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CONTENTS.

No one needs to be told our aversion to ordinary commercial competitions, so called, those exhibitions of ignorant greed and professional unscrupulousness amusing themselves at the expense of youthful confidence and hope; but our disgust for these is hardly deeper than our conviction of the value to students of true competition, in which equals contend with equals for the suffrages of judges whose decision all respect. Nothing does so much to advance a designer, no matter how proficient he may be, as a succession of such trials of skill. Without these tests, no one can ever be really sure either of his own strength or of his faults, and all true artists seek them by instinct. It is the weak ones only who rest content with the undiscriminating applause of the tea-table, and resent searching criticism. Those who love and take pride in their art are thankful for having their false notions and vicious habits clearly pointed out to them, in order that they may be reformed, while success in winning the applause of good judges not only encourages those who reach it, but does much more, by furnishing them with a firm step of acknowledged attainment, from which they can advance with the confidence which is, itself, in our art, one of the greatest requisites for renewed success. Believing, as we do, in the great value of such trials of skill, and regarding the lack of means by which architects, in particular, can exercise and discipline themselves in pure design, as one of the most serious hindrances to the advancement of the art among us, we have before taken occasion to institute modest competitions on our own account, offering such prizes as we were able, and we can truly say that we never look back at the collection of designs which were thus called out without great pleasure in their remarkable excellence, and an earnest desire to continue our efforts in a cause which we have so much at heart. Circumstances have hitherto opposed, but we have kept the matter steadily in view, and are glad to be able to announce at last the terms of a new competition, purely artistic, which has been arranged with much care, not only to save competitors as far as possible the drudgery, useless for such a purpose, of exact determination of dimensions, treatment of materials, and so on, and to enable them to devote their efforts wholly to the design, representing the subject by a perspective sketch, just as it would be first conceived, and afterwards carrying out the conception into details; but also to secure considerate judgment, by a jury of the highest authority, with careful criticism of the different designs, protected by their *noms de plume*. The prizes which we are enabled to offer, though not magnificent, will much more than repay any one, however valuable his time, for the small amount of actual work needed, but we can assure competitors that success in obtaining them will imply a skill and talent which a man may well be glad to possess. To architects of trained capacity, especially, we will say that they may hope to meet their equals on the field; that if defeated, they will be defeated in good company, and if successful, they will triumph over worthy rivals. Their co-operation, therefore, we particularly invite. They will find pleasure and profit in such artistic exercises, and we shall be glad of all the *éclat* which a numerous and brilliant array of competitors will add to our efforts and to theirs.

AN important report has recently been made to the New York Fire Department, by one of the district inspectors, upon the safety of the theatres in the city for their occupants in case of fire. As might be supposed, the report is in the majority of cases far from favorable. The most common defect which he finds is an insufficient provision for exit from the upper portions of the house. As he remarks, upper galleries should always have separate passage-ways to the ground; the merging of their stairways at some point half-way down into the passages from other parts of the building is certain, in case of fire, to cause a block by the meeting of two or more crowds at that point, with increased confusion, frantic struggling and loss of life. We do not need to specify the theatres named in the report, but it is satisfactory to learn that in the inspector's opinion, any, even of the worst ones, could be made reasonably safe at a cost of five hundred dollars or less, while one or two, notably the Union Square and Park theatres, are in good condition, and well cared for, the Union Square even having its scenery painted over with an incombustible preparation. The Broadway Theatre seems to be one of the worst; the building is old, the basement filled with old scenery and lumber, the floors cracked, so as to allow a free draught of air, and insufficient exits and appliances for extinguishing fires are provided. The Windsor is nearly as bad, and the Theâtre Comique little better. It ought not to be long before a thorough reform in these matters is enforced upon managers. One theatre, seating thirty-five hundred persons, is in a particularly unsafe condition. If five hundred dollars, or about one-tenth of a cent for each of its next winter's patrons, would make them secure against a dreadful death, there should be no hesitation in demanding that it should be expended without delay.

AN event of considerable importance to the architectural world is, or should be, the publication of a book by Professor Charles Eliot Norton, containing historical studies of the three great mediæval churches of Italy, — the cathedrals of Florence, Venice, and Siena. Of Professor Norton's preëminent qualifications for treating upon such subjects, we need not speak, and all architects will appreciate the interest of such essays, but, absorbed as most of them are in the petty details of every-day business, many need to be reminded of their professional value. We understand, perhaps better than any others, the surpassing excellence of the arts characteristic of a few great periods; we can appreciate their perfections, and realize the hopelessness of our own attempts to rival or imitate them, but we do not sufficiently study the national or religious impulses, the superstitions, convictions, or patriotic passions, in the midst of which they flourished, and of which they were in a great degree the expression. This is the more to be regretted, not only because such study, by fixing in our minds the logical connection between given historical conditions and certain artistic forms, would do much to relieve our architecture of the cold copyism, or the worse than meaningless anachronism, with which it is now justly reproached, but because the habit of properly connecting forms with the sentiments of which we find them to have been the expression will be of inestimable value in the formation of that future art to which we all look forward with hope, an art which shall be the representative in generations to come of the activity, freedom and humanity of our own age, just as the popular pride and devotion of the Greek and Italian communes are made visible to us in the great buildings of Attica and the republics beyond the Alps.

THE *Building News* just received contains a reproduction of the prize plans for the Glasgow Municipal Building, presented by Mr. George Corson in the competition which has caused so much discussion. We are not at all inclined to criticize the design, — at least, no city need be ashamed to possess the building represented by it, — the main interest of the drawing lies in the fact that it received the first premium under protest, so to speak, not because it was the best of all, but because it was

the best that complied with the conditions of the competition, and because the award brings prominently forward the question how far competitors can go in disregarding such of the express stipulations as they find to hamper them, without forfeiting their chance of obtaining the prize, and on the other hand, how scrupulous it is incumbent upon the promoters of competitions to be in avoiding even the appearance of being led away by an attractive drawing or design into violations of their own implied contract with the other competitors. The looseness with which these points have been regarded in most competitions has come near effecting the abolition of such trials of skill among the best architects, and it is time that some such authoritative discussion and decision should be made, for the guidance, not only of public bodies, but of architects themselves, who are far too much disposed to waive in particular cases the strict application of the rules which they know well enough to be for the general good both of the profession and the community.

About the time that our readers were, we hope, enjoying the perusal of last week's number of the *American Architect*, the great palace of the Tuileries was visited by a second fire, not so destructive as the Communist conflagration of 1871, but sufficiently violent to injure seriously one wing of the building, comprising the famous Pavillon de Flore, which terminated the garden front of the palace at the end next the river. This, together with its counterpart, the Pavillon de Marsan, which bounded the other extremity of the façade, were built for Henry the Fourth by Ducerceau, to add magnificence to a front then rather low and not particularly imposing, though of extraordinary richness. Long after the building of the terminal pavilions, the central portion was raised, to complete the façade as it was known to us. The *communards* and *pétroleuses* came near making an end of the whole structure, and for some time it was doubtful whether the municipality of Paris would consider the ruins worth preservation. Perhaps this second fire will again discourage the authorities. For one reason, however, even the scorched and broken heap of masonry is valuable, that is, as a protection to the priceless treasures contained in the Louvre, which immediately adjoins the Pavillon de Flore. Twice has this building been saved from destruction only by the circumstance that the Tuileries, probably less carefully guarded, caught fire first, and resisted the flames long enough to prevent them from spreading to the sister palace, and the world of art, which, thanks to the generosity of the French, enjoys as much benefit from the museum as its owners themselves, is interested in the safeguards which surround it.

A deeply interesting pamphlet has recently been issued by the *Railroad Gazette* management in New York, upon Bridge Disasters in America. The author, Professor Geo. L. Vose, a well-known engineer, observing the terrible losses of life and property which periodically take place in this country through the failure of defective bridges, both on highways and railroads, has brought together some statistics and facts which have come under his own observation, not so much with the object of suggesting a remedy as of awakening public attention to the evils of the present system of construction. According to his figures, *one hundred* railway bridges have broken down in the United States within the last ten years, in some cases with heavy loss of life, as at Ashtabula, Tariffville, and Dixon, sometimes without, where freight or stock trains only have been on the bridge at the time of its failure. The causes of these accidents are obvious enough; they resolve themselves invariably into some weakness of a bolt or strut, due either to its insufficient size, or the inferior quality of the iron, and could generally have been observed at the beginning. Often they can be detected, and the failure of the bridge predicted, after it is in place and painted over. The author speaks of many such structures in which he has calculated the strains, and compared them with the dimensions of the materials, to find that the latter were culpably insufficient. In one instance, he says, a bridge is now standing in a large New England town, with joints which will safely hold but ten tons, while the builders have warranted it to carry two thousand pounds per lineal foot, which would bring upon these joints a strain of thirty tons. Several other bridges are acknowledged, even by the officers of the railroads which own and use them, to be unsafe, but they plead the poverty of their companies as a reason for not replacing or strengthening them, or give an excuse which is little better, that only a few passengers travel over them. As Professor Vose remarks, perhaps these few set as high a value on their lives as the many who use the other lines. The inspection of bridges, whether by railroad commissioners or others, is justly condemned as a farce; the inspectors never think of requiring such structures to be tested by actual weight, or even, in many states, of going through the simple operation of calculating the strains, still less of examining the quality of the materials, and their reports, while they serve to gain an undeserved credit among the public for the various railway officials, excite in these an open contempt. We all know well this sort of inspection, with its miserable fruit. If Professor Vose can interest the community in his special subject, we can supplement his work with some facts on allied topics.

The *Builder*, in some remarks upon recent railway accidents in Great Britain, quotes statistics of considerable general interest. In the opinion of the writer, one great cause of collisions between trains on ordinary railroads is the practice of running cars upon them at different rates of speed, for conveyance of both freight and passengers, so that the fast and slow traffic is intermingled. In proof of his theory, he compares the average rate of accidents upon the surface lines with that on the London Metropolitan road, which is used almost exclusively for passengers and light freight, all its business being carried on at a nearly uniform swiftness. In spite of the disadvantage of darkness, the lines being mostly underground, as well as the increased risk occasioned by the nearness of the stations to each other, and the consequent frequency and suddenness of the stops, beside the rapidity with which the trains follow one after another, it appears that on these roads are carried with perfect safety more persons every year than all the other railroads of the kingdom put together convey with an average of eleven injured passengers per week. The vastness of the traffic over the Metropolitan tracks will astonish even those familiar with London. Last year three million, seven hundred and fifty thousand passengers were transported for *each mile of road;* much more than one hundred times as many as on any of the great surface lines, the London and Northwestern, for example. The earnings of the business during the same time, were thirty-eight thousand five hundred pounds per mile, or about seven times as much as the great surface lines. It is not wonderful that in view of such results the underground railway system in London is rapidly extending. If our recollection serves us, there are already, over seven hundred and fifty miles of track within the limits of the Metropolitan District, and the preliminaries are well advanced for a new "inner circle."

All the projects for dividing the northern from the southern continents of America received a severe blow by the publication of Mr. Nimmo's compilation of statistics regarding the trade which would be affected by such enterprises, and there has been for a long time little show of life on the part of any of them. Now, however, there are signs of returning animation, not only in the Nicaragua scheme, but in that of M. de Lesseps, which was perhaps the most vulnerable of any to such an attack. It is rumored that a syndicate of bankers has been formed in Paris to float the Panama loan of four hundred million francs, which seems to mean only that a certain number of houses on both sides the Atlantic are to be authorized to receive subscriptions. Whether any will be made is quite a different question. One thing is certain, — that the firms comprised in the so-called syndicate do not themselves intend to subscribe largely, if at all. Meanwhile, some of the newspapers endeavor to counteract the damaging effect of Mr. Nimmo's statements by insinuating that they were made in the interest of the transcontinental railroads, for the express purpose of frightening capitalists away from the canal enterprises. This charge will, we presume, give some amusement to Mr. Nimmo and the railroad directors, but what other good purpose it will serve to any one it is difficult to see. Certainly the projectors of the canals will derive no benefit from such assertions. We shall be very glad to see the commencement of any undertaking which will facilitate commerce and develop new territories, but it will occur to many persons besides ourselves that eighty millions of dollars is a great deal of money to lend without any other security than a "concession" and a heap of excavated rock, unless the prospect that the canal will really come into profitable use is made more definite than it now appears to be.

THE OPEN FIRE-PLACE. — XXII.

APPENDIX. — MISCELLANEOUS EXAMPLES.

The interior of a farmer's house in the neighborhood of Saint Malo. The abode of the peasant usually consists of a single room

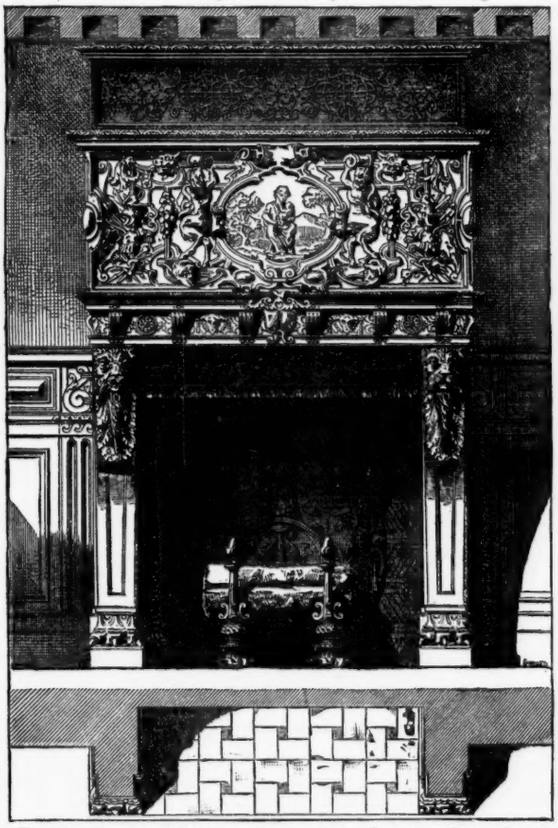


Fig. 239. Stone Fire-Place in the Museum of the Hôtel Cluny, Paris. French Renaissance. Fifteenth Century. Ecole Francaise Champenoise.
L' Art Pour Tous for 1869-1870.

on the ground floor, where the entire family lives. Large wooden partitions, raised a meter or a meter and a half from the floor, form

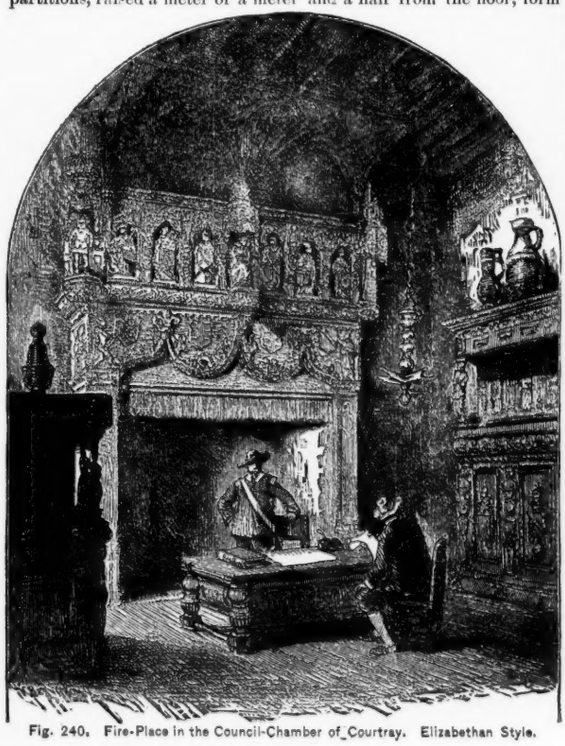


Fig. 240. Fire-Place in the Council-Chamber of Courtray. Elizabethan Style.

alcoves, having often two stories of beds one over the other and closed in front by sliding doors pierced with openings cut ornamentally. It is no uncommon thing to find eight or ten beds in one of these rooms, which serves as kitchen, parlor, bed-room and cattle stall at

Fig. 241. Fire-Place in a Peasant's Cottage, Brittany.
From the *Revue Générale de l' Architecture et des Travaux Publics*, 1873, César. Daly, Vol. XXX., Plate 12.

once. The table stands upon the mother earth, and is usually surrounded by benches. Large old armoires, sculptured and decorated with perforated brass-work, which is also placed on the panels between the beds; some old pieces of faïences on the mantel shelf, comprise all the portable furniture of the family. The plate represents a habitation somewhat modernized. The doors of the alcoves have been replaced by curtains, and there are no longer several stories of beds superposed. The vast chimney (Fig. 241) alone has preserved

Fig. 242. Gothic Mantel of Stone in the Guard Chamber of the Ancient Palace of the Dukes of Burgundy, at Dijon, France.
From *The Builder*, London, 1847.

its original appearance. The wood-work of this interior dates from the epoch of Louis XIV, or of Louis XV. We sometimes find in these rustic interiors, connected with much that is simple and naïve, the more delicate and carefully elaborated details, forming curious

subjects for study, and furnishing many happy inspirations. (From a letter to César Daly from Frantz Huguelan, architect).

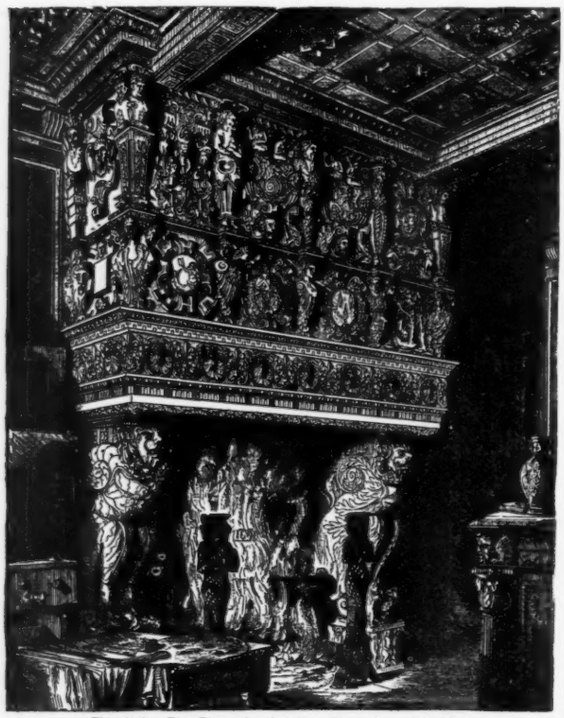


Fig. 243. Fire-Place of a Studio at Terre-Neuve (Vendée).
From *L' Eau Forte de 1877.* A. Cadart, Rue Neuve des Mathurins No. 58, Paris.

The style of the fire-place (Fig. 242) is late French Gothic or Flamboyant, called by Mr. Dawson Turner "Burgundian." "No

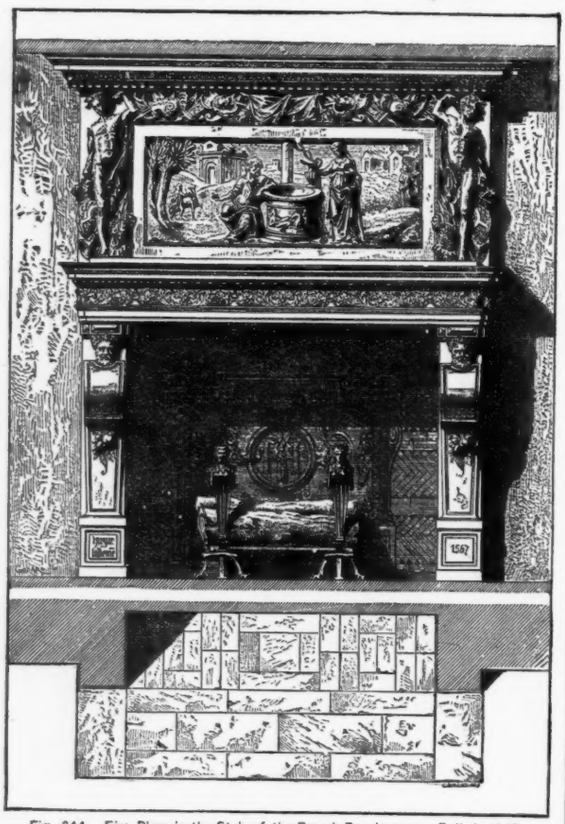


Fig. 244. Fire-Place in the Style of the French Renaissance. Built in 1567.
From *L' Art Pour Tous.*

distinct examples of it can be dated anterior to the reign of Philip the Good, and buildings bearing its characteristics are found in all the states which are under his authority." (Britton.) The date of this fire-place is probably the latter end of the fifteenth century. It projects, as was usual in the Gothic period, considerably into the room, having the upper portion of a pyramidal form to convey the flue into the wall.

"The decorated stone-work in the French example conceals this contrivance effectually, and it is probably the most elegant specimen remaining. There are several ancient Gothic fire-places with pyramidal upper part existing, in this country (England), but they are all undecorated. In France, a small concealed place or chamber was often constructed behind the fire-place. The Duchess de Berry and her attendants were captured in one of these hiding-places, having crowded more into it than the place was intended to hold, and the soldiers having made a large fire in front of them."

The fire-place (Fig. 239) formerly stood in a house built at Troyes, in the sixteenth century, and was brought to Paris shortly after the foundation of the museum in the Hôtel Cluny.

The example (Fig. 240) is in richly decorated Renaissance with an admixture of Gothic. The shield and strap work, characteristic of the style, are shown in the profuse sculpture.

DECORATIVE ART.

"Every man's proper mansion-house and home being the theatre of his hospitality, the seate of self-fruition, the comfortablest part of his own life, the noblest of his sonne's inheritances, a kinde of private princedom, naye, to the posessors thereof an epitomie of the whole world, may well deserve by these attributes, according to the degree of the master, to be decently and delightfully adorned."

The term "Decorative Art" is an attempt to classify certain kinds of art work which are included in the broader term "Fine Art." The advantage of determining and adapting any technical term is that its exact meaning is universally accepted, and unless it were, no comprehensive description could be given. The existing confusion of ideas as to the scope and aims of decorative art is largely owing to the fact that few persons can agree upon a definition of the term, and unless the reader can accept the definition here given, my philosophy will seem groundless. The word "decorative," from its Latin derivation, *decorus*, seemly, appropriate, implies the limitations of the art as *appropriate* adornment. Then a work of decorative art is dependent on the inherent qualities of some existing thing for its *raison d'être*, while a work of fine art is an independent creation; that is, independent of the forms, colors, and textures of material surroundings in its conception and execution, unless it be designed to occupy a certain place with special reference to the peculiarities, in which case it *is* a work of decorative art, and for that none the less a work of *fine* art, the distinction being based upon the abstract idea involved in the work itself. A decoration which embodies an intellectual idea independent of the whole scheme of which it is only a part, rises to the level of fine art. In short a work of decorative art is not the particular ornament applied in whatever manner, but the resultant effect of the whole decorated thing. I may so hang my pictures that they shall, from their various forms, sizes, and tones of color, lend themselves to a scheme of decoration suited to a certain apartment, and as a matter of general effect this may have nothing to do with their subjects or individual excellence. On this ground, the fortunate possessor of a really fine work of art, a statue, or a picture, should treat the apartment in which it is to be enjoyed as its casket, banishing everything that does not tend to enhance the effect. This cannot be called decoration, but it is certainly decorative art, and thus we are obliged to sub-divide: — decoration bearing the same relation to decorative art that decorative art bears to fine art.

There are two kinds of decoration; that is, two methods of producing decorative effects: forms in relief and forms drawn on flat surfaces, and these two methods become infinitely various by combination and by the use of color. To employ these means in modifying, correcting or emphasizing the inherent qualities of things, and thereby to show that beauty consists in harmonious relation, is the object of decorative art.

Beauty has been variously defined as: "Multitude in unity," "The splendor of truth," "The expression of perfection," etc., but all these seem to ignore sensual beauty and deal only with an association of ideas. In my definition of beauty (harmonious relation), I have attempted to avoid any limitation. I have no desire to discuss the metaphysical question of "the origin of beauty," but in support of my definition it may be said that mere matter is admitted to be devoid of beauty, and it is by the combination of different qualities that beauty results.

"It is the natural progress of instruction to teach first what is obvious and perceptible to the senses, and from hence proceed gradually to notions large, liberal, and complete, such as comprise the more refined and higher excellences in art." — *Sir Joshua Reynolds' Discourse VIII.*

It has been aptly said of art in general that it is composed of science and action. In other words, what is one to do in order to know? and what is one to know in order to do?

To the first question I would answer: Never admire or condemn anything without knowing why, and being sure that your reason is a sound one, and not a mere individual preference from association. Discover the points of resemblance and of difference in things, and, as far as may be, classify qualities, so that, in examining anything,

your attention is not wasted upon "lendings." By "lendings" I mean properties that belong to other things, which the artist may have availed himself of, and for which he deserves no crei

cognoscenti are often considered arbitrary in their judgment, because they look for some mark of individual excellence in every work of art; they demand that the artist shall add something of his own to the accumulation of the past. First, they demand technical excellence as an evidence of sincerity, and, the language of the art being acquired, they demand that something should be said that is not a quotation,—at least, that an old truth shall be well put in a new way. The comparison of utterly dissimilar things can result in no appreciation of either, and to arrive at a just opinion of anything, all preconceptions must be abandoned until the object or subject has been examined on its own terms. If then we cannot find it pleasing, there must be a reason for our lack of sympathy, and we ought to take the trouble to discover it, or refrain from expressing an opinion. Observe as much as possible, and try to acquire knowledge of the processes and methods employed, so that these may be readily recognized. A shorter or longer term of this sort of exercise, according to the aptitude of the student, must result in the acquirement of artistic knowledge.

What knowledge and skill must be acquired in order to perform creditably has, of course, no limit; art is far longer than the life of any sincere artist, and the most one can hope to achieve is to become a respectable specialist; that is, to achieve a partial realization of one's ideal in some particular branch of art to which one's energies are devoted more than to others. Generalization ought not to be avoided: no distinct line can be drawn between the interests of different arts. A specialist in a specialty becomes a mere manufacturer of things embodying one idea, and the various ways of illustrating it are soon exhausted. A landscape painter should, if he is conscientious, be a theoretical geologist, arborist, botanist, horticulturalist, and natural historian, or his pictures will suffer from his ignorance. Pictures are plenty in which impossible men, cows or sheep figure as points of interest in a pretty composition of color. I do not mean to imply that such accessories should be minutely drawn, but there is an effective difference between the indication of a man by a few flakes of color when these are applied by one who has studied anatomy, and when applied by one who has not — just as the merest indication of a ship in a marine picture shows whether the artist's devotion to his work has prompted him to learn, by studying shipping, what that indication must be in reality.

No degree of talent can supply the place of knowledge and hard work. Michael Angelo failed as an architect because he was ignorant of the grammar of architecture, and perhaps no man was ever possessed of a genius that would enable him, without training, to accomplish as much in everything that he undertook.

The decorator, of all artists, must be generally informed. In devising a scheme of decoration of any scope, from the surfaces of a tea-cup to the interior of a legislative chamber, the existing thing must be considered in each of its qualities and all its relations. These must be determined in the order of importance, so that the decoration may be, like the thing itself, designed upon a controlling principle (assuming that the design of the thing to be decorated is good and does not require modification or correction).

There are six inherent qualities in any object and everything: *purpose or function*, *consistence or material composition*, *form*, *size*, *nature of surface or texture*, and *color*. In every problem the decorator finds that some *three* of these qualities are absolute, and can neither be modified nor corrected, so that he is forced to accept them as the basis of his work; the remaining three qualities being under his control, and with these he may *apparently* modify one or all of the others if necessary, the first desideratum being unity of expression. Whatever is must be harmonized by and with whatever is added, or the decoration becomes mere ornamentation.

Of the above six qualities, two are invariably absolute in any object: *purpose or function* and *consistence or material composition*, however we may adapt the former and disguise the latter. The remaining four are more or less susceptible of actual change according to the nature of the object or thing to be treated. The quality of *size* is often absolute, but often susceptible of some reduction or increase as may be desirable. The quality of *form* can generally be considered in two ways: that of the whole, and that of parts and details, and often some changes in these latter may improve the general effect. In other words, the decorator often has to correct faults in the design of the object he treats, and where the faults are inherent to use his means so as to counteract them. In studying forms it will be found useful to classify them.

There are generally speaking, five classes of form, whether plane or solid.

(1.) Rectilinear and rectangular.
(2.) Rectilinear, but obtuse or acute angled.
(3.) Curvilinear, without contrary curvature.
(4.) Curvilinear combined with abrupt curvature.
(5.) Curvilinear with natural contrary curvature.

The lines or surfaces bounding or enclosing any plane or solid may be expressed by the above terms which will be referred to by number for brevity and clearness.

The propriety of employing any particular class of forms in any design must depend upon *two* of the six qualities and those two absolute: *purpose or function* and *consistence or material composition*, for plainly a design executed in wrought-iron in forms (3), (4) and (5), if executed in wood would be in contradiction to the nature of the material, and would in most instances be useless.

Thus a few general rules may be deduced. Forms exposed to compression should be of the harder and more durable materials, such as stone, and should be of forms (1) and (2). As an instance in violation of this rule, the twisted columns of the shrine in St. Peter's at Rome may be cited, where form (5) is used, though the material, together with the *function* of the columns renders the treatment uneasy and absurd. The usual column or shaft is a combination of (1) and (3). Many practical essays have been written upon form and material in their structural relations, but in this treatise, the resultant expression as a basis for decoration, and the employment of forms as a means of decoration are the questions to be determined.

To this end, to each class of form a general expression can be assigned that may be acceptable.

(1) and (2) suggest strength and invulnerability, consequently, durability, and consequently, repose.

(3) suggests a combination as between two points, and this expression increases until the line becomes a circle when the expression is unity.

(4) and (5) suggest lightness, grace, movement and growth.

With these materials almost any expression, short of phonetic, may be achieved by combination, especially if the symbolic value of form is added.

The quality of *texture* or *nature of surface*, is one that is almost invariably at the mercy of the decorator, for whatever the material, its surface may be changed by applications, and how far this liberty should be used is one of the nicest questions in decoration. However, a general rule may be laid down, that except in small objects, a reflecting surface, such as is imparted by varnish, should be avoided as uncertain in effect except from certain points of view, as often disagreeable and almost always cold and hard in effect.

A gloss, such as pertains to silk and to oil-polished wood is quite another matter and has its value. The other extreme is the velvet surface which is also useful, but is hardly ever effective in small objects.

All questions of texture as a matter of effect are directly dependent on the quantity, quality and direction of the light in which the object is seen, and the compromise between the effect by daylight and artificial light is the most difficult of all questions in decoration, especially in considering the quality of *color*, which is at once the quality most under control and most difficult to treat, while it is itself, scientifically speaking, a property of light. The simple relations of the three primary colors are easily stated; that red is the complement of green, because green is composed of the other two primaries blue and yellow, and that the red restores the equilibrium of white light. So blue is the complement of orange, and yellow of purple, but it is in the question of *tone*, the balance of intensity and respective quantity, or in other words the values of what is known as simultaneous contrast, that the nicest discrimination is necessary. However, it can be generally asserted that a composition based upon a gradation of purples requires the introduction of yellow in some way to make the effect of purple fully appreciable, but the extent and intensity of this yellow remains a matter of feeling. At all events it seems hopeless to determine rules that could be relied upon beyond the general rule that no color composition can be effective or complete in which the three primaries are not present, and further, that some one of the three must be the basis of the combination, and predominate.

If the values (the relative quantity and intensity of each color) of a composition are true, that is, so balanced as to realize to the utmost the desired effect, the whole could be translated into another tone of color, retaining all its excellences; as for instance, a sunset that appears to us in values of reds and yellows with all possible combinations and contrasts, would retain all these if seen through a green or blue glass. In short, the aim of the colorist is not so much to produce a certain effect by the employment of certain colors, as to produce a certain effect with any colors that the nature of the case may force upon him. The decorator is in most instances obliged to consider the relative effect of existing things upon his work, and it is in making stubborn fact his auxiliary that he shows his skill. — *A. F. Oakey.*

THE STUDY OF DRAWING.

THE *Saturday Review* says: —

It may seem presumptuous in these days, when South Kensington has extended its paternal despotism over the length and breadth of the land, to assert that drawing is, as a rule, very badly taught in England. But we do assert this most distinctly, and we are encouraged in this temerity by the example of M. Viollet-le-Duc, who, shortly before his death, wrote an elaborate work with the express purpose of establishing a similar proposition with regard to France. This work, the *Histoire d'un dessinateur*, is cast in that abominable narrative form — which has fortunately ceased to flourish in England, — besides being burdened by the introduction of a French version of Mr. Barlow, with an incredibly good little boy, who is almost more insufferable than Harry Sandford; but to any one who has the patience to disentangle the important ideas so elaborately wrapped up in the entirely uninteresting personal history of Monsieur Majorin and *petit* Jean, the work cannot fail to be instructive.

We all know how drawing is generally taught. The lowest depth

is to be found in the system of the fashionable drawing-master. In this, the greatest stress is laid on the management of the pencil. Trees are to be represented by a particular touch, rocks by another, water by another; shadows are rendered by parallel lines; lights can be advantageously put in with white chalk, etc. In a word, everything turns on manipulation. Until very recently, the system pursued in the great schools of art was little better. There was an elaborate method of stippling by which the shadows were worked up to an exquisite velvety texture, whilst correct outline or modelling were regarded as quite secondary matters. There used to be harrowing stories told of pet pupils at South Kensington, who spent six months on the shading of a single figure, and entrance to the schools of the Royal Academy is still barred to those whose accuracy of drawing is not equalled by the smoothness of their execution. At South Kensington there has been a great change for the better since Mr. Poynter has been placed in authority, but routine is still powerful, and art is still taught as if it had no relation to the life around us. And this brings us to the question, What is drawing? Drawing is the art of seeing correctly. There is no difficulty in putting down what one sees, provided one sees it clearly and rightly. Execution is a mere affair of practice, a dexterity which any hand will attain with time and use. The greater masters have used the most varied means of recording their impressions of nature. No two ever draw alike as regards mere execution; but all succeed in conveying to others a correct impression of the image that was before their eyes. In the *Histoire d'un dessinateur*, the artistic capacities of *petit* Jean are first discovered by a rude drawing that he has made of a cat, in which the animal is represented as seen from the front with only two legs and a tail sticking out of his head. When it is pointed out to him that this cannot be like a cat, because a cat has four legs and a tail that does not grow out of the top of his head, he only replies that he saw it so. Whereupon Mr. Barlow — we mean Monsieur Majorin — embraces him tenderly, and adopts him on the spot. And indeed, *petit* Jean was quite right; he had drawn what he saw, and nothing else, and that is the task that all draughtsmen have set before them. This is the capital problem not only of draughtsmanship, but of many other things. To state what one has observed without telling lies about it is the most difficult thing in the world, but on this depends all progress in the whole domain of science.

When *petit* Jean had been adopted by M. Majorin, he is encouraged to draw anything and everything that he sees around him. These drawings are duly corrected, and, when it is practicable, they are made an excuse for instructive explanations which would seem to belong rather to general education, but which are useful also to drawing by impressing the objects drawn more firmly on the mind. And here we come to the important truth that drawing, although it must always chiefly depend on the direct observation of nature, can nevertheless be greatly indebted to various indirect aids. A little elementary geometry is of great service, as giving certain typical forms by which the forms of nature can be classified and remembered. The mutual relations of these forms are given by geometry in their simplest aspects, and disentangled from the complications which are met with in real life. When familiarized with these abstract types, the pupil may proceed to perspective, the study of which is hopeless until he has a clear understanding of what is meant by a straight line, a plane, an angle, etc., knowledge which oddly enough does not come by nature or even by definitions, but, like most other knowledge, by familiarity. The study of perspective is a very important aid to drawing — so important that the conventional teaching has been compelled to recognize it — but with characteristic perversity has always begun with it at the wrong end. As in the study of grammar, a number of rules are given before the pupil has the least conception of the subject matter to which they are applicable — in neither case are the results very encouraging. And yet the proper way of teaching perspective is very simple. Very soon in the course of his drawing, the beginner stumbles across certain difficulties, owing to the discrepancy between what he really sees and what he thinks he ought to see. For instance, he is drawing a cart. Knowing that the two wheels of a cart are of equal size, he draws the further wheel as large as the near one, and then his drawing looks wrong. His teacher takes the opportunity of explaining that things decrease in apparent size as they are farther away from the spectator, and that apparent size is all that he has to trouble himself about. When the pupil has got this clearly into his head he has mastered the fundamental principle of perspective. The teacher now informs him that there are certain rules founded on this principle which will enable him to draw simple figures with great facility and correctness. Having learned these rules, the pupil is taught to connect them with practice by some such simple device as tracing a building, a piece of furniture, or any real object of sufficient simplicity, on a pane of glass, and then seeing that the rules of perspective are merely an account of how such objects look. It is this conception that is so essential to a vital knowledge of perspective, and which the ordinary teaching so entirely neglects — namely, that everything in nature is seen in perspective, and that for the simplest cases there are definite rules which can be applied in aid of observation. For complex cases, such as the forms of clouds, or trees, or mountains, or the human face, no definite rules can be given beyond the fundamental one that the apparent size of an object decreases as the square of its distance; so that perspective can never be more than a slight help to that direct observation which is the foundation of all drawing.

Drawing is aided in a somewhat similar way by an elementary knowledge of various sciences, such as anatomy, morphological botany, and geology. These enable the draughtsman to avoid errors, and direct observation to the important points of the object to be portrayed. Again, they increase the interest with which he looks at forms, and are an immense help in enabling him to remember them; but they have their dangers, in tempting him to substitute what he thinks he ought to see for what is really visible. For instance, superficial knowledge of this kind might have made *petit* Jean draw his cat with four legs when he saw only two; and in no case should the importance of these studies to the draughtsman be exaggerated. They can enlarge his mind, and they can aid his observation, but they can never stand in the place of it. It is certain that the Greek artists of the best period were unacquainted with anatomy, but their knowledge of the human form has never been equalled. It will be objected when we have got so far that our draughtsman is always supposed to be drawing something that he sees before him; is he never to draw out of his own head? Certainly he should be trained to draw from memory, especially if he afterwards compares his drawing with the original to keep up his standard of correctness. But is he never to imagine anything? As much as he likes; but that is no part of his education. No one can teach imagination. If he has it, all the better — if he has not, he may still be an excellent draughtsman. He may be taught to combine the elements of things he has seen so as to make new things that he has not seen, and for this any scientific training will be of good use; but the creative touch that will put something new into the combination, something that did not exist in any of the elements, is a matter of genius, and as such unteachable. We must teach our draughtsmen to see things as they are, and to so portray them as to give a correct idea of their appearance to other people — with that the duty of the teacher ends.

It will here be objected that all this will never make an artist; that, in all genuine artistic work, there is an element of taste, of refinement that such training will not give. Granted; but then our draughtsman need not become an artist. This is precisely the question that is faced by M. Viollet-le-Duc. After *petit* Jean has learned to draw, M. Majorin makes various experiments to see if nature has destined his pupil to be a painter or a sculptor. Having decided in the negative, he is not a bit discouraged, being of opinion that knowing how to draw cannot fail to be useful to a man in any position of life. And indeed, if our definition is correct, it is obvious that a draughtsman must have had his faculties of observation sharpened far beyond those of his fellows. *Petit* Jean gets apprenticed to a cabinet-maker, and of course makes his own fortune and that of his family, with that fine regard for consistency in which books are so much superior to real life. But we may readily grant the extreme value of good draughtsmanship in all pursuits where knowledge of form is at all essential. Indeed, in no other way is that familiarity with form obtained which is essential to dealing with it successfully. But, supposing *petit* Jean had had the artistic sense, would his training have been of benefit to him as an artist? Undoubtedly. It has never yet been held, even by the most refined of art critics, that a painter can draw too well. But will not this extreme accuracy have deadened his artistic sense? Will he not sink into vulgar realism? That depends on *petit* Jean himself; if he has imagination it will come out in his pictures, and all the more freely in that he has fewer technical difficulties to contend with. Indeed, there is nothing sadder than to see high imaginative gifts cramped and spoilt by the insufficient means of expression at the command of the artist. But supposing he has no imagination? Then he had better be content with realism; if he has the true artistic taste, we may be sure it will not be vulgar; realism, after all, means nothing worse than truth to nature. There is an art which teaches and inspires, and an art which records.

Of artists who are qualified to teach the world, there are but few. Of those who can do good service in recording the beauties of nature, there are fortunately many, and there would be more were not so many eager to teach who have nothing to say, and to inspire who have no inspiration. If we wish to be freed from the false sentiment, sickly pathos, and forced tragedy of modern art, let us not be too hard on realism.

THE ILLUSTRATIONS.

CHURCH TOWERS AT YORK, PA. SKETCHED BY MR. J. E. PERRY, ARCHITECT, BALTIMORE, MD.

SKETCH FOR A COUNTRY HOUSE. MR. W. R. EMERSON, ARCHITECT, BOSTON, MASS.

THE MORSE BUILDING, NEW YORK. ENTRANCE AND STAIRCASE OF THE SAME. MESSRS. SILLIMAN & FARNSWORTH, ARCHITECTS, NEW YORK, N. Y.

COMPETITION IN INTERIOR DECORATION.

The publishers of the *American Architect and Building News* offer three prizes of fifty dollars ($50) each for each of the three designs submitted in accordance with the following programme, which shall be adjudged of highest merit, the award being made by a jury, the members of which will be announced hereafter. The conditions governing the competition are these:

1. Every competitor, by taking part in the competition, signifies his willingness that his design be published in the *American Architect and Building News*, if the editors desire to publish it.

2. Each competitor is to submit two sheets of drawings, each measuring 14 inches by 22 within the inner framing line, the drawings being executed in pen and ink, on smooth white paper, in a manner suitable for reproduction in this journal.
3. The authors of the successful designs surrender to the publishers all property right in their respective designs.
4. In awarding the prizes heed will be taken of the manner in which the programme has been followed, the excellence and appropriateness of the design, and the execution of the drawing.
5. Each competitor is requested to sign his drawing with some motto or simple device, which can be recognized from its verbal description, and to enclose to the editors, together with his *nom de plume*, his real name and address.
6. The drawings to be received at the office of the *American Architect and Building News*, 211 Tremont St., Boston, Mass., on or before Saturday, December 11, 1880.
7. Drawings which are received after the day named will be excluded from competition, but not necessarily from publication.

PROGRAMME.

The subject of the competition will be the main or entrance hall of a small hotel in a country town frequented by the highest classes of society. As the hotel will contain not more than thirty chambers, and is not intended for the accommodation of many transient travelers it will be proper to maintain as great an air of privacy as possible while preserving the character of a hotel. Quiet refinement and not display is to be first sought.

The size and general arrangement of the hall are left to the competitors, but it is required to introduce into the design the office of the hotel clerk (in an unobtrusive way), an open fire-place, a resting place for the row-boys, and the hall-porter's chair.

Required.

A perspective drawing of the hall looking toward the entrance vestibule. This perspective is to occupy the whole of one sheet.

On the other sheet are to be shown a plan of the hall, and details to a larger scale of the fire-place, clerk's office, seats, chairs, chandelier, wall-treatment, etc. All details are to be explained by a graphic scale.

THE LATE CHARLES D. GAMBRILL.

At a recent meeting of the New York Chapter of the American Institute of Architects it was moved by the secretary that it be

Resolved, That this Chapter deplores the sudden and untimely death of its late prominent and highly esteemed colleague, Mr. Charles D. Gambrill, a member of the Society since its organization. Mr. Gambrill's unusual refinement of artistic feeling was complemented by his scholarly predilections, — a combination which, in a practitioner, assures the public against extravagant and illiterate artistic expression in execution; while his fastidious conscientiousness and modest faithfulness in all the relations of life were as noteworthy as the amiable private qualities which his associates will always hold in affectionate remembrance.

Resolved, That a copy of these resolutions be forwarded to the late Mr. Gambrill's widow, with the expression of the hearty sympathy of this society in her bereavement.

The motion was unanimously adopted.

Attest: A. J. Bloor, Secretary.

"ABYSSINIAN" TUBE WELLS.[1]

The process of obtaining water by digging wells is of great antiquity, and that of boring scarcely less ancient. The particular method of obtaining water that it is the object of this paper to explain, is entirely modern. The crude idea of driving a tube into the ground for water is scarcely more than a dozen years old, and many of the appliances for driving tube wells are still more recent. In ancient days, wells were national property, and battles of possession have been fought over them. Now, a well can be made in many places in a few minutes, and the very deserts may be tapped, and clear springs obtained from them. Like many other clever inventions, the tube well owes its first existence to America, although it has been jocularly claimed as having been really originated by the negroes, who drove pointed bamboo canes into the earth, and slaked their thirst by drawing up the water through the pores of the cane. Be this as it may, the first iron tube well could only be driven in the very softest soils, and the tubes were struck on the head, which caused bending, injury to the screw-threads, and fracture of the pipes. The pipes at first employed were also of inferior quality, such as are used for gas purposes, and were quite unsuited to the rough treatment and vibration that a tube well is subjected to. Upon the introduction of the patent into this country, the necessity for an improved method of driving the tubes became at once evident to those having charge of the invention.

This process it may be of interest to describe. In the first place, the materials used must be of the very best quality, and specially tough and good iron is required for the tubes. The first tube is pointed and perforated up for a few inches, with holes varying from one-eighth to one-quarter inch. The point is somewhat bulbous, but only sufficiently so to make clearance for the sockets by which the tubes are connected together. On the tube a clamp is fastened, provided with steel teeth, so as to grip the tube. This clamp is tightened by means of two bolts. Next, a cast-iron driving weight, or monkey, is slipped on to the tube above the clamp. The tube, thus furnished, is stood up perfectly vertical, in the centre of the tripod; ropes are made fast to the monkey, and driving is commenced by two men pulling the ropes, and allowing the monkey to fall on the clamp. It is particularly important that the bolts of the clamp are kept tight, so that no slipping takes place. When the pointed tube has so far penetrated the earth that the clamp reaches the ground, the bolts are slackened, and the clamp raised again some two or three feet. Length after length of the tube is thus driven into the earth, being connected together by socket joints. It will be noticed that the tube well proper is, therefore, self-boring, and that no core of earth is removed.

One of the first questions that will suggest itself to a thinking mind is, will not those small perforations be blocked entirely up by being thus forcibly driven through the earth. This was the American's first idea, and he provided a sort of sleeve, in the shape of a sliding tube, over the perforations, to protect them from the earth. Experience, however, has proved this protection to be quite unnecessary. The perforations are made about four times as numerous as is necessary for obtaining a full flow of water from the tubes. Earth does find its way into the tube well in pellets, like the casts from a worm; but some of the perforations are always left sufficiently open to allow water to pass into the well, and if the soil comes rapidly into the tubes, it is easily mixed with water poured down from the surface, and drawn up by ½-inch tubes, to which a pump is attached. To thoroughly clean and open the perforations, an ingenious contrivance has, however, been utilized. Long before the tube wells were invented, a pump was manufactured that, by lifting the handle, would allow the water to run out of the tail-piece, and thus prevent freezing in winter. This sudden liberating of a column of water that is maintained above its normal level, is the method which is employed to clear out the perforations of a tube well. In skilful hands, the water can be kept in a state of agitation, being alternately allowed to press through the perforations, from the inside and from the outside; and before the whole column of water has descended to the level of the spring, it is caught up by the pump, and a fresh supply drawn into the tube. In this way the perforations are syringed, as it were, free from all soft obstructions, and the excess of holes over what is required, makes the closing of a few by grit which is too large to pass through, of no consequence. This action of the pump is not only useful in clearing the perforations, but in some soils it plays a most important part in the development of a supply. When all the holes are free, the fall of the column causes jets of water to disintegrate the earth, and by this means the finer and softer particles are pumped to the surface, and either an actual cavity is formed below, or, in gravel, a sort of filter bed is left, out of which all the sand within reach of the pump has been withdrawn. It should be stated, that the first presence of water in a tube well is ascertained by an ordinary plumb-line, which is also useful for guaging the quantity of earth in the tubes. Having got the tube well into the spring from which it is to draw, the perforations all free, and the earth thoroughly disintegrated in the immediate neighborhood of the point, it remains to describe the method of pumping.

Until this plan of obtaining water was discovered, all pumping was done by means of a suction-pipe communicating with the well or bore-hole. As the atmosphere had free access to water in the well, the action of the pumps was simply to draw water out of the reservoir, and there its duty ended. The method of pumping a tube well is entirely different; all atmospheric pressure on the water in the tubes is removed at each stroke of the pump, and hence the supply is drawn to the spot, instead of simply flowing there by gravitation. Although the tube wells achieve this result as it were by accident, the importance of the fact is now generally acknowledged by engineers. Many engineers were of opinion that it would be impossible to obtain water at all, if the atmospheric pressure were excluded from the well, but they did not pursue their reasoning quite far enough. It is true there must be atmospheric pressure somewhere on the water that we pump from, but it need not be in the immediate vicinity of the well. Perhaps it is miles away. Pumping in this way, we have not the tiny reservoir of an artificial well, but in some cases natural underground lakes, one might almost say, seas of water, to draw from. Some here may recall how our army, during the Abyssinian war, was supplied with water by these tubes, and it was the prominence which that war gave to the invention that led to the present prefix to their name. For campaigning purposes the wells were only used singly, as one or two were found sufficient to supply the wants of a number of troops. When, however, large supplies for manufactories, towns and villages were needed, a fresh development in the system took place. Instead of single wells of great diameter, groups of moderate size were driven and coupled together by horizontal mains, so that powerful steam-pumps could draw from many wells at the same time. The great friction that would be caused by drawing an enormous body of water to a single spot is thus avoided. Wells so coupled draw from a very large area of ground, and the water-level at any one spot is not so rapidly lowered. The very action of the pump, too, in drawing the water to the wells, opens and maintains channels of communication which help to keep up the level of the water. In putting down plant for a large supply of water, a trench, hundreds

[1] A paper by Robert Sutcliff, printed in the *Journal of the Society of Arts*.

of feet in length, and some two or three feet in depth, is dug, and tubes are driven every twenty feet, and coupled by mains as already described.

It may be interesting to refer to some particular instances, where large supplies of water are thus obtained. At West Thurrock, in Essex, a cement company is pumping from two 5-inch tube wells, about 80 feet deep, 220,000 gallons per day of 10 hours. Another cement works at Northfleet is pumping 60,000 gallons per day. These have been pumped daily for about four years, and still give a constant supply. As expense is an important feature, it may be mentioned that the cost of these did not exceed £60 each. The coupled tube wells are to be found in greatest numbers at the centres of beer manufacture, where abundance of pure and cool water is an absolute necessity. At Burton-on-Trent, about two million gallons are pumped daily from these wells.

A feature of particular interest to this Congress is the question of purity of water supply. Tube wells very soon attracted the attention of sanitarians, from the fact that, being forcibly driven into the earth, there is little or no possibility of their being contaminated by surface drainage. Too frequently a dug well, from defective steining or other causes, becomes little better than a cesspool. It is also often expensive work to dig through water which is impure, in search of pure springs below, and still more costly, when the good water is found, to keep the bad from mixing with it. Accidental and temporary contaminations are not infrequent in dug wells. One of recent date came to the author's knowledge, which was of so serious a nature as to cause a Government inquiry. It was found that in a certain district, supplied by a water company, enteric fever was raging with great virulence. No less than 352 cases occurred in places supplied with this particular company's water. In a very exhaustive report to the Local Government Board, it was clearly proved that a contamination of the wells, caused in a peculiarly offensive and direct way, was the origin of the epidemic. The instances of tube wells having been driven through contaminated water, and tapping pure springs below, are very numerous. A few may be mentioned, where the results are not merely one of opinion, but are proved by analysis. At Gravesend, within a stone's throw of the Thames, a two-inch tube was driven through contaminated water, and reached a spring at about 50 feet, from which a sample was taken, and submitted for analysis. The analyst, after enumerating the particular constituents of the water, pronounced it to be the purest he had ever analyzed, with the exception of Loch Katrine. Bear in mind that this was taken from a well situated in the last place one would expect to find pure water, namely, within a few yards of the River Thames, which at that point is quite salt, and charged with London sewage. A point has sometimes been raised, as to whether water obtained from such positions is likely to remain pure when regularly drawn from, and, perhaps, severely taxed. This particular well has been made between four and five years, and subsequent analyses have proved the maintenance of its good qualities. It is used for purposes which necessitate a very strict watch over its excellence. The ships at that port fill their store tanks from this well, the Royal Yacht among the number, the quality of the water is not, therefore, taken for granted.

At Deal, another illustration of the perfect isolation of a spring was afforded. Most of the wells in that neighborhood are brackish, and a supply of fresh water was needed for a flour mill, and for domestic purposes. Within the first 25 feet water was found in gravel, but too salt for use. The miller was under the impression that if the tubes were driven deep, fresh water would be obtained, and he discouraged any further testing of the water on account of the delays in so doing, until 100 feet had been driven. At 117 feet the pump was again applied, but instead of being better, the water was as salt as brine. The engineer having charge of the work noticed that at the depth of 45 feet the water level differed both from that at 25 and that at 117 feet, and the fact suggested to his mind the desirability of testing the quality of this middle spring. A second tube was therefore driven to 45 feet, and from it quite fresh water was obtained. This happened five years ago, and the water still remains free from brackishness.

Hundreds of other instances might be mentioned, but these are so marked as to be sufficient for the purpose of illustration.

Some waters of good quality, but containing sulphate of lime, etc., are much injured by the exposure they get in ordinary wells, and the author has heard of dug wells at Burton-on-Trent that emit an unpleasant effluvia, and get unfit for use if not constantly pumped. This appears, therefore, an additional reason for keeping the atmosphere from the spring.

When rock, solid stone, or incompressible clay is met with, a tube cannot be driven through it without first making a hole, and removing the cores. In some cases, however, there may be many feet of loose earth which can be easily driven through; this (especially if gravel has to be passed through) is a tedious process. The tubes, therefore, may be fitted with a temporary hard wooden point, which will allow them to be driven through the soft earth, and when an obstruction that cannot be penetrated is met, the point is knocked out, and, being wood and in sections, it floats to the surface of the water, and leaves an open-ended tube, through which ordinary boring tools can be passed to chisel and break up the rock. A tube can frequently be driven through gravel and clay to a depth of, say, 70 feet in a single day. To bore to the same depth in similar stratum frequently takes ten days or a fortnight. The saving that may be effected by driving through the loose stratum can, therefore, be readily appreciated, and what is still more important, the upper part of the tubes are fixed more tightly in the ground than if a boring had been made to receive them. In some cases, however, hard strata comes right to the surface, and the boring operation, consequently, cannot be deferred. When this is the case, instead of using a pointed tube, an open-ended steel shod pipe is driven into the hole as the boring proceeds. As the tools pass down inside the pipe they do not cut so large a hole as the outside circumference, and some little trimming down of the sides is left for the steel shoe to perform.

In great depths, the single tier of pipes, with which the work is commenced, cannot be forced the whole way. Tubes, therefore, of smaller diameter are inserted; but, as to pump by the tube-well method, air-tight joints are absolutely necessary, the final tube is continuous from the deep spring to the surface. In this way, tube-wells 300 and 400 feet in length are put down, and if the spring, when tapped, rises to the surface, or within, say, 25 feet of it, only an ordinary lift pump is required to obtain the supply. Where the water does not rise to the required height, a deep well-pump can be lowered into the tube well, and worked by rods from the surface.

Bored tube wells are frequently put down in sets, and connected by horizontal mains, where large supplies are required.

The new water-works at the town of Skegness, in Lincolnshire, will be supplied by two bored tube wells thus coupled together. These wells are already completed, and a supply of pure water from the sandstone has been obtained, although salt water was passed through during the upper portion of the work.

In describing the method of driving tube wells in the commencement of this paper, mention has not been made of the latest system, which is more particularly applicable to tubes of large size. It is so simple as to merit a brief notice. An elongated cylindrical weight passes down inside the tube, and the blow, instead of being struck at the surface, is delivered where it is wanted, near the point which penetrates the earth. As water in the tube would impede the force of the blow, the first socket above the perforations is made sufficiently long to admit of a stout iron ring or washer being placed in the centre of it, in such a way that the two lengths of tube, when screwed tightly together, butt against it, one on the under and the other on the upper surface. The interior of this ring is of sufficient size to allow the water to pass freely through it, but it has a screw thread cut throughout its whole length. During the operation of driving, the opening in this ring is closed by a steel plug, which is screwed down into it until its shoulder butts on the ring. The upper surface of the plug forms an anvil, on which the driving-weight falls. The plug is readily removed and brought to the surface when the required depth has been reached.

GREAT-SPAN ROOFS.

Our engineers are beginning to learn that the larger the roof the more intractable it becomes. It is more costly to erect, difficult to repair and paint; it occupies greater height, and is generally attended with more risk. The St. Pancras roof, a combined work of engineering and architectural skill, affords us an example of one of the finest, in this country at least; but although it springs from the platform, it rises to a height, and presents an external appearance that are, perhaps, less satisfactory than flatter curves. A large roof, as we generally understand it, is a single span, springing from the walls and meeting at a point at the ridge. Such a form of roof necessitates considerable height of ridge, and the roofing-in of a large space. Paxton, in his ridge-and-furrow principle of roofing, taught us that a great space might be covered on a different principle, by, in short, a series of small-span roofs, and the Crystal Palace exemplified the system as one of decided economy for large buildings. Recently, engineers have learned the value of an economical principle in construction, namely, that the multiplication of small and simple elements is often more desirable than one large and complex structure; and that in repair and cleaning the former system has unmistakable advantages. Just now the ridge-and-furrow system, on a large scale, is being adopted at Carlisle, over the new station now erecting by the London & Northwestern Railway Company at that city. The roof is a series of small-span roofs, placed transversely to the line, and supported by open trellis-braced girders of light construction. But these girders, instead of being placed wholly below, are introduced immediately under the ridges, which they help to sustain, and the rafters and valleys are suspended from them. In a construction of such a kind, thrust is eliminated, and the whole roof becomes a succession of straight girders resting upon the walls, and supporting a series of gutters between them. Practically, the advantages offered in such a roof are great, curved principals are saved, height of walling is minimized, there is less weight of iron, and each cross roof becomes a simple one, quite independent of its neighbors, and capable of easy repair and attention. The Carlisle roof covers several lines of rail, and the open girders are placed at a good height above the platform. It would be of value to compare the cost of erection of this with roofs upon the ordinary plan, and the cost of repair and painting would be an interesting item. At the Glasgow terminus of the Central railway station, a roof of similar construction is to be seen, of even greater span; but the trellis-braced girders, which rest on the walls of the station, are entirely below the roofs, which in this case run longitudinally with the station. The effect is obviously less satisfactory viewed from the end, as the large cross-braces, with their upper and lower flange-pieces or booms, arrest the

eye at intervals, and there is greater height occupied by the arrangement. At the Carlisle station, the continuity of the roof in its main axis is assisted by light, open circles and cambered ties, if we can really call them such, which connect the great cross-girders longitudinally, and stiffen them in that direction. These are nothing more than spandrel-bracings to carry the cross-gutters, but they help greatly also in the effect. At the ridges of the roofs are raised lights, or louvres, for ventilation. One of the greatest advantages of the roof is, that there is no thrust on the walls; on the contrary, it tends to tie them together; there is no lost space; the walling may be lighter than with roofs constructed on the arched or bow principle. A span of 80 feet to 90 feet was considered a great engineering feat in roofing when first iron was employed, and the great Liverpool station-roof of 153 feet, or, still more, the joint station-roof of New St., Birmingham, 212 feet in span, spanning ten lines of rail and four platforms and roads, constructed on the bow principle, with cast-iron arched girders with cross-diagonals and struts, appeared to accomplish all that was required. But, though grand triumphs of constructive architecture, they have their defects, which the ridge-and-furrow principle in a large degree removes. The Italian Opera House, Covent Garden, was one of the first buildings in which the principle was applied, the spans in this case being carried by a series of double-trellis girders, 9 feet deep and about 20 feet apart, but they were placed below the gutters. In the Carlisle example the space is still further minimized, and the architectural effect rather improved. — *The Building News.*

ANOTHER CASE OF SUCCESSFUL CO-OPERATION.

A CORRESPONDENT of the *Boston Advertiser* writes as follows: —

"Leclair's grand experiment in co-operation finds its historian in the last *Nineteenth Century*, as well it may. The son of a French village-cobbler driven from school by poverty at about the age Franklin experienced the same calamity, apprenticed in 1811 to a country mason, next entering Paris as house-painter boy at seventeen, at twenty-six years of age setting up for himself in the same business, with no capital but the reputation of a first-rate workman. His thorough integrity and devotion to business seem to have insured his success from the beginning.

"But he did not seek to succeed for himself alone. His first benevolent enterprise was discovering a prevention of painters' colic by substituting zinc painting for white lead. His next anxiety was to find a way of saving good mechanics from loss of work just as age began to approach. Quite impossible was it to lay by enough before middle life was spent to support infirm relatives or a heap of little folks. It was suggested to Leclair that there was no protection short of the workman's sharing his employer's profits. So, after much study, he announced to his work-people the yearly division of a part of the profits to all the painters in his employ. Though accused of selfish purposes in the workingman's newspaper, and jealously watched by the police, he succeeded in 1841 in making his first division of over twenty-three hundred dollars among forty-four "hands." This was demonstration against all kinds of evil prophecies. After this, the unfailing distribution of the surplus over regular wages was forty-five dollars a year per man — about fifteen per cent on their earnings. Next came a mutual aid society, to guarantee help to the sick and disabled, amounting to two hundred dollars to every person incapacitated by injury, and the same amount to the widow in case of death, and a pension of two dollars a week to every one who had outgrown his capacity for work; a far larger sum in France, where habitual economy seems to be the pride of the people, than amongst us. The fund laid up by this society amounts now to two hundred and twenty thousand dollars.

"But there is a hub to this great wheel of a thousand spokes; a centre council, which one must be admitted to before enjoying the benefits of "mutual aid," which requires good conduct and personal improvement, numbering 122 members at present. Leclair depended upon this *noyau* or core of the apple to give an intellectual impulse and moral support to all the rest; over it presided the two partners of the house, and by its "family council" of twenty, the admission of members was regulated, the help in sickness, the distribution of provisions and a regular inspection of the books of the concern secured.

"The immediate advantages of this co-operation in production are that each workman has a personal interest in economizing materials, tools and time, so as to secure his larger share of profits; second, that each man has a motive to perfect his work, in order to promote the prosperity of the concern of which he is a part; last, that a fellow feeling is created, which seems to be the very spirit Christianity would give as its benediction to honest industry.

"All that Leclair expected was realized long before his death in the elevation of a most dilatory, dissipated and reckless set into thoroughly trustworthy mechanics, some of whom have changed their common toil into high art; and a grand evidence of the wisdom of his plan has been its passing undisturbed through the siege of Paris and the *commune* conflict; and, later yet, that it has borne the death of its founder, at a good old age, without interruption of its prosperity or misgiving for its future."

THE ENNEAPYLÆ OF THE ATHENIAN ACROPOLIS.

THE following discussion, excerpted from Mr. W. J. Stillman's Athens letter to the *Nation*, has a special antiquarian interest:

"While on the subject of the Acropolis I ought to say that German studies on the great staircase which Beulé excavated, have recovered some more fragments of the Temple of Victory, and shown some confirmation of the view previously advocated — that the staircase is not ancient, but a Middle-Age construction. Emile Bournouf, indeed, in one of the latest publications on the Acropolis (La ville et l'Acropole d'Athènes aux diverses époques), attacks the whole of Beulé's researches with a vigor in which it is impossible not to recognize personal passions which have led that never too sound archæologist to neglect the plain common-sense arguments in the question to such a degree that he destroys his own demonstrations. Burnouf maintains, in brief, that the whole western wall and the gate which Beulé uncovered, with the staircase and everything dependent on it, were the work of the Florentine dukes of Athens, and that the so-called restoration of Valerian was really originally a work by Nerio Acciaioli, and restored by Antonio, his son, in haste on the approach of Sultan Amurath. There is not room here to follow all his argument, and it must be admitted that he has made several good minor points against Beulé; but it would not, I think, be difficult to show that in his eagerness to demolish his predecessor he has exposed himself to destructive criticism. So far as concerns the general plan of approach to the Propylæa and the probable character of that portion of the enceinte, I do not believe that Beulé's theory can be attacked; but Burnouf and the later German excavations show that the staircase *in its present state* is a mediæval work — probably, *me judice*, an incomplete and greatly modified restoration of the original approach, without which *in some such state as is now indicated* the position and magnitude of the Propylæa (the structure that stood before the gates — *i. e.*, the nine gates) would be an architectural solecism, even an absurdity. It is clear that the staircase is not contemporary with the Propylæa; but Burnouf's ineffectual struggles to reconcile his hypothesis with the nine-gated approach alone suffice to show the untenableness of his theory, for there is not in the space he would dispose of — viz., that between the landing of the Propylæa and the foot of the present staircase — room to bestow nine gates without making them a weakening of the military defence, and the Pelasgi were too good engineers to put nine gates where three sufficed. The fact is, that a sound induction from the Propylæa and its surroundings would lead an investigator to look for some such gate and some such staircase as long as the bastions which once covered the whole approach existed, and Beulé was the third who, following this induction, attempted to find what he finally succeeded in finding. It is indicated in the plan of the Propylæa. Nothing that Burnouf advances goes to weaken Beulé's reading of the existing walls and gate, but, on the contrary, the reading proposed by the former only shows his entire ignorance of antique wall-structure; and his hypothesis that Antonio Acciaioli, in haste to defend Athens against Amurath, had been so careful as deliberately to select the antique material, restore the antique form of the gate with its archaic slope of lintel, and replace the band of Eleusinian black marble, so as to be in keeping with the use of the same in the antique substructure of the Propylæa above, is whimsically absurd. The internal evidence is irresistible that the gate known as Beulé's was reconstructed on an antique model, while something of the old Greek methods, traditions, and reverence remained; and there is scarcely any escape from the further conclusion that this was the work done by Valerian, as history records. The repairs which Burnouf shows Antonio Acciaioli to have made were in preparation for an attack by the Turks, who were already in the Phocide! The slightest examination of the wall in which is Beulé's gate will convince any one who has experience in these matters that it is utterly impossible that it should have been constructed only about 1430, as Burnouf would have us believe — the more that, being in a very few years later completely cased in by the massive masonry of the Turkish bastions, no chance remained for the wear of time and weather which it shows to-day most unmistakably. But neither Beulé nor Burnouf offers any valid suggestion as to the position of the Enneapylæ, and if the excavation of the western slope of the Acropolis and the southern of the Areopagus does not disclose some indications of it we must regard it as lost. Burnouf's attempt to locate the Pelasgicon within the inner enclosure of the Acropolis is so wildly at variance with every known tradition that it becomes difficult to give him credit for ordinary archæological acumen. On the whole, it seems to me, we must accept Beulé's conclusions as to the meaning of his own discoveries, as unmoved by any of the subsequent attempts to reconstruct the Acropolis."

A SLATE-COVERED BUILDING.

SKANEATELES, OCTOBER 1st, 1880.

TO THE EDITOR OF THE AMERICAN ARCHITECT: —

Dear Sir,—I enclose photographs of a building which I have put up, covered with unfading roofing-slate laid without lap either on roof or sides, which is perfectly water and fire proof. The design is my own and without any pretensions to architectural novelty. I am an amateur in all respects, having done with the aid of two common laborers all the wood-work, which is made entirely of old material and very rough under the slate. I have done all the slate-work individually. The face of the cornice is not yet covered. The building is used as an ice-house, and singular as it may seem, it keeps ice better than two other wooden ice-houses that I have used. This building is exposed to the sun's rays all day long, and the ice-box is only a cube of 9 x 9 x9 feet. Between each bracket under the cornice is an opening for ventilation, especially for the ice. The cost of the slate used, being

8 x 12 inches, is for the slate about two dollars per square, there being 400 pieces in a square as purchased, this for roofing with lap.

400 pieces will cover about three squares on the side of a building, using strips of longitudinally bent sheet-zinc between the joints, which are formed so as to represent mortar-joints and for making the building water-proof. These strips are only one inch in width, therefore economising the metal. The roofs of the towers were slated before putting up, then hoisted to their places.

A gentleman in New York having heard of this experiment writes me for information as he wishes to put up a castellated gate-way, and states that he recently gave up a very pretty design in wood because the material was so incongruous.

Respectfully,

E. Norman Leslie.

NOTES AND CLIPPINGS.

The Stevens Battery. — The famous Stevens Battery has lately been sold by a Master in Chancery for $55,000.

The Buda-Pesth Artesian Well. — The depth is 970.48 metres (3183.9 feet); daily supply 7,600 hectolitres (200,781.4 gallons); temperature 74 degrees (165.2 F.); mean increase of earth-temperature 1 degree for 12.61 metres (1 degree F. for 22.98 feet). The water is strongly impregnated with carbonic acid, together with some nitrogen and sulphuretted hydrogen; it contains 1.131 grains of salts per litre (66 grains per gallon), principally sulphates and carbonates of potash, soda, lime, magnesia, with some chlorides. It resembles the Kaiserbad water, at Ofen.

The Volga Bridge. — A large undertaking has recently been completed in Russia in the shape of a long bridge over the Volga, on the Syoran and Orenberg Railway, connecting the cities of Syoran in the government of Simbrisk with that of Samara. The width of the river is nearly a mile, and as it is liable to the occurrence of very heavy spring floods, the piers (of which there are fourteen altogether) had to be built 100 feet above mean water level, the depth of the river being more than fifty feet. The girders, 364 feet long and twenty feet wide, were all riveted and put together on the right bank of the river, and then floated to their position. The whole cost of the bridge was 7,000,000 silver rubles; and it is worthy of mention that it was completed without any loss of life or any accident of importance.

Concrete Foundations.—The strength of concrete to withstand the strain caused by heavy moving loads has been shown by the experiments with a 100-ton gun which were conducted at the Woolwich marshes on Monday. A temporary fortification on which the gun was mounted has been constructed of concrete on the marshes adjoining the Arsenal, the part below ground consisting of cement and Thames ballast, and the upper part of cement and crushed furnace slag. The parapet is ten feet high. About three thousand tons of material were used. The gun was loaded with a charge of 425 lbs. of pebble powder and a projectile about three feet long, which weighed nearly a ton. It is, perhaps, difficult to imagine the effect of the firing of such a mass, but although the vibration of the ground was evident, the concrete fortification remained uninjured. Whether concrete could resist a cannonading as well as masonry has yet to be determined. — *The Architect.*

The Law Relating to Obstructions by Building Operations. — The public, including a man's immediate neighbors, must submit (according to a recent decision by the English High Court of Justice) to the inconvenience necessarily occasioned in repairing or rebuilding a house, but if the inconvenience is prolonged for an unneccessary time or increased by the unreasonable manner in which the building operations are carried on, such operations are a public nuisance, and a person who has suffered thereby a particular damage, other than and beyond the general injury to the public, of a direct and substantial, and not a fleeting and evanescent, character, is entitled to maintain an action for such nuisance. The right of a man to step from his own land on to a highway is something quite different from the public right of using the highway, and if his right is interfered with by another man's unreasonable building operations, there is a right of action against the latter in respect of the interference with the private right, irrespective of there being a nuisance and particular damage suffered thereby beyond that suffered by the general public. Damage by loss of custom in business caused by unreasonable building operations being carried on in the neighborhood so as to obstruct and render inconvenient the access to the shop by customers, is not too remote to be the subject of action.—*New York Evening Post.*

Gold-Bearing Bricks in a House. — There is a certain brick building in Cheyenne, Wyo. T., says the *Leader* of that town, which is almost worth its weight in gold. The bricks in its walls are at least impregnated with this precious metal to a valuable amount. The discovery was made accidentally by a gentleman who has an office near by. He frequently noticed shining yellow particles in the bricks, and imagining that the colors were gold, he took out a brick from the wall for the purpose of ascertaining the facts. This brick he first pulverized and then "panned out" the colors. He could not get rid of all the dirt, and concluded to send the residuum to an assayer in Denver. In a few days the assay certificate arrived and showed that there was thirty-eight cents' worth of gold in the brick. The gentleman then took out two other bricks in different parts of the building and pulverized and panned them as he did the first. The same assayer gave his certificate as follows: Sample No. 1, gold, forty-seven cents; sample No. 2, gold, twenty-four cents. After considerable inquiry it was learned that the bricks were made in a yard that was formerly situated on Crow Creek, near Cheyenne, but which is now obliterated. Further investigation among the oldest residents showed that placer mining was at one time carried on along Crow Creek, but the miners thought that the pay wasn't big enough, and they therefore abandoned their claims. It was near these claims that the brickyard mentioned above was started.

M. Charnay's Discoveries near Tulla. — A correspondent of the New York *World* writes from Mexico as follows: "Charnay has discovered what he very properly terms 'the Indian or Mexican Pompeii' — a city buried at least for one thousand years. In my last I mentioned the discovery of a villa near Tulla. That house has now been fully uncovered and found to contain twenty-five rooms, fifteen staircases and twelve corridors. Attached to it are two cisterns, with clay pipes which were used to convey water to different apartments. Some of the household utensils are of coarse clay, a few of porcelain and one article of glass! Remember, Tollan, the capital of the Toltec Empire, covered not only the site of the present town of Tulla, but the spot where M. Charnay discovered the villa, and now he is unearthing near the former building a large palace. Perhaps during these excavations he may find historical data that will clear up all mystery with regard to the origin of the first inhabitants of the Western Continent. On the 28th ult. M. Charnay announced to *Le Trait d'Union* of this city merely the discovery of a palace, but made no allusion to any architectural peculiarities. We have, however, heard that the ruins recently unearthed are more distinctly Asiatic in style than any Toltec remains now known. In the course of a few days we shall receive further particulars. M. Charnay also had the good fortune to find the bones of some gigantic animals. These remains are now *en route* to this capital."

Boiler Inspection in France. — It is stated that the systematic inspection of boilers, especially in the north of France, has been attended with the happiest results. The French government has recognized as "of public utility" the Steam Users' Association of the Nord, which was founded in 1873. Its objects are the prevention of explosions and other accidents, and the dissemination of useful information as to the generation of steam, together with remarkable facts and discoveries relating to economy of fuel. The board of management consists of twelve members, elected at the annual general meeting, and its staff comprises an engineer-in-chief, three other engineers, four inspectors, three draughtsmen, and an accountant and treasurer. The engineers are selected from among the old pupils of the Ecole Polytechnique and the Institut Industriel du Nord; the inspectors from the first-class engineers on railways, and the best pupils at the Ecole des Arts et Métiers et Chalons. Two inspections are annually made on the premises of members. The first is confined to the external parts of the boiler and its appurtenances, the engineer at the same time giving such useful hints to the engine tender as may seem necessary. The second is a more minute examination, inside and out, and a written report is afterward presented to the responsible manager. The number of boilers under inspection has increased from 526 to 1,108, belonging to 328 establishments, and with the following results:

	1873-4. Per ct.	1876-7. Per ct.
Steam guages in good condition	40	92
Safety valves in good condition	63	88
Boilers with glass tubes	20	78
Number of boilers with old-fashioned water-guages	65	4

Only two accidents have occurred since 1873. In one case the owner of the boiler had just joined the association, and his premises had not been thoroughly inspected, while in the other, the manufacturer had objected to that course, and thus rendered himself liable to expulsion from the society. —*Iron.*

Baalbek. — Mr. Tristram Ellis, who has just returned from an artistic tour in the East, gives a melancholy account of the condition of the famous ruins of Baalbek. It would seem that nothing could exceed the apathy of the Turks, except the cupidity of the Arabs. History melts into legend, when it is sought to fix the date, or even the period to which the original building is attributable. The row of columns, which still stand as a land-mark, rising high out of the great plain of the B'kaa, has remained there for fifteen centuries. The buildings have had but one enemy to fear. What is called time they defied, but the earthquakes, which are common in the East, have toppled them over from time to time. But for them the famous temple would be as perfect as it was seven hundred years before the Norman Conquest. Eleven columns were still standing at the beginning of the present century, but the earthquake of 1820 overthrew five of them. It seems strange how the six that remain have escaped. They reach to a height of 75 feet from the base to the top of the capital, and the shafts are not monoliths, but are constructed in three pieces. The shocks of frequent earthquakes have shattered and cracked the stones of which they are composed, and yet the pillars still stand. The explanation is to be found in the wonderful strength of the joints, each of which was furnished with three copper cramps or lewises, held in their places by lead run from the exterior through small channels or tubes which can be traced on the surface of the fallen fragments. Neither prophet nor temple has honor in his own country. The Arabs found that for the bronze metal they could get a price in the bazaars, while the lead was useful for the manufacture of bullets. And so they have from time to time dug and burrowed into these old marble pillars, and scraped and rooted out the metal work and sold it and converted it to common purposes. The beautiful pillars still stand, but unless something can be done to counteract the mischief, to supply fresh couplings and to strengthen and validate them, there can be little doubt but that the first earthquake will topple them all down to the ground. But who is to do this work? The Turks own the ruins as they have owned them for centuries. They have their hands now full of work at home, and it is not likely they will turn their attention from their new Greek frontier to the ruins of Baalbek. Moreover, a fresh enemy has been developed in process of time and the citizens of the new world assist the ruin of the relics of the old. Mr. Ellis says that English and American travellers, but especially the latter, show off their skill by bringing down the volutes of the pillars and the acanthus leaves carved in the capitals, with the bullets of their revolvers. We shall probably never see the mischief done by the prowling Arabs repaired. But at least a custodian might be appointed to protect what remains of the ruins of Baalbek from the wanton folly of 'Arry and his sharp, smart cousin Jonathan. — *The British Architect.*

BUILDING INTELLIGENCE.

[Reported for The American Architect and Building News].

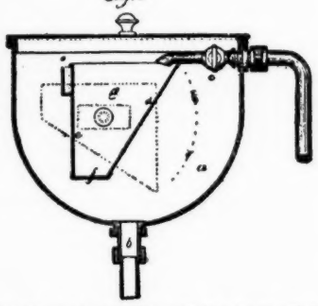
[*Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.*]

BUILDING PATENTS.

[*Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

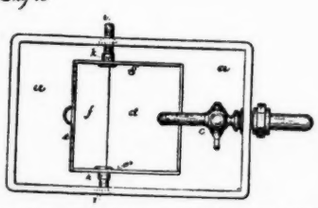
228,264. FLUSHING-CISTERN FOR WATER-CLOSETS. — Samuel G. McFarland, Newton, Mass. Water-closets have heretofore been provided with an elevated cistern from which the water is allowed to flow period-

Fig. 1



ically. In some cases the water is drawn off by a siphon, and in other cases the supply-water runs into a pivoted bucket that tips by the accumulated water and discharges its contents into the cistern, and

Fig 2



from that flushes the closet. In this second case the bucket has been held in position for receiving the water by a stop, and also comes into contact with a second stop when it is tipped for discharging the water, and is liable to turn back before the water is entirely discharged in consequence of the rebound when the bucket comes into contact with the second stop. This invention relates to a tipping bucket that insures the entire delivery of the water and the return of the bucket to its normal position and dispenses with a second stop. The bucket is of a wedge shape, the upper open end being the widest. One side of the bucket is nearly vertical, the other side is at an inclination, and the pivots are at the ends. The upper edge of the nearly-vertical side is weighted. In the normal position the bucket stands with its top edge level, and the water running into it tends to hold it firmly in its place until the accumulation of water above the pivots and upon the inclined side causes an increased weight at one side sufficient to tip the bucket and discharge the contents, and in so doing the bucket turns nearly upside down, and then swings back to place. The cistern vessel *a* is of a suitable size and shape to receive the flushing-bucket. From this cistern *a* the pipe *b* leads to the water-closet, urinal, sink, drain, or other article that is to be flushed periodically. The pipe and cock *c* supply a regulated quantity of water, that runs continuously and according to the quantity supplied, so the closet will be flushed at longer or shorter intervals of time. The tipping bucket is of metal. The pivots *i i* are pointed screws, passing through the ends of the cistern *a* into countersunk holes in the blocks *k*. These blocks *k* are located so that they are near the centre of gravity of the tipping bucket, the preponderance of weight always, however, being at the bottom of the bucket, so that when empty the bottom of the bucket will be down and the open upper end will be in position to receive water from the supply *c*. As water runs into the bucket the weight thereof below the centre of gravity tends to hold the bucket firmly against the cock *c* or other stop, and as the water rises the weight at the inclined side gradually increases in proportion until there is sufficient preponderance of weight to cause the bucket to tip and turn in the direction indicated, and assume the position shown by dotted lines, and pour all the water out into the cistern *a*, after which the bucket returns by the superior weight of the bottom into the normal position for receiving water.

229,486. AUTOMATIC HATCH-CLOSER. — Samuel E. Stokes, Philadelphia, Pa. This invention relates to an improvement in that class of hatch-closing doors which are hung below the level of the floor, and are opened and closed by the action of inclined planes on the cage, in connection with certain springs or weights. Figs. 2 and 3, are transverse sections of a hatch provided with these doors, and show the manner in which the opening and closing of the same are effected; Fig. 4 is a transverse section, showing the doors open and as they appear during the passage of the cage through the hatch; Fig. 5 is a transverse section, showing the doors closed. In the patent of Thompson and Morgan a pair of doors, D D, are hinged to a quadrangular frame, *x*, extending below the floor of the room and below the ceiling of the room beneath, the doors being self-closing and being opened by inclined planes on the cage during the ascent and descent of the same. Doors of this class are preferable to those which, when closed, form a continuation of the floor, and induce persons to stand on them in fancied security, while they are liable to be injured when the doors are suddenly opened by the cage, whereas the cavity formed by the sunken doors always serves as a caution not to approach the hatchway too closely. Each of the doors D is carried by the long arms of a pair of bell-crank levers, E, one of which is pivoted to a transverse beam, F, on one of the side-posts, A, and the other to a similar beam on the opposite side-post, the short arms of the levers being provided with weights *a*, and having anti-friction rollers *b*. Each door D is made in two parts, *d d'*, inclined in respect to each other, the angle of inclination being such that when the doors are open the portions *d* will bear against the inner sides of the beams B surrounding the hatchway, as shown in Fig.

FIG. 2. FIG. 4.

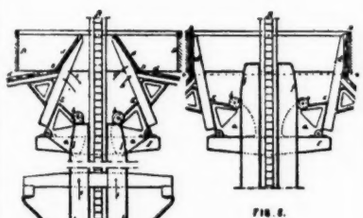
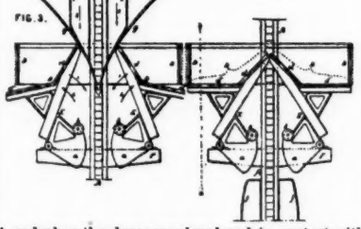


FIG. 3. FIG. 5.



4, and when the doors are closed and in contact with each other the portions *d'* will bear against the lower edges of said beams, and will be in line with the ceiling of the lower room, as shown in Fig. 5. The upper ends of the side beams, *f f*, of the cage are slightly curved, and their lower edges inclined, and the bottom of the cage has a wedge-shaped frame, *g*, as shown in Fig. 3. When the cage ascends, the upper ends of its side beams, *f*, will strike the anti-friction rollers *b* and cause the levers E to swing outward, as shown by the arrows 1, so as to open the doors D, the latter when fully opened occupying the position shown in Fig. 4, and remaining in this position while the cage is passing through the hatch, the rollers *b* moving in contact with the edges of the beams *f*. As the cage leaves the hatchway the doors gradually close, owing to the weights *a* on the levers E, the rollers *b* following the inclined lower ends of the beams *f* and the edges of the doors bearing against the frame *g*. When the cage descends, the above-described operations are reversed, the parts then moving in the directions of the arrows 2. It will be observed, on reference to Fig. 5, that when the doors are closed the hatchway is completely covered, no openings being presented for a draft of air from one story of the building to another, and this result is attained without the use of a closed frame extending below the ceiling, the construction of the doors D rendering such a frame unnecessary.

232,591. INDICATOR FOR ELECTRIC BURGLAR-ALARM. — Addison Bradford, Saratoga Springs, N. Y.

232,607. LEAD AND CRAYON HOLDER. — Alfred C. Hafely, New York, N. Y.

232,608. SAFETY ATTACHMENT FOR ELEVATOR-CAGES. — Philip Hinkle, San Francisco, Cal.

232,609. ROCK-DRILL. — Sylvanus Hussey, Gowanda, N. Y.

232,616. WINDOW-FRAME POCKET. — Harry D. Pursell, Washington Court-house, Ohio.

232,621. LINING FOR FIRE-PLACES. — Jas. B. Witherspoon, New Providence, Ky.

232,634. GAUGE-CHISEL FOR WOOD-TURNING. — Thos. S. Durgin, Worcester, Mass.

232,637. ELEVATOR. — George W. Fitts, Southampton, N. H., and La Roy F. Griffin, Lake Forest, Ill.

232,642. CHIMNEY VENTILATOR. — Joseph C. Henderson, Troy, N. Y.

232,643. ROOFING. Hermann W. Hoeft, La Crosse, Wis.

232,644. CORNICE BRACKET. — Hubert L. Judd, Brooklyn, N. Y.

232,654. CURTAIN-FIXTURE. — Al B. Shaw, Medford, Mass.

232,659. DOOR-HANGER. — Le Grand Ferry, Dundee, N. Y.

232,678. ELECTRIC LIGHT FOR BURGLAR-ALARMS. — Chas. E. Buell.

232,709. FAUCET. — John P. Gruber, Jersey City, N. J.

232,710. SASH-FASTENER. — John Harley, Wallaceburg, Ontario, Canada.

232,725. WINDOW-SCREEN. — John Joseph, Brooklyn, N. Y.

232,735. FILTER. — Ben F. Loomis, Baltimore, Md.

232,747. HINGE. — John T. Morgan, New Brunswick, N. J.

232,785. SCREW-CUTTING DIE-STOCK. — Martin W. Walker and George E. Williams, Sing-Sing, N. Y.

232,789. SHUTTER-FASTENER. — Allen M. Walker, Butler, Ga.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — The following building permits have been issued since the last report, of sufficient importance to be mentioned:

Lorentz & Ritler, three-st'y brick building on Leadenhall St., between West and Stockholm Sts.

Geo. Appold, three-st'y brick building, 25' x 63', on Swan St., in rear of No. 7 Baltimore St.

Smith & Wicks, one-st'y brick building, on cor. Eastern Ave. and Mill St., 100' x 266'.

W. W McClennan, three-st'y brick building, 29' 2" x 60', on Holliday St., between Second and Baltimore Sts.

C. Morton Stewart, three-st'y brick building, cor. Eutaw and Dolphin Sts.

ALTERATIONS. — Mr. C. Morton Stewart is making an addition and alteration to his residence, cor. Eutaw and Dolphin Sts.; cost, $3,500; Messrs. Wyatt and Sperry are the architects, and Henry Smith & Son, contractors.

Boston.

BUILDING PERMITS. — *Brick.* — *Egleston Sq.*, near Weld Ave., for City of Boston, 1 grammar schoolhouse, 80' x 115', three stories; Griffin & O'Sullivan, builders.

North St., Nos. 180 and 182, for Nathan Robbins, 1 mercantile, 20' 9" x 96', five stories; John Kelly, builder.

Wood. — *Washington St.*, near Rockwell St., for R. G. Parker & Co., 1 greenhouse, 20' x 69', with wing 24' x 60'; Hugh McNabb, builder.

Woodbine St., for Wm. Donaldson, 1 dwell., 21' x 30' two stories, pitch roof; Wm. Donaldson, builder.

Bailey St., near Dorchester Ave. for City of Boston, 1 primary school-house, 33' x 65'; J. B. Wilson, builder.

West Fifth St., for W. Chipman, 2 dwells., 15' x 35'; Delano & Little, builders.

Glen Ave., near Blue Hill Ave., for City of Boston, 1 primary school-house, 33' x 65'; Jos. Hammerlee, builder.

STORES. — A building for stores and business purposes is being built at the corner of South, Essex, and East Sts., for Mr. Leopold Morse. The three fronts are of Jonesboro granite, showing 70 feet on Essex St., and 114 feet on South; Mr. Louis Weissbein Boston, architect; J. H. Kelley, contractor for mason-work; McGarragle & Co., carpenters'-work; cost, $70,000.

Brooklyn.

BUILDING PERMITS. — *Strong Pl.*, three-st'y brownstone dwell., 20' x 45'; cost, $7,000; owner and builder, W. E. Donnellon, Pacific St., near Henry St.; architect, R. Dixon.

Fulton St., No. 1888, 2 two-st'y frame dwells., 12' 6" x 40'; owner, Hannah Cathcart; architect and builder, James Cathcart.

Bushwick Ave., 6 two-st'y brick dwells., 16' 8" x 40'; cost, about $2,600 each; owner, J. Murr, cor. Broadway and De Kalb Ave.; architect and builder, Thos. Miller.

Atlantic Ave., two-st'y brick stable, 20' x 39'; owner, Mrs. Hartman, cor Third and Atlantic Aves.; architect, T. F. Thomas; builder, C. B. Sheldon.

Magnolia St., cor. Broadway, 4 three-st'y brick dwells., 25' x 55'; cost, $18,000; owner, Augustus A. Leverich, 852 Bushwick Ave.; builder, John N. Smith.

Seventh Ave., one-st'y brick store, 60' x 50'; cost, $3,000; owner, Ansonia Clock Co.; builders, H. Buckley and H. D. Davies.

Rodney St., 16 two-and-a-half-st'y brown-stone dwells., 16' 9" x 45'; owner, H. B. Scholes, 119 Bedford Ave.; architect, W. H. Gaylor; builder, James Haughran.

Greene St., cor. West St., two-st'y brick stable, 100' x 37'; cost, $6,000; owner, New York Dye Wood Co.; builders, Barker & Berton.

Park Ave., 4 two-st'y frame dwells., 22' x 40'; cost, $2,200 each; owner, etc., George Loffler.

Hooper St., 3 two-st'y brown-stone dwells., 18' 7" x 42'; cost, $2,800 each; owner, etc., Patrick Concannon, 156 Wythe Ave.

Rapelyea St., three-st'y brick tenement, 19' 6" x 50'; owner, Phillip Loubenberger; carpenter, E. Osborn; mason, W. A. Thompson.

Bedford Ave., junction of Rogers Ave. and Bergen St., three-st'y brick store and dwell., 25' x 43'; cost, $4,500; architect, W. H. Gaylor; builder, A. H. Weed.

Bond St., 5 three-st'y brick dwells., 16' x 45'; cost, each, $2,000; owner and architect, Christopher Bedell, 337 Smith St.

Green Ave., 3 three-st'y brown-stone dwells., 17' 6" x 45'; cost, each, $5,000; owner, etc., J. Doherty, 598 Quincy St.

ALTERATIONS. — *Franklin Ave.*, raised one st'y; cost, $6,500; owner, Gutta Percha Rubber Co., office, Park Pl., N. Y.; architect, John Murphy; builder, Jas. Noble.

Court St., cor. Remsen St., theatre, interior alterations; architect and builder, C. H. Chamberlain.

Grand St., No. 107, repair damage by fire; cost, $1,800; owner, Estate Josiah Blackwell, Sturtevant House, New York; architect, J. W. Gibbons; builders, Marinus & Gill.

Chicago.

BUILDING PERMITS. — E. Lang, three-st'y brick store and dwell., 23' x 90', 181 North Clarke St.; cost, $10,000.

Charles Nichols, two-st'y brick dwell., 22' x 36', Julian St., near Paulina; cost, $2,100.

A. Booth, ice-house, 40' x 120', 12 and 14 Michigan Ave.; cost, $2,000.

R. M. Meadowcroft, 2 four-st'y brick stores and dwells., 48' x 89', 96 North Clarke St.; cost, $40,000.

Thomas Fallon, two-st'y brick dwell., 20′ x 60′, 155 North Union St.; cost, $3,000.

H. Tewes, three-st'y brick dwell., 25′ x 60′, 305 Illinois St.; cost, $18,000.

Mrs. H. Williams, two-st'y brick dwell., 22′ x 56′, 417 Hurlbut St.; cost, $4,000.

Desiccating Co., one-and-one-half-st'y elevator, 75′ x 100′, 330 Ullman St.; cost, $6,000.

John Adler, one-and-one-half-st'y brick dwell., 22′ x 50′, Evergreen St., near Hoyne Ave.; cost, $2,000.

Phillip Mueller, two-st'y brick dwell., 22′ x 64′, 528 Sedgwick St.; cost, $4,000.

P. Blackhahn, brick basement and front addition, 22′ x 24′, 2838 State St.; cost, $3,000.

Rev. P. Fischer, two-st'y brick dwell., 22′ x 50′, Hanover Ave.; cost, $3,500.

Monroe Salisbury, two-st'y brick dwell., 22′ x 45′, 329 Wells St.; cost, $3,500.

J. M. Maynard, 3 two-st'y brick dwells., 66′ x 48′, Locust St., near Clark; cost, $12,000.

John Kaiser, three-st'y brick store and ice-house, 24′ x 76′, 471 Larrabee St.; cost, $4,500.

J. Koenick, two-st'y brick dwell., 20′ x 50′, West Eighteenth St., near Paulina; cost, $2,000.

W. Halvorsen, four-st'y brick factory, 47′ x 100′, 130 and 132 Green St.; cost, $5,000.

Mrs. J. Ray, three-st'y brick addition, 25′ x 30′, 669 (old number) State St.; cost, $6,000.

A. Snell, 11 two-st'y brick dwells., 43′ x 167′, Randolph St , cor. Ada; cost, $35,000.

C. B. Farwell, five-st'y stores, 90′ x 115′, Market St., near Monroe St.; cost, $42,000.

A. Loeb, 6 two-st'y brick and stone dwells., 48′ x 164′, Lincoln Ave., near Sophia St.; cost, $20,000.

N. Murvan, 2 two-st'y brick stores and dwells., 46′ x 52′, 569 and 571 West Erie St.; cost, $3,300.

W. Dickinson, 5 three-st'y brick and stone dwells., 65′ 6″ x 103′, North La Salle St., near Schiller; cost, $25,000.

A. Asher, two-st'y brick dwell., 26′ x 55′, 83 Chicago Ave.; cost, $2,500.

Isaac Greensfelder and J. Rosenberg, three-st'y brick hospital, 44′ x 160′, Cottage Pl. and Twenty-Ninth St.; cost, $40,000.

G. H. Bentley, two-st'y brick dwell., 22′ x 61′, 252 Pine St.; cost, $4,000.

Cincinnati.

Building Permits. — S. L. Wilder, three-st'y brick, Nos. 202 and 204 West Sixth St.; cost, $9,000,

Mrs. George Ward Nichols, to repair three-st'y brick, Eastern Ave., north of Little Miami Railroad crossing; cost, $3,000.

J. H. Overbecke, three-st'y brick, south side Dandridge St., between Pendleton and Hunt Sts.; cost, $4,000.

New York.

Building Permits. — *One Hundred and Thirteenth St.*, two-st'y brick stable, 39′ x 70′; cost, $3,000; owner, L. Tone, One Hundred and Twelfth St.; architect, R. Townsend; builder, J. A. Hopper.

East Sixtieth St., No. 340, four-st'y brick tenement, 20′ x 60′; cost, $6,500; owner, G. G. Gregory, 148 East Forty-Ninth St.; architect, Julius Boekell.

One Hundred and Fortieth St., four-st'y brick tenement, 52′ x 25′; cost, $9,000; owner, Thomas Fisher, Third Ave:, cor. One Hundred and Fortieth St.; architect, James Stroud.

Ninth Ave., 3 three-st'y brick stores and tenements, 16′ 8″ x 35′; cost, each, $2,000; owner, Lawrence Odell, 48 West Thirty-Third St.; architect, Jno. Sexton; builders, W. H. & C. Gedney.

One Hundred and Fifty-Second St., two-st'y brick shop, 100′ x 63′; cost, $5,000; owner, D. Robitzek, One Hundred and Fifty-Second St., near Robbins Ave.; architect, A. Piering.

One Hundred and Forty-Third St., 3 two-st'y frame dwells., 17′ 8″ x 40′; cost, each, $2,500; architect, Wm. Bell, Fifth St. and Boston Road; builder, John Knox.

East One Hundred and Thirteenth St., No. 158, 2 two-st'y brown-stone dwells., 12′6″ x 50′; cost, $2,500; owner and builder, A. S. Fountaine, 222 East One Hundred and Twelfth St.

Seventy-Ninth St., 6 four-st'y Connecticut brown-stone dwells., 18′ x 56′; cost, each, $12,000; owner and builder, Jas. A. Frame, 107 East Seventieth St.; architects, Thom & Wilson.

Thirty-Fourth St., two-st'y brick feed store, 23′ x 90′; cost, $2,500; owner, John E. Connolly; architect, B. McGurk; builder, E. McEvoy.

Baxter St., No. 18, brick tenement, 24′ x 116′ 6″; cost, $18,000; owner, David Finelite, 171 East Broadway; architect, F. A. Peterson; builders, Patrick Childs and A. C. McKenzie.

One Hundred and Twenty-Seventh St., 3 three-st'y brown-stone dwells., 16′ 8″ x 50′; cost, each, $7,000; owner, architect, and builder, Samuel Lynch, 46 West One Hundred and Twenty-Fifth St.

One Hundred and Twentieth St., 4 four-st'y brown-stone tenements, 25′ x 51′; cost, $9,000 each; owner, E. Meehan, 131 East One Hundred and Ninth St.; builder, Hugh Meehan.

West Sixteenth St., Nos. 229 *and* 231, 2 five-st'y brown-stone tenements, 29′ 4″ x 86′; cost, each, about $20,000; owner, Warren Beaman, 320 West Fifty-Second St.; architect, W. H. Hume; builder, not selected.

West Thirteenth St., Nos. 66 *and* 68, three-st'y brick office-building, 40′ x 25′; cost, $5,500; owner, Thompson estate; architect, Jas. J. Lyons; builder, H. M. Reynold.

Eighth Ave., eight-st'y Dorchester-stone and brick family hotel, 204′ 4″ x 200′; estimated cost, $1,000,000; owner, Edward Clark, 34 Union Sq.; architect, H. J. Hardenbergh; builder, John Banta.

Fifth Ave., cor. Eightieth St., four-st'y Connecticut brown-stone dwell., 25′ 8″ x 67′; estimated cost, $50,000; owner, W. A. Dooley, Williamsbridge, N. Y.; architect, H. J. Hardenbergh; builder, not selected.

Fifth Ave., cor. One Hundred and Twenty-Ninth St., 3 four-st'y brown-stone dwells., 50′ 3″ x 50′; cost, $11,000 each; owner, Charles Wilde, 371 East One Hundred and Twenty-Third St.; architect, T. H. McAvoy.

Forty-Fifth St., one-st'y brick slaughter-house, 25′ x 60′; cost, $4,500; owner, Schwatzchild & Sulzberger; architect, J. McIntyre; builder, Jno. F. Moore.

Sheriff St., No. 89, four-st'y brick tenement; cost, $9,000.

Eighty-Second St., near Fifth Ave., 2 brown-stone four-st'y tenements; cost, $11,000 each.

First Ave., 2 brown-stone four-st'y tenements; cost, $11,000 each.

One Hundred and Fifth St., cor. Fourth Ave., 6 brown-stone dwells.; cost, $6,500 each.

One Hundred and Fourteenth St., near First Ave., 2 brown-stone four-st'y flats; cost, $8,500 each.

One Hundred and Fourteenth St., near Second Ave., two-st'y brick dwell.; cost, $5,000; John C. Burne, architect.

One Hundred and Fourteenth St., near First Ave., brown-stone four-st'y flat, 20′ x 52′; estimated cost, $8,000; James Duffy, owner and builder.

West Fifty-First St., Nos. 411 *and* 413, 2 brown-stone five-st'y tenements, each 25′ x 70′; estimated cost, $20,000 each.

West Farms, near Woodlawn Cemetery, a brick church, 37′ x 66′; cost, $7,000; Rev. M. Nolan, owner.

Ninety-Second St., near Lexington Ave., 3 brick three-st'y dwells., each 16′ 8″ x 42′; cost, $6,000 each; Albert Howell, owner; A. B. Ogden, architect.

Alterations. — *Broadway, Nos.* 858 *and* 860, raised 3 feet; cost, $2,500; lessee, Joseph Morton; builder, T. Conner.

Fourteenth St., cor. Irving Pl., one-st'y extension, 34′ 8″ x 30′; cost, $2,000; owner, Academy of Music; architect, W. P. Anderson; builders, F. Bloodgood and Haight & Monnis.

Hudson St., No. 573, raised one-st'y, general alterations; cost, $5,000; owner, J. Holtzderber, 569 West Tenth St.; architect, Wm. José.

West Twenty-Eighth St., No. 4, reduced one-st'y and three-st'y brick extension, 25′ x 35′ 2″; cost, $2,500; owner, Samuel Hassell, on premises; carpenters, McCarthy & White; mason, A. Keating.

Opera-House. — The plans were put in on October 1st, and it is anticipated that as soon as the successful plans are decided on, work will be immediately commenced.

The Obelisk is now under way to the Park, and it is anticipated that the corner-stone of the foundation will be laid to-day (October 9th).

Church. — Mr. S. D. Hatch has prepared plans for the Methodist Episcopal church to be erected on Seventy-First St., near Ninth Ave.

Building Materials remain about as last reported, and we see no prospect of any immediate change in prices.

Picture-Gallery. — Mr. Wm. E. Dodge is about to build a picture gallery adjoining his residence, at an expense of $25,000.

Asylum. — On Monday, October 4, the trustees of the Institution for the Improved Instruction of Deaf Mutes laid the corner-stone of their new institute building.

St. Louis.

Building Permits. — Forty permits have been issued since our last report, of which four are for frame structures of slight importance. Of the rest, those worth $2,500 or over are as follows: —

Owners' Name.	Use.	Str's	R'ms	Cost
S. M. Rose,	Dwell.	2	9	$5,000
F. Roth,	Dwell.	3	14	5,000
S. Wainwright,	Ice & beer st'ge	2	2	5,000
Mrs. S. Stobie,	Dwell.	2	6	2,600
Champion Machine Co.,	Warehouse,	3	3	15,000
C. K. Ramben,	Dwell.	2	14	7,000

Philadelphia.

Building Permits. — *Dauphin St.*, near Frankford Road, two-st'y warehouse, 22′ x 24′; E. Schmidt, contractor.

Wayne St., near Coulton St., three-st'y dwell., 32′ x 60′; Balderson & Hatton, contractors.

Ann St., cor. Edgemont St., two-st'y dwell., 20′ x 50′; Patrick Boyce, owner.

Warnock St., Nos. 2046, 2048, 2050, 3 three-st'y front buildings; Roydhouse & Atkinson, contractors.

Dauphin St., near Twenty-Eighth St., two st'y dwell., 18′ x 44′; Sam'l Stewart, contractor.

Baltimore St., near Sixtieth St., two-st'y picker house; Geo. Callaghan, owner.

Thompson St., near Somerset St., two-st'y building, 20′ x 18′; F. H. Develin, contractor.

North St., near Sixteenth St., two-st'y shop, 19′ x 19′; Edward Carter, contractor.

Palethorp St., near Diamond St., two-st'y stable and slaughter-house, 48′ x 30′; Aug. Schreiber, contractor.

Delhi and Dauphin Sts., two-st'y dwell., and two-st'y stable, 17′ x 40′; A. Kurtz, owner.

South Sixth St., No. 769, three-st'y store and dwell., 18′ x 30′; Chas. O'Neil, Jr., contractor.

Howard St., near Lehigh St., 2 two-st'y dwells., 15′ x 39′; Henry Hartzell, contractor.

Sixtieth St., near Vine St. — 5 two-st'y dwells., 13′ x 30′; Harry Pettit, contractor.

Dawson St., near Terrace, two-st'y dwell., 18′ x 45′; contractors, Staley & Davis.

York, cor. Orkley St., 2 two-st'y dwells., 15′ x 30′; owner, Charles Herman.

Fletcher St., near Ninth St., 2 two-st'y dwells., 16′ x 30′; owner and builder, A. Skilton.

Ninth, cor. Montgomery St., factory, 42′ x 400′; contractor, John Sullivan & Son.

Snyder St., near Eighteenth, three-st'y dwell., 15′ x 18′; owner and builder, M. A. Clark.

Somerset St., near Garret St., two-st'y dwell., 16′ x 40′; owner, James Creighton.

Forty-Third and Aspen Sts., 1 school-house, 16′ x 20′; Jno. F. Meye, contractor.

Ridge St., No. 3331, two-st'y building, 18′ x 34′; owner and builder, C. K. Sorber.

Art Building. — The new white marble building being erected for Mr. Alfred G. Baker, on Chestnut St., between Fifteenth and Sixteenth Sts., is nearing completion. It is intended as an art building throughout.

Asylum. — The new building of the Home for Incurables is nearing completion. This building is at junction of Forty-Eighth St. and Woodland Ave., three stories high, has frontage of 72′ and a depth of 44′; W. G. Hale, architect; cost, $25,000.

The Material Market has continued at previous quotations. Roofing-felt, however, is now quoted at 2 cents per pound.

General Notes.

Cleveland, O. — Two frame houses for Thos. Axworthy on Clinton Street. Cost $7,000. Jas. Cowell, contractor; Coburn and Barnum, architects.

Dorchester, Mass. — Mr. O. F. Smith, of Boston, is the architect of a house for Mr. G. W. Russell. It is 29′ x 40′, two stories, pitch roof; John F. Haines, contractor; cost, $4,000.

Elberon, N. Y. — For Horace White, Esq., a frame residence is to be built, from designs of Messrs. McKim, Mead & White, of New York.

East Liverpool, O. — The following are reported: a three-st'y brick wareroom, 45′ x 110′, by Goodwin Bros.; a three-st'y brick building for shops and wareroom, 40′ x 100′, by West, Hardwick & Co.; a two-st'y brick wareroom, 40′ x 90′, by Goodwin & Flentke; a four-st'y brick pottery addition, 110′ x 230′, by Knowles, Taylor & Knowles; a two-st'y brick addition, 35′ x 90′, to knob works, by Thomas & Sons; a three-st'y brick decorating establishment, 40′ x 90′, by Geo. Humrickhouse; a four-st'y grain warehouse, 45′ x 75′, by Frank Stewart; a large brick addition to the pottery of C. C. Thompson & Co.; a four-st'y brick hotel, 90′ x 100′, by A. M. Davidson; a two-st'y brick storeroom, by Pickel & McIntosh, 20′ x 80′; a two-st'y brick school-house, 20′ x 80′; a brick addition to the Flint Mill; a two-st'y brick storeroom, by Dr. J. J. Spert.

Louisville, Ky. — J. Lawrence Smith is to build a four-story brick building on the west side of Third street, between Jefferson and Green; cost, $3,000. The L. C. and L. Railroad Company is to build a one-story stone and brick freight depot, 100 feet front by 420 feet deep; cost, $30,000.

Mt. Hope Bay, Mass. — The erection of the lighthouse on Borden's flats, for which $25,000 was appropriated last session, is being pushed. It will be a low, strongly built structure, founded on long iron piles, packed with cement and driven into the marsh. It will probably be completed and its lantern lighted before New Year's day.

Riverhead, N. Y. — The Suffolk County Board of Supervisors have at last contracted for a new jail to take the place of the old insecure structure.

Stamford, Conn. — The establishment of the minor light on Forked Rock, Stamford Harbor, Conn., for which $7,000 was appropriated last session, will be finished by the end of this year.

Tarrytown, N. Y. — A deaf and dumb asylum is to be built, plans for which are now being prepared.

Washington, D. C. — Mr. Clark, architect to the Capitol reports that, on the Capitol extension, there was expended, last year, $50,000; on ventilating the hall, $30,000; heating apparatus, $4,000; lighting the grounds, $32,400, less $1,883.99 to be returned to the treasury; Capitol grounds, $60,000; extension to Government printing office, $43,000, less $516.19 returned to the treasury.

Wickford Harbor, R. I. — Last session Congress authorized the erection of a lighthouse on old Gay Rock, Wickford Harbor, Narragansett Bay, appropriating $45,000 therefor. This was the largest amount appropriated for a new lighthouse. Gen. Duane is now preparing plans and estimates for the structure.

Williamstown, Mass. — The building for the new Wilder Cabinet will be of stone, fire-proof, and so placed as to complete a quadrangle with South and East Colleges and the observatory. Another addition to the college buildings will be a building on the lot near Goodrich Hall for an art gallery, lecture rooms, rooms for the literary societies and other purposes.

Industrial.

Adams, Mass. — The Renfrew Manufacturing Company have decided to build a mill, ground has already been broken for that purpose. The main building will be 394 feet by 135, one story and of brick. A dye-house and drying-room, 160 by 30 feet, are also to be built.

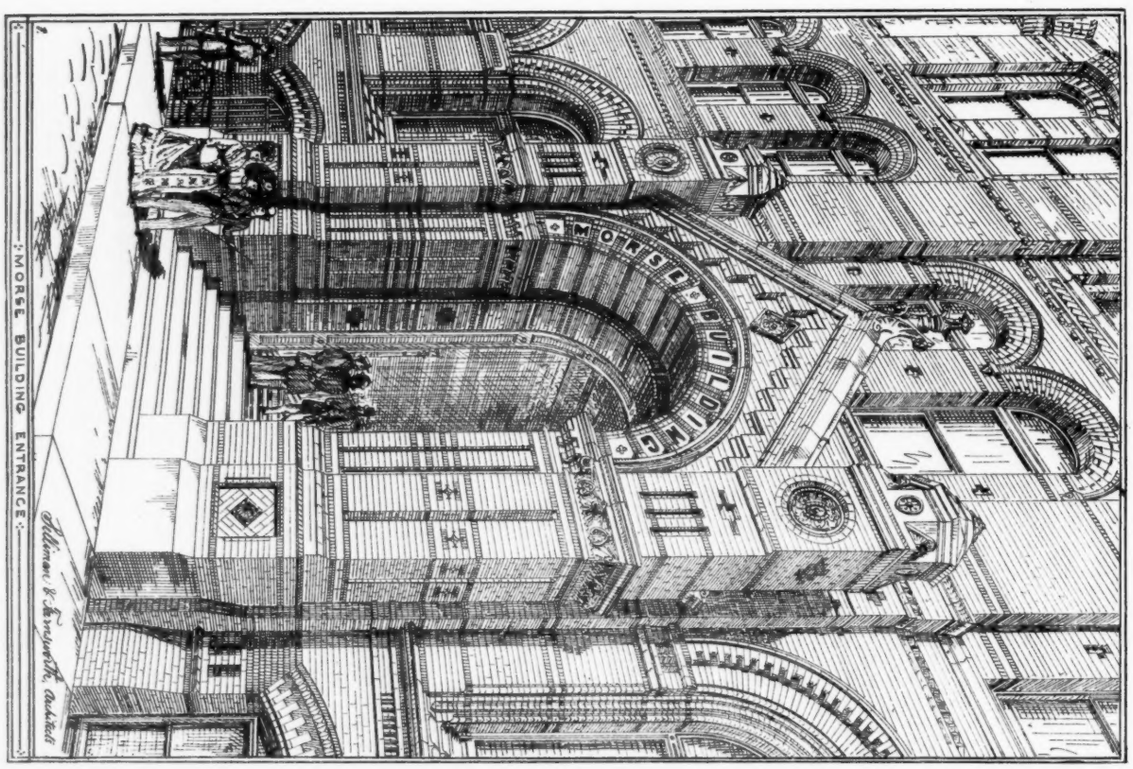
Camden, N. J. — Wood Brothers are to build a large woolen mill.

Newburyport, Mass. — Robert Couch is to build a wooden factory 80 by 30 feet, four stories high.

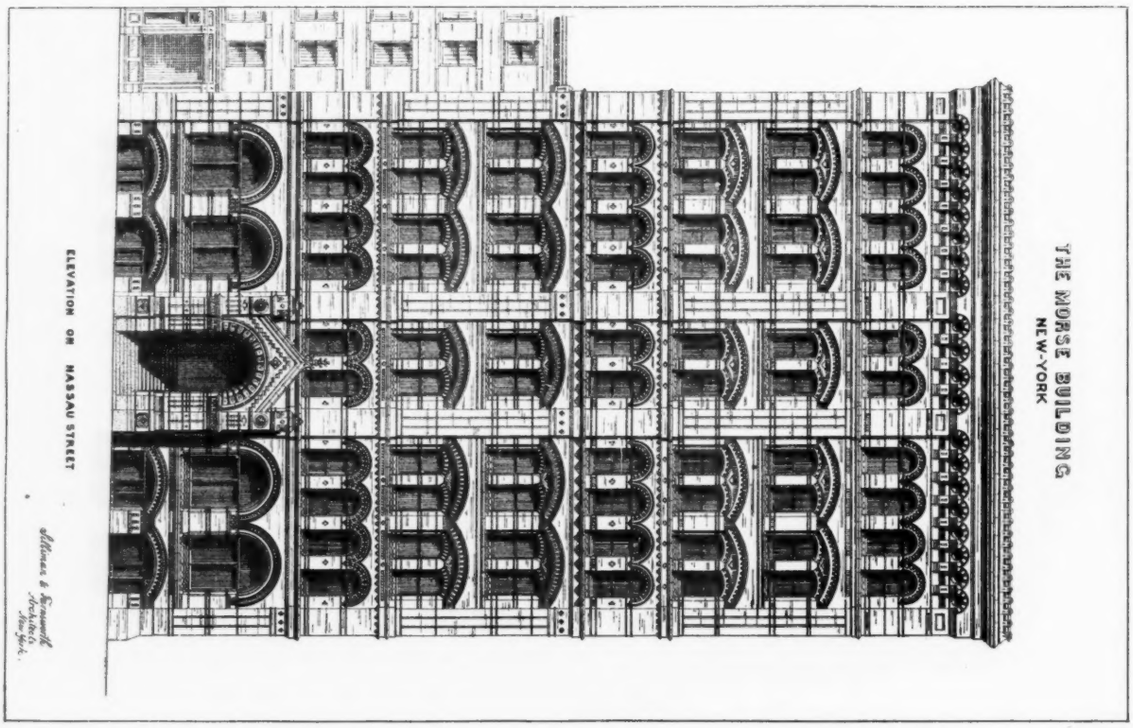
Orange, Mass. — The Orange Gold Medal Sewing Machine Company broke ground recently for an addition to the new shop, which is to be 130 feet long, 50 feet wide, and two stories high.

Troy, N. Y. — Samuel O. Gleason is to erect a large building which will be ready for occupancy by February 1, 1881. The building will be of brick, five stories high including basement, and will be 35 feet front by 106 feet in depth. It will cost, including the cost of the lot, about $50,000.

Westfield, Mass. — Crane Bros. are to build an addition 80 by 40 feet in size, to their paper mill.



MORSE BUILDING ENTRANCE.



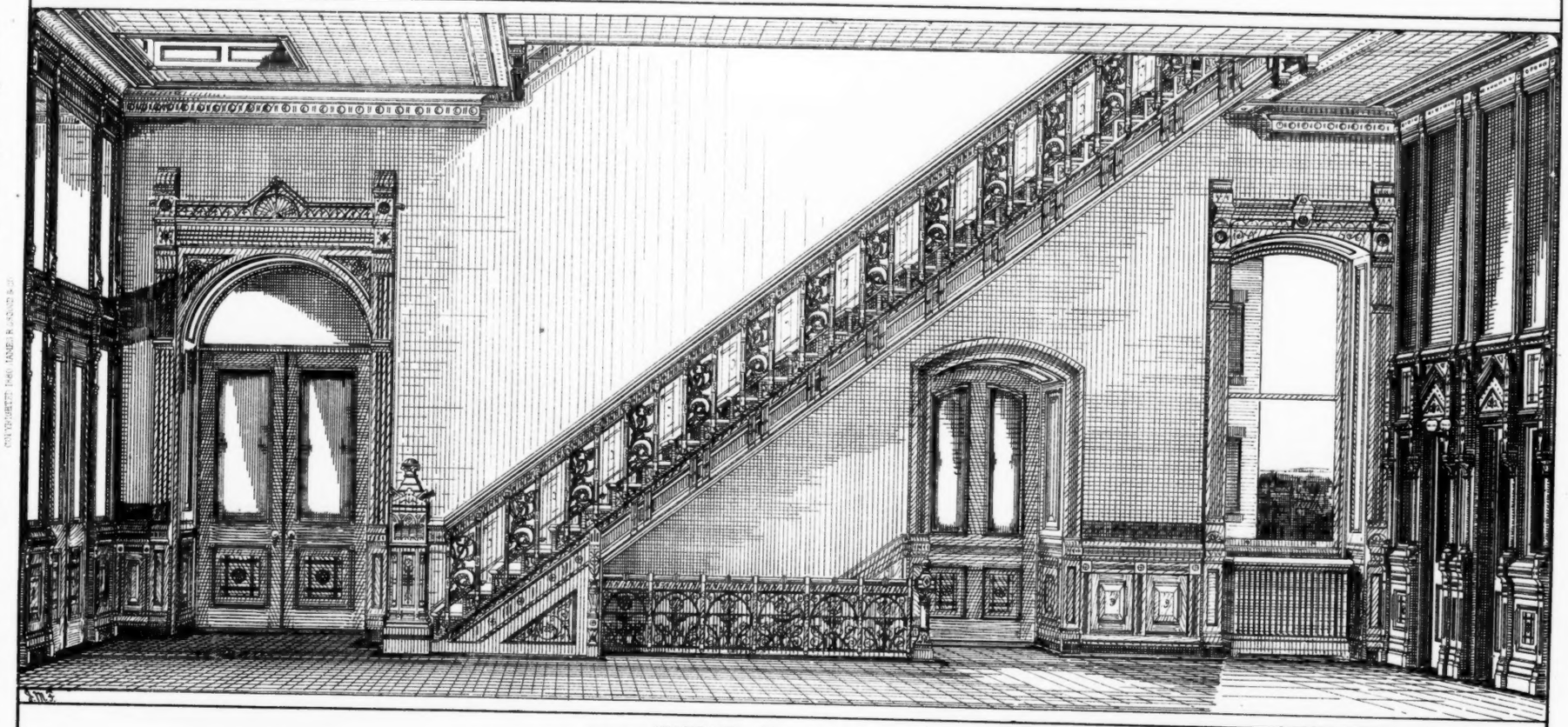
THE MORSE BUILDING
NEW-YORK

ELEVATION ON NASSAU STREET

Gilman & Kendall, Architects, New York.

AMERICAN ARCHITECT AND BUILDING NEWS OCT. 9, 1880. No. 250

MORSE BUILDING NEW-YORK.

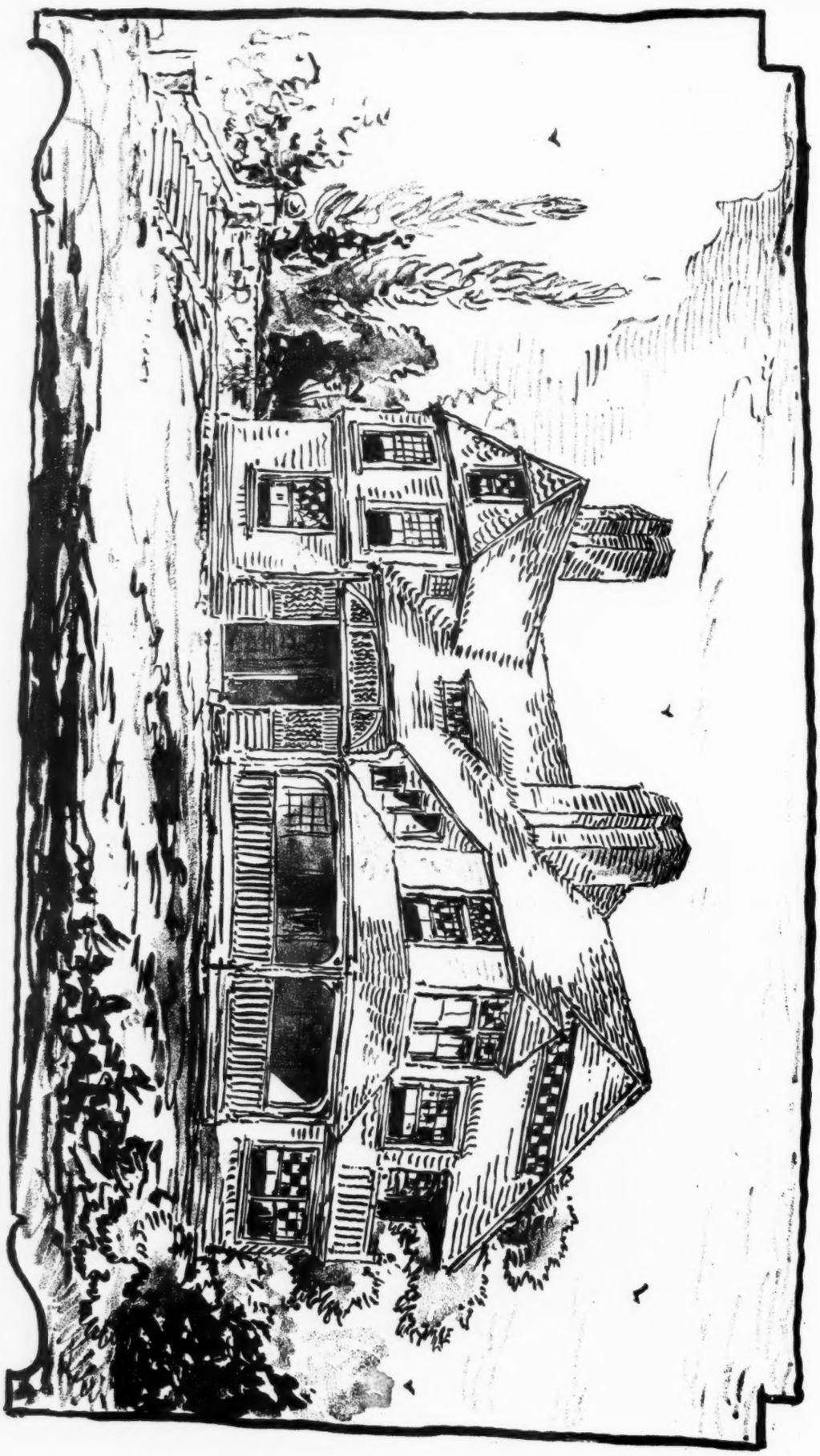


INTERIOR OF

STAIRCASE HALL MAIN FLOOR

Lillimar & Farnsworth Archts. N.Y.

THE HELIOTYPE PRINTING CO. 211 TREMONT ST. BOSTON.



SKETCH FOR A COUNTRY HOUSE.

W. R. Emerson, Architect.

CHURCH TOWERS, YORK, PA.

CHRIST CHURCH BUILT 1812

ZION CHURCH BUILT 1807

J.E. SPERRY, DEL