THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. VII. Copyright, 1880, HOUGHTON, OSGOOD & CO. NO. 227.

MAY 1, 1880.

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

CONTENTS.

WITH this number of the *American Architect*, the original editor bids his readers good bye. Absence from the country, — it may before a considerable time — will require him to give it up into other hands, though it be not without reluctance and regret. During the four and a half years since this journal was begun, he has seen it grow from a somewhat puny childhood into fairly developed adolescence, with every promise of an active and useful career. He has seen a frank welcome expand into a hearty support. With such a growth there comes the feeling of a cordial relation to his thousands of readers, which he would fain believe they have in some sort shared. Not the least of an editor's rewards is the intercourse which his work makes for him with many who are otherwise unknown, the acquaintance it brings with persons in far-off and unexpected places. There belongs to him especially a pleasure of which probably other persons than he have no idea, a pleasure almost like that of receiving a new and sympathetic member into one's family, — the pleasure of welcoming a new contributor. There are many friends made in this way to whom the present editor has now to offer his word of thanks, and his farewell, while he leaves their impersonal friendship as a heritage to his successors. The *American Architect* owes much gratitude to the contributors, solicited and unsolicited, who have given it credit before the public; to the profession which has accepted it with kindness, and which, the editor would like to believe, sets a value on it as in some degree representative; to the public and the general press, which have met it with a liberal feeling, without too great severity for its shortcomings, and, so far as he knows, with singularly little opposition. For his successors, already known to his readers in their work, if not personally recognized in it, who now take up the charge, relieved of the responsibility of finding shape and character for a new periodical, but with labor and difficulty enough before them in giving it all the completeness which it should have, — for them the editor would bespeak the supporting good will, the reasonable indulgence, and the help that have thus far sustained his journal, at the hands of the readers and contributors, of whom he now gratefully and regretfully takes leave.

HAVING printed last week the new schedule of terms for regulating open competitions adopted by the St. Louis architects, we print this week a circular which is now receiving signatures among the profession in Great Britain, and is to be formally presented, by Mr. George Edmund Street to the Royal Institute of British Architects for their action. As will be seen, the St. Louis architects propose to bind themselves much more strictly than their English brethren, but it seems probable that they have acted wisely in laying down terms so precise and complete that neither unscrupulous designers nor building committees will have much chance of evading them. It is none too soon for some effectual steps to be taken here toward the regulation of architectural competitions. The American Institute of Architects took up the subject at a recent convention, but beyond eliciting some amusing evidence, nothing was accomplished, and the subject was dropped, perhaps with good reason; for the resolutions and recommendations of such a representative body, which in this country would bind only a small part of the profession, do not have in practice so much weight as they deserve. However it may be with the British Institute, which includes a very large part of the profession, the only way in which we can secure an end which all sensible men acknowledge to be desirable, is by the action of local portions of the profession. Where, as is here the case, only a minority of the architects in a given place are members of the national organization, it is impossible to require that small minority to put themselves on a different footing in regard to their business from their professional rivals — many of them perhaps as eminent as themselves — by signing a schedule of terms, however wise; while, if all the reputable architects of a given locality agree to keep to certain stipulations, their point is gained at once, though there remains a possibility that outside architects, not bound either by similar agreements entered into at home or by a sense of honor, may try to intrude themselves by offering to compete on less favorable terms. If the rest of the profession will take advantage of the courage of the St. Louis architects, and follow their lead at once, they have an opportunity of putting themselves in a position far more respectable than the one they now occupy before the public, who cannot always conceal a lurking contempt for an eccentric profession whose members beset them with offers of gratuitous service for which they would willingly pay.

THE St. Louis schedule printed last week bears the names of twenty-seven signers, and is in most respects a fair and well-considered body of rules, although in one or two places it draws the line harder and faster than is desirable in a document of so wide a range. A few points seem to us particularly worthy of attention. One point of which clients are naturally negligent is covered by claiming not only time enough for preparing and perfecting a design, but some allowance for the ordinary occupation of competitors. It reminds those who may invite designs that an architect's drawings are his own private property unless paid for, in which case they are for the sole use of his client, but that the actual drawings still always belong to the architect who made them. This asserts a claim which is of great importance to the profession, but which the carelessness or want of nerve of the feebler practitioners has given too many occasions for disputing. The schedule also requires the explicit understanding that in case the building is erected after any of the designs submitted in competition, it shall be given in charge of the author of the first premiated design, who is to be employed at the usual compensation, and claims that the premiums shall be awarded under all circumstances for the designs which may have been admitted in competition. Another of the terms demands that one of the jury of award shall be an architect; and that no one shall be a juror who submits a design, or is in any way interested in the execution of the work. Any design is to be excluded which deviates from the instructions, or the cost of which will, in the opinion of the expert, exceed by ten per cent the allotted sum. Perspectives must be excluded unless expressly called for in the instructions, and if called for must be drawn to the scale of the elevations, with the picture-plane passing through the nearest corner of the building; and no more drawings must be called for than will clearly explain the design.

THE provision, copied we believe from an English scheme, that any design shall be excluded if it is declared to exceed by ten per cent the allotted cost, is one that seems to us overstrained. A disregard of the limit of cost leads to great abuses, certainly; but we do not think they are to be overcome in such an off-hand way. Its reasonable purpose is to prevent some architects from getting an advantage over more scrupulous competitors, by outshining them, with disregard of cost. But if the limit of cost is to be insisted on rigorously, we need something more decisive than the comparative estimate of an expert, at least unless the plans and specifications are made out minutely enough for a contract: to do this is to make competitions the unreasonable and unnecessary burdens against which architects are protesting, and against which the first of the regulations is specially directed. For practicable competition, the limit is much too close. Such a condition would not be applied in ordinary cases, and if it were, would breed more dissatisfaction than it would cure. Moreover, while one design might be ruined by paring off ten per cent from its cost, another may bear the reduction without serious injury. If a

design cannot be cut down to the required limit without sacrificing its character, it is unfair to give it preference over others which have been restrained by that limit; but it might also be unfair to a client to require him to give up a design which could be cut down ten per cent without losing the qualities which made it attractive to him. It is as impossible to allow for all cases in a short discussion as in the schedule; and there are some cases in which a very close adherence to limit is necessary; but such cases demand a very rigorous and elaborate competition, which should be paid for accordingly. A committee is apt to need instruction in the matter of cost, as much as in other matters. The common mistake, we are convinced, is quite as much in attempting to fix an exact limit of cost, as in doing violence to it when it is fixed, and it would often be a more reasonable way, — especially when elaborate plans are not required — to make the cost simply recommendatory, and allow architects to take their chance with that as with the other points of their designs; or else to allow a considerably larger margin than ten per cent. The question is, in fact, too difficult and too various to be dealt with very summarily in the gross.

The signers of the paper agree to the terms of this schedule, in the same manner as to the schedule of charges, a copy of which is appended to the document. It is encouraging to see signs that our profession means to hold its head up in the world, the more so when the signs appear in a part of the world where the newness of the profession makes special effort necessary to command its position; and if this schedule shall be generally imitated, we will answer for it that both architecture and architects will deserve and receive increased respect from the public at large. The St. Louis architects have deserved well of the profession in taking this stand. We trust they will be able to maintain it, and would most strongly urge upon their brethren in other parts of the country the importance of acting with them. If their lead is immediately followed, their hands will be strengthened, and all will receive the benefit of their courage. If the apathy of the rest of the profession allows their single-handed effort to fail, the precedent of defeat will have an influence for years to come.

The sad accident at the Madison Square Garden in New York, of which the news reached us just as we were going to press last week, continues to occupy largely public attention, and, thanks to the activity of New York reporters, we are enabled to gather a pretty full account of the circumstances, from which each one is at liberty to form his own theory of the cause of the catastrophe. The building is, briefly, a parallelogram two hundred feet wide by four hundred and twenty-five long, enclosed by twelve-inch brick walls, twenty-eight feet high. On the Madison Avenue side of the structure a portion had been partitioned off, by timber frame-work, as we understand, enclosing a space forty by two hundred feet, open from end to end, without any cross partitions whatever, and half way up the wall a floor was inserted, dividing the height into two stories. Posts were set up against the brick wall forming the Madison Avenue side, corresponding to the posts in the framing of the opposite wall, and cross girders supported on these posts carried the floor, independent of the wall, which, however, was anchored to it. On another tier of posts on each side rested the roof-trusses, which were of ordinary construction, low in pitch, and covered with boarding, and tar-and-gravel composition. On the occasion of the fair a light partition separated the upper story into two rooms, one of which was used for an art-gallery, and the other for a ball-room. Forty couples were in the ball-room, and fifty-four persons in the gallery, when almost without warning, a portion of the upper half of the brick wall fell outward into Madison Avenue, beginning at the centre, over the main entrance, and extending to the north-west corner of the building, and carrying the roof with it.

The wall appears to have been sufficiently well built, and the trusses, if the other members corresponded with the size of the tie-beams, which are said to have been six by eight inches, would seem, provided they were not too far apart, to have been of sufficient though not excessive strength for a span of forty feet, supported as they were by a good system of bracing. The explanation offered by the Department of Buildings, and by the experts summoned on the coroner's jury, is that the tie-beam of a truss near the middle of the building parted, letting the truss fall, and the thrust of the falling rafters pushed out the wall. In support of this theory Superintendent Dudley points out that one truss was found with the tie-beam broken at a large knot, and he considers the existence of such a defect, which might have been overlooked by contractors or inspectors at the time the structure was erected, sufficient reason for the accident, especially if, as he thinks possible, the heat from the gas-jets in the art-gallery had warped the timber badly. This explanation is improved upon by the contractors for the mason-work, who consider the heating of the timbers the main cause, and lay the catastrophe to the account of the managers of the fair, who should not have allowed so many gas-lights; in fact, should not have used the room for a picture-gallery at all, as it was never designed for that purpose. The contractors for the carpenter-work cannot see how the heat of a room should have such fatal effects on the strength of timbers in the roof above, but they also charge the accident upon the managers of the fair, who they say, should never have allowed dancing in a room not designed for that purpose. Dancing, they say, is one of the worst strains that can be put upon a building, and the vibration probably weakened the roof-timbers until they gave way. In fact, all parties seem to be agreed that the officers of the fair are in some way to blame for the disaster.

It is very difficult to judge with certainty in such cases, but with all due regard for Mr. Dudley, the Superintendent of Buildings, we can hardly give much respect to his explanation. That any conceivable knot in a wooden tie-beam should rob it of the comparatively small amount of tensile strength required would be a very strange circumstance. Still stranger would be a degree of warping which should give rise to so sudden a failure. We should expect in such a case that the broken timbers would protrude through the ceiling long before the gradual sinking of the rafters would spread the walls to a fatal extent, but all accounts agree that beyond the falling of plaster in small pieces, no bulging or other disturbance was observed in the ceiling: on the contrary, the collapse of the wall was the first phenomenon noticed. Another point, which is brought forward in the account of one witness, points to a more probable explanation of the disaster. This was a leaning of the wall, to an extent of about four inches from the vertical which is said to have been observed that morning. It will, we think, be agreed by most architects that a twelve-inch brick wall two hundred feet long, without buttresses or cross partitions, approached the verge of safety, even though only twenty-eight feet high. If the timber frame-work behind it had been well braced together horizontally, it would have formed a stable structure, to which the wall could have been safely anchored; but we see no evidence of this, and such anchoring as existed would not prevent the timber posts and girder of the middle portion from communicating their movement, which would be greatest at that point, to the masonry, and so perhaps fatally increasing the natural tendency of so long a wall to bend over midway between the ends.

A proposition has been made in Cleveland to introduce into that city the compulsory use of a device which is already prescribed by law in Chicago, to prevent the setting of fires by sparks from a chimney flue passing through the joints of the brickwork, and coming in contact with wood. This device is familiar in Europe, and consists simply in building into the flue a number of short fire-clay tubes, usually rectangular in section, with the corners rounded, and jointed with a little mortar, so that they form a continuous pipe to the top of the chimney. It must be acknowledged that our present modes of flue building are very defective. Four inches of brickwork is none too thick a wall to keep the fatal flames within bounds; it is not enough when, as we continually see, trimmer-beams and furrings are placed in contact with the bricks. Many a house can show beams and studs charred black by such contact. The plastering, or pargetting, of the inside of the flue is also but a feeble defence; the lining soon cracks and falls into the chimney, dragging with it the mortar from between the bricks, so that the ultimate state of the flue is worse than if no pargetting had been attempted; and even if the plaster stays in place, the pyroligneous acid of wood-smoke acts with great violence upon it, so that it is eaten out of the masonry in time. It is not surprising, then, that a large proportion of house chimneys have unobstructed openings between the interior of the flue and the wood-work outside, and it is simply a question of chance how soon a spark will stray through. Against this danger the fire-clay pipes offer perfect protection; their cost is not great, and their general use would greatly lengthen the average life of buildings.

VENTILATION OF BUILDINGS.[1] — III.

IN my last lecture I attempted to show the need of ventilation, the quantity of work to be done, *i. e.*, of air to be moved, and some of the difficulties and complications arising in effecting the purpose. I will now describe some of the methods pursued in accomplishing this work, and how they may best be adapted to the ends in view.

Three distinct methods for moving the air within the building are in use: —

1st, By *perflation*, — *i. e.*, opening doors and windows, and allowing the wind to blow through the building. This method is of course limited to mild weather, or in cold weather to short periods of flushing, as in bed-rooms, after leaving them in the morning.

2d, By the application of heat to move vertical columns of air in chimneys and pipes, by help of the greater specific gravity of the air outside of such pipes, etc., aided by wind.

3d, By mechanical force applied through rotary fans or blowers of any kind.

This last is sometimes called artificial ventilation, from the sole reliance upon motor machines of some sort. This power or force is generally applied in the form of compression, *i. e.*, by pushing the air along forcibly, while the second method is more akin to a process of exhaustion, the heated column being in a flue called an "aspirator." Yet, strictly speaking, the motive force here is gravity, and the upward movement is really produced by the excess of pressure through the bottom of the flue from the weight of air outside, as compared with the pressure through the top of the flue. The latter includes the lighter air and gas inside, and therefore fails to balance the outside column.

Taking up these methods in the order above named, —

The process of *perflation*, though limited as I have said, is by no means to be ignored. All buildings in warm climates, and dwelling-houses everywhere, should be so planned as to take advantage, as far as possible, of this cheap method of changing the air.

In dwelling-houses within densely peopled cities, the temptation to neglect this means is the greatest, for it becomes a question of cost. The compactness of city houses, when in continuous blocks, renders frontage valuable, and a majority of such houses have less than one-half their perimeter exposed to the air. Yet many devices may be resorted to by the architect to increase this perimeter by offsets and projections, such as have now become so common, beginning with the old-fashioned "swell-fronts" and blossoming out to-day in a great variety of oriels and niches. It enables us to invite every wind of heaven within our walls at pleasure. Such a development is also susceptible of æsthetic treatment, and is to be encouraged for that reason also. The extreme development of such an outline is seen in the modern field fortification, which by its re-entering angles and bastions is ready to receive the enemy in every possible direction. For the same reason it gives the best chance for a friend to get in, if not resisted by gates, moats and glacis — *vi et armis*.

But besides the exterior outline, the inside arrangements of a house should conform to the need of a direct access to the winds. In country houses the problem is simple enough, but in cities there is a constant pressure to avoid *cost* by devoting a large space in the interior, half way from front to rear, to various purposes which demand more fresh air than they often get. The result is generally an entire abandonment of *perflation* in this region, and the substitution of inefficient devices for aspiration. This is one of the greatest evils of a modern city house, and an argument of no small force in favor of spreading out the domicile in stratified "flats," on the French method, so that each house can have its outside exposure better arranged for the access of fresh air than if built on a ground plan of 18 by 80 feet, and five stories high. On the other hand, the "flat" system exposes a family to the unpleasant cooking, or other, smells evolved by the family or families below them, which may be a worse evil than the one before alluded to. The parts of a house which should be best provided with outer air at will, are the sleeping-rooms, bath-rooms, and kitchens. The modern habit places the kitchen at the bottom of the pile, almost buried in the ground, and sometimes with so little light that gas must be used for a good part of the day. The result is that it becomes next to impossible to exclude the fumes of the cooking, and as a large number of houses have no device whatever for carrying these off, or an inadequate one at best, one can hardly enter a city house on a winter afternoon without becoming aware, with the first breath, of all the most prominent dishes that are to be served for dinner. Such houses do not lose the odor of one dinner before the next is in progress, and the result is an accumulation in all the carpets, upholstery, and even in the blankets and wall-papers, of a nondescript odor of past cookery. The odors of food are very good things when fresh and in their places, but quite otherwise when thus become stale and hoarded up in one's furniture.

The kitchen should and generally can be located in a projection at the rear, so that two sides at least can have light and air from the outside, and should be isolated as far as practicable from all communication by air draughts with the rest of the house, through dumb-waiter shafts, stair-wells and passages. Where this projection is difficult or impracticable the most ample provision should be made for carrying off the fumes by a large and separate flue in the chimney, devoted *exclusively* to the purpose all the way up.

I have been called upon this very week to apply relief to a housekeeper whose chamber was invaded early every morning by the dense odors preliminary to breakfast. I found a large flue opening over the kitchen fire, well arranged for relieving the kitchen, but as the *same* flue had an opening in the lady's chamber, above which the flue was partly obstructed, the result was the ventilation of the kitchen into the chamber by a very efficient draught.

The bath-rooms and water-closets too should, wherever practicable, be so located as to get access to fresh air; but as this is rarely possible in the city, except at a large cost for ground-room, other devices are generally resorted to, instead of perflation, for changing the air in these apartments. As the sleeping-rooms are generally used only for the night, time can more easily be taken to get the wind through them than in the kitchens; but whenever located in the *interior*, and removed from the outside walls, the doors and openings should be so arranged opposite one another as to make it easy to get a draught through them at will.

In the planning of hospitals, halls for assembly, court-rooms, and other public buildings, particularly when to be used in mild weather, regard should be had to establishing these through currents, and in such a way that the draughts may be under control, as to the height above the floor. The warmest weather, with moist air, such as prevails near the seacoast for many days in summer and sometimes with but very little wind, requires the currents near the floor, and if the windows are all high we suffer for lack of the refreshment that a perceptible draught would give us; but in cooler or dryer weather we may need *some* air, but directed upward, so the draught may not be so perceptible. Tilting shutters above windows, or tilting sashes, hinged at the bottom, and held at different angles at will, are used with much success at such times for public buildings.

It is very important that ample openings should be provided for the escape of vitiated air from near the top of rooms where it accumulates, as I have explained. Many business offices, factories and public buildings have windows that do not extend within several feet of the ceiling. Although these windows may be made to open at the top, as all windows should, there will still be a reservoir of foul air above them which it is very difficult to remove, and which renders all efforts to change the air unavailing without a high wind to help us in doing so.

A simple piece of apparatus is used on all sea-going vessels, particularly steamships, called the wind-sail, by means of which the fresh air is forced down a vertical pipe into the hold by an open funnel or bell-mouth at the top, kept always facing the wind. Such a device, or a modification of it, with a vane attached, might often be of use to force air into the inner regions of many large buildings, at times when the sultry condition of the weather renders some special effort worth while in this direction.

With a proper regard for the considerations here referred to, the method of perflation is all that is needed for the ventilation of most buildings in this climate during several months of the year, and for the whole year in tropical climates. In hospitals and other large establishments where fresh air is of great importance, the other methods, which are generally provided for the cooler months, can generally be called into activity upon any emergency during the summer when the need is felt.

An excellent method of admitting a slight current of fresh air in a sleeping-room, even in winter, is to provide a bit of board about two inches square and the same length as the width of the sash. By shutting the bottom sash on to this piece, we leave a space between the meeting-rails where the air enters and is deflected upward by the glass, so that no draught is felt. The law of diffusion of gases is a great help in ventilating sleeping-rooms.

Hartley gives the following instance, showing the amount of work done by the combined effect of diffusion and leakage through cracks, etc.:

"A bed-room $12\frac{1}{2} \times 12\frac{1}{2} \times 10$ feet high, net contents 1,500 cubic feet, with a dressing-room on one side of 560 cubic feet capacity, and two walls against the open air. The windows and doors were all shut, but the chimney open. One person occupied the room for nine hours. It was found the CO_2 had increased one part in ten thousand. Taking the exhaled CO_2 at 5.4 cubic feet for the nine hours, the change effected was equivalent to 54,000 cubic feet, changing the whole contents of the room every fifteen minutes, if nothing is allowed for diffusion."

This goes far towards indicating the power of natural methods of ventilation in private houses, where the exposed surfaces are quite large in comparison with the number of persons occupying the house. But it is not applicable to rooms in the interior of buildings, nor to those which are occupied by many people.

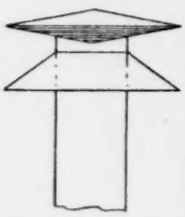
The second method (by means of heated columns of air) is the one generally used for all weather that requires the windows to be closed, both in dwelling-houses and public buildings.

A great variety of conditions are here met with, which complicate the case and call for special attention. Economy and convenience both point to the plan of using the heat required for the comfort of those occupying the building as a motor to do the work of changing the air, and this can generally be managed with success in dwelling-houses, school-houses, hotels, and most buildings used for commercial purposes. But the penurious character of many builders, with the great lack of information and attention to the subject, have produced a result very various and unsatisfactory. For rooms in dwelling-houses where chimney openings can be provided and where there

[1] A lecture by Mr. Edward S. Philbrick, C. E., delivered before the students of the Massachusetts Institute of Technology.

are one or more sides of the room having openings to the outer air, no further provision is generally needed, provided always that the gas-burners, if many are used, have special vent-pipes. But in city houses that have bath-rooms and water-closets remote from the outer walls, some special provision is generally needed. The interior of such houses is generally provided with a sky-light well, which can be used for an up-cast shaft to deliver air through the roof. If the top of this shaft is provided with a ventilating cowl, of which the common truncated cone, surmounted by a double conical cap (Fig. 1), is a good type, we can get a tolerable draught in windy weather or while the house is artificially heated, but during damp sultry weather, precisely when most needed, the pipe is quite inert. Although such appliances are generally worth while, and may do much good, it is also advisable to call in the aid of the kitchen-chimney flue, which is rarely without a fire even in summer, the heat of which can be used to create a draught. A common method, and a mistaken one, is to pierce the fire flue with a metal pipe for this purpose. If this pipe is large enough to do any real service, say six to eight inches diameter, it will be likely to spoil the fire draught. So the better way is to build a round pipe into the chimney, of cast-iron, eight inches or more diameter, exposed to the heat of the fire flue, and extending quite to the top. Branches can be led off from this, of tin or galvanized-iron pipe, to the bath-rooms and water-closet seats, urinals, etc., taking care that the sizes of these pipes diminish as they ramify, like the roots of a tree: otherwise those nearest the chimney will be the only ones to get a draught, or the reverse. This ventilation-pipe should never on any account be connected with any drain, waste, or soil pipe, the vents of which ought *never to enter any chimney*. I have applied this system to some old houses with excellent results, though it is much easier to apply it when they are built.

FIG. 1



When providing up-cast shafts for removing air from public buildings, special apparatus must be constructed and often furnished with special heating by steam-coils or otherwise. When working on such a large scale it is necessary to compute the proper capacity of the apparatus in proportion to the amount of work to be done. Let us then investigate the cause for the upward motion of heated air, and ascertain how great a force we have to depend upon.

The motive force is gravity, acting by means of the greater weight of the air outside, compared to the weight inside the shaft. We have a normal pressure outside of some 14.6 lbs. per square inch, tending to force air in at the base of the shaft. If the temperature inside were the same as outside, this pressure would be exactly balanced by that coming down through the top of the shaft, and no motion would result. If the inside air be heated, the pressure at the base through the top would be thereby diminished to the extent of the difference in weight of the heated column as compared with the air outside.

Now air expands about $\frac{1}{490}$ of its volume for every degree, Fahrenheit, additional temperature. So if we have a shaft forty feet high, and heat it fifteen degrees hotter than the outside air, the air inside would lose in weight by an amount represented by a column $40 \times \frac{15}{490} = 1.224$ feet high. The velocity with which the outside column would try to get in at any orifice at the base of the shaft would be governed by the same law as that of a body falling through the space of this excess of height. Now the formula for the velocity of falling bodies is $V = \sqrt{2\,g\,h}$, where h represents the height or space through which the fall is made, and g the force of gravity or the velocity at the end of the first second. This force at this latitude is about 32. Substituting this value for g, and the value 1.224 for h in the above general formula, we have: —

$$V = \sqrt{64 \times 1.2\,24} = 8\sqrt{1.224} = 8.848 \text{ feet per second.}$$

This is the theoretical velocity. We must then make such allowance for friction as circumstances demand.

The co-efficient of friction is seldom less than 0.5 to 0.3; but the friction is largely increased by the roughness, length, the crooks, or other disadvantages of the pipe.

The product of the velocity by the sectional area of the flue will of course give the volume of discharge.

In making all such computations we have some elements of uncertainty, — first, in the actual heat of the rising column, as it can be maintained; and second, the coefficient of friction, which in small flues is quite uncertain.

Since the introduction of fresh air in cold climates demands artificial heating, the hot air so introduced is generally buoyant enough to find its own way out of the building when vitiated, if a path is given it. In dwelling-houses and all buildings where no large numbers of people gather, the heating apparatus generally gives all the motive power that is needed to change the air during the period when the weather requires the windows and doors to be closed. But care must be taken to so adjust the influx of warm fresh air and the efflux of the vitiated air as to accomplish the purpose intended, and in a way not to produce disagreeable draughts. In the first place the air should be taken from a place where it is not liable to be contaminated. A too frequent practice is to supply it from the back yard, close to the ground, often within a few feet of a cesspool with grated cover, or unsavory heaps of rubbish that are apt to collect in such places. Dr. Angus Smith says, "Disease crawls along the ground." The cold-air duct should always terminate, in cities, some six feet or more above the surface, and it is much better to have it debouch on the north or north-west side of a building in this climate, so as to receive the winds that prevail here in extreme weather. It is found difficult to make air move in such ducts *against* the direction of a strong wind, and it is not an uncommon thing to find the air-current inverted if the inlet faces the leeward side of the house. It is found to pass down from the rooms on the windward side of the house, supplied from cracks or cold chimney-flues, and thence through the heating apparatus into the street or back yard! Not only is much heat wasted in this way, but great risk of fire incurred by forcing heated air through wooden boxes intended only for cold air. Another very common mistake is made by placing the cold-air ducts in sub-basement spaces almost inaccessible for inspection. They should be accessible through their whole length, and for this reason it is much better to keep them above the basement floor, and construct them of galvanized-iron rather than wood. I have during this month inspected a house near this building, one of a block of fine stone fronts, where the cold-air duct was made of brick sides and rough board covering, the bricks being laid directly on the ground under the basement floor. The rats had honeycombed the sand beneath it in great numbers, apparently nesting there, and stowing away their hoards of garbage. A drain-pipe suspended to the floor near by had a leaky joint, from bad workmanship, so the foul air from the drain circulated freely, and was drawn into the cold-air duct through its numerous rat-holes and cracks in the covering, to be warmed and distributed all over the house. A man had recently died in one of the chambers with typhoid fever, but the owner seemed loath to believe that the house was not in perfect order.

I was recently consulted by the owner of a house on Beacon Street, as to the position of his cold-air duct. It was located, as usual, under the basement floor, and though comparatively tight, was subject to the percolation of ground-water which stood in pools in it whenever the ground was saturated by rains. An examination of this water showed it to contain considerable quantities of sulphuretted hydrogen, arising from soil pollution in some form or another. The air-duct was abandoned and replaced by a galvanized-iron one suspended to the kitchen ceiling, made double to avoid the condensation and drip of moisture on the outside.

PORTLAND CEMENT.[1] — IV.

DISCUSSION CONTINUED.

Mr. Henry Sharp (Bourne Valley Pottery and Concrete Tube Works, Poole). — The tensile test at seven days, the tests for fineness and for weight, are useful as being the earliest that can be made, and as affording to some extent useful information, but the test which from a consumer's point of view I rely on is the tensile strength of a mortar or concrete twenty-eight days old. This mortar should be, in my opinion, gauged one of cement to three of clean sharp sand. These are the proportions adopted in Germany as a standard, and the minimum breaking strain is fixed at 105 lbs. per square inch section. This, however, is absurdly low, and one well-known German firm of cement-manufacturers offer me cement which they guarantee to produce a mortar breaking at not less than 284 lbs. per square inch at twenty-eight days, the gauging being one to three. At my works the cement we use is subjected to a similar test, but as a rule gives considerably higher results. The mixture is a concrete rather than a mortar, the briquettes being samples of the pipe mixture taken daily as it comes from the mixing-machine. We are not satisfied with less than 350 lbs. at twenty-eight days, and we find that with well-ground cement, and carefully proportioned aggregates, our briquettes will sustain even 400 lbs. and upwards at this age, those made from the German cement before mentioned being among the highest. Cement-manufacturers may reasonably say that they cannot allow the reputation of their cement to depend upon what consumers choose to mix with it, and I willingly admit that our concrete test briquettes are not mixed with mathematical accuracy such as would obtain in a laboratory, our object being to ascertain the strength of the material that is being made into a pipe. We however are able to quote these tests to manufacturers who supply us, because they are aware of the care we give to the subject — indeed, the results we obtain are evidence of this fact. Hence it is of no use for manufacturers to tell us that their cement gauged neat breaks at 600 lbs. at seven days (which figure, by the way, I have never been able to reach with *any* cement) if we find that our concrete made with it does not touch 250 lbs. at twenty-eight days. The value of a cement to the consumer consists in the amount of aggregate it will carry, retaining the requisite strength; and to ascertain this there can be no simpler test than the above. If the breaking strain, the appearance of the briquette and of its fracture are satisfactory at the age of twenty-eight days, it is quite certain that the concrete has nothing but a future of increasing strength before it. The only objection that I can see to this test becoming a standard one is that which, as I have already hinted, would be raised by the manufacturers of cement. If Mr. Faija is able to provide the an-

[1] A paper by Mr. Henry Faija, Associate M. Inst. C. E., read before the Royal Institute of British Architects, February 3, 1880.

swer to this objection I feel sure that such a recognized system of testing would often be found of very practical value to both buyer and seller, and of course there are cases where an independent chemical analysis may be required by one party or the other.

PROFESSOR LEWIS, F. S. A., *Vice-President.* — The subject which Mr. Faija has brought before us is by no means new to him, and I remember well a lecture which he gave some years ago upon it, when the well-known engineer, Mr. Bramwell, was in the chair. But we must bear in mind, in considering the whole subject, the very valuable experiments carried on for a series of years by Mr. Grant, of the Engineer's Department, Metropolitan Board of Works. It seems to me that tensile strength is really of comparatively little use to us unless it bears some direct proportion to that of the crushing and shearing strength. In actual practice, the weight which is put upon it acts directly as a crushing force, or, as in the case of a settlement, either as a shearing or bending force, — the question being in the latter case whether it would have such a degree of elasticity as to allow even the slightest settlement to take place without breaking the cement. I think that Professor Kennedy's experiments on this question are very interesting. They supply a want which we have felt, and unless the tensile strength has a definite relation to the crushing and shearing, the tensile may or may not show a good cement, but it is not a sufficient test for use. Another point likewise which Professor Kennedy has investigated is the difference of strength between the briquettes when the cement is simply poured into them in the usual way and when they are subjected to the crushing force. Of course in actual work a bricklayer puts on a layer of cement which receives the weight of brick or stone upon it at once. It is thus pressed directly by a heavy weight until the cement is set, and, therefore, to test the strength of the cement without the pressure upon it, is to test it in a way in which it is not used in actual buildings. For many years I have been carrying on a series of microscopic observations on the way in which cements and limes of all kinds set. I need not explain in this room the theories about the setting of mortars and cement, but the precise way in which the setting takes place was not investigated, I think, by Mr. Grant, and is still a subject not clearly known. I began the investigation some nine years ago under very favorable circumstances, that is, in a house in North Wales with a northerly aspect, and it was with a microscopic power of 110 diameters. I will allude now to Portland cement only, which I tried at first in its dry powdered state. Before it was put in, it had a perfectly uniform gray tint; under the microscope it resolved itself at once into very minute brownish-white specks lying upon a substratum of a black vitrified mass. I was puzzled at that, and of course the first thing was to know what that vitrified mass was. I sifted it through first of all the 50 sieve, that is the 2,500. The appearance was just the same; I saw these brownish-white specks exactly as before on the black substratum. I then passed the powder through another sieve, a great deal finer than anything you have seen to-night, having 14,400 perforations to the square inch. The cement was not a selected sample, but was taken at random from some used in a building which was being carried out under my direction, yet a large portion of the cement passed through the 14,400 sieve, and I had still the white specks and the black substratum. I separated them at last by dropping the cement gently into water, and then before it had time to set I poured out the lighter portion, mixed the residuum again with water, and so on until I got a deposit nearly black. Unfortunately I had to give up the investigation, and I have not had this dark deposit analyzed. My own impression is that the lime in the cement was not chemically combined with the clay, and that, therefore, I had got the strongly-burnt clay separated from the lime. But I have Mr. Faija's authority for saying that he has had that investigated, and that the lime and clay are chemically combined. I afterwards tried Portland cement mixed with water and very fine washed sand — one of cement and two of sand pressed down. The microscope resolved this into a loose mass of sand grains, with a very large proportion indeed of spaces in between. On each grain of sand minute granules of brownisl-white (evidently the cement) were scattered. The cement when fairly set gave no appearance of a pasty mass filling up the places between the sand grains, but presented the same appearance as at first, except that it had turned them quite white, the white granules being scattered over the sand, and the only parts in which they could be connected were where the grains of sand joined and where the little granular specks upon them likewise of course joined. A number of very curious results which I found, not only in regard to cement but of mortars, etc., might be interesting, and I may hereafter complete my investigations and bring them before you in a more definite form. Possibly these few remarks, though of no great practical use, may induce some to investigate the subject of the setting of cement in a different way from that which has usually been tried.

THE PRESIDENT. — It occurred to me before this paper was read, that possibly the subject matter might have ramified to a larger extent than it has. Able as no doubt the paper is, it is confined very much within the limits of the testing power of cement; whereas to architects the use of cement and plaster presents broad and pleasant features. I think, however, that within the limits the reader has assigned himself he has treated his subject ably and well, and that the discussion has been practical and useful. The suggestion made by Professor Kennedy is one that should have due consideration on our part; and it would be of very great utility, supposing that we were able to see our way to do it in conjunction with the Council of the Institution of Civil Engineers, to establish a standard method of testing cement. I quite agree with Professor Kerr, who, I think, made the remark that anything like the elaborate calculations and experiments suggested in the paper would be impracticable in the majority of the works with which we architects have to do. Great and important as the tensile strength of the material may be, equally important is the manipulation of the material: and if the writer of a future paper on Portland cement could define a rule by which we could frame a specification that would describe the use of cement when in its very best form, and avoid those miscalculations arising from bad manipulation, the use of bad cement, the undue quantity of water with it, and matters of that kind — he would render a great practical service to the majority of the members of our body.

HENRY FAIJA, Assoc. M. Inst. C. E. — I have to thank you very much for your kind reception of the paper, and I am glad that Professor Kennedy agrees with me in the experiments he has made in respect to the non-setting powers of the core of a cement. It is a question which I believe has been disputed by many people, and which I have tried to make perfectly clear, and when I have Professor Kennedy on my side I am quite sure that I am right. As an additional proof I gauged a small pat yesterday, and it is now perfectly set and hard; it is made from some core which had previously been mixed up with water. Now, as cement will not set twice, if the core had set when it was first wetted it certainly would not have set at the second wetting and when ground fine. Professor Kennedy objects to the tensile strain, and many other speakers have said the same thing. Now I do not think that, in the matter of testing, it is of the first importance whether you use compression or whether you use a shearing strain, whether you use tensile strain or whatever you use, for it is known that they all bear a relative proportion to each other. The best thing to use is the easiest. I think that the tensile is the easiest applied and the easiest used, and therefore I think it is the best to adopt. We have not all such beautiful machines and appliances as Professor Kennedy, machines that will crush and do everything else. We have to put up with small machines that cost a few pounds, and we must be satisfied with what tests we can carry out with them. The elasticity of cement — I do not think that has been tried before, and whatever Professor Kennedy's results may be, I think we may take it that cement is practically non-elastic. Professor Kerr seems to believe that no accuracy is required in testing cement, but I am afraid his way of testing cement would be of very little use. Mr. Sharp in his letter advocates the testing of cement with sand, instead of testing the cement only. Mr. Grawitz also speaks of it; and they both of them suggest a difficulty, and that is, to find a standard material to gauge with the cement. It may be desirable for a manufacturer of very great masses to know what would be the strength of the composition when he has used it; but the ordinary user of cement, who is going to make mortar of it, if he knows simply the strength of his cement he knows the strength that his material should have after it is finished, and, therefore, to test the cement ought to be sufficient for him to judge of the ultimate strength of his structure. And as long as you keep to the cement pure and simple, you reduce your limits of error to one thing, whereas to put sand and other things with it to test it, why, you increase your range of error. Of course we can all of us only wish that we had a recognized Board to which all disputes of cement and building matters could be referred, and I am sure Professor Kennedy deserves great credit for suggesting it. I hope it will be carried out. Professor Lewis has made some very interesting experiments in respect to cement with the microscope. I have also tried to look at cement through a microscope, and I must say I have not met with the success that Professor Lewis has. I have practically come to grief with it. The only thing that I did discover with the microscope was about the non-setting power of the core. I need not say that the core has seemingly a certain amount of "set" in it, but if you look at it through the microscope you will always find that there are particles of fine cement round each granulation that of course set when the water is added, and this is the only thing I have yet discovered about cement by the microscope. With regard to the chemistry of cement to which Professor Lewis alluded, I regret that Mr. Heisch was prevented through indisposition from being present, as he would have explained the matter much better than I can. The preliminary stages of manufacture result in a mechanical combination of the raw materials which by calcination resolves itself into a chemical one, the result being a double silicate of lime and alumina; any excess, therefore, of either material in the compound is unable to thoroughly amalgamate, and hence the blowing, or otherwise faulty, cement produced. The meeting, I think, has generally misunderstood my specification. I did intend that it should be taken as a complete specification, but, at the same time, that only certain clauses, more especially those relating to weight and fineness, should be adopted as thought desirable, my argument being that until a recognized manner of testing cement is adopted no very reliable results will be obtained. So far as the manipulation of cement is concerned, the only way in making concrete or mortar is to adopt machinery for the purpose; it is the only means of securing a uniform body in the compound, and if it is even not so good as the best hand-gauged, its regularity will render it superior. I have but one word more to say: it is with reference to the tests, to which Mr. Grawitz has alluded, made by the Metropolitan Board of Works. I think I am correct in stating that the new specification, introduced by the Board in Octo-

ber last, applies to such works only as are carried out under the Board's own supervision, and that it does not in any way affect the regulations set out in the Metropolitan Building Act.

SPRING EXHIBITIONS AND PICTURE-SALES IN NEW YORK. — I.

In view of this year's exhibitions it does not seem incorrect or premature to speak of an elder and a younger school in American art. A few years ago we began to hear of "new men" from Munich and Paris, who, however, diverse among themselves, united in differing by aim and method from all those whom the nation had been long accustomed to regard as its interpreters in art. Three years since these new men formed into a society which was organized as a protest against the methods of government of the National Academy. Its exhibitions, however, have been an equally decided protest against the methods of work of the National Academicians and their followers. And it attracted to itself, furthermore, as members or exhibitors, such men as Mr. Hunt and Mr. LaFarge, who had till then seemed abnormal in their development, and had never been associated in the public mind with the mass of their contemporaries.

When I say that the two associations now mark two contrasted schools, I do not, of course, use the word in its fullest and strongest significance. The elder school of American art has not, indeed, been a school in any sense of the word save that which may denote a large number of men working on similar lines, and producing results similar in artistic grade. Taken as a whole, it can assuredly not be thought a school to which future students will ever turn for example or for teaching, however instructive may be the work of one or two among its members. As for the newer school, it is, of course, in its infancy, a school potential, or, as some may think, of future certainty, but still in process of development. It is these two facts which just now make this younger band of workers so interesting to watch — the fact of its rapid growth, its daily, hourly expansion, and the fact that it is at actual daggers drawn with the typical men of our elder generation. He who went to this third exhibition of the Society of American Artists and forgot these things — did not know what names were absolutely new, what men were showing maiden efforts and trying 'prentice hands, who did not see the great advance others had made since their first appearance a year or two ago, who did not appreciate how they are all striking in the very teeth of our traditions, striving to win the public ear without sounding a single note such as it loves and listens for, — may indeed have got much pleasure from the pictures, but can have gained little knowledge as to the recent progress or the future prospects of our art.

The two exhibitions were open at the same time this year. The Society's was more homogeneous than ever before, and in stronger antithesis than ever to the mass of work that crowded the Academy wall.

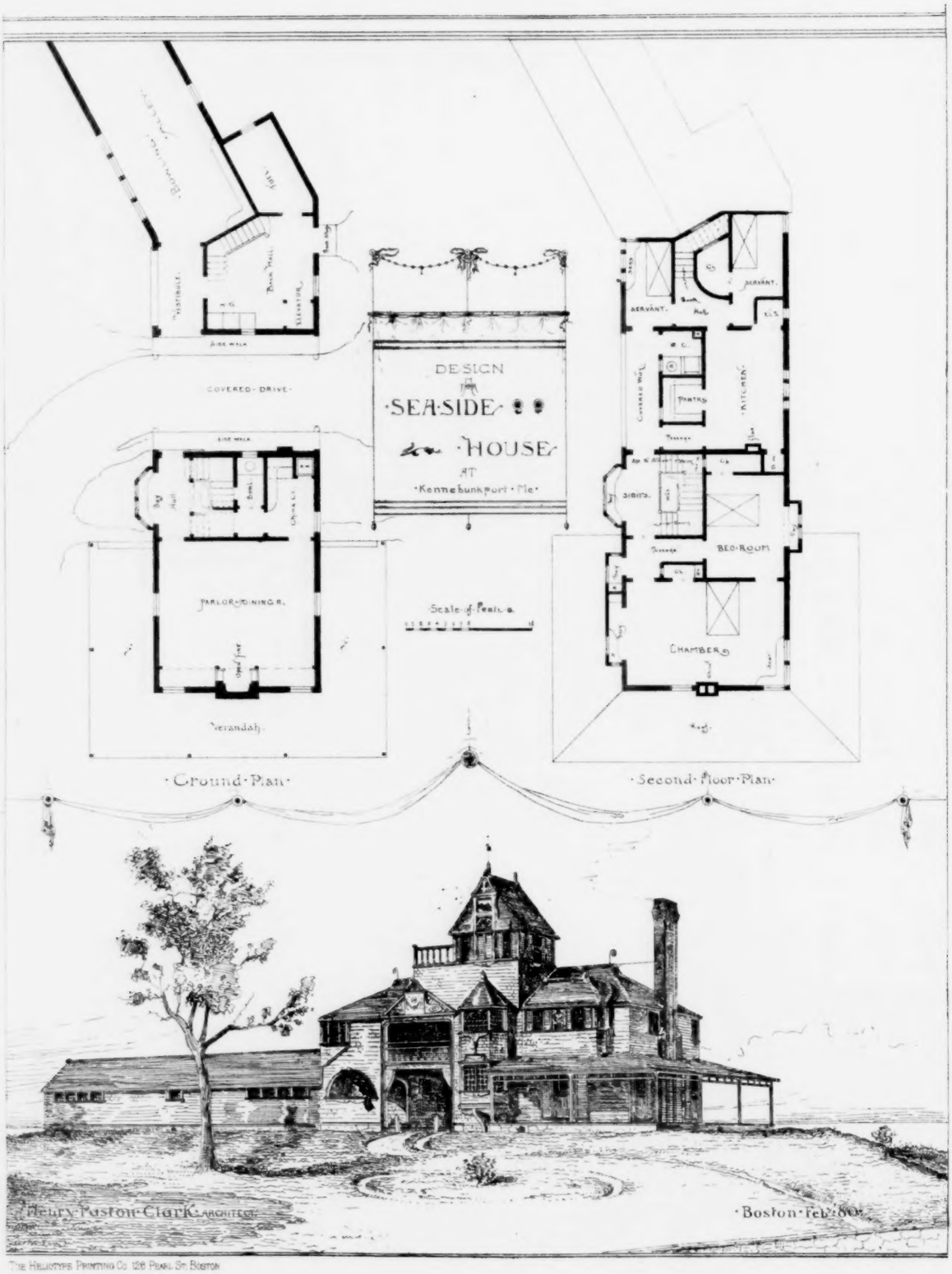
This latter work, it must be confessed, was less good than usual. Few pictures stood out from the 760 numbers in any pleasant prominence. When a departure was made from the dead level of commonplace and tiresome reiteration, it was usually in the direction of the strikingly bad. The "new men" contributed very little, preferring to keep their work together in their own place, partly from a natural desire to make their collection as good as possible, partly, no doubt, from an idea that they thus did themselves individually also the greatest justice. There were but 165 numbers on their catalogue, but the selection had been consistent, and there were not half a dozen canvases, which, however good or bad their execution, were alien to the aims and the beliefs of the majority, and it was, therefore, all the easier to judge of the majority's merits — actual and prospective.

Let us briefly note the qualities which marked the antithesis between these walls and those of the Academy.

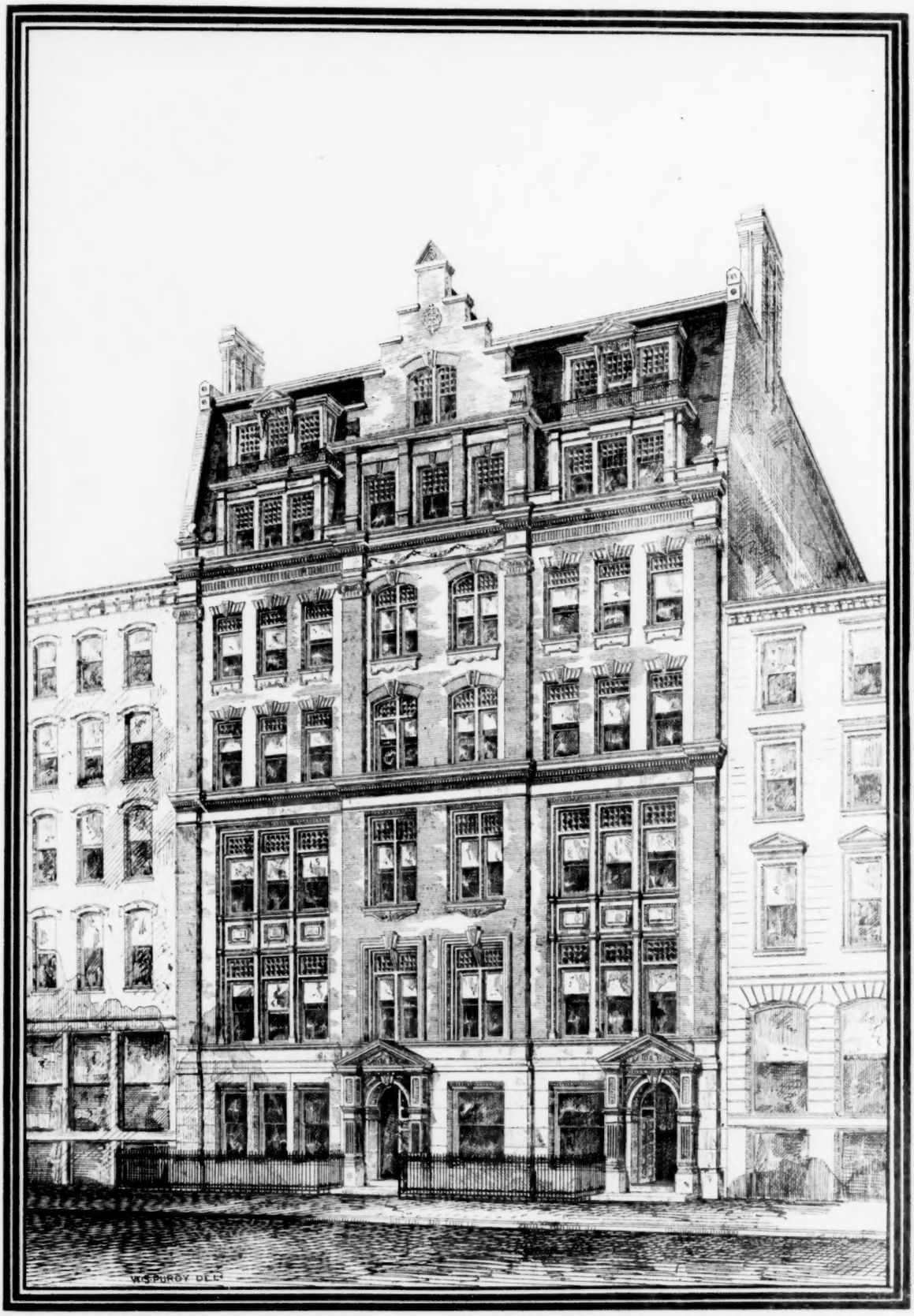
The terms most appropriate in the latter place are those most inappropriate here. Commonplace, mediocre, dull, are the last words we think of, while their exact opposites are constantly on our lips. These pictures are in almost every case unconventional, novel, individual, tentative, erratic — perhaps in one or two cases crude or ambiguous, and somewhat morbid in one or two more. Affected, I have heard them called not seldom, but without justice, as I think. There is, it seems to me, a note of sincerity in even the queerest products, and among the artists represented we find no copying of each other, which is one of the commonest results when affectation takes hold upon a company of men, work they on whatever line they may. With the non-existence of the commonplace, we must also note the absence here of anecdotal subjects. There were not half a dozen pictures in the room which needed a title, not half a dozen which existed for other than a reason which to the artist had been a simply artistic one. And in so working, an artist moves in the right direction, whether that reason quite justifies itself to the spectator in any given case or not. With the absence of anecdotal, literary interest, and the presence of purely pictorial efforts, we found, as we might have expected, an increasing love for and mastery of the pure technics of the art. This, indeed, is the main fact which resumed and presupposed the minor ones already noted. He who understands and values good painting, *per se*, will not care for inferior things, but will either devote himself to the simple exercise of his skill, — and when good, is not this often enough? — or will pass by its means to those higher things which can *never* — long as we have ignored the fact — exist satisfactorily together with neglect of those means. There are critics to-day who are not content to see our younger men making themselves good painters, who are not content to see our art freeing itself from the ruts of the commonplace, the bathos of sentimentality, and the ludicrous technical inefficiency, which have made it a byword; who are not content to wait for the possible development of highest beauty, and deepest imagination from a sound undergrowth of technical knowledge and manual accomplishment. Should we not appeal to them to wait more patiently for these things, bidding them look back if they would judge the worth of what we do to-day, not only ahead to some rare ideal? Should we not say "wait till our painters master the language of art, and till our public understands and values it"? Let us not match our new men only against the heirs of technically trained generations in the Italy, the Spain, the Holland of the past, or the France and Belgium of the present, but let us remember their parentage and the traditions they were born among, and credit them with their vast advance as well as with their evident shortcomings. It is a captious and, moreover, a harmful critic who, thinking of them thus, can deal savagely with this year's best pictures.

At the Society's rooms, to cease from generalities, the two canvases that attracted us first, were Mr. Chase's portrait of General Webb, and Mr. John Sargent's of Carolus Duran. They were apt to be noted together, not only for the excellence common to them both, but for their divergence from one another. They varied in subject as much as in style; the picturesque, Semitic youth and unusual costume of the French painter, being most unlike the white hair and conventional dress of Mr. Chase's sitter. There was much discussion as to the relative merits of the two portraits, for it is a bit of very usual stupidity to think that when two things are unlike, one of them, for that reason, must be far inferior to the other. Both these portraits were admirably conceived and painted, both were, technically speaking, work to delight an artist's eye, and it was a matter of taste, not of right or wrong, whether one preferred the vigorous accents of Mr. Chase's brush, or the smoother effect which hid from the careless observer how broad and sure had been Mr. Sargent's touch. With all the charm of pose and tone in the latter's work, however, and the true life of the face, there was unquestionably a flatness that had been avoided in the portrait of General Webb. There was an unusual relief, an intense livingness in this latter which has, indeed, been commented upon as almost overdone. The picture has been called restless, wanting in repose; and, compared with single figures by such as Rembrandt and Holbein, it has been found to lack the dignified simplicity which indisputably makes their charm. It is the old story of the impossibility of pleasing all the world. Foreign critics complained at the last Paris Exposition, for example, that the only characteristically American note in our section was sounded where the work was crude. When the painting became good, it was European in sentiment as in style. There is no question now as to the skill of such as Mr. Sargent, Mr. Shirlaw, and Mr. Chase. It remains to approve of or quarrel with the way they use it. When Mr. Shirlaw exhibited last year a "Burgomaster" that might have been dated 250 years ago, he was told not to *pasticher* the Dutchmen, but to paint as an American of to-day, work characteristic of himself and the men around him. When Mr. Chase now gives us just such work, he is told that Holbein's sitters would not have looked thus, and that Rembrandt would have conceived a picture very differently. To my mind, it is just this divergence from classically approved schemes that forms the great merit of this canvas, that makes it a degree more valuable than Mr. Sargent's. The latter is French work through and through, French no less in the technique, which is twin to that of more than one Parisian we know of, than in its feeling and its meaning as a work of art. The General Webb is in its technique individual, and, I think, characteristically American in this no less than in the living man it shows us. It would have been a not very difficult studio *tour de force* to have masqueraded General Webb into the pose and sentiment of a Rembrandtesque patriarch, to have made him as quiescent and as reposeful to look at. It was a touch of true power that could bring out a high artistic result, while preserving the nervous, restless, quite typical Americanism of the model. Be it noted, moreover, that this was not done by means of any complicated composition, or any suggested action in the figure. And the brilliant effect of the canvas was not due to color, which was kept in the soberest tones, but to the manner of handling and the vivid life resulting therefrom. Of Mr. Chase's other pictures, very different among themselves in subject and in treatment, I have no space to speak, though more than a word is due to all, especially to his portrait of a child, (No. 33), where all the lovely dignity of five years old was admirably given.

More lines than I can devote are due to the rest of the collection, — to the interest of almost all the pictures, whether that interest centered in their merits, their promise, or their peculiar faults, I can but note those that called the most loudly for mention. Mr. Shirlaw sent several small figures painted with his usual skill, and a larger Marble Quarry, which, though crude in color, for as yet unfinished, was admirable in composition, and in the spirited drawing of the men and horses. Of Mr. LaFarge's three numbers, the most attractive was a small portrait of himself painted some twenty years ago. His large portrait of a boy and dog was not very pleasing, and his Still-Life, (No. 30), though it contained as a matter of course, some good painting, was too inartistic in conception and general treatment, and too ugly in color, to satisfy those who knew what he might have done. One marveled that this mechanical, tiresome canvas, could be from



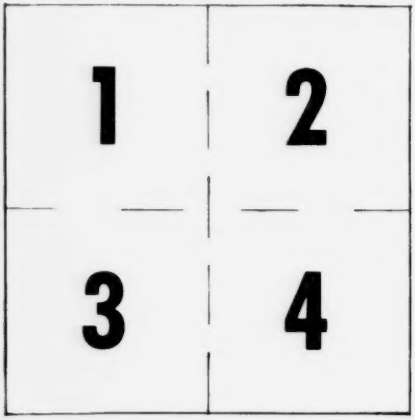
THE HELIOTYPE PRINTING CO. 128 PEARL ST. BOSTON



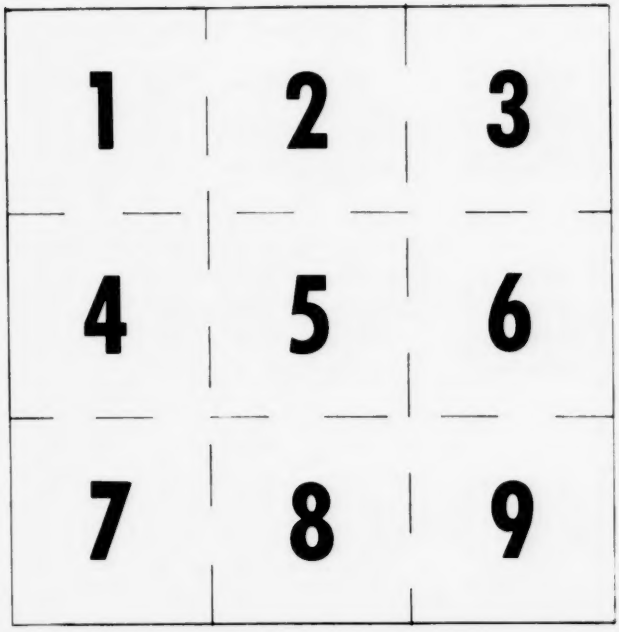
THE HELIOTYPE PRINTING CO. 126 PEARL ST. BOSTON.

NEW OFFICE BUILDING ON WALL ST. NEW YORK.
G. E. HARNEY ARCHT.

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.



e entirely included in one exposure
the upper left hand corner, left to
frames as required. The following



D D D

Gallery.

Tie Bar.
Oak Strut.
Tie Bar.

Iron Tie Bars in Wall.

A. B. C.

Wrot Iron plate Column

Longitudinal Section:

Wall.

15" Beam Str

Oak Strut.

Wall Line.

1·8"

Ground line

½ Iron Tie

Pier.

D

D

C B A

Interior View Shewing Five Forms of Trusses.

Drawn by D. A. Gregg.

The SCALE of Smaller Details is ⅛ of an inch to One foot. For Larger Details, is ½ inch to One foot.

Truss D.

16'-0"

Truss.

Truss D.

Truss CC.

20-6"

Truss B.

Truss A.

Gallery.

Section F.

Plan:

Wall.

Tie Bars.

Two 3x1"

Two 6x1"

Strut.

Oak Strut

Tie Bar.

Tie Bars in Side Walls.

Entrance

Stairs to Gallery

Office

Office Ent.

Entrance to Ring.

Gate.

Ring. 73'-0" x 106'-6"

Ladies Parlor.

Entrance

Stables.

Gangway

Door

Plan:

Scale of 50 40 30 20 10 feet.

Side El:

Iron Ties

15" Beam

Wall face

Plan:

Oak Strut

Cast Shoe

Iron back E.

Cast Iron Shoe

8"x8"

6"x6"

Two 3"x6"

1" Diagonal Tie

PLAN Showing PRINCIPLE of CONS

Iron Tie Bars in Wall.

Tie Bars.

Oak Strut

Iron Beam Strut

Arched Truss.

106'-6"

73'-0"

32'-0"

Iron Tie Bars.

Iron Beam Strut

Oak Strut.

Arched Truss.

Diagonal Ties

A B C C

Iron Tie Bars in Wall.

Quarter Plan of Roof Trusses.

Scale of 30 20

The SCALE of Smaller Details is ⅛ of an inch to One foot. For Larger Details, is ½ inch to One foot.

Truss D.

Truss C.C.

Truss B.

Section F.

Section:

Plan:

Side El:

Wall.

15" Beam Strut.

Oak Strut.

Iron Ties

Tie Bars.

Two 3"x1"

Two 6"x1"

Cast Iron Shoe

Ground line

1½ Iron Tie to Opposite Column, 106'-6" distant

Pier.

Wall Line.

Gallery

Entrance

Office

Ladies Parlor

Gate.

Quarter

Truss D.

Truss A.

Gallery

Detail of Roof Trusses D.

Elevation.

Cast Iron Shoe.

Two 3"×6"

1" diagonal Tie

Two ¾" bolts.

One 1¼

FIFTH AVENUE
Riding School.
58th & 59th Sts., NEW YORK.

CARL PFEIFFER, *Architect.*

F. SCHUMANN, *Civil Engineer.*

Ring. 73'-0" × 106'-6"

Stables.

Gangway

Plan:

Scale of 50 40 30 20 10 5 feet.

Tie Bars in Side Walls.

PLAN Showing PRINCIPLE of CONSTRUCTION.

Iron Tie Bars in Wall:

Arched Truss.

Arched Truss.

Iron Beam Strut.

Oak Strut.

Post

Iron Tie Bars

Diagonal Ties

106'-6"

73'-0"

32'-0"

20-6

20-6"

Iron Tie Bars in Wall:

Scale of 30 20 10 5 feet.

Quarter Plan of Roof Trusses.

CORBEL

At foot of Roof Trusses.

12" Wall

Iron.

the same brush that had painted in previous years the Bather s wet drapery and the divine Andromeda and tiny Venus. Those who had seen in these things perhaps the rarest work ever done by an American hand, could but protest against Mr. LaFarge this year, comparing him, as surely no artist can feel aggrieved to be compared, only against his better self. Mr. George Fuller's works —a lady's portrait and a large landscape—were not unusually good for him. Mr. Twachtmann's landscapes were among the strongest and best things in the room. The large one, April Clouds, was especially fine. Mr. A. H. Thayer's Autumn in a Berkshire Pasture (No. 40) was a proof that extreme delicacy of result is not incompatible with very broad handling. It was a reassuring picture, moreover, from the fact that it showed how poetical a canvas may be wrought after the same scenes that we have been accustomed to think of as resulting in the tin-tea-tray or omnibus-panel landscape dear to the typical American artist of the past. It is, thanks to such work as this and Mr. Twachtmann's, to such exquisite bits as Mr. Dewey's August Day (No. 39), to such strong work as Mr. W. S. Macy's (No. 29), to such simple, clever, satisfactory things as Mr. Walter Palmer's Grez (No. 98), and the studies of Mr. W. Ferdinand Macy of Nantucket, that we feel at last able to say that this typical American artist is or is about to be in very truth a thing of the past. There was more good landscape work than all this in the collection. We must not forget Mr. Foxcroft Cole or Mr. F. S. Church. Mr. Bunce's Venetian canvases were clever and very decorative, and I think, like the reality; but one has seen Venice painted in so many ways, from the way that travesties to the way that glorifies and idealizes, that it is hard, even with recollections of actuality to help us, to say whether any given canvas is like that actuality or not. No such doubt assailed one before Mr. Harry Chase's fine, broadly painted marine, On the Flemish Banks. A boat in the foreground was in the hollow of a wave, throwing the horizon line very high. It was by no means a small achievement to have so well managed so difficult a design, and to have so well given the surface no less than the power and sweep of the waves. That Mr. Homer Martin's large sunset picture (No. 93) was not like reality or any very charming fancy, was only too plain. It was one of the few wholly uninteresting things in the room. Mr. Wyatt Eaton in his Manasquan River, showed how the picturesque — commonly so called — is no necessary element in landscape art. This simple, level scene, with a board fence very prominent, made, so simply and broadly treated, a most satisfactory picture. A new name was that of Mr. Ross Turner, who sent from Munich two capital little landscapes full of light and air, and some still-life canvases admirably done. Mr. Tiffany's Madison Avenue (No. 9) shared the curious defect so often seen in his landscapes: we received the impression that the original had been no larger than this tiny record, that he had painted a toy village accurately and cleverly from some Nuremberg importation. His Still-Life (No. 38) had been painted more for the resultant decorative effect of the canvas than for any intrinsic interest as a composition. So viewed it was most successful, very charming in its light airy key of color, and showing some admirable bits of painting, especially in a certain little pale-green vase. Mr. Albert Ryder had for some time been the delight of connoisseurs, but this year he got himself more generally talked about by the public. That it failed to appreciate him very thoroughly is not to be wondered at when we consider that the charm of his work lay in singular, poetical impressions conveyed by means of a delicately sombre coloring. The definiteness dear to the Philistine heart and the glare which the Philistine mouth is apt to call "coloring," were far enough from his performance, which, more even than any other we have noticed, testified to the speedy emancipation of American landscape art from its former prosaic bonds. Was not such testimony, so charmingly given, enough to make one forgive some slight inaccuracies of drawing in one or two of Mr. Ryder's paintings?

If we return now to the figure subjects on the wall, we are driven once again to note their divergence from the Academic average. Even the portraits, properly so called, seemed less done to order for commercial reasons than studied from humanity for the lessons it could teach and the pleasure it could give, and the mere "studies" did not seem to have been "done out of the head," or from studio models, as those have usually appeared to be which we have been used to seeing at our annual exhibitions, but were definite renderings of individuals, portrayed, quite often, in an individual way. Mr. Eakins sent a life-sized portrait of a lady at the piano (No. 104), which was admirable in the head and hands and in the spirit of the whole, though neither the details of the composition nor the color were very agreeable. Mr. George Brush, who was scarcely more than a *débutant* this year, — I remember to have previously seen but a single small picture of his — made his mark with a life-size Miggles and Her Bear. The face was lovely, — not that of Bret Harte's Miggles, however, — the composition good, and the drawing of the figure very fine. The flesh-tints and the coloring generally were simple and straightforward, and showed none of that search for individuality of "tone," which to some eyes lowers, while to others it enhances, the value of such clever things as we had from two pupils of the late Mr. Hunt. Mrs. Whitman's Study of a Boy with a Violin was very strong and life-like, and Miss Bartol's Mother and Child was admirable in pose and spirit, recalling the master, it is true, but with a reminiscence, not an echo. Mr. Thayer's large Nymph and Tigers disappointed those who had looked for something of equal value with his lovely landscape. The conception was rather puerile, the color unpleasant, and the drawing, if quite accurate, had surely been done from an unfortunate model. Mr. Douglas Volk's large portrait of a fencing-master well deserved mention, as did Mr. Piggott's charming sketch, Contented, Mr. Dielman's study (No. 96), a Moorish head by Mr. Sartain, a full-length study by Mr. Moeller, sent from Munich, and a clever single-sitting sketch, very full of life, by Miss Wheeler.

If I have left Mr. Alden Weir to the last, it is not because he did not first challenge notice and long provoke examination. To say that the work of others gave one more pleasure, is merely the expression of a personal mood, and implies no denial of its strength and cleverness this year, or of the promise there was in the fact that his three numbers, each remarkable in itself, differed so widely one from another. His portrait (No. 54) was most excellent, vivid as life and simple as reality itself, all but the hair, which, as ever, he curiously failed to render. What was true of him last year was here again the truth, — he gave neither its detail with resemblance nor its general effect with accuracy. The portrait of a little girl and dog (No. 72) was less strong, but very individual in style and feeling, and those for whom that individuality struck a pleasing note esteemed it a sample of Mr. Weir's very best work. His Good Samaritan, with its two life-sized figures, was something more and something less than "*une bonne académie.*" There are men — I do not say among us — who might have better managed the very difficult foreshortening of the naked figure, and the equally difficult modelling of the flesh in full light. To do these things shows a power that has been arduously acquired. But to conceive a hackneyed scene in so fresh a way, in so serious, real, and unacademic a spirit as Mr. Weir, comes of endowment, and to paint certain parts of it so admirably as were painted the Samaritan's noble head and hands, and, in a less degree perhaps, the head of the wounded man, were achievements that showed such natural endowment had been assisted by a strong and clever hand.

Mr. Muhrmann's water-colors were as good as usual, except the one numbered 131, with its strangely presented cow.

The sculpture, though not great in quantity, was one of the special attractions of the exhibition. Besides Mr. O'Donovan's shadowy bas-reliefs and Mr. Olin Warner's medallions of his average excellence, we had a bust of Mr. Alden Weir, from the hand of the latter, that was startling from its almost antique vigor of conception and grace of treatment. The illusion was heightened by the classic, spirited beauty of the head, and also by the tinting of the plaster, which had assumed exactly the color of long buried-marble. Mr. St. Gaudens's half-length of President Woolsey, ordered for Yale College, was the wonder of critics, so accurate the likeness, so unconventional yet simple and artistic the conception, so beautiful the execution. The texture of the surfaces, worked with careful, delicate, almost brush-like touches, yet deprived of nothing in breadth, was well worthy of notice. It was as different from the mechanical smoothness of average modern work as from the inartistic over-elaboration in detail and accessories, that has usually characterized a desire for less insipidity. The statue was as distinctively American, it seems to me, as Mr. Chase's General Webb, and, at the same time, as artistic. The difference in spirit between the two well exemplified the difference that should be maintained between the spirit and the ideals of the two arts. Two such examples of plastic art as these shown by Mr. Warner and Mr. St. Gaudens were enough to settle the question whether or no truly good sculpture is possible in our day and country.

M. G. VAN RENSSELAER.

THE ILLUSTRATIONS.

FIFTH AVENUE RIDING SCHOOL, NEW YORK, N. Y. MR. C. PFEIFFER, ARCHITECT, NEW YORK, N. Y., AND MR. F. SCHUMANN, C. E.

THE roof rests mainly upon four iron columns, each carrying about forty-six tons. The problem was to make the side walls as thin as permissible, in order to gain as much room as possible for the ring hence the longitudinal trusses were decided upon. Another reason, a better opportunity for a good foundation, governed the adoption of this plan. The ground upon which the building stands, is swampy, and in part, it is the bed of a creek, sometime since filled in. Placing the piers where they are, gave sufficient room for the desired foundation, while on the sides, the same could not have been done without sacrifice of valuable space, as no projection of base beyond the line of the lot would have been permitted. The arched trusses are built up of two-inch planks, twelve inches wide, and thirty feet long, breaking joint every five feet, nailed together with twelve-penny nails, two nails to the square foot; the nails being driven normal to the curve of the truss; the layers are securely bolted together by $\frac{3}{4}$ inch bolts, two bolts to each bay of the truss. The ends of these trusses are received by cast-iron shoes, to which they are securely bolted, the shoes being supported by consoles bolted to columns built up of wrought-iron plates, the two outer faces being formed by two plates, each $\frac{3}{4}$ inch thick and 21 inches wide, while the webb or side plates are $\frac{5}{8}$ inches thick and 17 inches wide, all secured together by wrought-iron angle-bars, 4 inches by 5 inches, and riveted with $\frac{3}{4}$ inch rivets; these columns rest upon cast-iron plates $1\frac{1}{2}$ inches thick and 2 feet square, in turn resting on solid masonry; the column being kept in place by a projection on the upper side of these plates. Each pair of columns, longitudinally, is tied together by a $1\frac{1}{4}$ inch wrought-iron tie-rod, which is connected to the foot of each columns. The transverse studs between each pair of columns, and between

the columns and the side walls are, as shown, fifteen-inch rolled iron beams, stiffened by angle bars riveted to the webb of the beam. The longitudinal studs between the columns and the end wall are 12 inch by 14 inch oak beams whose bearing ends are received in cast-iron shoes. The tie-bars which resist the thrust of the arched trusses are wrought-iron rods which are pinned and bolted together, and, as will be seen on the plan, form a continuous horizontal tie about the building. The general structure and arrangement of the trusses is shown clearly in the detail sheet.

DESIGN FOR A SEASIDE HOUSE, KENNEBUNKPORT, ME. MR. H. P. CLARK, ARCHITECT, BOSTON, MASS.

NEW OFFICE-BUILDING IN WALL STREET, NEW YORK, N. Y. MR. G. E. HARNEY, ARCHITECT, NEW YORK.

BUCHAN'S PLUMBING.[1]

The readers of the London *Building News*, who are a large class, even in this country, will remember many lively and sensible articles and answers to correspondents, signed W. P. Buchan, Glasgow, in which a degree of earnestness and painstaking was shown in explaining various mysteries of plumbing, which it was very pleasant to notice. The more important articles contributed to that journal were collected in a small volume some three years ago, with some additional matter, the whole forming, as the author claimed, a suitable text-book for apprentice plumbers, to which they could turn for explanation of the difficulties which they might meet in their work; such a book as its author himself had felt the need of in his own early experience.

The success of the little volume was very great; not only was it eagerly bought by architects, builders, householders and students, as well as plumbers and their apprentices, but it was adopted as a text-book in universities and technical schools; and the first large edition having been exhausted, advantage was taken of the opportunity to add to the second a large amount of fresh matter, — a desirable feature in any treatise on a science so rapidly advancing as that of plumbing.

In its present form, the work constitutes a singularly practical, sensible and useful little hand-book, not for plumbers only, but for all who own or use the apparatus with which the plumbing trade concerns itself. To these it is as interesting, and quite as useful, to gain a knowledge of the mode of fitting up and the proper action of the traps, valves and pipes, which supply their wash-bowls and baths, as it would be to understand any other branch of household science, and the rapidity with which the book has sold shows the public appreciation of this fact. For architects, and others who have to superintend plumbing operations, an additional advantage is found in the great amount which it supplies of that practical knowledge of how things ought to be done, which is generally picked up by slow degrees through a long course of actual observation and experience, and which is, so far as we know, found in no other text-book on the subject. Much more might be added, and some things changed, to adapt it to the American peculiarities of practice; but such as it is, it is already pretty widely known on this side of the water.

By the English custom, much of the metal roofing, gutter and conductor work, which with us is the exclusive province of the roofer or carpenter, comes upon the plumber. For this reason, the first part of Mr. Buchan's book is taken up with instructions on that subject, which alone would form a valuable treatise to architects and builders. Many a young architect, especially, who imagines that the leakiness or tightness of a roof is a matter which Fortune alone decides, will by grateful for the clear and well illustrated directions for the proper arrangement of flashings, valleys and gutters, the metalling of skylights, and fastening of conductors, which will throw a flood of light on questions which even roofers do not always understand too well.

The second part is devoted to the sanitary works which we understand under the name of "plumbing," and, allowing for the material differences in modes of work between the English plumbers and our own, nothing could be clearer, fuller, or more practical.

The author shows, moreover, an independence and sincerity in speaking, as he must, of various patented appliances, which add greatly to the value of the book as a guide to the inexperienced amateur. Naturally, his own inventions, of which he mentions several, seem to him peculiarly successful in accomplishing their object; but it is only fair to say that, with some of them at least, their public reputation justifies his confidence.

Here and there are some observations which may have a general interest. Speaking of some experiments upon the rapidity with which water under a given head will pass through nozzles of the same diameter, but of various shapes, he illustrates a peculiar discharge-tube in the shape of a double conoid, through which, if smoothly polished inside, it is found that four times as much water would flow in a given time as through a plain nozzle of the same calibre, and under the same head; and states as an interesting fact that in the city of New York such conoidal nozzles, in the form of couplings, and beautifully polished inside, are used to connect the house-pipes with the street-service, by which means the wily proprietor obtains three or four times as much water through the regulation size of coupling as his neighbor who uses the plain fitting.

[1] Plumbing; with Supplementary Chapters on House-Drainage, by William Paton Buchan. Second Edition. London: Crosby, Lockwood & Co., 1880. Received by Little, Brown & Co., Boston.

An observation in regard to the action of lime or mortar upon rain water is new to us. It has often been remarked that lumps of mortar in lead cisterns cause corrosion, and rain-water which has flowed over lime will act upon lead pipes. Our author explains this, quoting from Dr. William Wallace of Glasgow, on the theory that ordinary rain-water, holding in solution some carbonic acid, coats the lead with which it comes in contact with a film of carbonate, which preserves it from corrosion, much in the same way that spring-water forms a crust of carbonate or sulphate of lead; but if the water containing carbonic acid passes over hydrated lime, the latter abstracts all the acid, allowing the dissolved oxygen and perhaps nitric acid which may be present in the rain to act freely upon the metal.

MR. HYATT'S LATER EXPERIMENTS ON CONCRETE FLOORS.

In the fall of 1877, I published and distributed a little work (see *American Architect* for January 12, 1878) setting forth the results of my experiments with iron and concrete for floor constructions. Since that time I have made over a hundred additional experiments, resulting in the discovery that common stock-bricks, combined with tie metals in "gridiron" form, make a perfect fire-proof floor, giving a maximum of strength with a minimum of materials and labor, and therefore cheaper than any other floors hitherto made of a really fire-proof character.

A narration of my experiments would require a volume larger than my former one, and the limits of a newspaper allow only a statement of conclusions. I can, therefore, merely state in brief the following facts: The sample floor-sections tested were made by placing bricks on edge or end between the blades of metal upon a flat platform or centering of wood, the cement being applied in the form of grouting. The first samples were made at my works in New York during the fall of 1878, and the results were so surprising that I resolved to repeat them at the earliest opportunity. My experiments in New York were interrupted by severe illness, and it was some months after my arrival in England, in July last, before I was able to resume them. Accordingly, in the fall of last year, I had made at the yard of Messrs. Edwards and Symes, engineers, Cubitt Town, the following sections. A brick floor 8 feet long by 1 foot 5 inches wide, and 4½ inches thick, was constructed of six rows of bricks placed edgewise and laid end to end, five blades of thin iron ⅛ in. by ¼ in. being placed between the rows of bricks, one blade between each row, the wires crossing the metals at 9 inches apart between the bricks. This floor, at four days old, upon a clear span of 7 feet 6 inches, supported 806 pounds at the centre, equal to 1,612 pounds distributed load, or say, 153 pounds to the foot super, in addition to its own weight, with a deflection of ⅛ inch. A concrete section of same dimensions made at same time for contrast with the brick, composed of same amount of Portland cement with same number of metal blades, sharp sand being substituted for the brick, was incapable of supporting any load at four days old, and at the end of 7½ days could sustain on a deflection of ⅛ inch but 196 pounds at centre, equalling 392 pounds distributed load, or 37 pounds per foot super. The brick section, when seven days old, sustained, on a deflection of ⅛ inch, 225 pounds per foot super, in contrast with the 37 pounds of the concrete floor. At the end of 12½ days, the brick floor sustained on a deflection of $\frac{3}{16}$ of an inch, 469 pounds per foot super, as against 177 pounds sustained on the same deflection by the concrete floor. Brick floor sections of 9 inches and 13½ inches deep were also made and tested with equally remarkable results. Tested by fire, the most surprising thing discovered was the ability of common stock-bricks to resist heat and flame equally with the best fire-bricks. These floors are, therefore, easy of construction; the materials to be found everywhere, cheap and abundant, and are put together like concrete constructions, without skilled labor, the bricks being merely well soaked in water, placed in position between the metals, and then bonded by a cement grouting made of pure cement poured in between the joints of the bricks and stamped home.

Thaddeus Hyatt.

MEMORIAL TO THE COUNCIL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

We give below the memorial, which is supported by such men as Colcutt, Edis, Pearson, Scott, Seddon, Spiers, Waterhouse and more than a hundred others, in favor of the profession as a body, independent of all society lines, taking a united stand against the demoralizing manner of conducting competition into which the public has fallen: —

We, the undersigned, Fellows and Associates of the Royal Institute of British Architects, being fully convinced of the unsatisfactory state of public architectural competition as at present conducted, beg respectfully to bring the subject before the Council of the Institute for their consideration.

Your memorialists are of opinion that this question can most successfully be dealt with in the interest of the whole profession by the Institute, as representing so large a section of it, and they earnestly hope the Council will be able to devise a remedy, which while ensuring greater advantages to the public, will at the same time place the competition system on a more satisfactory basis.

Your memorialists are of opinion that the necessities of the case call for united action on the part of the profession, and that the most effectual way of ensuring this will be to devise some scheme whereby

all members of the profession can agree not to take part in any public competition unless a professional adjudicator of established reputation is appointed, and to such a condition, if generally accepted, your memorialists are prepared to bind themselves.

And we the undersigned, architects, not being members of the above society, are desirous to aid this reform in public competition set forth in the memorial, and we are willing to bind ourselves under a similar condition, if generally adopted.

Here are to follow the names of subscribing members of the R. I. B. A.

BUTLER MINE FIRE.

MUCH has been published relative to this fire, and some very erroneous ideas entertained in regard to it.

The fire is in the fourteen feet, or Pittston vein, which at this point lies very near the surface, and on the highest ground of the Butler Coal Co. It originated in the month of May, 1877. An unfortunate woman took refuge for a few nights in an old slope that led to the old workings of the Butler Coal Co., of Philadelphia, situated about one mile back of the town of Pittston. During her stay, in order to keep herself warm, she built a fire, and when she departed it is supposed she made no effort to extinguish the glowing embers that were reaching out, and spreading fire among the coal chips and combustible material that surrounded the entrance. Not many weeks after, people who had occasion to pass in the vicinity of the old slope, noticed that a fire were raging in the abandoned chambers beneath; which led to an investigation, in which it was discovered that no less than three to four acres were in flames below, and that the fire was spreading very rapidly through the old workings, feeding upon the massive pillars of coal left for the support of the roof, together with great quantities of refused coal "gob" left at the bottom, in the ordinary process of mining.

Efforts were at once made by the Butler Coal Co., to stop the fire, and an offer was accepted from a certain miner to cut it off. He was to receive five hundred dollars, together with what coal he could remove from the threatened chambers, and within bounds of his cut-off. But instead of locating his cut-off square with the out-crop, he actually commenced operations parallel with it, and had been at work some four months before it was discovered by the company. In the meantime the fire had made rapid progress.

At this juncture, C. F. Conrad, C. E., was engaged to make a survey and report. Mr. Conrad's survey showed that the fire was restricted from spreading in certain directions: on the north and east by the out-crop of the vein; on the northwest the fire was shut in by a "fault," or dislocation of the strata, on the southwest the fire had open way to sweep its path through the workings of the Pennsylvania Coal Company, and thence under the town of Pittston. It was on this side that the progress of the fire must be stopped.

The plan adopted was to make a cut from the surface down through the laminated slaty rock, and coal, to the bottom rock, sufficiently far south to allow of its completion before the fire could reach it. The cut-off is twelve hundred feet long, and from thirty-five to forty feet wide, including a tunnel 240 feet long, which was made through one of the chambers. Before locating the cut-off, it was ascertained that a fire had occurred in the same vein in 1856–7, and its location made to pass directly through the centre of this old fire, thereby saving many hundred yards of excavation. In the process of excavation, a number of distinct impressions of mollusks of the silurian age was found.

The cost of the work has been about $24,000, about 45,000 cubic yards of material was excavated, and about 4,000 cubic yards of dry wall laid, without any serious accident. It is expected that this plan will succeed, and when the fire reaches the cut-off, it will be forced back, as there will be nothing for it to feed upon. — *J. W. Berry, C. E., in Engineering News.*

A QUESTION OF COMMISSION.

TO THE EDITOR OF THE AMERICAN ARCHITECT:

Dear Sir, — I have been employed the past year in designing and superintending the building of a church, at the customary five per cent commission. Mr. K. was also engaged as superintendent under me. In making the final settlement is it customary for the pay of the superintendent to be added to the cost of the church before determining the architect's fee, or is he entitled to five per cent on the total cost of the church, less the amount due the superintendent?

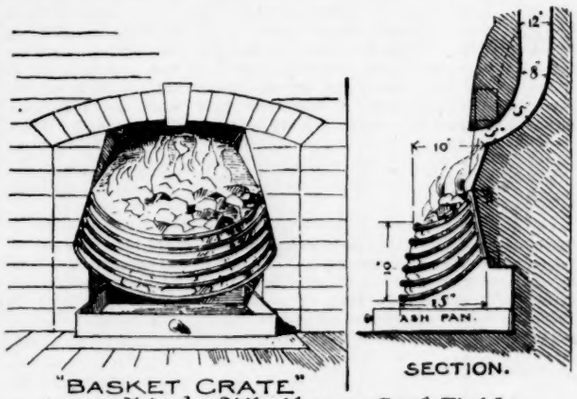
This is the first case of the kind arising in my experience, and not knowing the customary practice of the profession in the premises, I would be greatly obliged if you would enlighten my ignorance.

C. C.

[WE have never heard of a case such as our correspondent mentions. Our belief is that the superintendent's salary could not be justly added to the cost of the building before calculating the architect's commission. If the owner is willing to pay for a competent superintendent under the architect's orders, we should think it a little crowding to collect a commission on the superintendent's pay. The wording of the schedule runs, "the total cost of the works executed from his designs," and it would be seemingly as proper to include the superintendent's salary in that total cost as the premium on the insurance, the interest on the first payments, or even the architect's own commission, and no more so. We know of cases where the architect, for his own satisfaction, employs a superintendent, and of course pays his salary out of his own commission, this usually when the superintendent's time is divided between several buildings. In other cases the salary has been paid by owner and architect conjointly. — EDS. AMERICAN ARCHITECT.]

THE BASKET-GRATE OF THE ALLEGHANY REGION.

IT has been thought that the "Baltimore low fireplace grate" fulfils the best conditions for allowing a fire to perform its duties to the uttermost. The domestic fires in the "basket-grates" of the mining-regions of the Alleghanies, where the soft coals prevail, are fires that will compare, for beauty, comfort and good cheer, with any fires ever seen in any part of the world. The "basket-grates" are so set in the chimney-back, as to lean outwards for about one-half their size. They project so much in front of the flue, and lean so well forward, as to make, when the coals are all aglow, a powerful reflecting surface. The following diagrams serve to illustrate the form and position of the "basket-grate" from which probably the invention of the low fireplace grates of the East have been derived. The diagrams show how the grate projects outward from the bottom, and hangs downward from the top like a tilted basket, wider at the bottom than the top. It should be noticed that



"BASKET CRATE"
As used in the Alleghany Coal Fields.

the face of the back wall in the grate has two different slopes: one, the lower half of the back wall, slopes from its centre backwards and downwards; the other, the upper half, slopes from its centre backwards and upwards. The effects of this arrangement are plainly seen in the operation of the fire. The lower half of the grate is thus made to contain the bulk of the fire, while the upper half performs the duty of a reflector in throwing off the heat of the burning coals into the room. In very many fireplaces, and in ill-set grates, there are losses of heat that amount actually to 50 or 60 per cent of the amount that is generated.

W. G. ATKINSON.

PUBLICATIONS RECEIVED.

SPECIAL REPORT OF NEW YORK STATE SURVEY ON THE PRESERVATION OF THE SCENERY OF NIAGARA FALLS, and Fourth Annual Report on the Triangulation of the State. For the year 1879. James T. Gardner, Director. Albany: Charles Van Benthuysen & Sons. 1880.

BEVIS'S BUILDERS' PRICE BOOK for Architects, Engineers, Surveyors, Builders, and Contractors, and Guide for Estimates. By Henry C. Bevis, Surveyor, etc. Third Edition. London: Bevis & Co. 1880.

NOTES AND CLIPPINGS.

VALUE OF THE FRENCH NATIONAL PALACES. — The Bureau of Civil Buildings and National Palaces has just issued a statement concerning the approximate value of the public palaces: in it the Palais Royal, where the Council of State is at present, is valued at 10,000,000 francs; the Luxembourg Palace at 60,000,000 francs; the Elysée at 10,000,000 francs; the palace at Versailles, with its parks and adjoined buildings, at 112,000,000 francs; the Trianon at 13,478,000 francs; the palace at St. Cloud at 4,977,000 francs; the palace at Rambouillet at 3,044,000 francs; the palace at Compiègne at 13,000,000 francs; and the palace at Fontainebleau at 55,000,000 francs. The values of the Louvre and the Tuileries are not stated.

EFFECT OF COLD ON IRON AND STEEL. — Mr. J. J. Webster, an English engineer, has made a series of experiments to determine what effect extreme cold produces on iron and steel. After submitting numerous specimens to temperatures varying between + 10° C. (+18° Fah.) and — 21° C. (— 38° Fah.), he reached the following conclusions: First, the tensile power was not affected by the low temperature, but the ductility of iron bars was increased one per cent, and that of steel bars three per cent; second, the power of resisting transverse strains was diminished three per cent, and the flexibility sixteen per cent; third, the power of resisting shocks was affected in the following way: —

Metal.	Decrease in resistance under shocks.	Decrease in flexibility.
Wrought iron	3 %	18%
Cast tool-steel	3½%	17%
Malleable cast-iron	4 %	15%
Cast-iron	21 %	not determined.

Driven Wells. — Prof. George H. Cook, State Geologist of New Jersey, in a lecture lately delivered before the Newark Board of Trade, gave some information of general interest on the recent attempt of the authorities of that city to draw additional supplies of water from driven wells at Belleville, near the Passaic River. We quote as follows from the *Metal Worker:* "The water in the river was thought to be good when the present system of water-works was established some years ago. In the desire to improve the navigation of the river, the reefs had been taken out, and this had allowed a freer flow of tide-water, and the salt-water passed further up the stream than it did before. Added to this, a portion of the sewage of Newark is carried up the river by the tide. The country from Paterson to Belleville has grown in population and been built up, and factories have been established all along the river. In consequence of all this the water is not as good as it used to be, but still it is not very impure. The best way of getting a larger and better supply is the question to be considered. Experiments have been tried with driven wells in a strip of land at Belleville, draining about two miles of alluvial soil and about half a mile wide. Pipes have been driven down to a depth of 40, 42, and 48 feet without striking rock, and it is reasonable to suppose the soil is filled with gravel to that depth. The water obtained from these wells seems to be pure, cold and bright, but a little hard. This would seem to be no objection except for manufacturing purposes. These driven wells have been operated several months, and from them 2,500,000 gallons of water daily have been pumped. When the pumping began, the water sank until the sinking reached five feet, and when the pumps stopped it rose. It was noticed that the water rose and fell as the tide rose and fell, though not at the same time, and not as much as the tide, but one could not help concluding that the water came from the river and had filtered in through the earth. The basin in which these wells are situated covers a square mile and a half, and holds 209,000,000 gallons of water. If 3,000,000 gallons were pumped from it per day, it would take 600 days to pump this basin dry, and there is enough water there to supply the city for two years before it can be pumped out. As this water is pumped out it will be replaced by river water filtering in, and it will become softer. Last year, in Trenton, at the State Prison, a well 12 feet in diameter was sunk in sand and gravel for a depth of 50 feet down into solid rock, and it was found that the water at a certain level would supply 135,000 gallons per day, but at another level would not supply more than 68,000 gallons, and at another not more than 20,000 gallons. Professor Cook thought if in the basin in which the driven wells are situated these wells could be deepened, the supply would be increased indefinitely for a time, and perhaps could supply the whole city temporarily. He was confident a great increase could be obtained on account of the location of these wells near the river. He thought the impurity that filtered into the soil from the river would gradually help to clog it up, but the water would be better than we now get."

Hampton Court Palace Clock. — The antique and curious dial of the clock over the gate-tower in the second quadrangle at Hampton Court Palace has lately been replaced, and, with new works, again shows not only the hours of the day and night, but also, among other things, the day of the month, the motion of the sun and moon, the age of the moon, the phases and quarters of the moon, and the moon's southing. The dial is composed of three separate copper disks of different sizes, with a common centre, but revolving at varying rates. The smallest of these is three feet three and one-half inches in diameter, and in the middle of this is a slightly projected globe, painted to represent the earth. The quarters, marked on the central disk by thick lines, are numbered with large figures, and round the edge the disk is divided into twenty-four parts, a red arrow painted on the second disk pointing to these figures, and showing at once the quarter in which the moon is, and the time of southing. Next to the figure of the earth in this central disk, a circular hole ten inches in diameter allows a smaller disk travelling behind to show the phases of the moon. On the second disk, four feet one and one-quarter inches in diameter, but of which only the outer rim is seen, are twenty-nine divisions, and a triangular pointer, projecting from behind the central disk, shows the moon's age in days. The largest of the three disks is seven feet ten inches in diameter. The new clock drives both the astronomical dial and the hands of the ordinary clock-face on the opposite or western side of the tower. In the mechanism, many ingenious contrivances have been employed, and while the clock is guaranteed not to vary more than five seconds a week, it is not expected to vary even so much as that. — *London Times.*

A Legal Decision. — A case of great importance to architects, and involving in a great measure the beauty of town buildings, has been decided in the Queen's Bench Division of the High Court of Justice, March 24. It appeared that under a local Act of Parliament in Liverpool the authorities prohibited projections of a building in front of an arbitrary line "over or upon the pavement." The town surveyor, like nearly all his brethren in office, insisted that the erection of an oriel window, fourteen feet above the foot-path, and projecting two feet and a half beyond the front of an hotel, was contrary to the Act. He applied to the stipendiary magistrate, who refused to convict. An appeal was then made to the High Court, which confirmed the magistrate's decision, and declared that "the object of this and kindred enactments was the protection of foot-passengers, and the projection at such a height could not affect them."

The Lorillard Expedition. — M. Désiré Charnay states that he has sent everything before him from France to Vera Cruz. There are over four tons of implements and machines. Two tons of elastic hemp paper for moulding purposes, dredges for the sacred lakes of Yucatan, with which to search for the jewels cast into the water in idolatrous worship as offerings to the gods, ladders in sections with iron clamps, and photographic material are among the freight awaiting his arrival. No agreement with the Mexican government has yet been made, but M. Charnay will offer to share with that country the benefit of his discoveries. The Mexican minister hopes that he will meet with a cordial reception. M. Charnay does not expect to return for two years.

American Valuations of Bric-a-Brac. — In a letter to the New York *Times*, Mr. James Jackson Jarves says, in speaking of the late Demidoff sale at San Donato: My countrymen as yet scarcely appreciate the valuations placed by European connoisseurs on choice articles of bric-à-brac. Many left commissions to secure some of the chief and most beautiful things, showing their artistic appreciation, but failed lamentably in their financial estimates. Could they have been present at the last three days' sale of the snuff-boxes, the enamels, — Italian and French, — jewelry of the fifteenth, sixteenth and seventeenth centuries, old silver plate, — especially the English, — they would have been taught a practical lesson in this respect that would have astonished them. They would have seen dealers from Paris, London, Berlin, Dresden, Vienna, and even little Switzerland, — not to speak of the princely collectors, — sharply contesting small objects, such as snuff-boxes, rings, flagons, dishes, etc., that were selling at from $1,000 to $8,000 each. A little *aiguière* that had been valued by Tiffany & Co., as an extreme figure at 900 francs, sold for 5,700, and a small English silver tea-pot, as dear at 300, went in a few seconds to 1,200. A many-millionnaired gentleman, who coveted a repoussé silver plate at 1,000 francs, saw it in a minute knocked down for 8,000. French work of the time of Louis XIV. and the Regency, of almost any character, commanded extravagant prices, while other articles, much finer artistically, of German or Russian origin, and more interesting in composition, were almost given away in comparison. As a speculation, if one, the net result to the Prince must be a heavy loss, for the expenses of such a sale are simply enormous. Besides $20,000 spent in catalogues and given away, a small army of assistants, guards, etc., has to be kept for many months, while by orders there are telegraphic reports sent daily to all the chief papers of Europe and to the *Herald* of New York. Those of our readers who have catalogues of the San Donato sale, by turning to No. 1,238, will read an account of a remarkable silver toy made by Jamnitzee. This sold at 57,000 francs, and No. 1,189, a large silver *terrine*, for 40,000 francs. Fashionable ladies spent their mornings at the sale for entertainment, as at an exciting reception. To all the prices cited here must be added five per cent auction commission, paid by buyers, as is the custom in France and Italy.

The San Donato Treasures. — Many people will probably read with surprise of a great sale of the treasures from the Demidoff villa, San Donato, France, since they remember the series of auctions which took place in Paris three months prior to the Franco-German war, in 1870, when it was generally supposed that the contents of the famous Florentine villa were dispersed. The fact was, however, that so enormous had been the accumulation of *objets d'art* that a vast quantity of articles was piled away like lumber, and no sooner had the halls and galleries of San Donato been stripped, and their contents sent for sale to Paris, than they were re-filled from the stores which had long been concealed. These (for the most part inferior to what was sold in 1870) are what are now passing under the hammer. The owner of the collection sold in 1870 was Prince Anatole Demidoff. Like his brother collector, the Marquis of Hartford, he died in Paris, within a few weeks after his sale was completed, in April, 1870, at the age of fifty-seven. He had of late years resided almost continuously in Paris, where his bent form and haggard aspect were almost as well known as the Café Anglais. The Parisians gave him the dreadful nickname of Prince Decomposition. The great fortunes of the family were chiefly due to the energy of Prince Anatole's father, in working his malachite and other mines in Siberia, and the money derived from this source he (the father) invested in works of art, of which he was passionately fond. Most of his time was spent in Italy, and his vast means enabled him, in an impecunious country, to become the possessor of almost anything he desired. He is said to have given the Pope $200,000 for his title of Prince of San Donato. The late Prince Anatole married, in 1841, the Princess Mathilde, cousin of the ex-Emperor Louis Napoleon. — *New York Times.*

Japanese Marble. — Signor Gagliardi, an Italian Professor at the Polytechnic Institute in Tokio, who was lately commissioned by the Japanese Government to explore the Ibaraki mountain range, reports that he has found several veins of marble of different colors. One mountain, Suvoyama, seemed to him to be a mass of white statuary marble; and he also declares that he came upon some black marble equal to the finest in Europe. He anticipates that if care be taken in quarrying, and facilities of transport be provided, Japan will become the great marble market for the world.

The Black Walnut. — Hon. E. C. Whiting of Monona County, one of the veteran tree-planters of Iowa, says, in the Horticultural Report for 1877: "If I were to plant a section of timber for investment for an my children, I would have it all black walnut. A tree will grow to a sawing size sooner than pine, and even now in our markets it is quoted at three times the price of pine." The *Iowa Forestry Annual* for 1879, a little pamphlet issued under the auspices of the Horticultural Society, and containing much valuable information on tree culture, says: "Careful observations during the past two years in the prairie States convince us that the black walnut makes most rapid growth on our prairies rich in humus, and yet having a porous subsoil, so that it will not suffer in extremes of wet or drought." H. C. Raymond of Council Bluffs, another extensive tree-grower, says, in *Forestry Annual* for 1879, that black walnut, planted by him ten years ago, average five inches in diameter one foot from the ground, and are twenty feet high. The writer planted some nuts about ten years ago, which were transplanted at two years old, and in 1878 began to bear fruit. They are now fifteen to twenty feet high, with spreading tops.

M. Viollet-le-Duc and the Church of Vezelay. — M. Adolphe Cuillon, a landscape-painter, who passes his summers at Vezelay, states that in spite of the enormous sums that Viollet-le-Duc expended on the restoration of the church of Vezelay, the new portions are already in such a bad condition, that, for the preservation of these parts alone, an outlay is required which the older portions do not need.

BUILDING INTELLIGENCE.

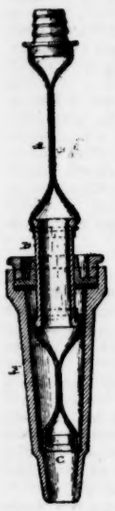
[Reported for The American Architect and Building News].

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

BUILDING PATENTS.

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

225,776. VALVE FOR SEWER-TRAPS. — William Wilson, Oakland, Cal. This invention is an improvement on the valve for which Letters Patent No. 220,559 were issued on the 14th day of October, 1879. In the former patent the collapsible section passed through a water-chamber, and the surrounding pressure served to collapse and close it until a superior internal pressure forced it open. This surrounding water-chamber can be dispensed with, and at the same time, the action of the valve is improved, so that water, steam or gas can only pass through it in one direction. *A*, is a collapsible flat tube which remains collapsed until a pressure inside opens it. *B*, is a short metal tube to which a short collapsible tube, *C*, is secured, while the lower end of a collapsible tube, *A*, is secured to its upper end. *E*, is a short conical tube, the lower end of which is secured to the waste-pipe below the sink so that the tube forms an enlarged portion of the waste-pipe. The tube, *B*, is placed in the upper or large end of the conical section, *E*, so that the short collapsible tube, *C*, will hang down inside of the conical section. The tube, *B*, is held in place by cement; this leaves a portion of the tube, *B*, projecting down into the conical section and a portion extending above it. The upper end of the tube, *A*, which is secured to the upper end of *B*, is connected with the waste-pipe of the sink above; any water passing down the waste-pipe will enter the upper collapsible tube, *A*, and expand it, and pass through into the short tube, *B*, and as long as water passes through this upper collapsible tube it will also pass down through the lower collapsible tube, *C*; but as soon as all the water has passed through the upper tube this tube will collapse by the outside atmosmospheric pressure, and thus maintain the tube, *B*, full of water all the time by the vacuum in the upper end of the tube. The lower collapsible tube hangs in a chamber, and is surrounded with air, so that as soon as water ceases passing through it, it will also collapse. Any back pressure, therefore, will find this lower tube tightly closed, so that it will be impossible for it to get back through the tubes. The lower collapsible tube prevents the return of gas, while the upper collapsible tube serves to retain a body of water in the pipe, which gives additional security; but the lower tube is all that is actually necessary.



225,590. DRAG-SAW. — John Augspurger, Trenton, Ohio.

226,602. SOLDERING-IRON. — Chas. M. Dravo, Allegheny, Penn.

226,603. AIR-FEEDER TO FURNACE. — Henry T. Drain, James McClung, and Emlen G. Penrose, Tama City, Iowa.

226,607. PENCIL AND CRAYON HOLDER. — Bradley A. Fiske, Naperville, Ill.

226,612. METAL-STAMPING, PUNCHING, AND SHEARING MACHINE. — Moritz Herzberg, New York, N. Y.

226,617. CABINET-MAKERS' CLAMP. — Johan L. König, Baltimore, Md.

226,620. SEWER CATCH-BASIN. — Patrick Markey, Milwaukee, Wis.

226,625. SKYLIGHT HATCH. — Semon J. Pardessus, Brooklyn, N. Y.

226,643. TAP-WRENCH. — Thomas R. Way, Springfield, Ohio.

226,664. PILE. — Lancelot Kirkup, Brooklyn, N. Y.

226,673. ELEVATOR. — Charles R. Otis, and Norton P. Otis, Yonkers, N. Y.

226,682. SLIDING-DOOR LOCK HANDLE. — William E. Sparks, New Britain, Conn.

226,684. LOCK-HINGE. — Walter S. Stockman, Boston, Mass.

226,709. COMBINED VISE AND DRILL. — Charles Brimmer, Peru, Ill.

226,718. DRAG-SAW. — John A. Cluxton, Bentonville, Ohio.

225,745. STEAM-HEATING APPARATUS. — Joseph L. Harley, Baltimore, Md.

226,747. PLUMBER-BLOCK. — Benjamin Hewlet, Birmingham, England.

226,753. SOLDERING-IRON HEATER. — John S. Hull, Baltimore, Md.

226,756. PLIERS. — Rolla K. Jones, Watertown, N. Y.

226,758. COMPOSITION FOR WHITEWASH. — Archibald H. Kerr, Midway Texas.

226,744. ENDLESS-CHAIN SAW. — Edward Norman, San Francisco, Cal.

226,786. DOOR-CHECK. — Henry B. Pruden, Dayton, Ohio.

226,791. SAWING MACHINE. — James B. Richard, Union City, Mich.

226,795. SLATE-DRESSING MACHINE. — Francis Shenton, Slatington, Penn.

226,798. FIRE-ESCAPE LADDER. — Michel Sichel, Cape Girardeau, Mo.

9,162. (*Reissue.*) FILE-MACHINE. — Joseph C. McKenzie, Adrian, Mich.

SUMMARY OF THE WEEK.

Albany, N. Y.

CHURCHES.—Messrs. Nichols & Brown are the architects of the new Catholic Church. It is to be 50′ x 125′.

A new Baptist Church is talked of.

CITY HALL.—A new City Hall is under consideration by the city and county in unison.

DEPOT.—A new Depot for Rensselaer & Saratoga and Susquehanna Railroad is to be built corner Maiden Lane and Dean Streets.

HOUSE.—I. K. Emmet, the actor, has commenced a house on the Boulevard.

REAL ESTATE.—The tendency of improvements in buildings, residences especially and real estate generally, is in the vicinity of the new Park at the West end of the city.

THE STATE HOUSE.—The appropriation of $1,500,000 for work on the Capitol, has been signed by the Governor. The south-east portion of the building is to be completed for the Senate. Much of the inside lining or finish in this portion, instead of being sand-stone,—which in the corridors has already cracked considerably,—is to be of variegated marble. The cracks referred to do not impair the strength of the walls proper, however. The contracts for the following materials were let April 20: sand, 3,000 yds. @ $1.; Howes Case Lime & Cement Co., 5,000 bbls. @ 0.75; brick, 1,000,000, @ $8.; 1,000,000, @ $7,50; 2,000,000 @ $7.;—4,000,000 in all. A resolution was adopted by the New Capitol Commission authorizing proposals for glass, iron window-frames and sash, for south central section and south-east pavilion.

Baltimore.

BUILDING PERMITS.—Twenty-eight building permits have been issued since the last report, of which the following only, are of sufficient importance to be mentioned:—

Hannis Distilling Co., one-st'y brick warehouse, 30′ x 58′, cor. Ostend and Russell Sts.

Sam'l Black, 3 three-st'y brick dwells., Maryland Ave., north of Townsend St., each 17′ x 45′.

Francis White, five-st'y iron-front warehouse, Sharp St., between German and Lombard Sts.

John Farber, three-st'y brick dwell., on Forrest St., near Chestnut.

HOSPITAL.—Work was resumed on the Johns Hopkins Hospital on the 19th ult., after having been suspended during the winter months, and it is thought that the immense building will be under roof by the fall.

PRINTING ESTABLISHMENT.—Messrs. A. Hoen & Co., Lithographers and engravers, are about to erect a large six-st'y brick and stone building, 30′ x 187′6″, on the cor. of North and Lexington Sts; first-st'y on North and Holliday Sts. to be of iron; the North St. front will be surmounted by a figure representing the art of engraving. Mr. Wm. F. Weber is the architect.

SEWERS.—The Legislature having authorized the city to issue $250,000 of 4½ bonds for the construction of Harford Run Sewer, the City Council has passed the necessary ordinance for the issue of the bonds; the City Council has also appropriated $7,000 for Boundary Ave. sewer

SOCIETY BUILDING.—Ground was broken on Wednesday 22d ult., for the new Centenary Biblical Institute, which will be built on the corner of Fulton and Edmondson Aves. It will be of Gwynn's Falls stone, two stories high, with mansard roof and basement. The building will measure 79′ x 67′; cost, $21,000; Mr. F. A. Davis is the architect.

RAILROAD PIERS.—The ordinance permitting the B. & O. R. R. Co. to construct two additional piers at Locust Point was signed by the mayor this week.

WAREHOUSE.—Bolton Bros. are putting up a large three-st'y warehouse, at 82 and 84 W. Pratt St., 30′ x 85′, the front of pressed brick.

Boston.

BUILDING PERMITS.—Brick, *Essex, No.* 180, for estate of T. T. Thompson, 1 store, 67′ x 94′, five stories; Rumey & Maxwell, builders.

State St., No. 7, office building, 20′ x 52′, for Geo. O. Shattuck; iron front, in Queen Ann style; Jas. Fagan, builder; Ware & Van Brunt, architects.

Cor. Commercial and Chester Sts., for P. Monahan, 1 Tremont House, 26′ x 40′, four stories; C. S. Stone & Co., builders.

Wood, cor. Glen Road, for G. W. Coffin; 1 stable, 25′ x 35′; C. G. Lynch, builder.

Murray Ave., Wd. 21; 2 dwels., 28′ x 40′; Wm. Donaldson, owner and builder.

Brighton Ave., Wd. 25, for W. J. Tirrell, 1 dwell., 24′ x 35′; H. M. Perry, builder.

ASYLUM.—Contracts for finishing the Asylum for Aged Poor, have been awarded, and work begun; C. J. Bateman, architect.

HOUSES.—Four houses are to be built this season on Newberry St., near Fairfield. Also cor. Newberry and Fairfield Sts. will be one for Mr. E. W. Cushing; Mr. Geo. A. Avery, architect.

Brooklyn.

BUILDING PERMITS. — *Yates Ave.*, cor. Ellery Street, 2 three-st'y brick tenements, 50′ x 50′, owner, Edward C. Reinhardt, 756 Flushing Ave.; architect, Th. Englehardt; builder, Wm. Dafeldecker and M. Metzer.

Furman St., 1 four-st'y brick factory, 91′9″ x 79′ x 77′8″ x 67′; cost, $15,000; owners, F. R. & W. C. Fowler, 100 Columbia Heights; architect, Isaac Gosling; mason, P. Castner.

Monroe St., 2 two-st'y brown-stone dwells., 12′ x 18′ x 41′ x 45′; cost, 4.50; owner, F. Sloate, 349 Tompkins Ave.

Amity St., No. 141, 1 four-st'y brown-stone tenement, 25′ x 75′; owner, George W. Brown, 728 Fulton St.; architect, C. B. Sheldon; builders, Levi Brown & C. E. Cozzens.

Dean St., cor. New York Ave., 1 two-st'y brick school-house, 50′8″ x 104; owner, Board of Education, Red Hook Lane; architect, J. W. Naughton; builders, Ashfield & Son, and P. F. O'Brien.

South Fifth St., cor. Tenth St., 3 two-st'y brick dwells., 17′2″ x 39′; cost, each, $3,500; owner, M. J. Ferguson, 82 Tenth St.; builder, R. Ferguson.

Pacific St., 1 three-st'y brown-stone dwell., 20′ x 65′; cost, $10,000; owner, W. R. Adams; architect, John Mumford; builders, James Ashfield & Son and Perkins & Green.

Spencer St., cor. Willoughby Ave., 1 three-st'y frame store and tenement, 20′ x 40′; cost, $3,000; owner, &c., George Loeffler, 140 Floyd St.

Spencer St., 1 two-st'y frame dwell., 17′ x 38′; cost, $2,000; owner, George Loeffler, 140 Floyd St.

Hancock St., 6 three-st'y brown-stone dwells., 20′ x 43′; cost, $7,000 each; owner, S. E. C. Russel, 558 Grand Ave.

Tompkins Ave., 1 three-st'y frame store and dwell., 20′ x 50′; cost, $3,400; owner, Ch. Hoffman, No. 24 Tompkins Ave.; builder, J. Finck; carpenter, Ch. Hoffman.

Court Street, 1 four-st'y brick store and dwell., 25′2″ x 60′; owner, P. Haggerty, 261 Warren St.; carpenters, M. Freeman & Son; masons, Burns & McCann.

South Third St., cor. First St., 1 nine-st'y brick factory, 58′10″ x 98, and extension 22′4″ x 41′2″; cost, $60,000; owner, Havemeyer & Elder; architect, T. A. Havemeyer; builders, Winslow & Janes.

Fifth St., 5 three-st'y brown-stone flats, 20′ x 56′; and *Fifth St.*, 5 three-st'y brown-stone flats, 20′ x 56′; cost, each, $2,000; owner, Geo. W. Brown, 728 Fulton St.; architect, C. B. Sheldon; builders, Levi Brown and C. E. Cozzens.

Prospect Pl., 2 four-st'y brown-stone flats, 20′ x 65′; cost, each, $2,500; owner, Geo. W. Brown. 728 Fulton St.; architect, C. B. Sheldon; builders, Levi Brown and C. E. Cozzens.

ALTERATIONS.—*Broadway, No.* 771, two-st'y frame extension, 18′ x 20′; cost, $1,600; owner, J. G. Jenkins, on premises; builder, John Brown.

Front St., No. 9 (Old Bank), raised two stories; cost, $3,000; owner, Thomas Messenger, Brooklyn Bank, builders, Charles Long & J. F. Wood.

Sidney Pl., No. 43, three-st'y brick extension, 9′6″ x 15′; cost, $3,400; owner, Wm. Leissler, on premises; builder, H. D. Southard.

Chicago.

BUILDING PERMITS.—*West Madison, No.* 750, three-st'y store and dwell., for Walter Cahill; cost, $7,500.

Third Ave. No. 232, two-st'y dwell., for A. Mass; cost, $2,300.

Cor. of Dearborn and Sixteenth St., iron covered elevator, 73′ x 36′, for Stewart & Dougal; cost, $30,000.

Twenty-second St., No. 369, three-st'y dwell., for H. Schaffroth; cost, $6,000.

Cor. of Fisk and Eighteenth pl., two-st'y store and dwell., for Joseph Vistein; cost, $4,000.

Cor. Franklin and Adam St., five-st'y store, 184′ x 160′, for George Armour; cost, $170,000.

Eighteenth, near Paulina, two-st'y dwell., for John Dryle; cost, $2,000.

Monroe, near Loomis, two-st'y dwell., for A. W. Adcock; cost, $4,500.

New York.

ALTERATIONS.—*First Ave., No.* 141, store front and interior alterations on first story; cost $2,000; owner, Adolph Fuller; architect, Charles Sturtzkober; builders, Schaeffer & Sons.

West Thirty-seventh St., No. 534, to be raised to four stories; also three-st'y brick extension on rear, 25′ x 102′; cost, $5,000; owners, Rohe & Brother; architect, Wm. Kuhles.

New St., No. 38, interior and exterior alterations; cost, $4,000; owner, The Stock Exchange; architect and builder, J. Richardson.

Sixth Ave., Nos. 90 *to* 98, an additional story on present one-st'y rear extension, also two-st'y brick extension, 103′ x 32′, also interior alterations; cost, $30,000; owners R. H. Macy & Co.; architect, James J. Lyons.

Avenue C., No. 81, two-st'y brick extension, 20′ x 23′; cost, $2,500; owner, Mr. Folsom; architect, Chas. Sturtzkober; builder, John Kraft.

Twenty-third St., cor. of Fourth Ave., exterior and interior alterations; cost, $6,500; owner, The N. Y. S. for P. of C. to Children; builder, Edward Sorensen.

East Forty-first St., No. 4, one-st'y and basement brick extension, 12′ x 45′, to be built on rear; cost, $10,000; owner, Dr. H. B. Millard; architect, Wm. B. Bigelow; builder, Richard Deeves.

Fourth Ave., No. 81, to be altered internally; cost, $3,000; owner, John Willis; architect and carpenter, J. R. Coggin; mason, J. L. Murtha.

West Fiftieth St., No. 46, two-st'y brick extension on rear, 9′ x 16½′; cost, $2,500; owner, Mr. Holmes; architect, Stephen D. Hatch.

Twenty-third St., No. 26, front to be rebuilt, interior changes throughout; cost, $15,000; owner, W. P. Earl; architects, N. L. Le Brun & Son.

East Fourteenth St., No. 15, roof to be raised 4 feet; cost, $2,100; owner, W. Jennings Demorest; builder, James Coar.

Seventy-second St., for Helen Langdon, Chas. W. Romeyn, architect; J. J. Rudder, builder; 3 brown-stone dwells., 16′8″ x 50′4″, three stories and basement; cost, $27,000.

Second Ave., for Mrs. Helen Tracy, Jno. C. Burne, architect, 1 four-st'y brown-stone flats and store; cost, $12,000.

West Fourteenth St., Nos. 116 *and* 118, for Wm. C. Schemerhorn; D. Lienan, architect; Benj. Blackledge, builder; brick store, 50′ x 106′6″; cost, $32,000.

Lexington Ave., cor. Sixty-fifth St., for Dominican Fathers, Wm. Shickel, architect, a brick convent, 88′ x 49′; cost $75,000.

Lexington Ave., cor. Sixty-ninth St., for Sisters of Charity, a brick hospital, 74′ x 50′, Wm. Shickel, architect; cost, $50,000.

Seventh Ave., cor. Twenty-ninth St., for F. Beck, Geo. W. Da Cunha, architect, a six-st'y brick factory; cost, $50,000.

West Twenty-third St., Nos. 27, 29, 31, 33, *and West Twenty-fourth St., Nos.* 8, 10, 12, brick store for Arnold, Constable & Co., Wm. Shickel, architect; cost, $200,000.

Seventy-fifth St., for D. Hennessy, Thom & Wilson, architects, 4 brown-stone residences; cost, $60,000.

First Ave., cor. Seventy-seventh St., for Joseph Schweneger, Jno. I. Wilson, architect. 1 brown-stone flat and store, 27′ x 75′; cost, $17,000.

First Ave., for Jos. Schweneger, Jno. I. Wilson, architect, 3 flats and stores, 25′ x 55′, of brownstone; cost, $45,000.

First Ave., same owner and architect, 3 brown-stone flats and stores, 25′ x 55′; cost, $36,000.

Fifty-fourth St., for Jno. Grant, Thom & Wilson, architects, brick tenement, 35′ x 40′; cost, $10,000.

Lexington Ave., for Thos. F. Fresey, Chas. W. Romeyn, architect, Jas. Frame, builder, 2 brown-stone dwells., 16½′ x 50′4″; cost, $18,000.

Tenth Ave., 1 brick two-st'y dwell., and shop, 25′ x 40′; John Dunning, owner; Peter Wagner, builder, cost, $2,000.

Art School.—A philanthropist of this city has bought some land on First Ave., between Sixty-sixth and Sixty-seventh Sts., on which he proposes to build a brick building one-st'y high on three sides of a court. It will have a frontage of 200 feet on First Ave., and a depth of 130 feet. The building will be lighted from the sides, and will have a gable roof. The main entrance will be on the avenue, and on either side will be rooms for the officers and managers. The gentleman proposes to give the use of this structure to the Trustees of the Metropolitan Museum of Art for three years.

Church.—Mr. L. B. Valk has filed plans for a new brick church, 68′ x 100′, for the Trustees of the Second Baptist Church of Harlem. The location is to be on the north-east corner of One Hundred and Eleventh St., and Lexington Ave. Cost, $30,000. Messrs. E. D. & A. Harrison, of Brooklyn, builders.

Factory.—Stephen D. Hatch, architect, has designed an eight-st'y brick building, 78′7″ x 101′, for Leopold Schepp, on Duane St. Estimated cost of the building is $150,000. John Masterson, builder.

Houses.—The foundations are now being prepared for Mr. H. R. Bishop's new house on Fifth Ave., its design has been drawn by Mr. C. W. Clinton. The exterior is to be of brown-stone, in Renaissance style. It will cover a lot 53′8″ x 90′.

Mr. Geo. Kemp will have a fine house built this summer on Fifth Ave., cor. Forty-eighth St. It will be built to harmonize with the old Dutch Reformed Church, and Mr. Soelet's new house.

Office Building.—The Liverpool, London & Globe Insurance Co., have cabled from the head office endorsing the plans of Mr. S. D. Hatch, for their new building, and estimates will be immediately called for.

School-House.—Mr. D. J. Stagg, has drawn plans for a brick school-house for the Board of Education, 125′ x 125′. Cost, $100,000.

Stores.—The site of the Olympic Theatre, which is to be torn down, will be covered with stores, designs for which are being prepared by Messrs. D. & J. Jardine.

Tattersall's.—Messrs. D. & J. Jardine will prepare plans for the N. Y. Tattersall's, on the corner of Fiftieth St. and Seventh Ave.

Philadelphia.

Houses.—*Fox St.*, 10 two-st'y dwells., 13′ x 41′, owner and builder, Henry H. Wister.

Hipple St., three-st'y dwell., 18′ x 46′; Charles Vogt, contractor.

Hamis St., 2 two-st'y dwells., 16′ x 40′; T. W. Wright, contractor.

Aspen St., cor. Forty-first, 1 three-st'y dwell., 32′ x 40′; John F. Meyer, contractor.

Division St., cor. Richmond, 1 three-st'y dwell., 20′ x 50′; Charles Fay, contractor.

Bainbridge St., 2 two-st'y dwells., 18′ x 54′; Thomas McCouch, contractor.

Twenty-fifth St., 6 thfee-st'y dwells., 15′ x 40′; J. L. Cane, owner.

Sixteenth St., three-st'y dwell., 22′ x 92′; James E. Smaltz, owner and builder.

Twenty-third St., 6 three-st'y dwells., 17′ x 49′; James M. Patterson, contractor.

Bower St., near Trenton Ave., 1 three-st'y dwell., 18′ x 32′; W. Steel, contractor.

Stores.—*Walnut St., No.* 1012, three-st'y building, 25′ x 49′; builder and architect, D. S. Gendell.

Market St., No. 930, five-story store, 20′ x 130′; James B. Doyle, Contractor.

Ridge Ave., No. 2109, three-st'y store and dwell., 18′ x 59′; T. A. Beaver, contractor.

Factories.—*Hamilton St.*, cor. Twelfth, three-st'y factory, 45′ x 110′; James McCartney, contractor.

Torpen St., one-st'y dye-house, 60′ x 32′; G. H. Bunkworth, contractor.

Front St., four-st'y factory, 50′ x 60′; W. Steel, contractor.

Stables.—*Mellon St., No.* 1123, two-st'y stable, 40′ x 53′; Patrick Olden, contractor.

Norris, cor. Thompson, two-st'y stable, 80′ x 400′; owners, Union Passenger Railway Company.

School-House.—*Poplar St.*, 1 two-st'y school building, 14′ x 37′; S. J. Rea, contractor.

Additions.—*Greene St., No.* 425, three-st'y addition to dwell., 18′ x 33′; George Glaystone, contractor.

Twenty-third and Brown St., addition to stable 100′ x 150′; owners, Union Passenger Railway Company.

Asylum.—Forty-eighth St. and Darby Road, three-st'y "Home," 72′ x 44′; Lewis Havens, contractor.

Insurance Building.—Mr. Theophilus P. Chandler, Jr., architect, of this city, has made plans for a new building for the Spring Garden Ins. Co., No. 431 Walnut St.

St. Louis.

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

Owners.	Use.	Stories.	Rooms.	Cost.
Grand Avenue Presbyterian Church	Church	1	1	$12,000

General Notes.

Adrian, Mich.—The State Reform School for Girls is to be built here.

Alleghany, Pa.—James McNally, clothier, will build a house to cost $18,000, on Bidwell St., the coming summer.

Altoona, Pa.—Messrs. Wilson Bros. & Co., architects, of Philadelphia, have just completed plans for a house 45 x 60, to be built for Mr. John P. Sevan. Cost, $15,000.

Bowenville, Mass.—Work on the new St. Joseph's Church has been begun by the contractors, Messrs. Hogan & Holmes, of Boston, on Monday.

Mr. Joseph McCreery, Superintendent of the Shove Mill, is building a cottage at the junction of Mt. Hope Ave., and Bay Street.

Bradford, N. Y.—Messrs. Holmes & Little, architects, of Buffalo, N. Y., are building a store; cost, $10,000.

Brattleboro, Vt.—Mr. W. H. Hayes, of Elmira, N. Y., is the architect of the New M. E. Church, which is to cost $12,000.

Bridgeport, Conn.—The Read Carpet Company are building a three-st'y brick addition, 50′ x 130′; John Rutherford, builder.

Plumb & Griffin are building a two-st'y brick pork-packing house.

Louis Kutscher is building a three-st'y brick block, 60′ x 50′, — three stores and tenements above; cost, $12,000; John Rutherford, builder; Lambert & Bunnell, architects.

Mr. D. T. Ellis, Treasurer of the Belknap Manufacturing Co., is to build on Cottage St., a three-st'y house, 40′ square; cost, $3,000; Palliser, Palliser & Co., architects.

S. M. Cate, Jr., is building a Queen Anne cottage, cor. Washington and William Sts.; cost, $3,500; Palliser, Palliser & Co., architects.

W. L. Wolfram has broken ground cor. East Main and Maple Sts., for a block of stores, 50′ x 75′, three-stories; French flats on second and third stories; pressed brick; cost, $9,000; Palliser, Palliser & Co., architects.

Builders are very busy, and mechanics scarce, and advertisements offering carpenters $2.50 per day do not bring the required help.

Camden, N. J.—The Pennsylvania Railroad Co. will soon build an iron depot, 160′ x 400′, at a cost of $50,000.

Cedar Point, O.—Mr. N. B. Bacon, of Toledo, O., is the architect of a huntsman's lodge, which is to be built here at a cost of $5,000.

Cedar Rapids, Io.—Mr. F. M. Ellis of Marshalltown, Io., is the architect of the new School-House, which is to cost $14,000.

Mr. Ellis is also the architect of the Episcopal Chapel, which will cost $6,000.

Chester, S. C.—Mr. Giles J. Patterson will build a house, stable, and outbuildings; cost, $4,500; Palliser, Palliser & Co., of Bridgeport, Conn., architects.

Dedham, Mass.—A keeper's house is to be added to the Norfolk County jail, four-stories high, and measuring 46′ x 50′. It will be of Quincy granite. Contracts not let. Mr. G. J. F. Bryant, of Boston, is the architect.

Denver, Col.—Plans and specifications are being prepared at the office of the Superintendent of the Denver Union Depot & R. R. Co., for the Union Depot, and will be ready for proposals in about thirty days. Size of building, 503′ x 65′; to cost about $300,000. Cross & Taylor, architects, of Kansas City, Mo.

East Hampton, Conn.—M. Curtin is building a cottage; cost, $1,000; Palliser, Palliser & Co., architects, Bridgeport, Conn.

Elmira, N. Y.—Mr. W. H. Hayes, architect, has the following work on hand:—

Wooden dwell., for J. D. F. Slee, Esq.; cost, $8,000; S. H. Cotrell, contractor.

Wooden dwell., for Jas. L. Woods, E. A. Swan, contractor; cost, $5,000.

Library, dining-room, and other additions to residence of ex-Governor Robinson; cost, $15,000.

Additions to shoe factory, seven stories high, of brick and Ohio stone, for Mr. J. Richardson; cost, $5,500; also designes for two cottages for the same.

Gloucester City, N. J.—It is said that a large iron foundry will shortly be erected by Philadelphia capitalists, on Peysen's Farm, in the southern part of this city.

Gloversville, N.Y.—Hon. Levi Parsons, of New York City, has given $50,000 to establish a Public Library for Gloversville and Kingsboro, N. Y.

Higganum, Conn.—Mr. Hotchkiss, of the firm of Stevens & Hotchkiss, will build a house. Mr. Heman Mervin is putting up another tenement house. Mr. J. H. Freeman is to build one or two tenement houses this spring.

Hoboken, N. J.—The Hoboken Ferry Company proposes to build a new ferry-house on the Hoboken side, 225′ x 150′.

Mr. Wm. Kuhles, of N. Y., has drawn plans for a store and dwell., 25′ x 50′, and extension. five stories high, to be built of brick, at a cost of about $9,000.

Hornellsville, N. Y.—A house is building for C. Richardson, Esq., at a cost of $4,000; W. H. Hayes, architect, Elmira, N. Y.

Hyde Park, Mass.—Mr. Charles J. Bateman, of Boston. is the architect and superintendent of the new Catholic Church, 70′ x 130′. Foundations just commenced.

Jackson, Tenn.—J. L. Wisdom, Esq., is building a two-st'y brick house, 45′ x 60′; cost, $ 4,000; Palliser, Palliser & Co., architects, Bridgeport, Conn.

Lancaster, Mass.—The Unitarians are to build a chapel.

Lancaster, O.—D. W. Gibbs, architect, of Toledo, O., is to furnish plans for the New Public Hall and City Library; cost, $35,000.

Lockport.—T. D. Ryan is building a two-st'y frame cottage; cost, $1,500; Palliser, Palliser & Co., architects, Bridgeport, Conn.

Lodi, N. Y.—The New M. E. Church is to be built at a cost of $12,000, from the design of Mr. W. H. Hayes, of Elmira, N. Y.

Louisville, Ky.—E. D. Standiford is to build a three-st'y brick hotel, on the northeast corner of Tenth and Broadway Sts.; cost, $17,000; and also a two-st'y double brick dwell., on Broadway, between Ninth and Tenth; cost, $6,200; also a two-st'y double brick dwell., on Tenth St., between Broadway and Magazine; cost, $4,300.

Hugh Stafford is to build a two-and-a-half st'y brick building, on Reservoir Ave.; cost, $2,000.

George Nicholas is to build a two-st'y brick dwell., on Madison St.; cost, $4,000.

Lynn, Mass.—W. R. Melden is to build at Glenmere a cottage; cost, $1,500; Palliser, Palliser & Co., architects, Bridgeport, Conn.

Manhattan, Kan.—Mr. W. H. Hayes, of Elmira, N. Y., is the architect of the new M. E. Church; cost, $8,000.

Milwaukee, Wis.—Plans for the additions to the Wisconsin Industrial School for Girls have been adopted. $10,000 will be spent on the improvements.

Marshalltown Io.—Mr. F. M. Ellis, architect, is building houses for Dr. McBride and Myron Woodard, costing $5,000 and $3,000 respectively.

Middletown, Conn.—A new building is to be built at the Insane Asylum.

Nantasket Beach.—On the Jerusalem Road is building a wooden house for Mr. H. T. Hyde, measuring 50′ x 60′. The foundation is in place, but the superstructure is not let; cost, $15,000; Messrs. Allen & Kenway, of Boston, architects.

Naples, N. Y.—A house is building for F. J. Cramer, Esq.; cost, $3,000; W. H. Hayes, architect, Elmira, N. Y.

Naugatuck, Conn.—Brown & Stilson, architects, of New Haven, are building a house for John Beebe, which will cost $4,000.

New Britain, Conn.—An effort is making to build a theatre.

Newcastle, Del.—Mr. T. P. Chandler, Jr., of Philadelphia, is architect for the Masonic and Odd Fellows' Hall, now being built.

New Haven, Conn.—Messrs. Brown and Stilson, architects, are building on Chapel and Howe Sts., a brick building for Joseph Parker, which will cost $15,000; a brick building for Mrs. Hadley, on Trumbull and Whitney Sts., costing $12,000; and cottages for Miss Spencer and H. Killam, Esq., which will cost $2,000 each.

Newton, Conn.—Work will be at once begun upon a new depot fo the Housatonic Railroad.

North Uxbridge, Mass.—The Baptist Church and Society are about to build a new church on Chase's Corner. The new church is to be of wood, two st'y high, 52′ x 76′, with a tower 80′ high; Mr. W. G. Preston, of Boston, is the architect.

North Pownal, Vt.—The North Pownal Manufacturing Co. has let contracts for building three tenement houses.

Osage, Ia.—Mr. N. A. Russell, architect, has in preparation plans for a brick building, cut-stone finish, owned and to be occupied by Sweeney Bros., and Libby, as a bank and real estate office; cost, $8,000.

Also plans for residence for Dr. J. L. Whitly, brick and terra-cotta; cost, $4,500.

Port Byron, N. Y.—G. W. Perkins is building a cottage; cost, $3,500; Palliser, Palliser & Co., architects, Bridgeport, Conn.

Portland, Oregon.—The Oregon Railway and Steam Navigation Co., is building a dock 500′ long, and several elevators and warehouses; $100,000 will be spent in the improvements.

Quincy, Mass.—Mr. H. H. Richardson, of Brookline, Mass., is the architect of the Crane Memorial Hall, which is soon to be built here.

Richmond, Va.—The architect of the new temple of the Congregation of Beth Ahaba, on Eleventh St., is Captain Albert Lybrock.

Rochester, Ind.—The Methodists are ready to build their church.

Rushville, Ind.—Mr. D. A. Bohlen, of Indianapolis, is the architect of the church now building, at a cost of $8,000.

San Francisco, Cal.—At present the market prices of building material rule as follows:—

Rough Redwood	$18,00	₱ M.
Framing Pine, Oregon	18,00	"
Surfaced Redwood and Oregon Pine	26,00	"
Rustic Redwood and Oregon Pine	26.00	"
Shingles	2.50	"
Lath	1.60	"
Flooring, 1″ x 4″, tongued and groov'd	26.00	"

Scoharie, N. Y.—J. Wallace Marsh has broken ground for his new store.

Southington, Conn.—Ground is broken for the foundation of the Soldiers' Monument, and the dedication will take place on Decoration day, May 30.

Sterling, Ill.—A new municipal building is to be built.

St. Paul, Minn.—Mr. L. S. Buffinton has been chosen architect of the new Union Depot.

Streator, Ill.—Jas. G. Wilson is building a two-st'y store 50 feet front, with hall above, for the Young Mens' Christtian Association, F. S. Allen, architect; cost, $3,500.

Col. Plumb has given the School Board $25,000 and two acres of land, for a new High School, one room of which is to be for the use of the Ladies' Library Association.

Tracy, Minn.—The town has voted $4,000 in bonds for a new school-house.

Troy, N. Y.—Jonas S. Heartt will build a first-class house at 16 Second St.

Ground has been broken for a first-class house near the corner of Congress and Second Sts.

Troy, N. Y.—Plans have been prepared for Sutherland's new building, on the corner of River and Hulton Streets, Troy. It will be 150 feet long by 95 feet wide, and five stories high.

Troy, Pa.—Newberry, Peck & Co.'s new store is to be built by W. H. Hayes, architect, of Elmira, N. Y.; cost, $65,000.

Vincennes, Ind.—G. B. Henderson will build a cottage this summer; Palliser, Palliser & Co., architects, Bridgeport, Conn.

Vinton, Io.—Mr. F. M. Ellis, of Marshalltown, Io., is building, at a cost of $5,000, a house for W. B. Watson.

Wabasha, Minn.—Mr. H. H. Jewell is building a large brick block.

Wallingford, Conn.—J. W. Spencer is building a house; Palliser, Palliser & Co., architects, Bridgeport, Conn.

Washington Court-House, O.—The Masons are about to build a temple on the Yeoman or Music-Hall site.