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CONTENTS.

THE Convention of the American Institute of Architects in Cincinnati last week was in every way successful and pleasant, and the indications of present prosperity and future progress were such as must give great satisfaction to every member. The attendance was not so large as it has been at some conventions, but twenty-six gentlemen, representing ten States, answered to their names at the first day's roll-call. The introductory address was delivered by Colonel George Ward Nichols, of Cincinnati, and deserves to be remembered as one of the most suggestive discourses ever given before the Institute. We shall have the pleasure of referring to the address more at length hereafter, and need only say that it was received with enthusiastic applause. The report of the Board of Trustees, which followed, showed that thirteen members had been advanced by election from the grade of Associate to that of Fellow during the year, and seventeen Associates had been added to the list. One honorary member, General J. D. Cox, of Cincinnati, and one Corresponding Member had been elected. Business relating to the future affairs of the Institute was next in order, and two amendments to the By-laws were proposed, one of them extending the limit of the number of Fellows from seventy to one hundred, and the other providing that a new chapter of the Institute might be formed on the application of one Fellow and two Associates, instead of two Fellows, as at present. In accordance with the rules, a committee was appointed to present the amendments in the form of a circular to the members before the next Convention when they would be called up for action.

THE evening session was devoted to the election of officers. Mr. Walter, of Philadelphia, was re-elected President, and Mr. Ware, of New York, was chosen Secretary. The present Treasurer, Mr. O. P. Hatfield, was elected for another term. For Trustees, Messrs. Congdon, Cady, Bloor, and Le Brun, of New York, were chosen, in addition to the President, Treasurer, and Secretaries, *ex officio*. Messrs. Bloor and Holly, of New York, Clark of Boston, McArthur, of Philadelphia, and Mason, of Newport, were elected as Committee on Publications, and Messrs. Ware and Potter, of New York, Ricker, of Illinois, Van Brunt, of Boston, and Stone of Providence, R. I., as Committee on Education. Mr. Clark, of Boston, was reelected Secretary of Foreign Correspondence.

THE second day was devoted to the reading of the reports of Chapters and papers on professional topics. On motion of Mr. Stone, of Providence, it was voted to hold the Convention of 1883 in Rhode Island, one day's session to be at Providence and the other at Newport, and the Board of Trustees was instructed to appoint the time of meeting, which should be either in July or August. A further motion was offered and adopted, that each member should be invited to present a drawing of an architectural subject for exhibition at the Convention, and the meeting was then adjourned.

THE circular of invitation to artists to submit competitive designs for the statue of Paul Revere in Boston has been issued, and as the erection of a twenty-thousand-dollar monument in the most conspicuous place in a large city, is, as we take it, a matter of public interest, we venture to make some comments on a document which does not seem to us adapted to secure the result which its authors intend. The circular invites artists to submit models for a statue, equestrian or otherwise, of the hero, with estimates of the "cost of construction," on or before April 19, 1883. All the designs are to be anonymous until after the decision, and for each of the best three models a sum of three hundred dollars will be awarded. Nothing is said as to the required scale of the models; nothing as to whether the artist is to design the pedestal, or whether the cost of the pedestal is to be included in the estimate submitted. Nothing is said as to whether the author of any of the designs will be employed to carry out his design; on the contrary, the wording of the circular, which says that "for each of the best three models a sum of three hundred dollars will be awarded," leaves it uncertain whether the three hundred dollars is to be given in the usual way as a premium for merit, or as an equivalent for the model, the property in which would thereby pass to the committee. Concerning the person or persons who will make the award nothing whatever is said, and there is no indication that the committee itself, which consists, according to the Directory, of one physician, one distiller, one elevator proprietor, one machinist, one architect, one dealer in stationery and fancy goods, one grain-dealer, one plasterer, one glue manufacturer, one copper-refiner, one leather merchant, one editor, one police commissioner and one lawyer, may not be the sole jury. We cannot help hoping that this invitation will be explained or modified without delay. To say nothing of the looseness of statement as to the requirements, the rewards offered are far less than the value, to a sculptor who can find other employment, of any model large enough in scale, and sufficiently well worked out, to be of the slightest use in indicating the character of the finished work, while the real prize, the execution of the statue, is not promised to any competitor; but instead of that, the suggestion is at least implied that the authors of the most meritorious works may, by the effect of the curiously-worded clause about rewards, be compelled to see their designs mangled and caricatured in execution, to the ruin of their reputation, without being able to help themselves, or get any redress. It is extremely improbable that any respectable and honorable sculptor would give a second thought to such an invitation; but for the benefit of those who may be tempted by their pleasure in the thought of working out so brilliant a *motif* as the story of Paul Revere suggests, we will say, as our deduction from a long experience of competitions, that their prospect of having their idea appreciated, and perhaps carried out, will not be increased, but diminished, by entering the competition, and that the person who will ultimately be entrusted with the execution of the statue is pretty certain to be one who has not cheapened himself before the public, and destroyed his reputation with the committee, by condescending to struggle for their insignificant prizes on the terms which they propose. Unless the choice among the models is placed absolutely in the hands of one or more professional sculptors of high reputation, who should be joined with an architect if a pedestal is to form a part of the design; and unless, also, the execution of his design at a liberal remuneration is promised without reserve to the person who receives the highest award, no artist should think of meddling with the competition. The sculptors do not form a very large class in the community; one of them, if the statue is carried out, must ultimately have the commission; they can fix their own terms as to the way in which the choice among them shall be made, and they will have the support of the best part of the public in making those terms such as will secure to all of them who deserve it honorable distinction, with a prospect of winning by merit high reputation and liberal remuneration; the city of Boston gaining at the same time what is likely, if chosen in such a contest as we describe, to be a monument of conspicuous excellence.

BY a mischance which came so near being infinitely more terrible that it seems itself almost fortunate, the Park Theatre in New York was totally destroyed by fire on Tuesday evening, about two hours before the time set for the performance. A few persons were at work on the stage, where the first scene for the play of the evening was already set, when the painter, leaving his work after the last touches, saw a flame licking the partition between the proscenium-boxes and the stage. The fire seemed to come from one of the proscenium boxes, but quickly drew through the arch upon the stage and among the wood and canvas of the scenery. The alarm was instantly given, and a number of fire-extinguishers which stood ready were seized by the workmen, but proved useless. Buckets of water were thrown on the flames, together with streams from several lines of hose, but without effect; the fire spreading with such rapidity that the brave men who remained a few moments to fight against it barely escaped, two indeed losing their lives, and the theatre was soon in ruins. The building was a comparatively new one, having been constructed in 1874, and though small, was very richly decorated. The furniture and theatrical properties, which belonged to the manager, were valued at about one hundred and fifty thousand dollars, and the loss on the building and on property in the stores on the ground floor — one of which, we are sorry to learn, was occupied by the well-known decorator and designer of paper-hangings, Mr. C. H. George — will amount to nearly as much more.

The lovers of old English domestic architecture will regret to hear of the destruction by fire of Ingestre Hall, in Staffordshire. This beautiful Elizabethan mansion was still occupied by the descendants of the knight who held the manor in the reign of Henry II, about the middle of the twelfth century, and although the varying fashions and needs of so many centuries had given occasion for various alterations and improvements, these detracted little from its historical or picturesque interest. The fire is supposed to have been caused by the overheating of a beam which supported the ancient fireplace of a state bed-room, and burnt for about five hours before it could be subdued; most of the mullioned stone windows, with the furniture and wood-work of the state apartments, being by that time destroyed or seriously damaged. The billiard-room, which was one of the most ancient and beautiful in the building, wainscoted with oak in grotesquely-carved panels, was saved intact, together with the servants' rooms and household offices, which occupied the remainder of the east wing.

Judiciary Square in Washington, the place which was fortunately not chosen as a site for the Congressional Library, has been assigned to the building intended to be erected by the Government for the Pension Office. The square forms an excellent location for this purpose, and is, indeed, the only available one under the law which provides that the Pension Office shall be erected on land already owned by the general Government; so that there is certainly no reason to regret the appropriation for a comparatively small building of a site which would be very unsuitable for a large and important one.

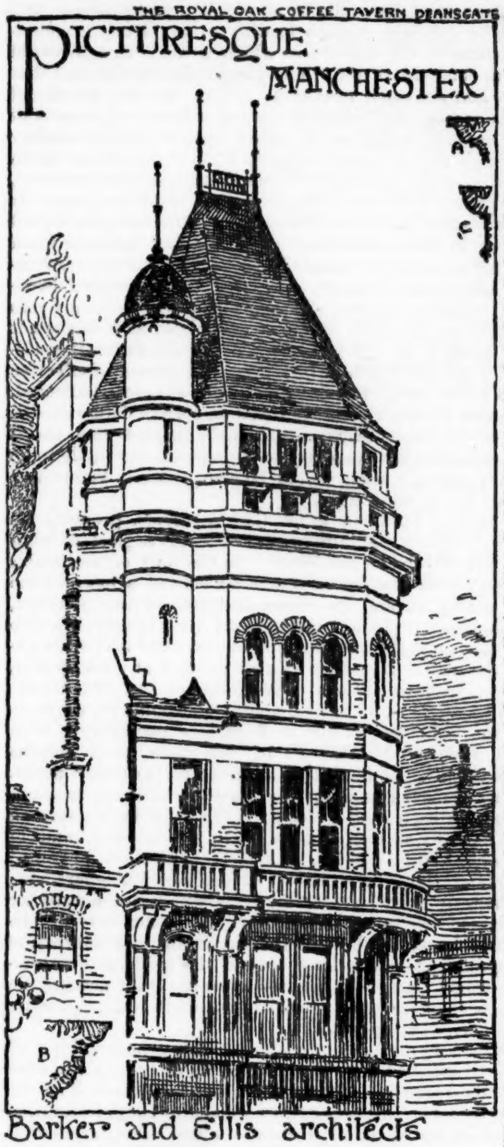
An occurrence which could not have been possible except by gross negligence on the part of some one is reported from Philadelphia. It appears from the account given in the *Telegraph* of that city that a serious leakage of gas was noticed some time ago by the residents upon a certain street, some of whom were made ill by the noxious odor. The officials of the gas company were repeatedly notified, but nothing was done. A week had elapsed since the discovery of the leak when, early one morning, an explosion occurred, probably in the sewer, which threw a man-hole cover a hundred feet into the air. A minute after another explosion occurred, blowing out a second man-hole cover, followed by a third, and three minutes afterward by a fourth; each explosion throwing out the nearest man-hole cover, and shaking the houses in the vicinity. The fourth report was followed by a burst of flame from the sewer, the gas continuing to burn at the mouth of the opening until the tardy employés of the Gas Trust came to shut off the supply. Not till then was a serious search made for the leak. It is most fortunate that the damage done by the explosions was so slight. A much less important escape of gas in Paris nearly caused the ruin of several buildings, and if the sewer in Philadelphia had not happened to be so situated as to draw the current away from the neighboring houses, a dozen of these might have been blown into the air.

A test in place of a certain bridge in Paris which carries the Rue Lafayette over the tracks of the Chemin-de-fer de l'Est was made recently to determine whether loaded trucks could safely pass over it. The bridge is made with metallic arches, and hitherto has been used only for light carriages and pedestrians, heavy teams being obliged to go around another way. The test for dead load was first made by piling two thousand iron rails upon the roadway of the bridge, and leaving them in position for two days. The weight amounted to about four hundred tons, but no material deflection was produced. The rails were then removed, and the test for live load was made by traversing the bridge with road-rollers belonging to the street department, two of them abreast being driven over it at full speed several times in succession. Under this severe trial the utmost deflection of the arches was only four and one half millimetres, or about one-sixth of an inch, and the result was regarded as so satisfactory that the bridge was immediately thrown open to traffic of all kinds. Such tests as this we fear, would be regarded as altogether too harsh for the delicate structures built by some of our own engineers. What would the designer of the bridge which was crushed by the weight of a cow, for instance, or of that which collapsed because the "head of a bolt flew off," say to having their fragile creations exposed to the remorseless concussion of a couple of twenty-ton rollers driven back and forth over them? There is something to be said, so far as the people who are to use bridges are concerned, in favor of having their soundness proved beyond question before any lives are risked upon them, but we all know that American engineers are distinguished for the boldness of their constructions, and it would be indeed hard if their fellow-citizens should refuse to show a corresponding boldness in venturing themselves upon them.

The *Scientific American* calls attention to the fact that sawdust is better than hair in preserving rough-cast plastering for the outside of buildings from scaling and peeling under the influence of frost and weather. "The sawdust," it says, "should be first dried, and then thoroughly sifted, to remove the coarser particles. A mixture is then to be made of two parts sawdust, five parts sharp sand, and one part cement, which should be thoroughly stirred together, and then incorporated with two parts of lime." This seems to be a new application of observations made by the masons of forty years ago, who were employed in the construction of the "stucco" or "mastic" fronts so popular at that time. Most of these, made by a coating of colored cement and sand on a foundation of brickwork, have long since peeled away, but before the fashion of them died out it was generally understood that no substance could compare with sawdust as a bond for holding the coating together and to the wall. In the application of the principle to rough-cast plastering, as now employed, we would make a further suggestion,—that the rough-cast be laid on wire lath. For wooden buildings there is no difficulty in applying the wire, and it can be nailed with little trouble on the surface of brick walls, giving in both cases a stronger hold for the mortar than can be obtained by any other means.

The Philadelphia *Times* mentions that the white efflorescence on brickwork, known to the ignorant as "saltpetre," has been particularly common in that city during the present season; several old buildings, which had long been free from it, showing as much incrustation as those of very recent construction. A reporter seems to have been enterprising enough to question Dr. Joseph Leidy, President of the Academy of Natural Sciences, upon the subject, and repeats with remarkable correctness what is certainly the true explanation of the phenomenon. According to Dr. Leidy, the efflorescence is composed of sulphate of magnesia, which is in most cases easily shown by analysis; and is produced, he thinks, by the action of the sulphurous acid always contained in the air of cities upon the magnesia salts in the mortar with which the bricks are laid. There is, we believe, some doubt whether the sulphurous and sulphuric acid of the atmosphere alone is sufficient to produce the effect. It is always observed that a wall, the top of which is exposed to the rain, or which receives water into its interior in any other way, soon shows a copious efflorescence, as if the magnesia salt was dissolved in the heart of the wall and brought to the surface by the evaporation of the water, so that some imagine that the coal used in burning bricks about Philadelphia and other sea-coast towns may leave a sulphurous deposit within their pores, which acts on the lime, or rather on the cement, with which they are built.

BUILDERS' SCAFFOLDING.—VI.



(From the *British Architect.*)

CHURCH-spires and towers are usually carried up with outside scaffolding surrounding them. It is usually of the single-faced description, the standards made of two or three thicknesses of scantlings, as 2″ x 6″, bolted together, with wind-braces footed on the ground, and transoms, and cross-panel braces in successive stages. The working-platform is carried on triangular brackets nailed to the sides of the standards. A hoist frame[1] of four posts similar in form and construction to the "Gabbert" structures already described, with a hoist "basket" is usually attached on one side of the tower to the scaffold, for the purpose of raising materials. This scaffold is usually set far enough away from the walls of the tower to admit of projections, pilasters, octagon corners, and other architectural or structural features being so introduced as to avoid any interference with the scaffold. When only one or two thicknesses of scantlings are used to compose the standards, solid wood brackets or cleats are nailed to the standards to support the ledgers, and they are further secured by rope lashings tightened by wedges as previously described.

In the case of halls, churches and other auditoriums where ceilings are very high, three thicknesses of scantlings are bolted together for standards to form double-faced scaffolding, with the usual ledgers, diagonal bracing and putlogs.

In England, London particularly, double-faced *pole* scaffolds are used, erected partly inside and partly outside, with a tier of standards on both inside and outside of front walls, at a convenient distance apart to afford room for a working-platform on both sides of the wall, with corresponding ledgers lashed to both tiers at proper heights for successive scaffolds. Strong putlogs or *needles* are run through the fenestral openings in the façade, and where piers occur which are too wide, making too great an interval for a single span of the planks forming the platform, or where solid portions of the wall thus interfere, then auxiliary ledgers are lashed to the "needles" or main putlogs, which support secondary or short putlogs, which in turn support the planking at necessary intermediate points. When solid projecting story cornices, belts or other horizontal features occur convenient to the height of a platform, they are sometimes used as supports for the inner ends of short putlogs, and thus do away with the auxiliary ledgers, or making holes for short put-logs in ashlar walls. This system also relieves the green walls of the mischievous disturbing weights and oscillating forces produced by movements on scaffolds whilst building operations are being carried on. All cross-bracing must occur through the openings between opposite standards. This system has also the advantage of providing simultaneously for both inside and outside scaffolding with only two sets of standards and ledgers. It is also useful when iron or steel joists are employed. Where the thoroughfare is narrow and heavy stones are used in the lower stories, and other concurring circumstances necessitate the mounting of a crane upon an elevated staging, for the purpose of setting large stone or iron columns, etc., then square timbers or logs are used for the standards inside and outside of the staging; the ledgers and needles are also of square timbers, and all are fastened together by dog-irons. The standards in such case are footed down upon timber sleepers laid flat on the pavement on the one side of the wall, and upon the ground on the inside. The staging is of heavy planking. For the superstructure double-pole ledger scaffolding is afterwards erected upon this staging, reaching high enough to serve the remainder of the stories above.

In cases where moulding, carving or sculpture has to be done after the stone is set in the building, a supplementary pole scaffolding is introduced intermediately of the square timber scaffold which is erected in the first instance for the constructive purposes of the building. For the supplementary purposes the standards are only of single poles, and the bracing is secured to the main scaffolding standards, etc.

When scaffolding is required to run high, it is usual in good construction to introduce flying wind-braces in order to increase the stiffness of the upper portions of the standards, as well as to carry up the stability imparted by the ground braces.

Pole scaffolds offer less obstruction to wind-storms than square timber and are lighter for handling, and in general are considered stronger and more elastic, section for section, than square timber or scantlings.

The footing of standards where no pavement is yet laid over a deep, front cellar area, sometimes rest on beams laid across the area from the cellar wall to the street curb wall.

In all outside scaffolds in English cities, whether intended for brick or stone masonry, it is imperative to place a hoarding of boards around the outside of each successive working-platform in the height of the scaffold 3 feet or 4 feet high, which not only serves as a guard-rail to the masons and laborers working on the platform, but also prevents brick, débris, etc., from falling down upon persons below. This very desirable precaution should be more generally adopted in American cities, as accidents and very narrow escapes are frequently occurring in the absence of such safeguards.

In London and large provincial cities of England, where the sidewalk or a very confined space is permitted to be hoarded in from the abutting street or lane which is much of a thoroughfare, the top of the outside fencing or hoarding is made to dish outwards several feet at an angle of 40 or 50 degrees, the better to catch or prevent falling outside of the hoarding all dust, débris, etc., which may fall when a change of scaffolds is taking place. This is also worthy of adoption in American cities.

When standards or "Gabbert" posts are constructed of several thicknesses of planks, the joints should be regularly broken at equal distances apart, as this is important, and frequently seems to be done in a hap-hazard manner, in disregard of all system, some of the contiguous joints being too close together to impart the utmost strength to the combination. The most care is required about the middle distance in the height, say to include the middle one-third of the entire length from top to bottom, where the distorting forces act with the greatest leverage and produce the maximum intensity of strains. It may be well to point out to the novice that an understanding at a glance of a systematic disposition of the butting joints is very simple: thus, if two thick

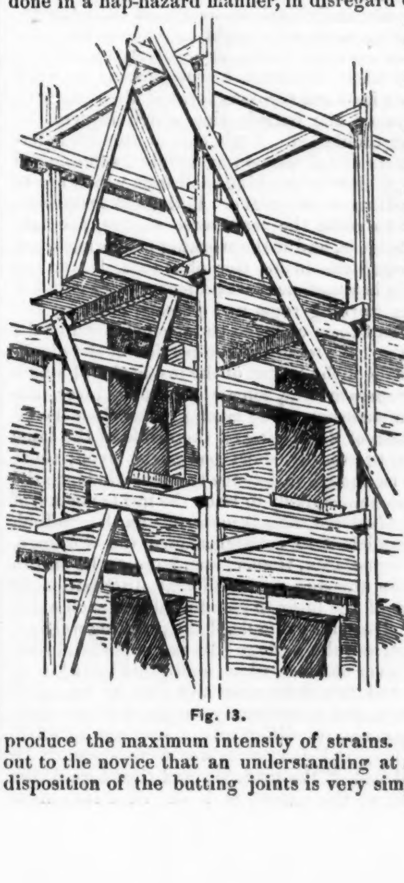


Fig. 13.

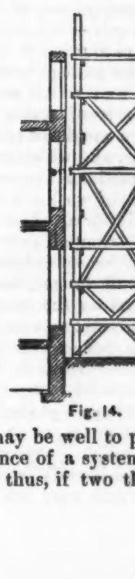


Fig. 14.

[1] As the crane is so inseparably connected with builders' scaffolding, it may in a future paper of this series be found advisable to describe and illustrate this particular form as well as others which are used elsewhere as accessory appliances.

nesses of scantlings are to be employed in combination the butting joints will occur at the middle points of the alternate pieces when the composing pieces are all of equal length, and if three thicknesses of scantlings, the butting joints will occur at the one-third and two-third points in the length of the alternate pieces, and similarly, if four pieces are combined the joints will occur at one-fourth points, *i. e.*, at one-quarter, one-half and three-quarter distances in the length of the alternate pieces. The transverse pieces should be inserted at the butting joints, when they cut through the upright pieces.

The variety known as double-faced ledger scaffolding is shown in perspective elevation by Figure 13, and a geometrical section of the same is represented by Figure 14. In some parts of America and in England it is mostly built of poles, similar to those used in the single-faced scaffold illustrated in Figures 8, 9 and 10, in the October paper. In Paris it consists of *spars*, by which we mean heavier and longer dimensions than those which we denominated *poles*, already described. In the eastern parts of America and in England it consists of timbers or of heavy scantlings. In the Western States light (and generally insufficient) scantlings are principally used. Generally speaking, however, it may be noted that for extensive or important public or private buildings in this country and in Europe square timbers or heavy scantlings are employed; the English builders adopt heavier scantlings than the American builders for similar classes of work; this is irrespective of the qualities of the timber which may be used for such purposes in either country. It may be safely assumed, as a rule, that a large proportion of the better qualities of timber is exported to England, which has as well the advantages of better seasoning, and as seasoned timber is usually estimated to be one-sixth to one-half stronger (transversely) than green timber, it is important to bear this in mind when specifying the scantlings of timbers (liable to be green or insufficiently seasoned,) which are intended to be used in any part of a structure where exposed to transverse strains.

The later practice in London of adopting by preference the double-standard, inside and outside, variety of scaffold described in the October number (5th paper), is gaining rather general adoption in other parts of England. It can, of course, only conveniently be used where the fenestration admits of it, as it cannot be adopted for the erection of dead walls.

The double-faced scaffolding is adopted when it is necessary to avoid putlog holes, as in ashlar or pressed-brick veneering, or in the square stone-work which prevails in Paris and in Scotland. It consists of two tiers of standards and is usually built on the outside of a façade; the inside tier is set up at a sufficient distance from the line of the wall to be clear of all structural, ornamental or other details projecting beyond the line of the wall, the two tiers of standards being set such distance apart as will afford the necessary working extent of platform, and at the same time be suitable to the transverse strength of the scantlings of the putlogs and ledgers which are intended to be used, having regard to the maximum weights which are likely to load the platform. Such distance apart of the two tiers of standards usually ranges, say, from six to twelve feet, according to the nature and extent of the operations for which it is required, the spacing of the individual standards of both the inside and outside tiers being ordinarily eight to twelve feet, the corresponding standards of each tier being set regularly opposite to one another, the better to admit of effective cross-bracing between them. Diagonal bracing is fastened across several of the standards in a longitudinal direction on the outside tier, which insures the necessary stiffness against oscillation. Each tier of standards has its continuous tiers of ledgers at corresponding heights, suitable for the successive scaffold-high tiers of working-platforms which are to be laid up as the wall advances in height. Putlogs of scantlings, usually of oak, sufficient to resist the transverse strains, are laid across the two tiers of ledgers, and if the working-platform should be extended inward between the inside tier of standards and the wall—which space in Paris is sometimes several feet wide to admit of the convenience of having working room and passage inside of the standards — the outer ends of them ought to be fastened down to the ledgers to prevent tipping up; the weight of the portion of the planking and putlogs lying outside of the ledger of the inside tier of standards, and which would represent the longer arm of a lever, the ledger itself acting as the fulcrum, being much greater than the effective weight of the portion of them lying on the inside of the same ledger, and which would represent the short arm of the lever; there is sometimes assumed to be enough difference to counterbalance the weight of workmen and mechanics likely to be on the inside portion of the platform. There are, of course, usually materials on the scaffold, so distributed as to be sufficient to counterbalance the workmen, but if heavy weights of stone, iron, timber, etc., have to be laid in the wall danger may arise through an insufficient distribution of weights on the long arm of the lever to counterbalance such extra weights on the short arm. Thus, for example, if the planking weighed $5\frac{1}{4}$ lbs. per superficial foot, and the putlogs $\frac{3}{4}$ lb. per superficial foot, and the longer arm of the lever be 9 feet, which multiplied by $(5\frac{1}{4} + \frac{3}{4})$ 6 lbs. $=$ 54 foot-pounds, and the short arm is 3 feet or one-third of the length of the long arm, and consequently one-third of its weight and leverage, or 18 foot-pounds, the difference of leverage or effective weight between the long and short arms would consequently be 36 foot-pounds per lineal foot of the scaffold; and therefore, if the short arm were not loaded to this extent, or if the effective excess of loading on the short arm over that of the long arm did not approach this normal difference, there would be no tipping up of putlogs. But there ought to be sufficient surplus loading to avoid any inaccuracies in the estimates of the differences which a small margin would not be liable to compensate for. The danger lies in the fact that the mechanics and workmen usually do not, or are not permitted the opportunity to stop and consider these niceties of adjustment of weights when suddenly called on to mount upon a scaffold already erected, — perhaps without proper consideration of the strains which may come upon it, — and use the platform in a hap-hazard manner, and as a consequence it frequently happens that accidents occur. It is therefore always advisable that all needful precautions in this regard should be taken by the scaffold-builder in the first instance when erecting it, either by adopting usual or special safeguards in the arrangement of the construction, or by having the undoubted assurance that the ordinary manner of construction will be amply safe under the conditions in which it is to be employed; as if this is not done it is very liable to be overlooked when the ultra-normal conditions alluded to arrive, which brings about an excess of effective loading of the short arm, and not provided for as before indicated. It is advisable that a proper estimate based on correct data with due allowance for all probable exigencies be made for each case, and if any limiting conditions are necessary to be imposed and liable to be exceeded in any instance, such should be conspicuously known and strictly enforced by the contractor.

It must be further borne in mind that *accidents*, properly so-called, may occur without the intervention of wilful neglect, or what would usually be regarded as carelessness on the part of mechanics or laborers, such as the slipping of a mason's hold of a heavy stone in lifting or setting it, and its consequent fall on the platform, which in all likelihood it brings down along with it, carrying also with it, perhaps, some of the men working on the platform; or an entire section of the scaffold, together with all the men at work upon it, may thus be brought down from a considerable height, with all the attendant fatalities. It is, of course, a vital question with those responsible for the sufficiency of the scaffold, how necessary it is to guard against occasional accidents of this class by a surplus strength of scaffold, beyond what is requisite for ordinary needs. Much would naturally depend on the class of building, methods adopted of handling such stones, etc., upon the scaffold, whether on wheel or hand barrows, or carried or lifted in the unaided hands of the workmen, or raised by derrick, or rolled upon rollers, or rolled bodily over, or slid along by means of handspikes, pinch-bars, etc., or other ordinary or extraordinary methods which are usually or occasionally resorted to by masons or workmen under varying circumstances; and hence if there were any liability of inordinate strains being produced by the use of any of the methods above alluded to, there would necessarily be reasonable cause for making the scaffold so much stronger than required to merely resist the static weights as ordinarily put upon it.

Such a provision to meet emergencies was the primary object of factors of safety, so-called, and if a coefficient of five or six were given to the static strength of the scantlings and fastenings of all the members of the structure, making due allowance for the deterioration in strength caused by all knots, cross-grain and other accidental weakening defects in the materials, such occasional short-comings within the range which ordinarily happen under careful management and adequate appliances, as alluded to, would not be liable to produce results so disastrous as, unfortunately, usually attend them when the scaffolding and appliances are of the inferior class and quality commonly met with in ordinary building operations. And here might allusion be appropriately made to the prevailing pernicious practices of employing cheap, but which too often in the end proves very dear, skilled labor or materials. To this system, in great measure, is due all the customary mishaps which befall building operations.

In connection with single and double ledger scaffolds, a separate staging eight to twelve feet square, for steam or horse power hoists of any form, is frequently attached outside of the scaffold for the purpose of hoisting and dumping materials for distribution to the masons, along the working-platform of the scaffold. It is formed of standards, ledgers, putlogs, and diagonal bracing, in directions perpendicular to each other, in successive stages to correspond to the several levels of the working-platforms, as they ascend with the wall as it advances in height.

For the heavy ashlar work of large public buildings where large blocks of stone, ranging, say, from two to eight or nine tons, have to be handled, a stronger form of scaffold is necessary in connection with adequate appliances, — and therefore in England and other parts of Europe, what is termed the *framed* whole (square) timber scaffold is usually adopted. It is numbered 2 in the preliminary classified enumeration of the varieties of scaffolding, and is represented by Figure 15. It is usually built in superimposed successive stories, and is composed of ten or twelve inch square or *whole* timbers for standards, — say twenty-eight feet high, — but more or less, according to the heights of the stories of the proposed building, clearance being required between the travelling-crane and top of the wall proposed to be reached before a higher story of the scaffold is superimposed, and for the hoisting-tackle, shear and lewis-chains, etc. The standards are set in two tiers, one inside and the other outside the wall to be built, and at such relative distances therefrom as shall serve for inside and outside tramways, etc. The standards are footed upon sleepers or sills of similar scantlings laid solidly along the ground and properly bedded so as to be firm and unyielding — the foot of the standards are sometimes stub-tenoned or gained, say a half to one inch, into the upper side of sill — and fastened by band-iron straps, spiked, pinned or bolted to the timbers, or, in order to avoid injuring the timbers for other constructive purposes after having served this one, simply fastened by iron "dogs," without any gains being cut or bolt-holes bored: dogs being 20 to 30 inches of, $\frac{3}{4}''$ square or rod iron with pointed ends about 3 to 5 inches long turned at right angles. Horizontal beams or "runners," say 8″ x 12″, or larger dimensions, according to the extension of spacing between standards, which is usually regulated by the fenestration to admit of transverse footing-timbers and diagonal bracing passing through the openings between the inside and outside tiers, are laid along the heads of the standards and similarly secured to them. Sometimes cap or corbel blocks are introduced between the horizontal timber and the head of the standard, and similarly fastened to the timbers both immediately above and below the corbel. The whole combination is preserved from swaying or rocking longitudinally by strut, or reverse queen-post, bracing, the upper end abutting against a fixed block or straining-piece, which sometimes occupies nearly the middle one-third of the span between the standards, when it is large. The straining-piece is secured in place by being bolted to the ledger-timbers, or otherwise fastened by means of dog-irons placed in opposite oblique directions. Transverse bracing of the structure, to prevent swaying sideways, is accomplished by ground raking-braces on either side of the scaffold, firmly footed against blocks and piles driven into the ground at proper angles to securely resist the directions of the thrust. These braces are also secured to the standards and foot-blocks by means of bolts and cleats or iron dogs. Along the top of the upper horizontal timbers railway-tracks are laid; on these travelling overhead cranes or derricks are run, worked by hand or steam power, for the purpose of conveying to and depositing in its proper place the material to be set in the building. In Figure 15 is also shown a transverse view of the scaffold in working position with a track or tramway shown on one side of the wall being built, for the purpose of transporting materials from any distant point, as the stone-yard or quarry. Whole timbers are generally used for standards, sills and runners, half-timbers for struts and braces. When the wall has been raised as high as the first stage of the scaffold will admit, a similar structure is built upon the top of it, and repeated superpositions of such similar structures are imposed to any required height, the successively imposed standards being placed over the preceding ones to prevent cross-strains on their sills, each successive one that is imposed being secured to the lower one or to the horizontal timber on which it rests, which now becomes its sill, by dog-irons. Trussing and bracing is similarly repeated in each story high of the successive structures, but the wind-brace instead of being footed on the ground is bolted to the outer ends of a pair of horizontal half-timbers called

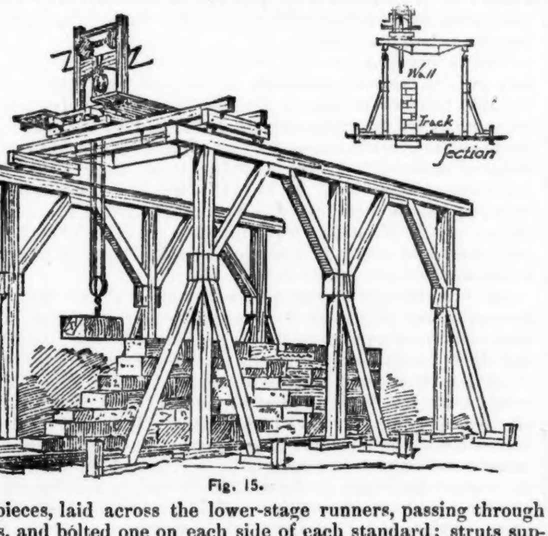


Fig. 15.

footing-pieces, laid across the lower-stage runners, passing through openings, and bolted one on each side of each standard; struts support their outer ends by being cleated to the standards. The tramway, crane, etc., are transferred to the top of each successive stage as it is superimposed, by means of masts guyed in different directions, and strong block-and-tackle gearing. When the stages are very high the above raking-bracing is repeated in reverse positions on both tiers of standards transversely, and also longitudinally, when the standards are a considerable distance apart, the foot of each longitudinal brace resting on the sill over each corresponding queen-brace. However, when this is not the case, and as the queen-bracing or struts mainly serve to resist transverse strains on the runners which support the travelling-crane, when it is transferred to a higher level by the addition of another story, causing, by increased exposure and leverage at a higher elevation, greatly increased side or wind strains, the strutting will serve to resist these only to the extent of the transverse *stiffness* of the upper sill-timber, between adjacent standards, and should any intense racking-force exceed this, the stability of the combined structure is lessened. It is therefore advisable especially where not only heavy weights are to be vertically lifted by steam-cranes, but also oblique pulls may be required, that firm diagonal bracing across several of the standards at a time in the form of a St. Andrew's cross be added to both tiers in each story, thus bracing or stiffening the structure longitudinally. It is also advisable, in order to counteract all transverse racking-strains, which the working of powerful steam travelling-cranes at high altitudes necessarily imposes on the scaffolding, that transverse diagonal bracing of the standards be done in both an inward and outward direction, passing through the openings, which, however, must be arranged so as not to interfere with the hoisting by the crane, and that the strutting be carried well down on the standards, where they will afford sufficient transverse resistance. Heavy plank platforms are laid for convenience across the footing-pieces, when not interfering with the hoisting, and when the span is too long auxiliary "needles" are laid across the sills to support the planking at intermediate points. When brick or rubble backing (the latter backing being the general practice in Scotland,) requires to be done, masons' inside working-platforms become necessary, and are erected in the single-ledger method, with poles or scantlings, between the floor-joists; and likewise, when moulding, carving, etc., require to be done on the façades, double-ledger scaffolds are erected inside the framed standards.

In order to effect economy of construction and simplicity and convenience of erection, transfer of working-platform, handling, etc., of scaffolding, especially for laying up brickwork in ordinary house-building, portable adjusting standards are adopted for the purpose, which dispense with ledgers, but require a greater number of standards in a given length of scaffold, as their distance apart, which forms the span between bearings, depends on the transverse strength of the boards or planks which form the working-platform. There are usually two forms, shown in Figures 16 and 17. The former is usually constructed of 3″ x 3″ oak scantling 14 to 16 feet long, tenoned into a foot-piece about 30 inches long, and rendered immovable on either side, gained into both the standard and the foot-piece, and fastened at each of these joints by screws. Sliding clamp-rests of band-iron forged into the outline form of an elbow in plan, with a pin riveted across the centre, support the putlogs. When the part of the clamp-rest through which the standard slides is held square with the standard there is a clearance between the pin and the end of the clamp, so that when the end of the putlog rests upon the other end of the clamp it then becomes level, and the end which clasps the standard becomes inclined so that the pin *bites* the standard on its one side, and the upper edge of the clasp also at the same time bites its opposite side, and by this means, acting somewhat in the nature of a bent-lever with a vice-like force, it is secured from sliding down when weight is put upon the putlog. In fact, the more the weight the firmer the bite or grip of the clasp upon the standard. The other end of the putlog rests upon the wall, being built as in the single-faced ledger scaffolding previously described.[1]

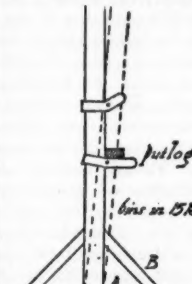


Fig. 16.

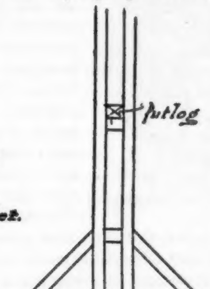


Fig. 17.

In setting up these standards, and indeed all standards in any form of scaffolding, care should be taken to have them plumb, to avoid throwing the strain on the foot-piece near to the strut-joint, or to endanger its tipping over in a longitudinal direction, thus endangering the safety of the scaffold. Bracing longitudinally is seldom attempted or necessary, but transverse bracing becomes necessary, but is seldom resorted to, and then only in a very make-shift way, such as nailing a stay-lath or strip to a joist at one end and to an outside board or plank of the scaffold platform at its other end. When the wall has reached "scaffold high," a part of the platform boards are taken off two or more of the adjacent putlogs at a time, the iron clasp-rests which are thus freed are slid up the standard to the next scaffold height, the putlogs are laid on the clamp-rests and on the wall, and the platform boards are transferred from the lower to the higher level, and this operation is repeated along adjacent sections of the scaffold, until the whole platform is transferred. By placing a few extra standards and putlogs in position alongside of those where the transfer is to be commenced, the boards can thus be transferred to form the upper platform without requiring unnecessary handling.

Transverse bracing (if any,) in the higher stages is of a similar nature to that already described, but probably nailing to a window-frame, or some such indifferent method is resorted to, though it may be noted that when not over two scaffolds, or ten feet high, and when no very severe dumping or other oscillating strains are a result of the operations carried on upon the scaffold, a very slight bracing, when in an *effective* position, serves to prevent the initial movement of the standards out of plumb, especially when there is considerable weight of materials upon the scaffold, though on the other hand, when a movement is *commenced*, the strains increase in an alarming

[1] Should a large opening occur opposite to one of these adjustable standards an extra standard is placed in the opening to support the wall end of the putlog. Planking or boarding is laid across these putlogs to form the working scaffold.

ratio, and hence, considering that the due appreciation of the true mechanical value of any change or interchange of these several conditions, or a departure from safe conditions, is a very precarious contingent, it is advisable that no risks be incurred, and that more certain methods be adopted.

Figure 17 is constructed of two pieces of 2″ x 4″ placed parallel to each other and about 3″ apart. Six-inch blocks, fitting between, are spiked thereto at proper successive heights to suit the intervals of stages found necessary to accommodate the successive working-platforms required for reaching the heights of stories in any building. This standard has footing-pieces and struts similar to those described for the preceding figure. The putlogs rest on the intermediate blocks successively as the wall rises to the "scaffold high;" the platform is transferred to the higher stages in a similar manner to that just described for the preceding method.

BUILDING SUPERINTENDENCE. — XXIII.

PART III.

THE third division of our subject will treat of a more complicated piece of construction than either of the preceding, and will lead us into the consideration of the stresses and resistances of materials in a way which should be familiar to every young architect. The habit of analyzing designs with regard to their merit as structures is one of the most valuable that such persons can form. To say nothing of the importance of acquiring that constructor's instinct which is the best safeguard against the slips that often bring discredit upon the most highly trained men, this same constructor's instinct, built up, so to speak, by the constant consideration and appreciation of weights, thrusts and resistances, is the main element of power in architectural design.

A certain amount of prettiness and refinement is within the reach of the architect who cares and knows nothing about the concealed construction which is to hold up his pretended arches and lintels, but the mind soon tires of detected sham, while it finds ever increasing pleasure in the masterly ease and originality which come from the skilful handling of brick, stone and wood as materials to be frankly used in satisfying the various conditions of modern structures. With us, unfortunately, certain important classes of building, such, for instance, as city dwelling-houses, have fallen into a routine of construction, which, if not positively vicious, offers at least few opportunities for the solution of novel problems; so that it is all the more important for the younger members of the profession to seek out and study special constructions, in order to keep their minds prepared for the difficult programmes which will sooner or later be set before them.

How this may be done can best be shown by means of an example which is to be considered in the way in which an intelligent architect would either study the details of his own design, or would criticize the work of another. The problem chosen is that of a town-hall, measuring seventy-five by one hundred and fifty feet, containing municipal offices in the basement and first story, and a single large room above for public entertainments. This room is divided into auditorium and stage by a brick wall, the proscenium-arch being a real construction of stone. The thrust of the arch is resisted on one side by the weight of a tower, which rises to a considerable height above the roof, and contains a fire-proof staircase, as well as a ventilating shaft; and on the other by the wall of a small dressing-room. Opposite the proscenium-arch is the gallery, under which is the main staircase with ante-rooms on each side. The auditorium is covered by an open-timber roof, with hammer-beams and curved braces, while the stage and gallery have roofs of simpler construction. The exterior walls are of brick, with strings, lintels and other work of stone, and all interior walls are of brick, except a few light framed partitions.

In order to shorten the calculations as much as possible, the floor-plan is made extremely simple; the object being merely to illustrate principles. The structure is to stand on piles, driven through made ground to a stratum which, although not possessing great resistance, forms the best foundation within reach; and as it is essential to cut off the piles under the water-line, which is here fifteen feet below the curb, this distance will be the height of the foundation-walls, including the footings. As usual in all buildings, the plan of the upper story determines that of the sub-structure, and the distribution of the weights and thrusts of the proscenium-arch and roof must be the first step toward the laying out of the foundation-plan.

THE ILLUSTRATIONS.

CAPITALS.

WE publish this week a group of capitals, in the hope that so large a collection of executed designs may be of practical use to our readers, even though the series makes no pretension to completeness of classification or thoroughness of compilation. It was our sole object to group together as many capitals of positive merit, irrespective of style, as could conveniently be included within the prescribed space, and though we do not pretend that we have by any means selected the best, we think that few conspicuously inferior ones will be discovered in the group.

SUBURBAN HOUSES FOR W. A. BUTLER, ESQ., AND J. C. BELL, ESQ., YONKERS, N. Y. MR. JAMES BROWN LORD, ARCHITECT, NEW YORK, N. Y.

These houses will be built of Collabaugh brick and terra-cotta. Bay-windows and attic-story, open-timber and shingle-work, costing about $20,000.

COTTAGE FOR F. W. SPRAGUE, ESQ., KENNEBUNKPORT, ME. MESSRS. H. P. CLARK AND I. LEWIS, ARCHITECTS, BOSTON, MASS.

LEGAL NOTES AND CASES.

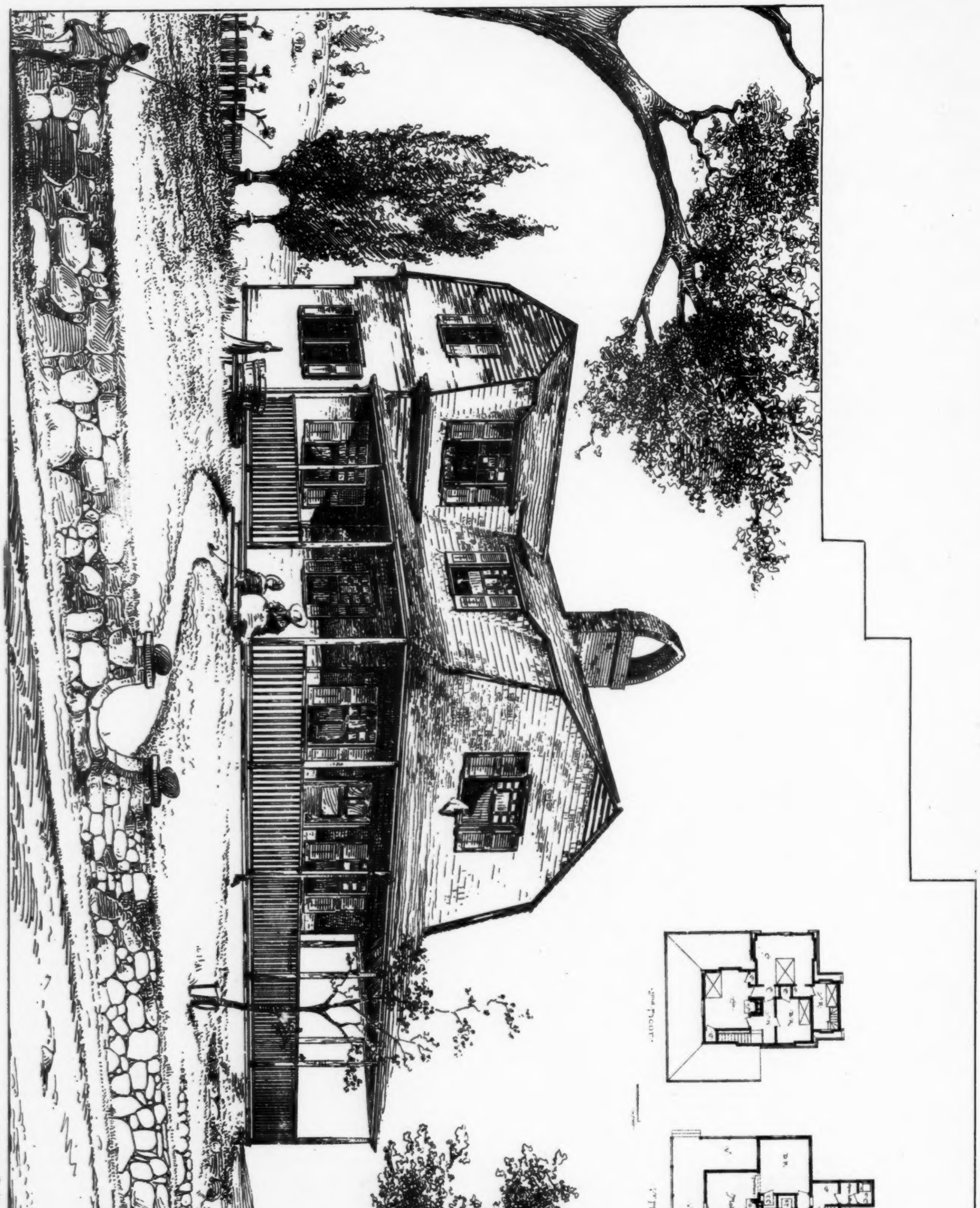
Fixtures. — Removal of House Built by the Tenant of Trespasser.

THE Supreme Court of Texas, at their present term, in the case of *Henderson vs. Ownby*, decided the question whether or not the tenant of one who had gone upon and taken possession of the land of another, who had erected a house thereon, could remove it when he had notice that the owner had brought an action for the land against his landlord before he had rented the land. It was determined that the house was a fixture and could not be removed.

The tenant, a shoemaker, rented the premises from Towery, and erected thereon a shop. The building was a box house, set on blocks, and was erected under an agreement with Towery that Griener should have the privilege of removing it at pleasure. The suit resulted in a judgment against Towery and wife, and after the judgment was rendered, but before a writ of possession had issued, Griener being about to remove the house, the plaintiff instituted this suit to enjoin him from doing so. The writ of injunction was issued and executed, and afterwards, by virtue of a writ duly issued under their judgment, plaintiffs were placed in possession of the premises. The injunction suit resulted in a dissolution of the injunction, and in a judgment in favor of Griener on a cross bill for damages for the conversion of the house.

Gould, C. J., in delivering the opinion of the court, said: The controlling question in the case is presented by appellants in the following proposition: "Towery and wife being trespassers on the lot could not move, or authorize Griener to move, any house built thereon with notice of appellant's claim and title, built there without appellant's knowledge or consent; and no contract between Towery and Griener would affect or be binding on the owners of the soil." Citing: R. S. art. 4814, par. 1; Ewell on Fixtures, 41–67, 51–65, 66 and 154; *Graham vs. R. R. Co.* 36 Ind. 463; *Whipple vs. Denny*, 8 Col. 37. The counter proposition of appellee is: "Towery and wife, being in lawful possession of the lot, having the lawful right to rent the same and collect the rents, a contract made by them with the tenant, Griener, to the effect that he could place his shoe-shop upon said lot and remove the same at pleasure, authorized and entitled the said Griener to remove the said shop, provided the removal of the same would not injure the freehold; and a recovery of the lot by the appellant, in a suit against Towery and wife, could not affect his right of removal." Citing: *McJunkin vs. Dupree*, 44 Tex., 520; *Hutchins vs. Masterson*, 46 Ib. 551; *Moody vs. Aiken*, 50 Ib.; *Fowler vs. Stoneham*, 6 Ib. 60; *VanNess vs. Pacard*, 2 Pet. 141; *Tifft vs. Horton*, 52 N. Y., 337; *Eares vs. Estis*, 10 Kan. 314; 2 Kent, side page 343, and note; 1 Washburne on R. P. pp. 20 to 30 and 437; Ewell on Fixtures, pp. 80 to 110.

An examination of the authorities cited shows that none have been produced which can be regarded as going to the point; that one who rents from a defendant, in a pending suit of trespass to try title can claim, as against the plaintiff, any greater right to remove fixtures erected by him for purposes of trade than the defendant himself would have had, had he erected such fixtures after suit brought. On the other hand, in Ewell on Fixtures, it is said: "In order to give effect to the intention of a party not to make an erection a permanent accession to the realty, the person making the improvement must have the right to determine whether or not the erection shall become a part of the realty; and if, as between himself and the owner of the soil, he has no right to erect the same as property separate and distinct from the freehold, an intention to do so, no matter how clearly manifested, is of no avail." Page 41. In the note to this passage, the case of *Huebschmann vs. McHenry*, 29 Mich. 655, is cited, and, although not fully in point, is, we think, authority for appellant's proposition. In that case, the house in question had been erected by a tenant under a lease from a third person, who claimed by virtue of a tax deed, and there was evidence of a usage entitling the tenant, as between himself and his landlord, "to remove structure so erected at any time before the expiration of the lease." The court says: "There may be cases, it is true, between landlord and tenant, and, perhaps, others, when the intention of a tenant erecting a structure to remove it, and the purpose for which it is erected, enter into the question of its character, whether a fixture or not, and from which the tenant's right of removal may be determined; but no such consideration can, as it seems to us, enter into the question, so far as a mere trespasser is concerned, where the nature of the structure is such as is ordinarily intended to improve the land, and to adapt it to the use and enjoyment of the occupant. The entry here was an assertion of title in the soil — if not in the defendant, at



COTTAGE FOR F. W. SPRAGUE ESQ, KENNEBUNKPORT, MAINE.

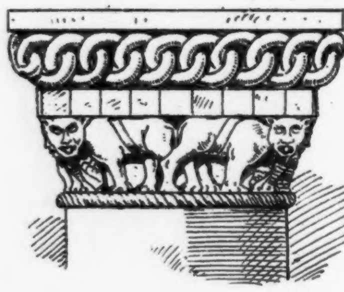
H. P. Clark, Ion Lewis, Arch'ts, Boston, Mass.

Heliotype Printing Co 211 Tremont St. Boston

From the
Church of St Demetrius Thessalonica.

(Texier & Pullans Byzantine Architecture.)

Nave Capital
Church at Ratisbonne
Germany.



(King's Study Book of
Medieval Arch. and Art.)

Romanesque Capital from
the Germanic Museum.
Nuremberg.

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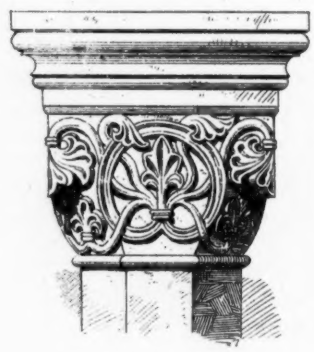
From the
Cathedral of
Notre Dame
Paris.

(Statistique
Monumentale de Paris)

From St. Albans Abbey Church
Eng.

(King's Study Book of
Medieval Arch. and Art.)

From Church at Ellwangen Wurtemberg.



13th.
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From
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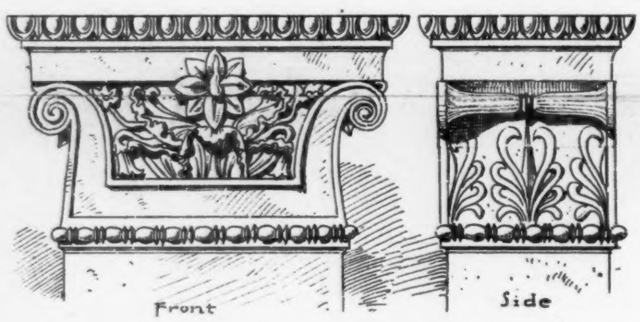
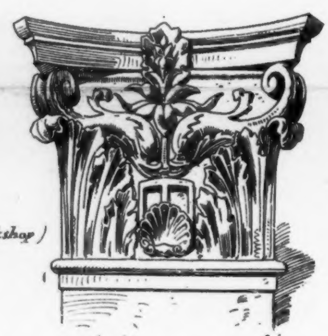


Front

Side

Capital from Pompeii, Italy.

(Croquis d' Architecture Vol VI.)



(The Workshop)

From the Church of Maddalena de Pazzi,
16th Century. Florence, Italy.

From the
Palazzo
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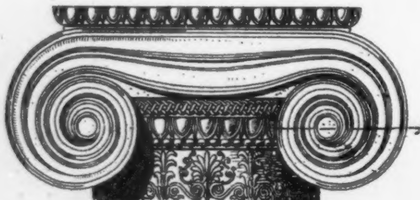
Ferrara.
Italy.

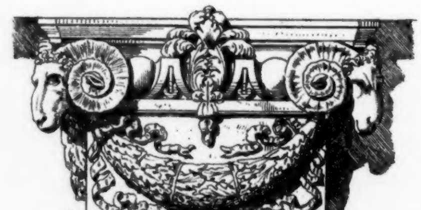


From the Erectheum, Athens.

(Renaud's Traité D'Architecture.)

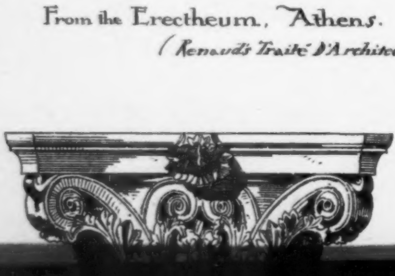
From the Forum of Trajan, Rome.

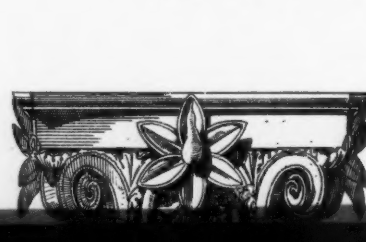
(Croquis d' Architecture, Vol. VIII.)

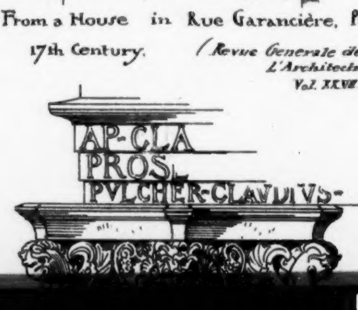


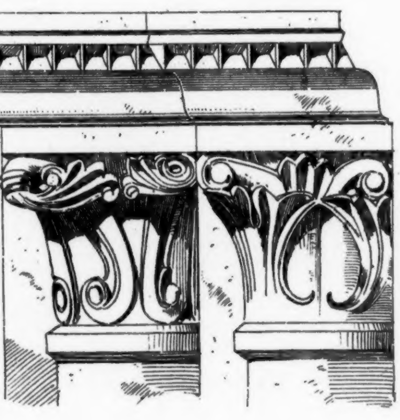
From a House in Rue Garancière, Paris
17th Century.

(Revue Generale de
L'Architecture
Vol. XXVII.)



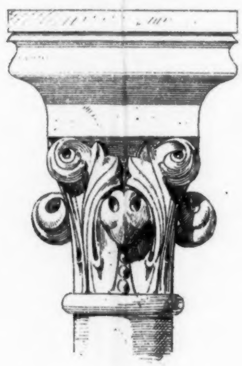






In Old Tower Chartres Cathedral, France.
(Cathédrale de Chartres.)

From Church at Noyon, France.



(Notre Dame de Noyon)

In the Refectory of the Priory of St. Martin des Champs.
(Statistique Monumentale de Paris.)

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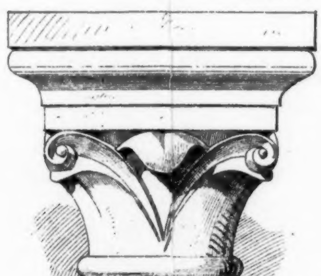
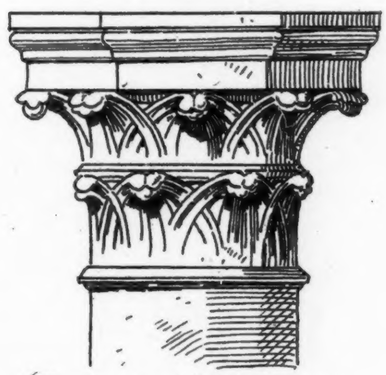
(Cathédrale de Chartres.)

From Chartres Cathedral France.



(Cathédrale de Cartres.)

In Nave of Laon Cathedral, France.



(From Drawings of Laon Cathedral by W.S. Fraser & A.S.F. Kirby.)

In Triforium, Ely Cathedral

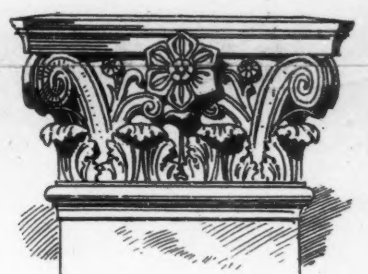
From a Tomb, Cemetière du Nord Paris
M. Dufeux Arch't.
Revue Générale de L'Arch. Vol. XII.

CAP-ITALS

From the Nat. History Museum, Paris.

(Revue Générale de L'Arch. Vol. XXVIII)

From the bldg for the Dept of Agriculture Pa



(Revue Générale de L'Arch. Vol XXIX.)

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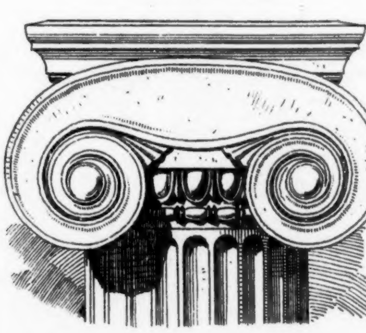
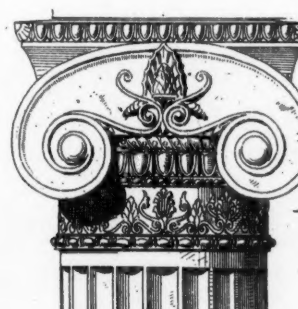
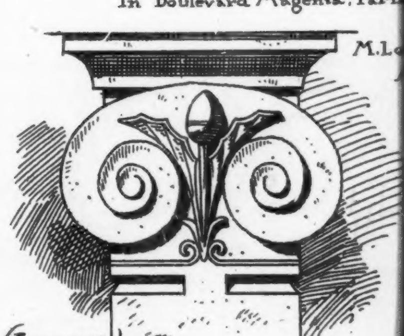


From a design for a Tomb.
(Revue Generale de L'Architecture. Vol XXXI.)
Coquart & Pascal Arch'ts. Paris.



Design for a Capital by M. Dischoff Arch't Paris.
(Croquis D'Architecture Vol II.)

In Boulevard Magenta, Paris
M.L



(Raguenet)

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From Church at Noyon, France.
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In Nave of Laon Cathedral, France.
(From Drawings of Laon Cathedral by W. L. Fraser & A. S. F. Kirby.)
From the Palazzo de' Leoni Ferrara, Italy.
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From a Tomb, Cemetière du Nord Paris
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CAP-ITALS
From the Nat. History Museum, Paris.
(Revue Générale de L'Arch. Vol. XXVIII)
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(Revue Generale de L'Architecture Vol. XXVII.)
From a design for a Tomb.
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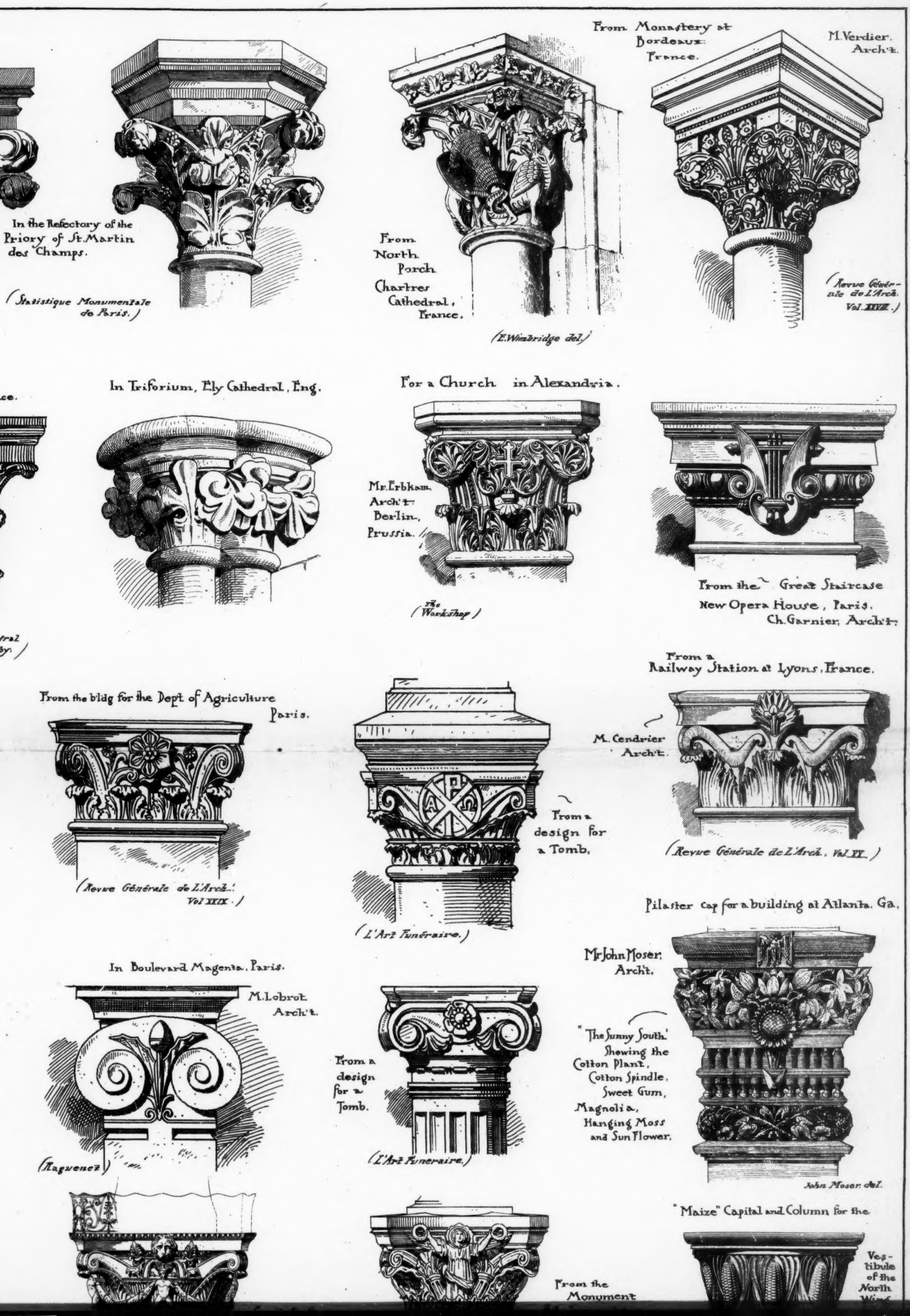
In the Refectory of the Priory of St. Martin des Champs.
(Statistique Monumentale de Paris.)
From North Porch Chartres Cathedral, France.
(E. Wimbridge del.)
From Monastery at Bordeaux France.
M. Verdier. Arch't.
(Revue Générale de L'Arch. Vol. XXVII.)
In Triforium, Ely Cathedral, Eng.
For a Church in Alexandria.
Mr. Erbkam, Arch't. Berlin, Prussia.
(The Workshop)
From the Great Staircase New Opera House, Paris. Ch. Garnier, Arch't.
From a Railway Station at Lyons, France.
M. Cendrier Arch't.
(Revue Générale de L'Arch. Vol. VI.)
From the bldg for the Dep't of Agriculture Paris.
(Revue Générale de L'Arch. Vol. XXIX.)
From a design for a Tomb,
(L'Art Funéraire.)
Pilaster cap for a building at Atlanta, Ga.
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"Maize" Capital and Column for the
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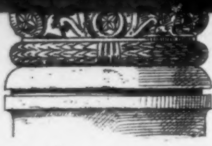

(Texier & Pullan's Byzantine Architecture.)

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Romanesque Capital from the Germanic Museum, Nuremberg.

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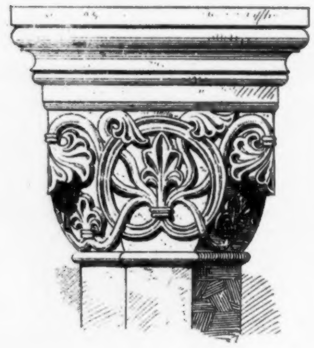
From the Cathedral of Notre Dame Paris.

(Statistique Monumentale de Paris)

From St. Albans Abbey Church Eng.

(King's Study Book of Medieval Arch. and Art.)

From Church at Ellwangen Wurtemberg.



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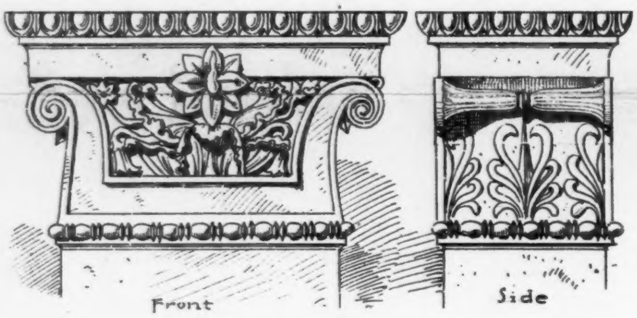

Capital from Pompeii, Italy.

(Croquis d' Architecture Vol VI.)

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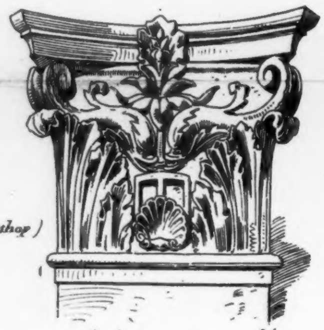
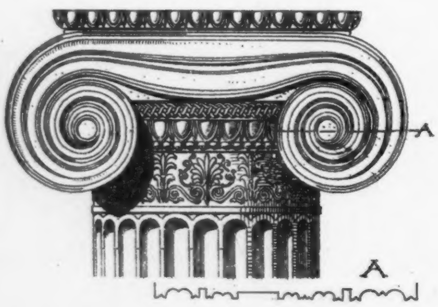


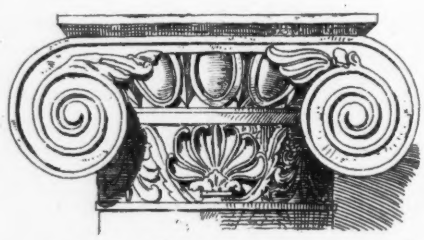
From the Church of Maddalena de Pazzi, 16th Century. Florence, Italy.

From the Palazzo de Leoni Ferrara. Italy.



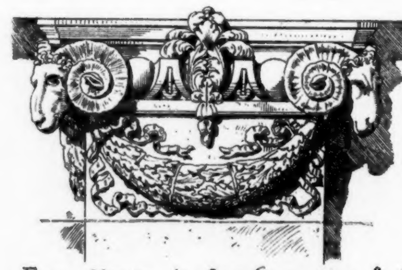
From the Erectheum, Athens.

(Renaud's Traité D'Architecture.)



From the Forum of Trajan, Rome.

(Croquis d' Architecture, Vol.VIII.)

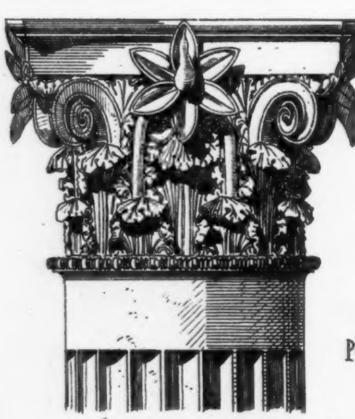


From a House in Rue Garancière, Paris 17th Century.

(Revue Generale de L'Architecture Vol. XXVII.)

(Moniteur des Architectes Vol. IV)

From the Temple of Mars the Avenger, Rome



From Pompeii. Italy.

(Vol. XX, Revue Générale de L'Architecture.)

From the Propylea of Appius. Eleusis, Greece.

(Revue Générale de L'Arch. Vol. XXVI)

Chiefly re-drawn for reproduction, by D.A. Gregg


In Old Tower Chartres Cathedral, (Cathédrale de Chartres) France.
(Notre Dame de Noyon)
(Statistique Monumentale de Paris.)
hédrale de Chartres.)
From Chartres Cathedral France.
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In Triforium, Ely Cathedral,
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From the Nat. History Museum, Paris.
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(Revue Générale de L'Arch. Vol XXIX.)
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From a design for a Tomb.
(Revue Generale de L'Architecture, Vol XXV.)
Coquart & Pascal Arch'ts. Paris.
Design for a Capital by M.Bischoff Arch't. Paris.
(Croquis D'Architecture Vol II.)
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From the Doorway of Scuola di S.Marco, Venice, Italy.
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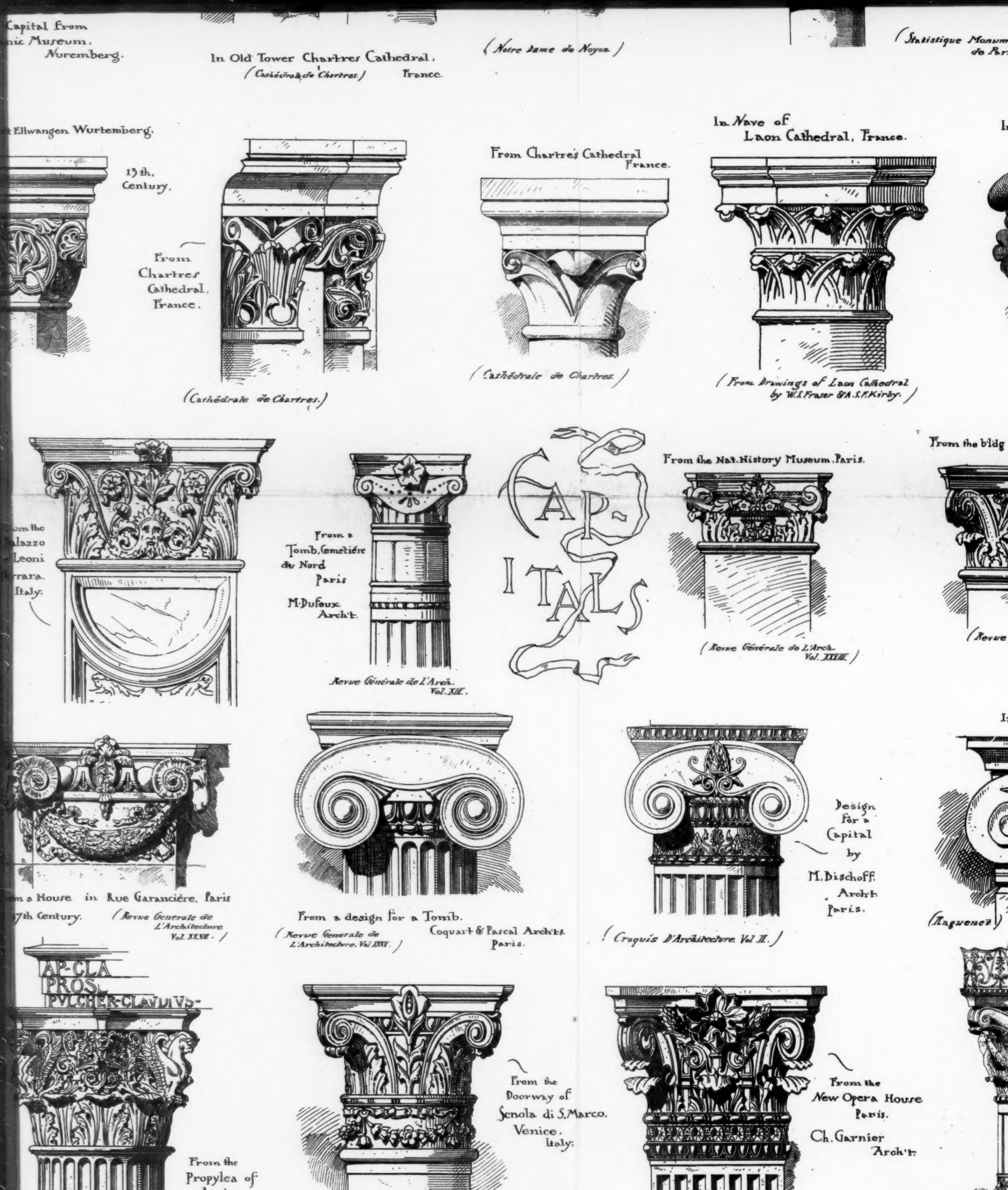

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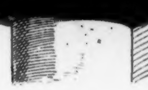

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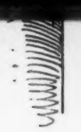
Porch. Chartres Cathedral, France.

(E. Wimbridge del.)



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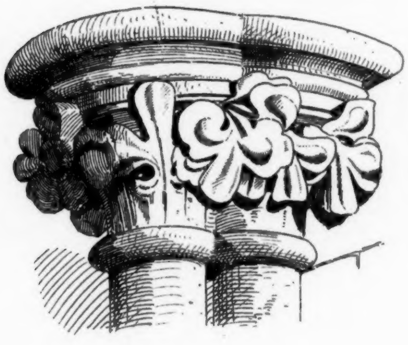
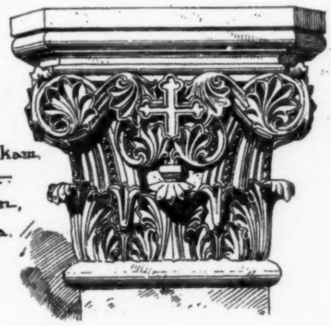
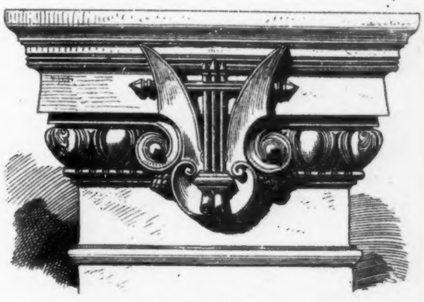


For a Church in Alexandria.



Mr. Erbkam, Arch't. Berlin, Prussia.

(The Workshop)



From the Great Staircase New Opera House, Paris. Ch. Garnier, Arch't.

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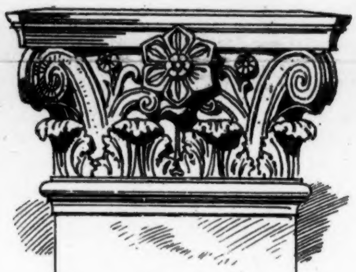

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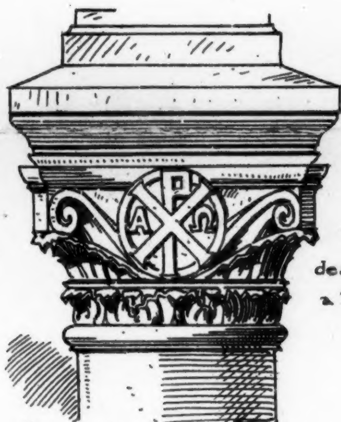
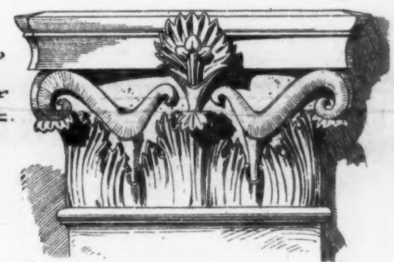


From a design for a Tomb.

(L'Art Funéraire.)

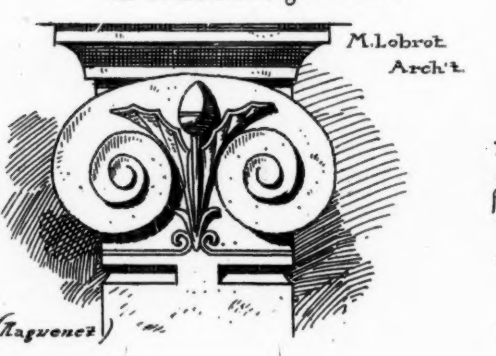
From a Railway Station at Lyons, France.



M. Cendrier Arch't.

(Revue Générale de L'Arch. Vol. VI.)

In Boulevard Magenta, Paris.



M. Lobrot Arch't.

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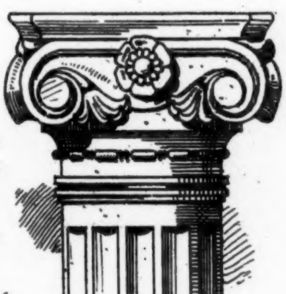

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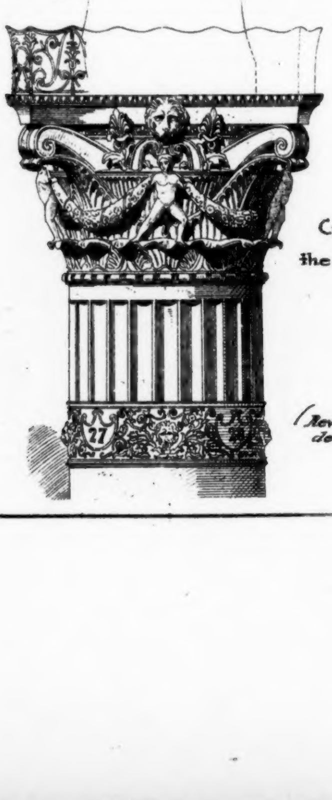
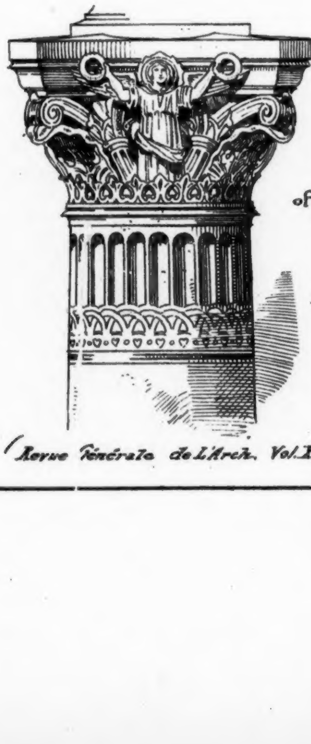


Capital of the July Column Paris.

(Revue Générale de L'Arch. Vol XXIII.)



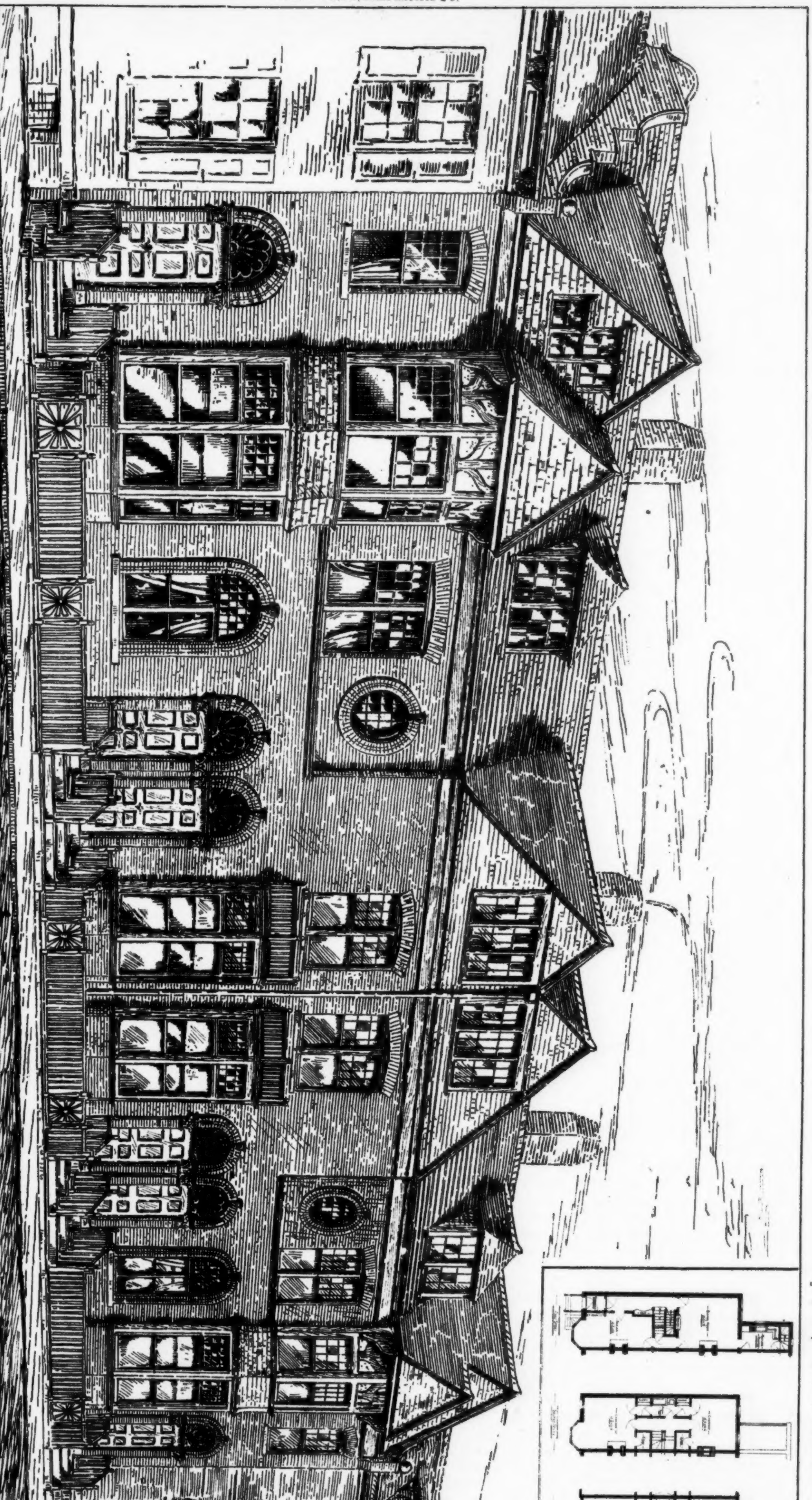
From the Monument of the Immaculate Conception. Marseilles, France. M. Esperandieu, Arch't.

(Revue Générale de L'Arch. Vol. XXXVI.)

"Maize" Capital and Column for the Vestibule of the North Wing of the Capitol at Washington.

B. H. Latrobe, Arch't.

Heliotype Printing Co. 211 Tremont St Boston.



Suburban Houses for Wm. A. Butler Esq. and J. C. Bell Esq. Yonkers, N.Y.

James Brown Lord · Architect · 121 · E. 23rd St. N.Y.

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least in the party under whom he entered. It was an entry with intention to hold an adverse possession. In pursuance of such entry and assertion of title, and with such intention, the house was erected to be used in connection with the land, and as a part of it, or part of the tenant's estate and interest in it. The case had, therefore, every element which characterizes the act of a trespasser who annexes his structure to the freehold, and is, therefore, presumed to intend to change the nature of his chattel and convert it into realty, and thereby give it to the holder of the permanent title, in case he should be subsequently evicted by such holder. In such case it seems clear that no proof of previous intention on the part of the wrongdoer to remove or sever the structure from the freehold should be admitted, for the purpose of changing its character from real to that of personal property, as between him and the actual owner of the soil." A defendant in trespass to try title who makes improvements pending the suit, does so at the peril of losing those improvements should the suit be determined against him, no matter what may have been his intention in regard to their removal. This is so, although the premises may have been sequestered and replevied by him. By replevying he is simply enabled to retain possession, notwithstanding the sequestration. His rights to hold and improve are no greater than they were before sequestration, but after suit. Having himself no right to remove fixtures wrongfully annexed by him to the land of another after suit brought, it is not perceived how, by contract, he can give such right to a third party, having notice of the pending suit. After suit brought he is no longer allowed any greater right to claim that he acts in good faith in continuing to place fixtures on the land, than would be accorded to a mere trespasser; nor can he thereafter, by renting the premises, secure to himself, through a tenant, any greater rights, in regard to such fixtures, than he would otherwise have. These views are conclusive of the case, and must lead to a reversal of the judgment. H. E.

CONCRETE FLOORS.

IN an article which appeared in the *Building News* some short time since, regret was expressed that but little information of a reliable character could be obtained by architects as to the construction and capabilities of concrete floors of ordinary construction, and that no data existed from which any calculations of cost and strength were available. Possibly, if such data did exist, the use of concrete as a floor material for dwellings — except, perhaps, of the humblest class, might eventually become more general. The usual description of wood floor, with a flimsy lath-and-plaster ceiling beneath, is bad from all points of view, and has no redeeming feature. It occupies a considerable amount of space, averaging at least five per cent of the whole cubical contents of most buildings. It affords a safe harbor of refuge under the boarding for rats and mice; provides a sanctuary in the cracks and crevices of the floor-boards for an innumerable and undefinable collection of insects; and becomes a receptacle for the dust and dirt of generations.

The damage and destruction of valuable carpets and upholstery in rooms but occasionally occupied is, to a very great extent, due to the fact that, no matter how much care is taken to exterminate moths, they have an infallible retreat in the gaping joints that appear to be inevitable in most floors.

The extended use of linoleum and kamptulicon has been the cause of dry-rot in thousands of buildings, and, in fact, when once these materials are glued to wood floors, as is often the case, the fate of the latter is sealed, unless free ventilation is obtainable between the floor-boards and ceiling, and this is rarely practicable. The cost of renewal and the danger existing from rapidly decaying — or totally decayed — floor-timbers, are not the only evils, for living and sleeping contiguous to wood undergoing the process of dry-rot is not to be recommended from a sanitary point of view.

Assuming that wood floors and lath-and-plaster ceilings had been unknown till now, and concrete had been the material in general use from time immemorial, any individual attempt to introduce the former, with a view of supplanting the latter, would certainly have been considered as evidence of insanity, and in crowded towns and cities the very fact of introducing a large amount of combustible material, spread over the whole area of buildings, in layers every few yards in height, would have created general feelings of alarm. But wood floors will, from prejudice and custom, continue the rule, and concrete floors the exception, until the use of the former in any closely inhabited neighborhood is prohibited, and, till then, we may look forward to no very great change in — next to the walls and roof — the principal constructional feature in a building.

Did any great difficulty exist in making floors of concrete, and rendering them as comfortable as wood floors (if, under the circumstances described, they can be considered as comfortable) there might be some little excuse for not travelling out of a groove we have been accustomed to for so many centuries.

But there is nothing of the sort. It is true the "data" for calculations and "tables of strength" are wanting; but, at a very moderate cost, these might be obtained, and the R. I. B. A. might spend money worse than in making experiments to obtain the "missing link," and placing its members in possession of facts and figures which would enable them to bridge any void with concrete and iron, without waste of materials and space. The objections urged against the use of concrete for floors in large towns—that special workmen are needed, that the aggregate for such a purpose is not readily attainable, that a cement floor is cold and unhealthy, and that no economical way is known of supplanting cement by any substance more congenial to our acquired tastes for wood floors — are all fallacious and misleading. Special workmen are not required. Concrete flooring, where proper materials and a clear plan and specifications are provided, is as easily accomplished under the supervision of a good clerk of works as any other description of flooring.

For an aggregate nothing is better, all points considered, than coke and coke-breeze, which are procurable in almost any town. Coke is light, free from admixture of an injurious character, cheap, undeniably fire-proof, and Portland cement, as a matrix, suits it to perfection. Portland cement is not cold compared with stone. Granted, it is colder than wood; but its dry nature renders it, when covered with a thin carpet, by no means uncomfortable. Certainly, it is not damp, and it is by many degrees healthier and more wholesome to live upon than a wood floor.

But a concrete floor can be made even more comfortable than a boarded one by floating over its entire surface with a thin coat of neat cement, and, upon this, glueing linoleum to form an unyielding — though slightly elastic and perfectly level — surface, upon which to lay a carpet. It must be apparent to every one that a carpet upon a surface of this kind would be far more durable than when laid upon a boarded floor with uneven joints and sharp ridges. Linoleum is apt to shrink after being laid down some time. This can be remedied, however, by laying it upon the floor face downwards for a week or so, as the canvas back, by exposure to the air, shrinks to its natural size.

Messrs. Eberhard & Co., of Hampstead-road, have invented a glue that firmly secures parquetry to concrete, so that parquetry is another material which can be applied without trouble. In this case, of course, cost must be a secondary consideration. A parquetry border, however, 18 inches or 2 feet wide to large-sized rooms, and linoleum glued down over the remainder of the floor as a pad or foundation for a carpet, would leave nothing further to be desired in the way of appearance and comfort, and fairly lay claim to the title *par excellence* of a "sanitary floor" fit for a mansion, and producible at a moderate cost. For supports of concrete floors rolled iron girders are, no doubt, cheaper and better than anything else, and as in any building 10 feet between supports is a safe span for a flat slab of concrete 5 or 6 inches thick, but very few girders really are needed for the floors of any dwelling, and to clothe that portion that must unavoidably appear below the ceiling, by means of concrete, which can be moulded into any required form *in situ*, and after the girders are in position, is a process of no difficulty whatever. No great gain is obtained by "arching" concrete floors, although, where a flat ceiling is not an absolute necessity, some material can be saved by adopting a segmental form, without any corresponding loss of strength.

Obviously, also, a diminution of the dead-weight of concrete renders smaller iron girders available. I find that half an inch rise in every foot of the chord-line of an arched-form floor insures an equal distribution of strength. Thus, for a floor 10 feet between bearings (the concrete composed of about five parts of aggregate to one part of Portland cement), 5 inches thick in the centre, and 7½ inches at the haunches, or springing, would be the correct proportion. The theory that the expansion and contraction of concrete must, in floors, exercise a prejudicial effect upon the external walls will not, I think, be found correct — at least, no deviation from the perpendicular has taken place in the external walls of a building 100 feet in length, erected some years since, and having a continuous concrete floor throughout its entire length, and this should be taken as a satisfactory test. It is a mistake to think that if ordinary care is exercised a concrete floor may collapse without any warning, or without any assignable cause, and, if subjected to any violent shock, without any signs of elasticity. The sudden collapse, a few years since, of a concrete floor at Portsmouth, causing the death of a workman beneath, was clearly from gross carelessness, and the downfall of a concrete roof at Cambridge in 1878 arose from causes which would apply to the erection of any building.

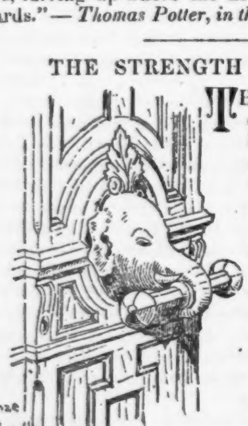
Perhaps the most interesting experiments in connection with concrete as a floor material were made by Mr. E. A. Bernays, M. Inst. C. E., some years ago. These experiments are the most useful, because similar materials might be procured in any neighborhood, and the experiments were conducted free from any suspicion of partisanship or exaggeration.

A concrete floor 16 inches thick, measuring 16′ 6″ x 17′ 6″, out to out, and 13′ 6″ x 14′ 6″ in clear (no intermediate iron girder being employed), was made with one part Portland cement, and four parts broken bricks, the latter broken to pass through an inch mesh; the concrete well beaten in place and covered with water for seven days. At the end of twenty-one days a party of eighty soldiers marched onto it, marked time at quick and double, then jumped, but with no result. It was then loaded with bricks piled over the whole of the unsupported surface, and broke under a weight of 10½ tons, or 1.07 cwt. per superficial foot. With a concrete floor 15′ x 13′ 6″ in clear of all supports, made in a similar manner, and the same age as the one previously described, an experiment was made by dropping a weight of 4 cwt. from a height of 4 feet on the centre of the floor, with the result of breaking a hole clean through; but no radiating cracks appeared, nor was the remaining portion of the floor injured. The superficial area of the weight as it fell is not given. But Portland cement is now manufactured 25 to 50 per cent better quality than was used for these experiments, and better results would, therefore, be obtained at the present time; and it must be remembered that at twenty-one days old a concrete floor has attained possibly 50 per cent only of its ultimate strength, so that, at any rate, there is sufficient evidence to prove that a concrete floor may be made of simple materials, by ordinary workmen, and to occupy about one-half the space necessary for a wood floor capable of carrying the same load.

As an instance of the accumulative strength of concrete floors, another of Mr. Bernays' experiments is given as follows: Size of floor 9′ 9″ x 17′ 6″, out to out, and 6′ 9″ x 14′ 6″ between supports, or 98 superficial feet in the clear, supported on an 18-inch wall all round. Composition of concrete: — One, Portland cement, four, broken brick ballast, gauged to half an inch mesh, and well beaten and covered with water for seven days. At the end of seven days it was loaded by piling layers of bricks over the whole of the unsupported surface, and the result is described as follows: — "When loaded with about 11 tons, or 2.22 cwt. per superficial foot, exclusive of its own weight, the edges of the slab began to rise along the long sides. When loaded with 15 tons, or 3.06 cwt. per superficial foot, it suddenly gave way."

A floor similar in all respects and conditions, except that the trial was made after an interval of twenty-one days, instead of seven, gave the following result: — "Covered with forty-five men on unsupported portion. Marked time at quick and double, and jumped together; afterwards loaded with bricks as before. No result from men jumping. Began to bend with 15 tons, or 3.06 cwt. per superficial foot, rising off outside edges. With 32 tons, or 6.52 cwt. per superficial foot, it cracked slightly; was then loaded up to 43½ tons, or 8.88 cwt. per superficial foot, without appearance of cracks altering. It had tilted up about ¾ inch at outer edges." No further trial being made, the result was not determined. The fact that this floor received 11½ tons additional weight, after giving warning of possible rupture, and then remained unbroken, proves that with sound construction, a sudden collapse is not a positive certainty. But these experiments go to prove that clear spans of about 14 feet, without help from iron in any form, are practicable, and that unlimited areas, with the assistance of rolled iron beams, may be constructed by ordinary workmen, and which shall be fire-proof, burglar-proof, and water-proof; their durability co-equal with the walls that support them; 50 per cent of cubic space saved when compared with wood floors; solid throughout; and not, therefore, permanent dust-bins and traps for offensive matter of every description; perfect as far as sanitation is considered; and, if recognized as a portion of a builder's business, not as a specialty needing special remuneration, as cheap in construction as the primitive method of making floors, the object of which appears to be principally to afford the next generation of builders a considerable item in all their estimates for repairs, "for re-instating and replacing decayed floor-timbers, furring up where the floors are uneven, and laying new floor-boards." — *Thomas Potter, in the Building News.*

THE STRENGTH OF QUARRY STONES.



THE issue of the *Builder* for July 22 called attention to a theory which has been propounded by Herr Müller of Magdeburg, according to which the strength of quarry stones is in direct proportion to their specific gravity.

A detailed criticism of Herr Müller's statements has since appeared, in which Dr. Böhme of Berlin takes up the position that the principles on which this theory rests are erroneous. He denies that any fixed rule can be applied to the settlement of the question at issue, in view of the differences which are known to exist in the various particles of which quarry stones are composed, and also in view of the varied character of the influences to which these stones have been subject in the process of their formation. With a compression spreading over a long period and gradually increasing in power, greater strength must, he considers, be attained than by the action of a sudden and violent force, the molecules having an opportunity in the former case of becoming thoroughly knit together.

The results of the experiments made by Dr. Böhme may be summarized as follows (the strength being shown in pounds per square inch): —

(*a*) Limestone with a specific gravity of 2.68: —

	5 wet samples.	5 dry samples.
Lowest strength	7154.16	7267.95
Highest strength	9984.54	10581.91

(*b*) Limestone with a specific gravity of 2.70: —

	11 wet samples.	11 dry samples.
Lowest strength	8050.22	8050.22
Highest strength	10738.36	12515.80

(*c*) Limestone with a specific gravity of 2.71: —

	6 wet samples.	6 dry samples.
Lowest strength	7196.83	7879.54
Highest strength	12316.72	13668.60

(*d*) Limestone with a specific gravity of 2.72: —

	5 wet samples.	5 dry samples.
Lowest strength	9073.27	9600.50
Highest strength	15033.71	14934.15

(*e*) Sandstone with a specific gravity of 2.54: —

	Wet samples.	Dry samples.
No. 1	12487.40	13668.60
No. 2	15488.80	14607.02

(*f*) Sandstone with a specific gravity of 2.56: —

	Wet samples.	Dry samples.
No. 1	10169.44	9700.10
No. 2	18518.24	18902.37

(*g*) Sandstone with a specific gravity of 2.59:

	Wet samples.	Dry samples.
No. 1	8932.04	9700.10
No.2	11051.27	11349.56
No. 3	17224.45	16754.40

From these results Dr. Böhme argues that it is impossible to assume that exact connection between specific gravity and strength which Herr Müller claims to have established. Quarry stones are, he remarks, masses of a very heterogeneous character. Their specific gravity is produced by the substances of which they are composed, which are of different specific gravities, while the proportion in which each component substance exists in the bulk is also liable to fluctuations of a more or less important character. He maintains that the strength of the stones principally depends upon the manner in which these various component parts are united. In the detailed consideration of this branch of the subject the various influences to which the stones have been exposed are elements of primary importance.

It is remarked that in porous and relatively light descriptions of limestone the close union of the component particles is sometimes productive of a greater resisting power than is found in other descriptions where great strength might be looked for, but which have been formed with relative quickness and therefore under circumstances unfavorable to their quantities of resistance.

Comparison between stones of Plutonic and those of Neptunian origin is not possible, according to Dr. Böhme, who points out the fact that porous hard lava, which is considerably lighter than sedimentary limestone and sandstone, is usually possessed of greater resisting power than either of these varieties.

Being for the most part a criticism on Herr Müller's theory, there are several points in Dr. Böhme's remarks which invite further debate, and doubtless the attention which has been thus drawn to the subject in German technical circles will lead to its eventual discussion in a complete form. The important divergence in the results of the two series of experiments on limestone would almost seem to point to some differences in the substances experimented upon or in the application of the tests. In the limestone experiments the principle of a simultaneous increase of specific gravity and strength would not seem to be exactly contro erted, but Dr. Böhme's arguments are to some extent borne out by the figures quoted in connection with his tests of sandstone. Doubtless his main intention has been to show the futility of any attempts to arrive at reliable data on the subject, and in this object he seems to have been more or less successful.

The Elevated Railway in Vienna. — According to the Vienna *Freie Presse* of October 5, the Austrian capital is to lead the way in the introduction of elevated railways into Europe, the Austrian Government having determined to grant the concession for the Vienna Railway to an English company headed by Mr. Fogerty. The municipality and magistracy of Vienna will, it is said, now have to discuss only the question of technical construction. The line will be concessioned as an elevated railway, and the whole of the iron required for the construction — from 150,000 to 180,000 tons — will be furnished by works in Austria. A contract for the greater portion of this quantity has already been concluded with the Wittkowitz Iron Works. More fortunate than Brooklyn and Westchester, Vienna, though it has a fine system of surface horse-railways, has no Deacon Richardson to lobby in their interests with the "municipality and magistracy" against this great step in metropolitan progress, and no Judge Tracy to help the horse-railway lobby by encouraging litigious and monopolizing citizens to put claims for imaginary consequential damages based on theoretical fees in the use of the streets in the way of rapid transit for the millions. — *New York Tribune.*

A Singular Lease. — At the Spencer sale of real estate in New York city lately, a piece of property on Crosby street, 75′ x 100′, was disposed of, which, according to the catalogue, was leased "as long as grass grows and water runs, renewable every ten years, at the price of a hundred days' work per lot of an able-bodied laboring-man attending masons, between the first days of May and October, prior to the expiration of ten years."

A NEW SYSTEM OF LIGHTNING-RODS.

[Translated from *Le Génie Civil.*]

OF all the numerous manifestations of electricity, the most anciently known, as well as the most terrible in its manifestations is lightning. The electric stratum which floats in the atmosphere has from time immemorial reminded men at intervals, by its sudden and violent displays of force, of the existence of a power which still remains but partially understood and controlled.

The first device invented for guarding against the danger of lightning has hardly been improved upon since it was described by Franklin in 1752. The principle remains the same under innumerable variations, and it is only within a few years that the conditions of its action have been made the subject of scientific investigation. Among the latest and most successful experimenters is M. Melsens, member of the Royal Academy of Belgium, whose improved forms of apparatus for the control of atmospheric electricity excited much comment at the recent electrical exhibition, and formed the theme of a discussion at the subsequent Congress of Electricians.

In a system of protection against lightning, M. Melsens said, certain elements were always included: (1) a metallic terminal raised in the air, and consisting of a prismatic bar; a point, sharp or obtuse; a sphere, smooth or covered with points; a star, vane or other form, in any case intended to receive the electricity of the atmosphere and conduct it to some safe outlet; (2) a conductor of metal in the shape of a round or square rod, a ribbon, tube, cord or braid, in direct communication with the earth; and (3) an earth connection of any form, serving to dissipate the current from the conductor in the earth, or into moist soil or water.

Notwithstanding the careful directions published by various scientific bodies as to the proper construction of lightning-rods, accidents have been very frequent, so that the efficacy of any form of conductor is sometimes denied, and M. Melsens, while accepting the general theory of protection, has been led to modify very materially the details of its practical application. In the first place, he multiplies, by numerous ramifications, the aerial point, the conductor and the earth connection, with the object of dividing, as much as possible, the electric discharge; in the second place he interweaves all the conductors, connecting one to another so as to form, all over the building to be protected, a kind of metallic net-work, which is found by experience to be a complete defence. For material he employs copper and galvanized-iron, but principally the latter. Although the conducting power of copper is, for the voltaic current, six times greater than that of iron, there is no such difference in the transmission of atmospheric electricity; on the contrary, the discharge of atmospheric currents is practically the same through copper and iron conductors of equal section. Moreover, the cost of copper is considerable, and conductors made of it offer constant temptation to thieves, so that it is preferable to make the main portion of the rods of iron, with copper tips only.

From the time of Franklin, the accepted form of termination for lightning-rods has been a point; but various modifications of this have been introduced, such as cones, truncated cones, prisms, and even spheres. The area protected by a single rod was formerly supposed to be about equivalent to a circle whose radius is equal to the height of the rod above the ground, and in accordance with this imaginary principle, the points of rods are often raised twenty or thirty feet above the building which they are meant to defend. Investigation into a great number of cases has shown this idea to be quite unfounded. So far as any determination can be made, the empirical rule of Mr. Preece is probably the most accurate which we have; his deduction from observed facts being that a good conductor absolutely protects everything included in a figure limited by a surface of revolution of which the profile is given by a quarter-circle whose radius is equal to the height of the rod, and which is tangent both to the rod at its upper extremity, and to a horizontal plane passing through its base. It is evident that such a figure would fail to include a large portion of most buildings, unless the rod were of inordinate height, and the multiplication of points seems a reasonable mode of meeting the difficulty. In M. Melsen's system a considerable number of points are distributed over the building to be protected, each point being composed of five or six radiating spikes, arranged around a longer one, and projecting at an angle of 45° with the vertical. The short spikes are of copper or galvanized-iron, either cast or in the form of wire. The longer upright one is of copper, and the whole forms a sort of plume at the top of a rod, rising a yard or so above the roof.

Whatever may be the theory of lightning-strokes, the advantage of multiplying the protecting points seems plain. According to Beccaria, the action of the pointed rod converts the electric cloud into one of the ordinary kind, while Professor Colladon finds that just before a discharge the electric stratum bends around and envelopes the object which it strikes, and in either of these cases the multiplication of the metallic tips affords a means of attacking the cloud at many points at once. As a further consequence of these observations, M. Melsens is led to diminish the section of his conductors, and in this he is supported by Mr. Preece, the distinguished English electrician. Instead of rods, he forms conductors of galvanized-iron wire, $\frac{3}{16}$-inch in diameter, which is easy to place in position, is readily bent to follow the contours of the building, and yields without injury to expansion and contraction. The multiplication of conductors renders it practicable to diminish their section to even less than this, actual experiment having shown the dispersion of a single electric discharge among three hundred and ninety conductors, varying in material as well as in size.

The earth connection, as every one knows, is one of the most important elements of a system of protection against lightning, and it is to a defective "earth" that most of the injury inflicted by lightning upon buildings is due. Notwithstanding the unfavorable opinion of certain scientific commissions, the utility of connecting lightning-rods with all the metallic portions of the construction of the building which they protect, particularly with the gas and water pipes, is now generally recognized. In this way the danger of lateral strokes between the conductor and the metal-work of the house is obviated, and numerous examples show the practical value of this arrangement. It is, however, unnecessary to push the principle of uniting all the metal-work of the building to the conductor too far. If the ground connection is such as to assure the dispersion of the current over a large surface of moist earth, small detached portions of metal may often be left isolated from the circuit without danger.

The character of a perfect earth connection is not always understood, and the majority of lightning-conductors are very far from what they should be in this respect. According to Becquerel and Pouillet, the conducting power of iron is to that of water, as a thousand millions to one, and to that of moist earth as four thousand millions to one; so that a lightning-rod of one square centimetre ($\frac{1}{4}$ of an inch) in section would, in order to transmit the stroke which passed through it without check, require to be terminated by a plate of iron two hundred and twenty-five metres (about seven hundred and fifty feet) square, supposing both sides of the plate to be immersed in water; while if merely buried in a wet soil, the terminal plate would need to be four hundred and fifty metres square, or in other words, would have an area of over fifty acres. Of course, such terminals are out of the question in practice, and the most that can be done is to endeavor to approach as near to the theoretical standard as possible, by making connections with gas and water mains, and in other ways augmenting the surface of contact with water and moist soil.

The ground connection of the conductors which protect the Hôtel de Ville at Brussels, in pursuance of this principle, is made through the medium of a well, in which are immersed a cast-iron tube having ten square metres of surface, twenty iron wires each five metres long and twelve millimetres in diameter, and eight large carbon plates. Besides this, connection is made with the gas and water mains.

The cost of protection against lightning has been very considerable, but the improvements in the construction of conductors have reduced their price. A farm-house is described which was furnished with a network of galvanized wire, armed with thirty-six clusters of points, each having six branches, and connected with the ground by eleven earth contacts, of which two were carried to the well, two to a neighboring pond, and the remaining seven to moist earth. The different conductors were connected by nine separate circuits, and the total cost was about four hundred francs.

HEATING PUBLIC BUILDINGS.

Chicago, Ill., October 25, 1882.

To the Editors of the American Architect:—

Dear Sirs,—Would you be so kind as to inform me through the *American Architect* what kind of heating, air or steam, you would prefer for a public building. Can you name me any books in French, English or German in that line of heating? Can you name me a weekly French journal about the same as yours? H. G.

[Heating by hot-air is generally preferable, but most public buildings are too large or too unfavorably distributed to be so warmed without using several furnaces, which involves much labor. With steam, which can be sent any distance from a single boiler, there is no such difficulty, hence, steam is usually employed for the purpose. Baldwin's "Practical Treatise on Steam-Heating" gives just the information you wish on that branch. "Peclet's Traité de la Chaleur" is the best theoretical work on the whole subject. Putnam's, "The Open Fireplace in all Ages" is also very good and practical in its remarks on hot-air heating. *La Semaine des Constructeurs,* published by Ducher & Cie, Paris, is an excellent journal, probably the best suited to your wants.—Eds. American Architect.]

CONSERVATORIES.

Hamilton, C. W., October 30, 1882.

To the Editors of the American Architect:—

Dear Sirs,—Can you give me the address of any firm that makes conservatories in either wood or iron? I do not see any such advertisement in your paper.

Yours truly, C. W. Mulligan, Architect.

[The only person engaged in this line of business that we know of is Mr. Arthur E. Rendle, 7 Warren St., New York.—Eds. American Architect.]

NOTES AND CLIPPINGS.

North Sea Canal.—One of the most remarkable of the great canal projects now occupying the attention of engineers is that of uniting the North Sea with the Mediterranean. Like most other enterprises of this character, it is old in conception, dating back, it is claimed, to the beginning of the Christian era. Four years ago it took a definite shape in a plan for a canal from Marseilles to Lyons and then to Dunkirk. During the present year a substitute was suggested in the form of a canal from Bordeaux to Narbonne. This latter plan, though possessing great advantages in point of distance, the route being much shorter and less expensive than the other, yet, on the other hand, is less attractive as an enterprise of vast scope, since it would merely connect the Bay of Biscay with the Mediterranean, cutting off the doubling of the Spanish Peninsula. Whichever project is selected, it would be remarkable to find the earth's surface so cut up that a ship may pass from Bombay to St. Petersburg solely through inland waters, as it would be able to do by using the Suez, the French and the Danish canals, the three being designed for the largest commercial vessels.—*Engineering News.*

Tripolith.—Tripolith is the name given by its inventors to a new binding material for builders, a substitute for lime, cement, and plaster under certain circumstances, and which is composed of sulphate of lime, coke, and oxide of iron in some form or other. To test its various qualities, the manufacturers, Messrs. von Schenk Brothers, of Heidelberg, have had a very thorough series of trials carried out with this material by the Imperial German Bureau for Testing Building Materials, and of these tests we give below a summary in tabular form. That the material requires considerably less water to form a workable mortar than ordinary lime is no doubt an advantage, while the time for setting can be admirably regulated by adding more or less ordinary slaked lime. Thus while tripolith mixed with sand only, sets in 10 to 15 minutes, an addition of slaked lime may easily increase the time required for setting to 60 minutes. The specific gravity of tripolith is lower than that of plaster; the former is 1.678, the latter 1.696. Turning now to the tests, we give in our table the mean results in each case of five complete experiments. The extraordinary increase of tensile strength after a long exposure to the atmospheric air is remarkable; it amounts to 100 per cent from seven to ninety days in mortar B, and to 189 per cent in mortar C for the same time. Compared with the tensile strength of lime and cement, the results obtained with tripolith are highly satisfactory. The compression tests point out for tripolith a position between lime mortar and cement mortar, but since after being fairly set it acquires about the same crushing strength as ordinary bricks, no more would be needed for general use. In setting, tripolith mortar loses in weight, and when placed in water does not absorb the latter so rapidly as ordinary mortar does. Its adhesion to brick, stone, and other materials is very considerable, and the tripolith mortar does not either reduce or increase noticeably in volume when setting. For facing and plastering, this material is excellently suited; it is easily handled and smoothed while soft, adheres well to brick or stone surfaces, and attains far greater hardness than plaster-of-Paris, and oil or other colors adhere to it well.—*Engineering.*

Hammers.—To most persons a hammer is simply a hammer, but every mechanic knows that there is a great variety of hammers, from the tiny lump of steel with which the watch-maker taps the mandril of a balance-wheel to the huge trip-hammer under which tons of hot iron are moulded into shape. The hammer, in fact, plays an important part in the mechanic arts, each one presenting its peculiar form, size, weight and material. In some trades there is great skill and dexterity required in the use of the hammer. Any one who has seen the operation of riveting a boiler has admired the sleight of hand with which the strikers round up the head of a rivet in less time than it takes to write about it. The blows follow one another with wonderful accuracy and rapidity, and when the rivet-head is finished it looks as smooth and regular as if it had been cast in a burnished mould. Take even the process of driving an ordinary nail and it is remarkable what a difference there is in the method of a novice and that of a carpenter. The one hits one side, often bends or breaks the nail, or bruises the finger that holds it. The carpenter hits with precision and drives the nail home with well-directed blows. The deft hammering of coppersmiths is proverbial, pounding metal into any required shape. The copper plates that are used by engravers are hammered hard in long strips by the use of large steel hammers with faces as smooth as that of a mirror. The most accurate hitting is required in this process, because the hammer-face is flat and must be held perfectly level to avoid cutting deep gashes in the plates. When it is necessary to make bevels on these plates, a skilled workman will make a bevel with a hammer in a few minutes that would require hours if made by filing and polishing. Silversmiths learn to be very expert in the use of the hammer. Spectacle-makers can take the temples of a pair of ladies' spectacles and temper them by dexterous planishing between hammer and anvil. A blacksmith always has an assortment of hammers with which to shape the ductile iron. File-cutters are required to use hammers with great judgment. Each tooth in a hand-made file is made by the burr raised by tapping a sharp chisel held to the soft file. After each blow the chisel is set up against the burr of the last stroke and another burr is raised, and so on until the file is finished. The force of the blow measures the size of the burr raised, so that the regularity of the file depends upon the evenness of the hammer-stroke. Many files are made by transferring processes by machinery, but the hand-made files command the highest price, while with many peculiar forms of files the hand-work is indispensable, and the regularity of hammer-work a necessity. One of the most difficult jobs to be done with a hammer is to straighten large flat plates of metal. An expert workman will here do, with a few strokes of the hammer well directed, work that a non-expert cannot do at all. Indeed, without great skill the attempt to straighten plates with a hammer generally results in making the crookedness worse. The gold-beater's hammer is wielded day by day by the trained hand, although an hour of it would fatigue the novice. The calker has a peculiar long hammer. The axe and the adze are but sharpened hammers. Machinists use great copper hammers for work where they wish to strike blows without marring the object struck. Among the queerest hammers in use is a magnetic hammer. There was once a Yankee peddler who used one of these to great advantage. He was peddling a fancy soap. He would go into a store, pull out his advertising-card, "Buy my unequalled soap," and before the astonished store-keeper could remonstrate he would tack up one of his cards on a rafter or wall where it could not be taken down without a step-ladder. The way he did it was to hold up his card to the required spot with one outstretched arm, standing on tiptoe. He had a magnetized hammer with a long handle, and in his mouth a few tacks. He put one tack on the hammer, point outward, and with one tap sunk it into the required place to secure his card out of reach. Recently, in South Brooklyn, a tall bill-poster pursued this plan of posting advertisement-cards on telegraph-poles so high that it required the line-men to climb up the poles to get the cards down.—*New York Sun.*

Luminous Paint.—A cheap luminous paint, it is said, may be produced by thoroughly cleaning oyster-shells with warm water, putting them into the fire for an hour, and at the end of that time taking them out and letting them cool. When quite cool they should be pulverized finely, and the gray parts removed, as they are of no use. The powder so obtained is put into a crucible in alternate layers with flour of sulphur. The lid is then put on the crucible and then cemented in place with sand made into a stiff paste with beer. When perfectly dry the crucible is put over a fire and baked for about an hour, and, after having cooled, the lid is again opened, when the mass within should be perfectly white. A sifter is then made by taking a pot and putting a piece of very fine muslin very loosely across it and tying it with a string. The powder is put into the top and raked about until only the coarse particles remain. The very fine powder contained in the pot is then mixed into a fine paint, with gum-water, and the article to be made luminous is supplied with two coats of this paint. The fluid should be rather thin, since two thin applications are said to give better results than one thick one. The article coated with this paint will remain luminous for a considerable length of time, provided it has been exposed to the light during the day.—*Exchange.*

TABLE SHOWING RESULTS OF TESTS OF TRIPOLITH MORTAR.

	Composition by Weight.	Water required for Mortar.	Rise of Temperature.	Mixture set.	Test Pieces.											
					Water required for Moulding.	Specific Gravity.	Tensile Test. Breaking Load. pounds per square inch			Compression Test. (Loads in pounds per square inch).						
							7 days.	28 days.	90 days.	Cracked	Crushed	Cracked	Crushed	Cracked	Crushed
		per ct.	deg. F.	minutes.	per ct.					7 days.		28 days.		90 days.	
A	Tripolith pure,	60	4.7	10 to 13	58	1.678	170	270	335	705	985	740	985	1035	1295
B	1 tripolith, 1 fine sand,	27	44.6	15	22	2.228	188	320	375	760	930	1114	1410	1370	1640
C	1 tripolith, 1 fine sand, 1 slaked lime	50	43.	30 to 35	42	1.817	86	160	245	245	405	300	460	630	280
D	1 tripolith, 2 coarse sand,	21	44.6	10	17	2.817	150	255	295	535	730	1040	1225	1215	1395
E	1 tripolith, 1 slaked lime,	90	46.	50 to 90	87	1.615	43	77	150	140	230	205	320	455	570

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.]

266,267. AIR-PURIFIER. — Peter Breen, Cincinnati, Ohio.

266,276. SCREW-NAIL. — Henry Dunham, Abington, Mass.

266,309. WATER-CLOSET. — Charles F. Pike, Philadelphia, Pa.

266,310. COMBINED WRENCH, VISE, AND NAIL-PULLER. — Daniel R. Porter, Cambridgeport, Mass.

266,384. DEVICE FOR CLOSING WINDOWS AND DOORS. — Doyel Pearson, Memphis, Tenn.

266,385. SAW-SET AND CLAMP. — John W. Petty and James K. Petty, Omaha, Neb.

266,388. LATCH. — Augustus B. Prouty, Worcester, Mass.

266,389. LOCKING-LATCH. — Augustus B. Prouty, Worcester, Mass.

266,390. LOCK. — Augustus B. Prouty, Worcester, Mass.

266,393. HEATING-STOVE. — Ewald Schöneberg, Bockenheim, Germany.

266,404. WATER-CLOSET AND URINAL. — George E. Waring, Jr., Newport, R. I.

266,416. PNEUMATIC APPARATUS FOR REMOVING NIGHT-SOIL FROM CESSPOOLS. — Jean Baptiste Berlier, Paris, France.

266,433. VENTILATING PIPE AND COWL. — John Cooper, Boston, Mass.

266,434. SUPPLY-TANK FOR WATER-CLOSETS. — John Cooper, Boston, Mass.

266,474. VISE. — Marvin T. Henson, Pratt, O.

266,479. SAFETY-STOP FOR ELEVATORS. — John Johnston, New York, N. Y.

266,485. WASTE OR SEWER-TRAP. — Colin Lightbody, Brooklyn, N. Y.

266,498. DOOR AND SHUTTER BOLT. — Robert B. Monroe, Philadelphia, Pa.

266,502. FIRE-ESCAPE. — Allen Newhall, Brooklyn, N. Y.

266,506. STEAM-HEATING APPARATUS. — Eugene F. Osborne, St. Paul, Minn.

266,507. STAINED-GLASS WINDOW. — Eugene Oudinot, Paris, France.

266,508. ORNAMENTING GLASS FOR ARCHITECTURAL PURPOSES. — Eugene Oudinot, Paris, France.

266,516. APPARATUS FOR TREATING TIMBER WITH ANTISEPTICS. — Joseph W. Putnam, New Orleans, La.

266,519. CARPENTER'S PLOUGH. — Frank A. Rappleye, Kendaia, N. Y.

266,522-523. VISE. — Henry F. Read, Brooklyn, N. Y.

266,546. VENTILATION. — Marshall B. Stafford, New York, N. Y.

266,556. TRY-SQUARE. — Justus A. Traut, New Britain, Conn.

266,562. MANUFACTURE OF TILES. — Lewis J. Walker, East Liverpool, O.

266,570. FIRE-ESCAPE. — John B. Wickersham, Philadelphia, Pa.

266,579. AUTOMATIC FIRE EXTINGUISHER AND ALARM. — Charles E. Buell, New Haven, Conn.

266,595. SCREW AND PIPE WRENCH. — William J. Owen, Nashville, Tenn.

266,596. FIRE-ESCAPE. — John Travers, Albany, N. Y.

10,223 (*Reissue*). METALLIC SHUTTER. — George Hayes, New York, N. Y.

SUMMARY OF THE WEEK.

Baltimore.

CHURCH. — Messrs. Wm. Ferguson & Bro. have been awarded contract for building Faith Presbyterian Church, at a cost of $43,000.

WAREHOUSE. — Four-st'y and basement warehouse, 38' x 93', for W. G. Primrose, Clay St., between Park Ave. and Howard St., brick, stone trimmings; cost, $15,000; Wm. Ferguson & Bro., architects and builders.

BUILDING PERMITS. — Since our last report twenty-four permits have been granted, the more important of which are the following: —

Geo. C. Hershman, 5 two-st'y brick buildings, s w cor. Essex and Concord Sts.

Wm. Jones, two-st'y brick building, in rear of n w cor. Bank St. and Madeira Alley.

Mary A. Smith, two-st'y brick building, w s Haubert St., s of Nicholson St.

Lancaster Ould, two-st'y brick building, Garden St., between Madison and Biddle Sts.

Gantz & Ameg, 12 two-st'y brick buildings, Chew St., between Wolf and Durham Sts.

E. D. Onion, three-st'y brick building, s s Warren Ave., e of Battery Ave.

Jas. C. Fenhagen, two-st'y brick building, Alice-Anne St., between Washington and Chester Sts.

Mrs. A. Schmidt, two-st'y brick building, Booth St., between Amity and Schroeder Sts.

Henry Kontner, two-st'y brick building, Boyd St., s s, e of Callender Alley.

Boston.

BUILDING PERMITS. — *Brick.* — *London St., No.* 61, Ward 2, for Rev. J. J. Williams, two-st'y and mansard dwell., 43' 4" x 45' 4" and 50' 4"; ell, 17' 4" x 27' 10'; Jas. Devine, builder.

Columbus Ave., Nos. 157-167, Ward 11, for Franklin L. Fay, six-st'y flat mercantile, 80' x 99' 4'; M. S. & G. N. Miller, builders.

Marlborough St., No. 441, Ward 11, for Samuel T. Ames, three-st'y mansard dwell., 23' x 58'; Samuel T. Ames, builder.

Wood. — *Neponset Ave.*, near Commercial St., Ward 24, for Mary A. Vance, one-st'y pitch dwell., 20' 6" x 27' 2"; H. P. Oakman, builder.

Hamblen St., near Arlington Ave., Ward 4, for Whittemore, Woodbury & Co., one-st'y, flat manufactory for wax, 28' x 25'; Geo. M. Starbird, builder.

Dorchester Ave., near Creek St., Ward 24, for Patrick Harb, one-st'y pitch stable, 40' x 100'; one-st'y, flat storage of wagons, 16' x 135'; one-st'y flat storage of wagons, 16' x 120'.

A St., rear, near Congress St., Ward 13, for Wm. H. Dole, two-st'y flat stable, 50' x 64'.

Swett St., rear of, near Magazine St., Ward 20, for Masten & Wells, one-st'y flat storage of fireworks, 15' x 45'; Maxwell.

Shurtleff Court, near Rutherford Ave., Ward 4, for Reed Bros. & Sawin, two-st'y flat stable, 40' x 64'; 2 ells, 40' x 44'.

Gage's Wharf, near Water St., No. 89, Ward 5, for Addison, Gage & Co., one-st'y pitch storage of ice-packing materials, 129' x 129'; N. C. Mulliken builder.

Savin St., near Tupelo St., Ward 21, for Wm. Barton, two-st'y pitch dwell., 17' 3" and 20' 6" x 31' 6"; ell, 15' x 18'; Wm. Barton, builder.

Savin St., near Tupelo St., Ward 21, two-st'y pitch dwell., 22' x 31' 6"; ell, 13' x 18'; Wm. Barton, builder.

Terrace St., rear, near Heath St., Ward 22, for Boston Car Spring Co., one-st'y flat manufacturing building, 21' x 60'; T. Merriman, builder.

Sumner St., near Webster St., Ward 2, for Patrick Haynes, two-st'y and mansard dwell., 19' 6" x 34'.

Pratt St., near Linden St., Ward 25, for Isaac Pratt, Jr., one-st'y pitch dwell., 20' and 26' x 30'; W. B. Cameron, builder.

Alden Pl., near Green St., Ward 23, for James McMorrow, one-st'y pitch stable, 17' x 24'; James McMorrow, builder.

Spring Lane, near Chestnut St., Ward 23, for F. A. Heerde, two-st'y pitch dwell., 23' x 30'; ell, 19' x 19'; Jacob Luippold, builder.

Wales St., near Blue Hill Ave., Ward 24, for Cheever Newhall, two-st'y hip dwell., 29' and 36' x 34' and 41'; Chas. E. Currier, builder.

Fuller St., between Washington St. and Dorchester Ave., Ward 24, for James O'Neil, two-st'y pitch dwell., 23' x 36'.

Unnamed Pl., off Walnut Ave., near Dale St., Ward 21, for Wm. Donaldson, two-st'y pitch dwell., 20' and 23' x 28'; Wm. Donaldson, builder.

Clifford St., No. 19, near Warren St., Ward 21, for Amity B. Davies, two-st'y pitch dwell., 21' x 38'; ell., 14' 6" x 16' 6"; D. Davies & Son, builders.

West Walnut Park, No. 9, rear of, Ward 23, for Rebecca J. Spenceley, one-st'y pitch workshop, 20' x 25'; C. J. Spenceley, builder.

Dorchester Ave., No. 912, cor. Grafton St., Ward 24, for Jas. Nolan, one-st'y pitch store, 15' x 15'; Chas. Stinson & Co., builders.

Culvert St., No. 18, Ward 19, for Wm. H. McIntosh, one-st'y, pitch manufactory, 18' x 25'; W. H. McIntosh, builder.

Brooklyn.

BUILDING PERMITS. — *Wall St., No.* 16, s s, 175' e Broadway, two-st'y frame dwell., tin roof; cost, $3,500; owner and builder, Henry Bossert; architect, Th. Engelhardt.

Lorimer St., w s, 250' s Norman Ave., 5 three-st'y frame tenements, gravel roof; cost, $3,000 each; owner and builder, J. J. Randall, 126 Manhattan Ave.

Vernon Ave., s s, 135' w Tompkins Ave., 5 two-st'y brownstone dwells., tin roof; cost, each, $4,000; owners, J. Clark & Sheridan, 675 Willoughby Ave.

Fulton St., s s, 120' e Grand Ave., 4 four-st'y brownstone stores and flats, tin roofs; cost, each, $8,000; owner and builder, W. H. Aldrich, on premises; architect, R. Dixon.

Clifton Pl., s s, 200' w Nostrand Ave., 3 two-st'y brownstone dwells., tin roofs; cost, each, $4,500; owner, A. Miller, 373 Decatur St.; architect and builder, T. Miller.

Greene St., No. 200, three-st'y frame tenement, gravel roof; cost, $3,000; owner, Wm. H. Marshall; architect, Abram Gamble; builders, Pat. Newman and Post & Gamble.

Norman Ave., n s, 50' e Newell St., 2 three-st'y frame tenements, tin roofs; cost, each, $4,500; owner, John Brodie; architect, Mr. Weber.

Gates Ave., Nos. 425 *and* 427, n s, 185' e Nostrand Ave., four-st'y brick double flat and 2 stores, gravel roof; cost, $20,000; owner, Paul C. Grening, 420 Gates Ave.; architect, Amzi Hill; builder, Jas. A. Thomson.

Meserole St., Nos. 64 *and* 66, four-st'y brick brewery, tin roof; cost, $14,000; owner, Joseph Fallert, 66 Meserole St.; architect, John Platte; builder, John Auer.

Bushwick Ave., s w cor. Ainslie St., 4 three-st'y frame, 1 store and tenement and 3 tenements, tin roofs; cost, $12,000; owner, James Baird, 114 Bushwick Ave.; architect, Geo. Hillenbrand; builder, Val Bruckhauser.

Quincy St., n s, about 250' e Throop Ave., 4 two-st'y brownstone dwells., tin roofs; cost, each, about $4,000; owner, etc.; J. W. Steuart, 952 Lafayette Ave.

Fifteenth St., s s, 126' 11" w Third Ave., 5 three-st'y brick flats, felt and gravel roofs; cost, each, $3,000; owner, James S. Basley, 176 Harrison St.; architect, E. W. Sanford; builders, Van Pelt & Pierce and Leclain & Greer.

Newton Creek, w s, n of Meeker Ave., one-st'y frame shed, felt and gravel roof; cost, $3,900; owners, A. C. Kingsland & Son, 430 Fifth Ave., New York; architect and builder, John H. McCullogh.

Baltic St., s w cor. Fourth Ave., 3 three-st'y brick flats and stores, felt and gravel roof; cost, each, $6,000; owner, J. H. Whooley, Baltic St., near Fourth Ave.; architect, R. Dixon; builder, E. H. Whooley.

Willoughby Ave., s s, 335' w Marcy Ave., three-st'y brownstone dwell., tin roof; cost, about $6,000; owner, etc., S. C. Phillips, 691 Lafayette Ave.

Dupont St., n s, 275' w Oakland St., three-st'y frame tenement, tin roof; cost, $3,500; owner, Maria Moore, 51 Lexington Ave., New York; architect, Albert Lang; mason, S. Van Riper; carpenter, M. Thomas.

Ewen St., No. 178, e s, near Stagg St., three-st'y frame store and tenement, tin roof; cost, $6,000; owner, Geo. Baser, on premises; architect, J. J. Smith; builders, Jacob Rauth and Henry Ochs & Sons.

Seventeenth St., n s, 275' e Sixth Ave., 2 three-st'y brick tenements, tin roof; cost, each, $4,526; owner, Simon J. Harding, 25 Second Pl.; architect, Wm. H. Wirth; builders, George Phillips and Frederick Schroeder.

Greene Ave., s w cor. Throop Ave., 5 two-st'y brownstone dwells., and 1 two-st'y brownstone store and dwell., tin roofs; cost, each, $4,000; owner, etc., Patrick Concannon, 187 Wythe Ave.

Willoughby Ave., s s, 355' w Marcy Ave., 2 two-st'y brownstone dwells., tin roofs; cost, each, about $4,000; owner, etc., S. C. Phillips, 691 Lafayette Ave.

Hancock St., n s, 60' e Nostrand Ave., 2 three-st'y brownstone dwells., tin roofs; cost, each, $4,500; owner, Frederica M. Kinney, 418 Third St.; architects, Parfitt Bros.

Park Ave., Nos. 797 *and* 799, n s, 150' e Throop Ave., 2 three-st'y frame tenements, tin roof; cost, each, $6,000; owner, Olof Nordstrom, on premises; architect, Th. Engelhardt; builders, Geo. Straub and Eich Bros.

Smith St., No. 116, about 75' from Pacific St., four-st'y brick store and tenement, tin roof; cost, $7,500; owner, Mrs. Cath. Gaynor, Warren St.; architect, D. Laub; builders, F. J. Kelly and C. Dietrick.

Broadway, s e cor. Sumner Ave., three-st'y brick store and tenement, tin roof; cost, $8,000; owner, Louis Funk, 626 Broadway; architect, Th. Engelhardt; builders, Wm. Dafeldecker and J. Frisse.

Stuyvesant Ave., w s, 18' s Vernon Ave., two-st'y brick dwell., tin roof; cost, about $8,500; owner, M. Figueira, Flushing Ave.; architect, Fred. E. Lockwood.

Huron St., No. 177, n s, 125' from Manhattan Ave., three-st'y frame tenement, gravel roof; cost, $4,000; owner, Mr. Depold, on premises; architect, F. Weber; builders, J. Newman and Post & Gamble.

St. James Pl., w s, 100' n Lafayette Ave., two-st'y Ohio-stone chapel, slate roof; cost, $45,000; owner, Emanuel Baptist Church; architect, E. L. Roberts; builders, W. & T. Lamb, Jr., and C. L. Johnson.

Hamilton Ave., No. 340, s s, 68' e Garnet St., three-st'y brick tenement, tin roof; cost, $4,220; owner, Jacob Leeman, or Seeman, Poughkeepsie, N. Y.; architect, P. Henry Gilvarry; builders, P. Kelly & Son.

Fulton St., s e cor. Elliott Pl., four-st'y iron store and dwell., tin roof; cost, $28,000; owner, Charles Cheesborough, Northport, L. I.; architect, C. A. Snedeker; builders, T. B. Rutan and E. Snedecker.

Oakland Ave., No. 130, e s, 200' n Norman Ave., three-st'y frame tenement, gravel roof; cost, $3,300; owner, Bernard Shelton, 274 Oakland Ave., architect, A. Gamble; builders, J. Newman and Post & Gamble.

North Sixth St., n w cor. Second St., four-st'y brick tenement, tin roof; cost, $8,500; owner, John McTernan, cor. Columbia and Warren Sts.; architect, Thos. F. Houghton; builders, Matthew Smith and John Fallon.

Johnson Ave., s w cor. Old Bushwick Ave., 2 two-st'y frame stores, tin roof; cost, each, $3,000; owner, Henry A. Smith, on premises; architect, Th. Engelhardt; builders, Ulrich Maurer and M. Metzer.

ALTERATIONS. — *Raymond St., Nos.* 73, 75, *and* 77, *and* 28, 30 *and* 32 *Division St.*, add one-st'y; cost, $4,600; owner, John Lockitt, Raymond St., near Bedford St.; builders, Hartt & Boyd.

Taylor St., s w cor. Kent Ave., four-st'y brick extensions, gravel roof, etc.; cost, $3,400; owner, F. Thill, on premises; architect and carpenter, J. H. Devoe; mason, J. F. Assip.

South Fifth St., s s, 100' w Second St., one and two st'y brick extension, gravel roof; cost, $3,000; owner, Frederick C. Knowles, on premises; architect, E. F. Gaylor; builders, Jno. McQuaid and Jenkins & Gillies.

North Eighth St., between Second and Third Sts., add one st'y, tin roof, present front rebuilt, also interior alterations; cost, $4,600; owner, Chas. Kelbe, cor. Third and North Eighth Sts.; architect, A. Herbert.

Chicago.

BUILDING PERMITS. — Chas. Groat, three-st'y brick flats, 21' x 60', 371 West Wood St.; cost, $3,000.

Aug. Zender, three-st'y brick dwell., 23' x 62, 239 Bissell St.; cost, $5,000.

J. H. Gibson, two-st'y and basement brick dwell., 17' x 50', 3524 Forest Ave.; cost, $3,000.

Thos. Owen, two-st'y and basement brick dwell., 20' x 50', 135 California Ave.; cost, $3,000.

John Schneider, two-st'y and basement brick store and flats, 38' x 56', Wentworth Ave., cor. Twenty-third St.; cost, $6,000.

Sturtevant & Lutz, two-st'y brick dwell., 21' x 48', 117 Jay St.; cost, $2,600.

A. Anderson, three-st'y brick dwell., 21' x 50', 208 West Division St.; cost, $3,000.

William Temple, 2 two-st'y and basement brick dwells., 45' x 50', 95 and 97 Hill St.; cost, $7,000.

E. K. Rodgers, 3 one-st'y brick cottages, 22' x 36' each, 165, 171 and 177 McGregor St.; cost, $3,000.

Cassel, Higbee & Co., 2 two-st'y brick dwells., 37' x 40', 13 and 15 Diller St.; cost, $4,500.

P. O'Brien, two-st'y brick dwell., 25' x 47', 555 Twenty-sixth St.; cost, $3,400.

E. Fox, two-st'y and attic brick dwell., 21' x 48', 647 South Ashland Ave.; cost, $2,600.

Fred. Zapel, three-st'y brick store and dwell., 25' x 70', Clybourn Ave., near Fullerton St.; cost, $5,000.

John F. Walsh, three-st'y and basement brick dwell., 50' x 78', Nos. 1 and 3 Whiting St.; cost, $14,000.

George Keller, 2 two-st'y and basement brick dwells., 40' x 40', 133 and 135 Dearborn Ave.; cost, $20,000.

J. B. Farley, two-st'y and basement brick dwell., 22' x 56', 271 Bissell St.; cost, $4,500.

Dr. L. A. Ruehl, three-st'y and basement brick store and dwell., 24' x 66', Ashland Ave., cor. Fifteenth St.; cost, $5,000.

C. Thinger, two-st'y and attic brick dwell., 22' x 52', 117 Lincoln Ave.; cost, $4,000.

John Basch, two-st'y and basement brick dwell., 20' x 60', 292 Dayton St.; cost, $3,000.

L. Z. Leiter, additional story, 41' x 144', 241 and 243 State St.; cost, $12,000.

E. B. Smith, two-st'y brick store and dwell., 25' x 50', 3246 Wentworth Ave.; cost, $3,500.

P. J. Sexton, 5 four-st'y brick dwells., 72' x 162', 341 to 353 Chicago Ave.; cost, $50,000.

Fannie M. Boone, three-st'y brick dwell., 25' x 86', 3033 Michigan Ave.; cost, $10,000.

John Schroeder, two-st'y and basement brick dwell., 24' x 60', 634 West Twelfth St.; cost, $4,000.

John Kranz, three-st'y brick dwell., 23' x 62', 284 East Huron St.; cost, $10,000.

M. M. Rothschild, three-st'y brick flats, 19' x 74', 3200 Prairie Ave.; cost, $10,000.

S. E. Gross, 4 one-st'y brick cottages, 20' x 30' each, Illinois Ave., near Thirty-second St.; cost, $4,000.

Chas. Bithke, two-st'y and basement brick store and dwell., 24' x 70', Ogden Ave., near Taylor St.; cost, $8,000.

W. L. Moss, two-st'y brick dwell., 32' x 43', 739 and 741 Ashland Ave.; cost, $3,000.

Mary Callnan, two-st'y and basement brick dwell., 21' x 60', 457 North Ashland Ave.; cost, $4,400.

Livesey Iron Works, four-st'y and basement brick factory, 53' x 80', 38 and 40 Quincy St.; cost, $11,000.

Mary Spelina, two-st'y brick dwell., 21' x 50', 112 Farquar St.; cost, $4,000.

H. Seekamp, 2 one-st'y brick cottages, 20' x 50' each, 463 and 465 Elston Road; cost, $2,500.

L. Morrison, two-st'y and cellar brick dwell., 38' x 58', Homan St., cor. Washington St.; cost, $15,000.

Louisa J. Bangs, two-st'y and basement brick dwells., 34' x 50', 469 North State St.; cost, $11,000.

M. Jedlika, two-st'y and basement brick dwell., 27' x 30', Kossuth St., cor. Portland Ave.; cost, $5,500.

Waclar, Schery, two-st'y brick dwell., 21 'x 60', 239 Kossuth St.; cost. $3,000.

Josef Seman, two-st'y and basement brick dwell.; 20' x 56', 391 West Sixteenth St.; cost, $4,000.

F. Conrad, two-st'y and basement brick store and dwell., 24' x 60', 931 West Twentieth St.; cost, $4,000.

W. Kreuger, two-st'y brick dwell., 25' x 60', Canalport Ave., cor. Twenty-first St.; cost, $5,400.

J. G. Fisher, two-st'y brick dwell., 24' x 74', Van Horn St., cor. Ashland Ave.; cost, $3,000.

Jacob Breuner, two-st'y and basement brick dwell., 24' x 56', Laflin and Seventeenth St.; cost, $4,000.

B. Oswald, two-st'y brick dwell., 44' x 63', Paulina and Fourteenth St.; cost, $6,700.

Toolen & Maloney, two-st'y and basement brick flats, 3622 Dearborn St.; cost, $4,000.

B. F. Fitch, two-st'y brick dwell., 22' x 50', 3533 Indiana Ave.; cost, $4,000.

Dr. Clapp, four-st'y and basement brick flats, 20' x 48', 40 East Harrison St.; cost, $7,000.

St. Luke's Hospital, four-st'y brick hospital-building, 80' x 153', Indiana Ave., cor. Fourteenth St.; cost, $115,000.

Cincinnati.

BUILDING PERMITS. — During the past week the following building permits have been issued: —

C. Bare, one-st'y frame dwell., Rachael St., cor. Second Ave.; cost, $2,500.

Wm. Franz, two-st'y brick dwell., 86 Calhoun St.; cost, $4,000.

L. E. Steinman, two-st'y brick dwell., Linn St., near Liberty St.; cost, $5,000.

H. Weiman, three-st'y brick dwells., Eighth St., near State Ave.; cost, $6,000.

Six permits for repairs; cost, $2,000.

Total permits to date, 616.

Total cost to date, $1,815,300.

Detroit.

BUILDING PERMITS. — The following are the more important of the permits granted since our last report:

Brick house, No. 76 Abbott St.; cost, $3,500; Neil McArthur, owner.

Brick house, No. 461 Fourth St.; cost, $4,000; H. W. Holcomb, owner.

Two brick stores, Nos. 141 and 143 Grand River Ave.; cost, $7,000; M. W. Scovel, contractor.

Block of stores, West Woodbridge St.; cost, $40,000; A. Chapoton, Jr., contractor.

Brick warehouse, No. 227 Croghan St.; cost, $4,500; Jacob Burnstein, owner.

Elevator and freight depot, West Woodbridge St.; cost, $350,000; Union Station Co., owners.

Brick warehouse, West Woodbridge St.; cost, $4,000; Belknap & Drake, contractors.

Frame house, No. 420 Fourth St.; cost, $3,500: Stevens & Co., contractors.

Thirteen frame houses, Russell St.; cost, $6,000; J. W. Weber, owner.

Alterations to brick manufactory, No. 70 Lafayette Ave.; cost, $6,500; Mason & Rice, architects.

Brick house, Fourth St.; cost, $4,500; H. W. Holcomb, owner.

Brick house, Woodward Ave.; cost, $15,000; W. G. Vinton & Co., contractors.

Brick house, No. 33 High St., w; cost, $6,500; W. G. Vinton & Co., contractors.

Brick barn, Woodward Ave.; cost, $4,200; Wells Burt, owner.

Two brick stores, Nos. 73 and 75 Grand River Ave.; cost, $4,200; William B. Wesson, owner.

Brick house, East Forrest St.; cost, $4,500; C. W. Shippey, contractor.

Brick dwelling, No. 29 Miami Ave.; cost, $9,000; J. V. Smith, architect.

Brick store and dwell., Second St.; cost, $12,000; Donaldson & Meier, architects.

Double brick house, No. 318 Lafayette Ave.; cost, $8,000; Donaldson & Meier, architects.

Two brick houses, Canfield Ave.; cost, $16,000; A. J. Fair, owner.

Alterations to brick dwell., No. 481 Woodward Ave.; cost, $7,000; A. C. Varney, architect.

Louisville.

BUILDING PERMITS. — The following building permits have been issued since last report: —

Geo. A. Houghsten, brick dwell.; cost, $3,000.

J. Kloz, frame dwell.; cost, $2,000.

Trinity Church Congregation, brick church; cost, $3,750.

Henry Vouderheide, brick dwell.; cost, $4,500.

Mrs. W. Dunker, brick store; cost, $10,000.

M. Irwin, brick dwell.; cost, $7,000.

James F. Calloway, brick dwell.; cost, $7,500.

Fred Smith, brick dwell.; cost, $2,000.

Baptist Orphan's Home, brick dwell.; cost, $8,000.

W. J. Watkins, brick dwell.; cost, $4,000.

John Bost, brick dwell., cost, $2,000.

Martha J. Hill, brick dwell.; cost, $3,150.

James W. Osborne, brick dwell.; cost, $6,000.

J. M. Atherton, brick dwell.; cost, $20,000.

New York.

APARTMENT-HOUSES. — A novelty in co-operative apartment-houses is to be built on Twenty-third St., between Seventh and Eighth Aves. One novel feature will be the size of many of the apartments, which will range from nine to three rooms each. Every apartment will besides this have a bath-room. The smaller apartments will probably be used by bachelors, and married people without children or servants. The building will be of brick, with stone trimmings, eleven stories high, and fire-proof throughout. The entire cost of land and building will probably reach $580,000; Messrs. Hubert Pirsson & Co. are the architects. The same gentlemen are preparing plans for another apartment-house, to be eight stories high, which is to be erected on the south side of One Hundred and Thirtieth St., between Madison and Fifth Aves. The building will be of brick, with stone trimmings, 50' x 125', fire-proof throughout, and will cost $300,000.

Mr. Carl Pfeiffer is drawing plans for a large apartment-house, also on the co-operative plan, which is to be built on the corner of Sixty-second St. and Eighth Ave., of brick, stone and terra-cotta, at a cost of about $350,000.

PARTNERSHIP. — Messrs. Chas. W. Romeyn, Alfred E. Barlow, and A. J. Stever have formed a partnership under the firm style of Charles W. Romeyn & Co.

CONTRACTS. — The contract for building the "Barcelona" apartment-house has been awarded to Mr. Terence Kiernan.

The contract for laying a rock-asphalt sidewalk on Fifty-ninth St., from Eighth Ave. to Fifth Ave., and on Fifth Ave., from Sixtieth St. to Seventy-second St., has been awarded by the Park Commissioners to the New York Mastic Works.

BUILDING PERMITS. — *Orchard St., No.* 19, three-st'y brick store and dwell., tin roof; cost, $4,000; owner, Marcus Adler, 19 Orchard St.; architect, John Brandt; builders, Wolf & Lochmann.

Greene St., Nos. 37 *to* 43, 3 six-st'y brick (iron front) stores, tin roof; cost, each, $50,000; owner, Alfred Brady, Rossmore Hotel; architect, M. Odell; builder, Wm. B. Pettit.

Broadway, s w cor. Fifty-seventh St., eight-st'y brick and stone apartment-house, slate and tin roof; cost, $300,000; owner, Chas. H. Bliss, 204 East Seventy-second St.; architect, Wm. Schickel.

Sixteenth St., s s, 170' 6" w Ave. B, 6 five-st'y brick tenements, tin roof; cost, each, $10,500; owner, Ph. Braender, Ave. B and Eighty-fourth St.; architect, John Brandt.

East Twentieth St., No. 219, five-st'y brick tenement, tin roof; cost, $10,000; owner, Henry Gucker, 183 Second Ave.; architect, F. W. Klemt; builder, J. P. Schweickert.

East Forty-first St., No. 550, five.st'y brick tenement, tin roof; cost, $12,000; owner and builder, Thomas Cockerill, 350 West Thirty-sixth St.; architect, Jas. Stroud.

First Ave., e s, 21' s One Hundred and Seventh St., four-st'y brick tenement, tin roof; cost, $9,000; owner and builder, John Norton, 1945 Third Ave.; architect, Bart. Walther.

Third Ave., n w cor. One Hundred and Fifteenth St., five-st'y brick tenement, tin roof; cost, $39,000; owner, Samuel A. Purdy, Jr., 51 West Fiftieth St.; architect, G. Robinson, Jr.

Fifth Ave., e s, 25' 10" s Sixtieth St., seven-st'y brick, brownstone and terra-cotta store, tin roof; cost, $110,000; owners, Park & Tilford, 117 Broadway; architects, D. & J. Jardine.

Park Ave., e s, 51' n Seventy-seventh St., 2 five-st'y brownstone tenements, tin roof; cost, each, $25,000; owner and builder, Frank A. Sietz, 332 East Forty-second St.; architect, J. M. Dunn.

Seventy-ninth St., s s, 76' w Fourth Ave., 4 four-st'y brick and brownstone dwells., tin roof; cost, each, $20,000; owners, Anson Squires, Fourth Ave., cor. Seventy-eighth St., and J. V. S. Woolley, 75 East Seventy-ninth St.; architect, Anson Squires.

Seventy-second St., n s, 300' e Second Ave., 3 five-st'y brick tenements, tin roof; cost, each, $23,000; owner, Samuel Simmons, 13 Sheriff St.; architect, Chas. Baxter.

Seventy-first St., s s, 100' w Eastern Boulevard, eight-st'y brick factory, tin roof; cost, $65,000; owner, Edward Leissner, 828 Broadway; architect, Albert Wagner.

One Hundred and Fourteenth St., n s, 146' 6" e First Ave., five-st'y brick tenement, tin roof; cost, $15,000; owner and architect, Alfred B. Ogden, 409 East Fifty-third St.; builder, not selected.

East One Hundred and Seventeenth St., Nos. 176 *to* 182, 4 five-st'y brick tenements, tin roof; cost, each, $13,500; owner, John J. Murphy, 66 Second Ave.; architect, G. W. Da Cunha.

One Hundred and Twenty-eighth St., n s, 285 w Fifth Ave., four-st'y brick tenement, tin roof; cost, $14,000; owner and mason, Cowan Keyes, 63 East One Hundred and Twenty-seventh St.; architect, A. T. Wilson.

One Hundred and Twenty-ninth St., n s, 225' e Seventh Ave., four-st'y brick tenement, four families, tin roof; cost, $18,000; owner, Wm. Fettretch, 124 East Eighty-fourth St.; architects, Cleverdon & Putzel.

Courtland Ave., w s, 59' 2" n One Hundred and Fiftieth St., three-st'y frame dwell. and public hall, tin roof; cost, $12,000; owner, the Melrose Turn Verein, Chas. L. Roeder, President, One Hundred and Forty-seventh St., near St. Ann's Ave.; architect, Adolph Pfeiffer.

ALTERATIONS. — *Madison Ave., Nos.* 608, 610, 612 *and* 614, n w cor. Fifty-eighth St., add one st'y, also seven-st'y extension, tin roof, etc.; cost, $135,000; owner, Sarah E. L. Taylor, on premises; architects and builders, Chas. Graham & Son.

East Tenth St., No. 469, add two stories; cost, $4,000; owner, Wm. E. Uptegrove; architect, W. Jose; builders, B. Shapter and Guy Culgin.

West Thirty-second St., No. 133, four-st'y brick extension, interior alterations, etc.; cost, $10,000; owner, Frederick Ackerman, 318 President St., Brooklyn; architect, A. Craig; builder, not selected.

Washington St., Nos. 606, 608 *and* 610, two-st'y brick extension, gravel roof; cost, $4,500; lessee, W. H. Kirby, 229 East Twenty-sixth St.; architect, Wm. Graul.

Bond St., No. 49, new mansard and flat roof, and a one-st'y brick extension, also interior alterations and new front; cost, $7,500; owner, New York Free Circulating Library; architect, W. E. Worthen; builders, Wm. McLaughlin and Robert Burgess.

Philadelphia.

BUILDING PERMITS. — *Olive St., Nos.* 1236 *and* 1238, three-st'y building, 30' x 71'; C. G. McMullen, owner.

Hope St., w s, n of Somerset St., 2 two-st'y dwells., 18' x 34'; W. A. M. Fuller, owner.

Fifty-ninth St., cor. Elmwood St., three-st'y dwell., 20' x 42'; W. W. Bozarth, contractor.

Salmon St., No. 3232, 2 two-st'y dwells., 13' x 29'; Sebastian Heim.

Germantown Ave., Nos. 1317 *and* 1319, three-st'y addition to factory, 16' x 30'; McLaughlin & McNamara.

Ninth St., e s, n of Girard Ave., three-st'y factory, 25' x 56'; J. H. Riter & Co., contractors.

Hamilton St., s s, w of Thirty-third St., 2 three-st'y dwells., 16' x 68'; Pennock Bros., contractors.

Arch St., No. 224, three-st'y store, 15' x 52'; Pennock Bros., contractors.

North Fifth St., No. 2637, three-st'y dwell., 18' x 52'; David Zimmerman.

North Second St., No. 1805, three-st'y dwell., 20' x 32'; Jno. Cairns, contractor.

Twentieth St., e s, n of Dickerson St., 6 two-st'y dwells., 16' x 42'; Thos. H. Hay.

Mascher St., e s, s of Oxford St., five-st'y factory, 50' x 80'; A. B. Rorke, contractor.

Huntingdon St., s s, n s Fox St., between Sepviva and Tulip Sts., 5 two-st'y dwells., 12' x 28' and 18' x 40'; W. H. Greenfield, owner.

Fox St., No. 605, three-st'y dwell., 15' x 34'; Pauline Wolf, owner.

Thirtieth St., e s, s of Poplar St., 8 two-st'y dwells., 15' x 26'; W. H. Bilyeu, owner.

Noble St., No. 146, four-st'y factory, 26' x 66'; Jas. Hood.

Front St., w s, n of Girard Ave., three-st'y dwell., 20' x 42'; Wildey & Gardy, contractors.

Tioga St., s s, e of Nineteenth St., 6 three-st'y dwells., 20' x 60'; P. J. Essex & Co.

Fifteenth St., e s, between Reed and Dickinson Sts., 2 three-st'y dwells., 16' x 50'; W. R. Machett, owner.

Dickinson St., s s, w of Broad St., 5 two-st'y dwells., 15' x 48'; W. R. Machett, owner.

Walnut St., Nos. 335, 337 *and* 339, six-st'y office-building, 50' x 106'; Marriner & Buckingham, contractors.

Myrtle St., s e cor. Holly St., 4 three-st'y dwells., 16' x 44'; Lewis C. Smith, contractor.

Winton St., s s, w of Sixth St., two-st'y dwells., 14' x 28'; Smith & McHenry, contractors.

Huntingdon St., s s, w of Fourth St. and e of Leithgow St., s of Huntingdon St., 11 three-st'y and two-st'y dwells., and 2 stores, 16' x 50'; E. J. Devlin, owner.

North Fifth St., No. 2639, two-st'y dwell., 18' x 50'; E. Schmidt, contractor.

Hancock St., w s, n of Huntingdon St., one-st'y dye-house, 46' x 66'; Wm. Steel, contractor.

Huntingdon St., n s, between Second and Hancock Sts., two-st'y office, 16' x 60'; Wm. Steel, contractor.

Hamilton St., s s, e of Eighteenth St., one-st'y shop-building, 30' x 100'; Baldwin Locomotive Works, owner.

Twenty-seventh St., s w cor. Jefferson St., 6 three-st'y and two-st'y dwells., 14' x 26'; J. Bryan, contractor.

Manton St., e s, n of Jefferson St., two-st'y dwell., 18' x 38'; Jos. Hutton.

Shackamaxon St., n w cor. Girard Ave., 4 three-st'y dwells., 18' x 33'; R. R. Hall, contractor.

Ash St., s e cor. Moyer St., 5 dwells., 1 three-st'y store and 4 two-st'y dwells., 18' x 38'; J. S. Baldt & Son, contractors.

Haines St., w s, s of Chestnut Hill Railroad, 2 two-st'y dwells., 15' x 28'; Wm. Kohl & Co., contractors.

Howard St., s s, bet. Norris and Berks Sts., two-st'y dwell., 18' x 40'; Jas. McCartney, contractor.

Tioga St., n w cor. Smedley St., 3 two-st'y dwells., 13' x 28'; Benj. Walker, contractor.

Orthodox St., s s, w of Race, (Frankford), two-st'y dwell., 16' x 30'; Benj. Taylor, contractor.

North Twenty-second St., No. 1705, dwell., 18' x 27'; A. Hindle, contractor.

C St., e s., n of Cumberland St., and w s Fairhill St., n of Cumberland St., 6 two-st'y dwells., 16' x 46'; Amos D. Kennedy, owner.

Cambridge St., s s, bet. Carlisle and Fifteenth Sts., 4 three-st'y dwells., 17' x 40'; Jas. V. McGarvey, contractor.

Diamond St., No. 116, two-st'y stable, 27' x 50'; Jas. V. McGarvey, contractor.

Taggart St., w s, n of Otis St., two-st'y dwell., 14' x 30'; Thos. L. Kelley, contractor.

Orkney St., w s, 126' s of Indiana St., two-st'y stable, 15' x 40'; Thos. L. Kelley, owner.

Chelton Ave., w of Green St., (Germantown) two st'y dwell., and back building, 22' x 61'; Chas. Rupp, contractor.

Howard St., cor. of Huntingdon St., 2 three-st'y dwells., 17' x 45'; Jos. Lougham, owner.

THE AMERICAN ARCHITECT AND BUILDING NEWS

ADVERTISERS' TRADE SUPPLEMENT.

No. 8. SATURDAY, NOVEMBER 4, 1882. VOLUME XII. No. 358.

FIRE ON THE HEARTH.

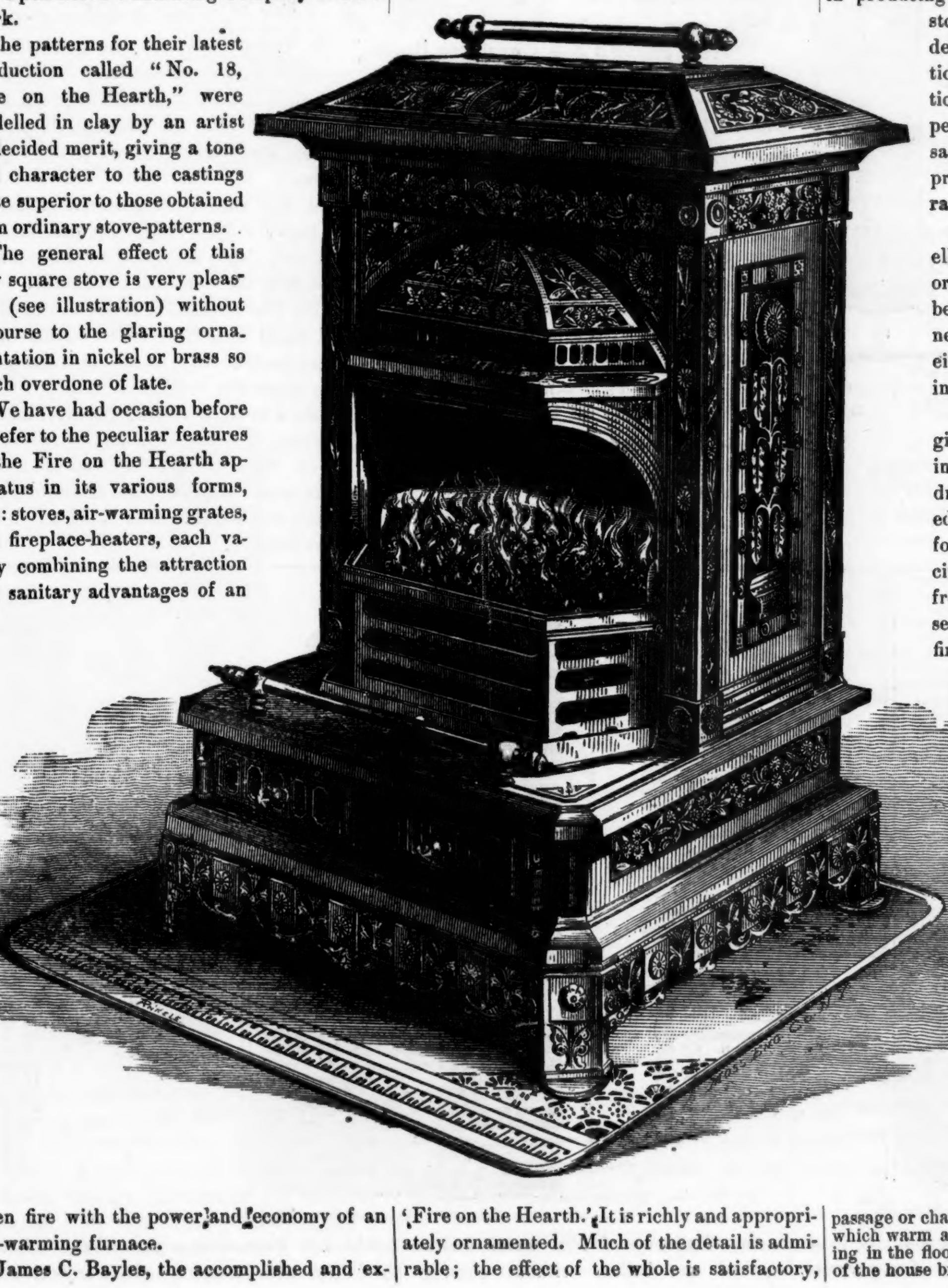
WE take pleasure in referring to a significant departure in the line of stove architecture by the Open Stove Ventilating Company of New York.

The patterns for their latest production called "No. 18, Fire on the Hearth," were modelled in clay by an artist of decided merit, giving a tone and character to the castings quite superior to those obtained from ordinary stove-patterns.

The general effect of this new square stove is very pleasing (see illustration) without recourse to the glaring ornamentation in nickel or brass so much overdone of late.

We have had occasion before to refer to the peculiar features of the Fire on the Hearth apparatus in its various forms, viz.: stoves, air-warming grates, and fireplace-heaters, each variety combining the attraction and sanitary advantages of an open fire with the power and economy of an air-warming furnace.

James C. Bayles, the accomplished and expert editor of the *Metal Worker*, says: "The Open Stove Ventilating Company have brought out something exceedingly good in their new 'Fire on the Hearth.' It is richly and appropriately ornamented. Much of the detail is admirable; the effect of the whole is satisfactory, and the stove is a strong heater." We predict a "survival of the fittest."



We have spared neither pains nor expense in producing this new and elegant form of stove (our No. 18), and are confident that our efforts in this direction will meet with hearty recognition among all those who have experienced the superior merits and sanitary advantages heretofore presented by our F. O. H. apparatus.

The patterns have been modelled in clay by an artist of high order, and improvements have been introduced which add to its neatness, convenience and efficiency. It may be trimmed either in brass or nickel.

The central idea which gave origin to the "Fire on the Hearth" in all its varieties, has been the drum above an open fire, surrounded by a shell so constructed as to form a capacious chamber for the circulation of a large quantity of fresh air, moderately warmed, thus securing all the ventilation of a fireplace, with the circulation, comfort and economy of a warm-air furnace, while at the same time, by applying the blowers, the apparatus can instantly be converted into a close heater, adequate for any emergency of temperature.

We herewith give an extract from the *Popular Science Monthly*, undoubted authority on the subject:

"The best contrivance we have seen is the ventilating stove or fireplace known as the 'Fire on the Hearth.' This combines the advantages of a stove within the room to warm by radiation, a grate giving an open fire, which is prized by many, and a passage or chamber open below and above, through which warm air ascends into the room. An opening in the floor with a duct leading to the outside of the house brings in a supply of fresh air which is passed through the stove warmed, and streams into the apartment. We have tried this stove and found it satisfactory both as a heater and ventilator. We used one of moderate size, which, as tested by the anemometer, gave from eight to ten thousand cubic feet of air per hour in the room, and thus secured excellent ventilation. The difference between an ordinary stove and this ventilating stove in an unoccupied apartment was most marked to all the inmates."

Professor E. L. Youmans (author of Youmans' Chemistry, Household Science, etc., etc., Editor of *Popular Science Monthly*), in speaking of the F. O. H. stove, says:

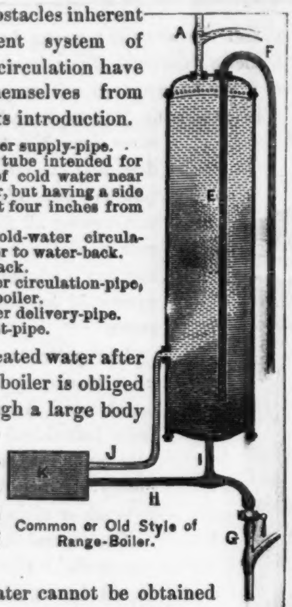
"*It is easy to heat an apartment, but to warm it uniformly by an inexpensive contrivance that secures at the same time an abundant supply of fresh air, is a desideratum that has not, as I am aware of, been previously attained.*

"Being specially constructed to promote an active circulation of air in the room, *it secures the equalization of temperature by this means in an unusual degree.*"

OPEN STOVE VENTILATING CO.,
76 BEEKMAN ST., NEW YORK.

A NEW RANGE-BOILER CIRCULATION.

SERIOUS obstacles inherent in the present system of range-boiler circulation have presented themselves from the date of its introduction.

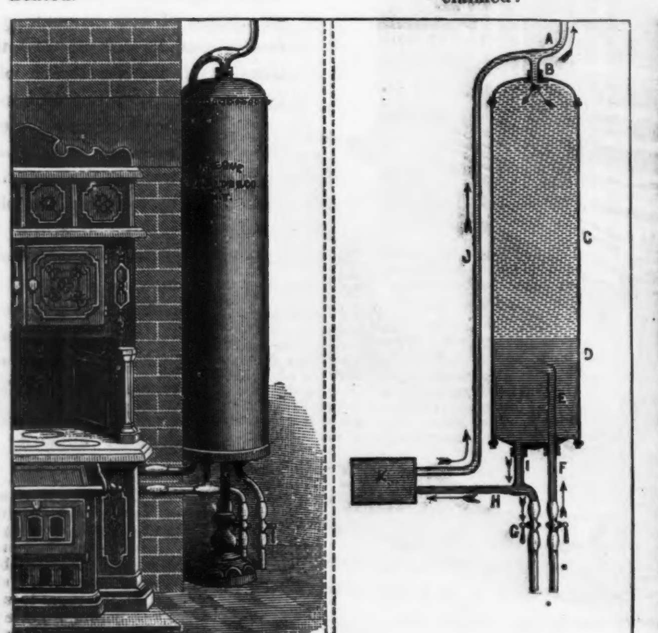


Common or Old Style of Range-Boiler.

F. — Cold-water supply-pipe.
E. — Interior tube intended for the discharge of cold water near bottom of boiler, but having a side hole in it, about four inches from top of boiler.
I and H. — Cold-water circulation-pipes, boiler to water-back.
K. — Water-back.
J. — Hot-water circulation-pipe, water-back to boiler.
A. — Hot-water delivery-pipe.
G. — Sediment-pipe.

1st. The heated water after entering the boiler is obliged to pass through a large body of cold water before reaching its appropriate place at the top of the boiler.

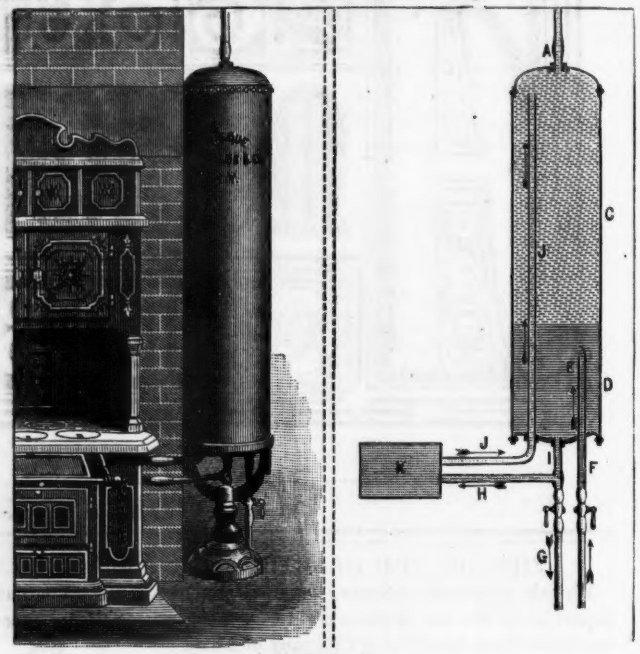
2d. Hot water cannot be obtained from the boiler until two-thirds or more of the contents of the boiler is heated.


Style No. 1.

3d. The circulation is not positive in direction or rapid in action, as it often reverses.

4th. Reversals of circulation are highly detrimental to a boiler; the sudden expansion and contraction of the boiler-shell soon causes it to leak, and tends to its rapid destruction.

5th. The orifice in the interior tube, about four inches from the top of the boiler, is intended to prevent siphonage of the water, whereas it is the prime cause of collapse in copper boilers, acting similarly to a jet condenser, — cold water being forced suddenly through the orifice into a body of steam, condensing it, creating a vacuum, and consequent collapse.


Style No. 2.

Creque's patented New Circulation Range-Boilers, manufactured by Messrs. Creque, Ronalds & Co., of New York, obviate these difficulties.

The principles involved in their new system are extremely simple, as may be observed in accompanying diagrams. Cold water is supplied at the bottom of the boiler, while hot water is injected into the top of the boiler.

This system of circulation has never reversed its action; the hot-water circulation-pipe being connected with the distributing-pipe in some styles, in others placed adjacent thereto, hot water can be drawn as soon as the water-back is heated. The hottest water will be always the first to be drawn, whether it is from the water-back or the boiler.

The following are some of the advantages claimed:

1st. Delivery of cold water at the *bottom* of the boiler, without chilling the heated water at the top of the boiler.

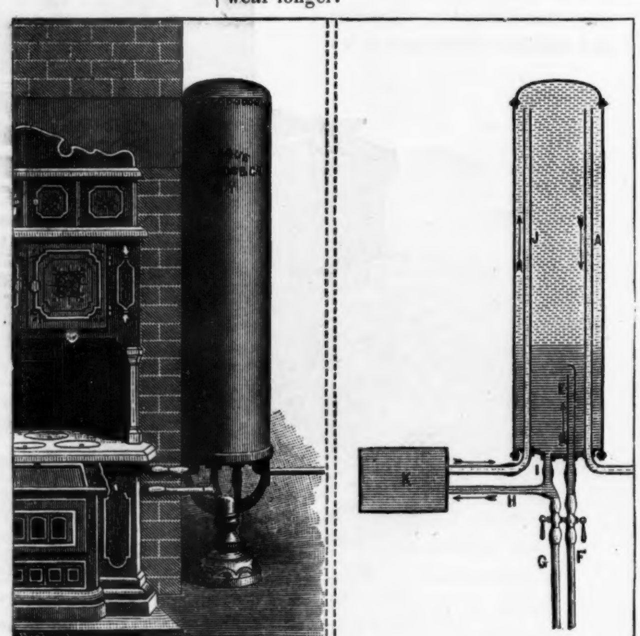
2d. Hot water is injected directly into the *top* of the boiler, the proper place for its accumulation, instead of at the side, near the bottom of the boiler, thus avoiding the chilling of the hot water in its passage to the top of the boiler.

3d. Hot water being stored at the top of the boiler without chilling, it can be used immediately; thus making the boiler serviceable as soon as the water-back is heated.

4th. The circulation is positive in direction and rapid in action, which enables a given water-back to fill a boiler with hot water in very much less time.

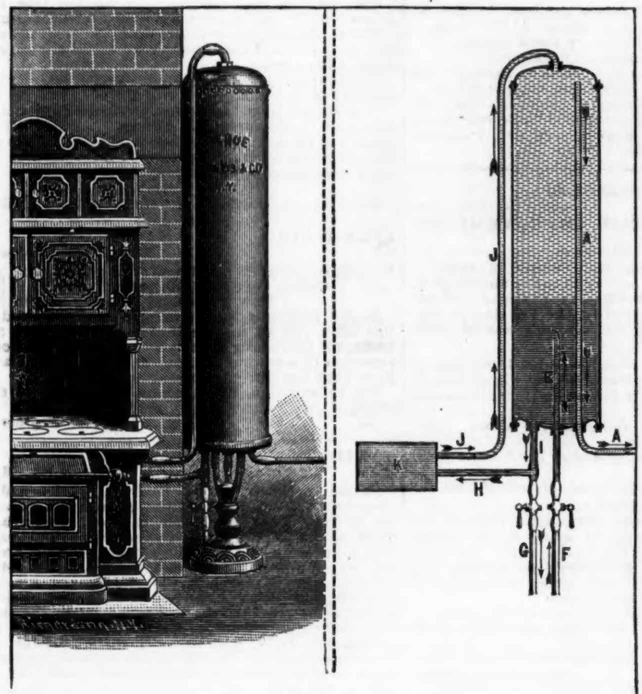
5th. Circulation being positive, there is no cracking, snapping or rumbling in the boiler.

6th. There being no reversal of circulation, there is no sudden expansion and contraction of the boiler-shell. The boiler will therefore wear longer.


Style No. 3.

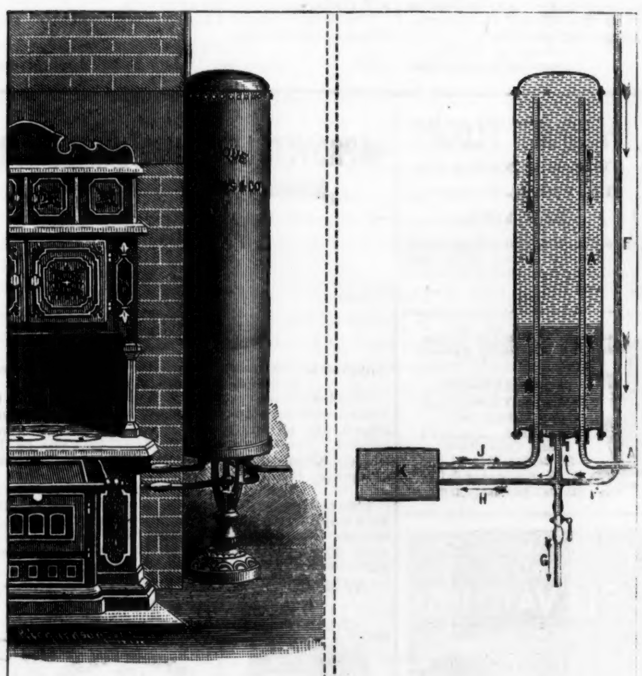
7th. In case of a part of the boiler being filled with steam, a sudden injection of cold water does not condense it, as the cold water supply is at the *bottom* of the boiler, thus forcing the heated water above it to fill the space left by escaping steam, when a hot-water cock is opened.

8th. A considerable saving in material and labor in cost of setting up the boiler and connecting pipes.



Style No. 4.

9th. The circulation being rapid in its action, the boiler is not liable to scale, hence it will last longer.



Style No. 5.

10th. Less care and trouble need be exercised in setting the boiler, as a variation in the level, (either above or below the water-back,) of the circulation-pipes connecting boiler with the water-back, does not interfere in the least with the circulation, or cause the boiler to snap and rumble, as in the old style of boilers. This very desirable feature will be welcomed and appreciated by all plumbers.

Unlike the old style of boiler, Creque's circulation has been arranged, by various styles of boilers, to meet every conceivable requirement of location or condition. To both the plumber and architect this is a great advantage, while it also lessens the cost to the builder.

These boilers have been in constant use for the past year, and have fully demonstrated all that is claimed for them.

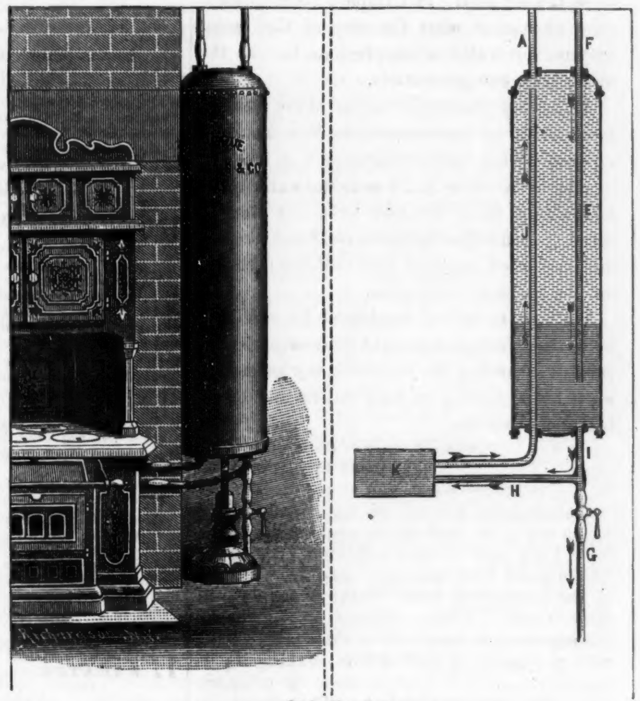
Boiler No. 1 is more especially designed for situations where the hot water is to be delivered on floors above the boiler. It has only three connections; two located in the bottom, one at the top.

F.—Cold-water supply-pipe.
E.—Interior tube for the prevention of siphonage.
H.—Cold-water circulation-pipe from bottom of boiler to water-back.
K.—Water-back.
J.—Hot-water circulation-pipe, from water-back to top of boiler.
B.—The connection device, for injection of the water into boiler, and discharge of hot water from boiler into hot-water delivery-pipe *A.*
A.—Hot-water delivery-pipe.
G.—Sediment-pipe.

Boiler No. 2 is designed for situations where no piping is desired about the boiler sides, and where the hot water is to be delivered on floors above the boiler. It has three connections at bottom and one in top.

F.—Cold-water supply-pipe.
E.—Interior tube for the prevention of siphonage.
H.—Cold-water circulation-pipe from boiler to water-back.
K.—Water-back.
J.—Hot-water circulation-pipe from water-back to interior of boiler, at the top.
A.—Hot-water delivery-pipe.
G.—Sediment-pipe.

Boiler No. 3 has four connections, all located at the bottom.



Style No. 6.

F.—Cold-water supply-pipe.
E.—Interior tube for the prevention of siphonage.
H.—Cold-water circulation-pipe from bottom of boiler to water-back.
K.—Water-back.
J.—Hot-water circulation-pipe from water-back to interior of boiler at the top.
A.—Hot-water delivery-pipe from interior of boiler at top to discharge-orifice.
G.—Sediment-pipe.

Boiler No. 4 has four connections; three at the bottom and one at the top, and is intended for use in French flats or apartment-houses, where the hot water is to be used on same floor with the boiler.

F.—Cold-water supply-pipe.
E.—Interior tube for the prevention of siphonage.
H.—Cold-water circulation-pipe from bottom of boiler to water-back.
K.—Water-back.
J.—Hot-water circulation-pipe, from water-back to top of boiler.
A.—Hot-water delivery-pipe from interior of boiler at top to point of discharge.
G.—Sediment-pipe.

Boiler No. 5. This style is especially designed for buildings having a tank-supply, and where the hot water is to be used on same floor with the boiler. It has three connections, all located in the bottom.

F.—Cold-water supply-pipe discharging into cold-water circulation-pipes *I* and *H.*
I.—Cold-water circulation-pipe, connecting cold-water supply-pipe *F* with boiler; also connecting boiler with cold-water circulation-pipe *H*, and connecting boiler with sediment-pipe *G.*
H.—Cold-water circulation-pipe connecting cold-water supply-pipe *F* and cold-water circulating-pipe *I* to water-back.
J.—Hot-water circulation-pipe from water-back to interior of boiler at top.
A.—Hot-water delivery-pipe from interior of boiler at top to point of discharge.
G.—Sediment-pipe.

Boiler No. 6. This style is adapted for buildings using a tank-supply; it has two connections in both its top and bottom.

F.—Cold-water supply-pipe, discharging into bottom of boiler.
H.—Cold-water circulation-pipe from boiler to water-back.
K.—Water-back.
J.—Hot-water circulation-pipe from water-back to interior of boiler at top.

A.—Hot-air delivery-pipe.
G.—Sediment-pipe.

In the old style of circulation, the larger the boiler the longer the time it required before hot water could be drawn. For instance, in a 30-gallon boiler 20 gallons of cold water had to be heated before hot water could be drawn. In a 60-gallon boiler 40 gallons had to be heated first. In Creque's New Circulation, no matter what the size of the boiler may be, hot water is supplied as fast as the water-back can generate it.

At a very thorough test of these boilers, lately made by some experts in New York, an air-trap of ten inches diameter was inserted in pipe *J* on boiler No. 1 near the water-back, and within three minutes from the time of starting the fire the circulation had commenced, and remained positive and uniform throughout the balance of the trial.

We have unlimited confidence in our new boiler, and furnish a printed guaranty with all sales, warranting the material, workmanship, economy of setting up, and satisfactory circulation and service.

CREQUE, RONALDS & CO.,
54 CLIFF ST., NEW YORK.

CONTRACTS for all of the iron railings which are to be used on the approaches to the New York and Brooklyn Bridge, specify the "Composite Iron Railings," and are awarded to the Composite Iron Works Company, of New York. These railings are made by joining wrought-iron rods at their intersection with ornaments of chilled-iron, making a perfect union, which is impervious to moisture and consequent oxidization. The shrinkage of the chilled metal serves to hold all the parts firmly in place, and each panel is like one welded piece of work.

WE hope that Messrs. Bissell & Co., of Pittsburgh, will soon enable us to lay before our readers an illustrated description of their "Peerless Grates," and the method of setting them.

BUILDING INTELLIGENCE.

General Notes.

ALLSTON, MASS.—Mr. E. A. P. Newcomb is the architect of a house for H. S. Richardson, Esq., measuring 45′ x 80′. It will be a frame building, costing about $12,000; C. W. Bowers, builder.

BURLINGTON, N. J.—House for F. S. Carter, to be of frame and brick; cost, $75,000; Geo. Hewitt, architect, Philadelphia.

SWAMPSCOTT, MASS.—Mr. J. P. T. Edwards will build at the junction of Atlantic Avenue and Orient St., a cottage costing about $7,000; Mr. S. J. F. Thayer, architect, Boston.

STONY POINT, N. Y.—Cottage for Geo. S. Allison; cost, $4,500; architect, H. G. Knapp, of New York.

THOMASVILLE, GA.—Three-st'y brick house; J. L. Finn, owner; Bruce & Morgan, architects.

TALBOT CO., MD.—Three-st'y frame cottage for Chas. Windser; cost, $6,000; Wyatt & Sperry, architects.

WATERLOO, IA.—The Building Association have under way a block of nine two-st'y brick residences, each, 20′ x 50′; F. D. Heycle, architect, Dubuque, Ia., furnished the plans.

PROPOSALS.

RIVER AND HARBOR IMPROVEMENTS.

UNITED STATES ENGINEER OFFICE,
PORTLAND, ME., October 22. 1882.

Proposals in duplicate, addressed to the undersigned, will be received at his office in Portland, Maine, **until 2.30 P. M., on Tuesday, the 7th day of November**, for improving the following named rivers and harbors, viz.:

1. *Newburyport Harbor, Mass.*—About 15,000 tons of *rubble-stone* for the southern jetty at Plumb Island, and the construction of a *dike* about 700 feet in length across "the basin."
2. *Lamprey River, New Hampshire.*—About 13,000 cubic yards of *dredging*.
3. *Cathance River, Maine.*—About 13,000 cubic yards of *dredging*.
4. *Moose-a-bec Bar, at Jonesport, Maine.*—About 25,000 cubic yards of *dredging*.

Persons desiring to make proposals for any of the above works, are requested to apply to the undersigned, at his office, No. 453½ Congress St., Portland, Me., for specifications, instructions to bidders, and the requisite blanks, and such further information as may be desired concerning the same.

GEO. THOM, Colonel of Engineers,
358 Bvt. Brig. General, U. S. A.

LOW-PRESSURE STEAM-HEATING APPARATUS. [At Boston, Mass.]

OFFICE OF SUPERVISING ARCHITECT,
TREASURY DEPARTMENT,
WASHINGTON, D. C., October 25, 1882.

Sealed proposals will be received at this office until **12 M., on the 22d day of November, 1882**, for supplying and fixing in place the low-pressure steam-heating apparatus required for the post-office and sub-treasury extension at Boston, Mass., in accordance with drawings and specification. Copy of specification and any additional information may be had on application at this office or the office of the superintendent, where the drawings may be seen.

JAS. G. HILL,
359 Supervising Architect.

PROPOSALS.

WROUGHT-IRON BEAMS AND OTHER IRON. [At Rock Island, Ill.]

ROCK ISLAND ARSENAL, ILL., October 7, 1882.

Sealed proposals are invited to deliver on board cars at this Arsenal the following wrought-iron beams and other iron:

About 700 tons of 15-inch, 12-inch, 9 or 10½ inch and 4-inch wrought-iron beams; 35 tons of 7-inch deck-beams; 16,000 lbs. of 6-inch channel-bars, 22½ lbs.; 15,000 lbs. T-iron; 6,000 lbs. angle brackets; 16,000 lbs. flat iron, various sizes.

Full bills of and specifications for the iron and forms for bids can be obtained from the undersigned.

The successful bidder must enter into contract and give good and sufficient bonds for a faithful performance of the same.

The contractor can have until April 1, 1883, for the delivery of the iron.

Bids should be addressed to the undersigned and be endorsed "Proposals for Beams." Bids will be opened **at 10, A. M., November 8, 1882.** Bidders are invited to be present. The United States reserves the right to reject any and all bids.

D. W. FLAGLER,
358 Lt.-Col. of Ordnance, Commanding.

SEA WALL. [New York Harbor.]

U. S. ENGINEER OFFICE, Room 59 Army Building,
Corner Houston and Greene Sts.,
NEW YORK CITY, October 10, 1882.

Sealed proposals, in duplicate, will be received at this office **till 12 M., Wednesday, November 22, 1882**, for furnishing materials and labor for the construction of a granite sea wall on Governor's Island, New York Harbor. Appropriation, $39,000.

For information, blank forms, etc., apply at this office.

G. L. GILLESPIE,
359 Major of Engineers.

BRIDGE. [At Kansas City, Mo.]

Sealed proposals will be received by the undersigned at his office, 509 Delaware Street, **up to noon, on Wednesday, the 15th day of November, 1882**, for furnishing all of the materials and doing all of the work necessary for constructing and erecting all of sub-structure and superstructure of a wrought-iron bridge and two wooden approaches over Big Blue River on the line of Blue Ave. Bridge to be 140′ long to centres, to contain 24′ in the clear for roadways, and head-room 22′, the wooden approaches to be 24′ wide in the clear for roadway, the eastern approach to be 60′ and the western approach to be 30′ long; trusses to have parallel cords and inclined end posts, and be proportioned to carry live load of 70 pounds to the square foot.

Specifications for the sub-structure can be furnished on application.

All proposals to be accompanied by plans of structure proposed, showing size, weight and details, together with strain, etc.

Bidders will state when they will commence to deliver the materials on the ground, and the time they will require to finish the structure.

The right is reserved to reject any or all bids of interest to the county.

DANIEL O'FLAHERTY,
358 *Ex-Officio* County Bridge Commissioner.