

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. VIII.

Copyright, 1880, JAMES R. OSGOOD & Co.

No. 245.

SEPTEMBER 4, 1880.

Entered at the Post Office at Boston as second-class matter.

CONTENTS.

SUMMARY:—

Democritus of Abdera and the New York Obelisk.—A Translation of his Reading of the Hieroglyphics.—The Endeavors of the New York Board of Health.—General di Cesnola and Mr. Gaston Feuardent.—The Nicaragua Ship Canal.—The Canal from Bordeaux to Narbonne.—The Value of Land in London.—Color in Greek Architecture.—Ancient Trusts in England	109
NOTES ON ELEVATORS.—IV.	111
VAULTS.—II.	113
THE ILLUSTRATIONS:—	
A Private Hospital in New York, N. Y.—A Street in Loches.—The Webster House at Marshfield, Mass.	114
HOUSE BUILDING IN SPAIN.	115
LIGHTNING AND GAS AND WATER PIPES.	115
UNDER-GLAZE PAINTING ON POTTERY.	116
LONDON WATER SUPPLY.	116
STAIRS.	117
THE MANAGEMENT OF PRIVIES IN NEW ORLEANS.	117
COMMUNICATION:—	
Discrepancies between Plans and Specifications.	117
NOTES AND CLIPPINGS.	118

A CORRESPONDENT of the New York *Graphic* has made a discovery which may well be said to throw all the other archaeological achievements of the age into the shade. It seems that the philosopher Democritus of Abdera, who was, as we can all discover by looking in the encyclopædia, a great traveller, spent several years in Egypt, and on his return composed, from notes taken there, a treatise on the Egyptian hieroglyphics, comprising a dictionary of the symbols, as they were explained to him by the priests of the country. This work, like most of the writings of Democritus, is lost, or rather has been supposed to be lost, for, by a coincidence which the *Graphic* very justifiably terms providential, just at the time that the London and the New York obelisks were either on the way or were preparing to embark for their new homes, a palimpsest was discovered in an "old monastery," at Catana, in the island of Sicily, which when cleaned proved to be a Latin translation of this very treatise. A "gentleman who wishes to remain unknown," now has possession of this document, and wishing to give the citizens of his native land some benefit of it, he has imparted to the *Graphic*, not, unfortunately, a quotation from the manuscript, which could not fail to be interesting, especially as it is "illustrated" with diagrams of some hundred hieroglyphic symbols, the explanation of which are contained in the text, but a translation of a part of the inscriptions on the New York obelisk.

JUDGING from the fragment of the translation which is given, we may be glad that he has spared us the rest, for a more foolish, ungrammatical, tedious and prolix inscription was surely never cut on stone. The translator, however, furnishes us with an abstract of the remainder, which he says contains an account of the wanderings of the ancestors of the Egyptians before their settlement in Africa, and their exploits afterwards, with some predictions as to the future, all of the most important character. The progenitors of the Egyptians, it appears, came from a place where rose-trees, dates, figs and tamarinds were abundant, and the "butterfly airs his gauzy wings the lifelong day," and "bees have no sting." Travelling through regions where the "grass is ever green and the goats never weary in giving milk," they, after some further adventures arrived at the "blessed Nile." Then follow references to Egyptian history, and the inscription winds up with a prophecy that the stone will be taken back to the land whence came the "noble sires" of those who erected it. The translator considers that this prophecy has been fulfilled, and is quite sure that the cradle of the Egyptian race was in the New World. Mexico, he thinks, is indicated by the text, a conclusion from which we must respectfully differ, dates, figs and tamarinds being about as little characteristic productions of Mexico as "gauzy winged butterflies" are of any known country. However, the translator thinks himself justified in claiming that Mexican civilization produced that of Egypt, and that there is a close relationship between the so-called Aztec inscriptions and the hieroglyphics. It is not long since we were informed that the Central American characters were in some cases so clearly of

Chinese origin that they could still be read by those versed in the ancient writing of China, but no doubt the illustrated manuscript of Democritus will explain all these things. The *Graphic* confirms the views of its correspondent by some cuts of Indian scrawls on flat stones, among which are represented rude obelisks, which, it thinks, show a relation between the arts of aboriginal America and Egypt.

WE are glad to see that we did the New York Board of Health injustice in a recent editorial paragraph, by underrating both their energy and the power with which they were clothed. The probability that such a board, unless organized *inter arma*, so to speak, as was the case at Memphis, would have either the authority or the courage necessary to compel the changing of the plumbing apparatus inside private houses seemed to us very small. The New York Board, however, prove that they have the courage, and claim the authority, so we apologize with such grace as we may for our error, and shall chronicle with much satisfaction the events of their warfare against filth and degradation. Their last exploit was, it seems, to order "school sinks," one of the very best forms of latrine for the purpose, to be placed in certain tenement-houses, in place of the present noisome apparatus. The proprietors of the houses of course objected that the use of the school sinks was "inexpedient;" that there was not sufficient water to flush them properly; that they required too much attention, and were liable to freeze; in short, they were in every way objectionable. Dr. Janeway replied very courteously, explaining the objections to the present closets, but without apparently making much impression on the landlords, who, finding that the Board would not modify or rescind their order, withdrew, threatening resistance in the courts. We hope that they will execute their threats, and that the struggle will be sharp and decisive. Nothing would help the authority of the Board more than a signal victory over private greed and obstinacy at the beginning, and no occasion could be better than this.

FROM present indications, the storm which was awakened by the letter of Mr. Feuardent to the *Art Amateur* about the Di Cesnola collection seems to be gathering strength before it breaks upon his devoted head, and we shall not be surprised any day to hear that his blood has been shed to appease the fury of the *Evening Post* reporters. Already an action for libel is talked about, and General di Cesnola publishes a card declaring the charge that "unintelligent restorations" have been made to be "malicious," and "absolutely without foundation in fact," and promising that when the Trustees return an investigation will be made which "will put an end to these attacks," "whether made from ignorance, from malice, or from interested motives." As Mr. Feuardent is a foreigner, and probably utterly unable to comprehend this uproar, we will inform him that it is only the usual style in which American artists and amateurs welcome criticism, and he may as well understand at once that if he ever receives any unfavorable impression of what he sees in this country, he will consult his personal safety by keeping his thoughts to himself. For the first time since the controversy commenced, we notice a reply to M. Feuardent's assertion that the female figure holding up its robe with one hand, and carrying a flower in the other, signified Hope, in the shape of a conversation with Mr. Savage, Assistant Director of the Metropolitan Museum, who says that it is now well established that this figure anciently signified Aphrodite, but was appropriated to symbolize Hope only in Roman times. He quotes Dr. Fränkel, editor of the *Archäologische Zeitung*, Mr. Newton of the British Museum, and M. Colonna Ceccaldi, in support of this theory, and says that to carve a mirror, as Mr. Feuardent believes was done, to make a statuette into an Aphrodite which was indisputably an Aphrodite already, would have been "extremely asinine." We should say that there was a weak spot in this argument, but will not point it out. Perhaps Mr. Feuardent, now that he has something else to reply to than bare assertions of his own folly and villany, may have a word to say in his turn.

THE Nicaragua Ship Canal enterprise has received a sudden and unexpected check through the formal protest of the government of Costa Rica against the contract made between Nicaragua and the Canal Company. The state of Costa Rica

claims to be divided from Nicaragua by the San Juan river and harbor, which it is proposed to utilize for the canal, and professes that its rights in them are equal to those of Nicaragua, and that the signing of a treaty between the latter state and the company, without its previous consent, was an offence to its dignity. On the other hand, Nicaragua has never admitted that the Costa Rica frontier extended to the river, and has no intention of yielding the point now. An ultimatum on the subject has been addressed to the government of Costa Rica, and there is a strong probability that instead of being the scene of peaceful enterprise and commercial activity, the debated region will for the next few years be scourged by the uniformed cut-throats and incendiaries of both sides, while the canal company will quietly withdraw, and divert their money and energy into other fields. Meanwhile, Captain Eads continues to advocate his ship-railway scheme with the modest self-possession of one sure of his ground. Judging from the experience of Nicaragua, it is no slight argument in favor of his undertaking that the railway will be located at the isthmus of Tehuantepec, within the territorial limits of Mexico, and therefore not subject to be lined on each side by the artillery of hostile nations engaged in "rectifying their frontier," while the distance between our Atlantic and Pacific ports will by this route be nearly seven hundred miles less than by the way of Nicaragua, and thirteen or fourteen hundred less than by Panama. Captain Eads asserts that such railways as he proposes are in constant use, at a smaller scale, on canals in Europe and this country, and the question of increasing the dimensions is an easy one to solve.

THE fashion of canal building now prevalent seems to be responsible for the revival of one repeatedly proposed in France, but much less promising financially, we should say, than the others which are now under consideration, by which it is proposed to furnish a passage for ships from Bordeaux, on the Atlantic, or rather the Bay of Biscay, to some port on the Mediterranean coast of France, probably either Cette or Narbonne. This part of the continent is quite broken in surface, especially near the city of Toulouse, which is situated on the route proposed, so that fifty or sixty locks will be required to lift the vessels up the ridges which culminate in the Pyrenees, and let them down again on the other side. The cost of the undertaking is estimated at something like one hundred million dollars, and the running expenses of a canal so complicated with locks must be very great, while the time saved in transit between Bordeaux and the Mediterranean ports over the route by way of the Straits of Gibraltar is only about sixty hours. Supposing the cost of operating to be only one half the gross receipts, and that the stock-holders were satisfied with five per cent dividends, ten million dollars per annum, or two hundred thousand a week, must be derived from tolls. To save a sixty hours' voyage might perhaps be worth a hundred dollars to the average Mediterranean trader. If the toll, therefore, were fixed at that sum, two thousand vessels per week must pass through the canal in order to keep the receipts up to the dividend-paying point; or three hundred and thirty-three per day; or, to be brief, about one every two minutes while the sun was above the horizon. It is safe to say that unless some new way of working the locks is invented, such a stream of business could not possibly pass through them, even if the business should present itself.

LONDON is a city of such immense extent, its parks, squares, "crescents," "circuses" and terraces occupy so much ground, and the passion for garden space around the houses is so universal as to give occasion for a very prevalent idea that the value of land for dwelling-house sites in the city is small in comparison with the prices demanded, for instance, in New York. The vast extension of the underground railway system also, is currently supposed to have brought the suburbs practically so near the heart of London as still further to reduce the demand for house-lots centrally situated. That this supposition is unfounded may be shown by the reports of actual sales of real estate. Much of the land in the best residential quarters of London is never sold, but leased to builders for long terms at a ground rent, and the purchaser of houses built on such land acquires only the use of the property during the unexpired portion of the given term. Hence it is not always easy to deduce the actual value of even unimproved land from the recorded price given. Now and then, however, a piece of freehold property comes into the market, the absolute ownership in

which passes by the sale, and the price obtained can be compared directly with those current among us. Such a sale took place a few weeks ago, the property offered being a small lot, of ninety-three feet frontage on Park Lane, a fashionable, but rather irregular street of residences which leads out of Piccadilly near the entrance of Hyde Park. The average depth of the lot was but twenty-two and one-half feet, and the ground was occupied by some very inferior houses with small shops, and the back entrance to a "horse repository." The total rental of these structures amounted to two thousand one hundred and fifty dollars per year, but the leases might be terminated at six months' notice, if the ground were wanted for building, and the lot was sold for sixty-two thousand five hundred dollars, or almost thirty dollars per square foot. Considering that the fashionable quarter in London continually changes, and that "May-fair," through which Park Lane runs, is already losing its prestige, it must be acknowledged that such property retains a very substantial value.

ONE of the best-known and most beautiful of all the antique models of the Greek Ionic order, is the temple of Athena Polias, at Priene, in Asia Minor, details from which have been familiar to students since the days of Stuart and Revett. More recently quite extensive explorations have been prosecuted on the spot, and although the natives have made way with everything that was of value to them, some interesting information has been gained. Among other things, the ruins of Priene afford peculiarly clear indications of the manner in which the marble was decorated with color, and these indications fully confirm the opinion now generally held, that paint was applied by the Greeks only upon the mouldings and the sculptured portions, and in the caissons; and that but two pigments were employed, vermilion, and a light blue silicate of copper. It will probably long remain a mystery how they could have obtained a good effect with them, but careful and conscientious restorations may yet reveal the secret. One of the most interesting subjects of archaeological inquiry is certainly the use which the ancient Greeks made of color. Inheriting, as they did to a certain extent, the knowledge and practice of those noble colorists, the Egyptians, it would be supposed that their eyes were as sensitive to hue as to form, but we have almost nothing to show us how their taste was gratified. The names of their great artists are household words with us, but except Mr. James Jackson Jarves, we know of no modern connoisseur who has seen an ancient Greek picture, in full color, and the best we can hope to do seems to be, by cautiously restoring the pigments upon architectural details, to gain an idea of the way in which they worked at more humble decoration.

SOME singular facts have been brought to light in the course of a recent official investigation into the present administration of trust funds left for various purposes to the authorities of some London parishes. It is well known that several of these parishes have diminished to a very small number of members, while some of the funds, originally small, have increased very largely in income. Thus it happens that a little trust, left long ago by some poor soul, who probably did not die quite at peace with his neighbors, for the purpose of furnishing four shillings annually, to be expended in a modest love-feast for two members of the parish who should have quarrelled and become reconciled during the twelvemonth, has grown until its income now pays for regaling the whole parish every year with a grand banquet, at a cost of seven dollars per head. A large number of trusts, founded for the purpose of providing for annual prayers at the grave of the testator or some other person, for burning candles in a given church, or before some shrine, or similar purposes, have been, on the ground that these are "superstitious observances," converted by Act of Parliament to other, so-called charitable uses, or, as perhaps some of the givers might say, confiscated for the encouragement of pauperism; but some have been simply violated altogether, or their administration neglected, the churchwardens dividing the annual proceeds among themselves, or paying them over to their sextons and beadles in lieu of salary. It seems a little hard that a dying wretch who, conscious that there was no one to hallow his grave with the tears and prayers of love, tried to provide a substitute in hired mourning, should have even that poor consolation taken away from him, but it rarely happens in any country that a man's wishes as to the disposal of his property after his death are very scrupulously followed.

NOTES ON ELEVATORS.¹—IV.

THE apparatus for driving lifts are much more numerous than the varieties of lifts themselves. To the ordinary observer two great classes present themselves, the water and the steam elevators, the difference between the two classes being somewhat obscure. It will be convenient to preserve this general distinction, and, as the simplest kinds of hydraulic apparatus formed our introduction to the subject, to consider first the elevators in which water is used as the means of applying force, although the force itself may be and very commonly is, itself derived from the expansive power of steam or hot air.

The inconvenience of the long cylinder, whether vertical or horizontal, which was necessary for those elevators where the stroke equalled the height of the lift, soon led to the invention of means for reducing it. In the simplest of these, the wire rope, or flexible piston, of a horizontal cylinder, instead of being continued over the sheaves or pulleys directly to the car, was attached to a pulley of moderate size, which was itself secured to the axis of a larger drum,

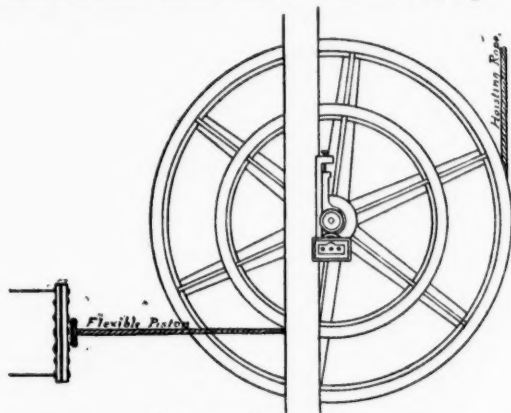


Fig. 11. Stebbins Double Pulley.

on which was wound the hoisting rope. Thus the length of rope wound or unwound on the larger drum at each revolution was greater than that wound on the smaller driving pulley in proportion to the difference in the circumference of the two. If the small pulley were half the diameter of the large drum, the number of revolutions necessary to wind up the hoisting-rope, attached to the latter, to an extent equal to the height of the lift, would be imparted by turning the small pulley the same number of revolutions, but with half the length of rope, and the cylinder from which the small pulley was actuated need be but half the length of the lift, instead of equal to it, as heretofore. Of course, the piston, being drawn through half the distance, must be urged with double the power, but this was easily provided for by increasing the diameter of the cylinder.

From this point the step was easy to a still further shortening of the cylinder by increasing its power, and multiplying its stroke—thus reduced in length, but much greater in energy—to the requisite amount, by means of devices familiar to all mechanics. The most

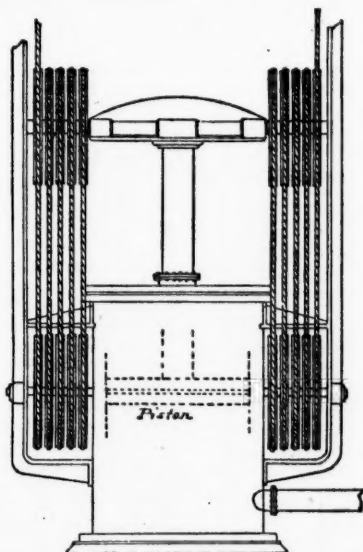


Fig. 12. Hydraulic Elevator.

common of them consists of a double set of sheaves, one set revolving freely on a fixed shaft attached to the cylinder, while those of the other set are strung loosely on a cross-head carried by the moving piston.

¹These papers will appear monthly. (See Nos. 232, 236, 241).

One end of the long hoisting-rope is strongly secured to, or somewhere about the cylinder. The rope is then passed over the nearest of the sheaves on the shaft attached to the moving piston, then back to the inner sheave on the fixed shaft, then over the second piston-sheave and so on, and is finally carried away to the top of the shaft, over the sheave there, and down to the car. It is evident that this will take up an amount of rope equal to the sum of half the circumference of all the sheaves in both sets, plus as many times twice the distance between the centres of the two sets of pulleys as there are pairs of pulleys employed;



Fig. 13.

and if the distance between the two sets of pulleys is increased by the movement of the piston, an additional amount of rope must be taken up equal to as many times twice the additional distance between the sheaves as there are pairs of them, or else the rope will be stretched and broken. The first sheave on the piston moves the most slowly, a point on its circumference travelling with the same velocity in its arc as the piston in its own horizontal motion, but as in order to allow of this motion it must take up the rope on each side, the circumference of the first cylinder-sheave must traverse twice as fast in order to supply rope enough. The second piston-sheave must move with three times the velocity of the first, in order to furnish rope to the first cylinder-sheave, and also an extra portion for the returning line, and so on. It is usual to arrange five sheaves in each set, so that the velocity of the last sheave is ten times that of the first, and the whole amount of rope drawn up at each stroke of the piston is ten times the length of the stroke. A clear idea may be gained of this kind of multiplication of power by winding a string a few times around two fingers and then separating them. Of course, the piston must be driven forward through its short stroke with ten times the power which the rope is

finally obliged to exert in order to hoist its load through the ten times greater distance, but it is easy to give the cylinder the requisite diameter. The friction, and the wear of the ropes by repeated bendings, are much greater than in the long stroke system, but the convenience so far outweighs the disadvantages that the short cylinder system is almost universal.

The arrangement of the sheaves renders it convenient to have a double set, one on each side of the cylinder, with two separate ropes; hence elevators of this kind usually have two hoisting ropes.

There is, however, a good form of elevator which secures the shortening of the cylinder very simply, without employing the multiplication of pulleys or sheaves. This is Burdon's Patent, in which the piston, instead of carrying an exterior cross-head, moves wholly within the cylinder, dragging after it a heavy chain, by means of which it revolves in on one direction or the other a shaft which traverses the lower part of the cylinder, with water-tight stuffing-boxes at each

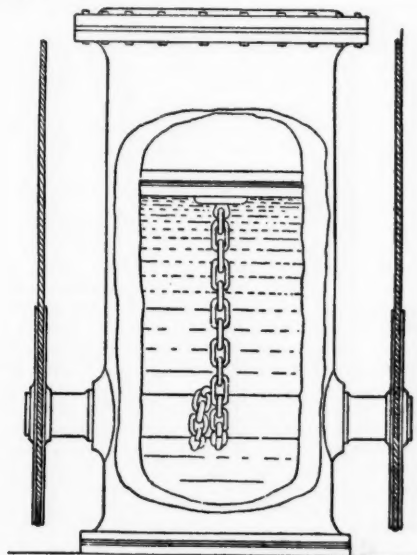


Fig. 14. Burdon's Elevator.

side. One or both the outer ends of this shaft have drums keyed upon them, on which the hoisting-rope is wound, without any further complication. It is very easy to give these drums ten or more times the diameter of the shaft which carries them, so that the movement of the piston is multiplied as much as by the ten separate sheaves of the other form, and in a much simpler way.

Another machine, whose action differs materially from the other hydraulic apparatus, is known as Hale's elevator.

In this a long vertical cylinder is employed, usually half the height of the lift, placed, not under the bottom of the shaft, but standing up within it, and the effective movement of the piston is the *inward* instead of the outward stroke, so that the water is discharged from the cylinder at the same time that the load is raised. This inversion of the usual system affords several important advantages, the chief of which is the avoidance of the variation in power which takes place between the beginning and the end of the stroke in long cylinders where the usual method is used, through the diminishing of the height, and therefore the hydrostatic pressure of the column of water as the piston ascends. In the Hale elevator, when the platform is at rest at the bottom of the shaft, the piston is at the top of the cylinder, which is full of water below it. To raise the load, the discharge-pipe at the bottom of the cylinder is opened, and water from the supply-pipe is admitted at the top. The cylinder being air-tight, the body of water in it is, as it were, hung by atmospheric pressure to the under side of the piston, which acts the part of the suction-valve in an ordinary pump, and as the piston is free to move, this weight, which in a cylinder thirty-two feet long would at the beginning of the stroke amount to fifteen pounds per square inch of the surface of the piston, drags it down. At the same time the water from the supply-pipe, admitted under pressure above the piston, forces it from behind in the same direction. As the weight of the water below the descending piston decreases by its discharge into the drain, the hydrostatic pressure above it increases, so that the one to a certain extent supplements the other, and a nearly uniform power is maintained throughout the stroke, the force if anything increasing instead of diminishing as the platform ascends. The hoist being completed, the discharge and supply pipes are closed, and a communication is opened around the piston, between the upper and lower ends of the cylinder, and as the weight of the car draws the piston upward, the water quietly transfers itself from above it to below, where it remains ready to exert its weight in pulling the piston down, and the car up, at the next trip, before it finally issues from the discharge-pipe.

The movement of the piston being downward while that of the platform is upward, the weight of the piston itself helps to hoist the load, and to increase this effect it is weighted to a point just short of that of the platform, which is thus perfectly counterbalanced. Four hoisting-ropes are commonly used, all attached to a cross-beam at the top of the shaft, thence descending to the travelling sheave carried on the piston, and up again to the sheave at the top of the shaft, whence they descend to the platform beam. Each hoisting-rope is thus twice bent between its attachment and the car, instead of twelve times, as in the ordinary "ten to one" machines. It is said that the ropes have been known to break, through some carelessness, and that the slender piston-rods, unable to sustain the counterbalance weights and sheave, have buckled, throwing the weights through the car. This must be a rare accident, but it might be guarded against by guides of simple character. In other respects this elevator seems to combine an unusual number of points of security and economy.

As it is essential to have the power of the elevator equal to the demands of the heaviest load, and as the consumption of water at each stroke is equivalent to the product of the sectional area of the cylinder by the distance through which the piston is driven, it follows that in these simpler elevators the cost of running will be the same whatever may be the load hoisted, since nothing short of a full stroke will raise the platform through the height of the shaft, whether it carries several tons of freight or simply its own weight. There are therefore many contrivances by which the length of stroke of the piston may remain the same, the stroke itself being made with greater or less power, and corresponding consumption of water, as the case may require. One way is to use three cylinders and three pistons, having a common cross-head, on which the sheaves revolve in the usual manner. For hoisting a light load one cylinder alone is employed; a heavier one may need two, while all three are available for the heaviest. In another form a double cylinder is used, the piston working in the smaller cylinder, which itself takes the place of a piston in the larger one. By admitting water to the small

cylinder, the stroke is made with the piston, with a moderate power, while if greater power is required the small cylinder is left empty, with its piston drawn back, and the water is turned into the large

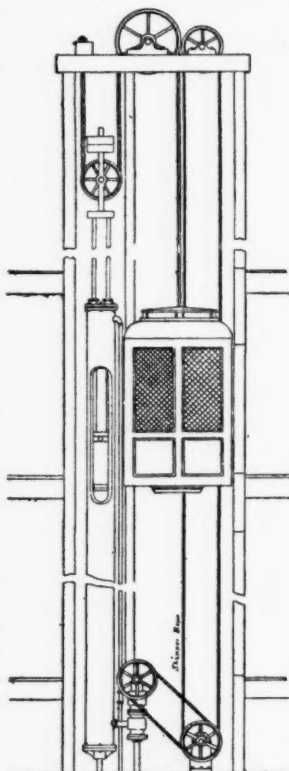


Fig. 15. Hale Elevator.

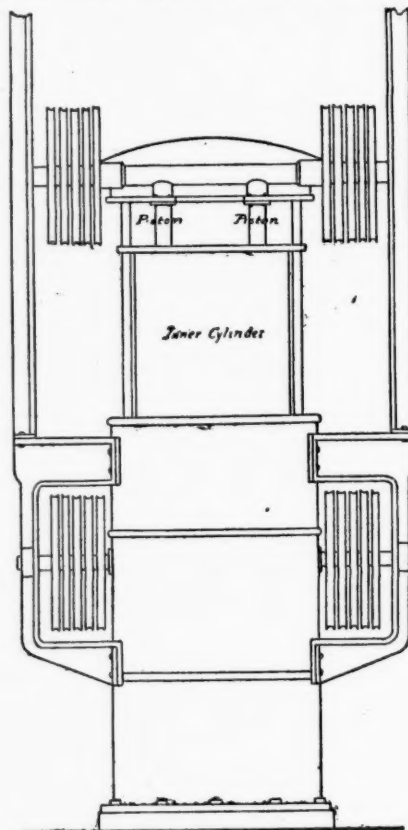


Fig. 16. Whittier Double Cylinder Elevator.

cylinder, driving the smaller one with its piston and cross-head through a stroke similar to that of the small piston, but made with much greater force.

The Hale elevator, just referred to, in its double power form employs two cylinders, one above the other, of the same diameter, with a double piston, passing water-tight through the partition between the two cylinders. For a small load one cylinder only is filled, and its piston moves separately, dragging the other after it in its own empty cylinder; but when greater power is required, water is let into both cylinders, the piston of each reinforcing the other.

Hydraulic machines are set usually with the cylinders vertical, the actions of the pistons being smoother, and the wear more uniform in that position than when placed horizontally, while the stroke is so short that the variation in power through loss of hydrostatic head between the bottom and top of the cylinder, although it often amounts to three or four pounds per square inch, is not felt to be a serious inconvenience. There is another way of changing power, adapted to the horizontal cylinder machines, by which one or more pairs of sheaves can be thrown off at pleasure, diminishing by so much the multiplication and therefore the swiftness of the hoisting movement, but increasing the force, and the distance traversed by the piston in the cylinder is adapted to the work required of it, stopping short of the full length when the increase of swiftness by additional sheaves enables the full hoist to be accomplished with a shorter stroke.

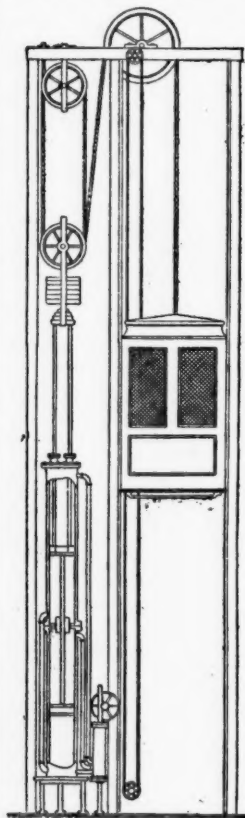


Fig. 17. Hale Elevator—Double Power.

VAULTS. I—II.
COMPOUND.

COMPOUND vaults are formed by the intersection of two or more simple vaults, which may be barrel vaults, or expanding vaults. They are commonly known as "groined" vaults, the angle made by two surfaces being the groin angle. There are numerous varieties, which we will endeavor to classify.

QUADRIPARTITE. These are formed by the intersection of two barrel-vaults, or four expanding vaults.

I. For covering a square compartment.

a. The common groined-vault, often called the Roman (Fig. 8), is formed by the intersection, at right angles, of two equal barrel-vaults, of any cross section, but usually semi-circular. The groin-angle is 90 degrees at the springing, gradually becoming more and more obtuse towards the crown or centre. The groin-line is straight on the horizontal projection, or plan. Its curve, projected on the plane

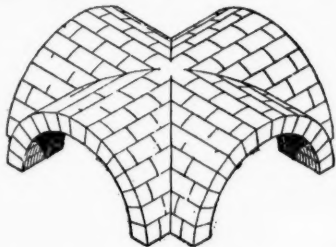


Fig. 8.

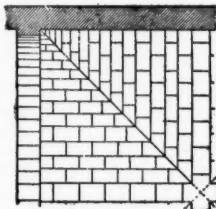


Fig. 9.

in which it lies, depends upon that of the cross section of the composing vaults. If the latter is circular or elliptical, the groin-line is elliptical. The ridges are level. The joints are parallel to the axes. Fig. 9 is a quarter plan. The compartments are here shown as separated by cross bands, which are merely portions, thickened by a few inches, of the main vault, the one that runs lengthwise of the building. They may, however, be independent arches, but do not support the vaults. Professor Willis states that in the Piscina Mirabile, near Baie, the "sub-arches are genuine ribs, strengthening and sustaining the vault, which is of tufa, while they are strongly built of brick or stone." In the drawing which he gives, however, the sub-arches, or bands, project so little below the surface of the vault that it seems improbable that the vault runs over their backs. It is possible that the construction is such as is shown in the section at a, Fig. 3, in which the cross-arch is a real rib, though showing only as a band. In Romanesque work the band is deepened and becomes a distinct arch, under the vault, as in the crypt of Lastingham church, England.

b. Domical vaults. In these the centre is raised above the level of the apex against the cross-arch and wall, so that the ridges rise

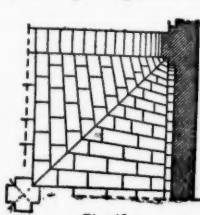


Fig. 10.

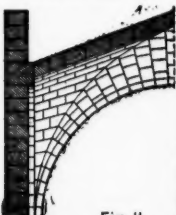


Fig. 11.



Fig. 12.

toward the centre. The compartments, if there are more than one, must be separated by cross-arches or bands. In Santa Sophia, Constantinople, the cross-arch is a strip of barrel-vaulting showing no

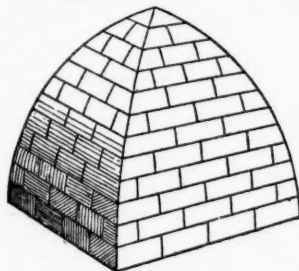


Fig. 13.

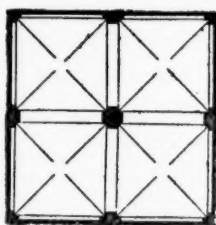


Fig. 14.

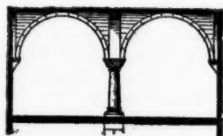


Fig. 15.

vertical faces but only the soffit. Domical vaults are formed, over square spaces, by the intersection of four equal expanding vaults, which may be conical or conoidal. The groin-line is straight on the plan. Its curve is elliptical if the composing vaults are conical; otherwise it is indefinable but approximates to elliptical. Fig. 10 is a quarter

plan, and Fig. 11 a half section of a domical vault composed of conical, or straight-sided conoidal vaults. Fig. 12 is a half section of one composed of convex-conoidal vaults.

c. The so-called "cloistered arch," or square dome (Fig. 13) is composed of four parts of equal barrel-vaults. It is the reverse of the groined vault.

d. A square room may be covered by four quadrilateral vaults, all springing at one of their corners from a central shaft, as in Figures 14 and 15, from the castle of the Wartburg. Such vaulting is quite common in crypts.

II. For covering an oblong compartment.

a. In Welsh, or underpitch, vaults the composing vaults are generally cylindrical. Both spring from the same level, but the transverse or side vaults are narrower than the main, and do not completely intersect it (Fig. 16). The groin-line on the plan is a hyperbola.

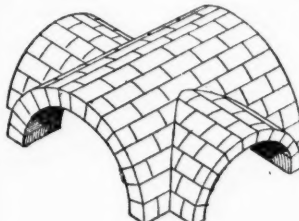


Fig. 16.

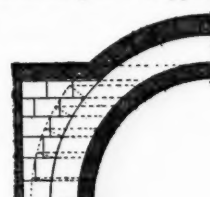


Fig. 17.

In this case, as in most others where the side vault is narrower than the main, the joints are spaced off on the main, and those of the side are determined by projection, horizontally, from them, as in Fig. 17. The result here is that while the *voussoirs* of the main vaults are all equal, those of the side increase in width as they rise; and the

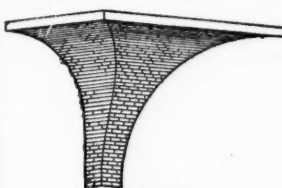


Fig. 18.



Fig. 19.

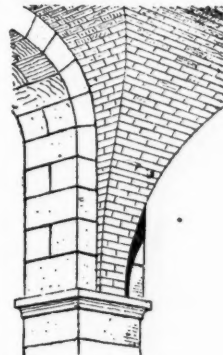


Fig. 20.

side vault is thinner than the main vault. Welsh vaults are occasionally found in Romanesque work, and are common in Renaissance.

They can be produced by the intersection of a barrel-vault, cylindrical, elliptical, or pointed, with transverse pointed, elliptical, conical, or conoidal vaults; but examples of such constructions, if they exist at all, must be very rare.

b. In side vaults, stilted, the composing vaults are cylindrical, but the transverse vault is narrower than the main vault and springs from a higher level, so that the intersection may be complete and both ridges on the same level. The groin-line is of double curvature. Stilted vaults were used by the Romans on a grand

scale, to cover the halls of their baths (Fig. 18). They also appear in French Romanesque (Fig. 19).

Fig. 21: A perspective view of a stilted vault, showing a rectangular compartment with a main cylindrical vault and a narrower transverse vault springing from a higher level.

Fig. 21.

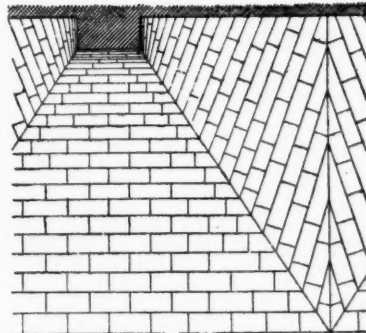


Fig. 22.

scale, to cover the halls of their baths (Fig. 18). They also appear in French Romanesque (Fig. 19).

¹ These papers by Professor Charles Babcock of Cornell University will be printed in monthly parts.

The Romans built them of brick and concrete. When they are of stone the planes of the joints of the vertical portion, or stilt of the side vault will be inclined; and those of the curved portion will not radiate from the axis, (See Fig. 20) or, the joints of the main vaults may be lead up to the transverse vault

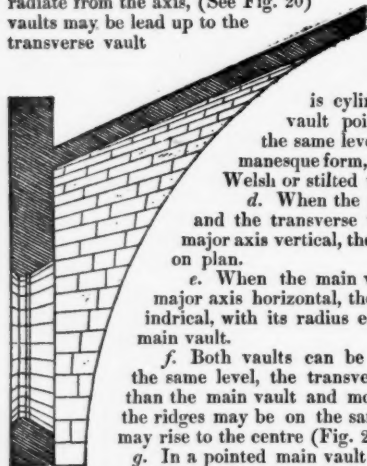


Fig. 23.

24 a longitudinal section) the groin-line is straight on plan. Note

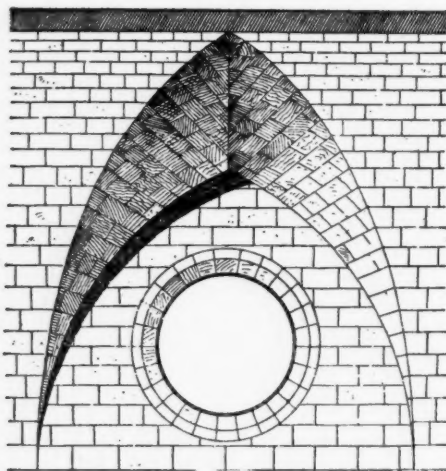


Fig. 24.

the disposition of the joints in the side vaults. The ridges of the side vaults are not straight, but of very slightly hyperbolic curvature.

A. In segmental vaulting (Fig. 25), the composing vaults may be equal or unequal, and spring from the spandrel of the cross-arch.

i. Of a segmental main vault intersected by a cylindrical transverse vault (Fig. 26), examples occur in French Romanesque.

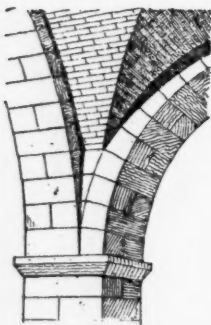


Fig. 25.

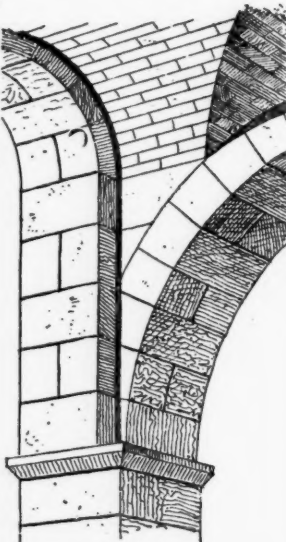


Fig. 26.

ERRATA. — On page 69, in first column, eighteenth line from the bottom, erase the word "hollow."

In second column, paragraph 6, instead of "790, A," read "790, of a." Fig. 6 should be 7, and Fig. 7 should be 6.

THE ILLUSTRATIONS.

PRIVATE HOSPITAL, CORNER LEXINGTON AVENUE AND FIFTY-SECOND STREET, NEW YORK, N. Y. MESSRS. SILLIMAN & FARNSWORTH, ARCHITECTS, NEW YORK, N. Y.

This building, now in course of construction, is designed for the reception of private patients. The ground floor contains the resident doctor's living-rooms, and a side entrance on Fifty-second street leads to his office and to the elevator which takes patients to the rooms on second, third and fourth floors. The fifth floor is devoted to dormitories for the nurses. The basement contains, besides kitchen, laundry, etc., a Turkish-bath for the use of patients. The building is built of Trenton pressed brick with moulded brick and terra-cotta finish and terra-cotta balustrade to protect the roof, which is to be used as a promenade. The window sills and water-table at first story are of North River bluestone. The windows are arranged with ventilating sills for the supply of fresh air, and each room has a separate flue connecting with the air-space under the roof, from which in turn the foul air is forced out by steam coils. The building is heated by steam, and plumbed as shown in the plans. The cost will be \$50,000.

THE WEBSTER HOUSE, MARSHFIELD, MASS. MR. W. G. PRESTON, ARCHITECT, BOSTON, MASS.

A STREET IN LOCHES, TOURAINE.

The ancient Castle of Loches, from actual history as well as from the romance with which tradition has surrounded it, absorbs so much of our interest that we are apt to forget that there are a few objects in the old town itself which may well command our respect both as historical monuments and as remnants of the architectural art of both Gothic and Renaissance periods. The town gates, for instance, are imposing enough as examples of that class of architecture which, while serving the peaceful object of admitting friends, has also to fulfil the grim purpose of defence against foes. Of the gates of Loches, the northern, the one shown in the sketch, which is reproduced from the *Architect*, is perhaps less successful, architecturally, than the eastern one, that which opens towards the road from Beaulieu, but when seen from the interior of the town, it will strike any one who beholds it for the first time as a more grand and uncommon structure, especially when taken in combination with the Renaissance Hôtel de Ville, which, in its feminine gracefulness, forms an appropriate contrast to the manly strength of the gate-tower. Faithful companions since the year 1535, when the Hôtel de Ville was completed, these two venerable structures have grown gray and timeworn in the service of the town, and fitting is it to observe that, whereas the more warlike building has many a distinct scar and memento of furious war, the more delicate one has been, comparatively, spared. They have both done good service, and it is pleasant to see that the town in return does try to care for and preserve the veterans. While contemplating the subject before us, we may follow history back, step by step, until, leaving out every building but the gate tower, and inserting the old town wall, and some thirteenth and fourteenth century buildings, we may even imagine that we are in the time of Louis XI, and that he, with Olivier le Daim, his majesty's barber and crafty privy councillor, and Tristan l'Hermite, the grim executioner, is coming up the street towards his castle above, making the honest man, as well as the thief, tremble in their shoes. A precious trio! But not often to be seen there, perhaps, for this same castle, being more a prison for the king's friends and advisers than a residence for himself, saw him probably but seldom. At least, in view of this gate, if not through it, must have passed the traitorous Cardinal La Balue to his iron cage up in the gloomy "Donjon" of the castle; and the gentle and learned Philip de Comines must have gone by in the year 1486 to the same prison, to return, however, a free man, more fortunate than the luckless Ludovico, "il Moro," Duke of Milan, who passed here but once in his ten years' imprisonment and his death. Pleasanter pictures, no doubt, may be conjured here, for many a hawking party, graced by the presence of Charles VII, and his gentle Agnes Sorel, or a more sombre cavalcade, the pious Anne de Bretagne and her retainers, may have passed to and from the chase in the famous forest of Loches. It was in the year 1520, ten years after the death of "il Moro," that the Hôtel de Ville was begun, and during Francis I, and subsequent reigns the town increased in prosperity; and several important buildings, such as the "Clocher St. Antoine" and others, especially ecclesiastical, were erected or enlarged, many of them, now, alas, mutilated or entirely destroyed. There is an old-world air about the place, the ancient costumes of the country people, the groups of quaintly cloaked old women, who, with their long sticks, look very witch-like indeed, the grave priests and the picturesque Sœurs du Sacré Cœur, all drawing you back some centuries; until up comes through the gate a smart gen d'arme, or you hear by your elbow, "Indicateur de l'exposition, vingt-cinq centimes!" to dispel your idle fancy. Exhibition, international or local, and progress by all means; but let us, in the meantime, go up to the old castle and examine the more early portions, when we, no doubt, shall admire the manner in which the old "Donjon" and other towers are put together; the masterly masonry the earlier the better, indeed better than that of any of the gate-towers, the manner of which is shown in the sketch. Let us have progress, indeed; but does this present age of vast iron structures show any skill in construction superior to these old works? It is doubtful. From the old we may learn how

to build in solid masonry to stand for centuries, rather than in deceptive iron, and not so that our castle or our bridge may next year succumb and suddenly hurl some hundreds of souls into eternity.

A. H. H.

HOUSE-BUILDING IN SPAIN.

SPAIN, for many past years a land of legends and travellers' marvels, is losing, now, that artificial aspect; and, to the rest of the civilized world, is appearing in a truer light of history and description. The readers of the *Building News* have already at hand more than one good account of the country and its architectural adornments. I purpose making, therefore, only a few notes; not of poetical impressions, but of every-day things, of ordinary Spanish house-building in use at the present day. Of course, some of these methods and materials are already known and utilized in England and other countries, but they are not common enough, I believe, to be uninteresting.

For the next ten years, Spain ought, then, to receive diligent attention from English painters and students. To the architect, perhaps, Spain cannot offer quite so much. There is a wealth of antiquity, and picturesque age. But purity, and the first principles of architectural art, were almost forgotten here when Gothic art declined. The Gothic architecture Mr. Street has made tolerably familiar to us, and Sir Digby Wyatt's book gives some examples of the Renaissance. There is in Spain an abundance of misshapen abortions, with so-called Italian detail; and, here and there, may be found a tomb or a doorway of a delicacy and refinement not to be surpassed. And there are marvels of elaborate decoration in late styles; but I don't think Spain is a country in which to study Renaissance architecture. But, in the north, Gothic, and in the south, Moorsque, architectural remains are many and instructive. And, comparatively, they are fresh.

This is a land of cheap labor and materials, and antique methods and tools. It is strange to see such things as the lathes upon which men turn their domestic woodwork (by means of a bow and string upon the article itself) being used in the nineteenth century in civilized Europe. But there are many "rough-and-ready" modes of construction and ornament which are worth notice, and might be remembered with advantage sometimes in out-of-the-way provinces, even in England. The varied and effective cornices, for instance, formed of brick, in combination with the hollow roofing tiles, are good and cheap, and can be made by the most uneducated bricklayer. The tiles I refer to are the almost universal Spanish roof covering. They are manufactured in a primitive manner thus: A table is served with roughly-tempered clay; the workman has a light, four-sided frame, about 12 inches by 10 inches, narrower at one end, to allow for the diminishing of the finished tile. A lump of clay is laid upon the table, within this mould, and levelled in it with a straight-edge. Then the soft tile is lifted upon a curved block, and an assistant carries it away, places it on the ground, draws out the block by the big end, and leaves the tile standing, arch-like, in the sun to dry; then it is burnt in a primitive kiln. The curvature of these tiles is nearly a quadrant.

Bricks, which are generally about 10 inches by 5 inches by 1½ inches, are sometimes made in moulds, as are the tiles. Now, with these two materials, and liberally-used mortar, the Spanish cottage builder crowns his wall with a really good cornice, which is not exactly like his next door neighbor's, nor yet a fantastic attempt at originality.

The use of the thin brick, too, allows of better effect in strings and surface relief than we can obtain with plain bricks; and I must add my testimony in favor of the appearance of the thick mortar joint, still prevalent here. The rough varied surface is far more agreeable than that of a dead flat English brick wall. Even in large monumental buildings it has not the cheap or crude effect which is probably what an Englishman fears. As for its resistance to weather, the winter is, in some parts of Spain, more severe, and nearly as humid as is usual in England; and these walls seem to stand it well enough.

In modern building one finds the walls being constructed in the extremes of solidity and flimsiness, sometimes in masses of solid stone and brickwork, and at others in three or four or more superimposed stories of brick nogging even for party and external walls. But I notice that the framing of this is carefully secured, and that every post is fitted with short pieces by way of cap and base, strengthening the post and head and sill at the same time. Some of these enclosures, carrying heavy floors and roofs, are curious examples of what, with careful attention to certain points, timber can be made to do.

Floors are nearly always tiled, even upon the upper floors. They are constructed of rough, sometimes unsquared, timbers laid about 1 foot 6 inches apart, and with rough arches of pieces of brick or stone between them, upon this a thin levelling of concrete, and then the tiles — plastered below on laths as usual. This is a floor very suitable for cottages in rural districts; almost any timber can be used with very little preparation or skilled labor — and its fire-resisting properties are very considerable. If wrought timber is used the lathing is generally omitted, and the undersides of arches are plastered between the joists. I like this ceiling very much; sometimes a few lines of color decoration make quite a feature of it.

In roofs, too, otherwise useless timber is made to serve by rough lathing and bedding the tiles (altogether without nails) upon an ample quantity of mortar; and the roof is so firm that when neces-

sary, people walk upon the tiles without disturbing them. And, of course, it lasts for generations.

Joinery, as might be expected, is rather rough; but it is solid and genuine, and effective, because of the use of thick framing in small panels, with a very simple moulding, or even quite square. I have seen doors and shutters simply divided up into square panels of from 6 inches to 12 inches side, which looked far more effective than many modern English overstrained attempts at decorative framing. In more complicated work, some of the older doors to churches, etc., with a richness rivalling the more ancient Moorish joinery, are very fine models. The windows to houses are generally casements differently contrived in different provinces — generally heavy, and with shutters hung inside upon the sash itself. Lifting sashes are unknown.

The frequent use of glazed and painted tiles for dadoes and wall-linings is worthy of note, and the tiles are all hand-painted; sometimes in a manner and with colors not to be despised. The household pottery (nearly related to these) is beautiful. As the town water-supplies are nearly all street fountains and natural streams, the pitcher, of unglazed red earthenware, in which it is carried and stored, is an every-day necessity. The forms are mostly very good, often superb, and there is a considerable variety. But already one sees occasionally a vessel of tin, ugly and hot. It would be worth while making a large collection of these beautiful pitchers and other smaller jugs and bowls, before they are replaced by the tin water-cans and wretched crockery of civilization.

Although Spanish national art has been unfortunate, and has not figured very prominently, I think that there is a considerable artistic feeling in the race. Among the degenerate, ill-led styles of decoration, one sees often evidence of it in some delicately designed bit of fresh-looking work. And there is a scope for decorative art which, if the vagaries of the Renaissance age had not led the present into such mistaken styles, would result well. Wall-papering, for instance, is almost unknown. Hand-painted walls and ceilings are more common, and some of them, upon a system of dividing up the surface into panels with lines of stencilled and free-hand ornament and a simple centrepiece, are very satisfactory. The most prevalent fault is the representation of relief, mouldings and sinkings with shadows being painted on the flat stucco. And this is largely done upon exterior façades. Perhaps at Toledo it is as common as anywhere. A perfectly flat front is scene-painted and shadowed to represent orders and cornices, architraves and arches, with a patience and at an expense which would have provided a really good decoration. And not only upon houses, but upon large public buildings, is this foolish "adornment" done.

In these cities of balconies, the smith is an important tradesman, and, with the cheap labor and little-valued time, common houses often get provided with wrought-iron work of genuine, simple design, for their balcony fronts, which would be a luxury in London. Bolts, bars, and latches are primitive, and ponderous or fragile, according to the builder's whim. It is, in some parts, no uncommon thing for a general smith to make a lock, from beginning to end. Some are artistic; but, as a rule, there is not much to be learnt from them.

As a rule, Spanish cities are not building very actively. Madrid, of course, shows some tendency to grow and improve itself. But although the capital is far in advance of the rest of the country, building seems to be carried on in much the same manner. Party walls of brick nogging are carried up apparently to unlimited heights. External walls are generally tolerably massive, and iron-mongery is better. The joinery is better in execution; but large panels and weak mouldings spoil it. The later façades are generally French in character; some very agreeable.

LIGHTNING AND GAS AND WATER PIPES.

THE city gas company of Berlin having expressed the fear that gas-pipes may be injured by lightning passing down a rod that is connected with the pipes, Professor Kirchhoff has published a reply in the *Deutschen Bauzeitung*, parts of which we copy. Regarding the fear that gas and water pipes could be injured, the author says:—

"I know of no case where lightning has destroyed a gas or water pipe which was connected with the lightning-rod, but I do know cases already in which the pipes were destroyed by lightning because they were not connected with it.

"In May, 1809, lightning struck the rod on Count Von Seefeld's castle, and sprang from it to a small water-pipe, which was about eighty metres from the end of the rod, and burst it. Another case happened in Basel, July 9, 1849. In a violent shower one stroke of lightning followed the rod on a house down into the earth, then jumped from it to a city water-pipe, a metre distant, made of cast-iron. It destroyed several lengths of pipe, which were packed at the joints with pitch and hemp. A third case, which was related to me by Professor Helmholtz, occurred last year in Gratz. Then, too, the lightning left the rod and sprang over to the city gas-pipes: even a gas explosion is said to have resulted.

"In all three cases the rods were not connected with the pipes. If they had been connected, the mechanical effect of lightning on the metallic pipes would have been null in the first and third cases, and in the second the damage would have been slight. If the water-pipes in Basel had been joined with lead instead of pitch, no mechanical effect could have been produced.

"The mechanical effect of an electrical discharge is greatest where the electric fluid springs from one body to another; the wider this jump, the more powerful is the mechanical effect. The electrical dis-

charge of a thunder-cloud upon the point of a lightning-rod may melt or bend it, while the rod itself remains uninjured. If the conductor, however, is insufficient to receive and carry off the charge of electricity, it will leap from the conductor to another body. Where the lightning leaves the conductor, its mechanical effect is again exerted, so that the rod is torn, melted, or bent. So, too, is that spot of the body on which it leaps.

"In the examples above given it was a lead pipe in the first case, a gas-pipe in the last case, to which the lightning leaped when it left the rod, and which were destroyed. Such injuries to water and gas pipes near lightning-rods must certainly be quite frequent. It would be desirable to bring them to light, so as to obtain proof that it is more advantageous, both for the rod and the building which it protects, as well as for the gas and water pipes, to have both intimately connected.

"Finally, I would mention two cases of lightning striking rods closely united with the gas and water pipes. The first happened in Dusseldorf, July 23, 1878, on the new Art Academy; the other, August 19, last year, at Stagliitz. In both cases the lightning-rod, the buildings, and the pipes were uninjured."

UNDER-GLAZE PAINTING ON POTTERY.¹

THREE or four years ago students of over-glaze painting on china were made happy by the publication of a little hand-book on the subject, compact in form and practical in instruction. The existing books and treatises on the subject had, to be sure, contained more or less satisfactory information on the art, but they were, as a rule, either written in a very involved style, or when intelligible were suited to the needs of advanced pupils rather than to those of beginners. This little book, written by Miss McLaughlin of Cincinnati, has now been supplemented by another on the more difficult art of painting under glaze, written in a frank and unpretentious style, and withal in so clear and practical a way that it must command the confidence of those who are beginners, while those who already know anything of the subject can recognize easily that the writer has a right to speak with authority.

There has always been as much charlatanism in the guild of potters as in other trades. A great secrecy has been maintained about the simplest processes. Each potter has his special glaze, his own combination of clays for bodies; each color-maker has his own unrivalled color, not to be discovered by outsiders, and if they choose to shroud their operations in mystery, forgetful of how easily the printing-press can dispel all such mediæval mystifications, it is their own affair. But the time is past when it would be possible to make private property of the truths of chemistry, and now-a-days one has but to turn to the little work of M. Roret, which we are pleased to see Miss McLaughlin has consulted, — perhaps in pursuance of the advice we proffered her in reviewing her first manual, — to find the master-key to many of these "trade-secrets," which very likely are all genuine discoveries of their several possessors — only some one had happened upon them before.

Miss McLaughlin does not profess to give full and complete directions for all possible treatments of every kind of pottery, but after outlining the essential processes, she frankly tells her readers that all certain knowledge is to be gained only by experiment and practice.

We cannot agree with the author when she places the Bourge la reine or Haviland method of decoration so decidedly in the front rank. This is, to be sure, a matter of taste, but the most trustworthy critics give the palm to other methods more purely artistic. The *impasto* work catches the eye by a trick rather than by honest good drawing. The delicate harmonies of coloring possible in this style of decoration are its greatest charm, and it is to be noticed that the instructed few prefer the pieces decorated in the lowest relief, which depend more on design and color than on the eccentricities of form and manipulation. It is a misfortune that the sketchiness, which is the most attractive feature of Haviland faience, should offer such evident inducement to would-be artists, who believe that here at last is a way in which by a few splashes and dashes they can achieve fame. We in common with many other critics would rather give the first place to some of the work issued from the Lambeth kilns, especially to the figures and sketches of Miss Lavinia Watts, in which are shown the highest forms of under-glaze painting, for her work can not properly be classed as decorative art merely — it is pure art. Others of the group of artists connected with the Lambeth Potteries produce beautiful and well-studied effects in decorative forms, and there are very few bad pieces allowed to leave the studios, although we have seen some. On the score of practical value the so-called Doulton ware, a hard stone-ware made by the same manufacturers and decorated by the same group of artists, can be made more useful in the household than the soft baked and soft-glazed Limoges wares. These last find their usefulness as articles in themselves finished decorations, and therefore useless for any other purpose. Their often vivid though harmonious coloring gains nothing by association with real flowers, for the holding of which most of the articles produced are intended, while the flowers are injured by such juxtaposition.

So far we have said nothing of Miss McLaughlin's own work, some of whose earlier attempts we have seen, which though crude and often inharmonious gave promise of rivalling before long the

better class of Limoges work. As yet we believe her efforts have been mainly confined to this method, although every now and then are heard reports of successful experiments in other directions, not only by this most successful of pioneers, but by the ladies who have followed her example.

This word "pioneers" reminds us that Miss McLaughlin states that the first piece of under-glaze painting in this country in the Haviland style was made by herself in October, 1877. We do not know to whom actually belongs such credit as is here claimed by the author: but in a cupboard door behind us, as we write, is a pottery panel measuring nine inches by fifteen, which was made in Boston in December, 1876, by Miss Cunningham; this had been preceded by several successful plaques, and was followed early in the following spring by a large fire-place facing, the tiles of which were twelve inches square. This is almost the only point which would call for change in a second edition. In fact this little book is so truthful, straightforward and modest that carping criticism would be out of place. There are points on which we should like fuller information, but as far as it goes, the book is complete. Even the preface, at times the best, at others the worst part of a book, is full of good advice.

LONDON WATER-SUPPLY.

THE following proposal to supply the metropolis with water from Bala Lake, in North Wales, has been submitted to the Secretary of State for the Home Department by Mr. J. W. Welborne for consideration by the Committee of the House of Commons now sitting: —

The water of Bala Lake has been carefully tested and proved to be equal in purity to the water of Loch Katrine, and ample in quantity for the supply of the metropolis. It is also probably sufficient for the towns *en route*. The country adjacent is sparsely populated, and a few mountain sheep and grouse constitute the occupants of the surrounding hills, hence there is a minimum of possible pollution. The rain-fall registered at Bala for the year 1876 was 52.69 inches, which is about the average rainfall there. The lake is nearly four miles long by three-quarters of a mile wide, covering 1,100 acres. The water-shed of the district contains 35,392 acres, or 55 square miles. This with the Bala register of rainfall would, after deducting 10 per cent for absorption, give 37,040,000,000 gallons per year, or 104,000,000, per day. But inasmuch as Bala lies on a level with the lake, the register of the rain-fall there does not represent the rainfall of the district. On the surrounding mountains the rainfall is probably twice as much as in the valley, which will leave a large surplus for supply, after giving compensation to the river.

The lake is 553 feet above Trinity high mark, and 300 feet above Stanmore, where it is proposed to make the reservoirs. By embanking the lake 5 feet, and drawing down 2 feet below the present level, sufficient water can be impounded to supply 104,000,000 gallons daily, for thirty-seven days without any rainfall. Should further supply be required, 50,000,000 gallons per day can be obtained from the River Vyrnwy which is situated on the lines of route to the metropolis.

It is proposed to convey the water from Bala through a series of iron pipes, sunk to a depth sufficient to protect them from the action of the frost, along the sidings of the Great Western Railway to Stanmore, where the reservoirs should be on a scale adapted to provide for a storage of water equal to forty days' supply. These should consist of one or more large reservoirs and ten smaller ones. The large reservoirs would be capable of holding 3,000,000,000 gallons, or thirty days' supply, and would be lined with brick or stone. The ten smaller ones, lined with white glazed brick, would each be calculated to contain 100,000,000 gallons. The space required for these reservoirs would be 500 to 600 acres, for the large ones according to depth, and 25 acres for each of the smaller ones. The water would be delivered into the large reservoirs as pure as its source, thence it would pass through a system of filtration of approved character into the smaller reservoirs in a condition of absolute purity. These reservoirs being 250 feet above the Bank of England, the water on reaching London would be conveyed through the existing mains of the water companies at high-service level.

GENERAL REMARKS.

Had Bala Lake existed at Stanmore instead of North Wales, it would, doubtless, long ago have formed the source of the London water-supply. If it is approved as a source of supply, it is simply an engineering question how to convey the water for the use of the metropolis free from pollution in the most effectual and economical way. By adopting the sidings of the Great Western Railway as the route, the following advantages would be obtained:

1. The right of way for almost the entire route would be secured by one negotiation.
2. Land otherwise of no value would be utilized without detriment either to it or to the property of the railway company.
3. All the plant required would be delivered by the railway company at the places where it would be laid.
4. The telegraph system would be available in case of any accident to the pipes.
5. There would be great saving in the time required for the construction, and also great saving in the cost.

By making the reservoirs at Stanmore, a sufficient level would be obtained to supply the high service to London without pumping, the cost of which, at present, with filtration, is about £100,000 (one hun-

¹ *Pottery Decoration under the Glaze.* By M. Louise McLaughlin. Cincinnati: Robert Clarke & Co. 1880. Price \$1.00.

dred thousand pounds) per annum. By the use of white glazed bricks for the lining of the smaller reservoirs, facilities for quickly and thoroughly cleansing them would be obtained. In short, pure water would be delivered from them as from a china basin. — *Journal of the Society of Arts.*

STAIRS.

WHEN were stairs first thought of? Who can tell! They were evidently preceded by the ladder; but, strange to say, the only ladder—a figurative one—mentioned in the Bible is that which held so prominent a place in Jacob's dream, when he journeyed to Haran in search of a wife. How many youthful minds have wondered over that story; how many little ones have pored—literally pored—over the print in the family Bible of the angel hosts, ascending and descending without in any way disturbing the sleeper who had so hard a pillow. How bright the angel faces seemed to us in those early days, and how we longed to peer through the misty veil that hid the topmost round in heaven. The first mention of stairs in the Bible is in the account of Solomon's Temple, where winding stairs (which shows an advanced stage of stair-building) are spoken of. Later they were frequently brought into notice and are last mentioned in the time of the apostles, when "Paul stood on the stairs," in Jerusalem, and told of his marvellous conversion. Paul's history will never be forgotten, but of the stairs on which he stood we know little or nothing. Will not some one give us a history of stairs, from Solomon's Temple down to our own day? It would be very entertaining.

Does it ever occur to one that the stairs by which he daily mounts to the several stories of his dwelling, are not all that he could desire? that the rise is too rapid, the treads too narrow, or that the space set apart for them is too contracted for comfort and convenience? If not, he is easily suited, or the stairs in his house are exceptionally good.

Many persons, in building, take pains to hide the stairs from observation; this must be from some mistaken notion. I can conceive of an unwillingness to expose an ordinary flight of stairs to view; but that an architectural feature which can be made so attractive, should be neglected or hid away from sight is to me incomprehensible. The Swiss put their stairs on the exterior of their cottages which in this way are made very picturesque, for they come in well with the broad eaves, low roofs and wide galleries on every side of the structure, but the privacy of the house is in a measure destroyed, and in a climate like our own, subject to great extremes, there is nothing in such an arrangement that we can adopt.

I have said that stairs can be made an attractive feature in a house. Every architect knows this; but no man can build a flight that will be comfortable, or even safe, in a cramped or narrow hall. Stairs are exacting in their demands, and if these demands are not complied with we shall be reminded of the neglect every time we use them. We may resort to make-shifts (if inclined to do so) in other parts of the house, but we cannot put off the stairs with anything and say "it will do," and no coaxing will bring an ill-contrived or badly arranged flight of stairs into use on any possible terms. A good run is what every flight of stairs requires. If the run is not long enough, then we must increase the height of the risers; and the rise, after it has reached a certain point, becomes trying, then difficult, and at last dangerous. In many houses, in almost all cheap houses, the rise is eight inches. Even the back stairs should not have a more rapid rise, and for the principal stairs this is wholly inadmissible. The other extreme, a fault not often committed, is to have the rise too low. Anything below six inches is almost as trying as the other extreme, but it is not so dangerous. The most satisfactory rise is six and a half inches, and from that, if crowded, we may go on to seven inches without drawing attention to the tread; but above that point the rise begins to fatigue us. A rise of six and a half inches requires a tread of at least fourteen inches, and for one of nine inches a tread of eight inches will suffice. But I cannot believe that any one would put a rise of that height into any dwelling. One might as well resort to a ladder, and indeed, a rise of this kind would be but little better than such a contrivance to reach the chamber floor. Whether the risers are high or low, they must all be of a uniform height. Any departure from this rule is always attended with mischievous results. If all the risers in a flight are seven inches, with one exception, and that one is either six or eight inches high, every person who passes up or down will trip at that stair. No matter how often he goes up or down, he will always trip at that point.

Stairs, to be effective, should be wide between the wall and rail, with one or two flats or landings; and in no instance should they be disfigured by the introduction of winders. The rail must be heavy, the balusters something more than "dipper handles," and at the foot let there be a newel, on which the architect may display his taste and skill. It need not be elaborate, but it is a conspicuous object, and it should have something more to recommend it to our notice than the cheap and stereotyped forms, which may be bought at the turner's by the hundred.

It is pleasant to mount by stairs properly planned, especially if they are well-lighted and ventilated. And if on the first landing the architect can contrive a bay, deeply recessed and provided with seats beneath the wide windows, he will, by so doing, add another charm to the house. Here those who are advanced in years, and who find it difficult to climb the whole flight at a time, may rest awhile, or sit and chat. Here the little ones love to pause in their

passage up and down, and here flowers, growing in a *jardinière* in front of the window, may send their fragrance through the house.

CHAMPLIN.

THE MANAGEMENT OF PRIVIES IN NEW ORLEANS.

A REPORT recently made to the New Orleans Auxiliary Sanitary Association contains the following information and recommendations in the matter of the construction of privy vaults:—

"In the estimation of your committee, the three prime requisites to the good sanitary condition of a vault are imperviousness, superficiality, ease of access. In insisting on the imperviousness of the material from which a vault is built, the idea is, not only to prevent leakage into the surrounding soil, but also to do away with the nuisance arising from exposure to the air of a surface soaked with foul liquids, every time it is emptied. In their search for a material from which such a vault could be constructed cheaply, they caused to be made a number of experiments, having the object of proving whether or not bricks could be rendered water-tight by boiling in coal-tar or any of its products. Through the kindness of Mr. Fletcher, they were enabled to investigate this subject at the tar-factory under favorable circumstances. While they did not succeed in finding a means of rendering bricks water-tight, your committee think they have conclusively proved that boiling in tar, pitch, or dead oil, adds little or nothing to their value for our purpose. Except in the case of oil, it was impossible to penetrate the brick, and the oil-soaked tile immersed in water, absorbed it as readily, nearly, as would the same tile before treatment, the oil leaving it as the water entered.

"Brickwork rendered inside and outside with pitch, or set in the same, creosoted lumber, cast-iron, glazed earthenware, are the materials most likely to give satisfaction. When creosoted lumber is used (undressed) it will be necessary to coat it with roofing pitch. This will form a glaze easily cleansed, and the importance of constructing a vault so that it can not only be easily emptied, but as easily cleansed when emptied, can not be too strongly insisted upon. If excrement is left sticking to the sides, the surface from which gases can emanate, so far from being diminished, is actually increased, the proportionate increase depending on the depth of the vault as compared with its floor area. From creosoted lumber probably the cheapest form of vault could be made. It would contain in its fibers a material in the presence of which no disease germ can exist. Its permanency has been amply demonstrated, and from its various good qualities your committee recommend it strongly.

"Pipes of glazed earthenware or cast-iron set vertically, one under each seat, would be very easy to empty completely, and could be washed with the least expenditure of water. They would have the important advantage of being jointless, and therefore tight beyond a question. The glaze on the earthenware should be that technically known as slip, i. e., porcelain. Either this or cast-iron, once set, would be practically everlasting. They could without prejudice to their efficiency be set any depth into the ground, provided, only, that their upper ends projected above the surface.

"As to the form of the vault, it would not seem to be of importance whether it be round, square, or oblong. Its size, however, is a matter of great importance. The conclusion arrived at on this part of the subject is that no vault should be constructed to hold more than six months accumulation, while your committee urge the importance of regular inspections by the city or Board of Health, to see that every used vault is emptied, washed and disinfected every three months. Conservancy means nuisance, unless accompanied by perfect disinfection, and here it is the Committee's desire to record their decided opinion that disinfection should not be allowed to cease with the cleansing of the vault, but continued, year in and year out, until the happy time when some effective substitute shall have been provided for our present system.

"It would facilitate the emptying and cleansing of a vault if its floor were inclined and provided with a pocket. Into this pocket the suction-pipe of the excavating apparatus could be dropped, and the vault thus more completely emptied. When built of bricks or tiles, the foundation must be laid on a double layer of planks. All vaults should be protected from the action of the sun."

DISCREPANCIES BETWEEN PLANS AND SPECIFICATIONS.

BOSTON, Aug. 24, 1880.

TO THE EDITOR OF THE AMERICAN ARCHITECT:—

Sir,—I would like to ask your opinion through the columns of your paper on the following question, in the interest of sub-contractors. To fully inform you I will state the whole case: I have figured on the plumbing of a house for a builder outside the architect's office, who had the house to build. The specification was very precise, specifying the various kinds of fixtures and fittings to be furnished by the plumber, but omitted to say anything about that very important item in the plumbing of a house, the bath-tub. As there are several styles of bath-tubs, costing from ten to fifty dollars, I concluded that they wanted some particular kind to be furnished by the owner, and I sent in my bid, leaving out the cost of the bath-tub. Two months after, the builder notified me the job was mine. I answered, "All right, when you want me let me know." When the building was ready for the soil and ventilating pipes I put them in, instructing my workmen to follow the drawings, the run of the pipes being sketched on the plans, having been cautioned by the architect not to be guided by my judgment, but his; but when the pipes

were put in place, being hung on the floor timbers, it was discovered that they would incommode the passage in and out the back door. The architect then inquired the cost of carrying them to a different location. I pointed out where I should have run them in the first place if allowed to use my own judgment, and I told him the cost of changing them. He said he guessed they would do well enough as nobody used the back door but the servants, and they could stoop under. But knowing how inconvenient it would be, and that it would not be the architect who would come in for the cursing,—for servants are not all saints, I had to change them at my own expense. Now the architect says that I must furnish the bath-tub, and calls my attention to a clause in the specification which reads as follows: "The plumber will provide other materials not particularly mentioned above, and entirely complete the work according to the general intent and meaning of the plans and these specifications." There being a bath-tub drawn on the plans, now I would like to know if he can compel me to furnish any kind of a bath-tub he chooses to select, or the kind I choose to furnish. By giving place to the above in your journal, and your opinion on such matters, for the interest and guidance of architects and sub-contractors, if not trespassing too much on your space, you will oblige,

Yours very truly,
PRO FORMA.

["Pro Forma's" question cannot well be answered without a rather extended inquiry into all the facts and agreements which concern the case. One thing he must remember, that he, as sub-contractor, and the architect have no official relation to each other whatever. Probably the main contract contains the usual clause that "the drawings and specifications are intended to cooperate, so that any work shown on the drawings and not mentioned in the specifications, or *vice versa*, is to be executed the same as if it were indicated in both drawings and specification, without extra charge," or other words to the same effect, and under such an agreement, if a bath-tub were shown on the plans, we do not see how the contractor could, unless the specification expressly said that it was to be omitted, or furnished by the owner, escape putting in one, neither the cheapest possible, nor the most elaborate, but suitable to the style of the rest of the work. Whether he can, however, oblige "Pro Forma," as his sub-contractor, to put it in at his own expense, depends entirely on the terms of the sub-contract, with which the architect has nothing to do. He is only expected to hold the principal contractor to his agreement, and if the latter is careless about his terms with his sub-contractors, they must settle the dispute among themselves.

We admit that it was careless to overlook in the specification the description of the bath-tub shown in the drawings, but to infer from this omission, without any further evidence, and without even taking the trouble to ask the question, that the owner intended himself to supply a peculiar kind of tub is, we think, hardly warrantable, especially in the case of an article so universally understood to form a part of all contracts for house-plumbing. For the obstruction of the door by pipes, if the architect directed the course which they should follow, he was undoubtedly responsible, and if the annoyance proved unbearable, he would have been obliged to change them at his own expense, but it must not be forgotten that the plumber has some duties in such cases, and that if he finds, being present on the ground, that there will be difficulties in the execution of the work as specified which the architect, working only with the imperfect help of the drawings, had overlooked, the good faith to which he is always bound requires him to report such difficulties or errors to the architect as soon as possible, so that they may be avoided or corrected without loss. In this case, although the architect was technically to blame, and should pay the cost of changing the pipes if that were found necessary, the plumber showed a carelessness much grosser than his, inasmuch as he made measurements on the spot for pipes whose course was necessarily, since the building did not then exist, laid down by the architect from plans, a number of which must be carefully compared and examined in order to show the existence of obstacles which would, when the plumber's work began, strike the eye at once. We think that "Pro Forma" will see, on reflection, that all his troubles might have been avoided if he had been as willing as he should be to consult and advise with the architect whose designs he was helping to carry out, whose favor, tacit or expressed, accepted him as sub-contractor, and who not only had no interest in misleading him, but would be glad to explain and remove his difficulties, and had a right to expect similar confidence in return.

EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS.

AN OLD IRON BRIDGE.—The iron bridge at Harrisburg that broke down lately with nine coal and grain cars of the Reading Road, was one of the first iron railroad bridges built in Pennsylvania, and had been in use about twenty-one years.

A NEW USE FOR THE TELEPHONE.—It is well known that if a long dry tube, open at both ends, be held over a jet of burning hydrogen, a musical sound is produced, the pitch and quality of which vary with the length, thickness, and diameter of the tube. It has been proposed to adapt such a tube to the safety-lamp underground, and to place it near a telephone in communication in the manager's office on the surface. The alteration of the sound, due to a greater or less admixture of gas with the air of the mine, would warn the manager of the state of the atmosphere in the workings.

THE PROFILEGRAPH.—The profilegraph is a new automatic device for tracing the profile of a road or district. It consists essentially of a two-wheeled carriage having suspended from the body between the wheels a heavy pendulum, free to swing in a line with the direction in which the carriage moves. As the carriage is drawn by a horse over the ground, the pendulum maintains a vertical position, whether moving on a level or up and down hill. The upper end of the pendulum, above the point of support, carries a pencil that touches a ribbon of paper moved by clockwork or by the movement of the wheels of the carriage, and so long as the carriage is moving, makes a trace on the paper, that is, as may be readily seen, a profile of the country passed over by the machine. At the same time one of the wheels, by a simple pedometer device, gives the distance traversed, and makes a scale for comparison with the profile trace to show the relations of the two measures of height and distance passed over by the machine.—*Scribner's Magazine*.

ORCHOMENOS.—During a meeting of the German anthropological congress, held in Berlin the first week in August, Dr. Schliemann read a paper upon his work at Troy. At its close he made the interesting statement that the Greek government had granted to him the right to undertake excavations upon the site of the ancient Orchomenos. The enthusiastic explorer, old though he be, hopes to commence the investigations this autumn, immediately after his return to Athens.

THE CHRYSSELPHTANTINE STATUE OF ATHENA PARTHENOS.—It has always been a difficulty in regard to the gold and ivory statue of Athena, by Pheidias, to explain why, in the annual lists of treasures in the Parthenon, no mention of it was found, though these treasure lists are still fairly complete for the fifth and fourth centuries B. C. Various theories were proposed, such as that for so important an object a special notification may have been made by the newly elected treasurers each year. But Köhler (*Mittheil. d. deutsch. Inst. in Athen*, v. 90) has found apparently four entries of the statue in lists or fragments of lists of the fourth century B. C. As would be expected, these entries occur at the beginning of the lists, immediately after the names of the treasurers and the date. The proceeding was to compare the different parts of the statue, its base and shield, with a detailed description which existed on a bronze tablet preserved in the Parthenon. In the inscriptions the statue is mentioned as being in the Hekatompedos, while the bronze tablet was in the Parthenon; so that the general opinion which explains the name Parthenon as applied to that division of the temple which contained the statue of Athena Parthenos must apparently be wrong.—*The Academy*.

PLATE GLASS CRACKED BY THE SUN.—Any one passing not long ago along the main street of a busy town in the West Riding of Yorkshire, might have observed a very curious fact,—the lower halves of several large plate-glass windows were rent from side to side. A single glance was sufficient to show that the cracks were not produced by the stray missiles of certain street Arabs, for they had not that radiating or starlike arrangement which is generally seen in such cases, but, instead, consisted of one large rent proceeding from one side to the other, with one or two minor cracks branching therefrom. To account for this curious and highly inconvenient phenomenon was a sore puzzle to many of the good folks about; some there were, however, more knowing than the rest, who arrived at a sensible and satisfactory explanation, thereby proving what is demonstrated every day, nay, every hour,—that science is only, to use the words of Huxley, trained and organized common sense. It was midsummer. The windows of the shops where these cracks were to be seen faced the south, and were therefore exposed to the full glare of the sun's light and heat. The lower halves of the windows,—i. e., the cracked parts,—were painted, on the inside, of a dun color, and by two in the afternoon had become quite hot to the touch, whereas the upper and unpainted halves were only slightly warmed. Herein lay the secret. The glazier fixed the windows as if they had been small panes, where the amount of expansion is very minute indeed, and they were fixed in a rigid framework that would not give way. The painter, on his part, in his ignorance of certain principles, put on a color which led to the glass being strongly heated in the sun's rays. This followed: the plate-glass was heated, and it expanded; the frame of the window tried to resist that expansion, and in the struggle the weaker had to give way; not doing so, however, until it was irretrievably injured.—*Science for All*.

EFFECT OF FIRE ON BUILDING STONES.—Dr. Cutting, State Geologist of Vermont, has concluded his unique series of tests on the fire-resisting qualities of building stones. He sums up the result in a late number of the *Weekly Underwriter*. He declares, in substance, that no known natural stone deserves the name fire-proof. Conglomerates and slates have "no capability" of standing heat; granite is injured beyond cheap or easy repair by even so mild a heat as that which melts lead; sandstones, including the variety called brownstone in this city, are better, and limestones and marbles are perhaps the best in this respect. But even they are injured by continuous heat of 900 degrees, and at 1,200 are changed into quicklime. Therefore it would seem that no stone buildings are fire-proof, and some of them, Dr. Cutting even says, are as much damaged by fire as wooden structures are. Brick, on the contrary, is usually uninjured, and is often rather improved by heat until it is melted. But as most brick buildings are trimmed with iron or stone, the damage is often considerable, even when the walls stand. To avoid this, Dr. Cutting recommends the use of soap-stone, which is open only to the objection of expense. The search for an ideal building material is not hopeless, but it must be prosecuted rather by the maker than by the quarrier of stone.

THE ARCHITECTURE OF BRUGES.—Visitors to Bruges should not, by any means, miss seeing the collection of old pictures now on view in the gallery of the Halles, under the belfry. This collection is one of the ways in which Bruges is celebrating the jubilee of Belgian independence; and, though the pictures exhibited date from a period long before "Belgium" had ever been heard of, they are all of a national character and likely to stimulate Flemish patriotism. The primary object of the organizers has been to bring together, from private or semi-public collections, all possible illustrations of Old Bruges; it being their laudable aim to direct in the right way the builders and "restorers" who are beginning just now to be rather active in the city. Bruges is showing some slight signs of a revived prosperity, and the inevitable accompaniment of that is demolition and rebuilding. If this is to be done, it is desirable that the old lines should be followed as exactly as possible; and this exhibition, which contains street-views of all dates from 1600 to 1800, gives ample evidence of what the old lines are. Besides the pictures whose interest is mainly architectural, the collection contains a very fine Martyrdom of St. Lucy, by a follower of Memling; an Adoration of the Magi, by Rogier van der Weyden; some Flemish and Dutch pictures of the seventeenth century, including a good Adrian Vandervelde; and a few modern examples.—*The Academy*.

BUILDING INTELLIGENCE.

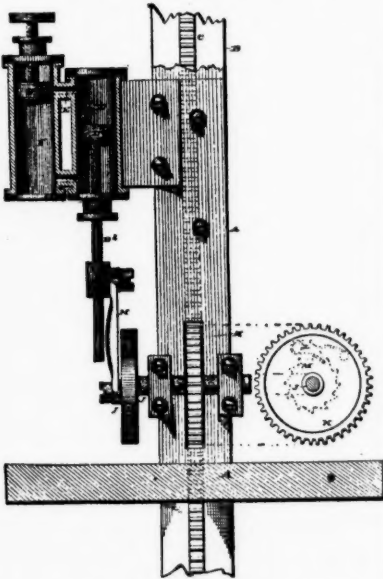
[Reported for The American Architect and Building News.]

[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.]

230,514. SAFETY-GOVERNOR FOR ELEVATORS.—Aretus A. Wilder, Detroit, Mich. This invention relates to safety-governors for passenger and freight elevators, but is equally well adapted for inclined-plane railways, brakes for cars and other vehicles, or for use on the elevating apparatus of mines. A is an elevator-carriage; B, its guides or ways. C is a stationary rack. D is a cylinder, with ports E communicating with the adjacent cylinder F. G is an adjustable valve for enlarging or diminishing the size of one of the ports E. D' is a piston or plunger in the cylinder D, and D' is a piston-rod, which, by means of the pitman H, connects it with the crank I of the shaft J. Slipped upon the shaft J is the pinion K, which meshes with the stationary rack C. The pinion K has a pawl-and-ratchet connection, L M, with the shaft J, so that as the elevator ascends the pinion will revolve, but its ratchet M will ride over the pawl L; but on its descent the two will engage and operate the piston D' in the compartment D. The operation of the device is as follows: The cylinders D and F are filled full both above and



below the plunger with water, oil, or any suitable liquid, and the valve G is so adjusted that sufficient impediment is offered to the flow of the oil through the ports E to constrain the piston to move only at the desired rate, corresponding with the desired rapidity of descent of the car. Now, as the elevator rises, the ratchet in the pinion K will ride freely over its pawl, and the piston does not move; but on the descent of the elevator the pawl and ratchet engage, and the liquid is pumped alternately from above the piston through the ports around into the space below the piston, and vice versa. Should the rope break or any accident occur, the elevator can descend no faster than the piston can work in its cylinders. If the valve is so adjusted as to leave the port E quite free, then the rate of descent may be quite rapid. If the valve is so adjusted as to considerably restrict the passage of the liquid through the port, the rate of descent may be made as slow as may be desirable. If the port is closed by the valve, the elevator will remain suspended. In practical use as a safety-governor, the valve should be adjusted to permit the elevator to descend at its usual rate, and to come into use as a governor only when by accident or otherwise the descent is too rapid. This mechanism may be within reach and control of the operator, so that the descent of the elevator may be controlled in ordinary use, since the operator, by means of the valve, may start the elevator down, stop it, and regulate its speed at will. The valve may be operated by a screw and hand-wheel, as shown in the drawings, or it may be actuated by a lever or other device. If employed as a brake, a suitable stop should be provided, so that the operator may not check the car too suddenly. In order to prevent the possibility of the upright and elevator springing away from each other to such an extent as to disengage the pinion from the rack, there may be employed, if necessary, a retaining-clutch, projecting from the carriage adjacent to the pinion, and embracing the upright or the rack, so as to hold them together. Instead of employing two compartments, D F, the same result may be accomplished with one, the passages which unite the space above with

that below the plunger being either through the adjacent wall or through the plunger itself.

231,388. AUTOMATIC ELEVATOR-GATE.—George Ackerman, Cincinnati, O.
231,389. MACHINE FOR PLANING BLIND-SLATS.—George W. Austin, Manchester, N. H.
231,390. AIR-HEATING STOVE.—John Batchelder, Jr., Jamaica Plains, Mass.
231,401. FASTENING FOR THE MEETING RAILS OF SASHES.—Lorenzo D. Cleveland, Chicago, Ill.
231,402. FOOT-REST FOR REGISTERS.—Benjamin T. Conklin, Brooklyn, N. Y.
231,413. RADIATOR.—Thaddeus Fairbanks, St. Johnsbury, Vt.
231,419. PROCESS FOR PRESERVING WOOD.—Jonas D. Francis, Hanover, Germany.
231,442. HEATING FURNACE.—William C. Miller, East Liverpool, Ohio.
231,454. WRENCH.—Amos Shepard, Plantsville, Conn.
231,462. BIDET WATER-CLOSET.—Jacob G. Van Houten, Trenton, N. J.
231,463. CHIMNEY-CAP.—Nathan W. Walker, Wells-ville, Ohio.
231,464. WATER-FILTER.—Jackson Willsey, Chicago, Ill.
231,468. FRAME FOR SCROLL-SAWING MACHINES.—Henry L. Beach, Montrose, Penn.
231,474. DRAG-SAW.—Nathan L. Brown, Brownsdale, Penn.
231,479. EXPANSION CONNECTION FOR PIPES.—John O. Davis, Hartford, Conn.
231,485. RADIATOR.—Edward E. Gold, New York, N. Y.
231,502. DOOR-ALARM.—John Simon, Oakland, Cal.
231,504. LATCH.—William E. Sparks, New Britain, Conn.
231,544. DRAIN-TILE GATE.—Frank Darst, Eureka, Ill.
231,548. WINDOW-AWNING.—James E. Dwinelle, Baltimore, Md.
231,557. MONKEY-WRENCH.—William H. Glover, St. Louis, Mo.
231,559. HOT-AIR FURNACE.—Albert L. Goodnow and William J. Owens, Utica, N. Y.
231,561. LATCH.—William F. Hall, Boston, Mass.
231,567. FIRE-ESCAPE LADDER.—Robert S. Harris, Dubuque, Iowa.
231,592. WATER-CLOSET VALVE.—Smith S. Leach, St. Louis, Mo.
231,593. PORTABLE HOUSE.—Earl Lee, Corona, N. Y.
9,352. FIRE-EXTINGUISHER (Reissue).—Henry S. Parmelee, New Haven, Conn.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS.—Eighteen building permits have been issued since the last report. The following only are of sufficient importance to be mentioned:
S. D. Price, three-sty brick building on Chase St., near Forrest St.
Chas. H. Giles, three-sty brick building, cor. Ensign and Eager Sts., 17' x 54'.
Henry Schwab, 2 three-sty brick buildings, on Green St., between Mulberry and Saratoga Sts.
Henry Westphal, 6 two-sty brick buildings, cor. Randall and Clarkson Sts.

Boston.

BUILDING PERMITS.—Brick.—Coleman St., between Hamilton Stand Bellevue St., for Geo. H. Wells, 35 dwells., 19'4" x 30'; two-stories and mansard; Geo. H. Wells, builder.
Unnamed Court, from 221 Webster St., for Conrad Decker, 1 dwell., 21' x 34'; two-stories and mansard; Angus Campbell, builder.
Washington St., cor. Ball St., for Chas. Davis, stores, 48' x 54'; Henry C. Allen, builder.
Hancock St., near Columbia St., for Addison P. Wheelock, 1 stable, 60' x 104'; two-stories.
Wood.—Albany St., No. 334, Jos. F. Paul, 1 storage lumber, 40' x 120'; three-stories; Jos. F. Paul, builder.
Perrin St., near Moreland St., for Wm. Donaldson, 1 dwell., 35' x 36'; two-stories; Wm. Donaldson, builder.
Boston Place, near Dorchester St., for Johann Wilhelm, 1 dwell., 19' x 30'; two-stories; Johann Wilhelm, builder.
Unnamed Court, from 116 Foundry St. for heirs of Wm. Devine, 4 dwells., 20' x 31'6"; three-stories.
Duck Lane, near Harvard St., for Thomas Flanagan, 1 dwell., 20' x 32'; two-stories; Michael Flanagan, builder.
West Broadway, Ward 13, for Edw. Tracy, 1 store and dwell., 20' x 45'; two-stories; Edw. Tracy, builder.
DEPOTS.—The New York and New England road is spending \$10,000 to remodel its depot, besides which will be built, a grain elevator with 500,000 bushels capacity, also a freight warehouse 505' x 200'.
The directors of the Boston & Albany Railroad have decided to proceed with the erection of the new passenger station on the land now preparing for it at the corner of Kneeland and Lincoln Sts. A proposition to unite with the Old Colony Railroad in building a union station has been favorably considered by the two corporations, but was abandoned on account of a combination of land-owners who held the property to have been taken at an exorbitant price.
EXHIBITION BUILDING.—The Charitable Mechanics' Association has adopted the plans of Mr. W. G. Preston, of this city, for its new building, at the corner of Huntington Ave. and West Newton St.
CHURCH.—The effort to build a new Catholic church, by French citizens, promises to be successful.
CHAPEL.—The Swedish Society will complete their chapel, on Emerald St., Samuel T. Waters, builder; E. A. F. Newcomb, architect; cost, \$15,000.

THE YEAR'S WORK.—The following table shows the number of permits granted for new buildings in the city of Boston each month of the present year:—

	Brick, Stone, etc.	Wood.	Total.
January.....	12.....	25.....	37
February.....	16.....	23.....	39
March.....	36.....	66.....	102
April.....	37.....	59.....	96
May.....	26.....	33.....	59
June.....	25.....	46.....	71
July.....	28.....	42.....	70

Brooklyn.

BUILDING PERMITS.—Eleventh St., 4 two-sty brick dwells., 16' 8" x 40'; owner, Mrs. Jones, Eleventh St., between Fifth and Sixth Aves.; carpenter, E. C. Squance; masons, John Buchanan & Son.
Hooper St., 4 two-sty brown-stone dwells., 19' 10" x 42'; cost, \$5,000 each; owner, John Sunderland, 39 Ross St.; architect, J. Rose.
Stockton St., 2 three-sty frame tenements, 16' 8" x 45'; cost, \$2,400 each; owner and carpenter, P. Drinnan.
Franklin St., 1 three-sty frame store and tenement, 25' x 52'; cost, \$3,200; owner and carpenter, Otto Goritz, 439 West Thirty-First St., New York.
Fourth Pl., 1 two-sty brick stable, 25' x 30'; cost, about \$2,500; owner, F. W. Whittle, on premises; architect, R. Dixon; builder, P. J. Carlin.
Halsey St., 5 three-sty brown-stone dwells., 18' x 40'; owner and builder, James Roper, 999 Bergen St.; architect, Isaac D. Reynolds.
Halsey St., cor. Nostrand Ave., 2 three-sty brown-stone stores and dwells., 20' x 45'; owner and builder, James Roper, 999 Bergen St.; architect, Isaac D. Reynolds.
Jacar St., 3 two-sty brick dwells., 17' x 40'; owner, etc., Lewis Acor.
Jackson St., 1 three-sty frame dwell., 25' x 40'; cost, \$3,500; owner, J. Jacob, Jackson St., near Graham Ave.; architect, John Platte; builder, John Rueger.
Lee Ave., cor. Hayward St., 5 three-sty brick tenements, 20' x 43', 55' and 63'; owner, M. J. Davis; architect, Wm. B. Ditmars; builder, F. Sheridan.
Pulaski St., 2 three-sty frame dwells., 19' x 40'; cost, \$2,750 each; owner, Jonathan Moore; architect, Wm. H. Dougherty; builders, J. E. Brittingham and Wm. H. Dougherty.
Greene St., 1 three-sty frame tenement, 25' x 38'; owner, —; architect, J. Bops; builders, Walling & Fenwick.
Grand Ave., cor. Bergen St., 2 two-sty frame dwells., 15' x 50' x 12' x 50'; cost, \$2,200 each; owner, J. H. Barbedt.
Varet St., 2 two-sty brick factories, 25' x 60'; owner, William Heilman, 29 Thames St.; architect, John Platte; builders, John Schleret and John Rueger.
Gates Ave., cor. Tompkins Ave., 1 three-sty brick store and dwell., 25' x 55' and 65'; owner, John Dieting; architect, S. W. Osmun; builders, Reynolds & Whitehead.
Gates Ave., 3 brown-stone dwells., 16' 8" x 45'; cost, each, \$7,500; owner and builder, C. Isbill, 338 Monroe St.
Halsey St., 2 two-sty brown-stone dwells., 17' 6" x 45'; cost, each, \$3,500; owner, Henry J. Rosevelt, Hancock St., near Stuyvesant Ave.; builder, John Erickson.
Flushing Ave., 2 three-sty frame tenements, 25' x 60'; cost, each, \$2,800; owner, Henry Gerdes, 9 James St., New York; builders, J. Schock and J. Rueger.
Schenck St., 1 three-sty brick dwell., 22' x 40'; cost, \$3,000; owner, James Boucher, Schenck St., near Willoughby Ave.
Water St., No. 177, 1 four-sty brick storehouse, 25' x 100'; cost, \$8,000; owners, John W. Masury & Son; architect, G. L. Morse.

Chicago.

BUILDING PERMITS.—F. Tong, two-sty brick dwell., 24' x 68', 2701 Archer Ave.; cost, \$2,000.
—McDonald, two-sty brick dwell., 22' x 44', 3244 Fifth Ave.; cost, \$2,000.
L. Levy, two-sty brick store and dwell., 22' x 53', 3212 Halsted St.; cost, \$2,000.
H. H. Forsyth, three-sty brick store and dwell., 24' x 80', 806 West Madison St.; cost, \$8,000.
Tomlin Bros., 3 two-sty dwells., 20' x 60', Warren Ave., near Robey St.; cost, \$15,000.
B. Weinberg, three-sty brick store and dwell., 28' x 70', 66 North Wells St.; cost, \$7,000.
Bemis & Carden, elevator, 40' x 50, Bliss St., cor. Hickory; cost, \$4,500.
R. Lefranck, three-sty brick dwell., 22' x 68, 114 Eighteenth St.; cost, \$4,000.
L. Dodge, two-sty brick store and dwell., 22' x 46', 413 Blue Island Ave.
J. Behn, 4 two-sty brick dwells., 72 1/2' x 56', Lane Place, near Centre Ave.; cost, \$16,000.
Arthur C. Thompson, four-sty brick flats, 24' x 70', 969 North Clark St.; cost, \$5,000.
L. Schreiber, two-sty brick store and dwell., 20' x 50', 468 West Lake St.; cost, \$2,300.
S. B. Williams, three-sty brick dwell., 24' x 58', 348 Wells St.; cost, \$4,000.
J. K. Kriat, two-sty brick store and dwell., 21 1/2' x 70', 541 West Eighteenth St.; cost, \$2,400.
C. D. Wills, two-sty brick dwell., 23' x 50', 301 Franklin St.; cost, \$8,000.
A. Moody, two-sty brick bakery, 50' x 95', 216 and 218 West Lake St.; cost, \$10,000.
E. L. Lehman, one-sty brick store, 24' x 90', 312 State St.; cost, \$2,000.
S. Munroe, 2 two-sty brick dwells., 22' x 38', Douglas Ave., near Ellis, cost, \$9,000.
John Nemece, two-sty brick dwell., 24' x 80', Centre Ave., cor. Nineteenth St.; cost, \$5,000.
Peter Reed, two-sty brick dwell., 21' x 48', Ashland Ave., near Fourteenth St.; cost, \$3,000.
Frieberg Bros., four-sty brick dwell., 49' x 34', Fifth Ave., near Polk St.; cost, \$7,000.
S. Kuebel, two-sty brick dwell., 24' x 57', 934 North Halsted St.; cost, \$8,000.
C. H. Smith, two-sty brick dwell., 25' x 52', Leavitt St., near Van Buren; cost, \$5,000.

Cincinnati.

BUILDING PERMITS.—The following permits have been issued by the Board of Public Works since our last report:

Merritt P. Owens, to remodel two-sty brick, cor. Harrison and Colerain Aves.; cost, \$1,400.
J. H. Cotterall & Son, four-sty brick, Central Ave., between Cherry Alley and Phoebe Alley; cost, \$12,300.
H. Neave, 2 one-sty brick, Staebler St., near Neave St.; cost, \$4,000.
B. Bohner, three-sty brick house, No. 463 Vine St.; cost, \$4,500.
Lakamp & Wulfeck, 2-sty brick, Marshall St., between Hammond St. and Auburn Ave.; cost, \$4,500.
S. Richards, two-sty frame, Curtis St., between Gilbert Ave. and Kemper Lane; cost, \$2,000.

New York.

BUILDING PERMITS.—*Fourth Ave.*, cor. One Hundred and Twenty-Third St., 4 four-sty Ohio stone apartment houses, 20' x 60', cost, each, \$15,000; owner, Thos. F. Treacy, One Hundred and Thirty-Fifth St. and Sixth Ave.; architect, Charles W. Roney.

Greene St., No. 98, 1 five-sty iron store, 25' x 100'; owner, Michael Byrne, Staten Island; architect, Charles Mettam.

West Fifty-First St., No. 531, 1 five-sty brown-stone tenement, 25' x 55'; cost, \$12,000; owner, Capers Forsch, 531 West Fifty-First St.; architect, J. M. Forster.

One Hundred and Thirtieth St., 8 three-sty brick dwells., 20' x 55'; cost, each, \$7,500; owners, Estate of Wm. Astor, 87 Prince St.; architect, Chas. Buck; builders, Webb & Son and Jno. Downey.

Sixty-Seventh and Sixty-Eighth Sts. and First Ave., 1 one-sty brick school-house for Technical School of Metropolitan Museum of Art; cost, \$8,000; owner, R. T. Auchmuty, 60 University Pl.; architect, James Renwick; contractor, Martin E. Deegan.

East Sixty-Fifth St., No. 246, 1 one-sty brick stable, 30' x 60'; cost, \$2,000; owner, Thomas McGinney; architect, Fr. S. Barus; builder, not selected.

Lexington Ave., 12 three-sty Connecticut brown-stone dwells., 16' 6" x 52'; cost, each, \$10,500; owner, John Hodge, on premises; builder, R. H. Coburn.

West Thirty-Fifth St., Nos. 139, 141, and 143, 1 three-sty brick and iron hotel and music-hall, 50' x 105'; cost, about \$20,000; owner and builder, Donald McQuien, 313 Bowers; architect, Geo. E. Harding.

Eighty-First St., 4 three-sty brown-stone dwells., 19' 6" x 52'; cost, each, \$9,000; owner, D. W. Evans, No. 146 East Eighty-First St.; builder, W. Picken.

Suffolk St., No. 101, 1 five-sty brown and Nova Scotia stone tenement, 25' x 60'; cost, \$11,000; owner, Chas. Hahn, 27 First Ave.; architect, A. H. Blankenstein.

Suffolk St., No. 103, 1 five-sty brick store and tenement, 25' x 60'; cost, \$11,000; owner, Chas. Hahn, 27 First Ave.; architect, A. H. Blankenstein.

Second Ave., 2 four-sty Connecticut stone stores and tenements, 25' 6" x 57'; cost, \$18,000.

Twenty-Fifth St., 1 two-sty brick shop, 50' x 25'; cost, \$2,000; owners, Mitchell, Vance & Co.; builder, Robert L. Darragh.

One Hundred and Thirtieth St., 2 four-sty brick French flats, 25' x 52'; cost, each, \$9,500; owner, Jas. Duffy, Fifty-First St.; architect, A. Spence.

First Ave., *Seventy-First and Seventy-Second Sts.*, 13 six-sty brick stores and dwells., total, 204' 4" x 43' and 143' 4" x 75'; cost, each, \$14,154; owner, Improved Dwelling Assoc.; architects, Vaux & Radford; builders, Murphy & McIntyre.

One Hundred and Nineteenth St., 3 three-sty Connecticut brown-stone dwells., 17' x 45'; cost, each, \$6,300; owner, James Gault, 210 West Fifty-Third St.; architect, E. Shultze.

West Fifty-Seventh St., No. 39, 1 four-sty brick dwell., 33' 4" x 65'; owner, David L. Einstein, 14 and 16 White St.; architects, D. & J. Jardine; builder, Samuel Lowden.

Sixty-Fifth St., 2 four-sty Connecticut brown-stone dwells., 25' x 52'; cost, each, \$35,000; owner and builder, Bernard Spaulding, 527 Lexington Ave.; architects, Thom & Wilson.

Sixty-Fifth St., 2 four-sty Connecticut brown-stone dwells., 25' x 58'; cost, each, \$38,000; owner and builder, Bernard Spaulding; architects, Thom & Wilson.

Fifty-Fifth St., 1 five-sty Connecticut brown-stone apartment-house, 25' and 23' 6" x 80' and 82'; cost, each, \$23,000; owner, Jane Jacobs, 30 West Thirty-Eighth St.; architects, Thom & Wilson; builders, J. Spelmann and C. W. Klapperts' Sons.

Seventy-Second St., 1 four-sty brick apartment-house, 20' x 64' 6"; cost, \$15,000; owner and builder, C. H. Bliss, Seventy-Second St., near Second Ave.; architects, Thom & Wilson.

Eighty-Third St., 2 four-sty brick apartment-houses, 20' x 55'; cost, each, \$9,000; owner, Selig Steinhardt, Madison Ave., cor. Sixtieth St.; architects, Thom & Wilson.

One Hundred and Sixty-Ninth St., 2 four-sty brick tenements, 31' and 30' x 53'; cost, each, \$8,000; owner, Jacob Stahl, Franklin Ave., near One Hundred and Sixty-Ninth St.; architect, Julius Kastner; builders, Jas. McGarity and Geo. E. Sherwood.

One Hundred and Thirty-Third St., near Sixth Ave., 3 three-sty dwells., each 16' 8" x 46'; estimated cost of each, \$7,000; John Hart, owner; Andrew Spence, architect.

Fulton Ave., near One Hundred and Sixty-Ninth St., a stable and carriage-house; cost, \$4,000; John Eichler, owner.

Henry St., cor. Montgomery St., a brick and iron front tenement, the lower floor to be used for a store, 21' 6" x 69'; estimated cost, \$9,000; George Graham, owner; G. Insole, architect.

Third Ave., near One Hundred and Thirty-Third St., a brick five-sty factory for the Mott Iron Works, 35' x 96'; cost, \$12,000; Thomas H. McAvoy, architect.

ALTERATIONS.—*First Ave.*, cor. Forty-Third St., raised one-sty; cost, \$4,500; owner, Dennis Harrington, on premises; architect, Thos. H. McAvoy; builder, B. Sheridan.

Fortieth St., No. 11, East, three-sty brick extension 19' x 6'; cost, \$5,000; owner, H. B. Hyde, 11 East Fortieth St.; architect, E. E. Raht; builders, D. Campbell & Co. and W. Germond & Co.

Fifty-Ninth St., Nos. 161 and 163, raised 7.6 and two-sty brick extension, 13' x 34' 6"; cost, \$4,000; owner, Louis Schoolherr, on premises; architect, Julius Kastner.

STAGE STABLE.—The Madison Ave. line of stages is to have a large depot, 90' x 200', built, between Lexington and Fourth Aves., from Forty-First to Forty-Second St. The building will be of brick, and will contain the latest improvements in stalls, ventilation, etc.; cost, about \$50,000; Messrs. D. & J. Jardine, architects.

APARTMENT-HOUSE.—Mr. Wm. Mathews intends to have built, on Seventy-Ninth St., between Lexington and Third Ave., an apartment-house, 100' x 100'. Messrs. D. & J. Jardine are drawing the plans.

HOUSES.—Messrs. D. & J. Jardine have prepared plans for 7 houses, brown-stone fronts, to be erected for one of our large capitalists, on Sixty-Fourth St., between Ninth and Tenth Aves. They will cost from \$5,000 to \$6,000 each.

The same architects have drawn the plans for a house for Mr. D. L. Einstein, 33' x 100', to be erected on Fifty-Seventh St., between Fifth and Sixth Aves. The house will be in Queen Anne style, with front of brick and terra-cotta, and will cost about \$50,000.

Messrs. O. P. & L. F. Hatfield are the architects of two houses to be built on Eighty-Second St.

St. Louis.

BUILDING PERMITS.—Thirty-five 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.	STORYS.	FRONT.	FEET.	COST.
G. Hambach,	Dwell.	2	16	7	\$2,800
F. T. Heindon,	Dwell.	2	16	7	5,700
J. A. Windell,	Dwell.	2	16	8	5,000
H. Schlieber,	Dwell.	2	16	6	3,000

General Notes.

ALTOONA, PA.—A brick house, to cost about \$12,000, is being built for Mr. J. P. Levan, Superintendent of Car Works of the P. R. R.; Messrs. Wilson Bros. & Co., of Philadelphia, are the architects.

BURLINGTON, IO.—Plans have been prepared and contracts let for a block of four stores, 80' x 87', three stories high, cut stone front, pressed brick side on Fourth St.; cost, \$27,000; C. A. Dunham, architect.

CATONSVILLE, MD.—Ground was broken on Monday, the 23d ult., for a new Presbyterian church, to be 72' x 36'. There will be a main auditorium, 56' x 36', with a Sunday school-room, 36' x 14', at the tower room, and a pastor's study at the pulpit end of the church, 12' x 18'. The entire structure will be surmounted with a tower, 86 feet high. The estimated cost is \$6,000 complete. Mr. Chas. L. Carson is the architect, and Mr. William Ferguson is the builder.

FISHERS ISLAND, N. Y.—A Union chapel is to be built here.

HINGHAM, MASS.—An addition which will contain two hundred rooms is to be made to the Hotel Nantasket.

HOLYOKE, MASS.—A new school-house is to be built of brick, with brown-stone finish. The contract will be let in a few days. Thos. W. Mann, architect.

M. J. Teahan is about building a brick block with Sutherland Falls marble trimmings.

HARTFORD, CONN.—St. Patrick's Catholic parish of Hartford has bought a site from the Willimantic Savings Bank, for \$12,000, for a new school-house.

HARRISON SQUARE, MASS.—A factory is being built for J. H. Bufford's Sons; E. A. P. Newcomb, of Boston, architect.

EAST WALPOLE, MASS.—A house in colonial style is being built for Chas. S. Bird, Esq.; Burt Bros., builders; E. A. P. Newcomb, Boston, architect; cost, \$5,500.

ORANGE, TEX.—The new round-house and new depot will require some 190,000 feet of lumber.

WASHINGTON, D. C.—Statistics just compiled show that there were erected during the year ending with June, 625 new buildings, against 511 in the previous year. Among the public men who are preparing new homes here are Secretary Sherman and Senator Cameron.

Industrial.

BALTIMORE, MD.—The corner-stone of the new factory of the Atlantic Furniture Company was laid on the 23d ult. The factory will occupy the ground known as Claggett's brewery property, on Lombard, Jones's Falls, and Granby Sts. The size of the new factory will be 50' x 180', five stories high, with engine-house, 30' x 50' in the rear, and a drying loft above it. The contract has been awarded to Mr. Frederick Burger.

HOLYOKE, MASS.—Geo. E. Dudley, W. E. Syms, and Geo. R. Dickinson, are to build another paper mill for the manufacture of book, writing and envelope paper; D. H. & A. B. Tower, architects.

The Springfield Blanket Company is building an addition to mill, from plans by Thos. W. Mann.

MONTREAL, CAN.—The Excelsior Glass Company (limited) is erecting twelve buildings. The factory proper is 145' x 63', three stories high; in addition there is the machine-shop, 40 feet square and two stories high, and several other buildings to be used for storage.

NEW BRITAIN, CONN.—The Russell & Erwin Manufacturing Company intend to build a brick building, 75 feet long.

Bids and Contracts.

BOSTON, MASS.—The Committee on Streets received the following proposals for building the abutments and retaining wall for the new Broadway extension bridge over the Boston & Albany Railroad: John Cavanaugh & Co., \$64,900; Thos. F. Maney, \$66,365.98; Frederick K. Ballou, \$71,777; Charles A. Trumbull, \$79,983; Cummeskey & O'Connor, \$87,000; W. C. Mc-

Clallan & Co., \$87,650. The contract was awarded to Mr. Cavanaugh.

SPRINGFIELD, MASS.—The contract for building the dry-bridge school-house, has been awarded to Chas. L. Shaw. It is to be a frame building.

ST. LOUIS, MO.—The Commissioner of Supplies has awarded a contract to Christopher Simpson & Co., for a lot of iron bar frames for the Insane Asylum.

Publishers' Department.

The American Architect and Building News.

PUBLISHED EVERY SATURDAY BY

JAMES R. OSGOOD & COMPANY,
BOSTON, MASS.

NEW YORK OFFICE, 21 ASTOR PLACE.

An Illustrated Journal of Constructive and Decorative Art devoted to the Interests of Architects, Builders, Decorators, etc.

15 cents per copy; \$7.50 per year; \$6.00 in advance.

Payments should be made directly to the Publishers, either by draft or by post-office order.

JAMES R. OSGOOD & COMPANY, Publishers,
BOSTON, MASS.

New Advertisements.

BAY OF FUNDAY QUARRYING CO. (New York and Boston), Brown and Olive Freestone. Page vii.
S. D. HICKS & SON (Boston), Copper-smiths. Page ii.
NEW YORK WEEKLY HERALD (New York). vii.
CRANE BROS. M'FG CO. (Chicago), Steam and Hydraulic Elevators, Steam Pumps, etc. Page ix.

MINERAL WOOL.

The mineral wool plant at Greenwood Iron Works, Orange County, has been worked to its full capacity without interruption for the past six months, and no stock is accumulating. The Pennsylvania Railroad Company has now over 300,000 pounds of this material in actual use, most of it for deadening floors of passenger cars, and recently ordered 126,000 pounds more for early delivery. Among other large orders recently filled we note a sale of 35,000 pounds to the St. Louis water-works for boiler and pipe covering; a car-load of 22,000 pounds each to the Barney & Smith Manufacturing Company of Dayton, Ohio, and the Cincinnati Gas-light and Coke Company, several lots to the Edgar Thompson Steel Company and Gautier Steel Company (limited), and two car-loads for the deadening of all floors in one of the finest residences of Fifth Avenue, New York, now nearly completed.—*Am. Manufacturer, Pittsburg, July 23, 1880.*

N. R. CAMPBELL & CO.

17 Franklin St., Boston.

Make a specialty of Mechanical and Scientific Books. Catalogues mailed free on application.

PERTH AMBOY

TERRA-COTTA CO.
170 Broadway, New York.

MANUFACTURERS OF

ARCHITECTURAL TERRA-COTTA,
Buff and Colored Brick, Fire Brick.

STORY & WILBUR,

FORMERLY A. WILBUR & CO. (ESTABLISHED 1821.)
NEW ENGLAND EMPORIUM FOR

ROOFING SLATES.

MERRILL'S CELEBRATED UNFADING BROWN-VILLE MAINE SLATE.

Purple and Black Welsh, Monson, Bangor, and Star Penna, Black Diamond, Purple, Green, and Red Slates. By cargo or square. Special rates by carloads from quarries.

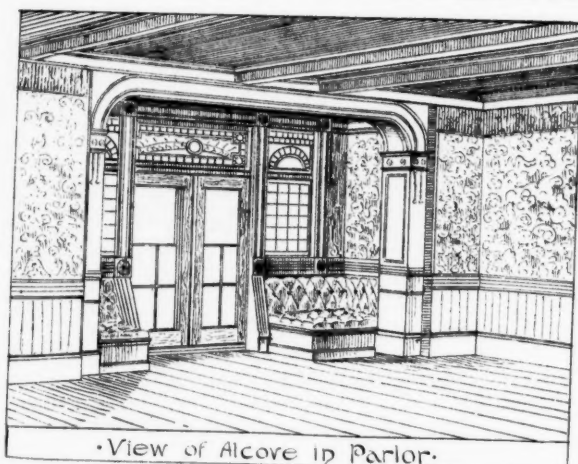
Slate Dressing and Punching Machine, Roofing Tin Zinc, Solder, Slating Tools, Nails, and Elastic Cement, Rosin Sized Tarred and Dry Felts.

Our stock of Slates embraces 10,000 squares of all grades and prices. Particular attention paid to stowing and forwarding by vessel or rail for export or home trade. Inquiries promptly answered.

Slate Wharves, 529 Commercial Street,
(Near Old Charlestown Bridge.)

JOSEPH STORY. BOSTON. S. A. WILBUR.

Messrs. S. & W. have the entire product of my quarries, for 25 years known as "Brownville" or "Bangor Maine Slate," the standard slate of New England; awarded a Silver Medal by the Mass. Char. Mech. Ass'n and the "Centennial" Medal, the highest awards to Roofing Slates. As my quarries are the only ones making this peculiar quality, architects, builders and others, by specifying "Merrill's No. 1 Brownville Maine Slate" may protect themselves against inferior kinds. **ADAMS H. MERRILL, Brownville, Maine.**

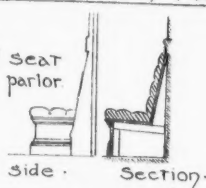


•View of Alcove in Parlor.



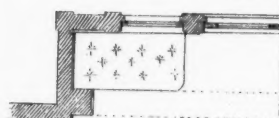
Veranda

Details of seat
in alcove of parlor.

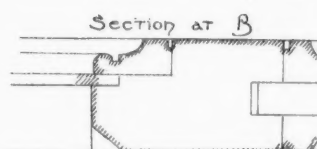


Side.

Section.

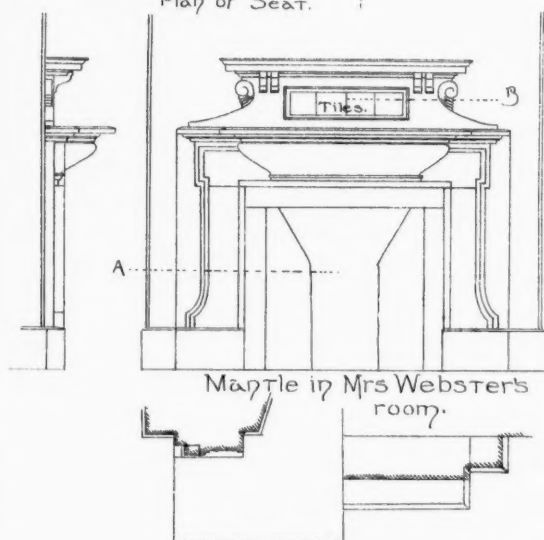


Plan of Seat.



Section at B

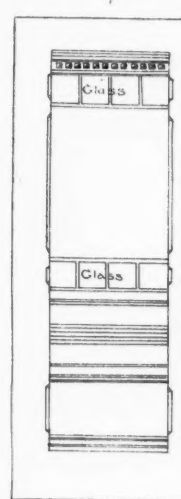
Details of Veranda



Mantle in Mrs Webster's
room.

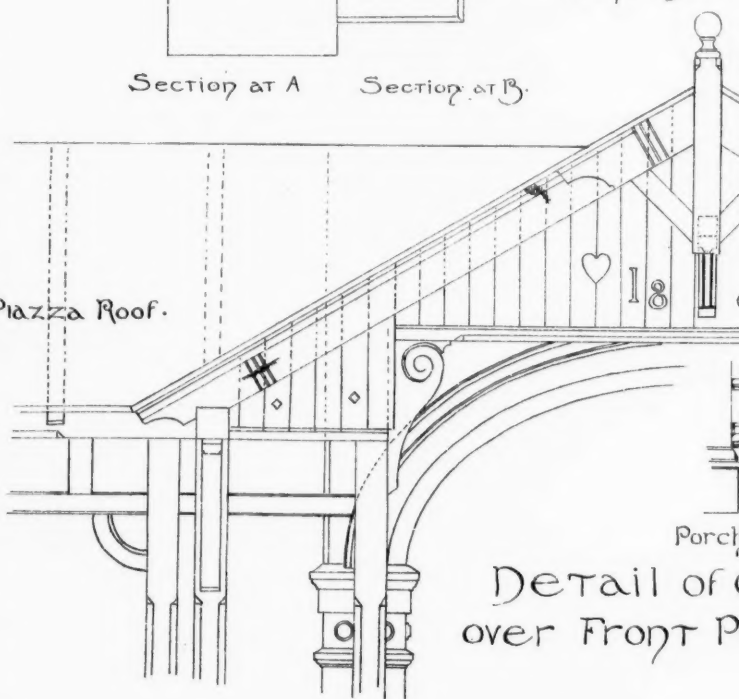
Section at A

Section at B.



Front Door

Piazza Roof.



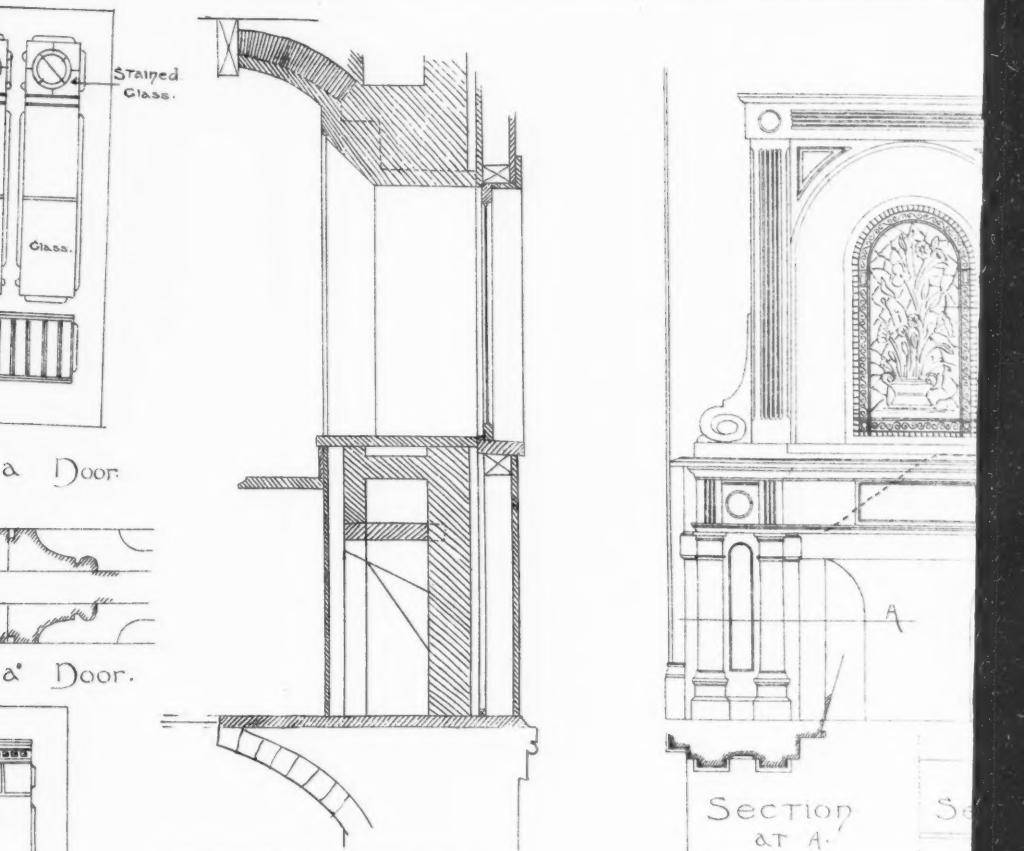
Porch

Detail of
over Front P

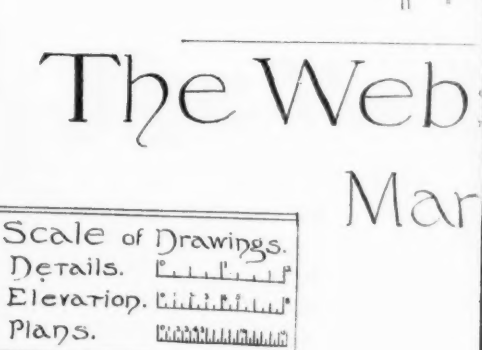
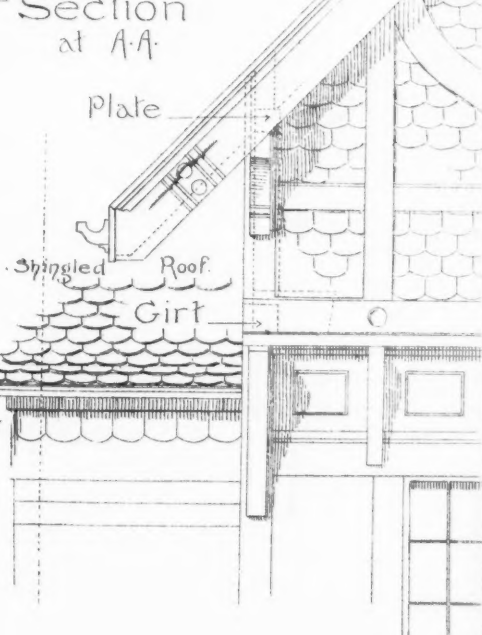
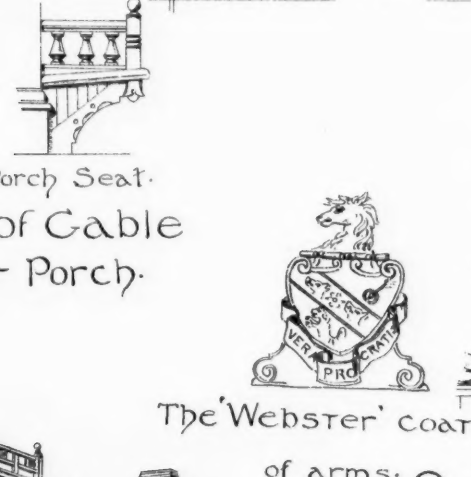
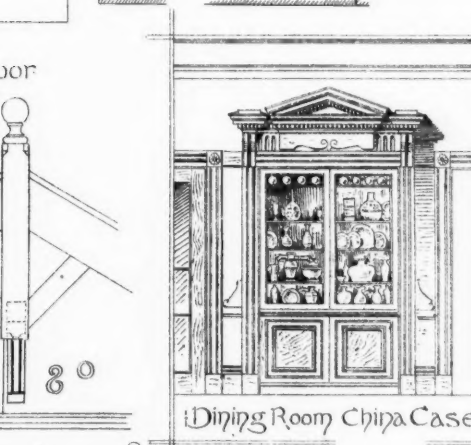
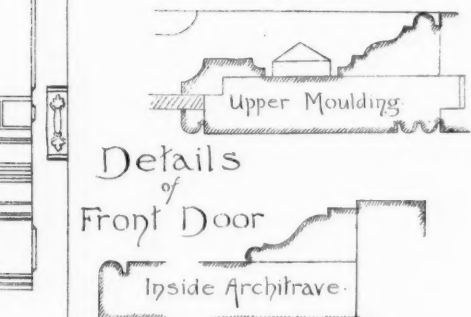


•Perspective View of H

Drawn by T.O'Grady Jr.

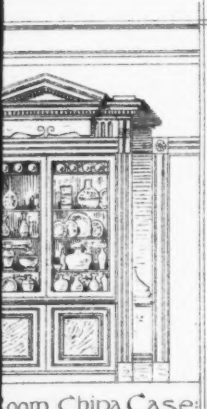
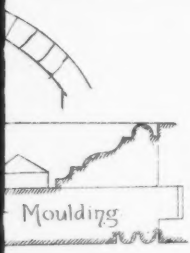
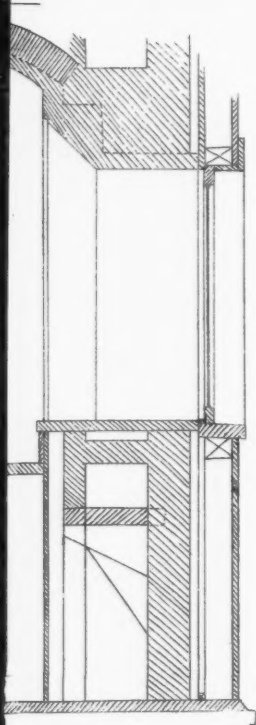


Dining Room



The Webster Mar

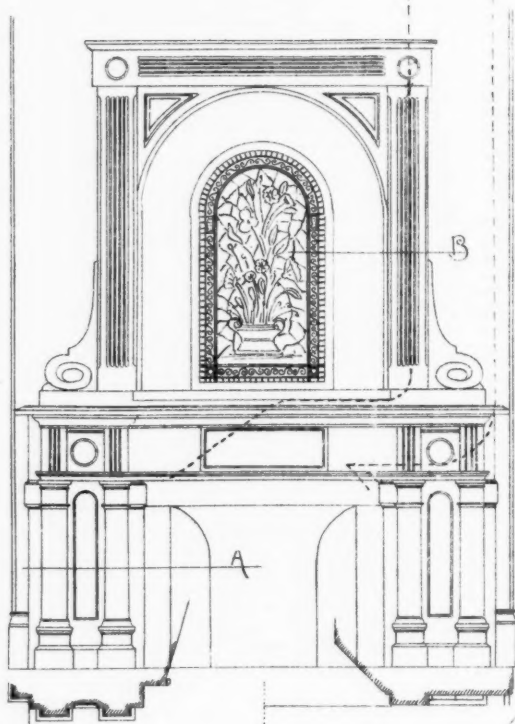
Scale of Drawings.
Details.
Elevation.
Plans.



Room China Case.



Webster's Coat of arms.



Section at A.

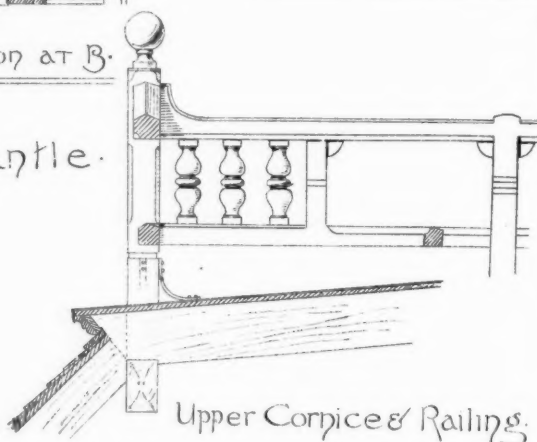
Section at B.

Dining Room Mantle.



Base Moulding.

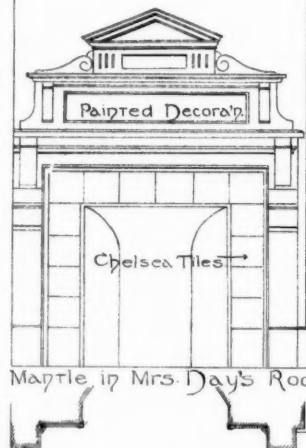
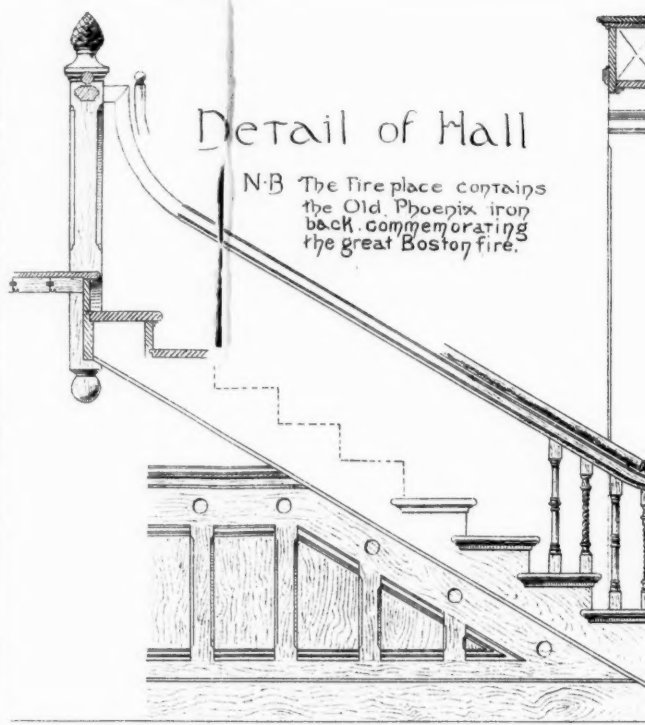
Chair Rail.



Upper Cornice & Railing.

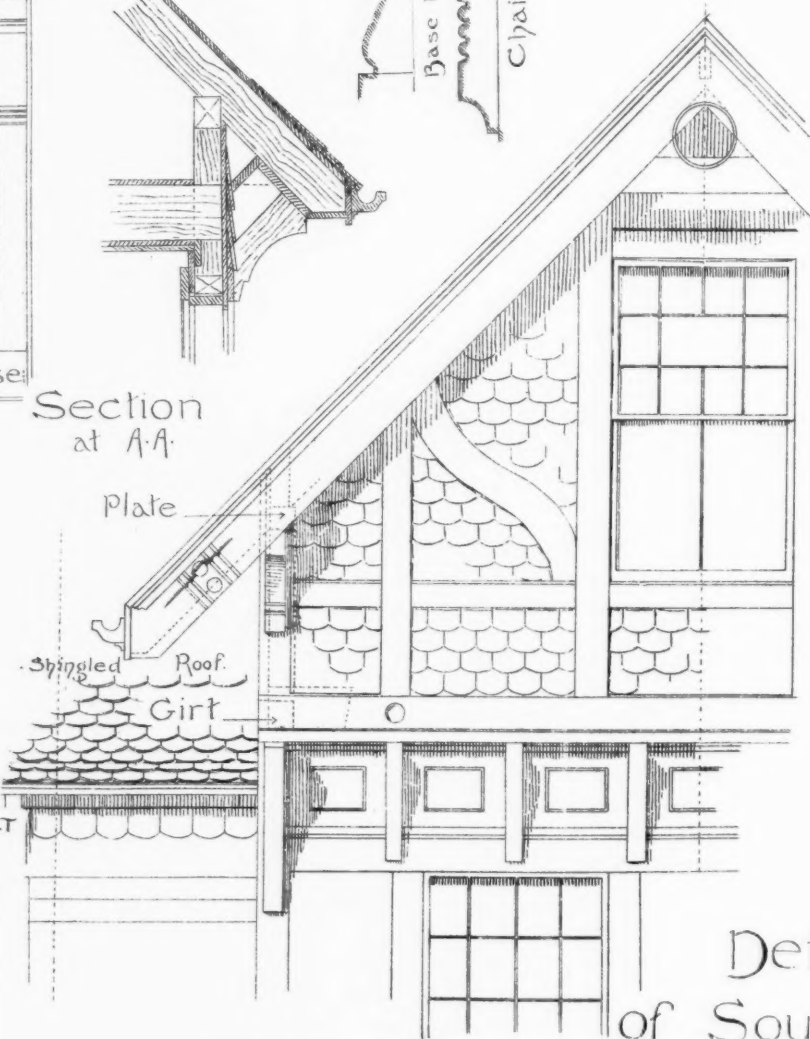
Detail of Hall

N.B The fireplace contains the Old Phoenix iron back commemorating the great Boston fire.



Mantle in Mrs. Day's Room.

Plan of Mantle.

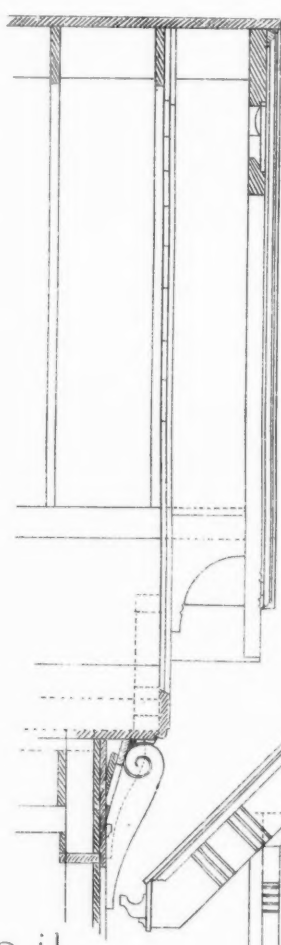


Section at A-A.

Plate.

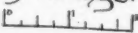
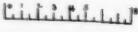
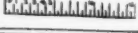
Shingled Roof. Girt.

Detail of South Gable

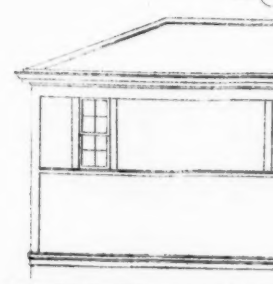


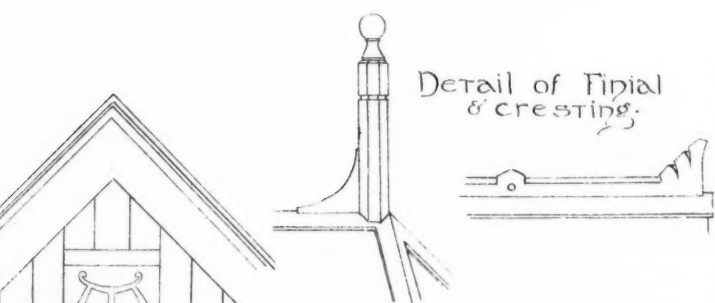
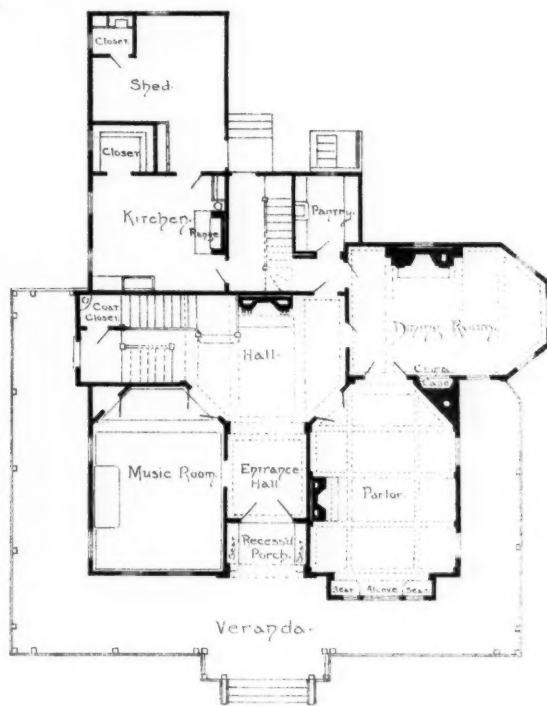
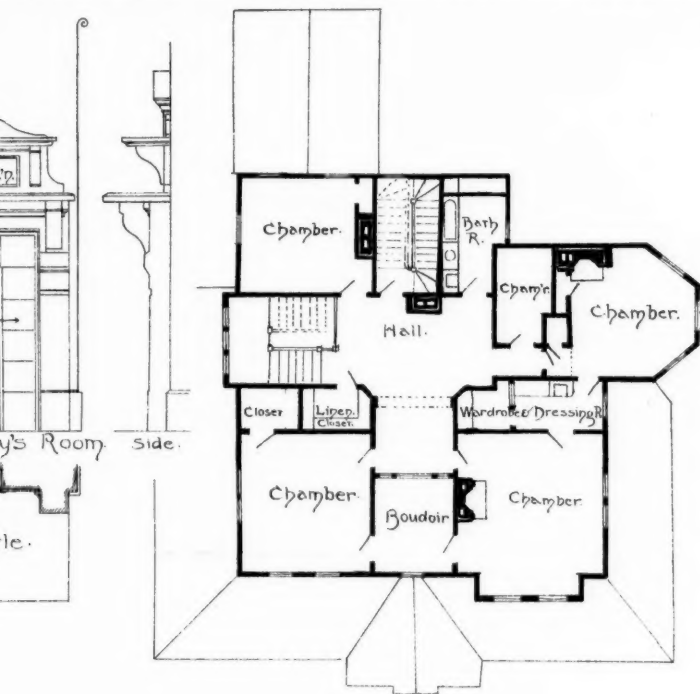
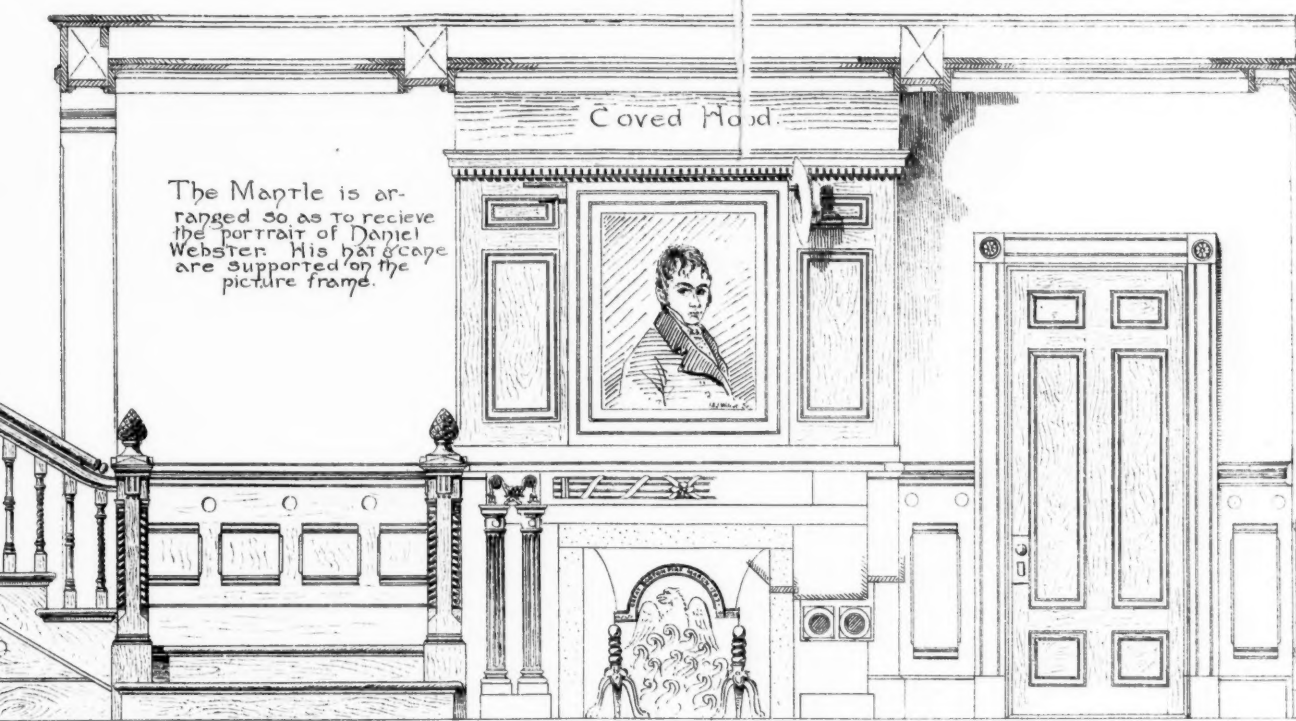
Side of Bracket.

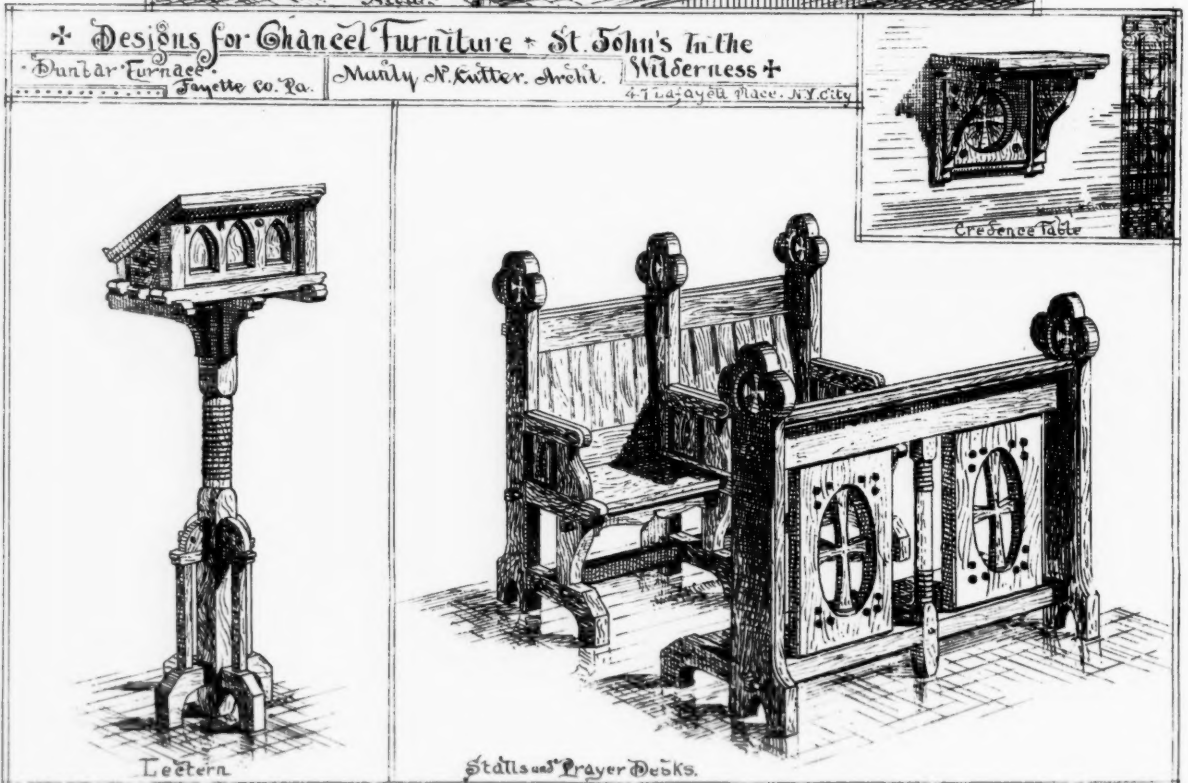
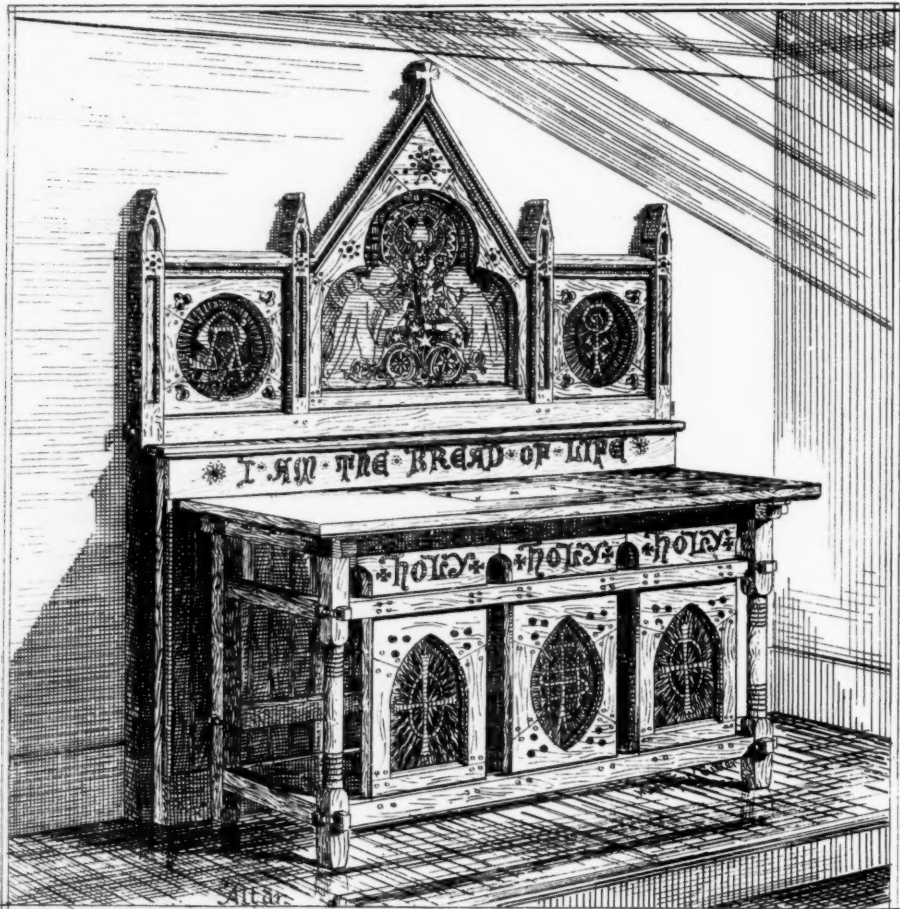
The Webster House. Marshfield, Mass.

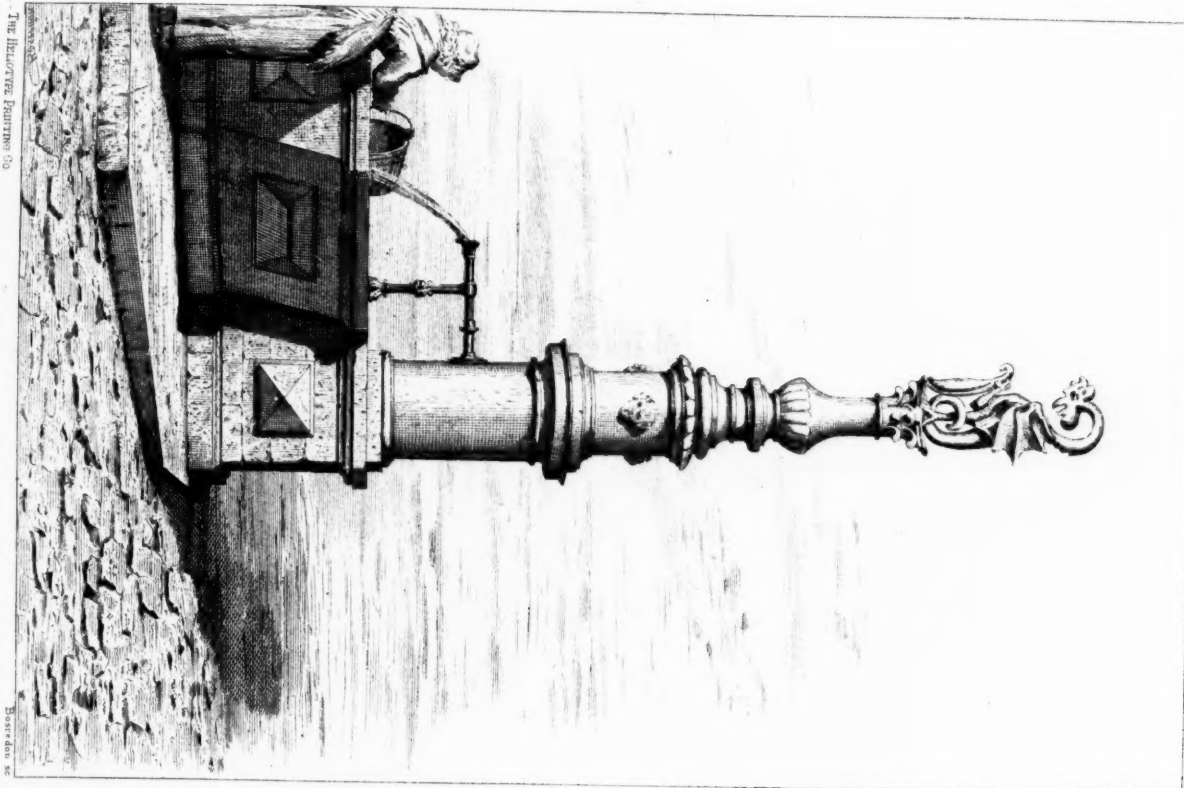
Scale of Drawings.
Details. 
Elevation. 
Plans. 

WM. C. PRESTON Architect.
Boston.





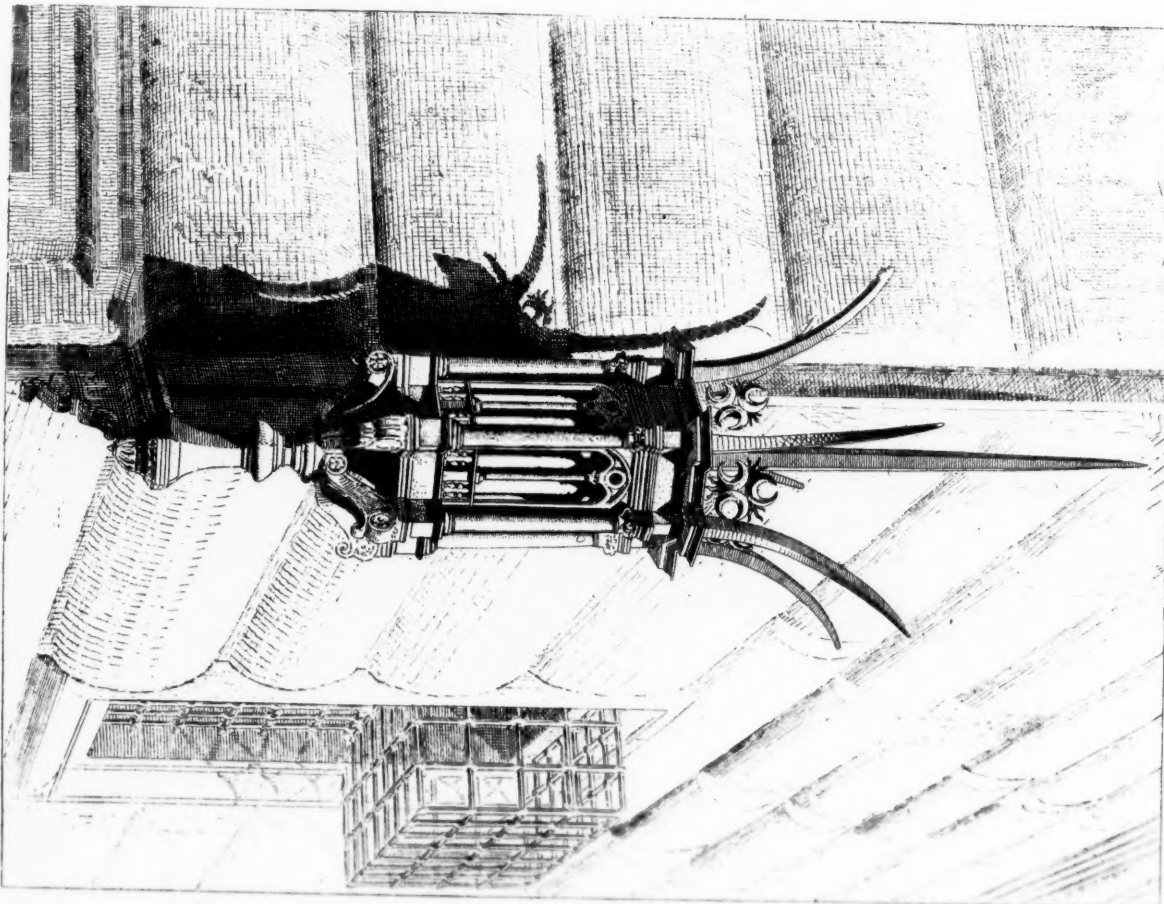




The Helvetic Printing Co.

Source: Jan. 1880

A SWISS FOUNTAIN.



Garten, 1880

AN ITALIAN LANTERN.