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CONTENTS.

THE New York *Evening Post* has taken advantage of a lull in the Feuardent-Cesnola war to turn its arms against the management of the *Art Amateur*, the journal in which Mr. Feuardent's letters were first published. This journal, in an article written to urge the taking of immediate steps to secure the prize offered to the Metropolitan Museum of Art, in the shape of a complete collection of casts from the antique sculptures contained in the various European museums, remarked that such a collection would be "incalculably more valuable to the museum *for educational purposes* than the two Cesnola collections of Cyprian antiquities and the Avery porcelains combined." This opinion, in which we should suppose that every person of sense would concur, is now, however, attacked by the *Evening Post* as "a feeble attempt to disparage the Cesnola collection," and some singularly irrelevant extracts from Mr. Newton's recent volume of Essays on Art and Archæology are brought forward to combat it, such as the assertion, which no one will contradict, that General di Cesnola's discoveries have "no parallel in the annals of archæology" and so on. What this has to do with the *Art Amateur's* remark, it is difficult to see. No one disputes the fact that, as Mr. Newton says, "these discoveries have added greatly to our knowledge of the archaic period of Greek art," but then, archaic Greek sculpture forms a very small and not extremely attractive subdivision of the whole field of ancient art, such as would be covered by a comprehensive collection of casts, and interesting as the Cypriote antiquities, the treasures of Mycenæ, or the remains of the mound-builders may be in themselves, such special collections hold, in regard to the study of plastic art,—as the *Art Amateur* justly reasons in the words which we italicize—a place even smaller than that which the time and country which produced them occupy in the history of the world. The *Evening Post* has the meanness to intimate that the noble series of casts which the *Art Amateur* as well as all persons interested in the advancement of our artistic culture wish to see secured is "probably to be obtained through some 'dealer'." We hope it is true, as it says in its peroration, that "the Metropolitan Museum has a strong hold upon the people of New York," for it seems as if some of its *soi-disant* champions were doing their best to discredit it.

L' ARCHITECTE, in speaking of some matters relating to the *Société des Architectes de Seine-et-Oise*, mentions incidentally a practice adopted in that body which we think worthy of imitation. As usual in reputable societies of the kind, no new member is admitted until he has given satisfactory proofs of his ability and attainments, as well as character, but having once passed the examination, and been admitted to membership, a stamp is issued to him, bearing his own name together with the society's seal, with which he is authorized to impress all drawings and professional papers proceeding from his office. It is a very common complaint with us, not only among architects but the public, that there is no easy way of distinguishing the honorable and skilful practitioners from ignorant and incapable pretenders. It is true that the membership lists of the architectural societies furnish satisfactory evidence as to the persons named in them, but such lists are not easily referred to, and, as it is not customary here for those who belong to the societies to write a row of initials after their names, as is done in England, their honorable position is known only to a very small circle. The device of furnishing members with an official seal, with which they can stamp the papers which continually issue from their offices, affords an admirable means of enabling them to publish in an unobtrusive way the fact of their membership, and gain the credit which they deserve for having attained it, while it is likely, if judiciously used, to extend the influence and reputation of the society itself. If well protected by copyright, such a stamp would soon become a valuable possession to its holder; every brilliant sketch or good diagram of construction impressed with it would cast honor on others which bore a similar mark, and a certain mutual dependence and coöperation would spring up among members of the same society, which would be extremely useful in many ways, but is now totally lacking.

CONSIDERABLE agitation has been caused throughout the British architectural world by the award in the competition for new municipal buildings at Glasgow. It will be remembered that a ready-made plan accompanied the instructions, which architects were expected to follow, liberty being, however, by an afterthought, granted them to vary from it if they wished. The heights of stories and several other points were fixed, and the limit of cost was set at one hundred and fifty thousand pounds. Ninety-six designs were received, and Mr. Charles Barry was appointed, according to the promise to competitors, to make the award, which was briefly as follows: The arbitrator began by saying that at Glasgow prices none of the designs could be properly carried out at the proposed cost. The model plan itself, which all were required to conform to substantially, could not, with the heights of stories prescribed, be executed, even with the plainest exterior, for less than one hundred and ninety-three thousand pounds. Mr. Barry, however, thought that the instructions, which gave a definite cost in connection with a minutely detailed model plan, suggested the inference that the price was an actual estimate from the plan, and competitors would therefore be justified in basing their estimates upon the standard deduced by comparing the cubic contents of the model design with the specified sum. Reasoning in this way Mr. Barry thought it fair to consider that those designs which would not exceed in cost the model plan had fulfilled the terms of the competition, and out of these he designated the best three, as entitled to the premiums offered. At the head of the list he placed a design which proved to be the work of Mr. George Corson, of Leeds, an architect of considerable distinction.

A POSTSCRIPT was, however, appended to the report, saying that the arbitrator was of opinion that other plans had been sent in of much superior merit to any of the premiated ones, but more costly, and he regretted that, being bound by the instructions as to the limit of cost, he did not feel himself at liberty to specify them. Naturally enough, this set the Town Council to considering whether they had not better pay Mr. Corson and the two others their premiums, and get rid of them, and then choose one of the more expensive designs for execution: that is, to put it clearly,—turn away the ablest of the architects, who were honorable enough and skilful enough to keep the cost of their designs within the prescribed limits, and bestow the great prize, the execution of the building, on some man who evidently was either too ignorant to know how to estimate the cost of his work, or dishonestly and intentionally violated the conditions in the hope of gaining an advantage over his more scrupulous competitors. This way of considering the subject, though common enough among town officials, is so admirably calculated to encourage the worst features of competitions by setting a premium on recklessness and fraud, that we are amazed to find so respectable a journal as the *Architect* talking about Mr. Barry's "rigorous technicalities," as compared with the "generous sympathies" of those who "ignore everything of the kind," and claiming that the arbitrator "coolly put all the best designs on the shelf, and bestowed the cash upon the second-rate, for reasons of discipline."

For reasons of common honesty, we should say, such as all those who have any regard for professional honor should uphold and maintain to the utmost. The other journals take a much more sensible view of the matter, and suggest a solution of the difficulty which is obviously the only fair one; that if the corporation of Glasgow do not wish to carry Mr. Corson's design into execution, they should, after paying him the premium which he has fairly won in the first competition, institute a second, with a different limit of cost, or none at all, to which he will be admitted on equal terms with such others as they may select, instead of ignominiously debarring him from all possibility of gaining the real prize, in return for having already once been the most successful in fulfilling all the conditions which they had themselves laid down as necessary for obtaining it.

One of the greatest difficulties attending the operation of the long submarine telegraph cables beneath the Atlantic has always been the feebleness of the current, as received after transmission through three thousand miles. A certain loss of force is inevitable on long lines, especially those laid under water, but in land telegraphs relays can be stationed at the requisite intervals, to refresh, so to speak, the current with new battery power. Until recently, however, no means had been devised for adapting such relays to ocean cables, and the only resource of electricians lay in the construction of extremely delicate galvanometer needles, which would be deflected by even a feeble remnant of the original impulse. Very lately, Dr. S. F. Van Choate has invented an apparatus, of which we have not a very clear description, but which in substance forms a mid-ocean relay, through whose means the loss of current is very greatly reduced, and electricians are thereby enabled not only to send messages with increased rapidity but with a current strong enough to operate printing instruments of delicate construction. There seems to be no reason why these "repeaters" should not be attached to a cable at several points, thus still further facilitating business, and making it practicable to lay and operate lines of any length. Even a trans-Pacific cable would thus be feasible.

A theory has recently been put forth to account for the magnetism of the earth, which has an attractive air of probability. Attempts have often been made to connect terrestrial magnetism with electric currents, the favorite idea being that the earth occupied the position of the core in an ordinary electro-magnet, while the helix, or coil of insulated wire through which the current in the electro-magnet passes, was represented by some movements of electric force upon the surface of the earth in a direction parallel with the equator. No such movements have, however, been observed, and even if they existed, the analogy between their relation to the imaginary line called the earth's axis, and that of the coil of wire in the electro-magnet to the insulated bar of substantial iron which forms its core would be far from complete. More recent investigations into the subtler natural forces have directed attention to the so-called luminiferous ether as being the medium of energies hitherto unsuspected, and it is suggested that movements of this ether may be identical with what we call electric currents. That the ethereal substance can be controlled much in the same way as a gas of extreme tenuity has been already demonstrated, and M. Lemstrom conceived the idea of testing the electrical properties of a current produced through purely mechanical means, by placing a core of soft iron within a double tube of paper, which was then revolved. The effect of this would naturally be to cause by friction a rotatory or helical movement of the ether contained in the tube, and on applying delicate tests the core was found to be magnetized. By reversing the direction of the rotation, the poles of the core were reversed. It would seem that the same effect might be produced if the core revolved while the tube remained stationary, and applying this principle to the terrestrial rotation, the inference is that the movement of the entire globe as a core within the surrounding ether may account completely for its being magnetized in a direction nearly perpendicular to the plane of the rotation. The subject is a very interesting one, and will, no doubt, be further investigated.

Those who take pleasure in the success of American artists abroad, as well as the personal friends of the gentlemen in question, will not object to be reminded again, if they know it already, that among the "recompenses" of the recent Paris *Salon*, not only was honorable mention in the department of painting awarded to Mr. Picknell, whose exhibition picture, the "Route de Concarneau," has been described in nearly all the American daily papers, but in the department of sculpture the same award was made to Mr. August Saint-Gaudens, of New York, the sculptor of the lovely bas-relief which terminates the chancel of St. Thomas's Church, New York, and the author of many beautiful works of greater or less importance. In Trinity Church, Boston, is some drawing by his hand in the frescoes which adorn the tower, and his name appears in the inscription which immortalizes those concerned in that work. It is worth remarking that the American sculptors who have dared to contend for laurels in the *Salon* on equal terms with the best in Europe are a very small body compared with the number who prefer the less arduous road to fame through industrious puffing in the daily newspapers of their native land, or the suffrages of patriotic tourists, and the victories of these young champions deserve to be recorded with such honor as we can give them.

At the late meeting of the British Association at Swansea Dr. Phéné read a paper of singular interest, to judge by the short notice of it in the *Builder*, upon the antiquities of the Pyrenees, and particularly the traditional ceremonies which have been handed down from the most remote ages. He finds almost everywhere on both sides of the mountains vestiges of a strange serpent, or dragon worship. The very name of an important town of Provence, — Tarascon, — seems to be derived from an ancient dragon title, and sculptured snakes, with what he calls "serpent mounds," are in some districts very common. But the most remarkable description is that of the ceremony which takes place all along the French side of the Pyrenees on the Eve of St. John in every year, when, as it was performed before him, a huge pine tree, split into many clefts and filled with combustible matter, is erected on the top of one of the serpent-mounds, with a cross of flowers at the summit, and after a procession from the church door, and the chanting of a litany, is set on fire by a torch in the hands of the priest, while the people utter wild shrieks, brandishing lighted torches in serpentine lines, and throwing live snakes into the flames. The peculiar cry which is used is a repetition of the words "hilla, hilla," and he thinks that this is probably a corruption of the ancient *evoë*, *evoë*, with which the Bacchanals of antiquity lamented in their rites the death of their deity, then, as now, assembling by night on the mountains, brandishing torches and holding serpents in their hands.

A practical application has been made of crude petroleum to a use for which it has been often suggested, — that of generating steam, in place of coal. We believe that small engines, and even locomotives have been driven in this way with success, but the most brilliant experiment thus far is certainly that which is on trial in the mail steamer *Cesarewitch*, on the Caspian Sea, whose boilers are heated by means of a refuse petroleum, left after the distillation of the lighter products, which is allowed to drip slowly into a kind of brass box, whence it is blown by a jet of steam into the furnace. The fine spray thus formed, aided perhaps by a partial decomposition of the watery vapor, forms a sheet of flame, controllable by a touch, and always ready for instant use. Such a fuel, moreover, makes no ashes, and is managed by turning a valve, so that the services of stokers are entirely dispensed with. Of course, the expense is considerable, but for war vessels, and in many other cases, that is a small consideration compared with the saving of time and labor, while in hot climates, where stokers can only be kept at their work by force, the new fuel promises welcome relief. Probably some danger might be feared from the vapor if oil were used containing any large proportion of the more volatile hydro-carbons, but if these were once distilled off, the residuum would not necessarily be any more subject to explosion than lard oil, or even the pitch-pine knots with which southern locomotives are fed. The next step in advance will be the discovery or manufacture of petroleum in such quantities as to make its use as cheap as that of coal. Some chemists consider that mineral oil, instead of being an independent product, is formed in the earth by the combination of the carbon of coal with hydrogen from water or other sources. If this is so, it would be worth while for some investigator to try to repeat the synthesis. Whoever learns to make petroleum by mixing coal and water will benefit himself as well as mankind.

VAULTS.[1] — III.

III. — OBLIQUE VAULTS.

a. WITH straight axes, composed of equal or unequal barrel-vaults (Fig. 27).

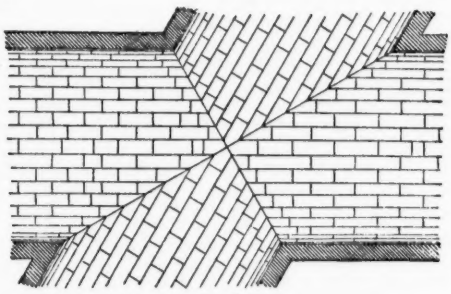


Fig. 27.

b. An annular vault intersected by a conical vault (Fig. 28). The apex of the cone is the centre of the annulus. The ridge of the conical vault is tangent to the curve of the cross-section of the annulus. The groin-line is slightly curved on plan, but may be made straight by substituting a conoid for the cone.

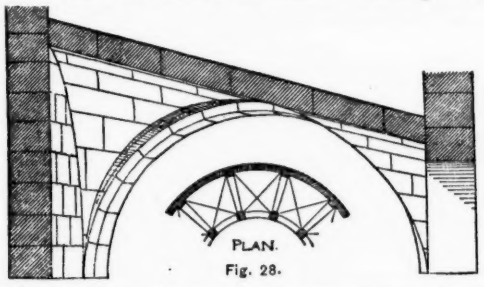


Fig. 28.

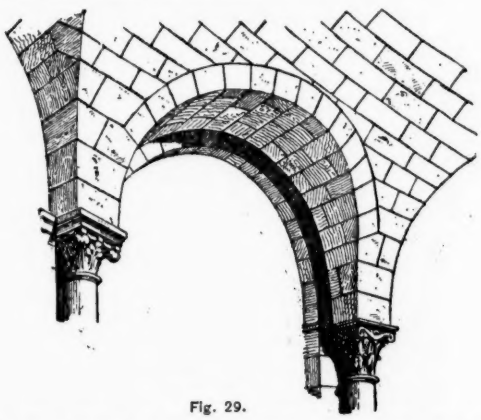


Fig. 29.

c. An annular vault intersected by an underpitch vault (Fig. 29). From the church of Notre Dame du Port, Clermont.

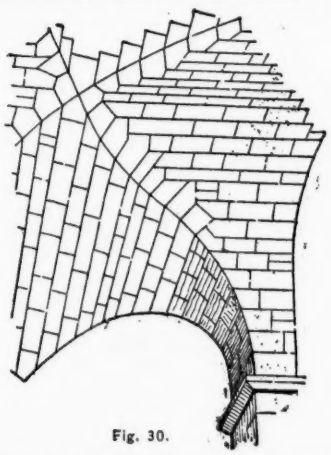


Fig. 30.

d. An annular vault intersected by a stilted cylindrical vault (Fig. 30). This form, and the two preceding ones are found in the French Romanesque churches, the annulus covering the semi-circular aisle which sweeps around the apse of the choir.

IV. — IRREGULAR VAULTS.

There are many examples of vaults whose surfaces do not conform to any regular geometrical shape. In some cases only the cross arch and the groin stones are cut and properly formed, in others the groin stones only; the rest of the vault being built of rubble, brick, or concrete, apparently shaped by "rule of thumb," and meant to be plastered over.

TRIPARTITE. These cover a triangular space, and are formed by the intersection of three barrel or three expanding vaults (Fig. 31).

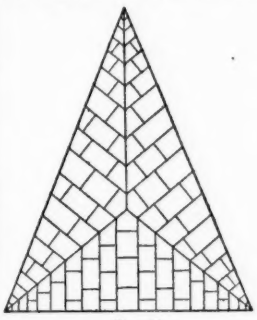


Fig. 31.

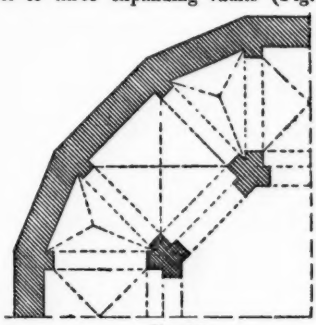


Fig. 32.

QUADRIPARTITE. These are used, in Romanesque buildings, alternately with quadripartite vaults, over aisles of polygonal apses, as in Figure 32, from Aix la Chapelle.

POLYGONAL.

a. The common octagonal vault, generally called a dome (Fig. 33), is composed of eight equal parts of a cylindrical vault.

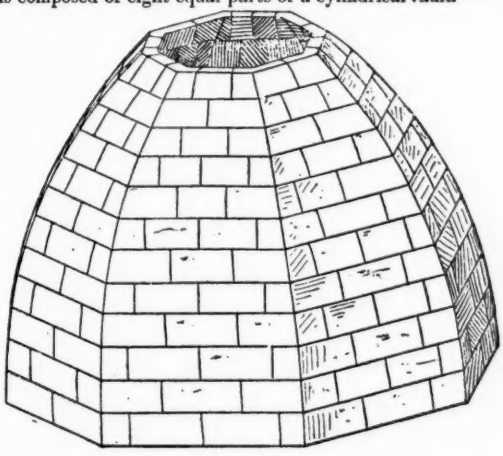


Fig. 33.

An octagonal space might be covered by a groined-vault formed by the intersection of four equal barrel-vaults, or eight expanding-vaults; but we know of no example of such a construction in solid vaulting.

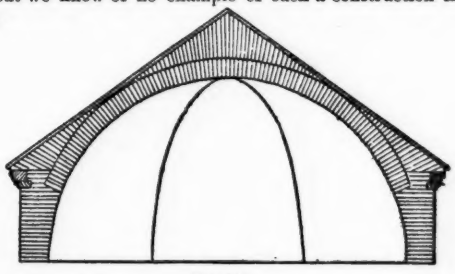


Fig. 34.

Figure 34, from Aix la Chapelle, is a section of an octagonal brick vault, carrying a roof of masonry.

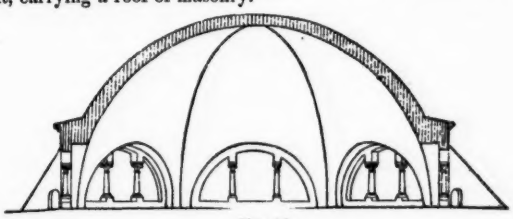


Fig. 35.

b. Figure 35 is a section of an octagonal vault having each of its sides intersected by an underpitch vault. It is Byzantine work, at

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

Neo-Cesarea, supposed to have been built about the year 375 A. D. The external angles are buttressed.

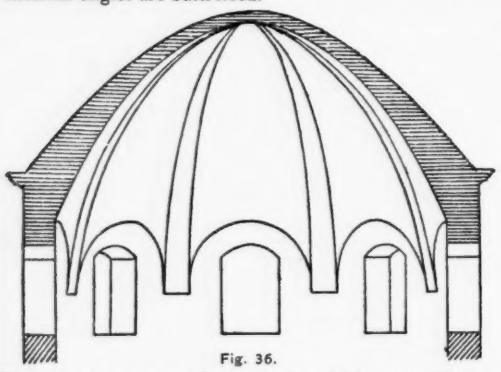


Fig. 36.

c. Figure 36 is a section of a structure which externally is an octagonal-vault, and internally is composed of eight spheroidal vaulting-cells separated by bands which are portions of the dome out of which we may conceive the cells to have been scooped. It occurs in the building known as the Temple of Venus at Baiæ, the date of whose construction is placed about the year 100.

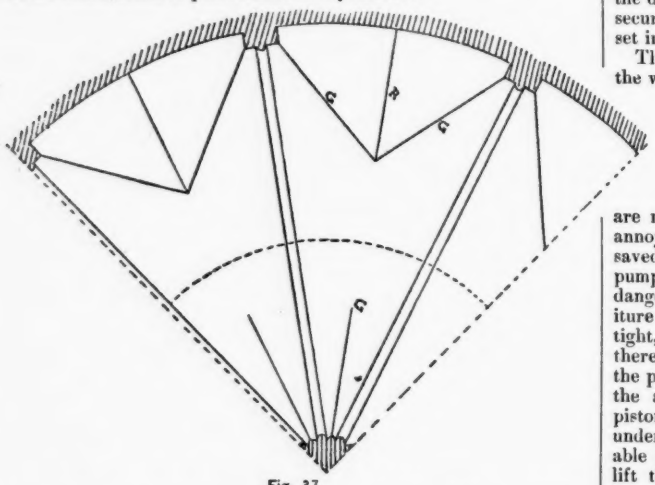


Fig. 37.

d. Vaulting of a decagonal room with a central shaft. From the crypt of the chapter-house of Worcester Cathedral. In the quarter-plan (Fig. 37) G is a groin-line, R the ridge of side vault, and the dotted line is the main ridge. Outside of the main ridge the construction is the half of an annular-vault intersected by ten under-pitch pointed vaults; inside there are ten groins whose angles are acute at the springing but rapidly widen as they ascend, dying out in

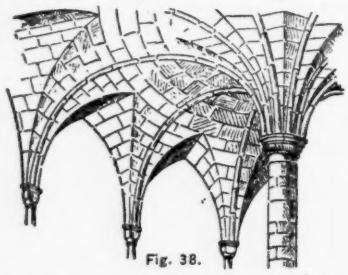


Fig. 38.

the surface of a part of the annulus which is within the main ridge. Figure 38 is a perspective view. The half-round moulding is transverse, that is in the plane of the cross-section of the annulus.

Errata. — Page 113, eleventh line from bottom, for "*b.* In side vaults, stilted, the," read "*b.* Side vaults stilted. The."

Page 114, fifth line from top, for "vaults" read "vault;" and for "lead" read "level." Sixth line from bottom, for "inequal" read "unequal."

NOTES ON ELEVATORS.[1] — V.

The manner in which the hydraulic elevators are driven varies according to circumstances; the cost of water in a given locality, the pressure to be obtained from the street mains or otherwise, and various other considerations; but, as a rule, all the machines can be adapted to any mode of supply. Where a constant and cheap supply of water, under a head of sixty or seventy feet, corresponding to a pressure of some thirty pounds per square inch, can be obtained, the simplest and least expensive mode is to turn this directly into the cylinders, the supply being controlled by modifications of the ordinary three-way cock, which admit the water above or below the piston, into one or another portion of the double-power machines, check it altogether, or allow it to flow to waste, at pleasure, merely by pulling the shipper-rope, which acts upon the valve by a simple mechanism, a greater or less distance in either direction. Where, however, water is expensive, as in most large cities, the cost of maintaining a much-used elevator amounts to a very considerable sum. It is therefore becoming common, instead of using water from the mains, allowing it to flow into the sewers after being once used, to build a large tank in the attic of the building, with another in the basement, and having once filled the former, to use it in the cylinder, discharging it, not into the drains, but into the lower tank, from which it is raised by a small steam pump into the upper tank, to be used over again.

The tanks are usually constructed to hold some 1,500 gallons each, for an elevator of moderate size, and the water may be used and re-used indefinitely, costing nothing for supply except at the first filling. The steam pump is one of the simplest and most automatic of machines: it will run with little attention, and that such as any porter or boy of ordinary understanding can give it, so that the cost of operation is much less than would be the case where a skilled engineer had to be employed to look after an engine.

Another mode of storing up power which was applied some years ago by Sir William Armstrong to the hydrostatic press, is now successfully adapted to water elevators. In this system, instead of placing the discharge-tank in the cellar and the supply-tank in the attic, to secure the "head" of a lofty column of water, both the tanks are set in the basement, side by side.

The supply-tank is closed, air-tight, but the steam pump throws the water back from the discharge-tank into it, precisely as if it were lifting it to a reservoir in the roof. The air pent up between the top of the tank and the inflowing water exerts a constantly increasing pressure upon the latter, which may be transmitted by pipes to any point, just as in the case of hydrostatic pressure, and the water having spent its force thus accumulated, is allowed to flow back into the discharge-reservoir. There are many advantages about this arrangement; the expense and annoyance of two heavy pipes the whole height of the shaft are saved, and the two tanks being close together and to the steam pumps, the whole is under easy supervision, while there is no danger to ceilings or furniture in case of leakage. The expenditure of fuel to obtain a given pressure, is, if the reservoir is tight, considerably less with the closed tank, for the reason that there is no loss of power, the force required to pump water in, against the pressure of the compressed air, being the same as that which the air itself exerts, through the medium of the water, upon the piston of the machine; while the friction in the long vertical pipes under the old arrangement requires the expenditure of a considerable percentage of pumping energy beyond that actually required to lift the water to the upper tank, while additional friction in the descending pipe still further diminishes at the point of application the hydrostatic power which a column of water of the given height would represent, so that the actual pressure under the piston is much less than the energy originally expended.

Of course, as the water from the tight reservoir is used in the cylinder, and the air allowed to expand, its tension diminishes, and more water must be pumped in to keep the volume of air, and with it the pressure, at a given point. This is managed by automatic contrivances, so that the necessary pressure having been determined on, a gauge is set at the required figure, and the tension maintains itself at that point, any diminution by consumption of water in the hoisting machine immediately setting the steam pump in motion, to continue until the desired pressure is again reached, when the action ceases of itself.

One more so-called hydraulic elevator, though beans, or sand, or bricks might take the place of water in it, provides a cab or platform in one shaft, balanced, or nearly so, by a suspended tank in another shaft near by. At the top of this second shaft a supply-pipe opens, mouth downward, over the middle of the tank, and in the latter a valve, much like the plug of a wash-basin, is provided. One shipper-rope controls a valve in the supply-pipe, while another acts upon the plug in the bottom of the tank. If the tank is empty, the cab will sink by its own weight to the bottom of the shaft, and the tank will rise to the top. In order to lift a load, all that is necessary is to pull open the supply-valve by means of the appropriate shipper-rope, and wait until water enough has run into the tank to overbalance the weight of the platform and load, when the latter will begin to ascend. If more weight is added during the ascent, another pull will supply more water to the counterbalance. The upward trip finished, the plug in the tank is raised, and the water runs to waste as the car descends.

A friction brake enables the attendant to control the movement of the cab, and prevent it from descending on the stepping of a heavy passenger into the car before water enough to counterbalance him can be added to the tank, and also from shooting suddenly upward on being relieved of his weight.

Great as is the number of varieties of water elevators, they form but a small proportion of those in use. In buildings where steam is used for driving other machinery, or even for heating, the additional consumption of fuel for running an elevator is hardly felt, and the engineer being constantly employed, there is no extra expense for

[1] These papers will appear monthly. (See Nos. 232, 236, 241, 245).

attendance. The steam hoisting-machine is moreover very simple, and, when driven by the surplus power of a large engine, has a certain reserved strength and reliability which are valuable where large quantities of goods are handled.

Instead of the multiplying sheaves of the hydraulic engines, the steam elevator uses a winding drum, with grooves cast in it for the ropes, in which they coil and uncoil themselves as the platform rises and falls. The revolution of the drum is often effected by means of gearing from a pulley on a neighboring shaft, but to prevent the danger which the breaking of a tooth might occasion, very many makers employ an endless screw driven by pulleys of its own, and engaged in the teeth of a cog-wheel on the shaft of the drum. Fig. 18 shows this arrangement in a simple form. The shipper-rope is shown controlling a rack and pinion whose action in shifting the belts on the pulleys at the left will be readily understood. Of the three pulleys, the middle one only is tight, the outer ones being loose upon the shaft. One of these is driven by an open belt, and the other by a crossed belt, which of course revolves its pulley in a reversed direction, and one or the other is shifted upon the middle pulley, which alone has the power of communicating its motion to the shaft, as circumstances may require.

Some machines offer a much more substantial screw mechanism than the one just illustrated. One of the most perfect is that of the Whittier Machine Company, in which two wheels with interlocking teeth are driven in opposite directions by a pair of endless screws, or worms, on

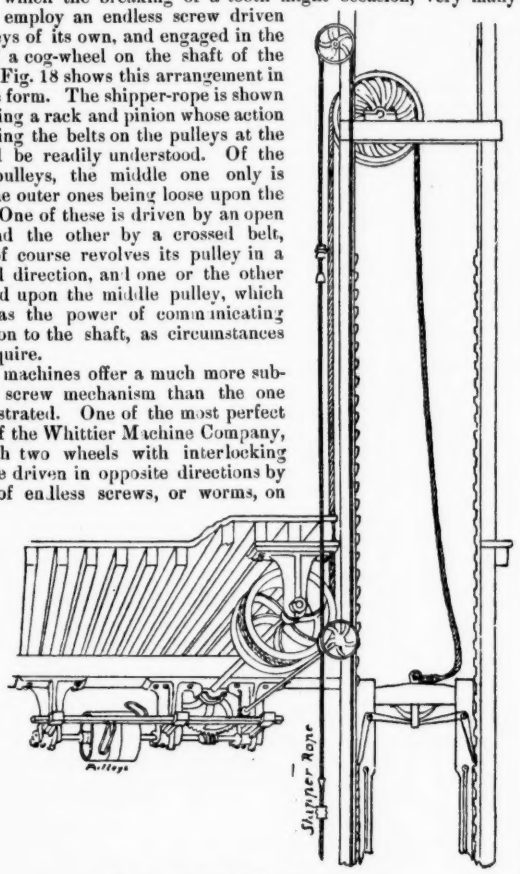


Fig. 18. The McLauthlin Elevator.

the same shaft, the thread of one worm being inverse to that of the other. By this means the strain is divided between the wheels, and the reaction upon the driving shaft, instead of being always one way, as where one worm is employed, thereby greatly increasing the friction on the bearings, is resolved by the two equal and opposite efforts of the screws into a tension of the shaft between them, which is no longer felt at the bearings. The Whittier machine has also a contrivance for stopping itself if any obstruction above should check the descent of the platform, without the aid of the shipper-rope, which is very apt to be broken by the terrified jerks of the operator thus put in sudden peril. This device consists of a movable lever, which, when the machine is started, is raised and lodged upon a small projection, just under the front of the winding drum. If the platform is caught by an obstacle in descending, the drum continues to revolve, and, the rope being no longer held taut by the weight of the car, as it unwinds hangs loose from the drum. The lever is so placed that as soon as this occurs the hanging loop pushes the lever off its seat, when it drops and throws a brake into action, stopping the movement at once. If the elevator should subsequently fall by the removal of the obstruction, it can descend only a short distance, and the danger of snapping the rope is much lessened.

It is common to see steam elevators forming simply one part of a set of machines, all driven by a common engine, which propels the shafting from which they all take such power as they need by means of belts and pulleys; but many are fitted with special engines, which the different manufacturers make for the purpose of compact form, these small engines either having boilers of their own, or taking steam from a large one common to several engines. This arrangement has many advantages. Not only is it more economical, but the large boiler, or set of boilers, affords a reserve of power which may sometimes be called upon with a heavy load, and the supply of steam is always ready, while in a small boiler the fire may slacken to an inconvenient extent in the intervals of use.

The expansive force of other gases than steam is sometimes utilized for lifting purposes. Gas engines are employed abroad, and in this country various kinds of hot-air apparatus are in common use. One of these, which may serve as a type of all, is the Sherrill-Roper engine. This consists essentially of a bottle-shaped furnace, in the neck of which a piston moves, which, by means of a connecting-rod and walking-beam, impels a heavy fly-wheel. To the same walking-beam is connected a rather primitive air-pump, and the smoke-pipe from the furnace is fitted with valves operated by eccentrics on the shaft. The fire having been lighted in the furnace, the door closed and screwed down air tight, and the valve in the smoke-flue shut, the expansion of the air and gases of combustion forces up the piston, and starts the fly-wheel. The revolution of this opens the smoke-pipe valve, and allows the gases from the furnace to escape and the piston to descend, at the same time filling the air-pump, by the lifting of its piston, with cold air from the outside. A further movement of the fly-wheel closes the smoke-pipe, and opens a communication between the furnace and the air-pump, admitting a stream of cold air which is instantly expanded by the heat and drives the piston again upward. The movement is rather jerky, but the power developed is quite sufficient for hoisting purposes. The air inlet is so arranged as to be controlled by a separate shipper-rope from the platform, and the air thrown into the furnace either above or below the grate. If it enters above the burning coal it is moderately expanded, without much influencing the fire, but by forcing it in below the grate it is violently expanded on its passage through the burning coals, and exerts a correspondingly increased force upon the piston, at the same time quickening the consumption of fuel. In this way the power and the expenditure of coal may be varied to suit the loads required to be hoisted.

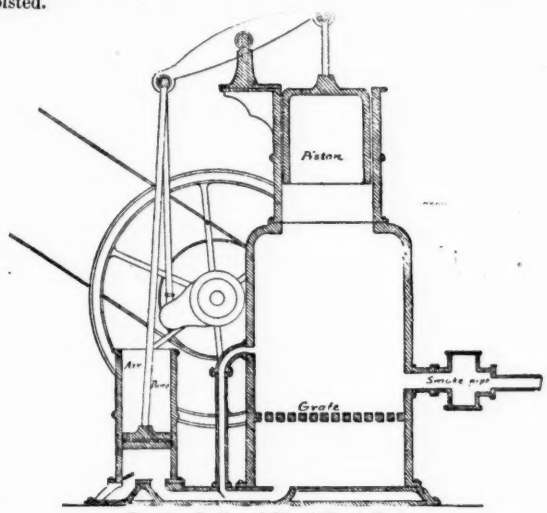


Fig. 19. Section of Sherrill-Roper Engine.

There remains yet one species of elevator, which is more often used in the small form of dumb-waiter than for the conveyance of passengers or heavy freight. This provides a double set of cars or cabs, arranged in a double shaft, but connected like the ordinary platform and its counterbalance, so that as one side ascends, the other descends. There is, no doubt, some advantage in this arrangement where large numbers of persons are to be carried, but the expense of fitting up a number of cabs in the style usual in the United States would be very large, and no material economy would be secured in running expenses under most circumstances.

Architects, builders and others are very frequently called upon for an impartial opinion in regard to the relative cost of operating the different varieties of elevators, and it is not easy to give a satisfactory answer without knowing all the circumstances. Undoubtedly, the most expensive apparatus of all is a steam elevator with special engine and boiler, remote from any other machinery, so that the whole salary of a competent engineer must be paid in order that the single engine may be attended to, while on the other hand the same engine and machine may constitute the cheapest mode of hoisting if the expense of boiler, fuel and attendance can be divided among a number of machines. The elevator engines are so nearly automatic as to need very little care. In a certain portion of New York, more than twenty are supplied with steam from one set or "battery" of boilers, and all are under the care of a single engineer, who visits each once a day. Such an arrangement is very favorable both to economy and efficiency. It is not necessary to combine the hoisting-machine with others of the same kind; the same power which drives looms or grindstones may operate an elevator also, and one engineer can attend to the whole, or steam may be hired from a neighboring boiler and used in the hoisting engine, and some agreement made for the periodical visits of an engineer. With good apparatus, well cared for, this is perhaps in most situations the cheapest mode of obtaining reliable power. Where one or two lifts only are to be operated, without any other important machinery, the hot-air engines offer a great economy of fuel, and need very little attendance, and that of an unskilled character, a porter or office-boy being quite competent to keep the apparatus in efficient operation. There is, however, a certain amount of skilled labor necessary with these for the renewal of the packings, which burn out rather rapidly.

For private houses, hotels and office-buildings, the hydraulic ele-

vators have perhaps the advantage, unless in those exceptional cases where a number of steam machines can be combined. If the street-pressure is high and the cost of water small, the direct-supply water elevators offer the advantages of being always ready for use, of requiring no fires, boiler, engine or engineer, and of costing nothing when not actually in motion. Theoretically, the running expense of such machines connected with the street mains should be much less than where the water is raised into a tank by a steam pump, since, even where pressure is not furnished by the natural head, the cost of obtaining an artificial head by pumping is less with large than with

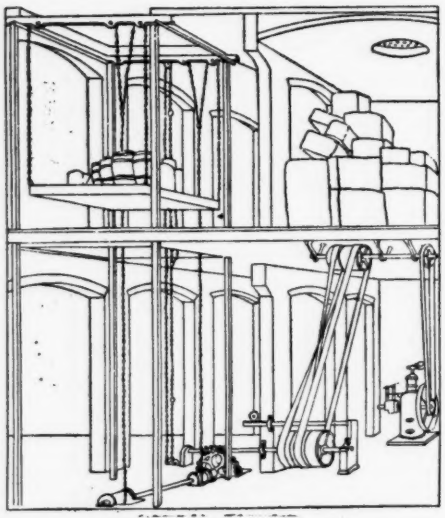


Fig. 20. Sidewalk Elevator.

small pumps; but practically, the tank and separate pump system may be the most economical. Inquiry into each particular case can alone determine this point accurately.

Too much care cannot be taken in the regular and frequent inspection of hoisting machinery. All the parts should be readily accessible, and the slightest untwisting or fraying of a rope, or slackening of a belt must be attended to. The average "life" of a wire hoisting-rope is but two years; very frequently it is unsafe before that time, and in the multiple rope elevators all the cables deteriorate together, by bending around the pulleys, in about the same time. The shipper-cord wears out long before the hoisting-line, many being reduced to the breaking point in six months, while the safety of the platform is in most cases nearly as dependent upon it as on the strength of the hoisting-ropes. In private houses, especially, competent inspection should be rigidly insisted on. The slipping of the belt which drives the majority of steam lifts is also a common and dangerous occurrence, which may happen at any time when an unusually heavy load is to be hoisted, unless great care is taken to keep it tightly stretched, and the shaft perfectly straight.

In the mercantile districts of New York much use is made of "sidewalk elevators," which are placed in the space, usually five feet in width, which is there reserved in front of buildings of this class. The hatchway is covered by an iron double trap-door, or bulkhead, which, when thrown back, allows the platform to be raised level with the sidewalk. Trucks may be wheeled or cases delivered directly upon the platform, and lowered to the basement, or *vice versa*. Great quantities of goods are often stored below the level of the pavement, many stores having both basement and sub-basement, and even where the main lift reaches to the lowest story, as is usually the case, a sidewalk elevator may double the amount of goods handled, without occupying any room or light in the superstructure of the building.

APPRENTICESHIP OF THE FUTURE.[1] — II.

The Institution de Saint Nicolas, in the Rue de Vaugirard, is the oldest of the schools, having been founded in 1827. It is under the exclusive management of a religious guild known as the *Frères des Ecoles Chrétiennes*, who devote themselves entirely to education. In this truly remarkable establishment there are eight hundred and ninety boys, all children of artisans, all boarders. Of this number, about two hundred are apprentices who come here to learn their trade. None are admitted who cannot already read and write. The greater part of the day is given up to manual work, only two hours being reserved for schooling on three days of the week, on the alternate three days the two hours are devoted to drawing. . . .

There are in the extensive premises of the school no fewer than sixteen *ateliers*, each let out to an approved master or *patron*, who is usually also the proprietor of a separate business in the city. To him are apprenticed for the term of three, or in some cases four years, some ten or twelve boys, all of whom at the end of that time will be able to take good positions as intelligent workmen. The trades thus taught are those of carpenter, wood-carver, turner in wood, optical turner, compositor, printer, wood-engraver, map-engraver (on stone), marble-mason, brass-worker, bookbinder, carver and gilder, clock-maker, portmanteau-maker, philosophical-instrument maker, and maker of wind instruments. The master of each separate *atelier* provides the materials, devises the work of the apprentices, superintends its execution either personally or by an authorized *contre-mâitre*, and to him belong the products of the work-shop. Nothing is made in the shops that will not sell; the apprentices learn the value not only of materials but of time; and though the works that successively pass under their hands are graduated to their capacity and experience, they are precisely of the same character as those which apprentices in any ordinary work-shop would have to undertake. The masters and foremen of the various *ateliers* appear to take great interest in their pupils, and pride themselves on the success of their instruction. . . .

The apprentices earn nothing during their term of service beyond a little pocket-money when they are satisfactorily advanced. During the whole period of their apprenticeship their parents must contribute thirty francs a month for their board and lodging in the school. Great importance is attached by the *Frères* to the complete isolation from exterior influences ensured by this internment. The magnitude of the work will be understood when it is learned that the income and expenditure of this establishment amounted to about £46,000 in the past year, the services of the fifty worthy *Frères* who conduct the school being given at a purely nominal rate. There is a large gallery in the building for drawing and modelling, and excellent systems of instruction in model drawing and geometrical drawing have been here developed. Spacious refectories, commodious, well-ventilated dormitories, and a large gymnasium form features of the school. The results of the system are significant. The aim of making intelligent workmen is really attained, and though the pupils have learned but one *métier*, and are in general better adapted for small businesses than for large, their repute for steadiness, skill, and general intelligence is such that the *patrons* have little difficulty in placing their pupils when their term of apprenticeship is over, and usually in circumstances where their earnings are about the average. The same testimony is borne everywhere concerning the apprentices of this establishment; and the writer was informed by M. Véver, President of the Syndical Chamber of Jewellers, of Paris, a gentleman greatly interested in the question of technical education, and possessing every opportunity of forming an accurate opinion, that the boys of Saint Nicolas are so much more intelligent and steady than the average workmen, that they are sought for by employers, and at the age of thirty have usually risen to the position of foreman or master.

The third type of apprenticeship school[2] is that of the *Ecole Professionelle* attached to the large and flourishing printing establishment of MM. Chaix et Cie. This school, founded in 1862 by M. Napoléon Chaix, receives two groups of pupils, the apprenticed compositors and the apprenticed printers of the house. The school-room and the apprentices' composing-room, though contiguous to and overlooking the great busy *atelier* of the firm, are distinctly separate from it. The apprentices, of whom there are between thirty and forty, devote most of their time to the practical work of composing; two hours a day only being allotted to lessons in the school-room. Apprenticeship lasts four years, during the whole of which time the apprentices receive wages rising from fifty centimes to two francs fifty centimes for the compositors; and for the printers, who work at the machines in the great *atelier* under the direction of a responsible master, from seventy-five centimes to four francs fifty centimes a day. The teaching comprises a special primary course, for those whose previous schooling has been insufficient; a technical course, including grammar and composition, reading of proofs and correcting for the press, the study of different kinds of types, engraving, and the reading and "composing" of English, German, Latin, and Greek — in the two latter cases from a purely typographical point of view, without any attempt to understand or to translate; lastly, a supplementary course, which includes the history

[1] Portions of a paper by Mr. Sylvanus P. Thompson, in the *Contemporary Review*.

[2] The *Iron Age* of a recent date says: "A system of apprenticeship in some respects new has been adopted by Messrs. Richards & Dole, machinists, of Springfield, Mass. It is intended to combine the thoroughly practical education of the shop with the theoretical education of the school; or, in other words, it is an industrial school in which the most time will be given to practice instead of to theory. They propose to require of the apprentice 58 hours a week of work in the shop, and 9 hours a week of study. The term of apprenticeship for those beginning to learn a trade, who are under twenty years of age, is to be six years, in which time, under this system, it is believed that an apprentice will be qualified to rank with the best journeymen and to earn the same wages. Those who are over twenty years of age are allowed to finish their apprenticeship in five years, and those who have worked in a shop are advanced according to proficiency. The beginner is first put to drawing from sketches, then takes up projection and diagrams, and advances regularly according to his ability. It is believed that in this way one year will qualify him as well to work from drawings as four or five years ordinarily. All applicants are taken for from four to twelve weeks on trial, and if not satisfactory, are then dismissed. For the first year's labor 5 cents per hour is paid to those under 18, 6 cents to those who are 18, and 7 cents to those who are 20 and upward; for the next years the rate is advanced to 6, 8, 10, 11 and 12 cents. The firm also pays 2 cents per hour additional into a reserve fund, which is paid to those apprentices who finish their full term of service; for the six years this amounts to $400. The scheme in this shop grew out of the difficulty experienced in getting thoroughly qualified machinists, and is an attempt to solve again the old problem of how to continue the system of apprenticeship, now largely fallen into disuse. It is stated that this firm already have more applicants than they can accept. The scheme certainly seems worthy of a trial. We have but little sympathy in many cases with the lament over the decadence of the apprentice system. The introduction of machinery and the consequent subdivision of labor have made it unnecessary in many trades. In some trades, however, there cannot be such a subdivision nor such machinery as will do away with the necessity for a large proportion of skilled, thoroughly-educated mechanics, and the machinist's trade is one of these. The scheme we have described above certainly seems well calculated to produce workmen not only competent for the ordinary routine of shopwork, but competent to design and oversee the execution of work."

of printing, simple notions of economics, a little mechanics and physics, and a smattering of chemistry, dealing chiefly with the materials that they will hereafter employ — acids, oils, fats, carbon, soda, turpentine, etc. Everything is done with the utmost system. Every line set up by a pupil is, if possible, so much contributed to the current work of the firm; and as time exercises are frequent, the value of rapidity in work is learned. At the end of the apprenticeship the pupils elect — almost without exception — to become *employés* of the firm, and enter at once into the rank of participants in the yearly division of profits. Of nearly seven hundred persons employed, two hundred and fifty-eight are now participants, of whom about eighty are past apprentices. A much larger proportion are depositors in the *caisse d'épargne*, or savings bank, established by the firm, or are "insured" in its books. Even the youngest apprentices put by a portion of savings out of their small earnings. The principals of the house fear no strike now, as there are enough participants in the wealth of the house to carry on its business through a crisis. "*La maison pour chacun, tous pour la maison,*" is inscribed in gold on one of the beams that cross the great *atelier*. The sum thus divided amongst the *employés* in 1878 exceeded £2,000. The financial results of these arrangements, at once educational and prudential in their nature, are most encouraging. M. Berger, the accomplished inspector of this department of the enterprise, attributes the substantial growth and prosperity of the business, now one of the largest and wealthiest in France, as much to one influence as to the other. He prides himself on the superior intelligence of his pupils and their technical knowledge, gained whilst they are in the very midst of a great business, and thus forced even to realize and keep *au courant* with commercial exigencies. The few who have gone out to take places elsewhere are also doing well.

The fourth and last of our typical schools is the *Ecole Municipale d'Apprentis*, which since 1872 has been at work in the Boulevard de la Villette. No school has produced more striking results as yet, and none merits more careful attention. Beginning with seventeen pupils in 1872, it now numbers a following of two hundred and twenty-one. The course lasts three, or in some cases four years. It speaks volumes for the efficiency of the school that out of seventy-two who up to the end of 1877 had completed the course and gone out into situations, sixty-nine are at the present moment pursuing the trade they have learned in the school, and are earning on the average four francs a day — some of them even as much as six and a half francs a day. A school which can receive young lads of thirteen or fourteen, and after a three years' course can turn out workmen at the age of sixteen or seventeen able at once to command wages of twenty, or in some cases thirty-three shillings a week, is something so wholly new that its organization merits the most profound study. Founded on the suggestion of M. Gréard, by the then Prefect of the Seine, M. Léon Say, at the expense of the city of Paris, it began its work in premises previously used as a factory of aneroid barometers, additional school-room accommodation being obtained in the adjacent dwelling-house. The object of the school is simply to make *good workmen*. The education it offers is absolutely gratuitous, and even remunerative to the pupils, for they receive every week a "gratification" varying from a franc and a half to three francs. None of the pupils are boarders. None are admitted until their primary education is completed, and then only after an easy examination. Five hours a day are given to studies, six hours to the work of the shops. The teaching of the school-room is both general and technical in character, mechanics, physics, chemistry, and technology being added to the usual programme of literary routine, whilst drawing and modelling occupy a prominent place. The system of solid geometry taught in the schools is excellently conceived and admirably followed. M. Müller, the director, himself conducts this and some of the scientific branches of study. All the apprentices learn also to sketch bits of machinery or even entire machines, figure the sketch from actual measurement, and then with rule and compass draw them carefully to scale. There are two principal work-shops, one devoted to the workers in iron, the other to workers in wood. The trades actually taught are forging, metal-turning, fitting, carpentry, wood-turning, and pattern-making. A small work-shop for teaching the manufacture of philosophical instruments has also just been organized. During his first or preparatory year the apprentice so-called — there is in reality no formal contract — is making the round of the various shops, taking a fortnight in each in rotation. There is therefore no haste to specialize his work, and he has the opportunity of discovering the pursuit for which he is best fitted, while gaining information and intelligence. His first year over, he settles down to serious work in one of the six categories of labor; henceforth all the articles he makes are saleable, and indeed of some value. Still, although the commercial element, eschewed in the Rue Tournefort, here steps in — to the profit of the municipality, be it said, rather than of the school — the apprentice does not sacrifice theory for practice. No single object must be attempted before the working drawing of it has been made out in plan and elevation; and the niceties of true surfaces and exact angles are scrupulously insisted on. . . .

Here one realizes one advantage possessed by this municipal school over those in which the *atelier* is simply the work-shop of a great business. In the early stages, when workmanship is very imperfect, it is not always well to strive to produce a saleable article. Better waste wood, says the superintendent of the shops, than spoil the making of a good apprentice. Better to let the young workman see something of all the different corners of his trade, than by too fine a division of labor to keep him all his years learning only to shape chair legs! And he is right, if the general look of intelligence, and workmanlike style of his young charges afford any indication of their capability of well fulfilling the career they have chosen. From seven in the morning to seven in the evening are the hours of school, with an hour's intermission for dinner, and two shorter recesses. Work over, they disperse to their separate homes, for there is no boarding. M. Müller points out that the cost of setting up these shops, with all their tools and appliances, has been at the average rate of £11 3*s.* for each of the 175 places nominally provided in the accommodation of the school; while each of the present two hundred and twenty-one pupils, as he passes through the school, costs the municipality on the average an annual sum which is, as it happens, almost equal — namely, £11 2*s.*, instruction included. When the extensions of the buildings now in progress are completed, a very slight increase of total cost will suffice to extend the benefits of the school to a much greater number of pupils. The school property and furniture have already cost the city of Paris 750,000 francs (£30,000), including the land and buildings, and the school is costing it 60,000 francs (£2,400) a year for working expenses. To set against this are the sums received for work sold, and the value of the instruments, models, and appliances fabricated in the school, and employed either in the school itself or handed over to one or other of the municipal schools, and which must amount to several hundred pounds yearly.

We have dwelt at some length upon this school, inasmuch as, regarded from the point of view of practical results, it appears to present by far the nearest approach to the ideal of an apprenticeship school. Not ignoring what is so valuable in consideration of the circumstance that the training is to be a preparation for after-life — the commercial value of the time and labor — it differs from the Institution de Saint Nicolas in regarding the aim of producing good workmen as higher than that of establishing a self-supporting school. The Institution de Saint Nicolas is, thanks to the self-denying labors of the *Frères*, self-supporting so far as the *ateliers* are concerned, though the pupils pay for their board and lodging. The Ecole Professionelle of MM. Chaix et Cie., which is but one example of a considerable number of similar establishments, is looked upon as one of the main causes of the prosperity of the concern. To establish such a school in any large business establishment requires little additional expense beyond the salaries of teachers. The Ecole Communale is a most valuable experiment, and shows with what slender outlay some useful instruction in manual labor can be added to the resources of an elementary school. The Ecole Municipale, with its kindred schools at Lyons and Havre, enables us to realize what an apprenticeship school may become if taken in hand by a rich and powerful municipality.

Turning once more to the conditions which obtain in our own country, the thought naturally occurs — which of these very different types of school will best suit the requirements at home? On which line shall we proceed in our attempt to adjust to the altered social and industrial conditions of our time the apprenticeship of the past? Probably no one of these varied types will meet the thousand possible cases which may present themselves in the working out of the problem. Possibly there is room for all these types of apprenticeship school, side by side, or room even for new and untried types. One may adapt itself better to one locality or industry, another to another. Our business is not to copy but to create and to develop for ourselves that which meets our own case. Much as will depend upon the character of each individual industry, all experience shows that there are other factors in the problem of scarcely less importance, and that much also depends upon the individual proclivities of the director of the school, the industrial enterprise of large firms, the far-sightedness of wealthy corporations. In France many of the schools have been initiated by the municipal or communal authorities. In Germany it is the town or the State that has made the venture. Will our Town Councils or our School Boards ever think the experiment worth a trial, or is centralization too fierce and too frigid to countenance the attempt? All that is most valuable in the results obtained in the majority of the typical cases afforded by the Parisian schools can also be attained by private local enterprise, if guided wisely and well. Private local enterprise may surely hope for a success at least as great at home as that which it has already won across the Channel. And obviously the various industrial establishments know best the strength and weakness of their own resources. If a guiding and organizing central institution is needed, and it probably will be, it will be forthcoming so soon as there is work for it to do. But no central organization or institution can be expected to do the work which, at the outset, the local industries must initiate for themselves and develop by their own resources, and direct by the light of the consciousness of their distinctive needs. Then, and not till then, shall we be able to form an exact estimate of the social and industrial conditions under which *the apprenticeship of the future* may become a living reality. Then, and not till then, will the apprenticeship of the future constitute a powerful instrument, not merely for the intellectual, moral and social improvement of the working classes, but for the promotion of the wealth and prosperity of the whole nation.

THE ILLUSTRATIONS.

GRAND SALOON, KEN HILL, NORFOLK.

THIS drawing, which we copy from the *Building News*, gives a view of the Saloon or Great Hall, in a house recently built by Mr. Edward Green, on his estate at Snettisham in Norfolk. The house is situated on Ken Hill, a flat-topped wooded elevation overlooking the Wash.

The plan is a practical example of a recommendation which the architect, Mr. Stevenson, makes in his book on House Architecture, which we lately reviewed, to return for country houses to the old mediæval plan of a great hall, suitable for large assemblages of guests for any purpose, as well as for daily use; but with some modifications necessitated by modern habits. It does not, for instance, like these, open directly by a porch from the open air and form the only entrance to the other parts of the house. Heating by hot-water pipes is provided. The ceiling is of ornamental plaster-work, supported on oak beams resting on oak corbels. The high-panelled dado and the floor are of oak. The chimney-piece is of oak and Italian griotte marble. The dimensions of the room are 42 feet by 22 feet, and 18 feet high. The work has been well executed by Messrs. Holland & Hannen, of London.

A COMPETITIVE DESIGN FOR THE CORN EXCHANGE, BALTIMORE, MD. MESSRS. WYATT & SPERRY, ARCHITECTS, BALTIMORE, MD.

HOUSE AT MILTON, MASS., AND DETAILS OF THE SAME. MESSRS. R. G. & G. R. SHAW, ARCHITECTS, BOSTON, MASS.

WIND-PRESSURE.

Among the many points which were brought into notice during the Tay Bridge inquiry there was no one of greater interest than the question of wind-pressure. To builders the effect of atmospheric disturbances had long been familiar, and the records of destruction, both among finished structures, but more especially in the case of gables during the course of erection, are neither few nor far between. It is somewhat astounding, therefore, to find that a danger to which every structure that is acted upon by the force of the wind is more or less exposed should not only have almost entirely escaped the notice of engineers, but should also have failed to elicit that amount of attention on the part of scientific investigators which in other branches of the profession generally afforded some reliable data as a foundation for the every-day use of practical men. Nevertheless, there is some apology to be found for the indifference with which it has been hitherto regarded by engineers in practice. Until lately the allowances that have been made for resisting what may be spoken of as the ordinary statical strains to which such structures as high bridges are more especially subjected, have been considered more than sufficient to withstand the force of the wind when added to the lateral strains thus provided for. In this way, wind-pressure in the every-day practice of civil engineers in this country came to be very much overlooked, and although a large allowance has always been made for atmospheric disturbances, both in France and in America, the subject has never attracted much attention in England. The failure on the part of science to supply reliable information seems to have confirmed the indifference which arose from the matter having been considered of little practical importance.

The exceptional circumstances under which it was proposed to throw a bridge over the estuary of the Forth brought the question into notice, and in the light of the terrible disaster of the night of the 28th of December last it would have been well if the inquiry had been made earlier, with special reference to the Tay Bridge as well.

In looking into the history of the subject it appears that the source of information to which engineers generally applied was a table presented by Smeaton to the Royal Society in 1759. Omitting atmospheric phenomena, which experience had shown to be confined to the tropics, he estimated the pressure of the wind in this country at 6 pounds per square foot of surface for high winds, 8 or 9 pounds for very high winds, and 12 pounds for a storm or tempest. These figures no doubt obtained considerable sanction on account of the distinguished character of the authority with which they were associated, and from the fact that the structures, more especially lighthouses, which had been presumably constructed on the basis of these estimates, had been constantly exposed to the utmost fury of the winds, and remained as monuments of their ability to resist them. But even in the face of such assurances there was at least one good reason why engineers in this country should have reconsidered the subject, from the fact, that in France and America the practice has been to allow 55 pounds and 50 pounds for wind-pressures respectively. Besides the very much greater margin which prevailed abroad, there were isolated instances in this country which proved conclusively that the wind reached a maximum intensity far beyond that which had been laid down by Smeaton. There are several authentic cases of railway carriages having been upset by the wind, both in France and America, and India as well, but of still greater importance as affecting the rules for providing against wind-pressure in the British Isles, is the record of a carriage having been thrown over by a hurricane, on the Chester and Holyhead line, in 1868. Quoting from the report of the Commissioners appointed to inquire into the circumstances attending the fall of the Tay Bridge, it appears that "the pressure required to overturn railway carriages may be taken to vary between 28 pounds and 40 pounds per square foot," so that it became necessary in the light of this exceptional instance to inquire how far such a pressure was likely to act upon the more extended surface of a wide and lofty bridge. It is here that we find a great discrepancy of opinion among practical men, and an absence of reliable information to assist us in forming a judgment. It appears that there is no record of any pressure approaching to that which upset the railway carriage on the Chester line ever having acted upon an extended area, but on the other hand, there is no record of how great the extent of surface may be over which such an exceptional pressure may exert its force. It appears that a hurricane at Walmer, of an intensity that perhaps exceeded the pressure which upset the railway carriage, acted over a width varying from 450 feet to 700 feet, and that a somewhat similar cyclone passed over the Isle of Wight during the winter of 1877. In the face of such facts it is difficult to escape from the conclusion that the wind may in a similar manner act upon a lofty structure of similar width, and that, therefore, it is imperative to provide for the possibility of its doing so.

Nevertheless, when the proposal to build a bridge across the Forth, with spans of 1,600 feet, came to be discussed, a very different conclusion was arrived at. It appears, as our readers have heard more than once, that Mr. Barlow and Dr. Pole, to whom the subject was remitted for detailed investigation, not being satisfied with their own judgment, consulted the Astronomer-Royal, and afterwards spoke of his opinion as "highly authoritative and valuable." The conclusion at which he arrived was "that the greatest wind-pressure to which a plain surface like that of the bridge will be subjected in its whole extent is 10 pounds per square foot." Although the plans for the Tay Bridge had been completed a long time before this opinion was made known, Sir Thomas Bouch seemed to have considered that it was applicable to that undertaking, and no doubt felt his mind much relieved in consequence. When the Astronomer-Royal, however, was examined before the Commissioners he drew a distinction between the two bridges, which, in the light of the opinion already referred to, is somewhat difficult to understand. In his letter to Dr. Pole and Mr. Barlow, he said that although "upon very limited surfaces, and for very limited times, the pressure of the wind does amount sometimes to 40 pounds per square foot, or in Scotland probably to more," yet, that, looking at the character of that bridge, which was a suspension-bridge with two spans of 1,600 feet each, the greatest amount of pressure to which it would probably be subjected on its whole extent, would, in his opinion, not be more than 10 pounds per square foot. If an engineer, without further explanation, had drawn the conclusion that this opinion meant that the wind-pressure would not be more than 10 pounds upon a span of 1,600 feet, but that it might be 40 pounds or 50 pounds over an area of 450 feet, he would have found it consistent with what the Astronomer-Royal afterwards stated; but, at the same time, we do not think that one engineer in a hundred would have made such an interpretation of the original opinion.

As matters stand at present, we have first the authority of Smeaton, and afterwards the opinion of the present Astronomer-Royal confirming it, for undefined areas between 450 feet and 1,600 feet. On the other hand, the conclusion arrived at by one of the Commissioners on the Tay Bridge is that the estimate of French and American engineers is much nearer the mark, and "that there can be no reason to doubt that there may be wind-pressure of 45 pounds and even 50 pounds in this country." In saying this, however, they do not commit themselves to any opinion as to the width of the structure, which would be sufficiently great to admit of a lower estimate being taken. To make matters still more complicated, Mr. Baker, who "is a civil engineer of eminence," and "who seems to have devoted much time and attention to the subject of wind-pressures," said that for the last fifteen years he had looked very carefully for evidence of any structure capable of standing a uniform pressure of 20 pounds which had been blown down, and that he had never found a single instance, — that there were hundreds of buildings in this country that would be blown down with a pressure of 20 pounds on the square foot, and miles of wall on the edges of cliffs and on open downs which would be blown down with a pressure of even 13 pounds. In the face of all this apparently conflicting evidence, there will be a natural anxiety on the part both of the traveling public and the engineering profession to have the subject thoroughly investigated, and meanwhile there is every prospect that the promoters of such undertakings as the Tay Bridge will find it a very difficult task to raise money unless they are able to convince subscribers that the question of wind-pressure has not only been successfully investigated, but that measures have been taken to render such lofty structures thoroughly secure. — *The Builder.*

SETTING OF STONE-WORK.

The maintenance and reparation of old buildings need a good deal of close supervision and examination, and our great public buildings, especially our cathedrals, have, happily, during this age of restoration, been placed under such surveillance, that those intrusted with the supervision of their fabrics exercise a vigilant care and a very pardonable amount of pride in keeping them in perfect order, and in examining every stone or dowel which has a doubtful appearance of durability. But even with the most careful watchfulness, sometimes a part of a building hidden from sight eludes examination. In the preservation of a large structure, a great deal more than superficial surveys is required. It is not always the detection of decayed stone-work on the outer face of a building that needs the first attention, though a crumbling state of decay gives a ruinous and uncared-for look to a building. There are more deep-seated maladies than this, and there is often a danger lest these hidden defects prove to be sources of danger and instability. A building of great weight must always be in a state of settlement; underground springs, soakage, and the diversion of water-courses have been known to undermine buildings, while in large cities, such as London, the constant altera-

tions of adjacent property, the removal of weighty buildings, and especially the tampering with the ground by the excavations of new sewers, etc., create an endless source of mischief. Large porticoes, such as that at the west end of St. Paul's Cathedral are more likely to settle than a homogeneous mass of masonry like a wall, and in the course of three centuries it would not be surprising if the axes of some of the end columns were thrown over a trifle in consequence. Any danger from such divergences need not be feared, as the settlements are too trifling; but they occasionally give rise to cracks and dislocations of different kinds, which the surveyor, by a careful diagnosis, is enabled to attribute to their proper cause. A contemporary has recently called attention to a giving-way of the stone-work in the upper part of one of the fluted Corinthian columns supporting the west portico of St. Paul's Cathedral which had been discovered on a recent survey being made of the cathedral. Such an announcement would be alarming enough to those who, when they see a fractured column or a crack, think the whole building is in danger; but the actual fact, on the contrary, is one that need not give rise to any uneasiness. From a casual inspection we find that a fractured portion of the upper stone of one column is being replaced. The column in question is the third one from the south side, in the lower range of columns of the portico. As most of our readers know, the western portico of St. Paul's consists of two orders of columns, the upper order carrying the pediment being of eight coupled columns, and the lower order extending an intercolumniation on each side, making twelve columns coupled. The column that is now under repair is therefore below the outer column of the upper range on the south side, and its base rests on the upper landing of the second flight of steps. From what we hear, it was found that the upper courses of the column at the joint were slightly out of position; in fact, that two portions or fractured prisms had bulged a little at the joints, and it was thought necessary to replace the cracked parts. The fractured prism which separated from the upper course of stone is not more than a fourth of the mass, and it has separated in an oblique plane with the sharp angle downwards, as usual in cases of crushing short cylinders of stone. The pressure on this column was probably never equal; that is to say, the inequality of a stone may have thrown the weight on the side which has fractured, or the stone may have been inadvertently placed on its wrong bed. The fractured prism we saw getting hauled up appeared as sound as new stone, indeed, harder, and will be replaced in its old position again, and no one will know that anything has been done to it. Perforations have been made in the fractured pieces, and no doubt copper bolts will be inserted through the whole course; they have been eased at the joints, and the column will then be sounder than it has been for the last century or two. It is unnecessary to refute the assertion that the structure has been at all endangered; the fractured pieces of stone which have been secured do not affect the strength or support in any appreciable degree, as the remaining part is sound and occupies two-thirds or more of the diameter of the column. Of course the main pressure on a column thus situated would be through the axis, and this part is quite intact. The fracture, trivial as it is, in reference to St. Paul's, has a lesson for the architect and mason. It might occur to an outer column with more dangerous results, or it might have taken place in a single column supporting another above it, and then some caution in replacing the stone would have been necessary. In the present case, luckily, the columns are in pairs, and ample support is afforded. But the construction of modern buildings is not always carried out with the consummate care exercised in the building of St. Paul's. In the first place, the foundations of single outer columns are not securely laid so as to insure a perfect transference of the weight; in the next place, if of stone, the stones are not personally examined and tested under pressure as they should be; in fact we have never known of an instance where the stones have been specially tested; their soundness and freedom from vents or flaws, veins, etc., is usually guaranteed by the foreman or clerk of works, and it is to the practical experience of those gentlemen we have to trust in most cases. Of course in the selection of stone in the quarry much depends, but a great deal more in the supervision of erection — to see, for instance, that the natural beds are in their proper position. Then there is another common fault — the erection of columns of stone without inserting some compressible substance like lead between the joints. Many of our modern porticoes have suffered from inattention to this point, and the consequent flushing at the joints. Referring to the resistance of stone, it may be said that as the greatest weight upon it is usually never sufficient to fracture it, we need not trouble; but such an assertion is unreliable in many cases, as when any natural fault occurs in the stone; and we believe it is stated that the greatest stress on any part of the masonry at St. Paul's, is about fourteen tons per square foot. — *The Building News.*

THE POSSIBLE DANGERS OF STEAM-HEATING.

Chicago, Sept. 21, 1880.

To the Editor of the American Architect: —

Dear Sir, — I notice in your issue of April 10, 1880, an article upon "The Possible Dangers of Steam Heating," which goes to prove that there is very little, if any, danger in the contact of steam-piping with wood.

I simply state the following as one of the cases of danger from said cause witnessed by myself, and which I noted at the time with special interest.

Our business, which is that of manufacturing, is carried on in a factory 40 by 60 feet and about 65 feet in height, four stories. Our engine-room, which is about 15 by 25 feet, is situated in one corner of the building on the ground floor, and is occupied by a Baxter six-horse-power engine, the working pressure of which is seventy pounds, and the safety-valve loaded to eighty. The boiler of this engine, being too small for our present wants, is supplied with steam from a larger boiler, 5 by 12 feet, in an adjoining building. Our drying and baking rooms, which are situated directly over the engine-room, on the third floor, are supplied with steam from a single half-inch pipe running from the smaller boiler. At about one foot above boiler this pipe is tapped and another pipe attached which passes through the second floor also and supplies the room immediately above with steam during the winter. In passing both floors, these pipes when put up cleared the wood by a space of about half an inch all around, which was considered an ample precaution.

One day during the middle part of last winter a workman accidentally entered the tool-room and discovered a narrow jet of flame issuing along and up the pipes near the floor. Upon examination it was found that the wood around the two pipes was charred and burnt. No waste, oil, or other combustible material was near.

Upon placing a thermometer at the spot recently, and at the same distance from the pipe, I find the temperature to be 120°, but on account of the absence of fire in the boiler just beneath, and consequently less heat in the room below, and only one pipe being in use at the time, the temperature can be estimated at more than twice that, or about 250° at the time of the ignition, or very likely more.

It certainly exploded a theory which we entertained that steam-pipe would not ignite wood under ordinary circumstances. Upon examining the floor above, the wood was found charred and appeared easy to ignite, but there being but one pipe there probably was not enough heat at that time.

The wood has since been cut away for a space of about three inches, and no further trouble has been experienced. G. A. Payson.

COUNTERCEILING.

Lynchburg, Va., September 25th, 1880.

To the Editor of the American Architect: —

Dear Sir, — I would be glad to obtain your valuable opinion on the following state of facts: A school-house is let to A, the contractor, and the specifications among other things require that certain floors shall be *counterceiled* without making any other further requirements as to this item. The contractor has laid his floors, counterceiling them by putting one-inch plank between the joist, while the architect and committee claim that the word *counterceiled*, as used by the architect in his specifications, meant that mortar should be used on the plank. Is this counterceiling according to the technical acceptation of the term? State also, if you please, what can be required of the builder in the case we mention, where counterceiling is demanded by the specifications, which say nothing as to the manner in which the same shall be done.

I am not the architect of the school-house, but have been called upon for an opinion, but preferring yours I would ask it through the columns of your esteemed journal. Yours truly, Subscriber.

[In the case mentioned by our correspondent, as in every similar one, the contractor is bound, where no specific description of a particular portion of the work is given, to carry out that portion according to the ordinary usage of the locality. If, as is usual in contracts, the work is agreed to be executed in a good, substantial, and workmanlike manner, he is bound, where not otherwise directed, to carry out all parts in the way customary among the good mechanics of the place. Whether that would require this particular contractor to spread mortar upon the boards cut in between the joists, we have no means of knowing; all depends on the local customs. "Counterceiling" is a word little used here, and not defined in any technical dictionary that we know of, but even if it were familiar, the acceptation given it in the place where the controversy has arisen would govern the decision, no matter what might be the definition of the word elsewhere. If the other respectable mechanics of the place consider that "counterceiling" means cutting in boards without mortar, that is for that locality the definition of the word; if they consider that a mortar deafening is implied, then the contract certainly includes that, and is not fulfilled until this is put in. Of course an architect's opinion, especially that of the architect of the building, is good evidence as to the meaning of the phrases in the specification, but there is a rule of law to construe doubtful points in favor of the party who has the work to do, and the testimony of other contractors would have, perhaps, most weight with a jury, if the matter should go so far, and would most effectually silence the objections of the recalcitrant mechanic. — Eds. American Architect.]

CISTERNS.

To the Editor of the American Architect: —

Dear Sir, — Under your answers to correspondents would you kindly let me know the name of the best work published on "cisterns"? I have a country house where I am obliged to rely for drinking-water on the rain-water collected from the roof, and as I have been singularly unsuccessful in my cisterns, built by the best masons, so far, I am anxious to build one with all the modern improvements.

"A Subscriber."

[There is no book published, so far as we know, which contains anything like an exhaustive treatise on cistern-building. J. Bailey Denton's Sanitary Engineering, published by E. & F. N. Spon, 446 Broome St., New York, has a chapter which is worth consulting, and there are many hints in the paper on Filtration of Potable Waters by Professor Nichols, in the Report of the Massachusetts State Board of Health for 1878, which is to be found also, re-written and amplified, in Buck's Hygiene and Public Health, Vol. I., published by Wm. Wood & Co., New York, under the title of Public

Water Supply. An article on the subject appeared in *Scribner's Monthly* some two years ago, we believe. The customs of cistern-building vary so much with locality that little more than suggestions can be obtained from these books. Possibly, if our correspondent would describe the particular troubles which he has met with, we could help him more. — [Eds. American Architect.]

NOTES AND CLIPPINGS.

The Fountain of the Chateau d'Eau. — H. Dugdale of New York is said to have offered $300,000 for the Chateau d'Eau fountain in Paris, lately removed to make way for the statue of the Republic. Probably he intends to present it to the city of New York for erection in Central Park.

The Theatre at Zea. — A little time ago sundry workmen employed in making the road to Zéa discovered, quite close to the Bay of Zéa, some ancient walls. The Archæological Society had a clearance made and the excavations revealed that a theatre dominating the bay once stood at this spot. This theatre, the existence of which was asserted by some travelers and contested by others, is undoubtedly that of which Xenophon speaks (Hell., ii., 4),and is quite distinct from the theatre of Munychia, the ruins of which are seen in the extreme distance at the northeast of the Bay of Zéa.

The English Law of Fixtures. — A correspondent of the *American Machinist* writes, "I am informed that English law makes real estate out of anything attached to a building. Thus, if you rent an empty factory and fill it with machinery which you bolt to the floor, the machinery so bolted becomes a contribution and a part and parcel of the premises, and is not to be removed by you when your lease is up. This condition of law has led to the contriving of a plan to get around it. Instead of bolting your machines to the floor, you bolt them to shoes previously bolted to the floor. When you buy a new machine, it comes with these shoes on its feet. You fix the shoes to the floor, and then fix the machine to the shoes. When you clear out, you take your machines, but leave the shoes as a souvenir of your respect for the law."

Theban Sacred Band at Chæronea. — A discovery that will cause a great sensation has been made at Chæronea. You know that the Minister of Public Instruction is going shortly to re-erect the Lion of Chæronea. For this purpose the Superintendent of Antiquities, M. Stamatakis, was sent to Chæronea. When he began to clear the ground about the lion he found the bones of those who fell in the memorable battle. The dead are buried in three sections, according to the order in which they fought. Each section is composed of six lines. In the first section have been found 77 dead; that is to say, at the first, second, third, and fourth lines, 15 each; at the fifth, 9, and at the sixth, 8. In the second section were found 41 buried in the same fashion. The excavations continue still. We know that beneath the lion were interred 300 of the Theban Sacred Band, so that, having now found 118 dead, 182 remain to be discovered. Near the bodies have been found remains of arms, buttons, and some *stleggides*, the well-known bathing-scrapers. The dead as soon as found are covered with earth, but it is feared it will be very difficult to preserve them.—*The Athenæum.*

Spontaneous Combustion. — Dr. Mitchell writing from Washington to an October magazine tells this: A singular occurrence has happened to Gen. Dayton, of Elizabethtown, one of the New Jersey Senators. He pulled off his stockings of silk, under which were another pair of woolen gauze, just as he was going to bed. The former were dropped on the small carpet by the bedside and the latter were thrown to some distance near its foot. Electric snaps and sparks were observed by him unusually prevalent when he was taking off his stockings. He slept until morning, when the silk stockings were found to be converted to coal, but having the semblance of sticks and threads, but falling to pieces on being touched. There was not the least cohesion. One of the slippers which lay under the stockings was considerably burned. One of the woolen garters was also burned in places. The carpet was burned through to the floor, and the floor itself was scorched to charcoal. It was a case of spontaneous combustion, the candle having been carefully put out, and there being very little fire on the hearth, and both of them being eight feet or more from the stockings.

A Machine-Shop Floor. — Mr. A. W. Fox of Baldwinsville, N. Y., describes in the *American Machinist* in the following words the manner in which he built a floor which was to uphold the ordinary large tools of a machine-shop and endure the usual rough usage: "Some years ago, in starting a machine-shop, and fitting a building therefor, I resolved on a change in the way of building the floor, knowing that I could not by any chance construct a worse floor to sustain tools, or to work upon, than some I had seen. Loads of dirt and gravel were wheeled in and water run on freely to settle it until the filling was six inches lower than the top of the floor required, when the filling was carefully leveled with coarse sand, and rolled with a heavy stone roller. On this filling was laid a floor of boards, both sides of which had been covered with boiling coal-tar and pitch. Blocks of wood had been prepared by sawing plank three and a half inches thick, and any width the logs would cut and leave the edges of the planks square. These planks were cut up into sections five inches long. One end of each block was dipped half or two-thirds its length in the hot tar and set on the board flooring, the tarred end down. In putting down the blocks, they were made to cover or lap over the joints between blocks previously laid, like builders 'breaking joints' when laying shingles. This was unnecessary, perhaps, but it was done. We set the smaller tools on the floor, and they stayed where they were placed; heavier tools were placed on stone piers, put in before the floor was laid. The result was, we could roll a heavy wheel across the shop without fear of breaking through, and as the grain of the wood was vertical, no slivers started up to throw a man down, or tear his hands in picking up anything, and no knots steadily rose from the surface around them; in short, it was quite satisfactory."

The Upas Tree. — Many a fine simile has been destroyed by the discoveries made of late years concerning the upas tree of Java. It was spoken of as growing 10 or 12 miles from any plant. Criminals condemned to die were given the choice of suffering the penalty or gathering some of the poison from the tree, and only about two in twenty survive the expedition. Of the land where the tree grew it is said, "There is no fish in the waters, nor has any rat, mouse or other vermin been seen there, and when any birds fly so near this tree that the effluvia reaches them, they fall victims to the poison. Also, in less than two months only 300 persons remained out of 1,600 who were compelled to live within a few miles of this tree." The tree is bad enough, but less of a criminal than writers would have us believe. It is a variety of spurge (*Antiaris toxicaria*) which, when wounded, exudes a poisonous, milky juice. It grows in company with other trees, without harming them, and has been cultivated in botanic gardens. Birds and lizards have often been seen to perch upon its branches. The juice is very irritating, and produces a kind of paralysis if introduced into the system. When mixed with other poisons it forms the *upas*, which in Malay language signifies poison, or specifically arrow-poison. Strange to say, this poisonous plant belongs to the same family as the famous bread-fruit tree, which furnishes such excellent food for man. — *The Northwestern Lumberman.*

A Practical Archæologist — Count Vespignani deserves the credit which attaches to a man who reconciles two opposite aims in the attainment of a useful end. He has tried to combine the commercial with the archaic, and appears in Roman circles at once as a Baron Hausmann and a Sir John Lubbock. The temple of Antoninus is one of the most famous ruins of the Piazza di Pietro. Though it has been repeatedly burned down, its walls have shown what the ancient Romans could do in days when the regulations of the Board of Works were not necessary to restrain the speculative builder. Eleven columns support the façade of the building, each of them about 4 feet in diameter and about 40 feet in height. But these shafts are buried in rubbish and brick-work, and their proportions cannot be seen. To detach all this defacing incumbrance and allow the building to stand as it stood in the days of Antoninus has been one of the motives of Count Vespignani. The idea certainly recommends itself to all who have visited Rome or care for antiquities. But another motive has singularly been joined to the first, and may possibly have proved the more efficient of the two. The Romans built their palaces to outlast their Empire, and the Temple of Antoninus might be made to serve a purpose very different from that of its original construction. A Chamber of Commerce is necessary to the capital of a commercial country, and the Romans themselves would have admitted the importance of a Bourse. The combined idea of restoration and of appropriation is due to Count Vespignani, and for the works at present being conducted in the Piazza he will be singularly fortunate in combining the gratitude of men of business and of men of learning. — *London News.*

The Misfortunes of Antiquaries. — The British Association excursionists experienced a rather severe disappointment lately, in a visit to a spot which was supposed to be rich in geological and antiquarian treasures. It had been previously arranged that a mound, supposed to be a tumulus, should be opened for the special edification of the members of the association, and the operation took place under the supervision of a well-known member of Parliament. Unfortunately, instead of being a tumulus "like the graves opened some years since by Sir John Lubbock," the mound proved to be nothing more imposing than a gravel and boulder heap, "accumulated by the centripetal action of two small springs which met at the spot." — *St. James's Gazette.*

A peculiar circumstance occurred to me, says a writer in *Chambers' Journal*, once while I was at Cheltenham. It was Whitsuntide, and I had organized a grand fête with special attractions, to take place in a cricket-field just outside the town. The chief feature of the day was to be the roasting of a bullock whole, in which I had had considerable previous experience. I therefore prepared drawings of the necessary structure, and gave full instructions to the caterer how he was to proceed. But after waiting some time, I found that no one had begun to construct the fire-place; so I determined to start the men at the work myself. Calling to one of them to bring a pickaxe, I pointed to the spot where he was to begin.

"Now drive your pick in just there," I said, "and loosen the earth a bit."

Down went the pick into the loose soil; up came the lumps of earth, and with them what looked like some pieces of old iron, corroded with age, and with the earth firmly adhering to their surface. There were three or four at this first pick, and the man put down his tool to examine them.

"Never mind them!" I cried impatiently; "for goodness' sake, get on with the work."

As the man proceeded, more of the same articles were unearthed, until at last a dozen in all were discovered, and thrown aside to be examined afterward. But Percy, one of the caterer's men, happening to come by at the moment, picked them up and examined them; afterward offering the workman half a crown for the lot. This the man accepted, and Percy took the articles, whatever they were, away with him. I thought no more of the incident until a day or two afterward, when a couple of policemen called upon me and began questioning me in a most mysterious manner about some treasure-trove that had been discovered in the cricket-field by some men who were working with me. I replied that I knew nothing about any treasure-trove. I knew some bits of old iron had been turned up, and that was all. Where they were then or who had got them, I neither knew nor cared. I suppose that, as far as the police were concerned, the matter dropped. But I heard afterward that these dozen pieces of "old iron" turned out to be what are known to collectors of curiosities as "apostle spoons." They were of solid silver; and each had upon it, as a continuation or elongation of the handle, an upright figure of an apostle — the twelve spoons together furnishing the twelve apostles. They were decidedly cheap at half-a-crown the lot.

BUILDING INTELLIGENCE.

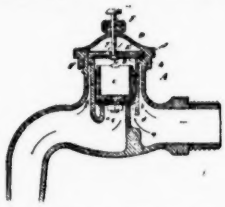
[Reported for The American Architect and Building News].

[*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.

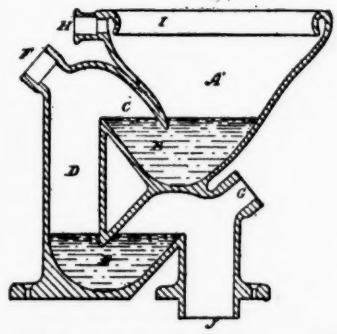
[*Printed specifications of any patents here mentioned, together with full detail illustrations, may be obtained of the Commissioner of Patents, at Washington, for twenty-five cents.*]

229,503. AUTOMATIC FAUCET. — Thos. H. Walker, Kansas City, Mo. The object of this invention is to provide a self-closing faucet that will close without spring or screw. A is the faucet-shell, provided with a tubular projection, *a*, which extends upward into the central cylindrical chamber, B, between the walls of which chamber B and the shell of the faucet are the water-passages *b b*. Within this chamber B is a hollow valve, C, on the bottom of which is fixed, by screw and nut *c*, the packing *d*, which closes tight down on the upper edge of the tubular projection *a*, which constitutes the seat of the valve C. On the top of the cap D is the stuffing-box F, through which passes the valve-stem G, on the end of which is a valve, H, which closes up into its seat on the under face of the plate E. This plate E is further provided with a water-passage *g*, which extends from its upper face near its centre through its lower face near its periphery, as shown. On the under face of this plate is secured a suitable washer for making a tight joint, B. Projecting downward from the connecting-ring between the chamber B and shell of the faucet A is a screw, I, which may be turned down to regulate the



flow of water into the chamber B from without, through the opening *h*. Water entering the faucet in the usual way flows up the water-passage *b*, through the hole *h*, into the chamber B, filling the chambered valve C and the space above it; and this pressure of water holds the valve C down upon its seat and prevents the passage of the water through the faucet, so that the faucet is self-closing, the weight of the valve and the pressure of the water within it and above it overbalancing the pressure of the water beneath it. In order to permit the flow of water through the valve the valve-stem and valve G H are pressed down, thereby relieving the pressure of the water in and above the valve C, and allowing the water to flow up through the opening *f*, around the rectangular section of the valve-stem G, into the chambered cap D, and thence down through the water-passage *g* of the plate E into the water-passage *b*, on the discharge side of the faucet, and thence out of the faucet, and at the same time the water pressure in and about the valve C being relieved, the pressure beneath it is sufficient to raise the said valve, so that the water also will flow into the cylindrical chamber B over the seat of the valve C, down through tubular projection *a*, and thus out from the faucet. The arrows denote the direction of the flow of water when the valve-stem and valve G H are pushed down.

230,651. WATER-CLOSET. — Henry Owen, London, England. A is the bowl. B a trap formed by the inclined outlet C from the back, which opens into the vertical passage D at the back, communicating with a second trap, E, similar to B. F is the outlet for gases. A pipe is connected with this outlet and carried through the wall of the house, and is there connected with a ventilating shaft. G is an inlet-opening, (closed



by a suitable air-tight stopper) placed immediately above the lower trap, E, and in front of the closet, which opening allows of easily unstopping the soil-pipe J, should it ever become stopped. H is the inlet for the flushing water, the water being carried around the basin by the hollow oval rim I, and then rushing through the traps. By this construction of water-closet the bowl A forms a perfect trap in itself, which is also the case with the lower trap, E, while the gases from the soil-pipe J, should they pass the lower trap, will be carried off through the outlet F. An advantage of this water-closet is that it can be made in one piece of earthenware and requires no metal-work whatever in its construction.

232,324. SHINGLING SCAFFOLD. — Richard A. H. Ashlock, Rockport, Ind.

232,326. CLAPBOARD MACHINE. — Simeon Babcock, Manistee, Mich.

232,338. HOISTING APPARATUS FOR ELEVATORS. — Nichols B. Cushing, Jersey City, N. J.

232,350. SELF-CLOSING FAUCET. — Matthew Hogan, Hartford, Conn.

232,359. DAMPER-REGULATOR. — John C. McLaughlin, Detroit, Mich.

232,376. SEWER TRAP. — Arthur Staples, Lowell, Mass.

232,377. ELEVATOR. — Freeman Stoddard, Brooklyn, N. Y.

232,380. FAUCET. — Lewis W. Truesdell, Oswego, N. Y.

232,387. WEATHER-STRIP. — Jas. W. Brown, Brooklyn, N. Y.

232,429. RADIATOR FOR STOVE-PIPES. — Chester F. Adams, Toledo, O.

232,434. CHIMNEY-CAP. — Wm. D. Bartlett, Amesbury, Mass.

232,436. METAL-TURNING LATHE. — W. F. and J. Barnes, Rockford, Ill.

232,455. SAFETY ATTACHMENT FOR ELEVATORS. — Dexter H. Chamberlain, West Roxbury, Mass.

232,457. HEATING STOVE. — Benjamin F. Clements, St. Louis, Mo.

232,467. WINDOW AND DOOR SCREEN. — Albert F. Demorest, Muscatine, Io.

232,470. FLOORING CLAMP. — Wm. Douley, Conesville, O.

232,509. LATCH. — Thomas W. Kimbell, New York, N. Y.

232,533. SCREW-CUTTING DIE. — William J. McCormick, Paignton, England.

232,555. DOOR-HANGER. — Samuel Shreffler, Jr., Morris, Ill.

232,556. SCAFFOLD. — Abraham W. Silvius, Galesburg, Ill.

232,573. WINDOW-SCREEN. — Bartlett N. Torrey, Creston, Io.

232,575. MACHINE FOR FRAMING TIMBER. — Richard H. Watson, Leadville, Col.

232,581. WRENCH. — Duncan Weir, Marshall, Tex.

232,584. ROSETTE LATHE. — Charles W. Woerd, Waltham, Mass.

SUMMARY OF THE WEEK.

Albany.

THE STATE CAPITOL. — The southern pavilion is receiving its iron roof, and the senate chamber is being completed in a style which must commend itself, especially as far as material goes, to the lovers of reality and solidity in art. We could wish that more of the interior of this great edifice had been of the superb marbles now being introduced there, contrasting in their truthfulness so forcibly with the film of gilt, and paint, and tile already to be seen there.

CITY HALL. — Designs have been submitted to the commission appointed by the last legislature for a new city hall; cost not to exceed $195,000. Some discussion has arisen as to the propriety of patching up the old building. It is most confidently hoped that a new one will be erected.

CHURCHES. — The Hudson St. Baptist Church, in Long Meadow, brown-stone and Trenton brick, is progressing finely. New Catholic and Methodist churches are nearly completed.

HOTEL. — An addition to the Kenmore Hotel is to be made by its architects, Ogden and Wright.

BANK. — The New York State bank-building, one of those pretty little "old-time fronts," pedimented and appropriately decorated with two great gold coin under the frieze over each doorway, is being remodeled by Wm. M. Woollett, architect. It was built in the early part of this century.

THE GOVERNMENT BUILDING. — The government building boasts of its third-story iron floor-beams, and assumes already a bold, classic dignity.

HOUSES. — Two houses, one a dwelling on Hamilton St., for a Mr. Padow, and another a villa on Madison Ave., for Mr. G. W. Van Slyke, are building; A. W. Fuller, architect.

THE MARKET. — Building ordinarily active. Much repairing being done; wages fair; mechanics mostly busy.

Baltimore.

BUILDING PERMITS. — Thirteen building permits have been issued since the last report; the following only are of sufficient importance to be mentioned:

A. Bruscup, three-st'y brick building on Caroline St., near Mullikin St.

John Thos. Kelso, 2 three-st'y brick buildings on High St., near Fayette St., 37′ front each.

Mrs. G. H. Williams, 10 three-st'y brick buildings, commencing cor. of Williams and Ostend St.

Wm. Devan, 3 three-st'y brick buildings on Gilmor St., near Baker St., 12′ 6″ front each.

CARRIAGE REPOSITORY. — Mr. Jos. Riddlemoser is about to build a large carriage repository on Fayette St., near Charles St., 30′ x 94′, four stories high; first story is to be iron, and the rest brick, with stone and terra-cotta trimmings. Mr. Jackson C. Gott is the architect.

Boston.

BUILDING PERMITS. — *Brick.* — *Marlboro St., No.* 234, for Samuel F. Eames, 1 dwell., 25′ x 55′, three stories and mansard; Edw. E. Chapin, builder.

Culvert St., between Tremont and Hampshire, for Whittier Machine Co., 1 boiler-shop, 65′ x 101′; J. Maynard Russell, builder.

Beacon St., No. 340, for Miles Washburn, 1 dwell., 20′ x 65′, three stories and mansard; James Fagin, builder.

Commonwealth Ave., between Hereford and Gloucester Sts., for Uriah H. Coffin, 1 dwell., 25′ x 60′, three stories and mansard; Uriah H. Coffin, builder.

B St, cor. West Fourth St., for Elbridge H. Grover, tenement-house and stores, 28′ x 38′, four stories; Alexander Gunn, builder.

Wood. — *McClellan Ave.*, near Blue Hill Ave., estate of Isaac McClellan, 2 dwells., 25′ x 33′; Manuel Silva, builder.

Albany St., near Dover St., for Jos. F. Paul, 1 storage lumber, 27′ x 48′, two stories; Jos. F. Paul, builder.

Everett St., cor. Gordon St., for John A. Fox, 1 dwell., 35′ x 35′ 4″, two stories; W. S. Mitchell, builder.

Centre St., near Louders Lane, for trustees under will of Seth Adams, 1 laundry, 25′ x 43′, two stories; J. J. McNutt, builder.

Washington St., near Green St., for Daniel Carroll, 1 blacksmith shop, 20′ x 50′.

WAREHOUSE. — A building on Lincoln St., for heirs of Nathaniel Whiting, is now being built from plans of Geo. H. Young, architect, of Boston. It is 35′ x 73′, five stories high, of face brick, treated with Philadelphia brick and terra-cotta; cost, about $20,000; Rumery & Maxwell, masons, and Leander Greeley, carpenter, are the contractors.

THE LUMBER MARKET. — The *Herald* says: "The lumber market shows considerable activity in many of its branches, with firm prices and a disposition to advance on the part of holders. In hardwood lumber there is already an active demand, from the circumstance that furniture manufacturers are receiving large orders and are preparing to fill them at once, and it looks as if there would be a very good fall trade. Black walnut boards running 4 No. 1 to 1 inch, $75 per 1,000 feet; for 1¼-inch, $78; and for 2-inch, $85; 4 stuff is quoted at $65. Ash is quoted at $35 to $40, according to quality. Plain oak will bear the same quotations as ash. Quartered oak, $50. Poplar is in demand at $25 to $28 for 4 stuff, and $35 to $38 for inch. Cherry is worth $70 for good quality. Butternut, $65 to $70. In hard pine the market continues without material change in prices, but the demand is quite active. Spruce has gone so high in price that hard pine has come into competition with it in the New York and Philadelphia markets, and the tendency of prices is upward. Hard pine is never sent North on consignment, but always on order, and of late the demand has been so great in this section that it is with considerable difficulty that orders can be placed at the South. Hard pine by the cargo is quoted at from $23.50 to $28 for cargo lots, and large mill orders of 16-inch have been sold at $32. The market for spruce lumber is extremely active. Indeed, the demand for this description of lumber has not been so great for many years past, or prices better. The market supply is not up to the demand. All the large lumber mills of New England are full of orders up to the end of the sawing season, which will be about December 1. In Bangor, Me., spruce has been selling at $14 for yard orders, which would be about equal to $16.50 in Boston. There is little or no spruce coming to this market on consignment. The tendency of this advance in the price of spruce lumber, which is from 30 to 40 per cent higher than the prices of last spring, it is apprehended by our lumbermen, will be to stimulate production to an excessive extent, and that, if the lumber trade will not profit by the lesson of the boom in the iron trade of last year, and the reaction of prices in consequence, a similar disaster may overtake them in spruce and other lumber, and that the former may be selling as low as $12 next summer. As things are now, there is an assurance of a good demand at high prices until June of next year. Spruce frames are quoted at $16, and the market strong, with an upward tendency. It is not a little curious that, while spruce has advanced so materially from the prices of last spring, refuse pine and hemlock have not materially advanced in that time. The former is quoted at $13 to $14, and hemlock at $12 to $12.50 for planed, and $11 to $11.50 for rough. Spruce boards, sidings, planed on one side, from $13 to $15, according to width."

Brooklyn.

BUILDING PERMITS. — *Hooper St.*, two-st'y brown-stone dwell., 19′ 6″ x 45′; owner, J. H. Hoffman, 257 Hewes St.

Ninth St., 4 two-st'y free-stone dwells., 15′ x 42′; cost, $5,000 each; owner and mason, Charles Long, 458 Carroll St.; architect, J. F. Wood.

Ninth St., 6 two-st'y brown-stone dwells., 18′ 4″ x 45′; cost, $4,500 each; owner, Wm. Irvine, cor. Court St. and Ninth St.; architect, John C. Burne; builders, Buchanan & Son and N. J. Conway.

Vanderbilt Ave., 5 three-st'y brown-stone flats, 20′ x 45′; cost, $2,500 each; owner, Geo. W. Brown, 728 Fulton St.; architect, C. B. Sheldon; builders, Levi Brown and C. E. Cozzens.

Ten Eycke St., 3 one-st'y brick factories, one 98′ x 100′, one 62′ x 50′, and one 32′ x 25′; total cost, $14,000; owner, L. Waterbury & Co., on premises; architect, B. Coszine; builders, John McQuaid and Jenkins & Gillies.

Myrtle Ave., 7 one-st'y frame stores, 15′ and 12′ 6″ x 40′; cost, $3,000; builder, A. McCurdy.

North Seventh St., 1 one-st'y brick factory, 25′ and 26′ 7″ x 69′ 4″ and 78′ 2″; owner, A. B. Ansbacher, 43 John St., New York; architect, Th. Engelhardt; builder, Benj. Mills.

Clymer St., Nos. 160 *and* 162, 2 three-st'y brick dwells., 12′ 6″ x 44′; owners, Washburn & Rawson, 219 Clymer St.

Rogers Ave., cor. Prospect Pl., 5 two-st'y brick dwells., 16′ x 45′; cost, $2,500 each; owner, George Nichols, 619 Warren St.; architect, D. H. Williamson; builders, Nolan & Richards and Williamson & Coutant.

North Seventh St., No. 313, one-st'y frame shop, 20′ x 20′; cost, $100; owner, Jas. Breslin, on premises; builder, Mr. Daniels.

Douglass St., near Nostrand Ave., one-st'y frame dwell., 20′ x 25′.

Chicago.

BUILDING PERMITS. — G. G. Lewis, two-st'y brick dwell., 22′ x 56′, —— West Adams St.; cost, $2,000.

Patrick Long, two-st'y brick store and dwell., 23′ x 64′, 3758 Dashiel St.; cost, $4,000.

Rubber Paint Co., four-st'y brick factory, 41′ 6″ x 112′, Market St., cor. Quincy; cost, $15,000.

Walter A. Wood, three-st'y brick warehouse, 80' x 105', 74 Taylor St.; cost, $15,000.

E. Populorum, three-st'y brick tannery, 32' x 240', Fleetwood St., near North Ave.; cost, $15,000.

John Hoffman, 3 two-st'y brick dwells., 65 x 66", Warren Ave., near Hoyne; cost, $20,000.

Rt. Rev. W. E. McLaren, brick church, 22' x 44', Genessee St., cor. Twenty-Fourth; cost, $1,000.

John Johnston, three-st'y brick store and dwell., 40' x 65', State St., cor. Kinzie; cost, $10,000.

Noble & Little, two st'y brick office, 22' x 36', Ashland Ave., near Twenty-second St.; cost, $2,000.

Frank Collier, two-st y brick dwell., 19' 6" x 44', Jackson St., near Paulina St.; cost, $2,500.

Geo. W. Pitkin, four-st y brick paint manufactory, 55' x 100', Clinton St., near Van Buren; cost, $13,000.

H. Johnson, two-st'y brick dwell., 31' x 64', Superior St., cor. Cass; cost, $11,000.

R. S. Mills, two-st'y brick dwell., 40' x 60', Indiana Ave., near Thirty-Sixth St.; cost, $8,000.

T. P. & G. I. Smith, two-st'y brick stores and dwells., 60' x 55', 10 and 12 North Clarke St.; cost, $4,000.

Samuel Beers, 2 two-st'y brick dwells., 34' x 107', Bloomer St., near Thirty-Fourth St.; cost, $5,000.

R. Reinhardt, three st y store and dwell., 25' x 50', Harrison St., near Foster; cost, $5,000.

E. D. Fisk, four-st y brick factory, 80' x 240', Twenty-Sixth St., near Western Ave.; cost, $20,000.

John Muller, two-st'y brick dwell., 43' x 56', 624 and 626 Sedgwick St.; cost, $7,000.

P. C. Brooks, 2 additional stories on Portland Block, Dearborn St., cor. Washington; cost, $30,000.

F. C. Link, two-st'y brick dwell., 27' x 39', North State St., cor. Chestnut St.; cost, $4,800.

Cincinnati.

Building Permits. — Blymyer Manufacturing Co., addition to two-and-one-half-st'y brick, Ninth St.; cost, $2,500.

James Griffith & Sons, two-st'y brick stable, cor. Spring Grove Ave. and Garden St.; cost, $20,000.

James Griffith & Sons, three-st'y brick, Ninth St., near Main St.; cost, $4,000.

Geo. Endres, two-st'y brick, Vine St., near Corry St.; cost, $3,000.

C. E. Brockman, four-st'y stone front, No. 112 Main St.; cost, $3,000.

Cleveland.

Houses. — Eleven frame dwells., on Perry St. and Payne Ave., for Col. O. H. Payne; cost, $37,000; E. A. Cass, contractor.

Six frame houses, for Walton Bros., on Kennard St. and Arlington Court; cost, $11,500; R. McQuoid, contractor.

Double brick dwell,, for Geo. H. Wannington, on Franklin Ave.; cost, $7,200; Co-operative Building Co., masons; Twelvetree & Scoville, carpenters.

Frame dwell., on Olive St., for N. W. Cutter; cost, $3,500.

Frame dwell., on Kennard St., for H. H. Collins; cost, $4,000.

Frame dwell., on Dunham Ave., for H. C. Hawkins; cost, $6,000.

Frame dwell., on Kennard St., for E. J. Blandin; cost, $3,300.

Messrs. Coburn & Barnum are the architects of the above-mentioned buildings.

School-House. — Alterations on Hicks St. School; C. Bruch, mason; H. O. Adams, carpenter; cost, $15,000; Coburn & Barnum, architects.

New York.

Building Permits. — *West Forty-Fifth St., Nos.* 312 *to* 322, 6 three-st'y brick dwells., 16' 5" x 50'; cost, $9,000 each; owner, John J. Astor, 85 Prince St.; architect, Thomas Stent; builders, Marc Eidlitz and Havilan M. Smith & Son.

Sixty-Fourth St., two-st'y brown-stone chapel, 35' 6" x 82'; cost, $20,000; owner, Madison Ave. Baptist Church; architect, E. L. Roberts; builders, R. L. Darragh and Wm. Bedell.

Leonard St., Nos. 29 *and* 31, 2 six-st'y brick storage warehouses, 25' x 83'; cost, $12,500 each; owners, S. D. Babcock and A. D. Juillard; architect, J. Morgan Slade; builders, John Fish and Henry D. Powers.

Seventy-Ninth St., 3 three-st y Connecticut brown-stone dwells., 17' 8" x 50'; cost, $8,000 each; owner, Thos. hane, New Rochelle; architect, John McIntyre.

Tenth Ave., 3 four-st'y brick stores and tenements, 24' x 65'; cost, $10,000 each; owner, H. H. Cammann, 4 Pine St.; architects, O. P. and R. F. Hatfield; builders, A. A. Andruss & Son, and Haight & Mounia.

Eighty-Third St., cor. Tenth Ave., four-st'y brick tenement, 27' x 87'; cost, $15,000; owner, Selig Steinhardt, cor. Sixtieth St. and Madison Ave; architects, Thom & Wilson.

Eighty-Third St., near Tenth Ave., 4 four-st'y brick tenements, 19' 6" x 52'; cost, $10,000 each; owner, Selig Steinhardt, Sixtieth St., cor. Madison Ave.; architects, Thom & Wilson.

Delancey St., No. 252, four st y brick tenement, 28 x 51'; cost, $11,450; owner, August Gotthelf, 147 Ave. B; architect, F. W. Kiemt; builders, John Schmitt and Grissler & Fausel.

One Hundred and Twenty-Second St., 5 four-st'y Ohio-stone flats, 18' 9" x 50'; cost, $13,000 each; owner, C. Ritchie, 205 East Seventy-Sixth St.; builder, E. T. Hatch.

Water St., Nos. 449 *and* 451, three-st'y brick building, 40' x 80'; cost, about $2,500; owner, Franklin Wight, 232 South St.; builder, James Ferry.

Seventy-Seventh St., 2 five-st'y brown-stone tenements, 25' x 61'; cost, $14,000 each; owner, Thomas McGuire, 644 Third Ave.; architect, John Brandt.

First Ave., four-st'y brick tenement, 25' x 61'; cost, $10,000; owner Louis Lochmann, 410 East Eighty-Fourth St.; architect, John Brandt.

East One Hundred and Sixteenth St., Nos. 339 *and* 341, 2 three-st y brown-stone dwells., 18' and 22' x 48'; cost, $6,000 each; owner, James Wood, 347 East One Hundred and Sixteenth St.; architect, Calvin Shipman; builder, William Norman.

One Hundred and Twelfth St., two-st'y brick barn, 39' x 70'; cost, $3,000; owner, H. Tone, One Hundred and Twelfth St., Ninth and Tenth Aves.; architect, R. Townsend; builder, J. A. Hopper.

Alterations. — *Hague St., Nos.* 3, 5 *and* 7, raised one story: also, repair damage by fire, etc.; cost, $4,000; owner, W. P. Groom, 350 Pearl St.; architect, Jas. Barrett.

East Thirteenth St., No. 537, three-st'y brick extension, 25' x 34'; cost, $4,000; owner, A. J. McQuade, 535 East Thirteenth St.; architect, H. J. Dudley; builder, not selected.

Fifth Ave., cor. Forty-First St., one-st'y brick extension, 28' 4" x 19'; cost, about $4,500; owner, Wm. J. Syms, on premises; builders, William Field & Son.

Hester St., Nos. 5 *and* 7, front and interior alterations; cost, $3,500; owner, Mrs. M. J. Knight, Brooklyn; builders, R. Ward's Sons.

Ninety-First St., raised three stories; owner, Jacob Ruppert; architect, Anthony Pfund.

Fourth Ave., raised one story, woodwork replaced by galvanized iron, walls partly rebuilt; cost, $30,000; owners, F. & M. Schaefer Brewing Co.; architect, Chas. Stoll; builders, Robert Huson and Hoffman & Schwartz.

Building Prospects. — We do not anticipate any very large amount of important new work this fall; the coming spring will however bring a great many flue buildings on the market. Most of the office-buildings are leased to the first of May, and so buildings cannot be torn down till then. One of the first will probably be a large store for the Astor estate, on the corner of Broadway and Prince St., for which plans are being drawn by Mr. Thos. Stent. Anterior to that will come the building to be erected on the site of the Arlington Hotel, which is to be torn down. Some stables on Thirteenth St. are to be removed, which will give a lot 80' x 206'. The building is for Mr. Jas. McCreery, and is intended for rental purposes. The front on Fourteenth St. is to be of iron; that on Thirteenth St. will be first story iron, and above brick and stone. The first story has running iron shutters. There will be four steam elevators. There will be five lofty stories and basement. Messrs. D. and J. Jardine are the architects.

Building Materials. — Building materials maintain a very even figure, as will be seen by our price list.

Hotels. — On the corner of Forty-First St. and Eighth Ave., a hotel, 25' x 60', to be built of brick, at a cost of about $18,000, for Mr. James Callan, from designs of Mr. Jas. McEwan.

For the same owner, alterations to the hotel cor. Forty-First St. and Seventh Ave., are to be made, also from designs of Mr. McEwan.

Club-House. — It is rumored that a new St. Nicholas club-house is to be built on Fifth Ave.

Philadelphia.

Building Permits. — *North Second St., No.* 615, one-st'y building, 20' x 30'; owner and builder, Lewis D. Belaire.

Tilton St., near Lehigh Ave., two-st'y stable, 40' x 80'; John Dond, contractor.

James St., near Alleghany Ave., one-st'y factory, 40' x 60'; contractor, Wm. Dickinson.

Woodland Ave., No. 4133, three-st'y store and dwell., 15' x 16'; contractor, H. T. Supiee.

Lombard St., near Sixth St., 2 two-st y dwells., 16' x 32'; owner and builder, Jacob Zeie.

Twelfth St., cor. Washington Ave., two-st'y picker house, 20' x 30'; owner etc., Thos. J. Martin.

Waterloo St., near York, three-st'y machine-shop, 20' x 30'; A. Culp, owner and builder.

Canal St., b etween Cedar and Locks Sts., two-st'y factory, 22' x 150'; builders, Saville & Schofie.

Tasker St., between Seventeenth and Eighteenth Sts., two-st'y dwell., 16' x 30'; George Rowe, owner and builder.

Preston St., near Hutton, three-st'y dwell., 16' x 40'; contractor, J. Longacre.

Edgemont St., near Lehigh Ave., two-st'y menagerie, 50' x 102'; contractor, J. Culbertson.

Wallace St., No. 1728, four-st'y dwell., 20' x 30'; contractor, W. Wiley.

Washington St., between Twenty-Third and Twenty-Fourth Sts., 3 machine shops, 65' x 112'; contractor, Hugh Kennedy.

Fifty-Seventh, cor. Market St., three-st'y dwell., 32' x 44'; owner and builder, Peter Hasan.

Cedar Lane, cor. Locust Ave., two-st'y stable, 38' x 48'; contractor, I. W. Wright.

Meadow St., near Paul St., 2 two-st'y dwells., 14' x 40'; contractor, E. K. Welsh.

Richmond St., No. 145, two-st'y stable, 14' x 29'; contractor, E. K. Welsh.

Wood St., between Twenty-Second and Twenty-Third Sts., three-st'y foundry, 20' x 100'; contractor, John Mahoney.

Shunk St., near Wecacoe Ave., two-st'y salt works, 88' x 228'; owners, "Pennsylvania Salt Works."

Palethorpe St., No. 1332, three-st'y dwell., 16' x 30'; contractor, Frank Gilbert.

South Broad St., No. 1023, two-st'y saloon building, 16' x 60'; contractor, John S. Benson.

Carlisle St., near Columbia Ave., 8 two-st'y dwells., 15' x 30'; contractor, John S. Pattison.

Thirty-First St., near Wharton St., 7 three-st'y dwells., 16' x 46'; owners, Harbert, Rupell & Co.

St. Louis.

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

Owners' Name.	Use.	Str'ts	Rms.	Cost.
Wm. Schaumleffel,	Dwell.	2	6	$3,600
Chas. Schumaker,	Dwell.	3	10	4,300
Mrs. L. V. S. Ames,	Dwell.	2	11	5,500
A. Todd,	Factory.	3	5	10,000
J. F. Yeager,	Dwell.	2	6	3,000
Sterling & Webster,	Offices.	5	6	9,000
Henry Springmeyer,	Dwell.	2	18	3,200
H. L. Raukin,	Dwell.	2	18	4,500
T. Toben,	Dwell.	2	6	3,000

General Notes.

Bordentown, N. Y. — On September 19, the corner-stone of Mount Zion African Methodist Church was laid.

Deerfield, Mass. — E. J. Everett will build, during the winter, a $10,000 hotel upon the site of the Pocumptuck House, burned in 1876.

Garrisons, N. Y. — It is proposed to build a stone Methodist church. Mr. George E. Harney of N.Y. is preparing plans, which are in the Gothic style.

Greenfield, Mass. — Work on the new union passenger station is progressing rapidly, the foundation being nearly completed. The station is to be just the size of the one built in North Adams by the State, last year.

Jamaica Plains, Mass. — Mr. John A. Fox is the architect of a house for Dr. E. P. Gerry; Mr. W. S. Mitchell, contractor. The house measures 35' x 35' 4", two stories high, with hip roof.

Marlboro', Mass. — Until Monday, Oct. 4, instructions as to building a new school-house to seat five hundred pupils can be obtained of R. D. Pratt.

Monson, Mass. — Mrs. Chalmers Dale has given the town $25,000 for a granite building, for a public library, in memory of Horatio Lyon, her father, and his widow gives $20,000 for an endowment fund.

Montreal, Can. — The governor-general laid the corner-stone of the Peter Redpath Museum, Sept 21.

New Rochelle, N. Y. — A frame house is being built for Mr. N. Edgar, from designs of Mr. George E. Harney, of New York; cost, about $10,000.

New Windsor, N. Y. — Mr. George E. Harney, of New York, is drawing plans for a house for Mr. A. H. Havemeyer.

Newton, Mass. — The cost of the Channing Church will be $65,000. Mr. George F. Meacham, architect.

Philadelphia, Pa. — Messrs. John T. Bailey & Co. are putting an addition to their manufactory on Otsego St. The new building is 55' x 320', three stories high.

Streator, Ill. — Mr. F. S. Allen, architect, has in hand the following work:

Wilson Block; cost $6,000.
Streator Glass Works; cost $20,000.
High School House; cost $35,000.
Two stores for Dr. Evens; cost $3,000 each.
Store for Messrs. Arthur Brothers; cost $4,000.
Store for Mr. W. H. Pilcher; cost $5,000.
House for Frederick Benkendolf; cost $3,200
Six tenement cottages for himself at a cost of $440 each. These are built in accordance with a copyrighted plan.

San Francisco, Cal. — Mr. Clenton Day, architect, is building for the Marine estate a three-story brick building on California St. at a cost of $28,500. Cox and Hall are the contractors.

A three-story frame store is building for Charles Scroth, on the corner of Geary St. and Martha Pl; cost $12,000; architect, John Marquis; contractor, S. S. Emorey.

Mr. Marquis is building for the same owner at the corner of Stockton and Morton Sts. a four-story brick building which will cost $45,000.

Stockton, Cal. — Messrs. Percey & Hamilton, are the architects of the brick building which the state is building on the asylum grounds at a cost of $66,450; contractors, Terrill & Slaven.

San Francisco, Cal. — The Chief Engineer of the Harbor Commissioners has been instructed by the Board to superintend the construction of a suitable building for offices and a pier on the westerly line of Powell St., at its junction with the sea-wall, for use of the United States Government.

Salisbury, Md. — Mr. Wm. H. Jackson, is about to build a house, 50' x 75', two stories; cost, $10,000; Mr. Jackson C. Gott, architect.

Turners Falls, Mass. — Hitchcock & Farnsworth will build the new Congregational Church.

West Medford, Mass. — On the 22d ult., ground was broken for a residence for G. H. Morgan, Esq.; cost, $5,000; architect, C. J. Bateman, of Boston.

Bids and Contracts.

Baltimore, Md. — Contracts were awarded, Sept. 25, by the city authorities, to H. A. Ramsay, for the construction of the superstructure of Chase St. bridge, at $30,936, and Pratt St. bridge at $28,498.

Boston, Mass. — The committee on public buildings has awarded the contract for building the new primary school-house on Seventh Street, South Boston, to James Fagan for $28,000. McGaragle & Co., were awarded the contract for doing the carpenter work for $10,985.

Industrial.

Allentown, Pa. — The contract for building the new factory for the Adelaide Silk Factory has been awarded to Thomas W. Snyder. The building, four stories in height, will be built of brick at a cost of $50,000. The architects are A. Derrom, Jr., & Co.

Cleveland, O. — The Brush Electric Light Company are building large works on the corner of Wason and McHenry Sts., L-shape, 265' x 300', one-story, 17 feet in the clear; cost, $35,000; Wm. Wright, of Newburg, N. Y., contractor; Blackburn & Charlotte, architects.

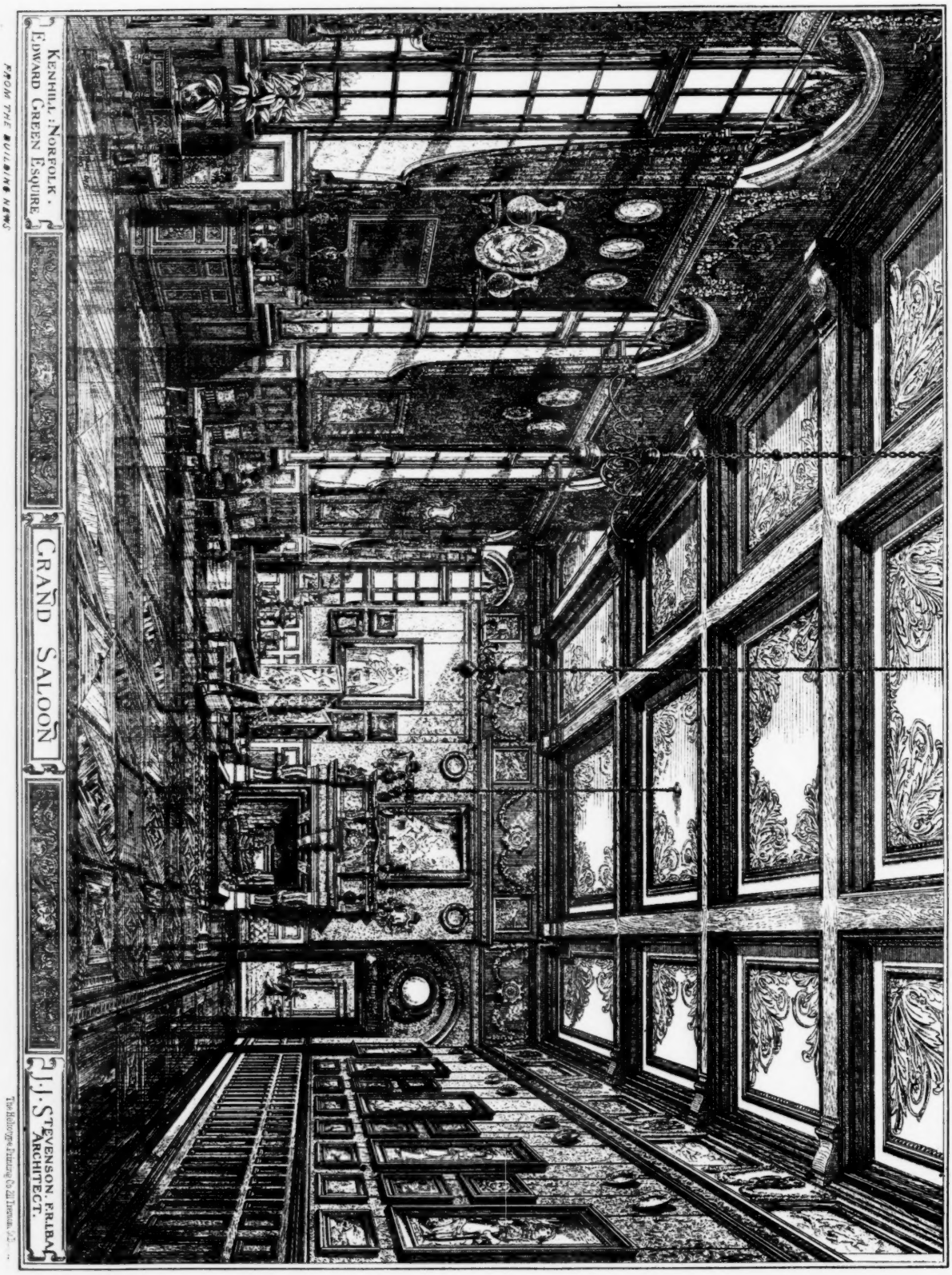
Chisholm Steel Shovel Co. are building large works on Case Ave., of brick and stone, three stories, 100' x 300'; cost, $35,000; Blackburn & Charlotte, architects.

Cleveland Stove Works are building a large brick building on the corner of Main and Winslow Sts.

The Powel Tool Co. are building large works on Elm St. They are also rebuilding their old works, recently destroyed by fire; Jno. S. Watterson, contractor.

Lowell, Mass. — The Wamesit Power Company of Lowell, are building an addition to their weaving building 150 by 62 feet, with a dye-house 30 by 40 feet.

Texas — At the East Texas Penitentiary are to be built a number of manufactories. The first shop to be built is a cotton factory, which is now going up. This building is 200 feet long by 55 feet wide, and two stories high, each one being 11 feet from floor to ceiling. This building will contain 85 large windows. Beyond this is to be a wool factory 200' x 45'. Then comes a furniture and wagon shop. This building is of the same size as the wool factory, 200' x 45'.



KENHILL: NORFOLK.
EDWARD GREEN ESQUIRE.

GRAND SALOON

J. J. STEVENSON. F.R.I.B.A.
ARCHITECT.

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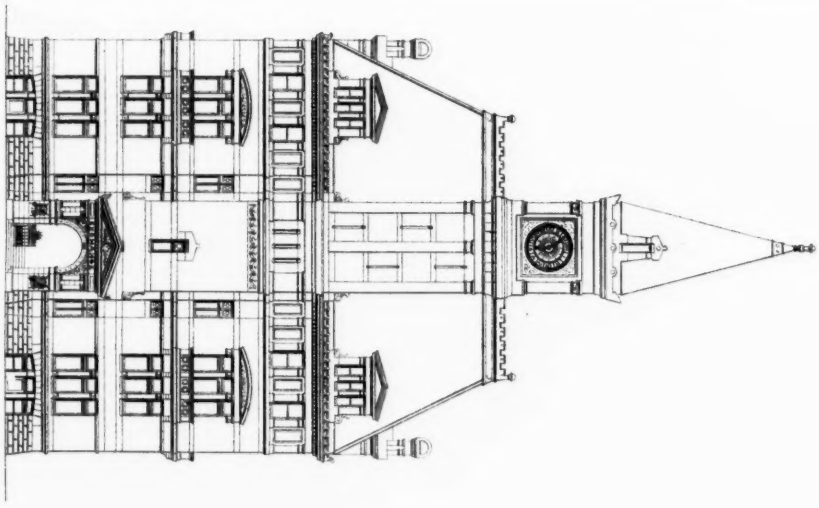
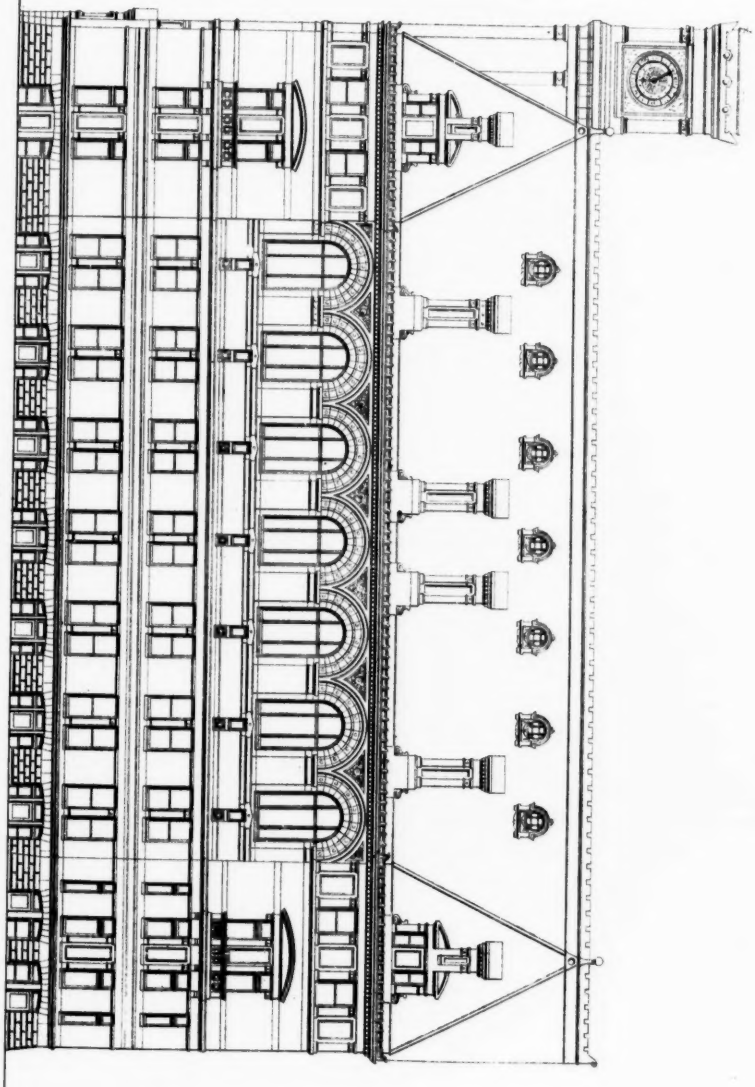
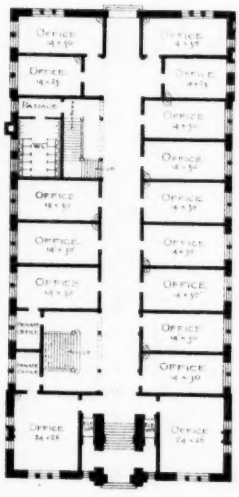
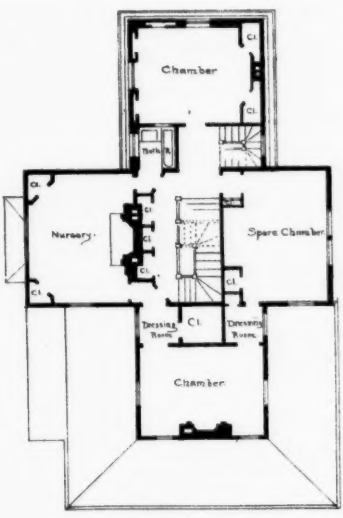






FIRST STORY.

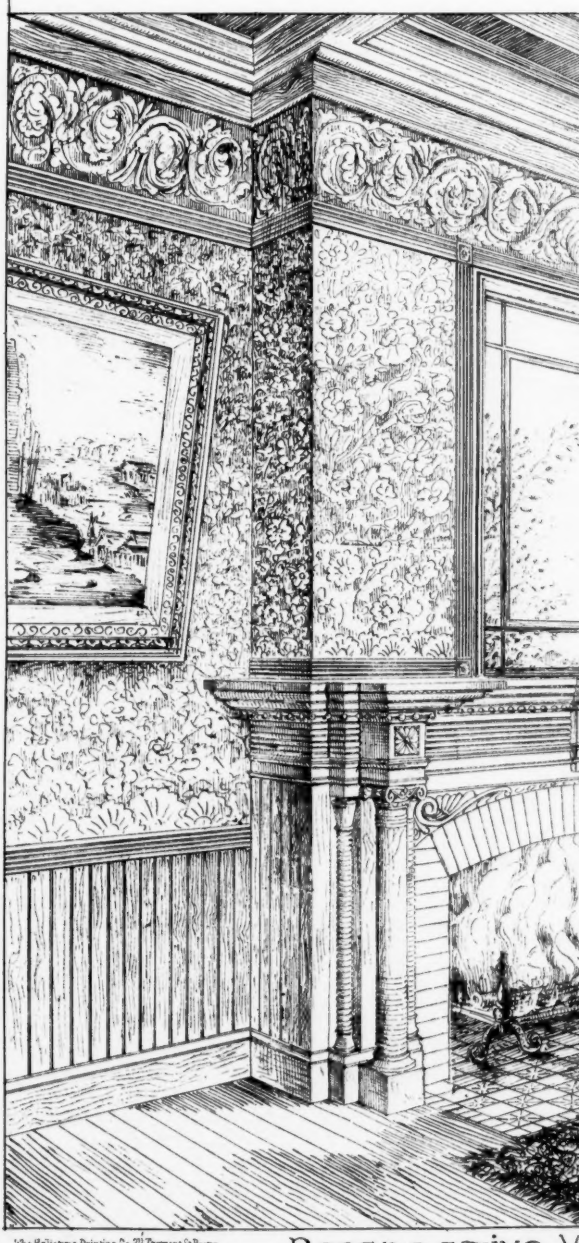
THIRD STORY.



Plan of 2nd Floor.

Section through Roof.

Plan of 1st Floor.



The Heliotype Printing Co. 211 Tremont St. Boston.

Perspective V

Drawn by T. O'Grady Jr.

rough

Front Elevation.

Section through Dormer.

Plan.

·Detail of Dormer Windows·

·Detail of Ventilator·

Side

Front

Section

Section.

Section

House

Chas.

G.R.&

e View in Sitting Room·

Elevation.

Plan.

Dormer Windows.

Section through Dormer.

View of Well House.

Section through Roof.

Front Elevation

Detail of Dormer Windows.

Plan

Section.

Detail of Dining Room Mantle

Section.

Front Elevation.

Side Elevation.

Plan.

Section at A

Section at B

Section at C

Section at D

Section at E

Sitting Room Chimney Sta

containing Sitting Room & Front Cham

Detail of Front Chamber Mantle.

Section

Front Elevation.

Side Elevation

Plan.

Detail of Piazza Roof.

Section through head of Library Window

House at Milton

for

Chas. G. White Esq.

C.R. & R.G. Shaw. Architects.

Scale of Drawings.

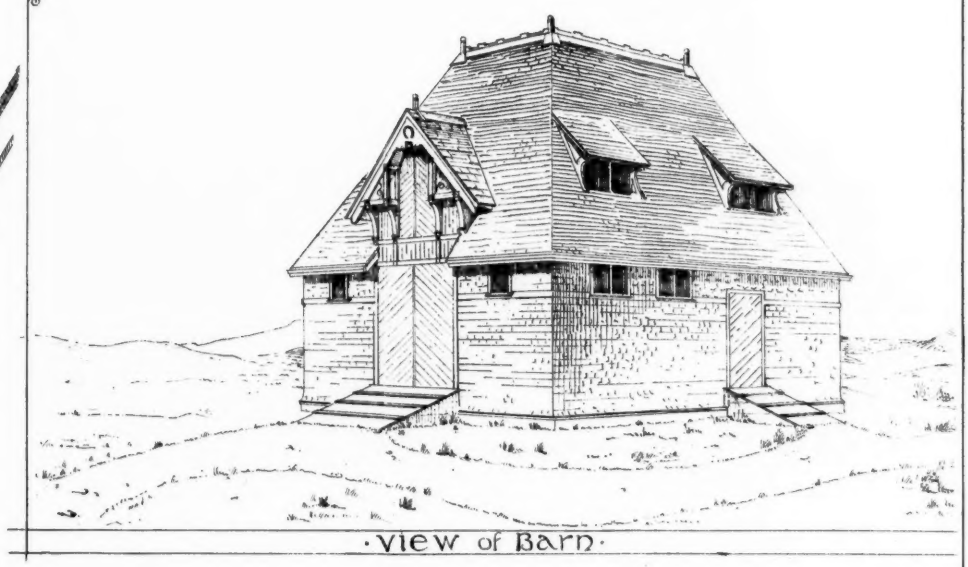
Plans.

Details.

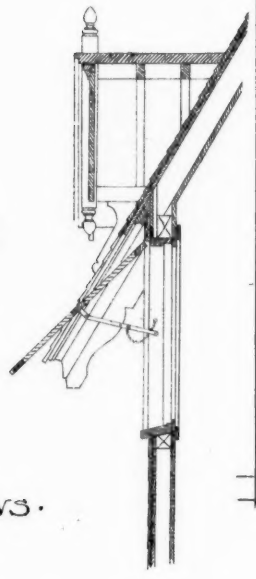
Section.

Front.

Detail of Cresting.



·View of Barn·



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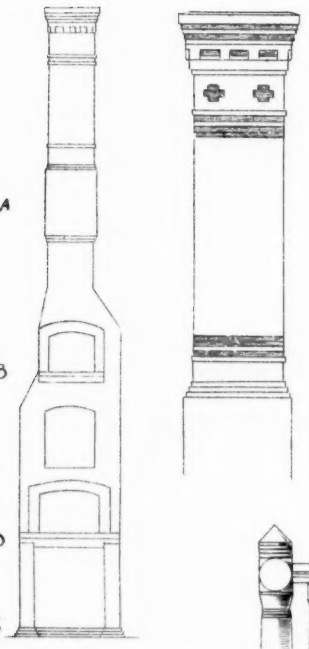
Section through Dormer.



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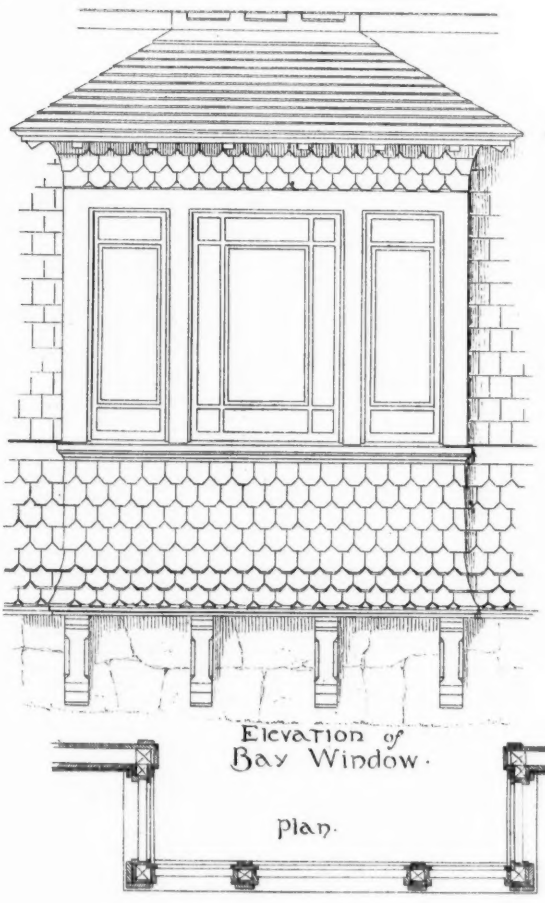
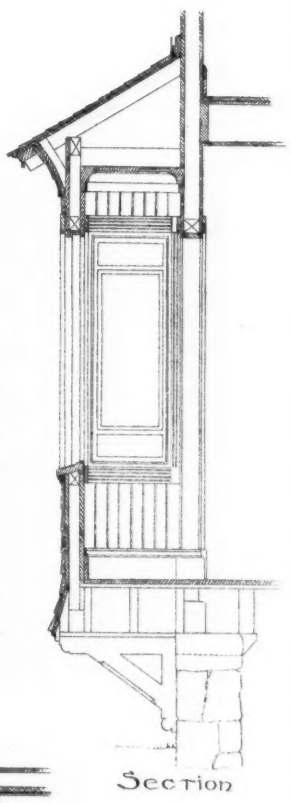
Front Chamber Flues

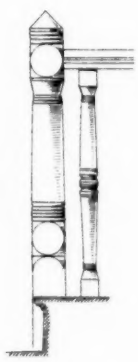


Elevation of
Bay Window·

Plan·



Section



Detail of Newel·

Bay Window Detail·

ry Window·

nt·

g·

·View of House·