.

37. The proposition that all lines lying in a plane have their vanishing points somewhere in the trace of that plane receives special illustration in the case of the paths which cross the flat open space beyond the railroad; being level, they have their vanishing points on the horizon, one at V^h, others at V³ and V². The ladder lying on the roof to the right has the vanishing point of its sides, which are supposed to be made parallel, at V¹ in the trace of the plane of the roof, TRN'.

This proposition is very serviceable in putting in any parallel lines on any plane, as, for instance, in drawing the diagonal lines of slating on the roof to the left, the vanishing points being shown at V⁴ and V⁵ in the trace of LM, the plane of the roof.

38. This plate illustrates also the proposition (12) that in the case of solid objects the plane surfaces by which they are bounded are visible only on the sides towards their traces, or horizons; they are visible only when they are, so to speak, below their horizons. We see in the plate that the roof most nearly below the eye, being below all the horizons, shows all its slopes, and so does the next one to the left. In all the others, one, two, or three planes disappear, as they are above their traces; until at last in the case of the church on the top of the hill, which is above all the traces, all the roofs are out of sight. One of the houses in the fort on the lower hill shows the roof LM just disappearing, the lines L and M both coinciding with the horizon TLM.

39. It is to be observed that these traces, being portions of great circles, do not terminate at the vanishing points by which their position is determined, but pass through and beyond them.

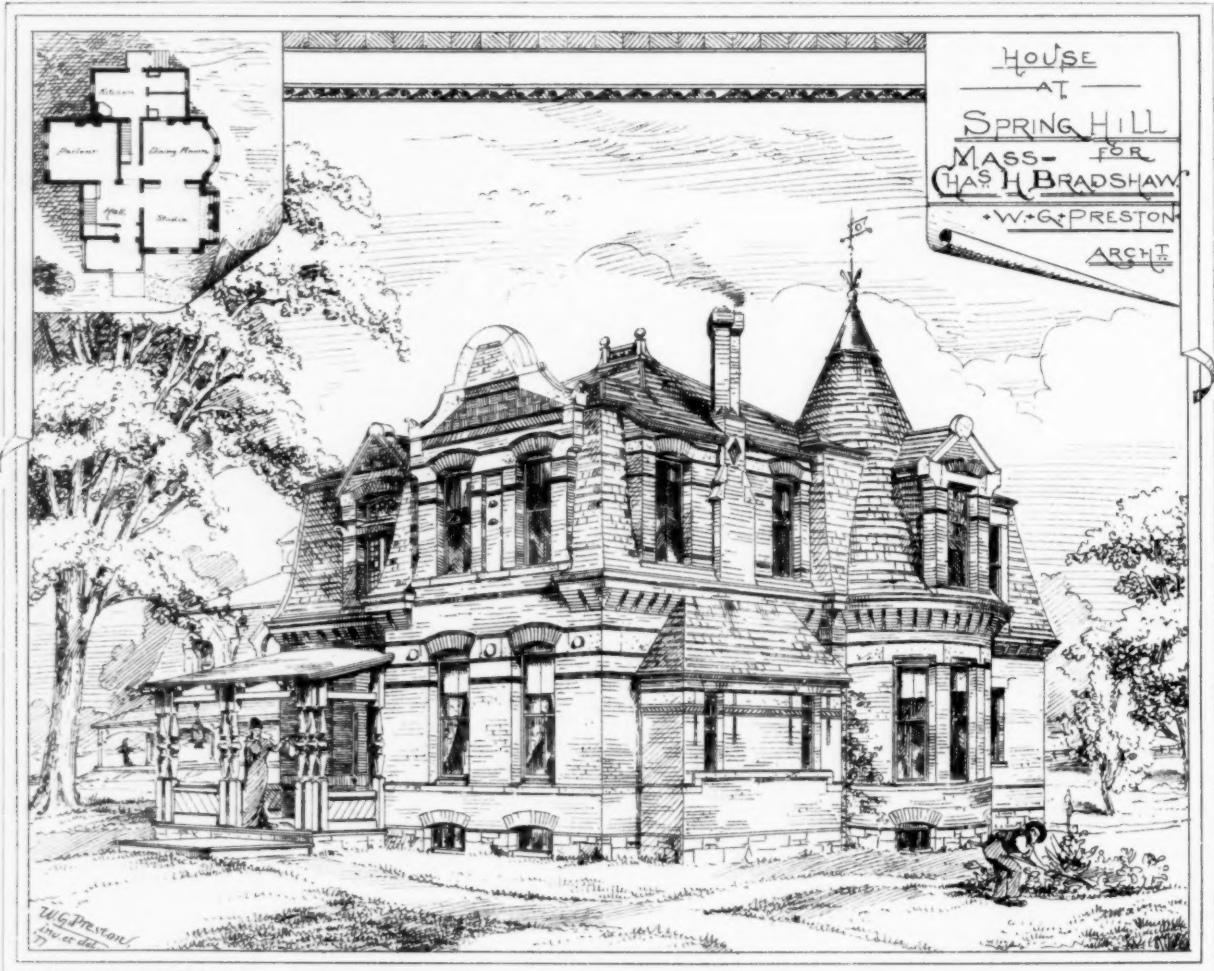
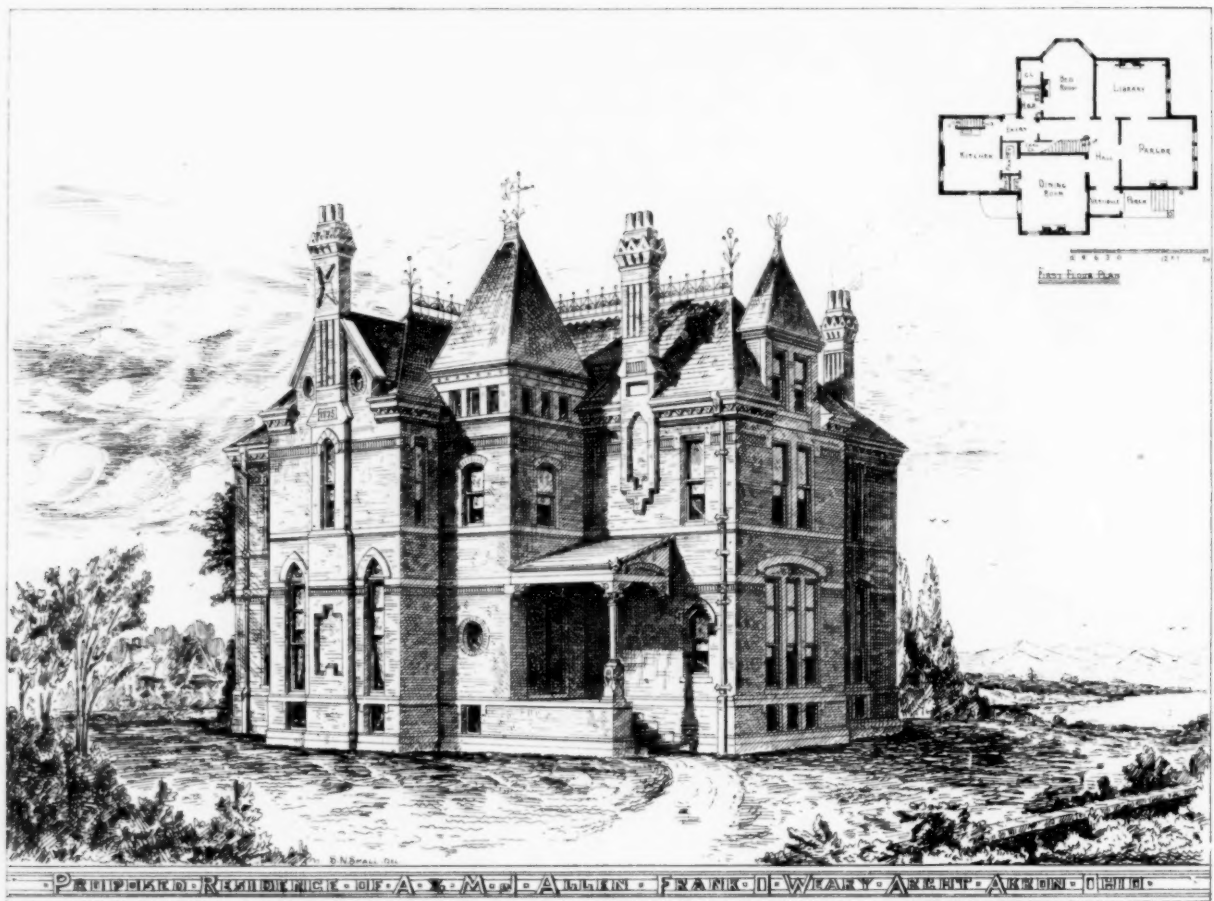
40. The perspective of a line or of a point is often called a perspective line or point, or when speaking of the picture, simply a line or point. But in this last case, to avoid confusion of mind, one must be careful to notice whether the real line or point and the infinitely distant vanishing point are spoken of, or their representations in the plane of the picture.

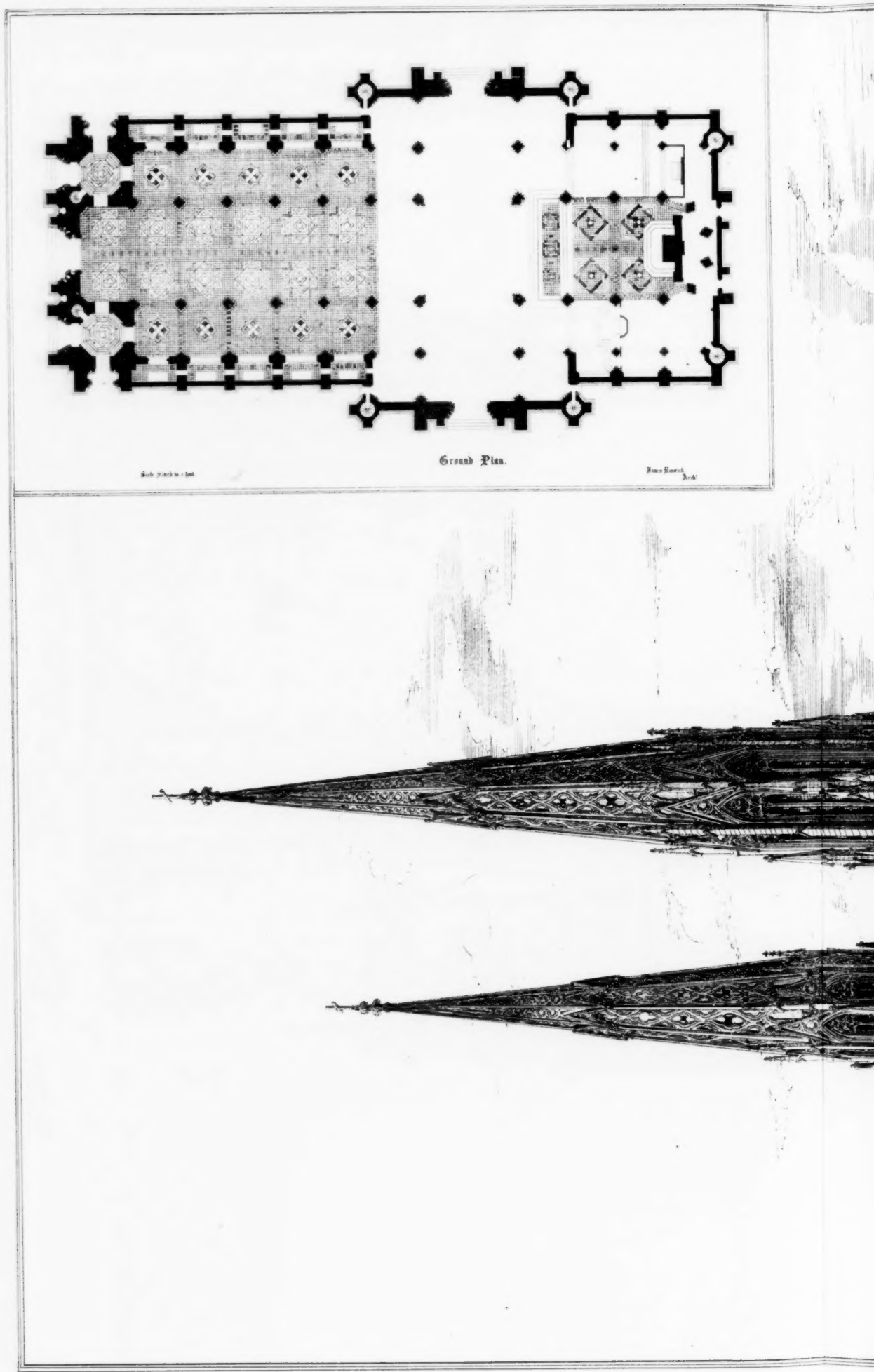
So in speaking of the trace or horizon of a system of planes, one must be careful to notice whether the infinitely distant line, or the line in the picture which covers, and to the eye coincides with it, is intended. It might be well for distinction's sake, to call the former, or distant imaginary line, the horizon of the system of planes; and the latter, or line where the plane passing through the eye cuts the picture, its trace.

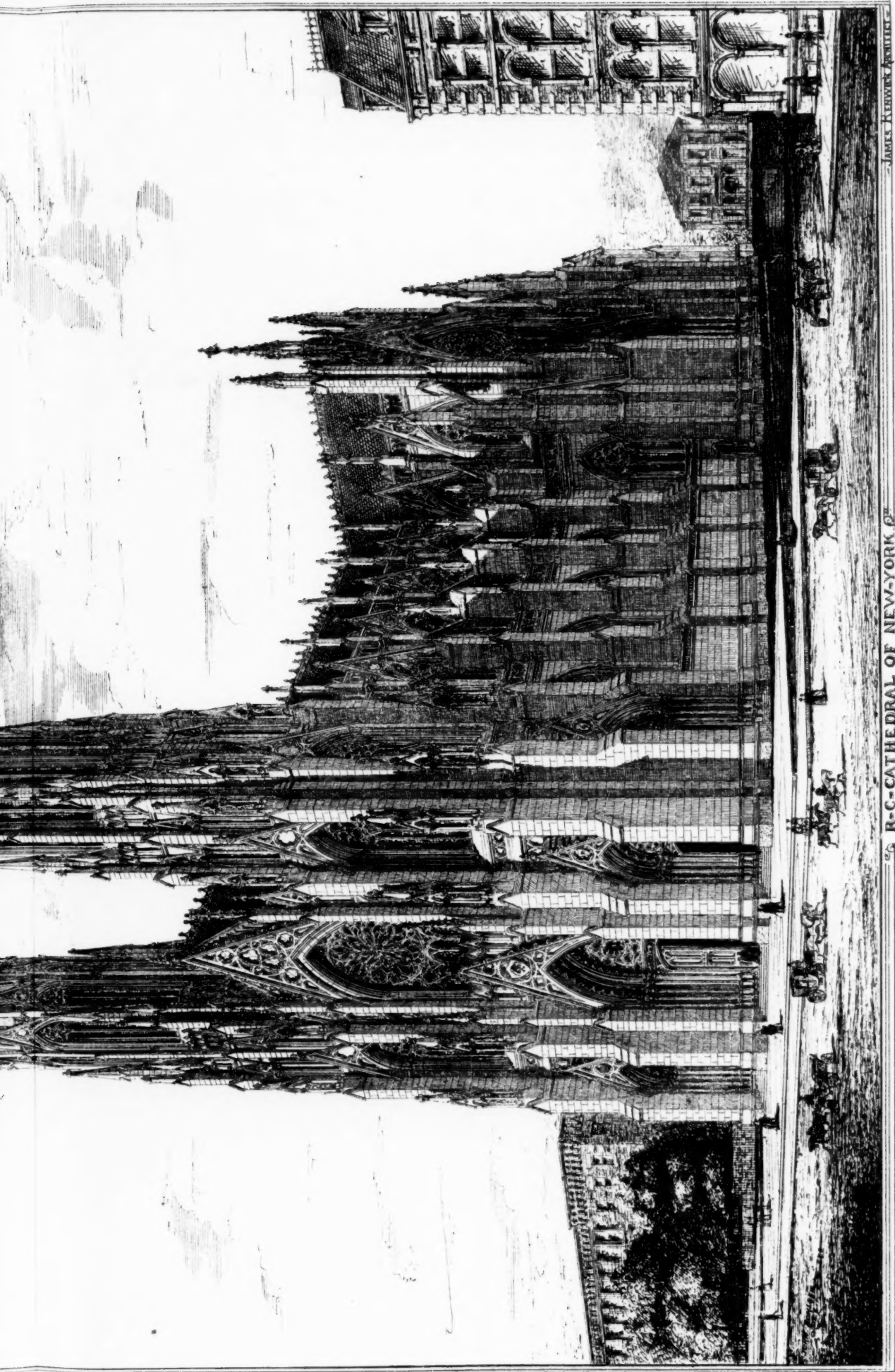
THE ILLUSTRATIONS.

ST. PATRICK'S ROMAN CATHOLIC CATHEDRAL, NEW YORK.

THE corner-stone of St. Patrick's Cathedral, New York, was laid Aug. 15, 1858, by Archbishop Hughes, in the presence of over one hundred thousand persons. It stands on the highest point of Fifth Avenue, below the Park, and occupies the whole block bounded by Fifth and Madison Avenues, Fiftieth and Fifty-first Streets. The site is rocky, the bed-rock extending in some parts up to the surface, and necessitated much blasting. The foundations are in blue gneiss in very large blocks laid in cement mortar;







R-C-CATHEDRAL OF NEW-YORK

THE R-C-CATHEDRAL OF NEW-YORK, N.Y. (SEE PAGE 100 OF THE ALBUM)

PLATE I.

Fig. 2.

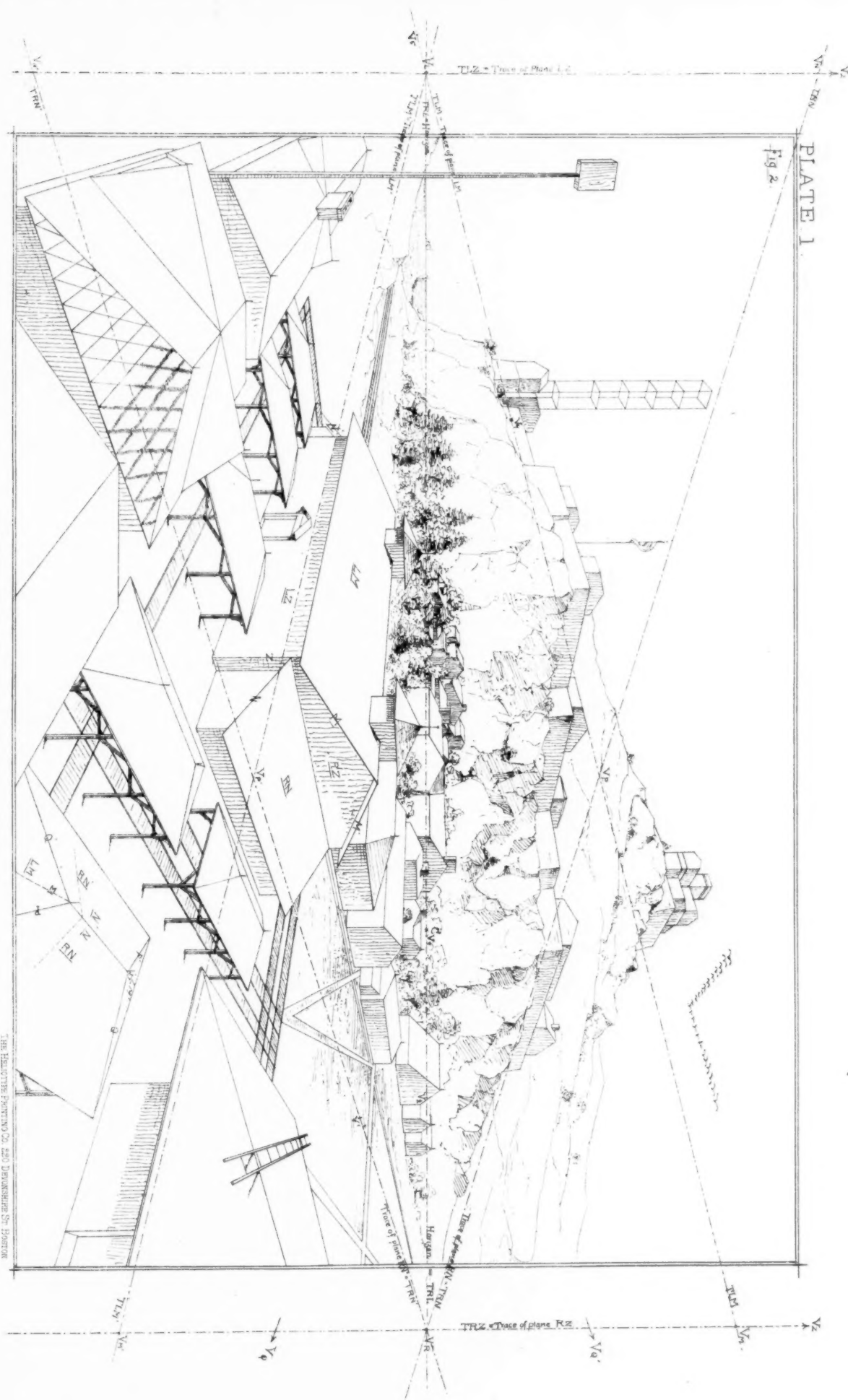


ILLUSTRATION OF PAPER ON PERSPECTIVE

THE HENRY P. PIERCE CO. 220 DEVEREUX ST. BOSTON

above the ground-line, the first base course within and without the building is in Dix Island granite; above this the whole exterior is in white marble from quarries at Pleasantville, Westchester County, N.Y., and at Lee, Mass. The walls are built with air-spaces and backed with selected hard brick; and up to this time not a single crack or settlement has been detected. The design is in the decorated or geometric style of Gothic architecture, of which the Cathedrals of Rheims, Amiens, and Cologne and the naves of York Minster, Westminster and Exeter, are examples. The ground-plan is in the form of the Latin cross, with nave, choir or sanctuary, and transepts, the nave and aisles being separated by thirty-two clustered columns in white marble. The general dimensions are: Interior length 306 feet; breadth of nave and choir 96 feet exclusive of the chapels, and 120 feet with these included; length of transept 140 feet, of which the central aisle is 48 feet wide and 108 feet high; width of side aisles 24 feet, and height 54 feet. The ceilings are in plaster, ribbed, with rich bosses of foliage at the intersections of the groins, and the capitals of the nave and clere-story columns are similarly built up in plaster; a triforium gallery is carried around the nave and along the transepts.

The principal front is on Fifth Avenue, and as will be seen is a central gable, with a tower and spire on each side. The gable is 156 feet in height, and the tower-spires each 330 feet. The grand doorway has its jambs richly decorated with columns with foliated capitals. The thickness of the wall here is 12 feet 6 inches, and the whole depth of the doorway is incrustated with marble. It is intended to place the statues of the twelve Apostles in rich tabernacles of white marble in the jambs of the portal. The width of the opening is 30 feet and its height 51 feet; a transom richly decorated with foliated carving crosses it at the spring of the arch, while a traceried window fills the tympanum. The gable over the main portal is filled with tracery, and has a shield bearing the diocesan arms in the central panel. The label over the gable is crocketed with a running design of intertwined grape-vine and morning-glory, with a very beautiful finial. The door is flanked on either side by buttresses which terminate in panelled pinnacles, and between these and the tower buttresses are niches for statues. The horizontal balustrade over the first story is of pierced tracery. Over this and across the face of the whole gable is a row of niches 7 feet 6 inches high, for statues. These niches are very richly decorated with capitals and gables, with tracery and finials, and are to be filled with figures of martyrs. Above this row is the great window, the head of which is filled by a magnificent rose-window 26 feet in diameter, filled with a design in stone tracery. Above this window the main gable is carried up to the roof-lines, and is veiled by a pierced screen of rich tracery terminated by a label, cornice, crocketed. The crockets are designed upon the passion-flower, flowing up and intertwining a cross bearing an emblem of the Sacred Heart at the intersection. The towers are 32 feet square at the base exclusive of the buttresses, and maintain the square form for a height of 136 feet, where they change to octagonal lanterns 54 feet high, and then come the spires 140 feet in height. The towers are divided into three stories: in the first are the doorways, corresponding in style with the central doorway, with crocketed gables, having tracery and shields containing the arms of the United States and of the State of New York, over which are balustrades of pierced tracery. In the second story are windows with tracery and moulded jambs corresponding with the rose-window. The third story will have four small windows on each side, and will be terminated by a label mould, cornice, and pierced battlement. The towers are flanked by massive buttresses which are decorated with tabernacles at each offset, and will be terminated by clustered pinnacles which will join the buttresses of the octagonal lanterns over the towers. The lanterns will have windows with tracery on each side, with gables and tracery over, the whole terminated by cornices and pierced battlements. The spires will be octagonal and will be divided into two stories. The first story will have rich mouldings at the angles, and the faces panelled with traceries. The second story will be moulded and panelled like the first, and end in a rich finial carrying the terminal crosses which will be of copper.

The first stories of the towers serve as vestibules from Fifth Avenue. Circular stone staircases are carried up in the buttresses of the towers to the organ-loft and upper stories of the tower, also to the triforium. A chime of bells will be placed in the third story of the towers, 110 feet above the level of the street. These bells are those which were rung at Machinery Hall at the Centennial Exhibition.

The side aisles of the nave are divided into five bays, each bay pierced by a window 13 feet 6 inches wide, and 27 feet high, which is divided into three parts by mullions and whose tympana are filled in with tracery. The transept fronts are divided into a central portion, 48 feet wide and 179 feet high to the top of the crosses of the gables and two side portions. In the centre of these façades are portals corresponding to those of the front. Over each door is a large window. These two windows are 28 feet wide by 58 feet high, and are divided into six bays. The heads are filled in with rich decorated tracery. A row of niches crosses each transept at the line of the eaves, and above this the gable is richly panelled.

The clere-story which rises 38 feet above the side aisle roofs, and

104 feet above the ground-line to the eaves, is divided into six bays in the nave, and two in either transept; three bays in the sanctuary on either side, and five in the apse, which is a half-decagon in plan. The bays are divided by buttresses which terminate in grand pinnacles rising 30 feet above the eaves; each bay is pierced by a window 14 feet 6 inches by 26 feet high in four bays by ribbed mullions. These windows are surmounted by panelled gables with traceries, and the walls between the gables and pinnacles are finished by pierced battlements. The roofs of the nave and side aisles will be slated, and the nave roof will have a cresting 5 feet 6 inches high, with a finial over the intersection of the nave and transepts 15 feet high; at the east end over the apse will be an ornamental cross 13 feet high.

It had been the intention of the architect, Mr. Renwick, to put in a ceiling of brick vaulting, with stone ribs; and to resist the thrust, flying buttresses had been provided for without. With the putting in of the plaster ceiling, these flying buttresses were omitted, and the pinnacles shown upon the buttress piers were dropped down to the level of the aisle cornice. In looking at the illustration this change must be allowed for. The cathedral has a real triforium, a spacious passage, extending along either side of the nave, and down the transepts as well. Here will be placed the coils of steam-pipe to assist in warming the church by creating an upper stratum of warm air, and preventing any downward draughts of cold air from the clere-story windows. Over the triforium arcades the side walls are built in an artificial stone, harmonizing very well in tint with the real marble-work. The windows throughout will be double glazed, and no small amount of care has been taken to make them the best stained glass windows in this country. The nave clere-story windows are in mosaic, by Morgan Brothers, as is also the great rose-window in the front gable. Some of the finished windows representing the imported work were shown at the Centennial Exhibition, and, from the windows now in place in the cathedral, give promise that when finished the effect will be very rich. The north transept window is by Nicholas Lorin of Chartres, and portrays the life of the Virgin. In the south transept window, the life of St. Patrick is shown in a series of mosaics by Henry Ely of Nantes. The flanking windows in the north transept are St. Augustine and St. Monica (Ely), and Paul at Athens (Lorin). In the south transept, the windows are the Sacred Heart (Ely), and St. Louis with the Crown of Thorns (Lorin). About the apse and choir, the clere-story windows are all by Lorin, and run as follows: South side, 1, Sacrifice of Abraham; 2, Aaron; 3, the New Law. Apsidal windows, 1, Disciples at Emmaus; 2, the Key to Peter; 3, the Resurrection; 4, the Communion; 5, Lazarus. North side, 1, Abel; 2, Noah; 3, Melchisedec. The five windows of the north aisle are, the Three Baptisms (Ely), St. Columba (Lorin), the Christian Brotherhood (Lorin), Martyrdom of St. Lawrence (Lorin), and St. Bernard preaching to the Crusaders (Lorin). North transept, St. Patrick (Lorin), St. Mark (Ely), St. Matthew (Ely). North side of sanctuary, St. Anne (Lorin), Adoration of the Magi (Lorin), and one vacancy. The five windows of the south aisle are, starting from the front, St. Vincent de Paul (Ely), St. Elizabeth, St. Andrew, and St. Catherine (Lorin), The Annunciation (Lorin), St. Henry (Lorin), Proclamation of the Immaculate Conception (Lorin). South transept, St. Charles Borromeo (Ely), St. Luke (Ely), St. John (Ely). South side of sanctuary, St. Agnes, St. James, and St. Thomas (Ely), and two vacancies. All these windows are the gifts of either individuals, corporations, or dioceses.

The high altar will be placed on the chord line of the apse, about twelve feet from the easterly end of the building. The table of the altar is of white marble, and is divided into niches and panels on the face, the niches filled with figures, and the panels with bas-reliefs of the Saviour's life. The tabernacle over the altar will be of marble, decorated with Roman mosaics and precious stones, and will have a door of gilt bronze. The base of the reredos behind the altar will be of white marble nine feet high, with moulded bases of colored marble, and the whole front is laid with a diaper-work of alabaster. The screen above has a central tower with colored columns, tabernacles, statues, and rich foliage, above which rises a pierced spire of open tracery, surmounted by a gilt cross. The two flanks have niches with colored columns and gables, with statues of St. Peter and St. Paul in them; over these the side towers are also crowned with pierced spires of open tracery work. The spaces between the central and two corner towers are divided into six niches, containing angel figures, bearing shields with emblems of the Saviour's passion, and terminating in pierced gables. The total height of the reredos is fifty feet, and the work upon it is now completed at Rome, Italy, and at St. Briene in France. Its entire cost will be \$35,000. The bishop's throne is also of marble, with a tabernacle of the same material, and is a most careful piece of carving.

The general effect on entering the nave from the main entrance is very striking, the height to the ceiling being particularly noticeable. The double line of windows in the apse looks rather broken. The floor will be laid in tessellated work; and though it was at first intended to avoid the cumbering of the interior with pews, it has lately been decided to fit up such sittings in ash. The space between the main buttresses on the outside has been used

for confessional alcoves, opening into the aisles beneath each aisle-window, five on each side the church. How many millions will be spent on the structure before its completion, it is almost impossible to say; nor would it be at all safe to fix the date of completion. An arch-episcopal residence and a number of other buildings are to be built in connection with it; but on these no work has yet been done. Since 1853, when the first sketches for the structure were made, the work has gone on faster or slower, as the funds in hand permitted.

HOUSE FOR CHARLES H. BRADSHAW, ESQ., SPRING HILL, MASS.
MR. W. G. PRESTON, ARCHITECT.

PROPOSED RESIDENCE OF MESSRS. A. AND M. J. ALLEN, AKRON, O.
MR. F. O. WEARY, ARCHITECT.

PERSPECTIVE STUDY.—NO. I.

For explanation of this cut, see the preceding article, "Papers on Perspective."

THE POSSIBILITY OF A NEW STYLE IN ARCHITECTURE.

[A paper by Mr. A. F. Oakley, A. I. A., read at the Eleventh Annual Convention of the American Institute of Architects.]

So many eminent authors have written on this subject, that it would seem little remains to be said; and yet I think that a careful comparison of the views of the best authors naturally suggests a conclusion that I find, whether intentionally or not, omitted, or rather not developed, in any of them.

Mr. Fergusson says that a new style is to be found in a development of the Italian Renaissance, that no progress is possible in Gothic or Greek, and further, that archaeology is not architecture; while Mr. Garbett, condemning the servile copyist, as strongly points to the possibility of a new style in the one constructive principle that has never yet controlled a style, i. e. "the Tensile." He believes that the *Depressile* and the *Compressile* have been exhausted, and that a system embodying "the Tensile," together with a generalized imitation of nature, is the goal we seek. Guillaume agrees with Fergusson in the main, but looks for no change till architects are guided by science more than tradition.

Much has been written by other distinguished professors, but in these three we have the sense of the discussion in its latest stage. I have looked in vain in the works of these authors, and in those of many others, for a statement or suggestion of a theory whose apparently unconscious corroboration has been, in Mr. Fergusson's case at least, the work of his life. I cannot read his history without being struck with the completeness of the evolution its pages record: there is no missing link in this work of nature; for I must believe architecture, as an expression of the longings and aspirations of physical and intellectual man, the work of nature as actually as any thing Mr. Huxley can enlighten us upon.

Until the fifteenth century, neither the whims of this or that architect or client, nor the accumulated traditional pedantry of either or both, could avail against the natural growth of forms born of bodily needs or religious superstition. The changes that were made from time to time, owing to climatical influences, or as the result of political or religious revolution, were as naturally consequent as the changes in the structure and exuberance of a vegetable when transplanted, or by treatment brought to a high state of cultivation. The cultivation must be in the right direction, the inherent and essential qualities of the plant must be cultivated, or the species dies out, and we have nothing left but the chromo in the book to record how beautiful a flower it once bore.

Why do we need now what the world never desired before? Why are we divided to-day between the revivalists and the novelty-hunters? and this last occupation the lowest incentive to architectural—I might say all—effort. On the one hand, are we to accept the conclusions of the fifteenth century as final in architecture more than in astronomy? and on the other, is there not an inherent fitness in things in form, consistency, and expression, that absolves us from any responsibility as to their age or novelty?

The answers to these questions are not in favor of tin gargoyles, or in fact constructive lies of any kind. As Sir Joshua Reynolds says: "The natural appetite of the human mind is for truth, whether that truth results from the real agreement or equality of original ideas among themselves, or of the representation of any object with the thing represented, or from the correspondence of the several parts of any arrangement with each other. It is the very same taste which relishes a demonstration in geometry, that is pleased with the resemblance of a picture to an original, and touched with the harmony of music." And again, what he says of other arts could well include architecture: "On the whole, it seems to me that there is but one presiding principle which regulates and gives stability to any art. The works, whether of poets, painters, moralists, or historians, which are built upon general nature, live forever; while those which depend for existence on particular customs and habits, a partial view of nature, or the fluctuation of fashion, can only be coeval with that which first raised them from obscurity."

In what I have quoted, has not Sir Joshua said enough to cover the whole field of art? and yet we continue to this day to waste our clients' money in tessellated towers and the like conceits, as if we expected to be undermined by our neighbors, and to be consistent with which scenic representations, we should go masquerading in shapes with chain-armor under our doublets.

To offset these archaeological reversioners we have the provincial builder with his jig-saw and his balloon frame; and we find ourselves admiring the progress of the engineer as the only worker in the field who has thought for himself, accepted the limitations of his problems, and met them with ingenuity: only his lack of artistic training enables us to find a living in our practice, unless we are content only to be called upon to minister to the unnecessary and luxurious evidences of civilizations, and to take no part in the development that will go on, whether we move with it or not.

It seems to me that Mr. Garbett is nearer the truth with his development of the Tensile system, than Mr. Fergusson with his Italian Renaissance; for this principle already shows its influence strongly in all our utilitarian work,—i. e., work in which the requirements must be met without regard to expression; and does not the expression follow inevitably?

Why should we discard the "Depressile" and "Compressile," simply because there is little room for invention in their application? Ought we not rather be glad that the earth's surface abounds with the truest examples to guide us in our work? It is no argument against a composite system of construction, that we have no precedents: we are in no sense bound to adhere to the peculiarities of any age.

The question must always be one of the best means to an end; and if the end is reached the means excuse themselves, especially as they are so bound up in it as to make it impossible to achieve a satisfactory result with insufficient means. Why have we not the courage to think for ourselves, and, when we are asked in what style have we expressed our thoughts, to answer that we do not think it necessary to classify and ticket every thing, to name in one word an ever-varying system that eludes such an attempt?

The Eastlake style, forsooth, is even now a recognized term; and yet it would puzzle the quill-drivers, or any one else, to say in what it consists. I like the old English definition of architecture: "the art of well building;" and what is not well and truly built does not deserve the name. This, it seems to me, is all with which we have to concern ourselves, to study each problem by itself; and, having met the requirements in plan, as we build up upon it, who shall hold us responsible for our style, if every purpose that was intended is served by ingenious, constructive economy?

I do not wish to inveigh against suitable and necessary decoration,—necessary as regards the phonetic expression of a design; but I can see no reason for reviving the mediæval, grotesque, or shutting fair daylight out of a building where light is a desideratum, because we have precedents for these dispositions. And there's the rub: Have we precedents for any such thing? No more than we have precedents for stone spires made of wood. If there is one fact connected with the examples we blindly imitated, it is that they were built for purposes which they fulfilled; and there is ample internal evidence that their designers would have treated our problems in an entirely different way.

Because our ancestors were fortunate enough to unearth the classic poets, and unfortunate enough to consider it necessary to revert in every thing to the classic type, we have been obliged to go all over that old ground; and it is not our fault if we have not repeated every vagary of every decline until we find ourselves where we started. Now that it has taken all these centuries to find the road we have strayed from, are we going to wander round the monuments of past ages, rhapsodizing this or that detail that has lost its significance in our day, ignoring the great principles that could lead us on, and mumbling about a new style? No man or whole professional brotherhood can saddle the world with what it does not need to satisfy its utilitarian ends or its religious thought; and it is worse than idle to grumble at the sway of the mighty dollar, to give as an excuse for constructive lies, the reason that the money was not forthcoming to pay for a real stone vault or flying-buttress. If the stone vault had been necessary, the money would have been forthcoming. The mighty dollar is the power of our age, and a power that places every process and every material within our reach if we would only avail ourselves of our opportunities.

The underlying principles that enabled the mediæval architects to command our admiration and respect are as true to-day as they were then, and it is only by their application to our needs that we can achieve as grand results as ever expressed by the political or religious civilization of any people; while we have the incentive of making our achievements forever stepping-stones for future generations in search—not of a new style, but of truth.

CAST-IRON GLAZED TILES.—The *Deutsche Allgemeine Zeitung* says, At the iron-works of Groeditz, near Riesa, Germany, glazed cast-iron tiles for roofing are now made. They are not heavier than ordinary tiles, and are very strong. The railroad depots of Loebau and of Reichenbach, and many private houses of Hamburg and Dresden, are roofed with them.

A MUCH-NEEDED TECHNICAL JOURNAL.

EVERY one who is interested in sanitary matters, and there are few who are not, will rejoice that a prospect is now open to them of being able to learn something of the experience of others in matters of plumbing and drainage, which shall be applicable to our own climate and circumstances, without undertaking the costly private experiments by which most of us have learned the difficulties of adapting to this region the sanitary systems and apparatus so enticingly described in the English books, which have been hitherto almost our only text-books.

To take a single example: how many American architects have read with joy the descriptions of the Jennings water-closet, thinking that at last the specific for their troubles in that department was found, and hastened to include it in their next plumbing specification: how many have stood by in dismay when the work was done, to see the water of its own accord alternately fill the bowl and siphon out, two gallons at a time, until the tank was exhausted? What consolation to be told by the plumber that they "always did so;" and when we humbly inquired of his superior experience what he considered the best thing of the kind, to hear that nothing had yet been invented so good as the familiar old abomination?

The plumber was wrong, as we should have learned on a second trial; but the most enthusiastic architect gets shy of experimenting either with his own or other people's money.

Now, however, in the pages of a neat sixteen-page monthly journal¹ we are to have an opportunity of relating our own mishaps, and learning wisdom from those of others, as well as of receiving instruction, not only from the best authorities in theoretical sanitary science, but from practical plumbers and gas-fitters, in branches of house construction which are at once so difficult and so important to understand as plumbing and pipe-fitting.

The first numbers are so good that it makes us anxious, thinking that the succeeding ones cannot possibly be equal to the first. We have the beginning of a series of scientific papers by Col. George E. Waring, jun.: a short article on bath-boilers, which contains in a column more information on that mysterious subject than can be gleaned from hundreds of pages of ordinary books on sanitary science; and a sensible communication on that hardly less mysterious subject, gas-fitting; while a few but important lines on damaged waste-pipes throw a flood of light on the murderous work which has been going on in some of our Boston houses. It has a refreshingly practical sound to hear, after learning that the cracked and leaky waste-pipes rejected at the foundries have been extensively sold and put up in houses, that "if any of our Boston friends will take trouble to look through some of the speculation houses built in the South End and out Roxbury way, they may find a mile or so of this pipe," cemented over, and with traps, etc., all in good style for contract work. The editor remarks that most of the builders and plumbers concerned in such work have failed, but "very few," he fears, "have got into prison." He thinks the plumbers may inquire why he betrays their professional weaknesses, and replies that he wishes to show the public why it costs more to do honest work than bad.

We can give him a better excuse still, — the interest of humanity; and will add from our own knowledge, by way of commentary, that in one of these houses *six persons* died of zymotic disease, within one year.

If such frankness would only last!

The managers promise not to sell their opinions or their columns; but in these days of artful advertising the editor of such a paper must be a clear-headed and courageous man not to be entrapped or frightened away from his purpose, and it seems to us that his best friends ought to be the architects. They alone can speak with perfect impartiality of the sanitary experiments with which they have been concerned; they have the best and most varied opportunities for observing; and they are more interested than any others in learning the whole truth about the matters on which he proposes to furnish them information. Let him keep steadily in view his purpose of careful, accurate statement and fearless warning; and let us help him by such encouragement and criticism as we may, availing ourselves of his courtesy to share freely our own experience with others, and remembering that innocent lives depend upon the faithfulness with which we give and receive instruction in these matters, intrusted as they are by most clients, absolutely to our care.

MR. GOLDWIN SMITH ON AMERICAN ARCHITECTURE.

MR. GOLDWIN SMITH lately presented the prizes to the students of the Oxford School of Science and Art. He delivered an address, in the course of which he said: —

"America is supposed to be given over to ugliness. There are a good many ugly things there; and the ugliest are the most pretentious. As it is in society, so it is in architecture: America is best when she is content to be herself. An American city, with its spacious streets, all planted with avenues of trees, its blocks of buildings, far from unimpeachable probably in detail, yet stately

in the mass, its wide-spreading suburbs, where each artisan has his neat-looking house in his own plat of ground, with plenty of air and light and foliage, its countless church-towers and spires, not architecturally good but varying the outline, might not please a painter's eye; but it fills your mind with a sense of well-rewarded industry, comfort, and even opulence, shared by the toiling many, — a prosperous, law-loving, cheerful, and pious life. I cannot help fancying that Turner, whose genius got to the soul of every thing, would have made something even of an American city. The cities of the Middle Ages were picturesquely huddled within walls, for protection from the violence of the feudal era: the cities of the New World spread wide in the security of an age of law and a continent of peace. At Cleveland in Ohio there is a great street, called Euclid Avenue, lined with villas, each standing in its own grounds, and separated from each other and from the street only by a light iron fencing, instead of the high wall with which the true Briton shuts out his detested kind. The villas are not vast, or suggestive of overgrown plutocracy: they are suggestive of moderate wealth, pleasant summers, cheerful winters, and domestic happiness. I hardly think you would consider Euclid Avenue revolting. I say it with the diffidence of conscious ignorance; but I should not be much afraid to show you one or two buildings that our Professor of Architecture at Cornell University, Mr. Babcock, has put up for us over Cayuga Lake, on a site which you would certainly admit to be magnificent. If I could have ventured on any recommendation concerning art, I should have pleaded before the Commission for a professorship of architecture here. It might endow us with some forms of beauty; it might at all events endow us with rules for building a room in which you can be heard, one in which you can breathe, and a chimney which would not smoke. I said that in America the most pretentious buildings were the worst. Another source of failure in buildings, in dress, and not in these alone, is servile imitation of Europe. In Northern America the summer is tropical, the winter is arctic. A house ought to be regular and compact in shape, so as to be easily warmed from the centre, with a roof of simple construction, high-pitched to prevent the snow from lodging, and large eaves to throw it off — this for the arctic winter; for the tropical summer you want ample verandas, which, in fact, are the summer sitting-rooms. An American house built in this way is capable at least of the beauty which belongs to fitness. But as you see Parisian dresses under an alien sky, so you see Italian villas with excrescences which no stove can warm, and Tudor mansions with gables which hold all the snow. It is needless to say what is the result when the New World undertakes to reproduce not only the architecture of the Old World, but that of classical Greece and Rome, or that of the Middle Ages. Jefferson, who was a classical republican, taught a number of his fellow-citizens to build their homes like Doric temples; and you may imagine what a Doric temple freely adapted to domestic purposes must be." — *The Architect*.

CIRCULAR TO OFFICERS OF THE TREASURY DEPARTMENT.

1877, Department No. 146,
Secretary's Office.

TREASURY DEPARTMENT,
WASHINGTON, D.C., Dec. 31, 1877.

THE following is based upon decision of the Supreme Court in the case of *Hawkins vs. United States* (No. 700 October term, 1877); and publication is made for the information and guidance of officers in charge of public works, etc., under control of this Department, and all parties having, or seeking to have, dealings with the Department through such officers.

I. When a service of a better or a higher grade than that required by contract is rendered upon the demand of a public agent, such demand being made upon an interpretation of the contract, the contractor can have no claim against the United States. Nor will notice given at the time to an unauthorized agent, of an intention to present a claim for additional allowance on account of such better service, change the rule.

II. When a contractor holds himself not bound to a performance which is sought to be required of him, he will immediately state his objections in writing to the agent in charge, who will forward it at once to the Department, with his report thereon, that the question may be decided by the proper authority.

III. Claims for compensation on account of materials or services will not be considered unless they are founded in some agreement; and, when the agreement is claimed to have been entered into by an agent for or on behalf of the United States, it must be shown that he had authority to make such agreement.

IV. Verbal agreements between the parties to a written contract, made before or at the time of execution of the contract, are in general inadmissible to vary its terms or affect its construction; the rule being, that all such verbal agreements are to be considered as merged in the written instrument. Written contracts must therefore be held to express the intention of the parties at the time of contracting; and their plain and reasonable construction cannot be diminished or enlarged by verbal testimony in explanation of such intention.

Neither can an implied promise exist with reference to any subject matter that is embraced in an express agreement.

JOHN SHERMAN, Secretary.

¹ *The Plumber and Sanitary Engineer*, published monthly at \$1.50 per year by the American Plumber Publishing Company, No. 237 Pearl Street, New York.

NOTES AND CLIPPINGS.

THE PROVIDENCE BUILDING LAW.—Mayor Doyle, in his Thirtieth Inaugural Address, says, "A bill was drawn with great care by the Rhode Island Chapter of the American Institute of Architects, which received a thorough examination by a committee of the city council, and a long and careful revision by the most experienced master-builders of this city, and, after being amended in many particulars, was approved by the city council in April last, and is now pending before the General Assembly. The safety of life and property demands the enactment of this law, or the experience of Portland, Chicago, Boston, and other cities, will be repeated here. The rapidity with which the brick and iron buildings were destroyed at the above fires gave the citizens an opportunity to comprehend how an extensive conflagration can occur in a business-district where the buildings are of substantial character. When such structures are well on fire, their destruction is certain; for even the most powerful streams from steamers are only of use in protecting the adjacent buildings; and when these are of great height, and only separated from the one on fire by a narrow street, the firemen cannot stay the progress of the flames, on account of the great heat, and the danger to which they are exposed by the falling walls. It is to be hoped that the approaching session of the General Assembly will not close without furnishing the city with authority to say in what manner buildings shall be constructed within the limits of this municipality."

EXPLOSION IN A SULPHUR-FACTORY.—An explosion occurred at half-past six o'clock, Jan. 11, in the sulphur-factory of D. H. Gray, on Ninth Street, Brooklyn. The force of the explosion blew out the side of the building, causing a loss of about \$300. It was reported that the boiler had exploded; but there is no boiler in the place; hence the explosion must have been caused by the confined vapor of some chemical used in the factory.

MOVING A BRICK HOUSE.—In many of our interior towns and cities it is a common occurrence to move houses from one place to another; but in Philadelphia such a feat is so rarely attempted, that the one now in progress is worthy of mention. At the corner of Hart Lane and Frankford Avenue there is now being removed, by means of screw-jacks, a distance of 90 feet, —30 feet one way and 60 another, — a three-story brick house, 23 feet front and 74 feet deep, which weighs some five hundred tons. The property is owned by Mr. John Bly, who placed the job in the hands of Mr. James P. Davis. The placing this heavy weight on the timbers on which it slides was hazardous; but it was successfully done, not even a crack making its appearance in the whole building. Ten jacks are used to propel the structure. Three sets of heavy timbers are used; for, as it is moved first easterly and then westerly, all the timbers have to be braced, so that there may be no slipping from their positions. The building is now almost in its new position, and about one week has been occupied in moving it to where it now rests.

ACCIDENT IN A CLOCK-TOWER.—A clock-weight in the tower of the Congregational Church in East Weymouth, Mass., weighing 450 pounds, fell from its position recently, and passing down through the gallery-ceiling, a distance of 20 feet, lodged on the floor in the rear of the church-organ. Fortunately its passage was obstructed by a heavy cable which had been placed under it as a precaution, else it would have caused greater damage.

THE MORTON MEMORIAL.—Mr. Larkin G. Meade's design for the Indiana memorial to ex-Senator Morton is a marble monument crowned by a colossal statue of Liberty, with a profile of Gov. Morton on the shaft, and a panel near the base, representing him sending troops to the war.

STREET-SWEEPING.—A report lately presented to the Municipal Reform Association of New York contained the following statements:—

"In London, with 1,410½ miles of pavement, every principal street is swept once in twenty-four hours, secondary streets three times a week, all others at least twice. In Liverpool, with 255 miles of pavement, like regulations are enforced. In Manchester, with 500 miles of pavement, the principal streets, roads, and thoroughfares, together with the markets, are cleansed every day, secondary streets thrice a week, all others twice. In Boston, with 70 miles of pavement and 200 miles of MacAdam, the principal streets are swept every morning before eight o'clock, all others twice a week, the MacAdam once a week, and all gutters flushed and cleansed weekly. In Philadelphia, with 600 miles of pavement, the principal thoroughfares are cleaned six times a week, secondary streets three times a week, and the whole city is thoroughly cleaned once a week. In New York, with 250 miles of pavement, the authorities claim to sweep her principal streets three times a week, and her other streets once a week. If the claim were well founded, she takes rank below every other important city above mentioned. How is it, then, when every citizen knows that the claim is baseless, and without shadow of right?"

PLUMBERS AS WITNESSES AND JURORS.—Some eccentric person is circulating in Washington a petition to Congress to have plumbers excluded from the witness-stand and jury-box in the District of Columbia.

AN INGENIOUS WATER-FAUCET.—A Californian is said to have invented an ingenious water-faucet, through which, if water is run, it comes out as cold as ice-water. Boiling water placed in any receptacle, and allowed to run through, will be found cool and fit to drink. The faucet contains numerous small tubes enclosed in large ones; and between the outside of one and the inside of the other certain chemicals are packed, which produce the desired effect. The inventor declines to give further particulars.

THE DURABILITY OF ZINC.—It is stated that a portion of the cloisters of Canterbury Cathedral is roofed with zinc which after thirty-three years exposure to the weather has been pronounced by the architect to be in good condition.

CLEOPATRA'S NEEDLE.—The litigation as to salvage for towing the Egyptian monolith into Ferrol, the Spanish port, has been so far settled as to allow another attempt to bring it to England to be made. Mr. Dixon writes to the London bureau of the New York *Herald*, "We purpose attempting to tow the Cleopatra to England about the 10th inst., as we shall then have a good moon. Our tug is overhauled, and, as it is projected, will leave about the 8th. Your weather prophecies from the United States have been so correct, that I shall venture to ask you about that time to telegraph immediately to my captain at Ferrol any news of probable weather that you may receive from the *Herald*. And, if you mention the matter pointedly to your Weather Bureau in New York, it might excite their interest in this undertaking, and induce them to give special attention to the weather in the Bay of Biscay."

M. GRAMME.—M. Gramme, inventor of the machine for continuous magneto-electric currents, has received the Cross of the Legion of Honor. He was formerly, it is said, a working cabinet-maker.

HOW THE DANUBE FEEDS THE AACH.—Some time ago a dispute arose between the German Government and certain manufacturers on the River Aach, which involved the determining the source of the river which has its immediate source in a spring, one of the largest in Europe, as it discharges about 1,350 gallons a second. The bed of the Danube is calcareous, and its inclination is the same as that of the ground from the Danube to the source of the Aach, which is at a level eight hundred feet below. For a number of years it had been noticed that at a certain place the Danube lost a portion of its waters through holes and crevices in its bed; this loss was so great that in times of drought it caused great inconvenience to manufacturers on the Danube, who attempted to prevent it by filling up these holes. This caused a great outcry from the manufacturers on the Aach, who maintained that the Aach was fed by the Danube, and that filling up the holes was an interference with their just and natural privileges. Hence investigations and experiments. First, twenty tons of salt were put into a hole in the bed of the Danube, and the water at the source of the Aach was analyzed for several days, and did give evidence of containing salt. To obtain more certain proof, advantage was taken of the wonderful coloring power of fluoresceine, which is the first of a series of superb coloring substances, which vary as there is introduced into its composition bromine, iodine, or chlorine. Its power may be judged from the fact that one part of fluoresceine to twenty million parts of water can be detected. In this experiment fifteen gallons of a solution of fluoresceine were thrown into the Danube at the suspected point, on Oct. 9, at five o'clock. On Oct. 12, sixty hours after the solution had been thrown into the Danube, the watchers at the source of the Aach noticed the first discoloration of the water: this discoloration increased until the evening, and did not wholly disappear for more than twenty-four hours. It is said that when the discoloration was most marked, the water gushing from the spring presented a truly magnificent appearance, varying in color from the most intense green through light green to a brilliant yellow. This test established the fact that the mill-owners upon the Aach were in the right.

HARD-WOOD FLOORS.—The renovation of parquetry, or floors of inlaid wood of any kind, can be well effected by the following simple means: The floor is first washed, by means of a mop, with a caustic soda solution, which has been prepared by boiling one part each of slaked lime and dry carbonate of soda (soda ash), with fifteen parts of water, for forty-five minutes. After it has stood a short time, the dirt and old wax should be thoroughly removed by scrubbing with sand and water and a stiff brush. The floor is again washed with sulphuric acid, diluted with eight parts of water. This restores its original color to the wood by penetrating its pores, and combining with the particles of dust and wax not reached by the soda solution. After being perfectly dried, the restored surface is waxed and polished anew.

ADVENTURES OF AN INSCRIPTION.—There was an old house in Brighton which for many years had a Latin inscription in raised Roman letters, which, in consequence of the action of the weather, underwent a variety of vicissitudes. First the inscription seems to have been, *Excitat acta robur* (Strength awakes action). This became changed to *Excitas actis robur* (Thou awakenest strength by deeds). Again this became changed to *Excitat actis robur* (He rouses to strength by acts). Again came another change, *Excitas acta robur*. (Thou awakest to deeds of action, O strength!) But its last appearance defied all efforts at translation, *Excitas ecta ropat*; and as it only excited ridicule, it was entirely obliterated. — *Leisure Hour*.

THE GILDING OF THE PRESENT DAY.—The "gold" gilding so profusely used for ornamental purposes at the present day is said to be silver-leaf, turned yellow and golden by the application of a shellac. The discovery of the process is accredited to a German tinsmith, who, while soldering a saucepan, accidentally dropped upon the metal some of the resin he had been using. This changed the bright tin to a sort of dead yellow, resembling gold. The development of the observation which this humble workman made years ago is the gilding process of to-day.

TO MAKE MODELLING-CLAY.—Knead dry clay with glycerine instead of water, and a mass is obtained which continues moist and plastic for a length of time. This removes one of the greatest inconveniences that is experienced by the modeller.