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THE New York Commissioner of Public Works has been drawn into a little difference of opinion with the Comptroller on the subject of compelling householders who take the Croton Water to use meters, and pay for what they consume according to its actual amount. The Commissioner is strongly impressed with the necessity for adopting some device to prevent the enormous waste of water which now threatens the most important interests in the city, and as the greater part of this waste is acknowledged to occur in private houses, it certainly seems desirable that the most efficient method of preventing it should be applied there, and Mr. Thompson, in order to do so with some degree of thoroughness, asks for an appropriation of two hundred and fifty thousand dollars for the next year, to enable him to use such appliances and methods for preventing waste as his professional advisers believe to be most efficient. The Board of Apportionment, which makes the appropriation of the tax levy, consists of the Mayor, the President of the Board of Aldermen, the President of the Tax Commissioners, and the Comptroller. Of these it is said that the three former were in favor of granting an appropriation of fifty thousand dollars, in place of the two hundred and fifty thousand asked for by the Commissioner, but Mr. Campbell, the Comptroller, whose opinion is entitled to the more weight as he was himself for five years Commissioner of Public Works, maintained that there was no immediate necessity for expending even one-fifth of the sum proposed by Mr. Thompson, and advised that the appropriation should be reduced to five thousand dollars, which was accordingly done. Although, knowing as we do the salutary effect which has followed the restrictions placed upon the waste of water in some towns in England, we cannot help sympathizing with the wishes of the Commissioner of Public Works, the Comptroller is justified in regarding the sum necessary to put in practice an efficient system as too large a one to be expended without mature consideration. The cost of the present styles of water-meters is so considerable as to restrict their use very materially, and city officials do well to hesitate before imposing even a comparatively light burden upon small consumers, or upon the tax-payers. The best solution of the difficulty would be the invention of a very cheap and simple water-meter; and we commend the problem to all ingenious persons.

THE Boston Manufacturers' Mutual Fire Insurance Company has sent to its members a second circular on the subject of electric lighting, which, as is usually the case with the documents issued by this company affords some valuable suggestions to all who are interested in the construction or maintenance of buildings. To the use of the electric-light itself the directors of the company make no opposition; on the contrary, the circular expresses their confidence in the safety of the arc-light "rightly put up and adjusted within the limits of a mill-yard under the control of the manager;" but they advise their policy holders "not to allow any public telegraph, telephone or electric-light wires to be attached to their buildings, or to be so placed in or across their mill-yards as to expose their property to the possible danger of the diversion of a current of a *public* electric arc-light wire outside their own control, except such wires as are needed for their own use in connection with the general service." Concerning telegraph and telephone instruments, the circular advises that they should be placed upon a base of glass, marble or other insulating and incombustible material, so disposed as to catch the drops of metal melted by an accidental overcharge, and suggests that, as its agents have frequently observed marks of scorching or burning of wood-work around the switches by which electric currents are turned on and off, such switch-boards should be made of terra-cotta, porcelain or glass; to which we might add some of the finer-grained concretes, and perhaps plaster-of-Paris, prepared in a spongy condition. It is the opinion of the writers of the circular that the responsible electric-light companies are using their utmost efforts "to maintain all the conditions of safety both in respect to public and private wires," and they warn their readers against dealing with irresponsible parties.

A BRICK building, completed only about six weeks ago, and just occupied by its tenants, fell in St. Louis last week, destroying about one-half of it completely, and burying seventy thousand dollars' worth of goods in the ruins. The structure was five stories high, forty-three feet wide, and one hundred and fifty-eight feet deep. The walls are said, in the Associated Press report, to have been twenty-two inches thick, and the cause of the fall is pronounced to be "a complete mystery." We will venture to assert that however "mysterious" the collapse may have been, it took place in accordance with the usual laws of statics and resistance of materials, about which there is nothing inscrutable or even difficult of comprehension. Without knowing more about the circumstances, it is impossible to hazard anything more than a guess at the origin of the catastrophe, but it has the air of being the result of insufficient tying of the walls, whose thickness was insufficient for so great a length and height, unless supported by cross-walls or by very thorough anchorage.

THE city of Pueblo, Colorado, has been visited with a catastrophe somewhat resembling those which have distinguished its sister town of Denver: the front of a two-story brick store, forty-eight feet wide, having fallen into the street, just as the roof was ready to set in position, the rest of the structure remaining intact. The architects, warned, perhaps, by the result of the Denver investigation, at once called in the assistance of experts, inviting them to make an impartial report, which was promptly done. The report pronounced the brickwork of the building to be bad, the bricks of inferior quality, laid dry, and so carelessly that there appeared to be no adherence between the bricks and the mortar. Each of the two middle piers, built as described, supported a weight of eleven tons, and the opinion of the experts was that the failure began at this point. The plans and specifications were also examined, and pronounced good, and sufficient, if faithfully carried out, to have produced a building of the requisite strength. Whether the responsibility of the architects ceased with this we do not know, but it so often happens in similar cases that plans intended to be executed with good materials and workmanship are taken out of the architects' hands, and carried out in the cheapest possible way, perhaps with ignorant emendations, that we shall be quite prepared to find them exonerated from all blame.

THE celebrated case of the United States Government against De Morgan was decided in the United States District Court last week. This was a suit of the Custom-house authorities against Mr. De Morgan to recover eight hundred dollars of duties levied upon a collection of statuary, vases and other antiquities imported into New York in 1879. The statute relating to such imports is in two sections: the first providing that "cabinets of coins, medals and all other antiquities shall be admitted free of duty;" while the second says that "all collections of antiquities specially imported and not for sale shall be free of duty." Mr. De Morgan refused to pay the import, and the curiosities were reshipped to Montreal, but were subsequently brought back to New York and exhibited at Mr. Feuardent's rooms, labelled "Not for Sale." This notice was

sufficient to prevent open molestation by the Custom-house officers, who could not then claim the payment of duties under either sections of the law; but after vigilant watching they discovered that four of the pieces had been sold to a Director of the Metropolitan Museum of Art, and immediately seized the whole collection. On the trial the inconsistency between the two sections of the Statute was clearly shown, the collector of customs being in the right according to the second section, and Mr. De Morgan, according to the first. The Court decided that the first clause only applied to the case, the second being superfluous, and Mr. De Morgan's treasures are to be restored to him.

The promoters of elevated railroads in Boston seem to have been reduced by repeated rebuffs to a state of exemplary humility and submissiveness. The last petition presented to the Legislature of the State in relation to the subject was from Captain Meigs, the inventor of the single-rail system, who finds it hopeless to try to persuade the committee on elevated roads to give him any countenance, and therefore asks of the Legislature itself the privilege, — not of occupying the streets of the city with his tracks, but of building at his own expense, in some secluded corner of the State, an experimental road, which the people of Boston can come and look at if they wish, and at some future time decide whether they will extend their clemency so far as to permit him to petition again for leave to erect a similar one in their city. The modesty of this request seems to have produced a favorable impression on the Great and General Court, and Captain Meigs was accorded further time to prepare his bill for acceptance or rejection.

The Boston *Herald*, a sober and impartial journal, speaks in terms of disapprobation concerning the insincerity which seems to characterize the proceedings of the Panama Canal Company in relation to its stockholders. According to its information, the periodical published in Paris in the interest of the canal scheme has from time to time printed statements which would convey the idea that excavation was rapidly going on, while the Panama *Star and Herald*, a long-established and well-known newspaper, printed on the spot, affirms that up to this time the first shovelful of earth for the canal has yet to be dug. This assertion, joined to the unanimous testimony of the Panama correspondents of the New York journals, must be taken as strong evidence of the difficulties under which the enterprise is laboring. It is said by a writer in the New York *World* that the King of the Belgians, who is a large stockholder, sent out a private messenger to obtain information as to his investment, and it is not unlikely that others may before long find it wise to follow his example. Panama is not, like Suez, a village in the desert, but a large city, containing, if we are not mistaken, something like a hundred and fifteen thousand inhabitants; and it cannot be very difficult to ascertain the truth in regard to such important operations as are now in progress there.

Professor Sargent, the special agent of the Census Bureau in charge of forestry statistics, has collected very many valuable data upon the timber supply of the country, and publishes a few of them which should engage the attention of the whole country. To show the probable duration of the timber in the several States, Professor Sargent has prepared maps indicating the present extent of the wooded region, as well as the district denuded of its wood during the past twelve-month. Estimating in feet, the easiest mode of making effective comparisons, he shows that in Michigan there remains about thirty-five billion feet of pine lumber untouched. Last year, in the same State, four billion four hundred and ninety-seven million feet, or nearly *one-seventh* of the whole present timber resources of the State, were cut and sold. In Wisconsin about one-twentieth of the remaining stock was cut during the same time. Texas, Mississippi and Alabama still retain their pine growth nearly unimpaired, but cutting is increasing in those States every year, and their total present timber resources are now but one-half larger than the remnant of those in Michigan and Wisconsin. Florida and Minnesota each contain a little pine timber, but there is not enough in either State to supply the sawmills of Wisconsin and Michigan for a single year. Evidently, the time when pine will be a rare and costly wood is rapidly drawing near. The market already shows signs of fears for the future, and they are certainly only too well founded.

The *Builder* makes some judicious criticisms upon the destruction by a recent storm of the great break-water in process of construction at Madras. This was an immense work, the estimated cost of which was nearly three million dollars, intended to protect the artificial port from the force of the enormous waves which roll upon the coast after the monsoons. The plan of the enclosure was a square, formed by two walls three thousand feet apart, and running out at right angles to the beach for the same distance, then turning and approaching each other, leaving between them an opening of four hundred and fifty feet to form an entrance to the harbor. The work was nearly completed, when a storm occurred of a character not unusually severe, but sufficiently violent to wash away, first the walls fronting the open sea, and then the others, until nearly half the structure was destroyed, allowing the surf to roll freely into the enclosure, where it dashed together and wrecked two small vessels, drowning their crews. The construction of the break-water was like that of several other engineering works of the same kind, consisting of a foundation of rubble stone, or fragments of hard marl, thrown loosely into the water, and forming an embankment, the top of which was levelled off, to receive a wall of concrete blocks, twenty-four feet thick and of the same height.

The formation of this wall is condemned by the *Builder* for reasons which every one experienced in masonry will, we think, approve. The blocks, weighing twenty-seven tons each, were twelve feet long, eight feet wide, and four and one-half feet thick. Each block was formed in a mould on shore, and when hard enough carried to the end of the break-water and deposited on its edge, sloping slightly toward the shore. Two blocks thus formed the width of the wall, and three, one above another, formed the height. They were simply laid side by side, without any kind of bond, forming practically, not one wall, but two parallel walls, each twelve feet thick, and independent of each other. The absence of any longitudinal bond among the blocks also made it possible for any disturbing force to act upon them separately, instead of having to overcome the united resistance of a number, combined by the effect of their friction upon each other; and the structure had, in comparison with a well bonded mass, the same force which a pile of bricks laid end to end on edge would have relatively to a good sixteen-inch wall. Such bonding as is considered indispensable in a wall above ground is still more desirable in one exposed to the violent impulse of water, which exerts a tenfold power by its property of acting in all directions at once, lifting a block from its place at the same instant and with the same force with which it drives it forward; and in the case of a submerged wall with a continuous joint through the middle exercising its destructive energy upon both portions with the same blow, while encountering the resistance of one only. There seems to be no serious obstacle to the deposition even of such blocks as were used in this case so as to form a perfect bond, especially when it is considered that concrete being only twice as heavy as water, the weight to be managed would be reduced to thirteen and a half tons as soon as the block was submerged; and a wall so built might be well grouted by means of appliances familiar to engineers, and thus rendered doubly secure, not so much by the cementing action of the mortar as by its effect in excluding water from the joints, and thus guarding against the potent splitting effect which it exercises upon them when impressed with an external force.

A composition is described in the *Scientific American* which is said to have the property of preventing and destroying dry-rot in timber. In its most efficient form, the preparation consists of a solution of silica, common salt, and boracic acid, which is applied with a brush to the surface of timbers, or to walls infected, as cellar walls often are, with the dry-rot contagion. As silica is, under ordinary circumstances, insoluble in water, we presume that it is necessary to dissolve it at first in the form of silicate of soda, a water-glass, converting the soda subsequently into salt by the addition of hydrochloric acid, which leaves the silica in the form of a hydrated jelly, to which the boracic acid can easily be added. The second form of "antimenilion," as the compound is called, consists of infusorial silica, an extremely fine powder, mixed with twenty per cent of ground boracic acid, which is scattered about the moist or damp places where dry-rot is feared. With a smaller proportion of boracic acid, the dry powder is cheaper, but less efficient in its action.

BUILDING SUPERINTENDENCE.—XV.

THERE are innumerable points about the finishing of a dwelling-house which, though trifling in themselves, count for a great deal in the impression which the completed structure will produce upon the owner and his friends, and the architect or superintendent will do well to go thoroughly and repeatedly over the building during the finishing, and make sure that every visible detail is satisfactory before the contractor leaves it.

Detailed Inspections.

First among the points to be examined is the hanging of the windows. The sashes vary considerably in weight, and unless each one is accurately balanced, which takes both time and care, the sash will not stay in place. The sash-fasts may also be badly set, so that they will not lock, and nothing short of an actual trial of each sash of every window will serve to make sure that all are as they should be. Door locks and knobs are also very carelessly applied, and there are few houses where all of them work perfectly. The striking-plate, particularly, is apt to be set too high, or too low, or too far into the rebate, so that either the latch or the bolt will not enter the mortise intended for it; while the "roses," or round plates, screwed upon the opposite sides of the door, in which the stems of the knobs move, are rarely placed exactly opposite each other, so that the spindle, instead of being perpendicular to the door, is forced into an oblique direction, causing the knobs to bind and stick in turning (Fig. 172). The knobs, again, are generally put on without inserting the proper number of the thin washers which slip over the spindle for the purpose of filling out the space between the lock and the knobs on each side, and the latter are left loose in consequence, sliding in and out with the touch of the hand in an annoying way. Many architects call in their specifications for "swivel spindles," with which the turning of the knob on one side of the door does not affect that on the other side; but except for those front doors which have an arrangement for locking the outside knob separately, the swivel is hardly necessary.

Balancing of Sashes.

Sash-Fasts.

Door Furniture.

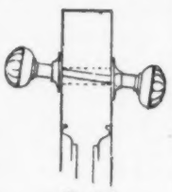


Fig. 172.

Swivel Spindles.

Chair-rails, picture-mouldings, wooden cornices, and other finish of the same kind will often be applied with the utmost carelessness. Nothing is more common than to see such horizontal mouldings varying very much from their correct position, the workman having put them on by what he would have called "his eye," instead of measuring at short intervals the proper distance from the floor or ceiling.

Chair-Rails, etc.

The young architect or superintendent should train himself to quick observation of all these points. Any defects are sure to be discovered sooner or later by the owner, to the discredit of the one whose business it was to look out for and correct them at the proper season.

An Eye for Defects.

The character of the hardware about a building is also of much importance. The variety of patterns and qualities of locks, knobs, pulls, bolts, hooks, hinges, sash-fasts, and so on, is so great that nothing but a thorough familiarity with the different kinds, and a minutely detailed specification, will protect the architect or superintendent from being occasionally compelled to accept fittings which he does not like, but which the indefinite character of the specification precludes him from rejecting as not in accordance with the contract.

Hardware.

The locks form a very important part of a building. Those used in good houses are generally mortise locks, inserted into a mortise cut in the edge of the door. The centre of the knob should be exactly three feet above the finished floor, and the mortise for the lock, in inside doors, will extend one inch above and three inches below this point. For outside doors, the mortise is generally six inches high—two inches above and four inches below the centre of the knob. In designing the doors, the panelling should be so laid out that the lock-mortise will come beside a *panel*, and *not* opposite a rail of the framing; as, in the latter case, the mortise will cut off the tenon of the rail, weakening the door very badly. For want of attention to this point, young architects often find that doors, in whose elegantly-proportioned panels they take the greatest pride, have to be fitted with handles set either at an immoderate height from the floor, or ridiculously low, to avoid making them altogether unserviceable. This is particularly likely to be the case in copying doors of the last century, either out of books or from actual examples. These show invariably at the level of the knob a wide *rail* instead of a panel, but it must be remembered that mortise locks were not in use then, their place being supplied by rim locks, in which the working parts were enclosed in an iron or brass box, screwed to the outside of the door, a small hole only being bored through the door for the spindle of the knobs. Of course, the tenon not being in this case interfered with, there was no reason why the lock should not be screwed on next the rail, and as many of the ancient rim locks, or the latches which were substituted for them in inferior rooms, were longer than the width of the "style" at the edge of the door, it was an advantage to place it where it could extend back upon the framing. Occasionally, a modern version of the Colonial doors is seen with a mortise lock set opposite a very wide lock-rail; but this must be done by framing the latter with two tenons, far enough apart to give room for the mortise between them, and forms an arrangement not to be recommended.

Locks.

Proper position of Knobs.

Arrangement of Door Panels.

Colonial Doors.

For closet doors, a mortise latch is sometimes used, with either one or two knobs, but no lock or key. The case for this is only about 2¼ inches high, but such furnishings are only suitable for inferior houses, a closet which cannot be locked being as inconvenient as a door with a knob on only one side is mean in appearance. The hand-made locks are far superior to those made by machinery, and also much more costly; but some of the machine-made kinds serve well enough for ordinary purposes. Any good contractor or hardware dealer can furnish the names of the most reliable manufacturers, and the safest course for the young architect is to require a first-class make by name in his specifications. The manufacturers' catalogues will furnish him with all necessary information as to styles, and he should call for exactly what he wants so clearly that there may be no mistake as to his intention, finally assuring himself by inspection that the contract has been carried out.

Closet-Door Latch.

Reversible locks should be chosen, unless the architect is willing to see a door here and there hung on the wrong side to accommodate some carpenter who has selected his locks at random and finds himself short of the proper kind; and the character of the keys should be specified, or he may find a set of locks of tolerably good appearance accompanied by cast-iron keys, tinned or galvanized. For the inside doors of ordinary houses a mortise lock of P. & F. Corbin's make, for instance, with brass face and striking-plate, brass bolts and German silver or plated keys, does well enough. For the best rooms a "fancy" face, formed by grinding the brass in curling forms, may be used; or some expense may be saved by allowing the bolts to be of iron instead of brass. A cheaper lock still has an iron face, lacquered to imitate brass, but there is no real economy in using it.

Reversible Locks.

Keys.

It is hardly necessary to say that locks for interior doors are usually of the simplest construction, the wards of the key merely fitting stationary projections inside the box, which give no security against opening by a skeleton key or a piece of stout wire; but it is not required in such cases to provide against the operations of professional burglars. Such locks are commonly used in sets of twelve, the twelve keys differing from each other, but the complete sets being exactly alike, so that in a house with twenty-four doors there will be two keys of each pattern, which may, however, be distinguished by a difference in the finish, one set being bronzed and the other plated, for instance. For outside doors, which must occasionally be left without the security of bolts, "lever" or "tumbler" locks are needed, in which the interior construction is far more complex, and the security, as well as the cost, correspondingly greater. Many varieties of these locks are made, with and without night-latches, and inspection will furnish the best guide as to the arrangement desired. Some front-door locks are so arranged that the outside knob is permanently fixed, but the better ones are furnished with a movement by which it can be held firm, or released if it is desired to allow the door to be opened directly from the outside, without a key. Locks of either kind, of the common construction, are somewhat liable to have the latch become slow in working, so that a sharp bang is necessary to close the door. Age increases this fault, which is only partially cured by oiling, and a more satisfactory service can be had from the patent locks, in which the latch is in two or three parts, one, which projects in front, turning on a pivot, as it is drawn against the striking plate, and by the same motion drawing back the others, so that when the whole reaches its place, it slips out into its mortise without any friction of importance. Robinson's patent is the lock of this kind most used, but similar ones are perhaps made by other parties.

Lever Locks.

Patent Latches.

Care should be taken, if locks and knobs are procured from different makers, as will generally be the case, to have the hole for the spindle correspond with the actual size. Most locks can be had fitted to either ⅜ or ¼ inch spindles; and although ¼-inch is the size commonly used, there are many advantages in having the knobs mounted on ⅜ spindles, with or without swivels. What shall be the material of the knobs must depend upon circumstances. Brass, bronze, cast-iron, hard rubber, glass, porcelain, celluloid, wood, and various compositions of sawdust and glue, dried blood, glazed earthenware and other substances are used. Among these, dark bronze metal of good quality is the most satisfactory. The light bronze, even when good, is apt to tarnish in rooms not much used, and the soft, inferior bronze wears to a dirty yellow color which is very unpleasant. Moreover, there is in bronze hardware a much greater variety of patterns than in any other kind, and knobs, hinges, bolts, chain-bolts, sliding-door pulls, sash-fasts and other furnishings can be so selected as to match in color and general appearance throughout the building. There is however much difference in the execution and finish of the castings, and it is unsafe to trust to the drawings in the catalogues of unknown makers without seeing samples of the work.

Spindles.

Knobs.

Polished brass furniture, where it is fashionable, is very costly, and requires continual attention to keep it bright. Silver-plated

brass knobs soon lose their coating, and are becoming obsolete. Cast-iron is used for door-knobs only in a miserable imitation of bronze or brass. Hard rubber and celluloid make durable and pretty furniture for in-doors, but do not bear weathering well. Glass is a good material, and can be had in great variety: the old-fashioned cut octagonal knobs are the handsomest, but those pressed in various forms are serviceable. The blown-glass knobs, silvered inside, are fragile unless of very good make. Porcelain and the vitrified materials known as "mineral" and "lava" with "hematite" and some similar substances, are used for inferior rooms. Knobs of wood or its imitations are somewhat liable to become sticky from the softening of the varnish upon them. Whatever the kind used, the specification should not omit to mention a bell-pull for the front door to match the design of the other furniture; and should keep in mind also the sunk pulls for sliding doors, if there are any such.

Bell-Pull.

Bolts are necessary for all doors which need to be rendered tolerably secure against intrusion, and afford more protection than any lock. The neatest and most convenient are the Ives patent mortise bolts, which are set into a small auger-hole bored in the edge of the door, and show only a small key outside. Outside doors are frequently guarded by a chain-bolt, consisting of a strong ornamental chain, attached to the frame, or one leaf of a double door, which can be hooked into a slotted plate on the movable part of the door, and will allow the door to be unlocked and opened three or four inches, for conversation with a person outside, but prevents it from opening further until unhooked. This effectually resists the attempts of tramps to force their way past a servant into the house as soon as the door is unlocked, but as it can easily be dislodged from the outside by a wire, it should be used in addition to, and not as a substitute for, the ordinary bolt.

Bolts.

Chain-Bolts.

Sash-fasts of the ordinary kind are the least effectual of all domestic defences against the operations of burglars. By introducing the blade of a knife between the upper and lower sashes from the outside the lever can be easily pushed back and the window opened, and this is in fact the common mode of entrance for thieves. Of late years the necessity for preventing the movement of the lever from the outside has become so obvious that several devices, more or less perfect, are now in use for the purpose. The earliest form, still much used, has a spring catch with a thumb-piece attached to the inner plate, which, as the lever is swung around, is first pushed back and then springs out, holding it in place until it is again pushed back by the thumb. This is convenient, and reasonably secure, but after some years' wear the catch becomes rounded by friction, and the lever may sometimes be forced back over it from the outside by a strong pressure. An improvement on this is a self-locking sash-fast introduced by Hopkins & Dickinson of New York, in which the lever itself is hollow, and contains a spiral spring, acting upon a pin which moves within the lever and has a knob-shaped head projecting at the end. In locking the window, as soon as the lever is turned to its place, the interior pin springs into a hole made for it in the pivot, preventing any back movement until the pin is withdrawn by pulling on the knob. This sash-fast is still very popular, but is closely followed by a simpler and stronger device, the Morris sash-lock, in which the thumb-piece of the lever is movable, and on being turned to its place drops down into a notch made to receive it in the circumference of the plate which carries it. To open the lock from the inside nothing is necessary but to lift the thumb-piece from its notch and turn back the lever by a single motion; but to open it from the outside is impossible. Various styles of all sash-fasts are made, to correspond with bronze, silvered, or the cheaper kind of metal furniture.

Sash-Fasts.

Hopkins & Dickinson's Sash-Fast.

Morris Sash-Fast.

Hinges form the only other article of importance in the hardware dealer's order. Solid bronze metal, polished brass, silver plate, "Boston finish,"—a brown lacquer over iron, resembling bronze — black japanned iron, either plain, or with silver or bronze tips, and plain iron, are at the command of the architect. If solid bronze, brass, or silver plate are used, only the best quality, with steel bushings and steel washers should be used; as the softer metal wears out rapidly from the movement of the door. Iron, either japanned or Boston finish, for hard-wood doors, with tips either of the same or of solid bronze or plated, and plain for doors intended to be painted, forms on the whole the best material for ordinary dwelling-houses. Most houses are now fitted with "loose-joint" butts, which allow the door, after opening, to be lifted off and replaced without unscrewing the hinge. With heavy doors, however, there is danger of bending the projecting pin of the hinge during this operation, and it is better to require "loose pin" butts, in which the pin itself can be drawn out from the top and the door removed and replaced, with as much ease as in the other case, and greater safety. Young architects occasionally forget to proportion the size of the butts to the circumstances of their door-frames and architraves, and find, too late, that the doors of their best rooms cannot be swung back to the wall. Where the openings are finished with unusually thick mouldings, Gothic beads, or pilasters, the proper way is to make a horizontal section of the door, with its frame and finish, *including* bases or plinth blocks, and captials, if there are any; then add the extreme projection of the trim from the plane of the door to twice the thickness of the door, and deduct half an inch from the sum; the remainder will be the minimum width of butt which will hang the door securely and throw it clear of the mouldings. If the result does not correspond with a regular size of hinge, the nearest size larger should be specified. Butts are made of several widths to the same height, as 4″ x 4″, 4″ x 4½″, 4″ x 5″, 4″ x 6″, and so on; the dimensions being those of the hinge when opened flat.

Hinges.

Boston Finish.

Loose-Joint Butts.

Loose-Pin Butts.

Size of Butts required.

For the remaining small items, as coat-hooks, drawer-pulls, and the like, all that is necessary is to describe clearly in the specification what is wanted. In certain cases drawer-pulls must be of fancy styles, but for closets japanned iron is much the best material, and the simpler and smoother the pattern the better. Architects and builders often go to a small unnecessary expense in putting fancy cast-bronze or Boston finished pulls on their cases of drawers, which serve only to bruise and excoriate the fingers of those who handle them; and fit up rows of roughly-finished bronze metal hooks, whose edges quickly cut the material of clothes suspended from them, while the artistic knobs and curves with which they are adorned always prevent them from being as serviceable as the plain, strong triple hook of japanned cast-iron.

Small Items.

It is important that the young architect should inform himself as to the character and comparative cost of the various kinds of metallic house-furnishings, and describe distinctly what he requires in the specification, without resorting to the slovenly practice of specifying that the different articles shall cost a certain sum per dozen, or per set, or per gross. The actual expense of such goods to the contractor is a very different thing from the cost as set down in the price-lists, and to specify articles of a given price, instead of a given kind, is usually to oblige the owner to pay a large profit on goods which he might have obtained for the net value if they had been distinctly described.

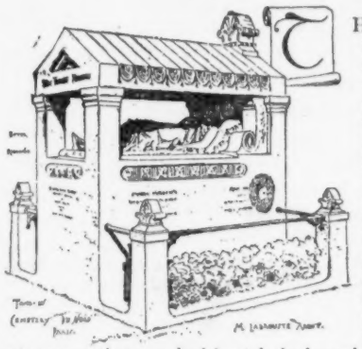
Fixing Prices.

If the architect has been wise enough to demand specific articles of hardware from manufacturers of good reputation, the duty of the superintendent will require little more of him than to see that the order is correctly filled, and that the fittings are properly put on. If, however, the specification is one of the kind that vaguely stipulates that such materials shall be "good," or "neat," or "worth two dollars per dozen," he must prepare himself for a rigid inspection of the goods furnished in accordance with it. The bronze hardware of all kinds may prove to be of soft yellow metal, with a thin bronze finish over it, or even of iron skilfully lacquered or bronzed; the brass faces of locks and bolts may be fictitious, consisting of iron, varnished with yellow lacquer, or brass-plated; the silvered-glass knobs may be of a substance so thin, or so carelessly blown, as to crush in an incautious hand, inflicting frightful wounds, or any kind may be so feebly secured to the metal shank as to come off altogether upon occasion, or the hinges may be destitute of washers, and will soon creak painfully. The cases of cheap mortise locks are often made, to economize material, so short as to bring the knob within an inch of the edge of the door, so that the hand is scraped against the rebate of the frame whenever the door is shut; or sometimes the width as well as the length of the case is reduced, and the knuckles come into painful contact with the key on turning the knob; while occasionally a lock is seen which allows the door to be opened by turning the knob one way only, instead of both ways. The screws furnished for putting on cheap hardware are also generally too small, so that the fixtures are insecurely fastened; and the worst workmen will increase this fault by their fashion of applying them, which consists in driving the screw nearly home with a heavy blow of the hammer, finishing with a turn or two of the screw-driver. Such men also generally show an exasperating indifference to the appearance of their own or other's work, putting on bronze metal or japanned fittings with plain iron screws, instead of blued iron or bronze, and using them of different sizes, or several sizes too large, if necessary to save themselves the trouble of going after suitable ones; screwing hinges, bolts, or plates at random on veneered doors, and if they fail to fit, removing them and screwing them on again somewhere else, leaving two or three sets of screw-holes yawning in the polished surface of the wood, or in a hundred other stupid and blundering ways defacing the building which they help, after their fashion, to complete. Continual vigilance is needed to discover and correct such faults, and the superintendent of a house which on delivery to its owner proves to have all its hardware perfect, well put on, and in good working order, has at least some qualities which particularly fit him for his profession.

Inspection of Hardware.

Burdette writes from Nantucket: "Many of the old houses in the town are shingled all the way over, reminding one of the houses so common in St. John. The shingler, when he shungle, apparently began at the base board, shongle right up the front of the house, over the cornice, up to the ridge pole, where he crawled over, went right along shingling, and shangle head first on down the other side of the house to the ground. Perhaps it was not done in this way. I do not assert that it was. I only say, and I say it very meekly, that that is the way it impressed me, and if any man says I a n a liar, I will take it back, right immediately, and admit that the shingles were pasted on with gum arabic or the white of egg."—*Exchange.*

BUILDERS' SCAFFOLDING. — I.



THE criminal ignorance and indifference of builders and architects are the obvious precursors of the oft-recurring catastrophes which insecure scaffolding occasions. The fact is patent that the scaffolding usually employed in many of the operations connected with building in this country, instead of being as it ought, a reasonably rigid, stable structure, not imperilling life, or limb, or property under the heaviest stresses that can legitimately be brought on it, is by the caprice, cupidity, or ignorance of the contractor generally of very inadequate strength, stability, and character, and does not in any degree provide for the extraordinary strains to which occasionally it may be incidentally subjected, owing to the carelessness or wilfulness of the constructors, or to other individual contingencies; there being in such cases no prospective provision, either in adequate scantlings of the materials, methods of secure fastenings and connections, or scientific arrangement of parts, which shall obviously be sufficient to insure a proper reserve of proportionate strength and stability.

Scaffolding is frequently so frail that even the innate consciousness of the uneducated workman recoils at the idea of such deathtraps being erected for his use, and occasionally he indignantly refuses to risk his life on a structure of such treacherous character, which is almost certain of destruction. On numerous occasions such scaffolding has been a fruitful source of serious fatal disasters, and minor building casualties are of daily occurrence which are usually explained away for the benefit of the contractor by the blind speculations of ignorance or by ingenious fanciful theories of the reckless mechanics interested, perhaps, in covering up the real cause, to which some of them by their carelessness may have been in some measure contributory; or if a too flagrant outrage be perpetrated to be thus frivolously explained away, an attempt is made to palliate the offence. Thus public alarm and indignation have been allayed by an exculpatory verdict mysteriously attributing the mishap to the all-shielding device, "accident," which, — in public estimation, — dispels the sin; whereby the guilty parties are unrighteously absolved from their criminal responsibility, and from deserved public censure, in which both builder and architect are not without their contributive measure of responsibility.

Notwithstanding that investigation into alleged causes often reveals conflicting fanciful theories of ignorant workmen, not justified by the facts of the case as interpreted by the unerring light of intelligently applied mechanical science, no effectual step appears to have yet been taken looking to the amelioration of the imperilling condition of the laws and customs of the various commonwealths in this regard, which, as it were, implied by sanction this dangerous exposure of innocent workmen — who by force of circumstance must take such work as offers, or starve — to possible fatalities, by allowing them to expose their lives on frail scaffolding without a definite authoritative, protective protest in the form of legislative enactment which shall specifically impose a rigid liability on builders, contractors, and architects who use scaffolding defective in materials, methods of construction, or manner of erection, and shall thus remove the necessity of recourse to costly and uncertain legal proceedings, which cannot ordinarily be undertaken by poor workmen or their dependents, in the face of the uncertainties and hopeless delays created by the too nice evasive distinctions of legal technicalities, the difficulties in most cases of procuring direct evidence to sustain the case, the proverbial unreliability of witnesses under the ingenuities of severe cross-examination, and the natural reluctance of employés to inculpate their employer by truthful evidence.

Such legislative provision would be a fitting counterpart of the Mechanics' Lien Law, which most of the States have established for the protection of the weak against the strong.

As some States have constituted boards of examiners of insecure and unsafe buildings or structures in the larger cities, it might be suggested that the powers and remedies invested in them be extended so as to include scaffolding.

The normal purpose of scaffolding is to form, by means of a convenient scientific assemblage of parts, a suitable temporary level platform around the walls of a building, inside or outside, or elsewhere as the case may be, which shall afford sufficient extent of floor-space, and stability, strength, and stiffness to support and accommodate with safety the workmen and the various materials, tools and apparatus which are required in the mechanical processes of constructing the essential parts of a building.

There are several varieties of scaffolding: —

1. Ledger scaffold, single and double faced. 2. Frame scaffold, of whole or square lumber, superimposed in stories as successive heights of the structure demands. 3. Adjustable, portable, upright scaffold. 4. Hanging scaffold. 5. Bracket scaffold. 6. Trestle scaffold. 7. Cantilever scaffold. All in more or less varieties of form, combination and structure adaptable to the special purposes of the respective artisans' work in different departments of building.

There are also stagings and false works of various kinds for a variety of purposes, which may be comprised under the general term scaffolding, as the same laws of mechanical science and the general principles of constructive devices and technical skill are in the abstract equally applicable to the various kinds employed, varying only according to the importance or degree of mechanical undertaking involved in its employment, and therefore these may with advantage be included in these papers as affording perhaps a wider range of interesting examples illustrative of the scientific principles and constructive devices and mechanical forces and resistances involved.

The essential requirements of all scaffolding are that while it shall be all that is desirable or attainable in an economical point of view, it shall also possess in a sufficient degree *strength*, so that in all its parts it is adapted to resist gravity strains of the intensity and direction which its use in any given condition of circumstances is liable to demand or may suggest, and also *stiffness* and *stability* to enable it to effectually resist oscillations and the attendant strains and rending forces and the resulting dangers from its unchecked transverse and lateral movements.

Like all superstructures, temporary as well as permanent, scaffolds in order to serve their purposes should have a sufficient foundation support to begin with — if an outside scaffold of great height, it should be seen to that the *pavement* be properly sleepered, so as to give sufficient area of bearing surface. The same attention should be given if the scaffold is *inside* and starts from a cellar-floor grade, or if resting on joists care should be taken to see that they are securely bridged and stay-lashed to prevent buckling sideways, also that they are free of large cross-limb knots, wind-shakes, cross or crooked grain, especially near the central third of the span, it being remembered that the nearer a defect is to the centre the less is the strength, and in like ratio is the stress produced by a load greater the nearer it is placed to the centre of a span, and the longer the joist is in proportion to depth the more liable it is to excessive deflection or to break down. A standard should not be set with its bare end on the ground or on a single joist, but should have a sill or sleeper laid across two or more joists, for a heavy weight may come upon a single standard which is not shared by adjacent standards. The footings and fastenings for longitudinal braces (either as ties or struts) should be secure, and particularly transverse bracing, which is seldom sufficiently attended to, should be firm and unyielding.

The normal purposes of scaffolds being defined and scientifically appreciated, the next requirement is to obtain a thorough understanding of the forces and stresses which their respective employments involve, their manner of action and the methods of estimating their varied intensities in the directions of their *compositions* and *resolutions*. This would naturally be followed by a practical consideration of the strength of adaptable materials of construction employed to resist the different kinds of strain (as tensile, compressile, shearing, etc.), which their positions in a structure involve. Then as all of these elements become known we arrive at a point where we are prepared to consider what should be the guiding conditions and elements of design.

The essential conditions of the normal employment of scaffolding in any of its various forms and purposes, being safety to life, limb, and property, these are therefore properly conceded to be prime factors in determining the proper manner of its construction and erection, whilst its necessarily temporary nature, which inevitably leads to a corresponding temporary character of construction, demands the very simplest constructive devices that will insure efficiency so as to effect the utmost economy in expense. This is therefore the natural as well as really economical order and sequence into which the premises wisely resolve themselves to control the designs for scaffoldings, but taken in the usual reverse order of appreciation and importance they become somewhat antagonistic conditions to a strictly economical solution of the problem. The difficulty of attaining a reconciliation of these elements of disparity is increased by the unwise and selfish attitude of the public towards contractors in abusing and degrading the competitive system of bidding for jobs, so that it has ultimately recoiled against the public weal in an unwelcome train of moral and material calamities.

The mechanical problems involved in scaffold-building are such that they demand that the design should provide for adequate strength and stability, and desirable economy, convenience, and despatch in its construction, erection, and removal. Its temporary purpose and character, and its occasional liability to severe, though often momentary, impulsive strains, make it the more imperative that the design for simplicity and rapidity of construction should be all that scientific attainments and mechanical ingenuity can accomplish. With this end in view, several devices have been proposed and patented, each having a leading principle of employment to subserve, and hence a more or less limited application; and as they usually involve a large first-cost, though intended to be durable, they do not appear to be generally favored by contractors.

In order to determine any special design of scaffolding, we must assign a certain maximum amount of strains which it shall safely resist; and with a view to economy in the design, it is not expedient to have one general design that shall be strong enough for the largest building, but which may be largely in excess of what is required for a small building, thus entailing a consequent waste of

materials. It is therefore in the direction of effecting economy that we suggest some such classification of scaffolds as the following, according to a certain scale of increasing stresses involved, and which will, we hope, facilitate the consideration of the subject in a simplified manner.

By design is here comprised not only the proper scientific arrangement and convenient disposition of component parts, but also adequate scantlings of the materials employed, as well as adequate methods of joinings, connections, etc.

1st, for ordinary stories up to 15′ high (or 3 scaffolds in height).
2d, for one and two " 25′ " " 5 " "
3d, " two " three " 45′ "
4th, " four " 60′ "
5th, " five " six " 75′ "
7th, " above six " special.

Note.—The heights are between floor-joists, or without having support of intervening floor-joists in the whole height of either class of uprights.

The several component parts of each class of scaffold are to be adapted to resist the intensity of strains suggested by the maximum forces to be imposed. The variations of stress will apply principally to the increase of stresses due to increase of height, and will affect the scantlings of uprights and braces, both longitudinal and transverse, and will require also a corresponding increase of strength of joints and connections of parts.

The weights which may come upon a common scaffold (without having any side runs) for ordinary brick-walling, may occasionally amount (including the added weight of scaffolding itself) to 250 lbs. per lineal foot, considering the load to be uniformly distributed over the scaffold; but as cut-stone trimmings, iron bed-plates, etc., bricklayers, hodcarriers, and incidentals may at times be crowded into one place (say 6 feet run of the scaffold), an extra loading of 2,100 lbs., or 350 lbs. per foot run, may in addition to the distributed load be crowded on any part of the scaffold, thus making a total loading of $250 + 350 = 600$ lbs. of dead and moving load per foot run of scaffold. A live load is usually estimated to have double the static effect of a dead load of the same weight, but as the wall carries half of this load, then $\frac{250}{2} + 350 = 475$ lbs., which is therefore the ultimate loading liable to be sustained by uprights in single-faced scaffolds.

To illustrate the application of the stress produced by such a loading upon the uprights or standards: suppose a scaffold with fifteen-feet long uprights of 4″ x 4″ cross section, without having any transverse bracing at any mean point in height. The ratio of least breadth to length or height is $\frac{180 \text{ ins.}}{4 \text{ ins.}} = 45$ diameters, and 45 squared $= 2025$, which being substituted for $(\frac{l \text{ ins.}}{b \text{ ins.}})^2$, and $4'' \times 4'' = 16$ sq. ins., being substituted for sectional area in following formula, viz.:

Breaking weight in pounds per square inch $=$

$$\frac{\text{Sectional area} \times 4800 \text{ lbs.}}{1 + (\frac{l \text{ ins. sqd.}}{b \text{ ins. sqd.}} \times .003)}, \text{ it becomes } \frac{16'' \times 4800 \text{ lbs.}}{1 + (2025 \times .003)} = \frac{76800.}{5.83975} =$$

13151 lbs., or 822 lbs. per square inch.[1]

With what is improperly called a *safety factor* of 4, which means one-fourth of the weight which would crush 2″ cubes of perfect specimens, this would give a resistant, compressive, and antiflexure strength of, in round numbers, 200 pounds per square inch of sectional area, as a safe temporary *axial* load for merchantable white pine, free of cross or crooked grain, large cross-limb knots, windshakes, or other weakening defects. Hence 200 pounds × 16 square inches = 3200 pounds = safe strength of upright, which, divided by 475 pounds load per foot run would give over six and a half feet apart for the 4″ x 4″ x 15′ uprights, not braced at a mean point of height.

How many of the ordinary modern scaffolds have even this moderate safety? It is not unusual to see scaffolds which have occasionally or accidentally to do all of the above estimated duty with uprights of 2″ x 4″, or at most 2″ x 6″, of low grades of merchantable lumber, and set perhaps eight or nine feet apart. Now a 2″ x 4″ scantling, would have only one-half the diameter (and one-half the sectional area), but with about one-fourth (or three-elevenths) of its antiflection strength, as it would ultimately *bend* before the initial *crushing* strength is approached, its effective comparative area being consequently reduced in this increasing ratio, whilst the span between uprights is also increased one-third, consequently adding one-third to the load on the uprights; all these elements of disparity, viz.: one-fourth part deflecting resistance, and one-third increase of loading, making a total decreased strength of one-twelfth of that of 4″ x 4″ set six and a half feet apart, which readily accounts for so many of the scaffold *accidents* occurring throughout the country under incidental loads.

If scaffolding contains barrow-runs, requiring additional width, in connection with steam or horse-power hoists, the standards thus having greater moving weights passing over them will require additional sectional area to maintain the necessary stiffness.

If the staging for a steam or horse-power hoist be supported on any part of a scaffold and consequently on any of the standards, these must be increased in cross section in relative proportions to the additional strains involved, for in some of these arrangements large quantities of bricks are dumped from hoist-boxes onto the staging.

The following table will be useful in indicating the decreasing compressive strength of square or rectangular pillars of fir or white pine.

Safe quiescent load per *square inch* of section, taken at one-sixth of the ultimate breaking load:[2]

RATIO OF BREADTH TO LENGTH.

Length in inches. ÷ Least breadth in inches. =	6	8	10	12	14	16	18	20	22	24	26	28
Pounds per square inch. =	800	760	720	680	640	600	560	479	416	368	328	296

(*Ratio continued.*)

30	32	34	36	38	40	42	44	46	48	50	52	54	57	60
269	246	227	210	195	183	166	151	138	127	117	108	100	90	81

This table, it is evident, is of direct immediate use for rapid estimates of resistance of standards, struts, etc., to compression, by simply taking the *ratio* of length to least breadth ($\frac{l \text{ ins.}}{b \text{ ins.}}$) and multiply the number of pounds set under the ratio by the sectional area of standard, etc., which will give strength which can be safely depended on for white pine of good quality, dry and free of weakening defects. It must be observed that the strength of wood pillars, over thirty diameters high, depends on the co-efficient of elasticity of the wood and not its mere compressive resistance. When a pillar is bent very little a small additional weight breaks it, because of the rapidly increasing stresses which each additional small deflection developes.

THE ILLUSTRATIONS.

A PARALLEL OF DORMER-WINDOWS.

Our attempt to make a collection of dormer-windows which should have a permanent value to even the most skilful designer seems to us to be so successful, that we will suggest that those who conceive that a similar sheet of bay and oriel windows would be valuable to the profession should forward to us at once sketches or scale drawings of one or more of their happiest efforts in designing a feature which so few American buildings are without.

HOUSE FOR JAMES P. TOLMAN, ESQ., WEST NEWTON, MASS. MR. W. G. PRESTON, ARCHITECT, BOSTON, MASS.

PROPOSED HOUSE AT LLEWELLYN, PA. MR. ALFRED E. BARLOW, ARCHITECT, NEW YORK, N. Y.

SPECIFICATIONS.[3]

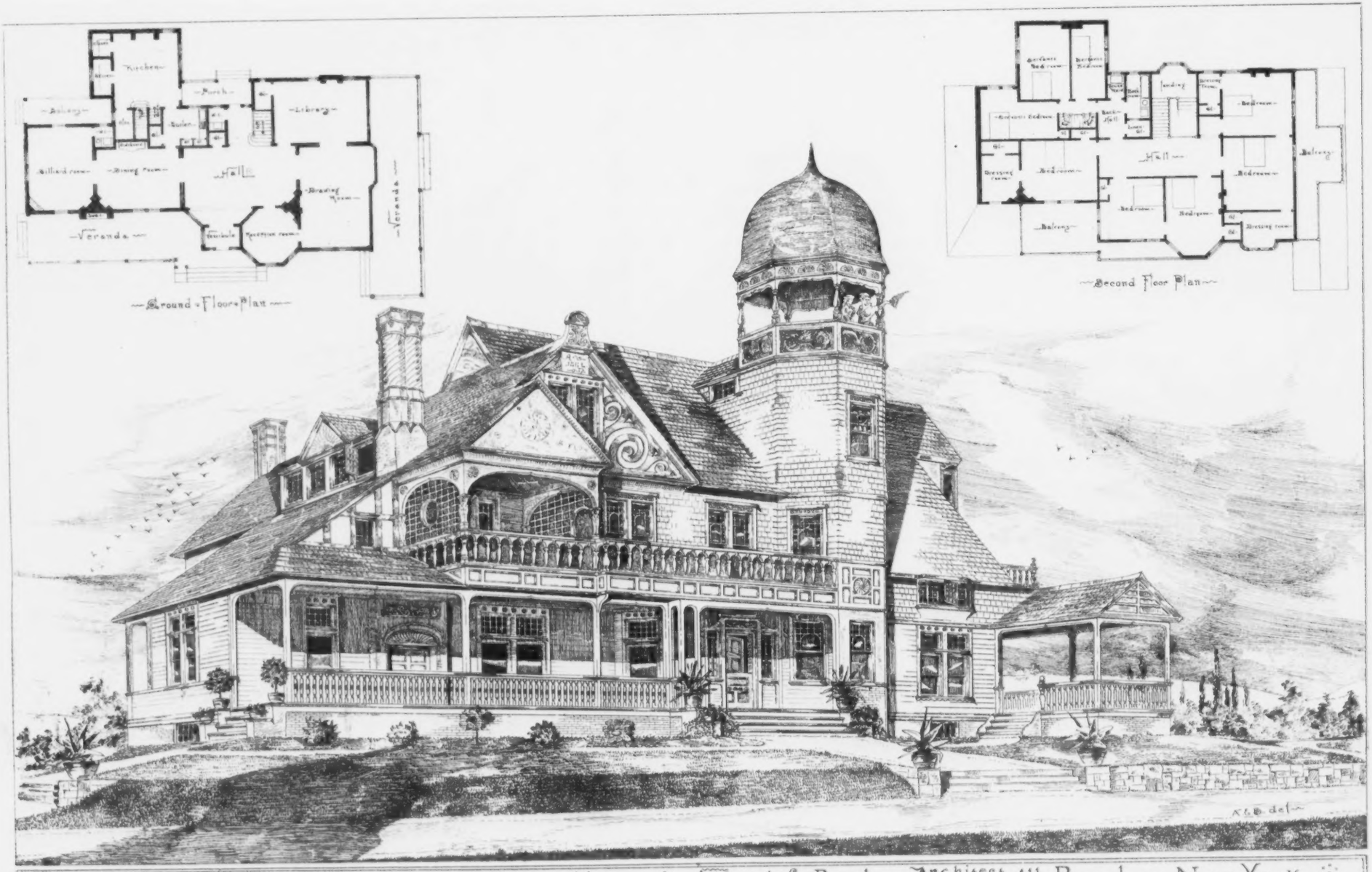
Mr. Ewan Christian commenced his promised address on the above subject, and said that when he received the invitation to say a few words to the young men of the Association, it brought to his mind one of the bugbears of his youth, some fifty years ago. He remembered the horror he had of a specification, and how he had asked the head man in the office whether he would ever have to write such a document. But this person was a cheery old fellow, and had said to him, "You never know what you can do till you try." This he had remembered ever since, and found what useful advice it was. He had received the invitation just as he was starting for his holiday excursion, and as he travelled from Paris to Geneva he took out his book and jotted down some observations. His remarks were intended solely for the young men and not for the elder ones, who perhaps knew better than he did what a specification was. His subject was "A Chat with the Younger Members of the Association on Specifications," and he proposed, first, to say a few words on specifications in general; and secondly, to take up one in particular, and to go through its general provisions; and afterwards to make some few observations on some methods of acquiring the necessary knowledge for writing such documents. Now, in the carrying out of an architect's design, the specification, properly considered, was the pith and marrow of the building operations. The first sketches might be said to represent the poetical or inventive part of the work, and the working drawing and the specification—which should always go hand in hand—were the hard and laborious filling-out and filling-in of the first ideas. It had fallen to his (the speaker's) lot to read many specifications from many hands. The much-lamented President of the Institute, Mr. Street, had truly said that an architect was known by the work he executed, and so, also, something about him could be known by his specification. He would describe some with which he had made acquaintance.

[1] In the formula, l = length or height, b = least breadth, both in inches; 4800 lbs. is the crushing resistance of 2″ cubes, the other constants of the formula being empirical deductions from experiments, applicable to the conditions of action of long columns under pressure.

[2] If one-fourth instead of one-sixth of breaking load is to be used, add one-half to the number of pounds given in above table.

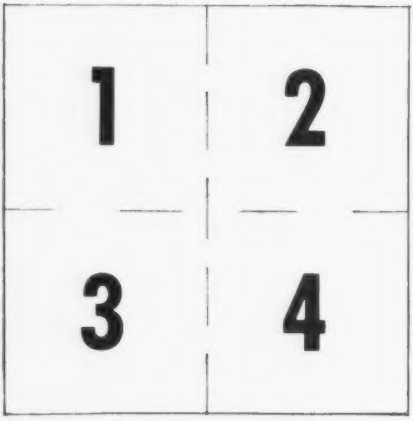
[3] A paper read before the [English] Architectural Association and reported in various journals.

No. 525 American Architect and Building News, Mar 4, 1882.



Proposed House at Llewellyn. Alfred E. Barlow Architect 111 Broadway New York.

Maps on this order too large to be
are filmed clockwise beginning in th
right and top to bottom as many fra
diagrams illustrate the method.



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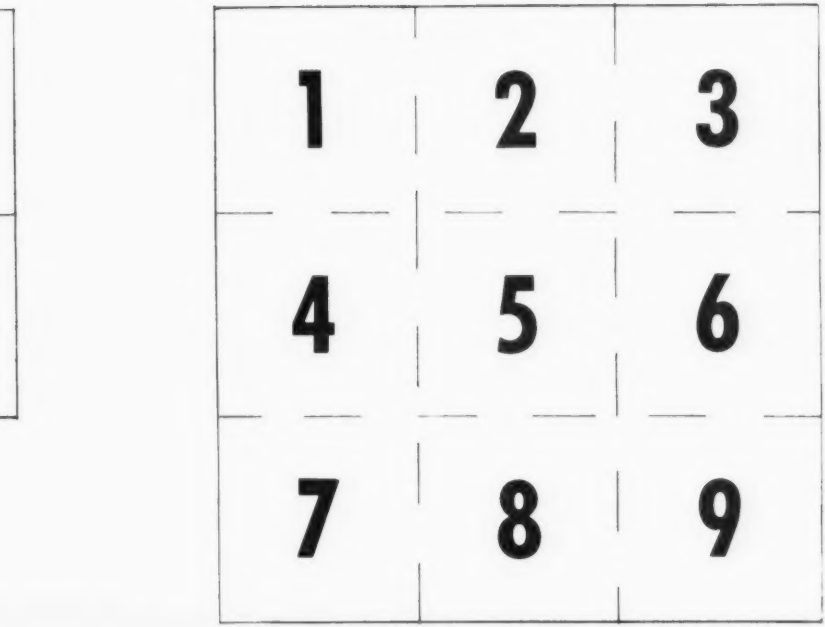
frames as required. The following



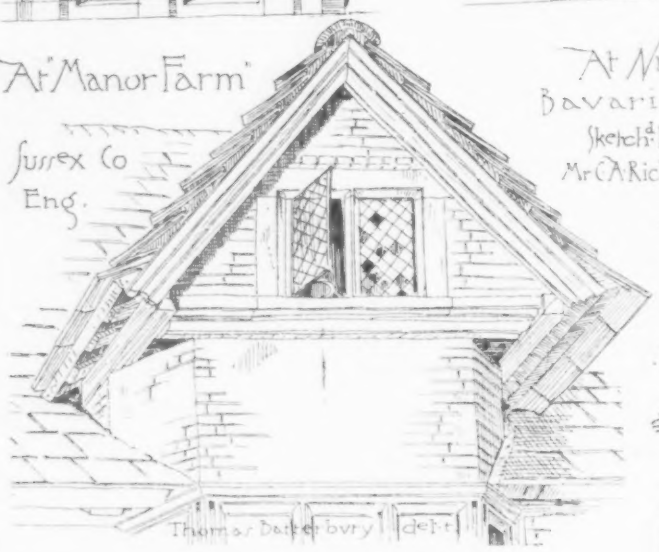
From House for C Vanderbilt Esq 57th St & 5th Ave New York
Mr Geo B Post Archt New York

From House for O Goelet Esq 5th Ave New York
Mr E H Kendall Archt New York

Brick Dormer on "Stone Hall"
Wellesley College Wellesley Mass
Messrs Ware & Van Brunt Archts Boston

From the Her
Cambridge Mass

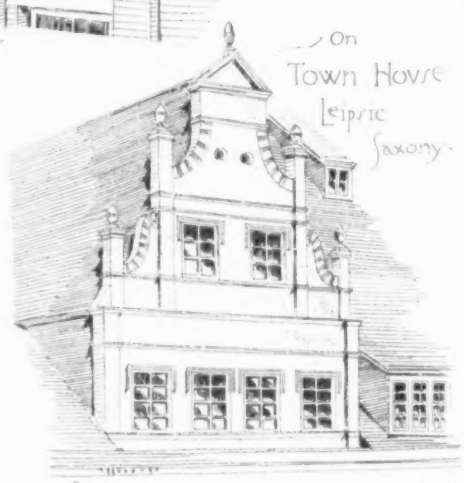
At "Manor Farm"
Sussex Co Eng



Thomas Daltery del

At Nuremberg Bavaria
Sketched by Mr C A Rich

On Town House Leipsic Saxony



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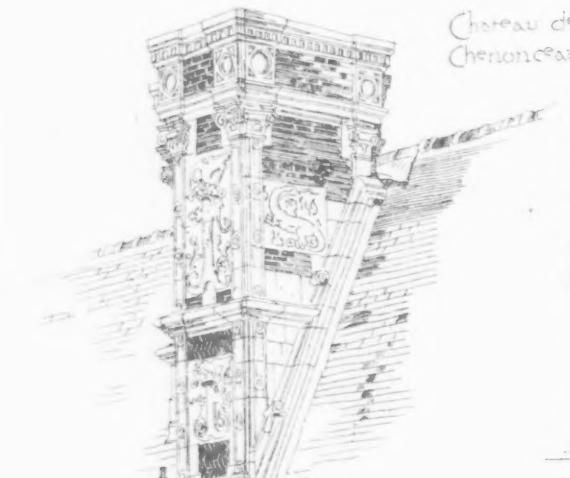
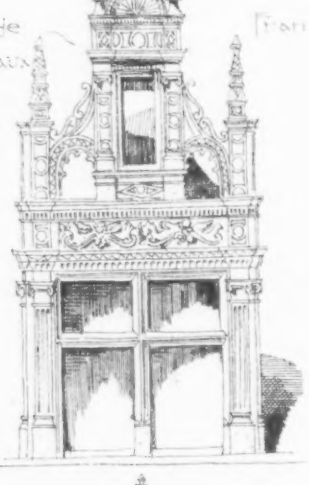
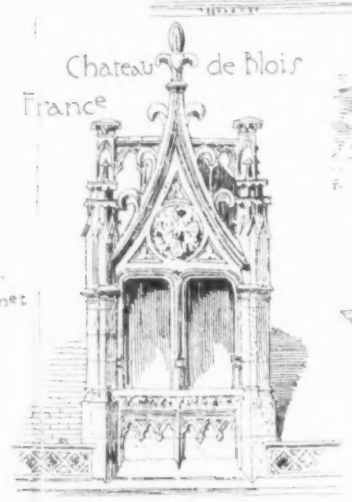


Chateau de Chenonceaux France



After Raguenet

Chateau de Blois France



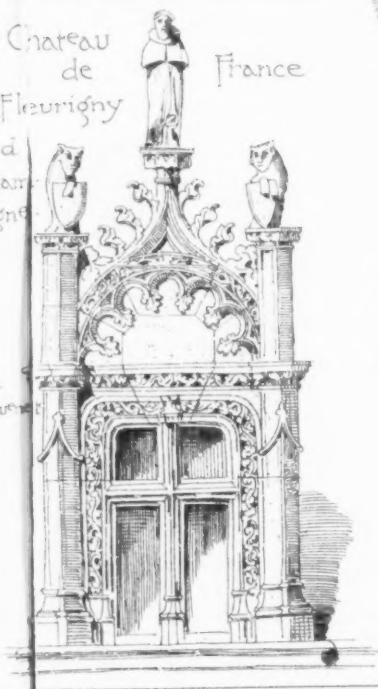
A Shady Dorm

Sketches by Mr T Raffles Davison England

A Que Ann Dorm

From the Hôtel Ecoville at Caen
Built by Blouse Lepicstre 1535

Chateau de Fleurigny France
and Champagne
After Raguenet



From Design for Office Buildings Manchester England

Chateau de Blois France

From a Photograph


Hemenway Gymasium
Harvard College
Messrs Peabody & Stearns Archts Boston
From Building. Pearl St. Abany. N.Y.
Messrs Potter & Robertson Archts New York
From Hovse for E. Torrey Esqre
Dorchester Mass
Messrs Cabot & Chandler Archts Boston
Dormer of Hovse at Rvabon England
Designed and drawn by Mr. T. Raffles Davison
From Hotel de Ville. Chartres France.
After Raguenet
Dormer at Beauvais France
Sketched by Mr. Thos Batterbury
Hotel, Holborn Viaduct London
Mr Isaacs Archt
In Boulevard Malesherbes Paris
A Parallel of DORMERS
School Buildings Hanover St London
Mr E.R. Robson Archt
At Ely Grange England
Messrs Salomons & W
From Business Premises Chelmsford England.
Mr Fred Chancellor Archt
Villas Hampstead London
Mr F.K. Green Archt
Queen "Anne" Dormer
Mr. A.P. Bell Architect
R. Norman Shaw Architect
Dormers at "Cragside" Northumberland. England
R. Norman Shaw R.A. Architect
From design

From House for O Goelet Esqr 5th Ave New York

Brick Dormer on "Stone Hall" Wellesley College Wellesley Mass

Messrs Ware & Van Brunt Archits Boston.

From the Hemenway Gymasium Harvard College Cambridge Mass

Messrs Peabody & Stearns Archits Boston

From Building Pearl St. Messrs Pott

From Hotel de Ville, Chart Fra

At Nuremberg Transferred Sketched by Mr C.A. Rich

Dormer at Beauvais France

Sketched by Mr Thos Batterbury

On Town House Leipsic Saxony

A Parallel DORMERS

Chateau de Blois France After Ruguenet

A Shady Dormer

From Business Premises Chelmsford England Mr Fred Chancellor Archt

Villas Hampstead

Sketches by Mr T Raffles Davison England

A "Queen Anne" Dormer

The Hotel de Ville built by Blaise Ledroite 1535

Chateau de Fleurigny France and Champagne After Ruguenet

From Design for Office Buildings Manchester England Mr A P Bell Architect

R Norman Shaw Architect

Dormers Cragside Northumberland Engl


Abany. N.Y.
Potter & Robertson Archts. New York
From House for E. Torrey Esqre Dorchester Mass.
Messrs Cabot & Chandler Archts Boston.
Dormer of House at Ruabon England
Designed and drawn by Mr T. Raffles Davison.
From house at Leicester England
Messrs Tait & Langham Archts
artres France.
After Raguenet.
Hotel, Holborn Viaduct London
Mr Isaacs Archt
In Boulevard Malesherbes Paris.
After Raguenet
Fords Hospital Coventry England (Old Work)
School Buildings Hanover St London
Mr E.R. Robson Archt
At Ely Grange England
Messrs Salomons & Wornum Archts
London
Mr F. Green Archt.
From Accepted design for Wakefield Municipal Buildings Eng.
Mr T.E. Collcutt Archt
at
humber-
d.
England
R. Norman Shaw R.A. Architect
From design for Didsbury Library Institution England
D.A. Gregg Del.

American Architect and Building News, Mar 4, 1882. No. 525

HOUSE at WEST-NEWTON * MASS.

for Jas. P. Tolman, Esq.

1882

Wm G. Preston.
Archt Boston

First Floor

First, there was the careless specification, the production possibly of the man who thought his art so high that he could not condescend to things so low as practical details, and so gave himself no trouble in the matter: wrote in the loosest possible fashion a few vague sentences, and necessarily, in consequence, ran the risk of heavy bills for "extras" and of giving much general dissatisfaction. He hoped there were no such specification writers present. Next, there was the uncertain specification, from the man who, not knowing his own mind, left everything vague, and said that such and such things were to be done "as the architect may hereafter direct;" or that everything was to be done that was or ought to be necessary for the completion of the work, whether mentioned or not. But what was the poor builder to do in making his estimate from such a document? What a chance for wild estimates and after litigation! Then there was the surveyor's specification, which he always knew by the clause, "Provide water for the work" — as if it could be done without water! If everything had to be provided, why should water be so specially mentioned. This was generally a practical and dissecting specification, but with no warmth or geniality about it. Then there was the muddled specification, which it was a positive torture to read, and in which one had to hunt through page after page to find the proper sequence of things, and, when found, had sore trouble to put them together. Then there was the too-diffuse specification, that which said over and over again that this thing and that thing were to be provided and done in the best possible way, when one clause to that effect would be sufficient. Such a specification was a trouble to read, but one forgave its wearisomeness in respect for the earnestness of the writer. Next, there was the plain and practical specification, which went straight to the point it was intended to reach, and said exactly enough, and no more — the writer being evidently a good business man, who did his work thoroughly well, wasted no time, and had no difficulty in settling his accounts at the conclusion. Lastly, there was the well-written and properly-descriptive specification, the writer of which evidently enjoyed his work, wrote it *con amore*, revelled in the pictures he summoned up as he went on, and filled his pages with sketches to illustrate his words. Such specifications were a real pleasure to read.

What, then, was the form of the specification that should be useful? Let them consider the ordeals which the document had to encounter. First of all it had to satisfy the client, not, possibly, for his own reading, but to defend his interests in the work which the architect had been entrusted to do for him. It should be remembered that clients sometimes attached strange meanings to doubtful descriptions. Secondly, it had to be put before the builder, who, if he were an honest man, would do his best to carry out its provisions faithfully and well; but if he were a scamp, he would try to evade them at every turn, and would be sure to go through any loophole that had been left. Thirdly, it had oftentimes to be interpreted by workmen; they might be intelligent, or they might be the reverse, and then woe to the man whose work was slightly done. It was all very well to put in a clause that the architect was to be sole judge of everything. So he ought to be, but if he had left room for misinterpretation, and mistakes were consequently made, as an honest man he ought to decide against himself, and not blame the workman. Lastly, together with the drawings the specifications had to be the basis of a contract. Some employers, and possibly some architects, thought that the contract was the lawyer's work exclusively, and that he was to be responsible if anything went wrong; but he (Mr. Christian) said "No!" The lawyer might put in his stringent clauses, might provide for bondsmen, and set down penalties to be exacted in due course, but if the specification were imperfect, the foundation of it all was rotten, and all the legal phrases in the world would not make it stand. Not that he despised the lawyer's work — far from it; it might be, and was, in many cases very necessary; but the specification and the drawings were the real bases of contract, and the general conditions might be fairly left to the lawyer, though not even those without the architect's co-operation. A specification, then, was, or ought to be, a document which should fully and completely describe the architect's intentions, illustrated by the drawings of what was to be done from the time of cutting the first sod to the delivery of the key of the finished work into the owner's hand. That was what a specification ought to be. Who was the man who could write it? "Oh," perhaps some of his hearers would say, "the surveyor: he is the man who must know all about it. He dissects the work, describes its bones and sinews, and clothes them with flesh; and so in due course it comes out all right from the builder's hands." But did it? And whose, then, was the work? At best it was but a partnership concern. No; if his young friends had learnt the surveyor's work in addition to their own, by all means let them do it — nothing was more practically instructive; but if not, let them never in their young days depute the writing of their specifications. If they could not do it themselves they had not learnt their business perfectly, and ought not to practise it, because they could not do their employers justice. It would be plain, therefore, he (Mr. Christian) thought, that, so far as his judgment went, the person who wrote the specification should be he who designed the work; and so far as regarded its chief points, those in which his design was out of the ordinary track, where individuallty was to be exemplified, so it must be to his life's end.

Again he would ask: who was the person who could write a specification? Not the careless man; not the man who was vague and did not know his own mind; not the man who, like Nebuchadnezzar in his dream, expected the builders to interpret what he could not himself describe; not the muddle-headed man, for the sooner that gentleman left the architectural profession the better for himself and for everybody else. Lord Bacon, among his many wise words, said, "Reading maketh a full man, conversation a ready man, writing an exact man;" which might be thus paraphrased to meet the special requirements of the architectural profession, "Reading makes the full man, sketching the ready man, specification-writing and drawing the exact man;" and an architect's work, if it was to be worth anything at all, must needs be exact. The essential elements of specification-writing, then, were: knowledge, not only of theory but of practice; method, conciseness, clearness of description, and thoroughness. Now, in the view of its requirements, he would take up the second part of his subject and go through a specification. Time would not, of course, allow him to speak about every detail, and he would confine his remarks to general principles and points of importance.

A specification could never be properly written as a thing apart. Drawings and specifications should advance together; and there was nothing more useful than for the architect to have his specification and headings all prepared, and, as his drawings proceeded, to note for each trade what he found it necessary to describe in writing. He might, if he preferred (and it was an exceedingly good practice), make his drawings themselves the vehicle for much of his description, and so lessen the bulk of his separate writing; but, nevertheless, this practice would not supersede the general notes, because some things must be described which could not be represented on drawings. Now, inasmuch as it was probable that for one man who might be called upon to erect a public building, or any other large structure, fifty might be asked to design and build a house, he would base the remainder of his remarks on that probability. He would take the case of a house in the country, to be built of brick; and, in spite of "Queen Anne," it should have, for the sake of illustration, some stone mullioned windows, and might also, perhaps, indulge in some of the fine Dutch brickwork now so fashionable. But let them not forget, as they proceeded, another of Lord Bacon's wise sayings — one which ought to be printed up in every architect's office — viz.: "Houses are built to live in, not to look on." He would presume that the architect of the house had duly inspected the site before preparing his design (a matter which should never be neglected); that he had noted its requirements; made out all about water-supply, drainage, etc.; tested the nature of the subsoil, etc.; learnt all that he required to know as to materials, carriage, etc.; and had settled where the garden was to be. Then would come the consideration of the excavator's work. This he had seen dismissed in a single sentence; but it was most important work, for the excavator found out what you were going to build on, and unless you were careful of your foundations you could not be sure of building a good house, for the excavator might go too fast, or the reverse, according to the nature of the ground dealt with. Clay, as in London, was a dreadful material: it closed in wet weather and opened in dry, so that the building jumped about. In other cases clay was the best friend possible to have, in which case to cut away a foot of clay would cause most serious damage. Where silt occurred below the clay, you must only build upon the surface, and every inch of clay must be preserved. Therefore, if you dismissed the excavator's work summarily, and unless you knew what you were going to build on, the excavator might cut away all the sound foundation, get you into a serious difficulty, and even, as had occurred to himself, bring you down on a quicksand. In ordinary foundations there might be much vegetable soil, but your specification merely stated the ground was to be excavated one foot or so many feet. The foundations for the Shrewsbury Shire-Hall, the building designed by Sir Robert Smirke, were cut 10 feet deep all over, and as soon as the surface was taken away there came up a magnificent crop of mushrooms. To be perfectly safe, therefore, the whole of this mould must be removed, or the entire surface must be covered with concrete. Where a garden was intended the mould would be invaluable, but anything actually outside of the four walls of the building rarely had any provision made for it. They should know, then, the nature of the ground, and the best part on which to place the soil. Give accurate instructions to the excavator. Tell him, of course, to take down the trenches to a solid bottom, to drain the ground if wet, and where concrete had to be put in describe what kind of concrete to use. Lias lime or Portland cement was the best on clay where you had water. According to circumstances, position, and nature of materials must you build with solid or hollow walls, the foundations at any rate being solid. The specification must also be arranged according to the season of the year. The same amount of water, for instance, must not be used in the winter as in the summer. Working in winter, the walls must be kept as dry as possible, and for some four or five months of the year they should never think of using a drop of grout in the walls. The foundations must be laid as solid as possible, and if the soil were wet there should be a damp-proof course just above the level of the surface, one at the bottom, and a vertical damp-proof course in the middle. The latter was a most valuable expedient, but was not often adopted, and, like most valuable things, it was perfectly simple. All that was requisite was to leave a clear cavity of about 1½ inches in the middle of the wall — the thickness of a scaffold-board turned edgewise would do — and as the walls rose a laborer could, every nine inches in height, pour in boiling asphalte, which had a wonderful affinity for bricks. If ever they

had to build against the wet they should use it. If a vertical damp-proof course were not required there should be a damp-proof course at the lower level and at the level of the surface, otherwise the damp would rise by capillary attraction, and the house would be dreadfully damp. The bricks should be hard, sound, square, and well-burnt; no others should be allowed to come on the ground. Nothing more on that head need be said in the specification.

According to circumstances they must describe the mortar and sand. In the country sometimes road-drift had to be used; in some cases good river sand might be got. Road-drift, unless good, off a flint-road, prepared a long time beforehand, and all the filth washed out of it, must not be used. The walls should be faced with such bricks as were thought right, and the best which could be got in the locality. He himself was a great advocate of hollow walls, and had used them for many years, but they required great care in the building. In the other room he had seen drawings showing hollow walls, the authors of which had joined the walls at the jambs of the windows and at the coigns. Some thought, and no doubt it was theoretically and practically correct, that there should be a greater thickness of wall inside. If only two thicknesses of 4½ inches could be afforded, the hollow wall should not be employed, unless bricks absolutely impermeable to wet were used. It should not be bonded with iron, for the iron rusted, and the wall went to the bad. An excellent hollow wall, and the best in his opinion, was to have a double thickness of 9 inches with a cavity of 3 inches between, the whole bonded with long bricks, but with bricks that would not carry the wet through. It was practically a solid wall, and had all the advantages of a solid wall. He was building one now, and every 18 inches he put a continuous course of these bonding bricks, so that the cavities between the courses were 15 inches. Such a wall was the best, driest, and warmest that could be built, and was equivalent to a solid wall a foot thicker. In several cases he had proved the warmth and comfort of it, but he was now proving its value in a different way. In a large country house he was building all the external walls on this principle. Not being able to get materials in time for doing the work in the summer, he had built the inner part of the walls and left the bonding courses projecting; the casing would be put on in the summer and the work when done would be solid as a rock. This enabled him to build against time; the house would be finished in time, to do which he would otherwise have had to resort to the horrible work of pointing. If building in the very usual way with a 4½-inch thickness inside and 9 outside, iron must be employed. In specifications it was constantly stated that the walls were to be properly bonded with iron. The builders would say that hoop-iron would do, but it would not do; an accurate description must be given of what the iron bond must be: specifications must never be vague. Before beginning the builder must be told what he had to do, and you must be sure that what you said had to be done was sufficient.

If they adopted the modern principle of ventilation under floors, the ventilation must be thorough. It was not sufficient to specify that there should be air-bricks, for the dry-rot would get in at some corner and begin its ravages. The old fashion, and he was not sure but what it was the best, was to lay oak joists, solid in loam: the air was stopped out, and this was equivalent to a thorough ventilation. He had taken up floors of that kind which must have been down considerably over a century, sometimes nearly two centuries, and had found them perfectly sound. When he saw written in a specification that every brick was to be a whole brick, he was sure it was written by a young man. In the foundations it might be so, but above the surface they must have some bricks that were not whole; they should be careful to bond them well, and not to use too many broken bricks. Another clause specified that every fourth course was to be grouted. The bricklayer was first told that every course was to be laid solid, and then that every fourth course was to be grouted; it was like covering a man's mouth with plaster and telling him to drink. The best brickwork in the world was that of the Romans. The old brickwork was always done with good thick joints, that came to the surface; it was honest work. Splendid instances occurred in some parts of the country, especially in the counties of Norfolk and Suffolk. The work introduced by Dutch William was not brickwork—he should call it toy work; but if they intended to use it, they should be at the pains to back it in with cement, or something of the kind, or it would be absolutely rotten. He supposed them to be building their house in the summer, and that all the joints—good, honest joints—were finished as they were built. Then they had the flues and chimneys to build. No one should allow a tallboy to disgrace his chimney, which should be built to carry the smoke up properly, so that it could not come puffing down into the room. There should always be a spare flue or two. Above the roof a damp-proof course should be worked in. He had constantly seen cases where the wet came in, worked down into the rooms below, and of course made the house damp. They should therefore always build in a damp-proof course of lead right through the chimney and through the pargetting. In winter they should be built solid to the outside with cement. All fireplaces should be made available for doing double work, as he had said when addressing them on a previous occasion. It was an argument, too, in favor of internal chimneys.

Then there was the drainage to consider. It was sometimes dismissed in a sentence or two, but it should be described with the greatest particularity, just as it should afterwards be laid with the greatest particularity. In connection with the drains of country houses they would always require a tank, but they must not send dirty water into it. It was just as easy to filter it and send it in clean. If they made a filter of gravel and examined it some time after the house was built, they would find a mass of filth on the one side of it. In the country, too, cesspools had to be made, and you were liable to get into a difficulty in a sandy or gravelly soil if you did not make them watertight, for your drinking water would get poisoned. They must always be ventilated. He wished to impress on them that they should do their drainage with the utmost possible care, and supervise and examine it thoroughly. Every tank must have an overflow, but not connected with the foul drain. You could not avoid contaminating the water in the tank if so connected: it was a *sine quâ non* that the tank should have no connection with foul drains.

Coming to the mason's work, Mr. Christian said that honest old mullion windows were becoming unfashionable. Sash-bars, etc., were advocated, and the old casements pooh-poohed. No windows gave so much light as mullion windows, and they might make them as big as they liked. One great advantage in them was that they kept the painter at bay, for he hated the painter as far as the damage he did to the rest of the work. He mentioned these stone mullion windows because there was commonly a clause in the specification that an unlimited use was to be made of cramps and dowels, and the builder in making his estimate would be sure to provide sufficient of them. They should consider whether they wanted any at all; he did not think any were wanted. In taking down old windows he had never seen any dowels and very few cramps. They should be jointed properly with stone; in fact masonry should be used as masonry. The cramps in many cases spoiled the stone-work, causing it to break off.

The floors he now supposed were got in. Timber should never be built into the wall on the ground floor, though the ends of the joists were constantly built in in such cases. It was a capital plan, where stone was available, to put in corbels on the ends of which, inside, the plates could be placed. In specifying for the roof, instead of stating that the gutters were to be laid with all necessary falls and drips, it was just as easy to describe with accuracy the amount of fall and drip. If you took care of the gutters and drips the roof would take care of itself. The important point was the drip, for, if the snow got in and froze, the water would come into the house when a thaw took place. When he complained of there being too little drip he was always met by the answer that there was a good fall; he could not get people to see that it was at the drip that the water got in. A common defect was to make a closed sepulchre of the gutters; but they should make a convenient way to them. At their last meeting two opinions were given in regard to slating and tiling, and one speaker hit the right nail on the head when he said that tiles were the most comfortable. A point which applied, however, more to churches than houses was that persons while erecting substantial walls never thought much of the roof covering. They put on what was literally an attic roof as a covering for a vast number of people, and expected to keep them comfortable—cool in summer, and warm in winter. In the old coaching days, if you buried your feet in the straw while travelling you were perfectly warm. The reason was because the straw was a capital non-conductor, every straw being hollow. On this principle—which was the same as that of the hollow wall—he had covered his house with reeds plastered underneath, and thus got an outer and an inner cavity in the thickness of four inches. Tiles were a real comfort, and you could slip one in at any time when required, which could not be done with slates, which were nailed down, without tearing the roof to pieces. The color of the tiles should be tempered, especially when building out in the open and where no trees were about.

When describing the joiner's work, you should go mentally into every room and part of the house, and make sure you saw all the requirements; by doing so you produced a good result, and escaped extras at the end. Joiner's work must be prepared well beforehand, as wood would shrink; and one other matter not sufficiently attended to was the season of the year. They were, he supposed, getting the house comfortably roofed in by the end of October, and the building might be let stand open; no matter if the snow came in—the important thing was that the air got in. If the building had to be finished by Christmas they must use diligence and get it completed. They should never let a client make them finish it early in the year, or, at the worst, they must only do it under written protest, the client absolving you from all responsibility. However dry the wood-work you put in it, everything would be reeking with damp, the wood-work would swell and drive the framing asunder, etc.; and these were things clients did not or would not think of. When specifying that the wood should be clear of sap, he added a clause that it was to be clearly understood that exactly what was said was meant, that it must be clear of *all* sap. If, just as the work was finished, you found out your instructions had not been attended to, it would involve the expenditure of two or three months, for wood, however dry it might be, always shrank after planing.

He would like to ask how often they made sketches and notes of things of ordinary use. Whenever in travelling he saw a good door or casement he immediately made a careful drawing of it, for thus only did he get an accurate knowledge of it. Many houses in London, especially those built towards the close of the last century, had as beautiful joinery as was possible to be seen—doors, floors, and fittings of all kinds. They should not content themselves with saying it is beautiful; they should draw and describe it, and sketch, not for the picturesque alone, but for the practical. Some of the most

beautiful wood-work ever wrought by the hand of man was to be seen in this city of London. He might say of our floors that he never went abroad to France, Italy, or Switzerland without being disgusted with the work in this country. We had been utterly spoiled by the rage for building cheap houses; no wonder we covered the floors with carpets. In London, when this good joinery was executed, some of the most beautiful floors anywhere to be seen, of the primest of wood, and without a particle of sap or a nail in them, were found. Except in the matter of parquetry floors, in which there was a good deal of sham, we had gone back. Evelyn's advice on the subject of floors was that the boards should be tacked down one year, and permanently fixed the next year. At any rate, they could, if they liked, stop builders putting down floors in the present careless fashion, and prevent them "following my leader" in these matters, like so many sheep, as described by the lecturer at their previous meeting. It was important to tidy up everything, and clear away from under the floors every particle of shavings and every little bit of wood. He had been called into a church in Salisbury, where dry-rot had carried everything before it. There was a good ventilation right through under the floor, but a few shavings had been left below on the ground, and on these a fungus had fastened, and thence spread all over. The season when the work was done, probably about November, had been very wet, and the ground underneath had been saturated; and if there was one place that took water better than another it was the ground under an old church. When superintending work, they should see that every shaving was removed, and that the ground was dust dry before a board was laid. In the same way they should look carefully after all staircases, etc.

They should try to please the mistress of the house, and not only the mistress, but the cook, the house servant — all important persons in their way. Especially they should pay attention to fittings. When in the country, why should they not ask to see the pantry and kitchen, if it is good work? Make a note of what you find the mistress and the cook approve of. No better place could they go than on board one of the Atlantic steamers to see how a pantry was fitted up, and how everything required for the large number of passengers is stowed away in so small a space. Whenever they saw anything really good, whatever it might be, they should put down a note of it. Half their reputation as house-builders would depend on this.

Mr. Christian then alluded to the horrible iron pipes which were put on buildings on the erection of which no amount of money was begrudged. If ornamentation were desired, what better things could be had than the lead pipes of old. He had seen many examples of them over a century old, things of beauty even to the present day. No one fifty years hence, he thought, would use these cast-iron pipes. He had seen, too, lead eaves-gutters four centuries old; no one would ever see an iron one that age.

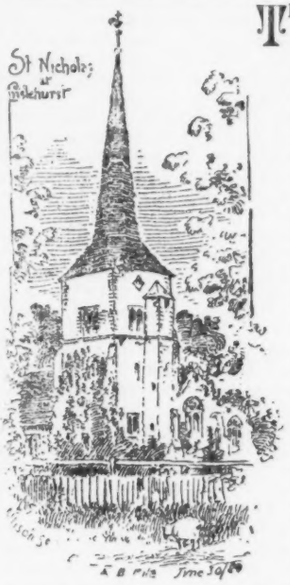
In regard to plumbing matters, the pipes should be put where they could be got at, and where they would be warm and dry. He was greatly taken by a device of a lady who had had painted on each pipe its name — "I feed the boiler," "I go to such a place," etc. They should not forget to let their pipes tell where they went to.

The hot-water cistern should not be placed in the roof, where the water got frozen and thus caused half the boiler explosions one heard of in winter. It should be made of use, and if placed in the middle of the linen closet it would keep the linen aired, and there would be no danger of pipes bursting.

One of the speakers at the last meeting said the old builders did not understand the making of mortar. Well, as a matter of fact, there was a great deal of bad building in old churches, and some of the mortar was horrible stuff, and he could testify to an instance of it in work of the thirteenth century. They knew how to build in those days, and the only explanation was that some rogue had been employed to build who scamped the work. Scamps could not be excluded in those days any more than now. Mr. Christian said that if they wished to see good mortar and good building they should study the old abbies and castles, which required gunpowder to bring them down, and he mentioned how the rector of the old parish church at Cromer had obtained a faculty for pulling down the chancel on the plea that it was rotten, and having got the faculty he could not get it down with using gunpowder, and the ground was covered with great solid masses of walling with flint work embedded in it. After saying that they should never pass by even the taking down of a brick wall without observation, and seeing the cause of its failure, how it had been constructed, etc., Mr. Christian remarked that there was no reason why young men, who had proved themselves thoroughly in earnest, should not be made clerks of works. When on the building they would get valuable information from the builder, should never be without their note-books, should observe and measure everything, find out how long it took to do certain work, and at the end of the day value it. After giving his experience as clerk of works during three years, Mr. Christian said that at Hungerford Market he first met Sir G. Scott. Mr. Scott had the run of Grissel's workshops, and asked so many questions that people wished him further, and made himself rather a bore. If, however, they wanted to learn, they must ask questions, and not be afraid to do so.

Mr. Christian concluded by advising the young men not to be in a hurry, as young men usually were, to get to work, but to learn their work thoroughly first of all, and to acquire practical knowledge by acting as clerks of works, etc., otherwise they would be bunglers all their lives.

INCOMBUSTIBLE MATERIALS FOR BUILDINGS.[1]



THE last city conflagration at Quebec reminds us of the thought recurring at every great fire destroying an enormous mass of property, viz.: Why do we not build uninflammable houses of all kinds? or, why use any timber or any combustible material in building? Timber decays, if it escapes fire, and must be renewed on an average under fifty years old. If all the timber-work of a house was valued, and an estimate of iron and metal required to be substituted instead to give equal strength, the difference of expense in some things will be found in favor of the substitute, and the average would be more than a turn in favor of rolled iron and cast-iron work,—a great proportion requiring only what is called old iron, which sells at from 50 to 70 per cent under the price of new iron, and has to undergo waste and expense in being re-cast and forged for sale in all shapes. If that average cost per cube of 1,000 feet is even a turn against iron-work, the consideration of durability alters the case still in favor of the incombustible work. But it may be said, how can a house or store full of very inflammable goods be a bit safer from being built of stone, brick, cement, concrete, iron, brass, zinc, copper, lead, slates, tiles, and glass, if those combustible goods take fire by accident, or development of coal-gas, or leakage of gas-pipes? In such cases, excepting all explosive matters, a fire may burn itself out,—if the iron door is shut and kept cool—if necessary; and, clearly, in such instances a very short time would make enough of "fire-damp" to extinguish the fire before it had taken such head as to melt a cast-iron door of the lightest possible casting. Certainly such a building would be fire-proof against all but the conflagration of spirits, paraffine, petroleum, and turpentine, where heat sufficient to pulverize brick and concrete might be produced by the burning of large quantities of those exceptional things, which are explosives in a great degree.

For walling, the Portland cement concrete, made of one part cement to four parts washed gravel, is nearly everywhere cheaper than brickwork, and often cheaper than stone-work; at half the thickness stronger than stone; and, in case of fire, will suffer less than stone and lime-mortar work, and very much less than brick-work in lime mortar. The cost of walling may, therefore, be excluded as one of the data required to make a comparative estimate, but for the increase of durability which gives the concrete the preference at equal prices. Well made and well handled, with the least possible stirring after wetting, the two materials mixed dry, the gravel concrete makes better structure than most of our building stones, particularly the sandstone of all colors.

Very good attempts have been made with Bangor and Valencia flags to make fire-proof floors for bonding-stores in Bristol, using slabs of 12′ and 15′ long, by 6′ or 7′ wide, and 3″ thick, laid on walls and metal girders under the ends of those lengths, after testing the strength of the slate slabs to more load than they will ever have to bear; but such floors are very expensive, and the bare slate flag exposed to intense heat will suffer more than a concrete floor. They must collapse when the metal posts supporting them are melted, unless the pillars are cased in concrete. All condemned rails, sold by the railway companies for one-half the price of rolled iron, make very good joists for spans not over 14′, spaced 30″ apart centre to centre. Flat arches of small flat stones, 6″ deep, resting on 78-pounds per yard old rails set across the roadway, and grouted with fine concrete, and flushed over with it, form the roadways of several iron bridges in the County Kerry, and have been laid for less than a wooden floor with 2″ x 10″ joists and 1″ boards. A fire-proof floor was put in the Bridewell at Tralee, over the prisoners' cells, in this way for 45*s.* per square of 100′, which is about the same as timber flooring of the scantlings described. In wider spans these rails can be supplemented by midway girders or plain flitches of rolled iron under, so as to make the floor perfectly rigid. Such a floor would never fail to keep down any fire underneath it. For dwelling-houses, ceilings could be worked out in plaster more firmly than on laths of ¼″ thick.

The roofs would afford most saving on the comparative estimates. The strength of the modern iron roof in angle and T iron bars and beams is to be had for less money than what timber of the usual sizes will cost. Galvanized riband iron, on frames 4′ apart, pierced for copper fastenings or iron rivets, will cost very little more than wooden sawed laths. Cast-iron gutters can be had for less than half

[1] From a paper by Mr. Henry Stokes, read before the Institution of Civil Engineers of Ireland.

the price of 7-pound sheet-lead for both flat gutters and valleys. Slates drilled to be fastened by nails can be tied on to the laths of riband iron with copper wire as cheaply as with nails.

Cement concrete roofs on centering made to a catenarian curve inverted may be relied on to stand but 2½″ thick, if the abutments are secured from lateral thrust by a few tie-bars across the span, mounted on washer-plates outside and screwed tight, or tightened by heat and cooling. It may require a rise of arch of one-fifth span, and a thin coat of pure cement as a water-proofing, which is further secured by a couple of coats of coal tar. Mr. W. T. Crosbie, of Ardfert, has built a good many roofs of this material, but in elliptic arches very flat, and, therefore, requiring more than double the depth of concrete, and they have cost him 5*s.* per square yard; so that the catenarian curve may be had for 3*s.*, which is much less than any slate and timber roof can be put up for now-a-days.

Interior fittings of doors and window-frames with the doors and sashes, it can be easily understood, may be had in metal and black iron without trouble or expense greater than wood, but cheaper, from being everlasting.

It is to be expected that the objections will be raised on account of iron-work contracting and expanding with cold and heat, which has given some trouble in making smooth joints between long pieces of railway-iron. This may be avoided by using cast-iron where long spans are to be set up, such as tie-bars to wide and flat roofs, where the expansion would be very small. Metal window-sashes are, on this account, liable to be found difficult to stanch against wind and water. To obviate this I have used a fillet of caoutchouc between the glass and the metal, to be *soldered* on to the iron and glass by a hot-edged tool, which will give sufficient room for contraction in the elasticity of the india-rubber to prevent the glass being broken and makes a stanch joint always. In a continued row of such houses as I have tried to describe, no fire could spread to any considerable extent, even if extra inflammable goods took fire, and this last advantage in itself is, or would be, an enormous gain. The only drawback would be that the carpenter's occupation would be gone, or almost gone.

MONTHLY CHRONICLE.

January 30, 1882. Bursting of a reservoir at Calais, Pa., which causes the destruction of a school-house and two other buildings. Twenty-seven bodies recovered at last reports.

January 31. Explosion of the Citizens' Gas Company's gasometer at Newark, N. J. The iron cylinder covering the gasometer became tilted by the weight of snow and ice upon it, and by the force of the wind, until the chains holding it in place broke, and the top of the gasometer struck against the brick sides of the tank, producing a spark, the explosion following. No lives lost. Damage, $25,000.

January 31. Burning of the old *World* building, New York.

February 2. Explosion of the Grove shaft of the Midlothian coal mine in Chesterfield County, Va. Thirty-two men buried in the mine.

February 6. Fall of an elevator in the partly-burned Wrigley building, Newark, N. J. Three men killed.

February 7. Fall of two walls of the Messrs. Emery's hotel, Cincinnati, in process of building. No lives lost.

February 10. Fall of a temporary staging, bearing 400 children, during an exhibition at Power's opera house, Grand Rapids, Mich. No lives lost, and but few children injured.

February 11. Explosion of Jackson's fire-work factory, Chester, Pa., which results in the loss of eighteen lives.

February 13. Crevasse, 300 feet long, in Kemp Levee, Concordia Parish, La., one of the largest levees in the State.

February 13–23. Terrible floods along the Ohio and Mississippi rivers, the water rising higher than in the floods of 1876. Many lives lost, and incalculable damage done to real property.

February 17. Burning of the business portion of Haverhill, Mass. Loss over $2,000,000.

February 23. An old sewer at Louisville, Ky., bursts, and floods a portion of the city.

February 25. Fall of a five-story brick building, at the corner of Second street and Christy avenue, St. Louis, Mo., occupied by Krafft, Holmes & Co., wholesale grocers. No lives lost. Damage, $20,000.

THEATRE-STAGE VENTILATION.

Chicago, Ill., February 14, 1882.

To the Editors of the American Architect: —

Dear Sirs, — With reference to an editorial in your valuable journal of February 11, 1882, and which in the summary is mentioned as an "Inconclusive Trial of a Theatre Ventilator," permit me to say a few words, and to state the fact, that the "smoke-escape" to which you refer in that article, built by me over the stage of Hooley's Theatre in this city, which has lately been successfully tested again by the present city authorities, has formerly been tried while the gas was lighted all through the house and the regular ventilating apparatus over the chandelier in the auditorium was in full operation, and with the same result. Fire-marshal M. Benner was especially watching the trial in that respect, and declared himself to be fully convinced of the efficacy of my system, which in the first place is designed to keep the smoke from a fire on the stage behind the proscenium arch, and prevent it from issuing into the auditorium, thus giving the audience ample time to disperse before the fire could come outside the proscenium, and also giving the firemen opportunity to enter the auditorium and work there successfully.

In order to prove more fully the effective operation of my "smoke-escape," I will say that while burning up fire-works on the stage, which frequently occurs, and the house is crowded to its utmost capacity, a smell from powder, etc., has never been noticed in the auditorium, even when the valve was only partly opened.

I am yours very respectfully,

Theo. Karls, Architect.

Chicago, February 18, 1882.

To the Editors of the American Architect: —

Gentlemen, — The issue of your valuable journal of the 11th inst. contains an editorial on the efficacy of a "smoke-escape" which I adopted for my theatre for the purpose of rendering the same safe to the public in case of fire. With reference to the article, permit me to say a few words: I am fully convinced of the many merits of this simple apparatus, and I have tested it frequently and always with success, especially when the gas in my house was all through lighted. I feel obliged to say that I would not like to be without the smoke-escape of Messrs. Sues and Karls, and I take great pleasure in recommending its general adoption in all theatres as a means of preventing panic in case of fire.

Very truly yours, R. M. Hooley.

GREASE TRAPS.

Philadelphia, February 18, 1882.

To the Editors of the American Architect: —

Dear Sirs, — Can you inform your readers where "grease traps," as described in your recent series of articles on house-plumbing, can be had? I refer to the tubs or reservoirs to be placed in the cellar, of sufficient capacity to allow the ordinary discharge to cool and deposit its grease before flowing into the sewer. Plumbers here, to whom I have applied, appear to be ignorant of the device. X.

[The grease reservoirs of which X speaks are, or were, for they are fortunately becoming obsolete, generally made of hard brick in cement, about two feet each way inside, plastered water-tight with cement, and covered with a flat stone, cemented down. The outlet-pipe should have a quarter-bend inside the reservoir, turned down so as to dip below the surface to keep floating cakes of grease from entering the pipe; and if this is done the separate trap under the kitchen sink must be vented below the seal, or the water will not run through it. A glazed stoneware grease-intercepting trap is made in England, and has been imitated in this country by, we believe, the Portland Stoneware Company, 8 Liberty Square, Boston, which is far preferable to the brick reservoir. Perhaps Thomas Maddock & Sons, 273 Pearl Street, New York, could give some information on the subject. Field's flush-tank, either in iron or earthen-ware, forms a very effectual grease trap, but the siphon is apt to get clogged and give trouble.—Eds. American Architect.]

FINISHING HARD-WOOD FLOORS.

Brooklyn, February 21, 1882.

To the Editors of the American Architect: —

Dear Sirs, —Will you please state in your next issue, the kind of preparation used for finishing a floor of ash and cherry?

Yours truly, F. R. Hein.

[Painters differ very much in their methods of finishing hard-wood floors. A very common way is to fill with any of the patent paste wood-fillers, and varnish with several coats of shellac. Some use a softer varnish, but it is not so desirable. To our mind the handsomest floors are those finished with wax, and well polished with a brush; or still better, with Butcher's patent composition, a kind of hard wax, which has not the stickiness of the ordinary article, and keeps its polish much longer. The great advantage of a wax finish is that it rather improves with wear, and if periodically renewed keeps the floor bright and shining until the boards are worn through; while a varnish finish of any kind becomes incurably shabby when the coating is worn off.—Eds. American Architect]

NOTES AND CLIPPINGS.

The *American Architect* had not passed the first year of its existence before we had given offence to some one — probably by rejecting drawings or manuscript — who favored us with a series of anonymous letters, the burden of which was that we seemed to be so pre-eminently qualified to conduct a comic paper that we had better take up that field of journalism, or at least establish a "funny column," where our peculiar genius would have a clear field for its exercise. As our modesty was greater than our unknown adviser gave us credit for, we have never attempted to exercise the talents he ascribed to us; but his suggestion caused us to make note of such pleasantries as we encountered in the daily papers, and we here gather them together that our readers may see how the wits of various countries exert themselves at the expense of the building professions.

The carpenter, children, is one of the strangest subjects that you ever saw. It grows in interest the mortise studied

When hungry, the carpenter can dine off one of his joints, take rabbit plane for entrée, and his plumb for dessert.

But the carpenter never deserts his friends. He does everything on the square.

Though a strong man, the carpenter cannot raise his frame without assistance.

Here is another funny thing about the carpenter. His finest work is his plane work.

The carpenter's weapon is the hammer. He uses it to drive the nails home.

The carpenter does everything by rule. It is rule or ruin with him.

With some men, if you give them an inch they will take an ell. The carpenter, on the contrary, will not give you an L until he has taken a great many inches.

The carpenter never deals in fiction. His stories have always a foundation.

When a carpenter sells a house he sells the cellar with it. The buyer is also frequently sold.

The carpenter is an upright man, but you will sometimes see him on his beam ends. Perhaps this should not beamend-tioned.

The carpenter has many tools. You may auger from this that he has to brace up a bit to keep them awl sharp. This adze to his labor, which should be borne in mind by those who would chisel him out of his earnings.

The most celebrated carpenter I ever heard of was the Carpenter of Rouen. You never saw him, but you have seen the ruin of the carpenter, perhaps.

The carpenter is not much of a fisherman, but is very fond of the angle.

The carpenter's voice is not first-rate for singing. He wants timber. However, he is accurate in his measure, and, if a boss, is careful to keep good time.

It is a mistake to suppose that a carpenter ties his frame together with the knots in the timber.

His work is usually constructed on correct models, though he is not always a model man himself.

The carpenter is a pillar of society, and though coping with all sorts of difficulties, is seldom floored. He writes no political articles for the columns of the press, excepting now and then something relating to cabinet work.

Let us hope that the carpenter may continue to build up in good character, and if at last he should fall from his scaffold may a rope prevent his falling too far! — *Boston Transcript.*

RICH Dentist (who is contemplating the erection of a fine residence). —What style of architecture would you recommend?

Architect.—Seeing it's you, I should think Tuscan would be about the thing.—*Exchange.*

A WEALTHY but illiterate man, who was advised by his architect to build his suburban residence in the Tudor style, replied, "I don't want two doors. One door will do for me. My family is small and there'll be less to lock up."—*Exchange.*

ARCHITECT (to Mr. de Newvo Ritch, who is considering the front elevation of a projected residence: "If you do not like those towers, Mr. Ritch, we can have them eliminated." Mr. de Newvo Ritch: "They're real han'some as they be; but if 'liminatin' on 'em would make 'em han'somer, let's have 'em 'liminated." — *Columbia College Spectator.*

HE is a Detroit architect. We shall not give his name, because if we did some other city would bribe him to pull up stakes. One day last Fall a citizen went to him and said:

"Draw me the plans for a residence; I am willing to pay $500 if they suit."

The plans were drawn and they suited, and yet the architect said that $200 was enough. He estimated the cost at $12,000, and it amounted to only $10,550. He estimated the time in building at twelve weeks, and the house was finished in nine. He will of course have offers to lecture and to put himself on exhibition, and other cities will offer him a bonus to leave Detroit, but we sincerely trust that he will abide among us and continue with us. — *Detroit Free Press.*

THE builder of a church in a London suburb recently on returning thanks for the toast of his health, which had been proposed, remarked with much candor, "I fancy I am more fitted for the scaffold than for public speaking."—*Exchange.*

A TWO-FOOT rule was given to a laborer in a Clyde boat-yard to measure an iron plate. The laborer not being well up in the use of the rule, after spending a considerable time, returned. "Noo, Mick," asked the plater, "what size is the plate?" "Well," replied Mick, with a grin of satisfaction, "it's the length of your rule and two thumbs over, with this piece of brick, and the breadth of my hand and my arm from here to there, bar a finger."—*Punch.*

THE architect Petit, a furious archæologist, visits Palmyro in the hope of discovering some monument which will hand his name down to future generations.

After many and long researches he lights upon a ruined temple half hidden beneath earth and nettles. Trembling with hope and joy he has the foundation laid bare and is struck dumb with stupefaction to discover graven on the corner-stone, "Brought to light by Smith in 1827."

Foaming with rage he seizes his mallet and chisel and cuts beneath it, "Discovered by Petit before!" — *Le Figaro.*

THOMAS had been a carpenter; but, owing to dulness in trade, he engaged as footman at the "big hoose" in the village. On the day of his engagement, his mistress, having a lady visitor in the drawing-room, rang the bell for the footman. "You will show this lady the front door, Thomas," she said. "Yes, mem," replied Thomas; and bowing to the lady, he requested her to follow him. On coming to the door, Thomas opened it, and the lady was about to pass out, when Thomas, tapping her on the shoulder, remarked, "This is the door, mem; guid pitch pine in't, framed twa and a half inches thick with raised moldings; wad cost aboot twa pound ten, mem." — *Manchester Times.*

JUDGE CAREY showed the greatest interest in these weird tales, and edged up to the group.

"These are curious yarns, gentlemen, but I believe them all. I had a dog once, back in Nebraska, that I kept to herd lumber."

"Beg pardon, Judge; did you say the dog herded lumber?"

"Yes, sir; cottonwood boards. We always kept a dog there to bring the lumber in at night."

Everybody now paid the closest attention, as they knew that the boss was at work.

"It was this way. Cottonwood boards warp like thunder in the sun. A board would begin to hump its back about nine o'clock in the morning, and in half an hour it would turn over. By eleven it would warp the other way with the heat, and make another flop. Each time it turned it would move a couple of feet, always following the sun towards the west. The first summer I lived in Brownville over 10,000 feet of lumber skipped out to the hills the day before I had advertised a house raisin'. I went to the county seat to attend a law-suit, and when I got back there wasn't a stick of timber left. It strayed away into the uplands. An ordinary board would climb a two-mile hill during a hot week, and when it struck the timber it would keep worming in and out among the trees like a garter snake. Every farmer in the state had to keep shepherd dogs to follow his lumber around the country, keep it together, and show where it was in the morning. We didn't need any flumes there for lumber. We sawed it east of the place we wanted to use it, and let it warp itself to its destination; with the men and dogs to head it off at the right time, we never lost a stick."—*Carson City Appeal.*

THE largest hotel in one of the Western cities is called Rich's. Probably because it has wings.—*Exchange.*

PRESENCE OF MIND.— Visitor in Cathedral town, desirous of information, and willing to pay for it, to respectable-looking party, (whom he takes for a burger): "I suppose now these cloisters" — (slips florin into his hand) — "are not older than the sixteenth century?" Respectable party: "Well, sir, I'm sure I" — (pockets the coin) "thanky, sir, can't say, sir, 'cause I'm a stranger 'ere myself!" — *Punch.*

DON CAMERON had an English architect plan his Washington residence. That's why people ask what church it is. — *Berkshire Eagle.*

"SYRACUSE has a female architect." Norristown hasn't a female architect, but she has more than one designing woman. — *Norristown Herald.*

A WELL-KNOWN New York architect was lately urged by a person who was interested in a certain monument project of large pretensions to make a design for it. He objected. When further urged to name a sum he replied, "Well, I'll make you a design for $1,000." "Isn't that a trifle steep?" said the inviter. "I don't charge $1,000 for merely making a design," answered the architect, adding, "any man who makes a design for an American Monumental Committee is a fool, and when I deliberately make a fool of myself, I want at least $1,000 for it.—*Exchange.*

GLIMPSES of a future event: An immense ship carrying the Washington monument from the United States, then an ancient and abandoned country, to the grand republic of Africa, to be set up in the big square in the city of Timbuctoo. But we may euchre the Vandals after all by not completing the monument. Ha! ha! We shall prove too much for posterity. We are a wonderful people. — *New York Graphic.*

A WEALTHY manufacturer of Connecticut, having built an elegant mansion and wishing to take a second wife, said to his architect: "Which agrees best with brick and brownstone, a brunette or a blonde?" —*Exchange.*

"WHAT kind of a house do you want?" asked the architect. "Oh," replied the citizen, wearily, "I don't want a house at all. I just want you to build me three tiers of closets, like jail cells; one hundred and thirty closets in a tier, and put a roof over the top tier. I want to put up a house that will contain enough closets to satisfy my wife." But the architect, who was a man of broad experience, told him he would have to put a thousand closets in a tier and make the edifice six stories high, and then his wife would say when it was completed that there wasn't a closet in the house big enough for a cat to turn around in. — *Burlington Hawkeye.*

THE square man mezzures the same each way, and haint got no winny edges nor shaky lumber in him. He iz free from knots and sap, and won't warp. He is klear stuff, and I don't care what yu work him up into he won't swell, and he won't shrink. He iz amungst men what good kil dried boards are among carpenters, he won't season-krack. It don't make enny difference which side ov him yu cum up to, he iz the same bigness each way, and the only way tew get at him, enny how, iz to face him. He knows he iz square, and never spends enny time trieing to prove it. The square man is one ov the best shaped men the world has ever produced; he iz one of them kind ov chunks that kant alter tew fit a spot, but yu must alter the spot tew fit him.—*Josh Billings.*

A YOUNG architect recently created quite a reputation by building for a newly-married couple a house in which the parlor had two fireplaces close together, so designed that the husband and wife could each build a fire in an individual manner without quarrelling, and then could sit together at the same hearth, warmed by a mutual blaze. Their place is hence called "Harmony Grove."—*Exchange.*

WHEN the Court-House was building in West Chester, some one asked of old John Hickman what they should carve over the arch in front above the pillars. The old man raised his cane, and pointing along the cornice, deliberately suggested the following words: "Justice is slow and d—d uncertain."—*Chester County Democrat.*

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.*]

Baltimore.

Labor Market.—Prices in all departments of labor correspond to the figures last mentioned.

Houses.—Six three-st'y basement houses, McMechen St., and Park Ave., for Henry Blake, Esq.; to be built of brick, stone, and terra-cotta; Mr. Chas. L. Carson, architect.

Store.—Iron front store, 20' x 66', four-st'y, for Mr. Jno. A. Hamman, No. 46 North Howard St.; cost, $9,000; Mr. Jackson C. Gott, architect.

Building Permits.—Since our last report twenty-two permits have been granted, the more important of which are as follows:—

Philip P. Trazer, two-st'y brick building, s w cor. Jefferson and Chester Sts.

W. T. Seebold, two-st'y brick building, Saratoga St., between Fremont St and Myrtle Ave.

Samuel Snowden, 3 two-st'y brick buildings, Bouldin Alley, commencing 70' n of Wilson St.

Frank Gunterman, 2 two-st'y brick buildings, Chestnut Alley, between Cross and West Sts.

John W. Geiger, three-st'y brick building, s e cor. High and Pratt Sts.

Arthur Dickinson, 2 three-st'y brick buildings, German St., between Pine and Fremont Sts.

Jos. Patterson, three-st'y brick building, Eager St., w of Broadway.

Dr. T. W. Coyle, three-st'y brick building, No. 239 Eutaw St., between Madison Ave. and Biddle St.

John Schonewolft, three-st'y brick building, and two-st'y brick stable, s w cor. Williams and Gittings Sts.

Boston.

Building Permits.—*Brick.—Tyler St., No.* 105, for C. A. Jordan, stable, 27' 6" x 60', four-st'y; Wm. M. Rumery & Co., builders.

Wood.—Euclid St., near Withington St., Ward 24, for Wm. C. Hawkes,' Jr., dwell., 22' x 30', two-st'y; J. H. Wilder, builder.

C St., Nos. 29-31 *and* 33, Ward 13, for Hugh Gibbon, 3 dwells., 21' 6" x 39' 4", three-st'y.

Rutherford Ave., nearly opposite Miller St., Ward 5, for Robert Duddy, stable, 25' x 40' and 25' x 50', two-st'y; Chas. B. Erskine, builder.

North Beacon St., nearly opposite Lyman Ave., Ward 25, for H. B. Goodenough & Co., wool-pulling building, 30' x 120', three-st'y; Stephen Holmes, builder.

Dove St., cor. E St., Ward 14, for Joseph Green, stable, 32' x 65'; 2 ells 21' x 68' each.

Minot St., cor. Sheridan St., Ward 24, for H. P. Oakman, dwell., 20' x 32', two-st'y; H. P. Oakman, builder.

Bearse Ave., near River View St., Ward 24, for Alfred T. Newcomb, dwell., 25' x 30', two-st'y; F. M. Severance, builder.

Arklow St., cor. Walden St., Ward 22; Thomas Sprowles, dwell., 14' and 15' x 27'.

Arklow St., cor. Walden St., Ward 22; Thomas Sprowles; dwell., 13' and 14' x 29'.

Glendale St., near Bird St., Ward 20, for Edward McKechnie, dwell., 31' x 35', two-st'y; Edward McKechnie, builder.

Canterbury St., near Hyde Park Ave., Ward 23, for Wm. O'Brien, dwell., 18' x 26'; Thomas Shea, builder.

Neponset St., rear of, near Union St., for Wm. Whyte, storage, 22' x 33', Ward 24; Munson Rowland, builder.

Glendale St., near Bird St., Ward 20, for Edward McKechnie, dwell., 31' x 35', two-st'y; Edw. McKechnie, builder.

Brooklyn.

Building Permits.—*Graham Ave.*, e s, 25' n North Second St., three-st'y frame tenement; cost, $4,500; owner, Wm. Shaffner, cor. above Sts.; builders, J. Rauth and M. Metzen.

Jefferson St., n s, 195' e Tompkins Ave., 12 three-st'y brownstone dwells.; cost, each, $5,000; owner, D. T. Macfarlan, 67 Liberty St., New York; architect, N. M. Whipple; builders, Macfarlan & Co.

Sumner Ave., Nos. 40, 42 *and* 44, *near* Floyd St., three-st'y frame store and tenement and 2 three-st'y frame tenements; cost, each, $4,000; owner, F. Koch, Hopkins St.; architect, Th. Engelhardt; builders, W. Rauth and Y. Eich & Bro.

Prospect Pl., s s, 140' e Rogers Ave., three-st'y frame tenement: cost, $3,800; owner, M. Masace; architect, J. D. Reynolds; builders, J. Richard and T. Donnelly.

Macon St., n s, 100' w Reid Ave., 6 two-st'y brownstone dwells.; cost, each, $5,500; owner, George Nichols, 80 Rogers Ave.

Bushwick Ave., s e cor. Jacob St., three-st'y frame dwell.; cost, $11,000; owner, C. A. Robinson, 114 Magnolia St.; architects, D. & J. Jardine.

Beaver St., n w cor. Locust St., 5 three-st'y frame tenements; cost, each, $3,200; owner and carpenter, George Loeffler, 82 Tompkins Ave.

Chicago.

Building Permits.—B. Luders, two-st'y and basement brick dwell., 21' x 56', 183 Larrabee St.; cost, $3,500.

Potter Palmer, three-st'y and cellar brick dwell., 56' x 80', Bank St., e of State St.; cost, $90,000; Cobb & Frost, architects.

N. B. Blatherwick, two-st'y and basement brick flats, 44' x 50', Jackson and Leavitt Sts.; cost, $8,000.

P. J. Quinn, three-st'y brick flats, 20' x 44', 29 Pine St.; cost, $3,000.

Chicago Rubber Works, three-st'y brick factory, 54' x 135', Grand Ave., near Rockwell St.; cost, $30,000.

E. Ottenheimer, three-st'y brick addition, 10' x 20', 20 Brown St.; cost, $2,000.

Geo. W. Cooper, two-st'y and cellar brick flats, 24' x 64', 204 Walnut St.; cost, $4,500.

A. Wachter, three-st'y brick flats, 20' x 60', 182 Sherman St.; cost, $6,000.

J. A. Roche, three-st'y and basement brick dwell., 23' x 58', 433 Warren Ave.; cost, $8,000.

Mrs. G. C. Early, two st'y and basement brick dwell., 639 West Monroe St.; cost, $6,000.

Drs. St. John and Copland, three-st'y and cellar brick flats, 36' x 84, s e cor. Stanton and Warren Ave.; cost, $10,000.

Wm. Smith, one-st'y brick foundry, 62' x 125', Twenty-third St. and Stewart Ave ; cost, $6,000.

Chicago Lumber Company, three-st'y brick factory, 64' x 150', Thirty-third and Iron Sts.; cost, $25,000.

Chicago Lumber Co., two-st'y brick barn, 35' x 50', Thirty-fifth and Iron Sts.; cost, $3,000.

Chicago Lumber Co., two-st'y brick office, 32' x 50', Thirty-fifth and Iron Sts.; cost, $2,500.

Chicago Lumber Co., one-st'y brick dry kiln, 80' x 80', Thirty-fifth and Iron Sts.; cost, $6,000.

W. Schade, 2 three-st'y and basement brick stores and flats, 50' x 65', Nos. 759, 771 West Lake St.; cost, $16,000.

Paul Juergens, 2 three-st'y and basement brick dwells., 44' x 50', Nos. 486 and 488 La Salle Ave.; cost, $15,000.

Addle & Farran, two-st'y brick flats, 24' x 61', 375 Mohawk St.; cost, $5,500.

New York.

Rumors.—That the Knickerbocker Club have sold their present club-house, at the corner of Twenty-eighth St. and Fifth Ave., to parties who have also bought the two adjoining houses, and that the three are to be converted into an apartment-house.

That the Gramercy Park Hotel property is to be altered into a first-class apartment-house.

That the main entrances to the Grand Opera are to be utilized as stores, or that the whole building be made into a business emporium.

Labor Market.—This month shows no change, and we hear of no rumors of any advance to be asked at present.

Stores.—It is proposed to erect stores, 50' x 100', on Eighth Ave. and Forty-fourth St., the buildings to be brick with stone finish; Mr. Jas. Stroud, architect.

Nos. 440 to 444 Canal St., with a frontage of about 75', and running through to Vestry St., are to be built up as stores, fronts brick with stone finish; Trinity Church Corporation, owners; Mr. Chas. C. Haight, architect.

Apartment-House.—On the n e cor. of Fifty-fourth St. and Madison Ave., an apartment-house, 25' 6" x 88' is to be built. It will be five-st'y, and have a front of Philadelphia brick with Ohio stone finish.

Materials.—There is no change of importance to note. Pale brick are not obtainable at less than $5 per M, and lath are firmly held at $2.25 per M.

Building Permits.—*Third Ave.*, s e cor. One Hundred and Second St., four-st'y brick store and tenement; cost, $14,000; owner and builder, Daniel Schoonmaker, 1849 Third Ave.; architect, A. Spence.

Third Ave., e s 26' 11" s One Hundred and Second St., four-st'y brick store and tenement, 25' x 68', tin roof, iron cornice; owner, Elizabeth Schoonmaker, 222 West Twenty-fourth St.; architect, A. Spence; builder, D. Schoonmaker.

Third Ave., e s, 170' n One Hundred and Seventieth St., one-st'y frame car-shed; cost, $3,000; owner, Harlem Bridge, Morrisania & Fordham Railroad Co., on premises; architect, W. W. Gardiner.

Baxter St., Nos. 3 *and* 5, five-st'y brick store and tenement; cost, $18,000; owner, Thomas Foulke, 60 West Thirty-eighth St.; architects, D. & J. Jardine.

One Hundred and Nineteenth St., s s, 210' w Third Ave., one-st'y iron store; cost, $3,000; owner, A. Kitterman, 166 East One Hundred and Nineteenth St.; architects, Cleverdon & Putzel.

West Forty-fourth St., No. 25, five-st'y brick and Ohio stone tenement, 25' x 63' 6", extension 12' x 18' 6' and 5' x 9', tin roof, iron cornice; cost, $18,000; owner, George Shepard, 322 West Twenty-second St.; architect, J. M. Dunn; builders, N. & H. Andruss and O. T. Mackey.

Fifty-first St., s s, between Fourth and Madison Aves., three-st'y and basement brick and brownstone school-building; cost, $30,000; owners, R. & O. Goelet, 261 Broadway; architect, J. M. Dunn; builder, M. Reid.

Chatham St., Nos. 29 *and* 31, extends to North William St., five-st'y brick store and office-building; cost, $25,000; owner, Levi A. Lockwood, Brooklyn; architect, J. B. Snook.

Seventh Ave., w s, 24' 9" s Thirty-seventh St.; 2 five-st'y brick tenements; cost, each, $17,500; owner, James J. Morison, 135 West Thirty-fourth St.; architects, Thom & Wilson; builders, J. Vix & Son.

East Forty-fourth St., Nos. 312 *and* 314, 2 four-st'y brick tenements; cost, each, $8,000; owner, F. E. Smith, 1216 Third Ave.; architect, F. T. Camp; builders, Smith Brothers and Henry Ellis.

Sixtieth St., n s, 77' w Boulevard, 2 four-st'y brick tenements; cost, one $5,000 and one $7,000; owner, Clarence M. Embury, 4 East Forty-third St.; architect, A. B. Ogden.

Madison Ave., s w cor. Fifty-eighth St., 6 four-st'y brick and Nova Scotia brownstone dwells.; total cost, $159,000; owners and builders, Charles Graham & Sons; architect, Thos. Graham.

Canal St., No. 278, three-st'y office and store-rooms; cost, $2,500; owner, Catharine W. Bruce, 39 East Twenty-third St.; architect and mason, J. Demarest; carpenter, W. A. Vanderhoff.

Fifty-fifth St., n s, 274' w Sixth Ave., one-st'y brick exercising building; cost, $4,500; owner, Henry M. Flagler, 140 Pearl St.; architect, John Correga; builders, L. N. Crow and McGuire & Sloane.

Fifty-fifth St., n s, 299' w Sixth Ave., three-st'y brick stable and dwell.; cost, $39,000; owner, architect and carpenter, same as last.

Grand St., No. 553, five-st'y brick tenement; cost, $20,000; owner, James Reed, 554 Grand St.; architect, Chr. Sturtzkober.

Varick St., s e cor. Beach St., six-st'y brick building for tenement, with 3 stores on first floor; cost, $15,000; owner, Henry McArdle, 31 North Moore St.; architect, M. C. Merritt.

One Hundred and Tenth St., s w cor. Lexington Ave., two-st'y brick and brownstone store and dwell.; cost, each, $9,000; owner, R. H. L. Townsend, 171 Madison Ave.; architect, Chas. Baxter.

Seventy-eighth St., n s, 250' e First Ave., 3 four-st'y brick tenements; cost, each, $10,000; owner and builder, John W. Warner, One Hundred and Sixth St., between Fifth Ave. and Madison Ave.; architect, Wm. Graul.

Eighty-second St., n s, 225' w First Ave., four-st'y brick tenement; cost, $14,000; owner and builder, John W. Warner, One Hundred and Sixth St., between Fifth Ave. and Madison Ave.; architect, Wm. Graul.

Lawrence St., n s, 225' w Ninth Ave., four-st'y brick apartment-house; cost, $12,000; owner, Wm. McReynolds, 209 West One Hundred and Twenty-eighth St.; builder, A. McReynolds.

Lawrence St., s s, 200' w Ninth Ave., 4 four-st'y brick apartment-houses; cost, each, $10,000; owner, etc., same as last.

One Hundred and Twenty-seventh St., s s, 225' w Ninth Ave., four-st'y apartment-house; cost, $8,000; owner, etc., same as last.

West One Hundred and Twenty-fifth St., Nos. 211 *and* 213, 2 one-st'y brick and iron stores and dwells.; cost, each, $5,000; owner, John Cromwell, Crawford, N. J.; architect, N. G. Foster; builders, J. P. Niblo and Dixon & Riker.

Alterations.—*West Forty-fourth St., No.* 120, three-st'y brick extension; cost, $4,000; owner, Otto J. Bueb, 101 West Forty-third St.; architect, J. G. Michel; builder, John Sheridan; carpenter, not selected.

Philadelphia.

Building Permits.—*Walnut St.*, e of Twenty-first St., three-st'y dwell., 50' x 100'; R. H. Tout, contractor.

Robeson and Main Sts., M'y'k, two-st'y office, 20' x 35'; S Schofield.

Foulkrod St., w of Franklin St., three-st'y dwell., 16' x 44'; Yerkes & Haines, contractors.

Race St., w of Franklin St., 5 one-st'y stores; Jno. Borden, contractor.

Roberts St., between R. R. and Baker St., two-st'y stable and 4 two-st'y dwells., 14' x 36' and 16' x 50'; Wm. Cole, owner.

South Broad St., No. 253, two-st'y hall, 38' x 60'; F. Thron, owner.

Leverington Ave., e of Mitchell St., three-st'y dwell., 18' x 20'; Jno. Swoyiger, owner.

Front and Morris Sts., three-st'y store and dwell. and two-st'y dwell., 14' x 28' and 19' x 54'; Amos Dotterer, owner.

Long Lane and Reed St. and Twenty-first St., 2 two-st'y stores and dwells.; two-st'y dwells., 18' x 32' and 18' x 34'; Robert McFarland, owner.

Fisher's Lane and York Road, two-st'y station, 19' x 46'; Tourison Bros., contractors.

Hope St., No. 2207, two-st'y stable, 18' x 28'; Henry Gill, contractor.

North Front St., No. 2206, three-st'y store and dwell., 18' x 76'; H. Gill, contractor.

Atmore St., between Thirteenth and Broad Sts., 3 three-st'y dwells., 12' x 35'; Wm. Holloway, contractor.

Brown St., No. 1333, three-st'y dwell., 20' x 62'; W. Holloway, contractor.

Passyunk Ave., No. 1526, two-st'y dwell., 15' x 28'; And. Miller, owner.

Coral and Auburn Sts., 2 two-st'y dwells., 13' x 33'; Benj. Tyndall, owner.

York and Moyer Sts., one-st'y store-house, 39' x 138'; Slater & Miller, contractors.

Passyunk Road, between Tasker and Moore Sts., three-st'y dwell., 16' x 40'; J. H. Billington, owner.

Cook St., between Memphis and Tulip Sts., one-st'y brass foundry, 36' x 50'; Eldridge & Stewart, contractors.

Waterloo St., n of Diamond St., two-st'y stable, 36' x 44'; Eldridge & Stewart, contractors.

Seventh St., 18' s of Moore St., two-st'y hay-house, 70' x 80'; Chas. Kilpatrick, owners.

Armat St., e of Hancock St., 2 three-st'y dwells., 16' x 42'; H. F. Whartman, contractor.

St. Louis.

Building Permits.—Twenty-nine permits have been issued since our last report, seven of which are for unimportant frame houses, and one important frame house. Of the rest those worth $2,500, and over, are as follows:—

Owner's Name.	Use.	Stories	Rooms	Cost.
J. C. Brockmeier	Store & Dwell.	2	8	$ 3,500
J. C. Brockmeier	Dwell.	2	12	2,500
G. Haven	Dwell.	2	12	4,000
Mrs. M. Gaffey	Dwell.	3	10	6,000
A. Held	Dwell.	2	8	4,000
T. Rick	Dwell.	2	18	6,000
John Fausck	Tenement H'se	2	12	3,000
Schultz Belting Co.	Tannery	5	3	2,500
H. Langenford	Dwell.	2	14	6,000
St. Louis Railway Co.	Frame Houses.	1	1	3,900

Toledo.

The winter has, as a whole, been a very dull one, so far as new projects for building are concerned, especially for this city. But the outlook is somewhat improving, and a good business in the surrounding country is anticipated. Material and labor being somewhat advanced may deter many from building; yet there are no excessive prices: in fact not as high ones as in 1873-4. Natural laws seem to regulate it all, for when building is expensive, there is more money with which to build.

(*Continued on next page.*)

The American Architect and Building News

ADVERTISERS' TRADE SUPPLEMENT.

No. 2.] SATURDAY, MARCH 4, 1882.

AMERICAN ELECTRIC-LIGHT COMPANY OF MASSACHUSETTS.

THE following correspondence on that great topic of the time, the electric-light question, is self-explanatory: —

BANKING HOUSE OF FOGG BROS. & CO.,
BOSTON, February 28, 1882.

To whom it may concern: —

As our house is interested in the American Electric-Light Company of Massachusetts, and has acted as financial agent in placing the stock of the company with our customers, we felt the necessity of a report upon the system of electric lighting now in use by the American Company by some well-known and responsible electrician whom we knew to be unbiassed, by reason of having no monetary interest in this or any other electric-light company. We therefore employed Professor Blodgett, late of the Massachusetts Institute of Technology, and now in charge of the electrical department of the Boston & Albany Railroad Company. Professor Blodgett's report was eminently satisfactory to us, and we deem it advisable to give it to our customers and the public in this way.

FOGG BROS. & CO.

PROFESSOR BLODGETT'S LETTER.

BOSTON, February 25, 1882.

MESSRS. FOGG BROS. & CO., BANKERS:—

Gentlemen, —At your invitation I have visited with you on several evenings the office and lighting station of the American Electric-Light Company in this city. I have made a careful examination of their apparatus, and communicate my observations herewith:—

This company exhibits two entirely distinct systems of electric lighting, one by the electric arc, so called, and the other by what is known as the incandescent system. Each of these I have examined, and will consider them in order. The apparatus for arc lighting, as shown at the office of the company, No. 160 Tremont Street, consisted of a dynamo machine and three lamps in operation. The machine is constructed on a novel principle, the invention of Professor Thompson, now or formerly connected with the Franklin Institute, and whose standing in electrical science is well known. From the manner of its construction such a machine should be capable of great economy and efficiency, and, in fact, while occupying but a small space, it was running three large lamps in a very satisfactory manner. I was informed by the engineer in charge that the machine could give four lamps as well as three, but that he had no place to put another, and the machine did not appear to me to be working to its full capacity. I did not regard the results, while in an eminent degree satisfactory, as better than the average which the apparatus will give, though the lamps burned very steadily. They were intensely brilliant, and in comparison with a lamp of another kind near by were to all appearance far superior.

Later in the evening the difference was not so marked, but the quality of the light was, as at first, whiter than the other, which is for many purposes an important factor. From a superficial inspection of the machine, I judge it may have been using three and a half horse-power, not an excessive amount. At the Mechanics' Fair building, on Huntington Avenue, which the company are now using as a central station, two larger machines of the same kind were running from one of the engines used to furnish power during the late fair. These machines had twenty-two lamps in circuit, sixteen of which were burning when I saw them. Like the smaller machine at the company's office, each was furnished with an automatic regulator, which so perfectly controlled the current that extinguishing one or several lamps had no appreciable effect on the others. Twelve of these lamps were at the Fair building. Of the remaining four lamps, three were over the entrances of the Hotel Brunswick, and one in the square opposite Trinity church. All were furnishing a beautiful white light, well diffused, and illuminating the front and side of the Brunswick and the surrounding buildings with great brilliancy. Each lamp is regulated by a peculiarly arranged system of feeding magnets and shunt coils, which are in equilibrium with each other, and secure a very uniform flow of current through the lamp. It is prompt and sensitive in its action, and a very limited inspection of the lamp would have demonstrated its efficiency. These lamps are also provided with automatic "cut-outs," which, should the carbons become exhausted, or the regulating apparatus be injured, or for any reason fail to properly perform its functions, by the operation of this part of the mechanism would furnish an independent passage for the current, whereby the circuit should not be broken or the lamp suffer injury.

To sum up the points observed in the apparatus for arc lighting: The machine appears to be an excellent one, constructed on scientific principles, simple, compact, and durable, not difficult of operation, or liable to get out of order. From the manner of its construction, a maximum of electrical effect is obtained within a very small compass, and apparently with a small expenditure of power. The moving parts are light and almost entirely concealed, and there is little chance for accident. The lamps are good, and give a beautiful light, very brilliant and steady, and from all that I could discover, ought to prove as successful as the very best in the market. If the results shown were no better than may usually be obtained from the apparatus, it leaves little to be desired in the direction of lighting by the electric arc.

The incandescent system was represented by a machine and about twenty lamps (the invention of Professor Bernstein, the local electrician of the company), most of which were in operation. They gave a soft and brilliant light, perfectly steady, except such fluctuations as were probably due to the irregular speed of the engine, which was small and unfit for the purpose. They appeared somewhat more brilliant than an ordinary gas-burner. The company claims to be able to furnish six such lights for each horse-power consumed—or brighter ones by an increase of power—and I do not regard either of these claims as extravagant. These lamps, which consist of a filament of carbon in a glass globe devoid of air, and joined at its ends to conducting wires sealed in the glass, do not differ greatly from those of several other inventors, but have an important advantage over others I have seen in use, in that the destruction of the enveloping globe is not, it is claimed, necessary, when for any reason the carbon filament (which is the light-giving portion of the lamp) needs renewal. With

proper care in their manufacture this would seldom be required, and, as it appears, can be simply and easily accomplished when necessary. They are easy to manipulate (being turned on and off like a gas-jet), and require little care to keep in perfect order. I could not well judge from so small a machine running under such conditions how economical a larger one running under other conditions would be, but I am of the opinion that it will prove as efficient as any type of such machine which I have seen in use.

In conclusion, while longer observation and more careful experiment might possibly modify in some particulars my view of the apparatus of this company, I have no hesitation in saying that from an electrical point of view I can see no reason why it should not be commercially and practically very successful.

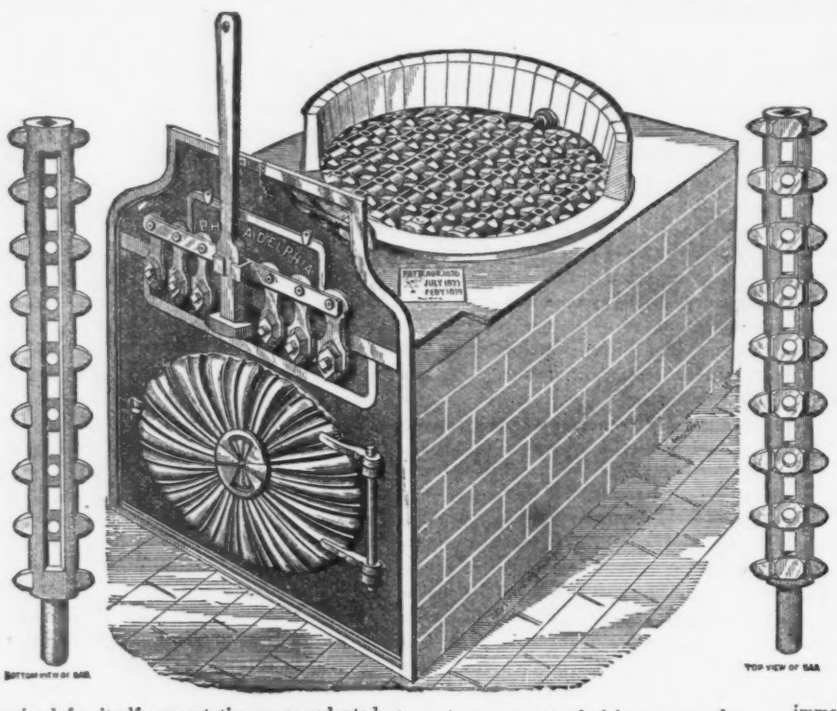
Yours very respectfully,

GEORGE W. BLODGETT,

(Firm of Blodgett Bros. & Co., Electricians).

"MERSHON" PATENT SHAKING AND ANTI-CLINKER GRATE.

This grate and bar is acknowledged, after being used by hundreds of parties for the last four years, to be as complete, economical, effectual and easy working one as has ever been invented and offered to the public. It has gained for itself a reputation unprecedented. It is adapted for burning anthracite and bituminous coal, coke or wood. You require no pokers and do not have to stoop in operating the grate. No door or part of a door is opened in shaking or dumping the fire, thereby preventing any dust or ashes coming into the cellar and covering the clothing of the attendant. The grate is very simple and easily repaired. The bars are all separate and any of them can be taken out and replaced in a few moments' time, without using a single bolt of any kind, thereby costing less to make repairs than any other shaking grate now in use. The bars can be worked separately, in couples or all together as may be desired. The ease by which this grate can be worked is remarkable. A boy can rake the largest heater fire more quickly and thoroughly than it can be done with any other grate by an adult. A grown person can generally rake the fire effectually by using only the finger and thumb upon the lever. The central bar can be dropped, to more readily remove the ashes; at the same time the other bars can be worked, facilitating the operation. This bar is replaced by drawing up the chain which shows on the front of the cut. It keeps a clear level fire at the sides as well as in the centre, consequently giving all the heat the fuel possesses. It is a grate that does not waste coal. Fault is often found with servants in not properly attending to heater fires; the cause of this is that they cannot rake the fire without labor and fatigue, and consequently they will keep putting on coal instead of raking the fire when it needs it. To save all this trouble you can keep a good servant, save coal, and have your heater properly attended to by putting in one of these grates. They can be added to any kind of heater and of any size. The labor and coal it saves and the satisfaction it gives will more than pay for it. Any one not desiring to purchase a new heater can have this grate and fixtures put to their old one at the same cost as any old-style grate and fixtures. We have altered a great many, and the testimonials we have received are highly flattering. We would also say that any steam or hot-water heater can have this grate attached. Parties contemplating making a change, or those in want of a really good first-class and reliable article of this kind, should call and see it. Estimates and all other information cheerfully given.



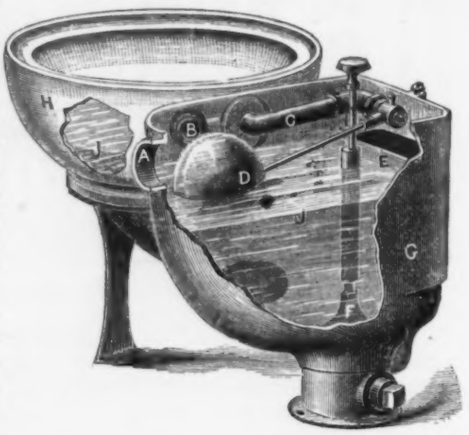
DANIEL MERSHON'S SON,

N. W. Corner Twelfth and Filbert Sts.,

Philadelphia, Pa.

ZANE'S PATENT SANITARY CLOSET.

For years the public has been obliged to suffer from the inconvenience and unhealthfulness of ill-constructed and imperfectly-modelled water-closets. The old-fashioned "pan and trap" style, in spite of the numerous improved "attachments" thereto, has ever proved itself a nuisance in any establishment wherein it may have been placed. Not alone in the disagreeable and offensive odors which constantly emanate from these basins, but also in the terrible and often fatal diseases engendered by the obnoxious gases which, arising therefrom, permeate the atmosphere of every apartment of the building in which they are found.



At last, however, these objectionable features have been overcome by the invention of Zane's Patent Sanitary Water-Closets. They are constructed in such a manner as to allow the "bowl" to remain at all times half-filled with water, which completely cuts off any smell that might otherwise arise from the soil-pipe. Aside from this quantity of water in the bowl, there is an equal amount in the reservoir placed at its side, through which the soil must pass, and is carried with great force by this body of water through the soil-pipe into the main sewer of the street.

There is a solid rubber plunger, which fits into the mouth of the pipe, and effectually prevents the water from escaping from the bowl, or reservoir, and is also an additional check to the escape of foul gases. This plunger is to be lifted (the same as any lever connected with an ordinary closet), immediately after using, and when the bowl is emptied, is allowed to drop back into place, and the water rushing in re-fills the bowl and cistern, until shut off by a ball-float, which closes the supply-valve, when the closet is again ready for use.

It may be seen that by having a small reservoir so closely connected with the basin, that it does away with the necessity of building the tanks, which form such an ungainly addition to the interior arrangement of a great number of our finest residences; and in the removal of these cisterns is also done away the liability of choking and ultimate stoppage of the supply-pipe with the dust and dirt, the

accumulation of which it is impossible to avoid is one of these receptacles.

An impartial observer cannot help seeing on the instant the great superiority maintained by these closets over all others now upon the market, as the main principle upon which they are constructed is to allow the body of water (a common pailful) to rush with all its force down the pipe, and consequently it cannot fail to carry with it every particle of soil deposited in the bowl.

The trouble experienced by the use of the "pan" closets (by their becoming choked, or the pan refusing to close tightly on account of the presence of some foreign substance, thus allowing the water to trickle slowly away and waste itself, leaving the bowl dry and unfit for use), is entirely obviated by the introduction of Zane's Patent Sanitary Water-Closet, as it is impossible for any matter to withstand the powerful pressure brought to bear upon its removal.

These closets have been highly recommended by all who have used them, their entire simplicity of construction being a strong argument in their favor, while they are also made in such a manner as to be readily fitted into the place of the old-style closet without altering the pipes or wood-work, and they are considered by such architects, plumbers, and physicians as have examined them to be the most perfect article of the kind offered to the public.

Perhaps the best recommendation these superior closets could have is, that during the last year some 3,000 have been placed in various houses throughout the country, and there is little doubt but that the demand for them will be doubled this present year.

The well-established reputation of the patentees, who have been in business for over forty years, is a guaranty that the closets are made in the very best manner. They are also patentees and manufacturers of the well-known Boston Safety Self-closing Faucet. Every article is warranted.

JOSEPH ZANE & CO.,
81 SUDBURY STREET, BOSTON.

NEW SPEAKING-TUBE ANNUNCIATOR.

MR. W. R. Ostrander has invented and has been granted two patents for a Speaking-Tube Annunciator. Figures 1 and 2 of the accompanying engravings give a fair idea. The special advantages claimed for this device over other methods are that it is self-acting, and requires no attendance in regulating. There is nothing about it in the shape of springs requiring to be wound up, no delicate mechanism, and no electric batteries to keep in order. The working of the annunciator may be clearly understood by inspection of Figure 2. By a slight blow into the tube, the drop F is released from its vertical position which it usually occupies, and in falling strikes upon the rod H. This rod, as will be seen by examining the section, is at one side of a nicely adjusted balance, which the weight F is sufficient to overcome. Tipping the balance in this manner sounds the gong-bell, and attracts the attention of the attendant. By means of the portable mouth-piece shown in the foreground of Figure 1, communication is established through the pipe from which the signal was given. By replacing the lid in a vertical position the annunciator is ready to receive other signals. The desirability of oral communication between the rooms of a hotel and the office, or between rooms in apartment-houses and the janitor's office is of considerable importance. It insures the guest in the hotel the most prompt attention, and results in a saving of bell-boys as well as wear of carpets. There is nothing in the construction of this annunciator which would interfere with its being placed in buildings already occupied, without special inconvenience to tenants. The case of the annunciator is finished to correspond with the wood-work of the apartments in which they are situated. Mr. Ostrander gives personal superintendence to his work, and everything is fitted in the best possible manner. In the last patent granted to him, the annunciator cannot give a false alarm by jar of building or other concussions.

W. R. OSTRANDER,
19 ANN ST., NEW YORK.

Fig. 1.

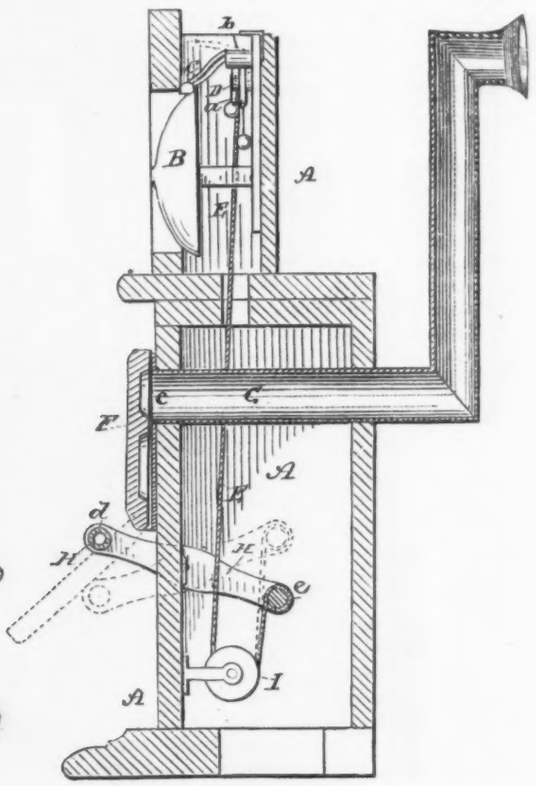


Fig. 2.

NOTES.

THE sewer-gas trap invented and manufactured by Mr. F. E. Cudell, 204 Superior Street, Cleveland, Ohio, has been placed in the White House at Washington, on the recommendation of Mr. George E. Waring, Jr., who was charged with the re-arrangement of the drainage system of that building.

Messrs. Fiske & Coleman, New England Agents of the Akron Sewer Pipe Company, and managers and agents of the Boston Fire-Brick Company, and the Boston Terra-Cotta Company, have moved into a larger and more convenient office, at 62 Congress St., Boston.

Mr. Howard Fleming, 23 Liberty Street, New York, who furnished 15,000 barrels of J. B. White & Brothers' English Portland Cement for the Washington Monument has published a large and elaborate show-card in honor of this fact.

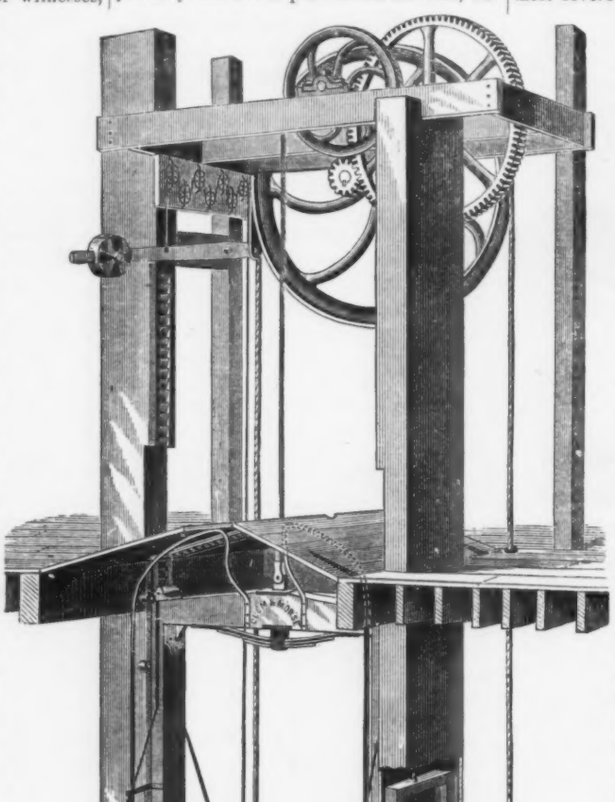
Those of our advertisers who desire to make use of the next issue of the *Trade Supplement*, for April 1, are requested to send us their articles at once.

AUTOMATIC HATCHWAY DOORS.

When we read over the list of disastrous fires that have recently occurred — notable among which are the Potter or Old *World* building, in New York, and the block in Haverhill, Mass., — the subject of protection for elevator hatchways demands greater attention than has ever been given it heretofore.

The loss of life in the *World* building, it has been shown by the testimony of witnesses, was largely due to the fact of the flames rushing up the elevator hatchways into every story, making the ignition so rapid that all avenues of escape were cut off almost before the alarm was sounded.

Most people are aware that there are such things as doors that open and close automatically every time the elevator platform passes through, but they have not entered into very general use until recently, as most of the styles patented are not capable of being adjusted when any shrinkage in the wood or settling of floors occurs, and as these things sometimes *do* happen, doors of this class prove themselves more of a nuisance than a blessing, and the only remedy is to take them to the blacksmith and have the rods lengthened or shortened, which overcome the difficulty for a while only. The great improvement in the style we herewith illustrate is in the adjustable rod beneath the curved levers which are jointed at the pin or shaft, on which they work. By simply loosening a set-screw, the slotted rod can be moved out so as to enlarge the circle of the bowed lever, which will press the door back hard against the post, or if it bears back too hard the rod can be moved back so as to diminish the curve of the lever. We have spoken more particularly of the value of automatic hatchway doors against the spread of fire, but they are also valuable as a life-saving apparatus, as many persons are instantly killed or maimed for life by falling through unprotected hatchways, and unless the protection provided is automatic it is useless, employees being so careless they will not take the trouble to close doors or put up bars.



This illustration shows the doors in connection with one of our hand-power elevators, but they are applied with equal success to our steam and belt-power elevators. Our firm has also secured the right to apply Henriksen's automatic safety-clutch to elevators, which overcomes the objection of safety clutches depending on springs whose action depend on the breaking of the cable. The clutch acts independent of the cable and will act immediately upon any undue acceleration of the speed of the platform, or car, whether caused by the cable, belts, or any part of the machinery. The Heebner Patent Governor is also another specialty of the Clem & Morse Elevators.

While the doors are a valuable addition as a protection against the spreading of fire, or accident from persons falling through the hatchways, — the doors being always closed, except while the platform is passing through — yet they are not a part of the elevator, nor in any way essential to its good working, and are never included in prices quoted for our elevator, unless distinctly so specified, at an additional price. We show this style of automatic doors as being one of the best and cheapest in the market, but the elevator is equally well adapted to a number of other styles which we put on. This elevator embraces all the most approved principles which our long experience has enabled us to embody in hoisting machinery. There is nothing complicated in its construction, but particular attention is paid to every detail that will add durability, or ease in operating. The platform is made of selected ash lumber, and ironed so as to secure the greatest strength and neatness in appearance. The safety-catches which have proved their merit under most severe tests, are concealed in the cross-beam of the platform, and are operated by the heavy steel coach-spring shown underneath, so that in case of the cable breaking, they are shot out and caught by the toothed iron rack, shown on the posts. On each side of this iron rack, ash strips are placed, as a track for the roller guides, which are placed at four opposing points on the platform, to overcome all friction, or binding, when the platform is unevenly loaded. The platform is centrally suspended by a fine wire cable, — which usage has demonstrated to be far superior to rope — and is counter-balanced with a weight adjustible to the load to be carried. The machinery is fitted up by skilled mechanics. The rope-wheels are balanced, to make them run without shaking, and the boxes, or bearings, are bored out smooth in a lathe, and made self-oiling. It has our improved brake, which is operated by a single check-line that does not require holding to keep the brake on, or off, but remains stationary wherever placed by either an upward or downward movement of the hand of the operator. We desire to call especial attention to the Heebner Patent Governor, for which we own the sole right to apply to hoisting machinery, but, like the automatic doors, it is never included in the price we quote unless so specified. Its method of construction is different from the governor on a steam engine, but the result attained is the same, as it instantly moderates any undue acceleration of speed when the platform is descending heavily loaded, and proves most valuable in connection with the automatic doors, by preventing the platform from obtaining such a momentum as to forcibly strike the levers, jerk the doors open, and slat them back against the posts in a way that does not prove at all beneficial, but is very apt to result from careless management of a machine without a governor. The manufacturing is done under the personal supervision of one member of the firm, while the other looks after the erection of the elevators after they leave our works, thus securing care to attain excellence in all departments.

CLEM & MORSE,
Fifth and Cherry Streets, Philadelphia, Pa.