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CONTENTS.

A CORRESPONDENT in San Francisco writes us, saying that the effort to form a Chapter of the American Institute of Architects on the Pacific coast will, he fears, end in the establishment of a merely local society, through what appears to be a misunderstanding of the constitution of the Institute. The committee appointed to communicate with the officers of the Institute reported that no regular meeting would be held for three months, and the feeling among those interested in the projected chapter seemed to be, very naturally, that so long a delay might result in the abandonment of the whole scheme. It is true that the regular meetings of the Trustees of the Institute are held only quarterly, but nothing would be easier than for the California architects to form a provisional body which could be erected into a chapter in due form at the first opportunity. We hope we need not urge upon the reputable members of the profession on the Pacific coast the advantages of being in some regular relation with their fellows throughout the country. Slight as is the personal intercourse between the widely scattered members of the Institute, there are many occasions when the mere familiarity with a name on its catalogue serves the owner as a recommendation which may be of much service to him, while the correspondence which members of committees are obliged to maintain often forms an introduction to the pleasantest relations. The By-laws of the Institute furnish also another means of promoting the mutual advantage of its members, by providing that the secretary of each chapter shall send reports of its meetings to every other chapter. This rule is, unfortunately, not so sharply enforced as it might be, but if the San Francisco architects would set the example of strict compliance with it, we are sure that their monthly or fortnightly communications would be looked for with much pleasure in the societies beyond the mountains, and hope that the frequent accounts of the doings of their Eastern brethren would interest them in return.

A VERY singular circumstance has been noted in regard to Memphis, which causes a good deal of anxiety to those who hoped for excellent results from the complete and scientific system of drainage so recently carried out there. According to the New Orleans *Picayune*, the death-rate for the first three months of the present year at no time fell below thirty-one and two-tenths in the thousand, and rose once to nearly fifty-nine per thousand, the average being forty-one. The average in New York during the same period was thirty and six-tenths, and in New Orleans twenty-nine and five-tenths. Those who find reason in these statistics for calling Memphis a "pest-house," and for speaking of its "pestilential power," should, however, recollect that the winter months are those in which zymotic or "pestilential" influences are generally quiescent, and that there is no proof that this great mortality was the result of such causes; while it may, and probably should be attributed mostly to the unprecedented severity of the winter, which was felt with peculiar keenness in Tennessee, as in the other portions of the middle belt of States, whose inhabitants were wholly unprepared for the bitter cold of the past six months, and were generally unprovided with proper clothing or shelter. Every physician knows that the effect of such a prolonged strain upon the vital powers of resistance is sure to be followed by the decimation of the feeble ones, and if no outbreak of cholera or yellow fever should occur before the first of October, it may well be claimed that the new drainage system has accomplished all that was expected of it.

THE United States Electric-Light Company, which now controls the Maxim patents for incandescent lamps, is making preparations for extending its operations in New York. The recent trials of the incandescent lamps in the Union and Union League Clubs have proved very satisfactory, and the company is, or soon will be, ready to introduce them in private houses, to replace gas-lights. Already several offices in the vicinity of Wall Street have been fitted with them, and the company proposes to make a standing offer to replace the gas-burners in any private establishment with its apparatus, and supply light at the same price that the proprietor would have to pay for gas. It is claimed that the electric light can be furnished at much less than half the cost of gas, but the company believes that it will be generally preferred at the same, or even a higher rate, and a liberal margin will by this arrangement be left to provide against the competition which is sure to arise before long. On account of the failures which are apt to occur with any incandescent apparatus yet constructed, several spare lamps will be allotted to each consumer, and imperfect ones can be replaced with no more trouble than would be incurred in changing a broken glass chimney. In a few weeks the company expects to have a thousand men at work, manufacturing apparatus, and the introduction of the new light will be a rapid process. We have heard recently of several architects who, anticipating future needs, have had insulated wires, suitably arranged for the supply of electric centre-lights and brackets, carried throughout the houses under their care at the stage when they could most readily be hidden behind the plastering; and no doubt the owners will have reason to thank them for this timely prevision.

THERE seems to be an increasing probability that the projected railroad between Cambridge and Boston will be built, if at all, through the most densely populated portion of both cities, where, although the cost will be large, the return on the capital invested will be far surer and more ample. During the discussion which at one time promised to end in the adoption of some cheap route through the salt-marshes or among the squalid districts of the Somerville border, to enter Boston over the tracks either of the Fitchburg or Albany roads, it is a little singular that no one should have called to mind the history of the "Harvard Branch" of the Fitchburg Railroad, which was built from Somerville to Harvard Square about twenty-five years ago, but never paid expenses, and was soon abandoned. It is by no means improbable that the same fate would even now overtake a road built through a similar sparsely settled region with a view primarily to cheapness, to improving the value of neglected real estate, or to anything else but the transportation of as many passengers as possible. Whether a terminus can be secured in Pemberton Square seems doubtful, although it would be extremely desirable, and the mere fact of possessing a station so conveniently situated would go far toward insuring the success of any suburban line. Since the rejection of the elevated-railroad schemes a considerable reaction has begun in favor of increasing by other means the facilities for communication between the centre and circumference of the urban district which really constitutes Boston. To the demands that the existing lines shall add to the number of their trains the reply is given that they already conduct their suburban business at a loss, and cannot afford to furnish better accommodation; and to secure what cannot be obtained from them it is proposed to construct a network of narrow-gauge lines, lightly built and equipped, which can make a profit in conveying passengers at half the rates now demanded, and will find it for their interest to devote themselves to the development of the business to its highest possible point. For the terminus of such a system of roads extending northward and westward from the city Pemberton Square is admirably adapted, and if the Cambridge line can acquire the right to this, it will hardly be many years before the use of the eastern end of its line, with its tunnel and station, will be sought by a dozen other corporations, and the vast traffic of the horse-railways, which centres in Tremont Street, a stone's throw away, will be surpassed by the bustle of continual arrivals and departures by the quick and light suburban trains from a circle of a little larger radius.

The prospect of a World's Fair in New York two years hence is rapidly fading away, notwithstanding the offer which is said to have been made by some railroad company, to buy the Main Building at Philadelphia and transport it in sections to New York, to be set up there for renewed use. This economical plan has its merits, and it would be easy to remodel the great structure so completely as to save it from anything of a second-hand look; but the general apathy with which the project has come to be regarded, due, perhaps to the prolonged dissensions among its promoters, presages its total abandonment, especially since the time is already so advanced that it would be very difficult to carry out the necessary operations of construction before the appointed day. A rather unexpected turn has been given to the thoughts of those who interest themselves in such matters by a proposition of General C. B. Norton, who has, by his official connection with the more important of the great expositions since 1876, gained an extended knowledge of the circumstances necessary to their success, that the next international fair should be held in Boston, in 1885. It happens that two independent, and in some respects rival corporations, the Mechanics' Charitable Association and the New England Manufacturers' and Mechanics' Institute, are at this moment erecting immense buildings, both fronting on Huntington Avenue, and less than a third of a mile apart, intending to use them for occasional exhibitions; and General Norton proposes to connect these two permanent structures by a vast temporary gallery, approaching in dimensions the Main Building of the Centennial Exhibition, the materials of which might, indeed, be used for the purpose; thus obtaining a well arranged series of suitable and spacious halls at a minimum of expense, and in a situation singularly central and accessible. Boston has of late years been sinking so contentedly into the position of a third-rate city that its inhabitants will be perhaps more surprised than any one else to learn that General Norton considers it, by its situation with regard to ocean transportation, as well as its facilities for communication with all parts of the Western Continent, to be a peculiarly favorable place for such an enterprise, while the manufactories of New England would alone furnish a respectable and interesting show.

Contracts have actually been made for the second great bridge which is to cross the East River from New York to Long Island. The Brooklyn suspension bridge having proved to be unfit for railway use, a second bridge, intended expressly for steam trains, had begun to seem almost a necessity, and in order to secure as much stability as possible, a point was some years ago selected at which it would be practicable to divide the span by several piers. The New York end of the bridge will be at Seventy-seventh Street, crossing to the coal dock at Blackwell's Island in one span. A second pier stands on the eastern shore of the Island, from which the bridge extends to a point near the Long Island shore at Ravenswood, gaining the firm land by another short span. By means of the bridge close connection will be made between the Long Island Railroad and the New York Central and New Haven lines. There has been a rumor of projected improvements at Montauk Point, near the eastern end of Long Island, by which this little fishing settlement would be made a stopping-place for ocean steamers both eastward and westward bound, bearing the same relation to New York that Queenstown now does to Liverpool, or that Milford Haven is intended soon to occupy toward London; and possibly the new bridge may play a part in this scheme.

The "Monroe-Hayes doctrine," as the newspapers persist in calling a rather obscure collection of somewhat unmeaning phrases, has been under consideration again in the United States Senate, where a resolution has been proposed, and is likely to be adopted, announcing that the interests of the people of this country are so involved in the subject of the construction of ship-canals across the Isthmus of Panama that their Government formally declares its intention to insist that its consent is a necessary condition precedent to the execution of any such project, and that it must also be consulted in regard to the regulations under which other nations may participate in the use of such canals or other means of communication. The adoption of this resolution is said to be rendered necessary by the progress of M. de Lesseps's operations at Panama. Perhaps we underrate the dignity of the United States Senate, but it seems to us at least possible that M. de Lesseps might hear of the passage of this resolution, and yet venture to go on digging as if nothing had happened; and in such a case it looks as if the United States would have to accept one or the other of two alternatives, — either to coerce him and his constituents by force of arms to accept the regulations that it saw fit to impose upon him, which, if M. de Lesseps chose to resist, and to call his own Government to his aid, would be a somewhat serious undertaking; or to let him go on, and say nothing more about it, which would simply make our Government ridiculous.

An interesting competition is now in progress in Paris for the new monument to commemorate the Constituent Assembly of 1789, to be erected at Versailles on the ground once occupied by the hall where the Assembly met. The official programme, after giving some general directions as to the disposition of the design, required that the pedestal should be adorned with statues of Mirabeau, Sièyes, Bailly and La Fayette. As usual in French monumental work, a sculptor and an architect were associated in most of the designs. The preliminary competition resulted in the choice of ten sketches, whose authors were invited to submit more detailed studies of their designs, comprising a model of the whole monument, at a scale of one-tenth the full size, and two models, at one-third the full size, of the figures of Mirabeau and the embodied Republic. All those participating in the second competition are paid something for their trouble. The author of the work adjudged the best will receive a prize of thirty thousand francs, and has the prospect of being commissioned to carry out his design; those which take the second, third, fourth and fifth rank are entitled respectively to prizes of twenty thousand francs, fifteen, ten and five thousand, while the others receive four thousand each. As might be expected, the ten designs thus selected out of more than fifty sketches are of distinguished excellence, and the final judgment will be looked for with interest.

An enormous immigration seems likely to be the distinguishing feature of the present year. Up to the close of the last month, the total number of arrivals in New York since the first of January was upwards of one hundred and five thousand, or nearly one-third more than during the corresponding period of 1880; while the lines of freight steamers which ply between Boston and Liverpool have brought many thousand more in the same time. Generally May is the month when the largest immigration of the year takes place, and as the winter in Europe has been unusually long and severe, it is more than probable that the preparations of those intending to take the voyage have been delayed, and that the flood-tide of the movement will be later in the season than usual. A single line is said to have made contracts to transport sixty-five thousand persons from a certain district on the Continent, and many of the Irish are ready to fly from the disorders which threaten their own country. It is impossible to witness this remarkable transfer of human beings from the old world to the new without reflections which, though serious, in sympathy with the preoccupied anxiety expressed on the faces, browned by Atlantic winds, that now meet us at every turn in the two great seaports, are for the most part comfortable and reassuring. The character of the new citizens is better than ever before; the great majority bring with them some property, and what is still more valuable, the habits of industry and prudence which the possession of property implies; and little beyond this is needed to make their arrival a presage of new prosperity and honor to the Republic, and, we hope, of success and happiness to themselves.

Strikes continue to be heard of in all directions; the building trades leading, as is to be expected at this season. Some of the more brutal and lawless unions have joined the movement, with the usual result of arousing by their conduct a strong public feeling against their respectable and rational fellows as well as themselves. In Chicago, the employees of the various railroads centering in the city replied to a voluntary offer of advanced pay on the part of the companies by leaving their work in a body, breaking up trains, and assaulting the engineers who endeavored to proceed with their duty; concluding their performances by resolving to allow no more freight trains to leave the city. Whether the owners of the freight will accede patiently to this arrangement remains to be seen, but we have serious doubts on the subject. The public mind was wrought to such a pitch of exasperation by the outrages against persons and property which accompanied the last great railway strike that it will be many years before any similar attempts of irresponsible laborers to extort a few dollars for themselves by enormous injury to innocent parties will be tolerated.

BUILDING SUPERINTENDENCE.—V.

THE FIFTH VISIT.

BEFORE his next visit, let the superintendent provide himself with a light steel rod: steel wire three-sixteenths or one-fourth of an inch in diameter can be obtained at the hardware stores in pieces about five feet long, which answer very well. Let him divide his inspection as before: first a tour around the walls outside, then inside; next a survey of the materials inside the excavation, and lastly of those outside. The concrete piers are found to be nearly done. They should be completed and left for a week or two to harden. The footings are nearly all in, the masonry under the north and south exterior, or aisle walls, is three or four feet above the cellar-bottom, and the clerestory foundation several courses high. The tower foundation is also started, and the drainage-well and trench in that place ready. We notice dust on the surface of the concrete, which otherwise appears well mixed, and is about as hard, and of much the same consistency, as ordinary sweet chocolate. By breaking off a piece and rubbing it on the hand, a rough judgment can be formed of its composition. If it contains too much sand, it will lack coherence, and crumble away. We direct that the dust shall be washed clean off the surface of the piers before the next layer of concrete is added; otherwise the two layers will not adhere.

Outside the aisle walls the gravel has been filled in as fast as they were built up. This is customary and proper, but we will have a hole dug to satisfy ourselves that the outside of the wall has been pointed as we directed. If not, we order the whole to be dug out, the wall thoroughly wet, and the pointing done in a proper manner. If all is satisfactory, we will remind the workmen to puddle the gravel filling as fast as it is put in, by throwing on water. If water is difficult to get, the gravel may be packed with wooden rammers. In a clayey soil, the filling next the outside of the wall should not be of the excavated material, but gravel or cinders should be obtained, at least for the lower part.

As we pass around the building, we take care to look at the lines from which the walls are being built. They will probably be shown by cords stretched between the batter-boards, from which plumb-lines hanging at intervals serve to transmit the required points to the cellar-bottom where the men are at work; and the batter-boards should be examined to see that the cords are attached at the proper notches; if these are correct, we must observe whether the masonry is being laid exactly to the lines so given. Nothing is easier than to make mistakes in these respects at the outset, which will be very difficult to remedy afterwards. It may often be observed that a few courses in a wall have been built incorrectly, and the line having been soon afterward rectified, the masonry is built out, overhanging these courses either on one side or the other, so as to recover their proper position. Any such work should be immediately taken down, and rebuilt correctly from the bottom. A want of firmness and decision in this respect on the part of the superintendent will be the source of far greater troubles afterwards.

So far as we observe, the workmanship of the wall is tolerably good; the horizontal joints are well broken, giving a good longitudinal bond, and the cross bond is maintained by a sufficient proportion of stones extending through the whole thickness of the wall. (Fig. 31.) If any portions had come to our notice where vertical joints came one above the other (Fig. 32) through three or four successive courses, we should at once have ordered them

Bonding.

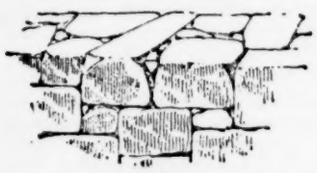


Fig. 31

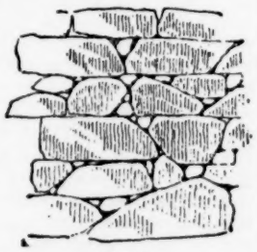


Fig. 32.

torn down and rebuilt, but none appear. It will, however, be well to watch the men from time to time, and observe their manner of working. The acquaintance with their individual characters thus formed will save much time subsequently, by showing us in what quarters to look most sharply for careless indifference to orders, intentional shirking, and well-meaning ignorance, as well as where to expect intelligence, faithfulness and skill.

As we pass along by the aisle wall we notice a mason at a little distance haranguing his companions on some subject about which he seems to have a flow of words, if not of ideas. Seeing us coming, he hastily shovels up a trowelful of gravel and stone chips from beside him, and throws them dry into a cavity in the stone-work before him, then dashes a quantity of mortar on the top, and smooths it over. To all appearance, his part of the wall is done just like his neighbors' work, but our suspicions have been aroused, and we approach and thrust the steel rod down into the fresh masonry. The supple wire insinuates itself among the stones far down into the wall, meeting now and then with the slight resistance due to the soft mortar, but penetrating many void spaces of considerable size, which are instantly detected by the feeling. One or two other trials give the same result, and as masonry so laid is liable to settle under the weight of the walls above, besides being permeable to water, we order the man to take down his work and rebuild it with joints properly filled. He grumbles, but begins with a very poor grace to remove the stones, while we remain near to see that our direction is strictly complied with, testing meanwhile the walling laid by the other men, which proves reasonably satisfactory. It is too much to expect that all the voids will be completely filled, but the steel rod will quickly show the difference between good and bad work. Every man whose workmanship is once found to be carelessly or intentionally defective should be noted, and the portion of wall on which each is engaged should be continually tested.

There are other qualities in rough masonry besides a large proportion of mortar which are essential to its good quality, and about many of these also the steel wand will inform us.

The usual practice of masons in rough walling is, after setting the larger stones, to fill the interstices with "chips," or even pebbles, more or less carefully fitted, put in dry; then to dash in mortar, trusting that it will work its way into the crevices. It does so to a great extent, especially if the wall is grouted occasionally with thin mortar, but the dishonest or indifferent men shirk the trouble of fitting in the smaller stones one by one, and content themselves with throwing in a lump or two of any shape, and then a quantity of small chips, which catch in the crevices and hang long enough to allow a fair bed of mortar to be spread over them, hiding the empty cavities below. This sort of work is immediately detected by the steel rod, which can be felt to shake and dislodge the loose pieces. The very best workmen avoid either of these methods, and place no stone, even the smallest chip, except in a bed of mortar prepared to receive it, rubbing it well in, and settling it with blows of the trowel or hammer, again driving smaller fragments into the mortar which is squeezed up around it, so that nowhere does stone meet stone without a cementing layer. The men who do work of this kind should be remembered, and the others incited to imitate them as far as possible.

The following points should be constantly and carefully observed. In laying the larger stones, the workmen will of themselves set the smoothest face toward the visible side of the wall; the superintendent must see that the outer side, which will be buried in the ground, has also a good, smooth face; that the bottom bed of each stone is level, or nearly so; or if not, that the masonry on which it is to rest is brought up with mortar and stone chips to fit its concavities before it is laid; that there are plenty of headers, or bond stones, extending across the wall from side to side to prevent its splitting; that long stretchers running lengthwise of the wall are sufficiently numerous; and that all angles are tied by long stones laid alternately in either wall. (Fig. 33.)

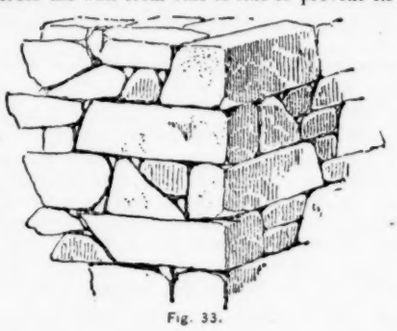


Fig. 33.

Care must be taken in building up the wall to keep in mind the position of the window and door openings which are to come above. The tendency always is for masonry below a pier to settle under the excess of weight, down to the very footings, tearing itself away from the less compressed portion under the opening (Fig. 34), so that long stones should be built in, extending from the part under the pier to that under the opening, to carry the weight out and distribute it uniformly over the whole foundation. For the same reason, if the sills of openings are built into the wall, instead of being "slipped" in afterwards, they must be pinned up only at the ends, a clear space of half an inch being left between their under sides and the masonry below them, which should not be pointed up until the completion of the building: otherwise the settlement of the piers will carry down the ends of the sill more than the middle part, and it will be broken.

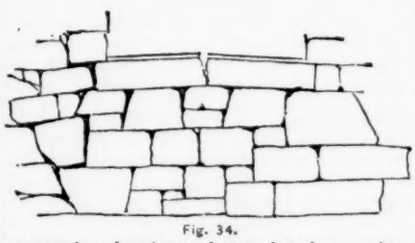


Fig. 34.

The proper proportion of headers varies according to circumstances, but in an ordinary foundation one stone at least in every space of five feet square should extend through the whole thickness of the wall.

An opening should be left for drain-pipes to pass out, and for water and gas pipes to enter the building, covered with strong stone lintels. Neither contractors nor their men ever think of this, unless reminded by the superintendent, and in consequence, when the time comes for laying the pipes, ragged holes have to be broken through the wall, at the imminent risk of causing settlements.

A very important element in determining the character of the

foundation walling is the height of the masonry above it. Not only will a high and heavy wall compress a loamy or other yielding ground beneath it more than an adjoining light wall, but the mortar joints in the high wall, if laid in the same way as those of the lighter wall, will be squeezed into a smaller compass by the greater weight; a very considerable inequality of settlement resulting from the combined effect of the two causes, with consequent dislocation of the masonry.

To illustrate this by the example before us: The tower at the south-west corner of the church, disregarding for the present the circumstance that it will stand on a rock foundation, while the adjacent walls rest upon gravel and clay, is to be so high, and the masonry near the bottom so heavily weighted, in comparison with the light and low aisle wall which adjoins it on the south-east, that if the lower portion of the two were to be built up together, in the same manner, with stones of the same size, in ordinary mortar, the compression of the mortar in the tower under the increasing weight would be so much greater than in the aisle wall that by the time the spire was finished, of two stones, one in the aisle wall and the other in that of the tower, originally set at the same level, the latter might be forced down two inches or more lower than the other; a movement which would cause dislocation the whole height of the aisle wall. Many stone church-towers show this effect, which can, however, be avoided by proper care. There are three ways in which the difficulty may be met. One is to make the tower masonry of the largest stones, as high as the top of the aisle wall, making the aisle wall of small stones. In this way the number of joints in the high wall will be so much less than in the low one that although the compression of each will be greater, the aggregate settlement will be about the same. Another expedient is to make the mortar joints in the high wall thin, and those in the low adjoining wall thick. The third is to lay the high wall in cement, and the low one in mortar made mostly of lime; then the contraction of the cement joints being relatively much less than with lime mortar, the total settlement can be kept nearly equal in the two walls.

The *rationale* of the last method depends upon the distinction, which should never be lost sight of, between the "setting" action in lime and cement. Strictly speaking, pure lime mortar does not "set." The soft paste resulting from the slaking process if exposed to the air, or placed on a piece of blotting paper, or between dry and absorbent bricks, will lose a little of the water used in mixing, leaving a firm, damp mass of hydrate of lime, which consists of pure lime holding in a loose chemical union about twice its bulk of water. This water still continues to evaporate slowly, and the paste to diminish in bulk, during a period of months, years, or even centuries, if the wall is very thick; and if the hydrated lime forms the cementing medium between the courses of a wall, the wall will settle as long as the evaporation and shrinkage continue. The superposition of a heavy weight increases the settlement, partly by the forcing of the semi-plastic material out of the joints, and partly by the pressing out of the water of hydration more rapidly than it would pass off by natural evaporation. This indefinite shrinkage of the lime is the principal, perhaps the sole reason for the addition of sand to mortar. The particles of sand being incompressible, and divided from each other by thin layers of lime, the contraction of these layers exerts a comparatively small influence on the total mass, so that a joint of half an inch in height, in mortar of lime and sand, will usually settle less than a sixteenth of an inch; while if made of lime only, it might shrink half its width.

With cement the action is quite different. When mixed into paste with water, a few minutes only elapse before the soft paste suddenly assumes a firm consistency, so as to resist the impression of a pointed instrument. This is the "set," and forms a true chemical reaction, by which a portion of the water enters into close combination with the cement, from which it cannot afterwards be separated except by heating to redness. With the help of this combined water, the constituents of the cement enter upon a series of reactions by which they gradually form a hard stone, little less in bulk than the original cement paste, and with some cements even equal to, or greater than the volume of paste. This characteristic quality of cement gives it great value in controlling the settlement which forms an important element in the consideration of stone structures; and by mixing cement and lime in different proportions a whole range of mortars can be obtained having any desired quality as to diminution of bulk in hardening.

Returning to our tower, for which we have to choose among the three methods of keeping the masonry at the same level in its walls and in the comparatively low aisle wall adjoining; we reflect that to lay the tower walls in cement and the adjoining wall in lime mortar would be sufficient, but the contrast in color between the brown cement joints and the white of the lime would be objectionable in the walls above ground. The same would be the case, in a less degree, if we were to lay the tower wall with thin joints, using thick joints in the aisle wall. If we lessen the number of joints in the tower, instead of diminishing their width, by building it of large stones, the same end will be attained, and the contrast of the massive masonry in the one with the small stones in the other will be rather piquant and attractive than otherwise.

But we must not forget the difficulties presented by the ground beneath the tower and the adjacent walls. The trenches show that under the tower we can reach the rock everywhere, at least by going down two or three feet below the general bottom of the trenches in one corner. All this foundation will then stand on the solid ledge. To get a rock foundation for the aisle wall would, however, require very deep digging, the ledge sloping rapidly eastward; and yet if one wall is built on rock and the other on compressible ground, the latter will settle and tear itself away. The soil overlying the rock under the aisle wall, as shown by the trench, is gravel, which has the advantage of being practically as incompressible as the rock itself if not loaded beyond a certain point. In general, it will not yield perceptibly under a less load than five tons to the superficial foot, but to make sure, we will take three tons as the limit, as a soil of so little depth over a ledge is less reliable than if it were deeper. We will reckon up roughly the weights with which the soil is to be loaded. The foundation, allowing an extra foot for the excess in width of the footings over the rest of the wall, is 12 feet high, 2 feet thick. The wall above is 20 feet high, 20 inches thick; total,

Compressibility of Gravel.

$$12 \times 2 = 24$$
$$20 \times 1\tfrac{2}{3} = 33$$
$$57$$

— 57 cubic feet of masonry to each linear foot of the aisle wall, which at 150 pounds per cubic foot, an average weight for such masonry, will amount to 8,550 pounds.

Of the roof, which slopes at an angle of 45°, about two-thirds the weight will come on the aisle wall, the rest being borne by the clerestory wall. The roof, measured on the slope, is 15 feet wide, and the weight of rafters, boarding and slate, and plastering on the under side, may be taken at 30 pounds per superficial foot. Adding the *possible* weight of wet snow and ice, 40 pounds per superficial foot, makes 70 pounds per square foot, which multiplied by the width, 15 feet, gives 1,050 pounds to each lineal foot of roof. Two-thirds of this, or 700 pounds, is to be added to the previous weight of the masonry, 8,550 pounds.

Calculation of Weight on Foundation.

One more burden must be calculated and added to the rest to find the whole load which will need to be sustained by the subsoil beneath the wall: that is, the floor, which being level rests half on the aisle and half on the clerestory wall. The span is 10 feet, so that 5 square feet, which at 30 pounds per foot, with a *possible* additional load of 120 pounds, will give $5 \times 150 = 750$ pounds more, to be added to the total pressure on the footings, the whole amounting to $8{,}550 + 700 + 750 = 10{,}000$ pounds, or exactly five tons, on each linear foot of wall. As the wall is two feet thick, the weight on each *linear* foot is divided over two *superficial* feet, making two and one-half tons on each. We have increased the spread of the footings from the usual six inches on each side to twelve; this will divide the burden at the point of contact with the earth over four square feet instead of two, making the pressure but one and one-quarter tons to the superficial foot of soil. This is sufficiently far within the limits of resistance to compression to give assurance that no settlement of the substratum is to be feared.

We have then only to direct that the largest stones shall be selected for the tower and its foundations, that every stone shall be hammered well down into its bed, so as to bring the surfaces as nearly as possible into contact, and that all the crevices shall be thoroughly filled with stone chips and mortar. The aisle wall adjoining is to be built of smaller stones, and tied into the tower wall every few feet in height with long stones as well as with iron anchors.

In bedding the tower footing-stones upon the rock, any little ridges or projections on the surface of the ledge must be hammered off, so as to give a moderately even bed, and small stones and mortar must be built up to fit the irregularities of the under side of the footing-stone, and finally, a thick bed of mortar spread over all, so that there will be no cavities under the stone. All the heavy blocks should be laid with a derrick, so that they can be held suspended over their place while the bed is being prepared, and if they are very irregular, lowered into place and then raised again, so that the impression made in the soft mortar will show whether the bed is exactly fitted. The practice of rolling the stones into their place with crowbars must never be permitted in a heavy wall. The bars tear up and dislocate the bed of small stones and mortar to such an extent that it is impossible to be sure that the stone when so laid does not rest on the edges of two or three little chips, which will crush and cause serious settlements when an increased load comes to be placed upon them.

Derrick-laid Stones.

It will not be so easy to make a neat outside and inside face to the foundation-wall of large blocks, but it should be done, especially on the outside, even if some of the stones have to be dressed off. It is dangerous in a heavy building to leave, as is often done, the larger pieces in a foundation-wall projecting outside, to save the trouble of cutting away the excess of size. Not only will water get into the wall by running along the top of such a stone, but hard earth, or a pebble, may be wedged under the projecting end, so as to keep it up while the wall settles under the increasing load, causing a bad crack beneath it, and throwing the whole weight on the inner end of the stone, which is likely either to give way altogether, or to break up the masonry about it.

Our tour outside the walls being now completed, that inside may be short. We must see that the drain under the tower does not get obstructed, and that a good opening, spanned by a strong stone, is left for it to pass beneath the walls. Workmen have not so high a respect for drain-pipes as architects, and will often cover up a choked or broken pipe, saying nothing about it, thinking that they will be out of the way before the trouble is discovered, and careless of the very great expense which may be necessary to replace it. The clerestory foundation must be sharply watched: long stones are the first requi-

site for this wall; everything depending on the efficiency with which the concentrated load on the piers is spread out laterally over the foundation, till the pressure on the footings is uniform under piers and openings alike. The workmen must be cautioned to leave an opening two or three feet square at the top of this wall, under the arches (Fig. 35), and the same precaution must be observed wherever any portion of a cellar is cut off by walls from the main part, in order to secure circulation of air. If deprived of this, the beams of the floor above are sure to rot before many years, and will sometimes fall in all at once after a few months.

Ventilating Apertures.

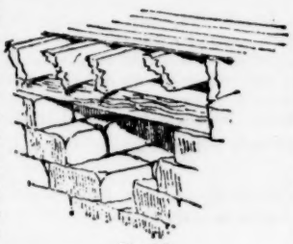


Fig. 35.

The derricks, of which two or three are probably now set up, must be examined. Let the superintendent see that the ropes are not fraying out, and that neither the mast nor the boom is cracked or sprung out of perfect straightness. He must also observe where each of the guy-ropes is fastened. Every one should be secured to a growing tree, or a post set five feet or more into a hole in the ground, and the earth refilled and packed around it. If any guy-rope has been carelessly fastened to a fence-post, which is very likely to be half rotted off at the ground; or to a curbstone, or a boulder, or any other anchorage not perfectly secure, orders must at once be given to have it changed, and all guys must be strictly required to be drawn up taut. A loose derrick rope, or an insufficient anchorage, is terribly tried when a heavy stone on the end of the boom is swung around so as to bring the strain suddenly upon it, and although that is properly the contractor's affair, a little attention on the part of the architect will do no harm, and may save loss of property, and even life. The foundation-walls of the chancel, it should not be forgotten, are to be lined with brick, and anchors must be built in to hold the lining as described below. We will remind the contractor of this in good season.

Derricks.

Anchorage of Guy-ropes.

The last thing to be done is to inspect the materials delivered since our previous visit, which will end our duties for the day.

A quantity of granite for the face of the basement wall above ground has been sent, already cut; it being very common to cut the harder stones at the quarry, while the softer freestones are cut at the building. The blocks are of random sizes, and vary much in thickness, some being one or more points less than two inches thick. These should be at once rejected, no matter how thick they may be at the other edges (Fig. 36), since their corners are liable to break off under the weight, and disfigure the work. Still worse are the stones which, though of sufficient thickness around the edges, are hollow in the middle. (Fig. 37.) Not even the most skilful backing can make these secure. Usually, the minimum thickness admissible in the facing blocks is mentioned in the specification, but if not, nothing under six inches should be allowed in the basement wall, and not that unless all such stones are anchored to the backing. It is rather advantageous to have the stones large on one bed and small on the other, provided they do not come to too thin an edge. (Fig. 38.) Such stones bond well together and to the backing.

Fig. 36.

Fig. 37.

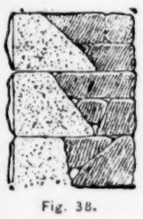


Fig. 38.

It is common in specifications to require that granite shall be "free from knots, sap, shakes and rot." Rotten, or crumbling granite is easily detected, as are also the brown stains known as "sap," and the black or white lumps called "knots." Shakes, if very bad, are shown by their discolored edges, but we are likely, with some kinds of granite, to find stones with seams through them, which are tight enough to hold together while the stone is cut, but will, after they are placed in the wall, open by the effect of the weight upon them, and allow rain-water to penetrate. Where the stone is thick enough to extend nearly through the wall, a great deal of water will often in heavy rains blow into the building through a seam which may have been quite imperceptible when the stone was set in place. The most certain way of detecting blocks so affected is to strike them with a hammer, rejecting the stones which do not ring clearly.

The only other new material which we find delivered is brick, of which two lots are on the ground; one near the west end of the building, which we find to be mainly composed of small bricks, of a dark color, the ends of many being black or bluish, and generally crooked or irregular in shape. In the middle of the cellar others are piled, larger, and more regular in shape, but light-colored, at least one in four being very pale. We will test the hardness of these by actual trial, since the color by itself is an unreliable indication, many clays yielding a light-colored brick of very good quality. Selecting two of the paler ones, we strike them together; they meet with a dull sound, and the edges crumble at the point of contact. After a few blows one breaks in two, showing an earthy fracture, destitute of the compact, hard look of good brick.

Brick.

The reddest-looking of this lot ring quite clearly when struck together, and their good shape is in their favor, but the men could not be depended on to pick out the best ones, and it is safest to order the whole lot sent back. If the contractor is honest, he will have ordered good brick, and if the superintendent rejects them, the loss will not be his, but the brick-maker's. If the superintendent passes them, through negligence or complaisance, not only is the contractor deprived of his support in attempting to compel the dealer to furnish better materials, but he is likely to think that he need not himself be too scrupulous in other respects. Let the superintendent make a note of having rejected the bricks, and give the contractor a memorandum of it; following up his action by a close watch to see that his directions are carried out. Let him never allow any brick of which he can crumble the edge with his fingers to remain on the ground. The hard, but crooked bricks, if not too much distorted, may be utilized in the backing of the stone-work, or in forming the jambs of basement openings, but must not be used in any pier or arch.

The staging lumber will need occasional attention. Although with us the architect takes no responsibility about the scaffold, his directions in regard to it will be listened to with respect, and he has an undoubted right to control its construction where that may influence the execution of the building.

SIXTH VISIT.

At our next visit we find the first staging up, the drain-pipes on the ground, centres ready for the arches under west wall, and the arch bricks delivered. We go around the outside of the walls, then inside, then examine the materials inside, and lastly, those outside. This should be the regular routine of each visit, as the surest way of observing whatever may be new in the work.

The concrete piers are firm enough to build the arches upon them, the foundations are going on well and nearly finished, with good bond, and neatly pointed outside; the long stones under clerestory wall have not been forgotten, and trials with the steel rod reveal only a few places to be taken out and filled up. In the tower foundation the opening for drain-pipe is properly formed, and the large stones well laid and bonded. On our way to the tower, we watch the setting of the capstones to the concrete piers. The stones have been cut square, with "skew-backs" formed for the arches to spring from, and all the faces "pointed" to a uniform surface; the top of the concrete is well wet, a layer of cement mortar made with an equal bulk of sand is spread over it about an inch thick, and the stone lowered into it, and beaten down by blows of a sledge-hammer, not applied directly on the stone, but on a piece of timber interposed. The cement will soon set, and the centres can be placed in position at once and the arches commenced. These should be built in separate concentric rings or rowlocks, four inches thick, rather than in the fashion called "bonded," where each ring is tied to the others by bricks set the eight-inch way. The latter has some advantage in point of appearance, but the arch of separate rowlocks possesses a certain elasticity, and power of accommodating itself to the weights upon it, which make it much better in heavy constructions. The bricks must be very regular in shape, well *soaked* in water, — not merely sprinkled, — and laid with mortar of equal parts of cement and sand. The arches spanning the basement openings, behind the straight lintels which terminate them outside, should be built in a similar manner.

Brick Arches.

None of the granite facing of the basement wall has yet been set, although the grade lines which mark its commencement are set out by strings stretched between stakes outside. We take advantage of the opportunity to question the contractor about the manner in which he proposes to anchor the face to the backing. The specification indefinitely requires it to be "well anchored," without further details. Much depends on the character of the ashlar. If the stones are thick, with many of them extending through the whole thickness of the wall, as is common in Europe, no other ties will be necessary to keep the weight of the superstructure from forcing the facing stones off the wall, but with us such ashlar varies from two to twelve inches in thickness, according to the value of the material, backed by a rubble masonry of rough stone or brick, to which it must be held by iron ties.

Ashlar.

A four-inch ashlar, and still more a two-inch, which is used only for facings of marble, must have, for a high wall, at least one anchor in every stone. When the ashlar is thicker than this, they may be much less numerous. We find our granite blocks to average eight inches in thickness, and being assured by the contractor that the stones to come will be of a similar character, we agree with him that if the anchors are so distributed that there shall be at least one to every three feet in length, and two feet in height, the work shall be accepted as satisfactory, stipulating also that the last course of ashlar, under the water-table which marks the transition from granite to freestone at the first-floor level, shall have an anchor in every stone. The brownstone ashlar for the upper part of the wall will be of about the same thickness, and the same proportion of anchors is directed for that also; every stone under the horizontal string-courses and cornices to be anchored, in the same way as under the water-table. The anchors are made of wrought-iron strips about one inch wide, and as much as one-twelfth-inch thick. Iron of one-sixteenth-inch thickness is sometimes used, but is too light. One

"Clamping" of Ashlar.

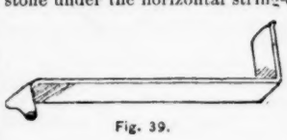


Fig. 39.

end is turned up about two and a half inches, and the other is turned down about one and a quarter inches. This end is heated by the blacksmith and driven by a blow into a round hole made in the anvil, which rolls it into a tubular shape suited for insertion into a hole drilled in the top of the stone to be anchored. (Fig. 39.)

The drill-hole should be one and a half or two inches from the face of the ashlar block, and the length of the anchor should be so measured as to extend entirely through the wall, the other end turning up close against the inner face.

As these ties would be soon destroyed by rust if used in their natural state, they must be protected by tarring or galvanizing. The latter is most expensive, and perhaps best, but the former is generally employed.

In setting the first course of stone above ground, it is advantageous to have it overhang the foundation-wall about an inch: then the rain-water, which flows in sheets down the exposed surface during storms, when it reaches this point drips off, and is absorbed by the ground, instead of continuing its journey down the face of the foundation-wall. (Fig. 40.) Of course, this must be arranged for in making the detail drawings if it is to be done systematically. At all events, the construction sometimes seen, where the base course is set back from the face of the foundation, leaving a narrow level strip on top of it, should not be countenanced. Such a shelf serves only to catch the water streaming down from above and conduct it into the masonry, and if the plans require such a relative position of the foundation and superstructure, the former should terminate by a surface sloping back to the line of the wall above it.

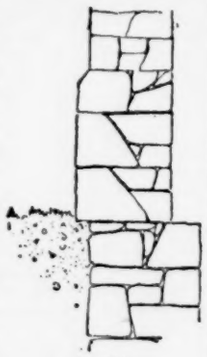


Fig. 40.

In supervising the facing work, attention should be paid to the appearance. With random ashlar, much of the beauty depends upon the frequency with which the horizontal joints are broken. It is common to specify for such work that no horizontal joint shall extend more than six feet, and this is a good rule to follow in all cases. The difference between a neat and slovenly walling is illustrated by Fig. 41. *a* and *b*.

Random Work.

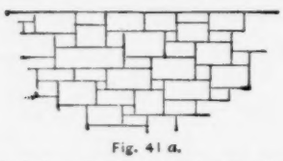


Fig. 41 *a*.

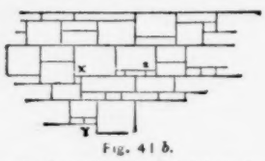


Fig. 41 *b*.

In *b* the effect is injured not only by the long horizontal joints, but by the frequent occurrence of small stones, as at *X*, *Y*, *Z*, inserted to fill awkward vacancies.

The work now goes on without intermission until the granite-faced wall is ready to receive the water-table or bevelled course which terminates it. (Fig. 42.) This, like all horizontal string-courses, particularly if projecting, should be composed of long stones, running back as far into the wall as practicable. They are often specified to have the top bed not less than eight inches in the wall, and this is a good standard, though narrow string-courses near the top of the wall may perhaps have an inch or two less. Care is necessary to ascertain the exact level some time before the wall has reached the required point, and it is best to build up all the corners of the building to the line in advance of the rest, and set the corner-stones of the water-table, levelling them carefully with an engineer's instrument, afterwards bringing the intermediate portions up to the line. This will prevent an appearance like this (Fig. 43) caused by the attempt to regain a true level after the wall has been carried up nearly to the top.

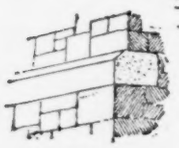


Fig. 42.

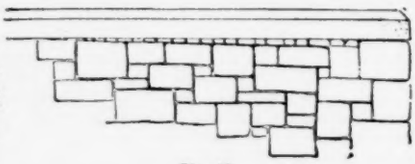


Fig. 43.

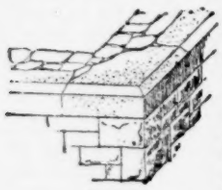


Fig. 44.

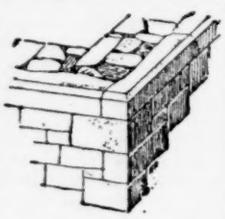


Fig. 45.

The quoins, or corner blocks of the water-table, as indeed of all the stone-work, must always, for appearance sake, show a wide head on both sides the angle (Fig. 44), instead of being cut out of a stone of the same thickness as the rest (Fig. 45).

THE ILLUSTRATIONS.

GATE-KEEPER'S LODGE FOR A. H. BARNEY, ESQ., HARLEM, N. Y. MR. BASSETT JONES, ARCHITECT, NEW YORK, N. Y.

Mr. Jones writes: "Although it is a small thing, I have taken some pains to present it in an attractive form for the purpose of showing what can be done with an elevation, and with the hope that it may induce others to do the same thing. An indifferent perspective draughtsman would undoubtedly find this method much more within his reach, and would attain more satisfactory results."

DESIGN FOR A SUBURBAN HOUSE. MESSRS. MASON & RICE, ARCHITECTS, DETROIT, MICH.

INTERIORS IN THE HOUSES OF MARCUS SAYER, MONTROSE, N. Y., AND T. B. HOWELL. MR. W. H. WOOD, ARCHITECT, NEWARK, N. J.

VAULTS.[1] — X.

9. Groin-ribs interrupted, or diverted and branched.

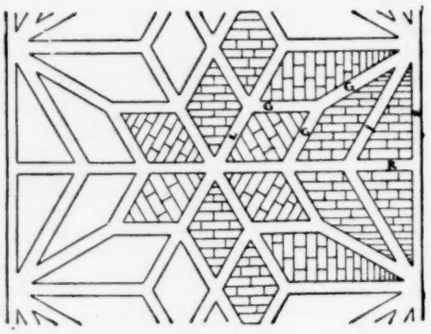


Fig. 99.

a. Star vaulting. (Fig. 99.) Figs. 100 and 101 are other examples from the nave of S. Castor, Coblenz, which, though an early Romanesque building, has Gothic vaulting.

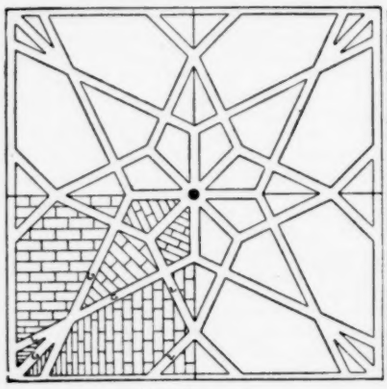


Fig. 100.

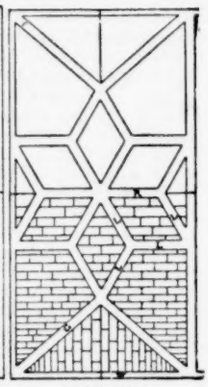


Fig. 101.

b. Panel vaulting, as it is commonly called. (Fig. 102.)

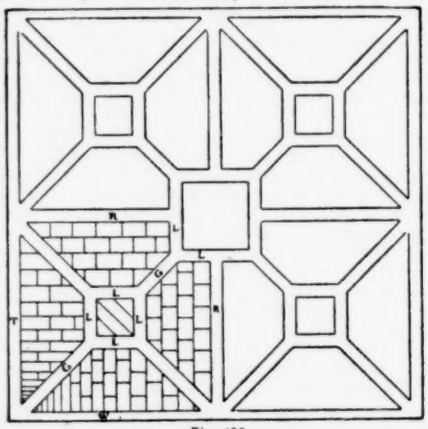


Fig. 102.

10. Vaults whose ribs, excepting the ridge, are all arcs of the same circle, differing only in length. They are necessarily domical.

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

A SUBURBAN RESIDENCE.

GATE-KEEPERS LODGE AT HARLEM N.Y.
for
A.H. BARNEY ESQ.

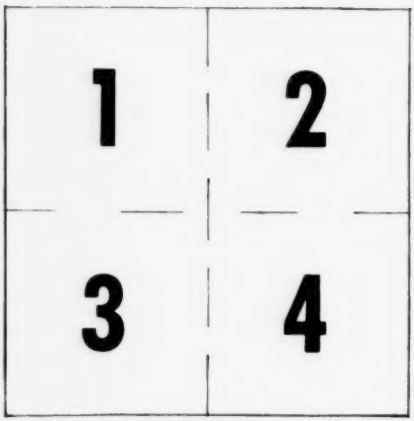
South Elevation.

West Elevation.

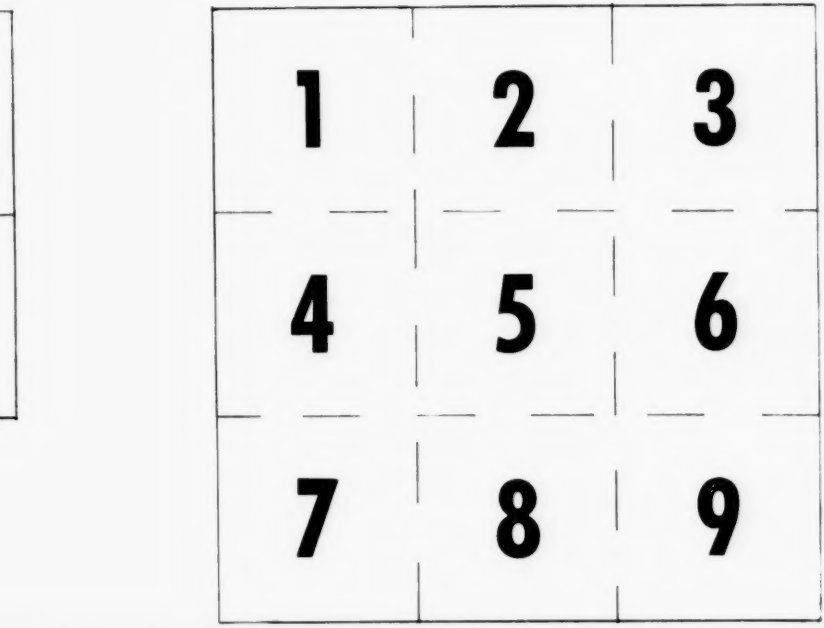
East Elevation.

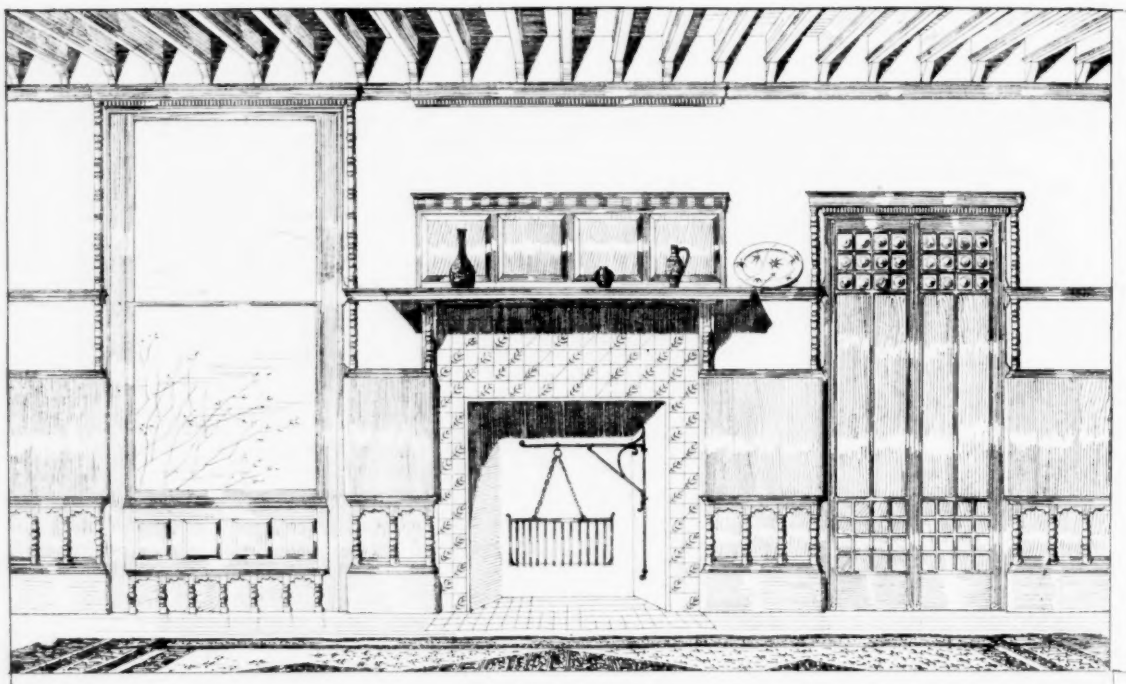
North Elevation.

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

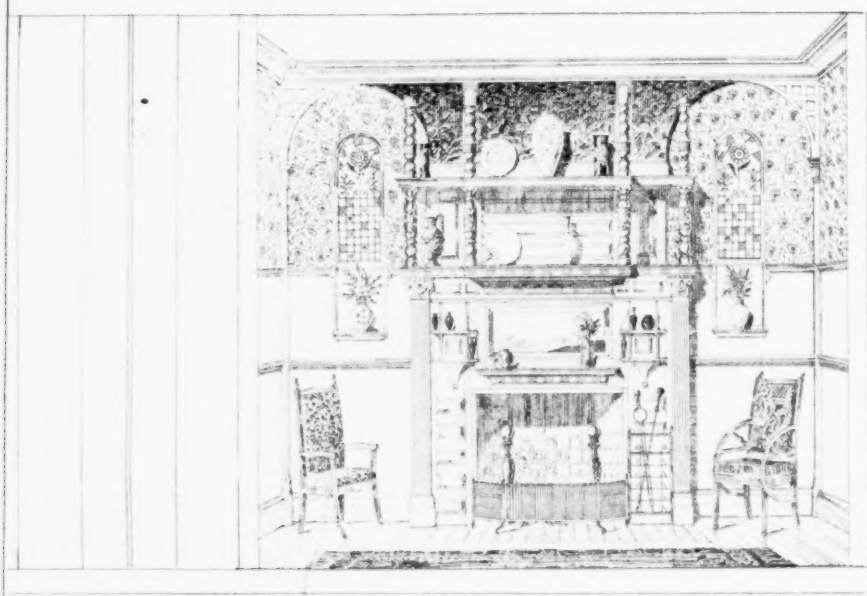


e entirely included in one exposure
the upper left hand corner, left to
frames as required. The following

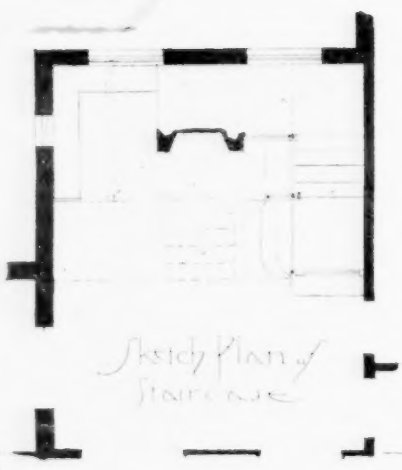




Dining Room ❁ Finished in Walnut ❁



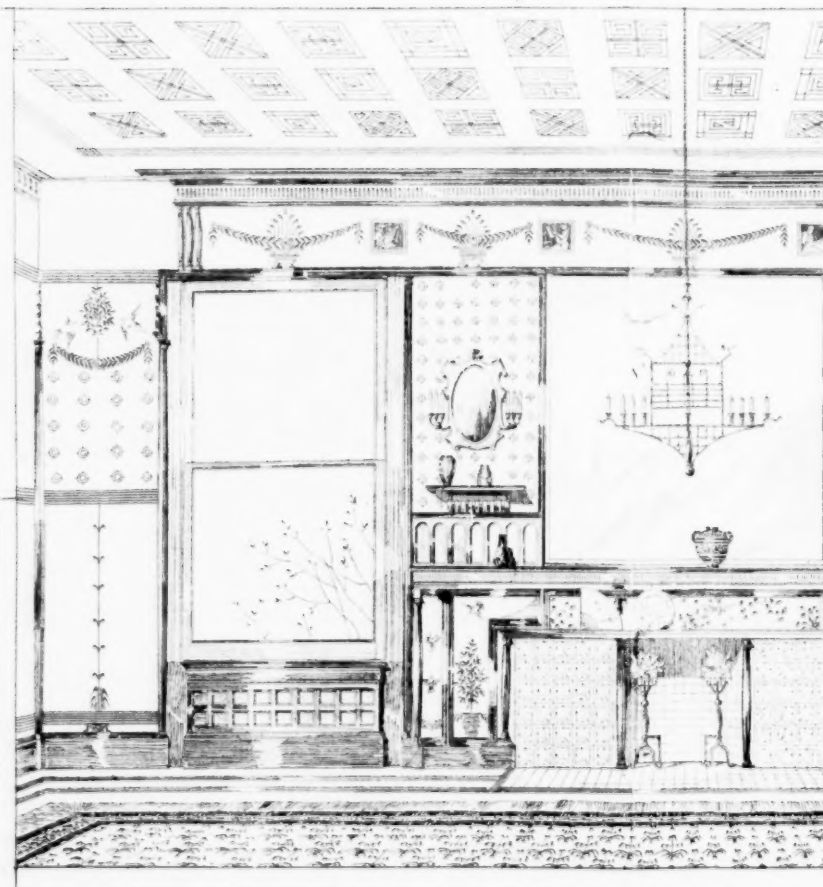
Fireplace End of Library in House for Mr T B Howell



Sketch Plan of Staircase

Finished in dark Oak. The walls covered with paper of a dark green pattern

Staircase and Hall.



The Parlor. Ebony finish. Buff Terra Cotta Panels in Mantel. the entire wall and ceiling tinted the same color, the decoration in outline red.

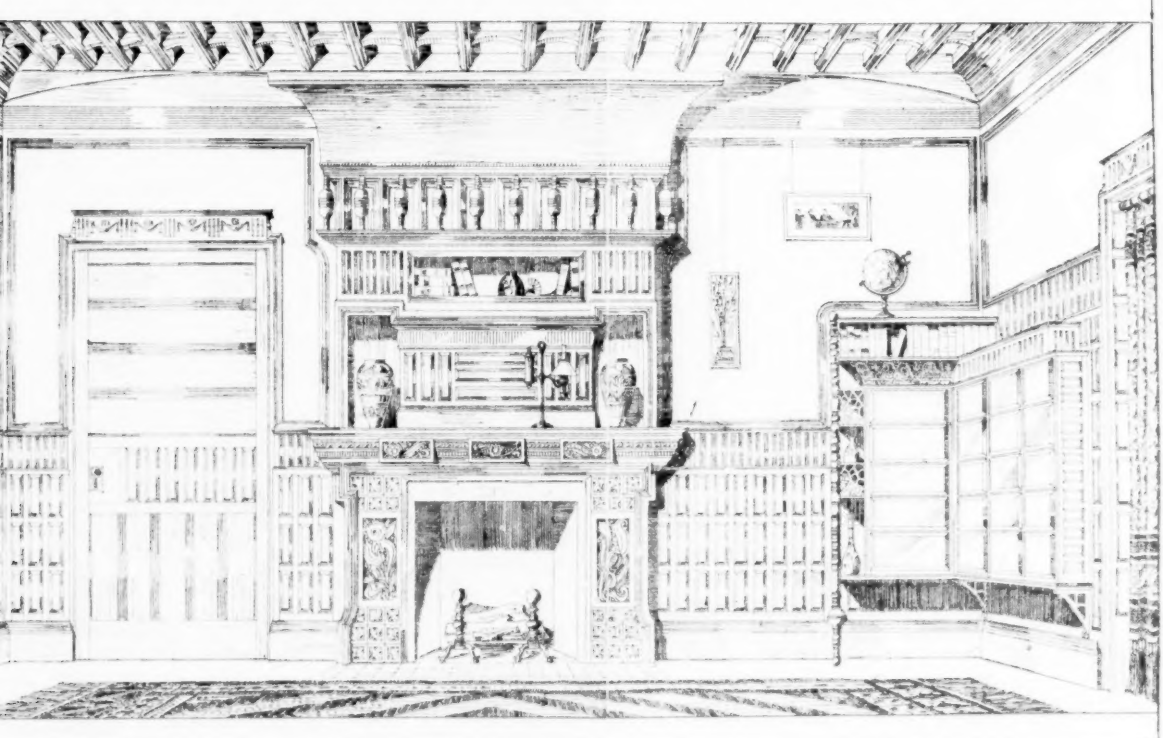
LONGMANS & CO.

VTERIORS

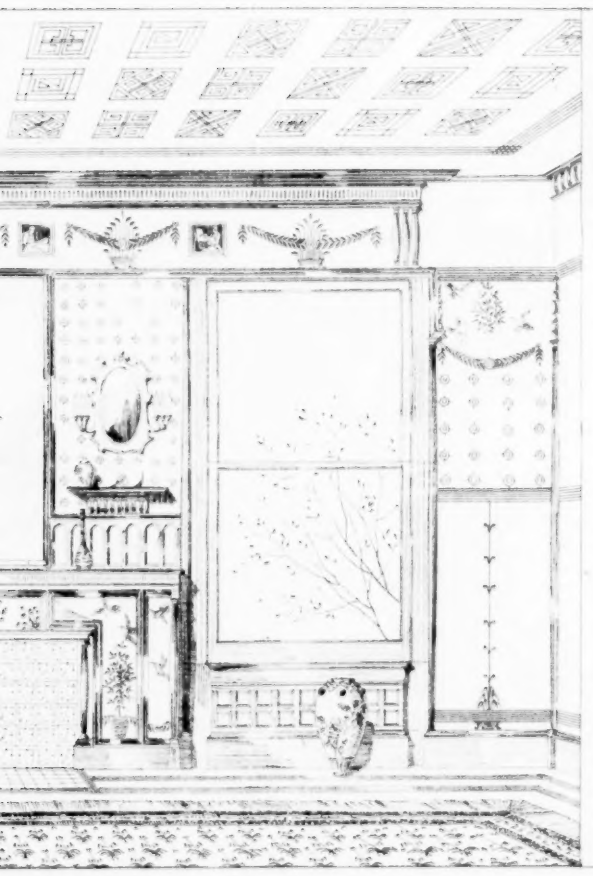
MR. MARCUS SAYERS' HOUSE
MONTROSE, N.J.

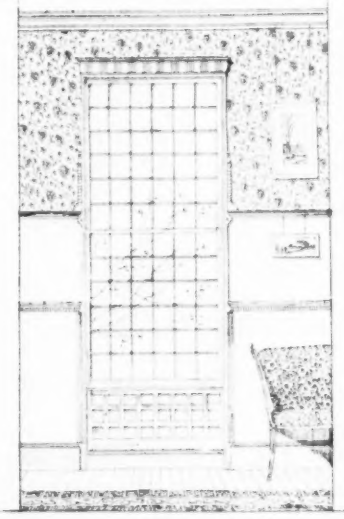
F. Halsey Wood
Architect.
NEWARK N.J.

EXCEPT as the Two views otherwise marked.

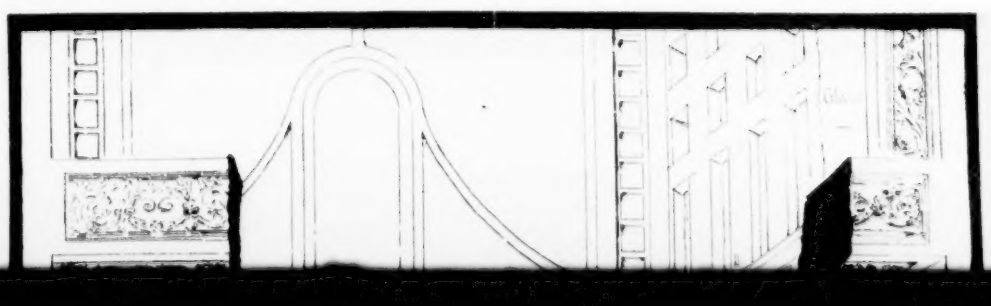


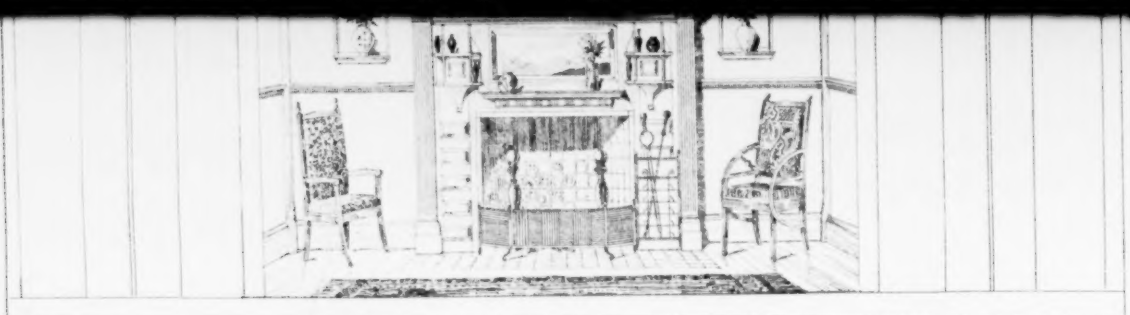
The Library. Basswood Finish throughout, the wall spaces above panelling covered with dark red paper.



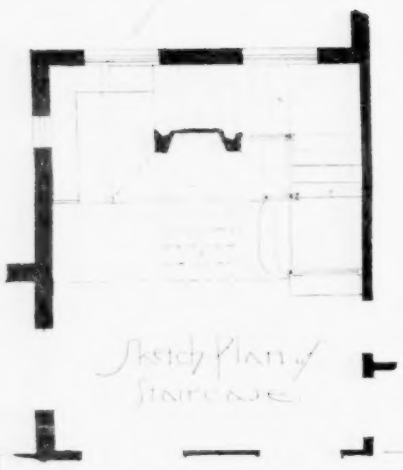


Window in Library
House for Mr T B Powell





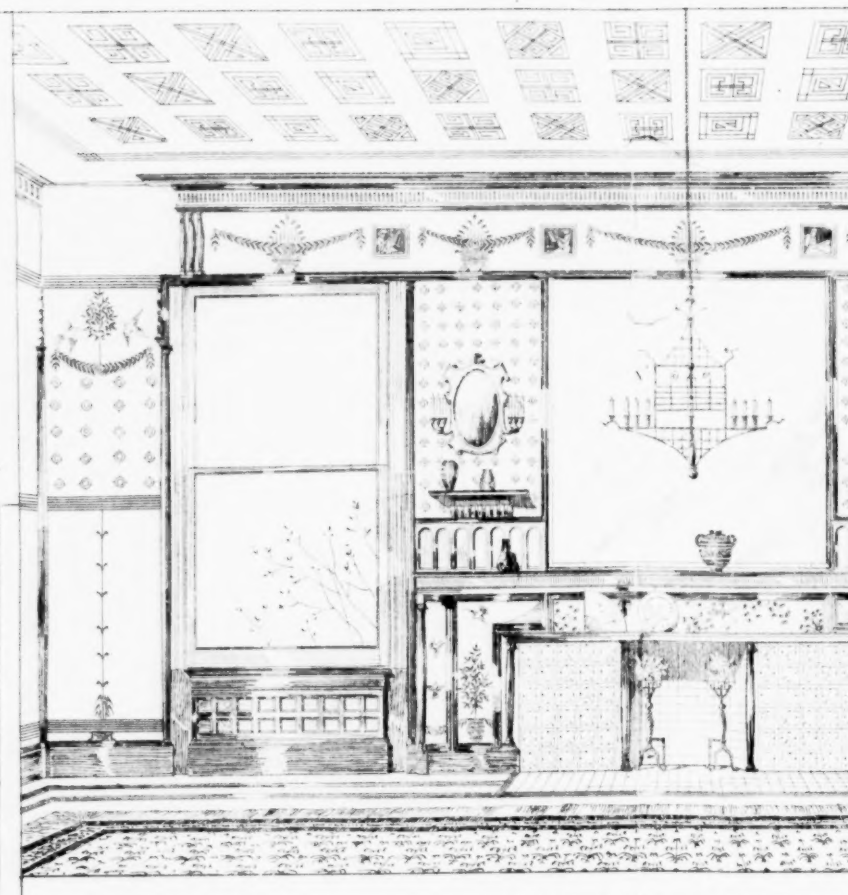
Fireplace End of Library 2nd House for Mr T B Howell



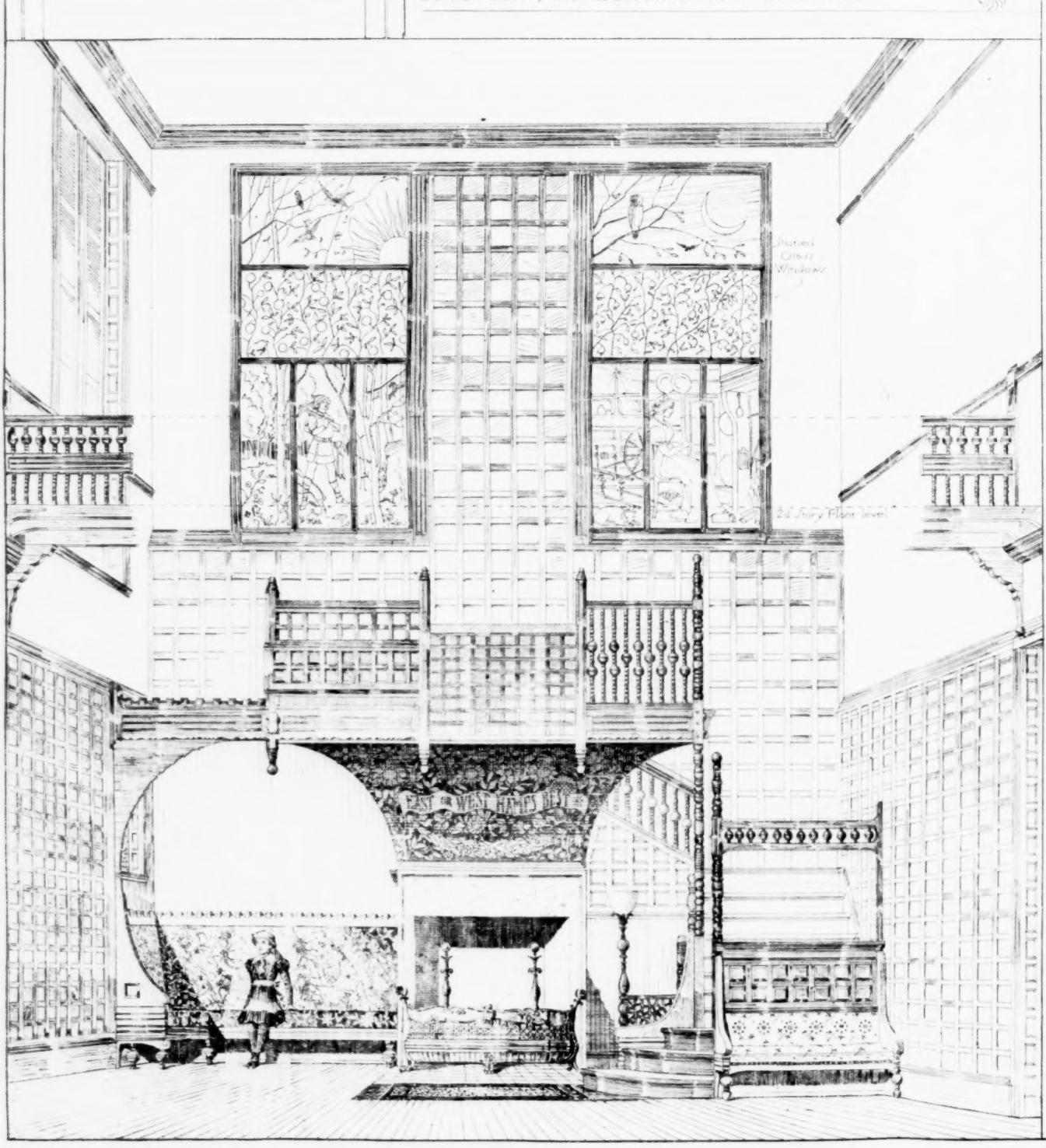
Sketch Plan of Staircase

Finished in dark Oak. The walls covered with paper of a dark green pattern

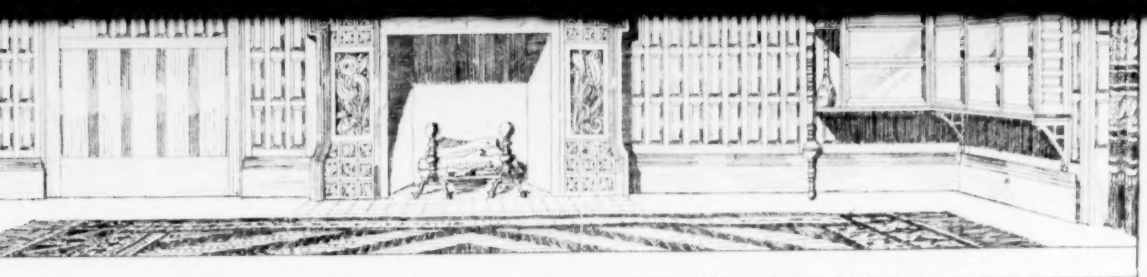
Staircase and Hall.



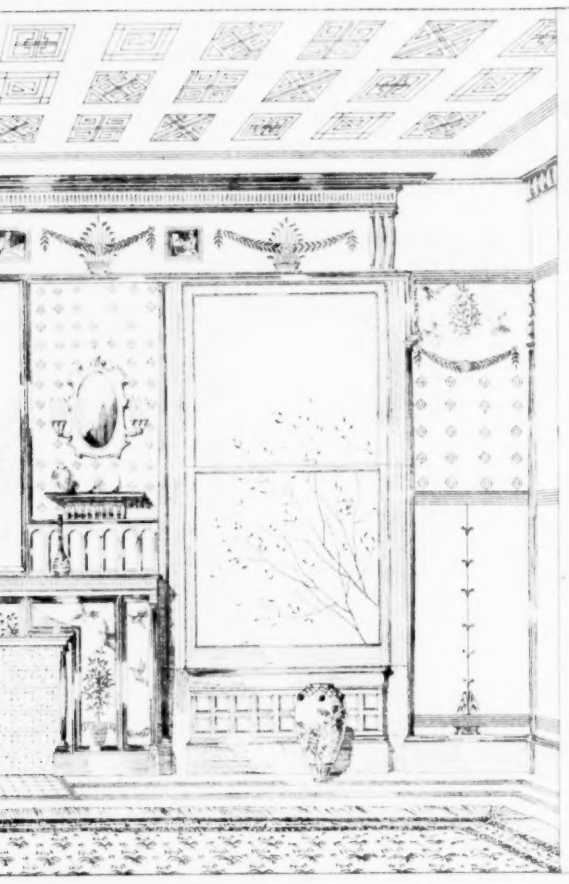
The Parlor. Ebony finish. Buff Terra Cotta Panels in Mantel, the entire wall and ceiling tinted the same color, the decoration in outline red.

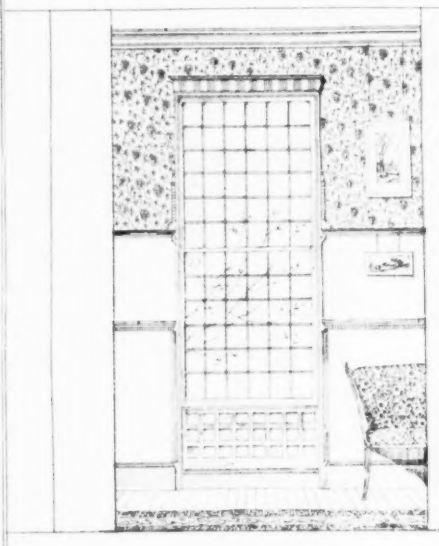


The Heliotype Printing Co 211 Tremont St. Boston.

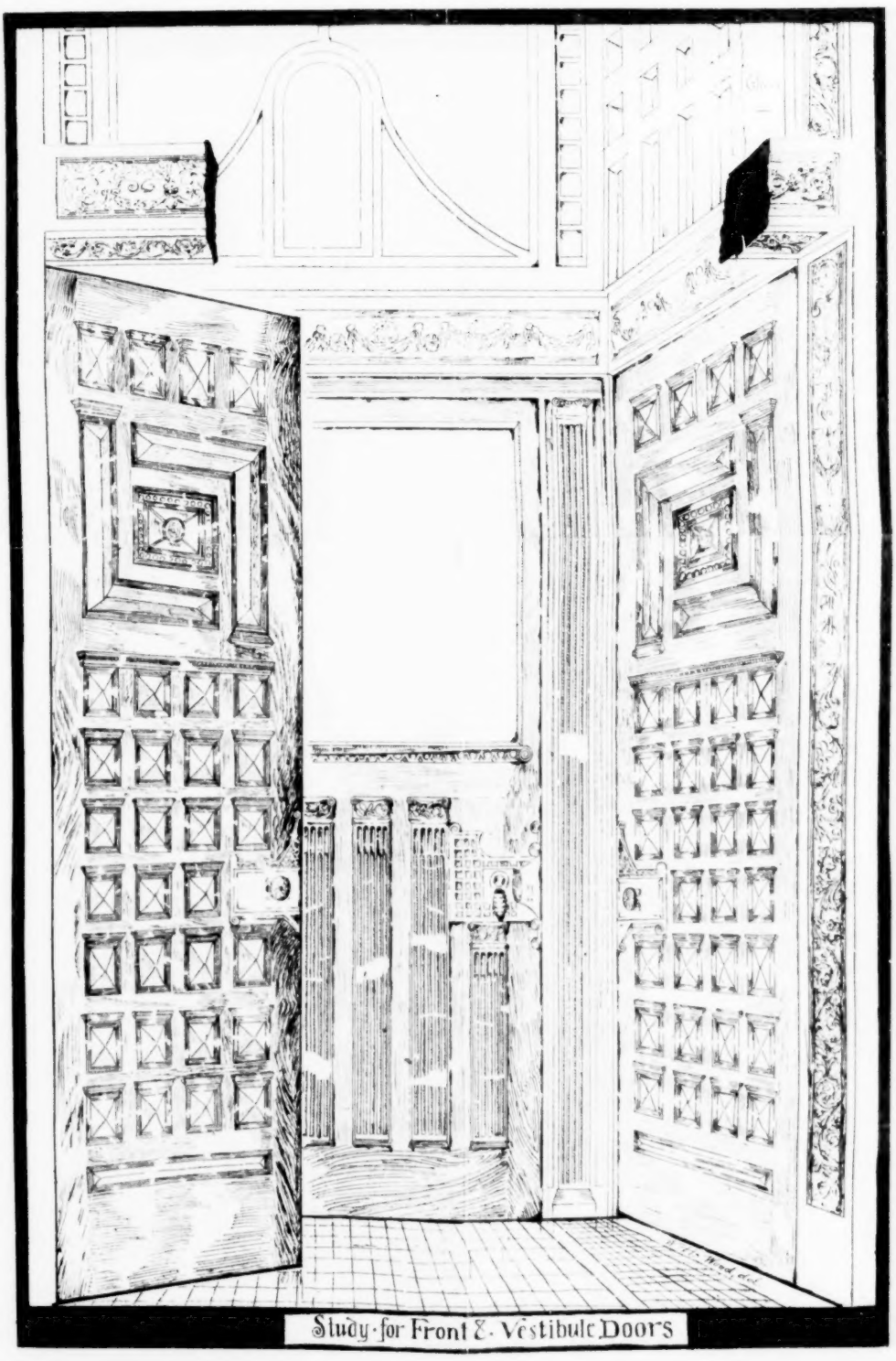


The Library: Butternut Finish throughout, the wall spaces above panelling covered with dark rich red paper.





Window in Library
House for Mr T B Howell



Study for Front & Vestibule Doors

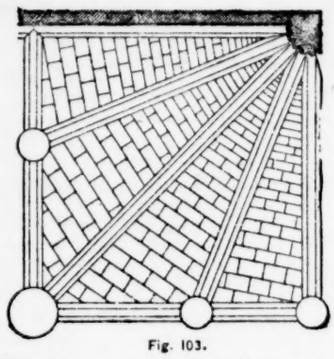


Fig. 103.

They appear to be the immediate predecessors of fan-tracery vaulting. Fig. 103 is a quarter plan.

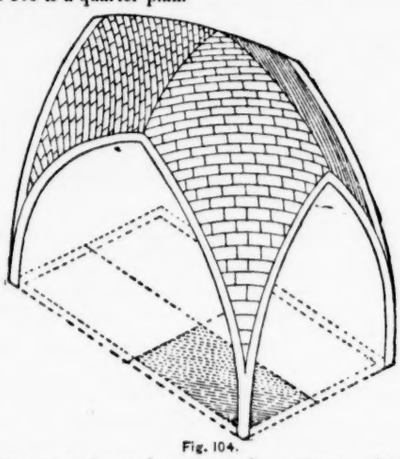


Fig. 104.

11. Groin-ribs (or rather diagonal) lacking. Fig. 104 has transverse and wall ribs only, but these are really groin-ribs. The

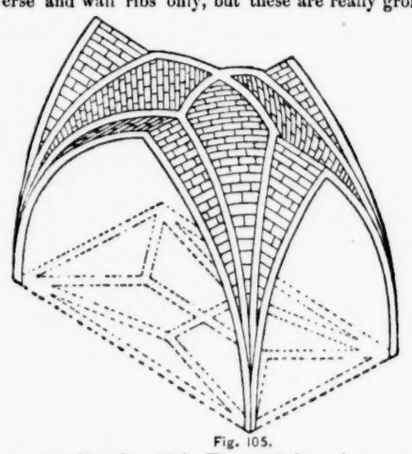


Fig. 105.

panels are usually spheroidal. Fig. 105 is from Antwerp, and Erfurt; Fig. 106, from Senlis; Fig. 107, from Worms; Fig. 108, from St. Nicholas, Toulouse.

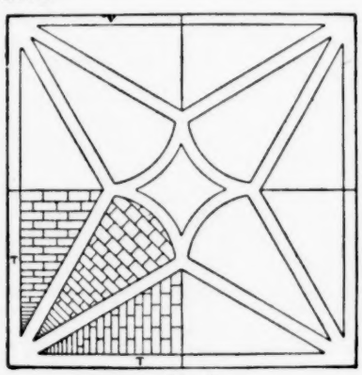


Fig. 106.

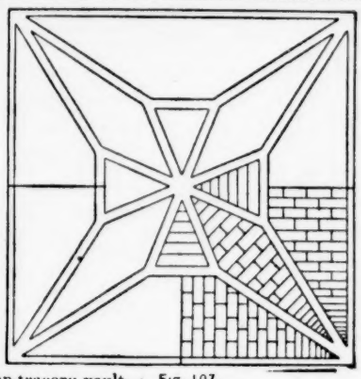


Fig. 107.

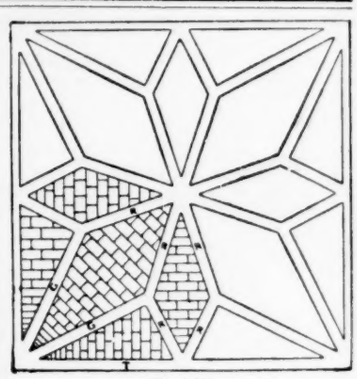


Fig. 108.

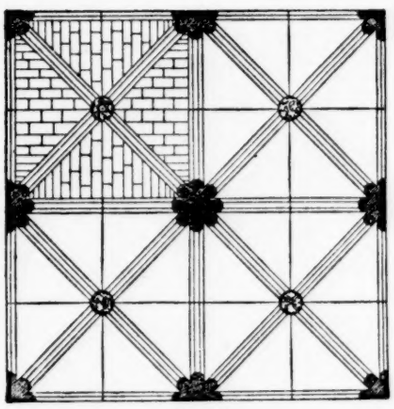


Fig. 109.

12. Vaulting of a square room with a central shaft. Fig. 109 is a plan, and 110 an interior view. It is composed of four quadrilateral vaults. Examples may be found at Crossraguel Abbey, Scotland; at Laon Cathedral, in the choir chapels, etc.

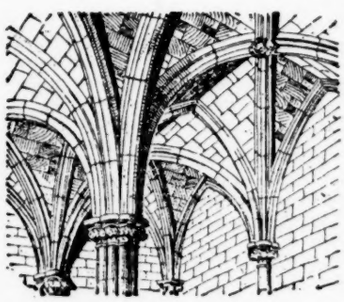


Fig. 110.

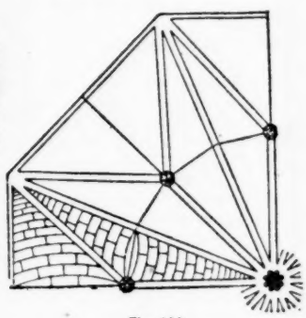


Fig. 111.

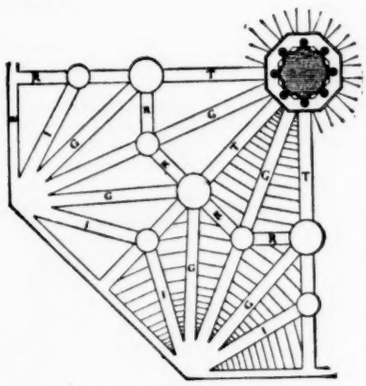


Fig. 112.

13. Vaulting of octagonal rooms with a central shaft. Fig. 111 is a quarter plan, from the chapter-house of Salisbury Cathedral. Fig. 112 is from Elgin Cathedral.

Decagonal rooms are vaulted in a similar manner, as in the chapter-house at Lincoln.

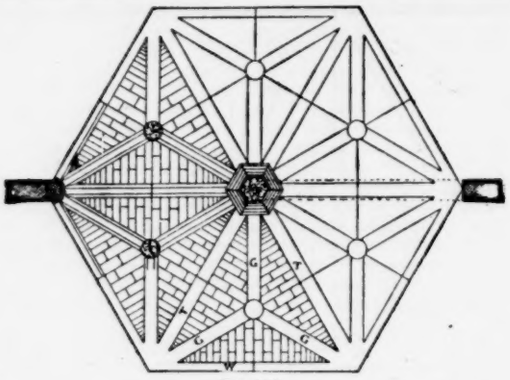


Fig. 113.

14. Pendent Rib Vaults. Fig. 113 is a plan, and 114 a section, from the Lady Chapel at Caudebec.

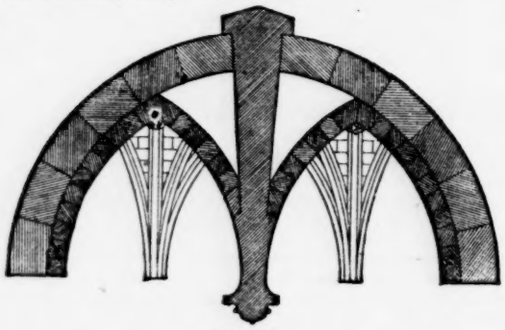


Fig. 114.

Note. — In a recent investigation, we find that the vaults of the rectangular spaces of the triforium in the church built by Charlemagne at Aix-la-Chapelle are not examples of the form IV, *b*, page 65, but simply *inclined* barrel vaults.

THE END.

NOTES ON THE CORROSION OF IRON.

When iron is placed in contact with other metals, galvanic action is instantly excited; the positive metal, or that which has the greatest chemical activity, will suffer, and thus preserve the negative or less active metal.

The theory of metallic preservation is, that the galvanic action of the electro-positive metal decomposes the water, which, in the ordinary action of oxidation, threatens the electro-negative metal, the hydrogen which is liberated combining with the other gases to form new compounds. Thus zinc is electro-positive in relation to iron, and when placed in contact with that metal, even in water, will exercise a preservative influence. Lead, on the other hand, is electro-negative towards the iron, and the latter metal, being positive, will thus preserve the lead at its own expense.

An examination of any old iron railings which have been fastened to the stone-work by means of lead will clearly show the detrimental action that is caused by lead when in contact with iron; the lead will be found to be in a perfect state of preservation, while the iron in its proximity will show evidences of active corrosion. Tin is also electro-negative towards iron, and thus, instead of preserving the iron, it generally accelerates corrosive activity.

Copper, brass, and especially gun-metal, are also electro-negative in relation to iron. The iron, therefore, suffers by contact with these metals and alloys.

The author has deduced the following average coefficients of corrosion of iron and steel (under various conditions and for twelve months) from a vast number of experiments carried out by Mr. Mallet, F. R. S., Professor Calvert, and other equally reliable and distinguished authorities: —

TABLE SHOWING COEFFICIENT OF CORROSION OF IRON AND STEEL ON ONE SQUARE INCH OF SURFACE IN TWELVE MONTHS.

	Foul Sea-Water.	Clear Sea-Water.	Foul River-Water.	Pure Atmospheric Air. Clear River-Water.	Atmospheric Air of City or Manufacturing District, or Sea Air.
	Grains.	Grains.	Grains.	Grains.	Grains.
Cast-Iron	3.500	3.586	2.034	0.604	2.537
Wrought-Iron	10.450	5.835	7.680	0.655	6.690
Steel	10.370	5.175	6.045	0.675	6.675

	Grains.
Cast-iron, in contact with brass, exposed to sea-water of average foulness	10.175
Cast-iron, in contact with copper, exposed to sea-water of average foulness	10.685
Cast-iron, in contact with gun-metal, exposed to sea-water of average foulness	18.630
Best wrought-iron, in contact with brass, exposed to sea-water of average foulness	14.820
Best wrought-iron, in contact with copper, exposed to sea-water of average foulness	21.395
Best wrought-iron, in contact with gun-metal, exposed to sea-water of average foulness	24.195

The foregoing results are evidences of the danger of permitting the contact of metals of opposite electrical polarity.

Cast-iron, protected with one coat of lead paint, exposed to the atmosphere of a city, loses by corrosion 0.6355 grain per square inch.

It will be surprising to many that corrosive action should proceed under a coating of paint; but this action occurs, owing to the drying oils, when the paint is applied, absorbing the oxygen from the air, and becoming converted into a transparent resinous varnish. Occasionally the absorption of the oxygen produces considerable heat, which phenomenon is essentially similar to ordinary combustion, carbonic acid and hydrogen both being evolved. This absorption of the oxygen by the oil, through the minerals forming the color-medium, is the cause of the microscopic pores which exist in all parts of the coating of paint, the number being proportionate to the affinity which the oil has for the oxygen. These minute pores are the cause of the slow oxidation of the metal under a coating of paint, the oxygen and moisture passing through the pores to the metal. Iron exposed to any influences likely to promote corrosive action should therefore be coated with at least three layers of paint, each coat of paint being allowed to dry before the application of subsequent ones.

As to the minerals, zinc is far preferable to lead, owing to its positive electrical relation to iron.

The author has arranged the following formulæ in order to ascertain with a tolerable degree of exactitude the metallic life of iron and steel of any given section and under the various conditions enumerated in the foregoing tables.

Let C represent the coefficient of corrosion for the various characters of iron exposed to various conditions which can be obtained from the foregoing tables.

β the weight of the cubical section of the metal expressed in grains.

γ the lineal length of perimeter in section.

Then $\frac{\beta}{C \times \gamma} = S =$ years of metallic existence of the metal.

— *B. H. Thwaite, F. C. S., in the Building News.*

THE ACTUAL LATERAL PRESSURE OF EARTHWORKS.

THE INSTITUTION OF CIVIL ENGINEERS.

At the meeting on Tuesday, the 5th of April, Mr. Brunlees, vice-president, in the chair, the paper read was on "The Actual Lateral Pressure of Earthwork," by Mr. B. Baker, M. Inst. C. E.

The author dealt with the actual lateral pressure of earthwork as distinguished from the "text-book" pressures which, as Professor Barlow pointed out half a century ago, were based upon theoretical calculations that disregarded the most vital elements existent in fact. The question affected the stability of retaining-walls, the strength of tunnel linings, the timbering of shafts, headings, tunnels, deep trenches for sewers, and many other works of every-day practice. Attention was directed to the measurements by Lieut. Hope, R. E., of the direct thrust of sand on a pressure-board, which was found to be equivalent to that of a fluid weighing 19 lbs. per cubic foot, and to the experimental brick retaining-walls tested by the same officer, when pressure of half that intensity was recorded, and these actual pressures were compared with the corresponding theoretical pressures, of 27 lbs. and 23 lbs. per cubic foot. General Pasley's and General Cunninghame's model revetment walls were then referred to, and General Burgoyne's experimental masonry walls, 20 feet in height. Col. Michon's 40-foot wall, averaging hardly more than one-twelfth of its height in thickness, and Mr. Constable's "toy" retaining-walls of wooden blocks with pease for earthwork, indicated no less than the previously cited experiments that the actual measured lateral pressure of good filling hardly ever exceeded one-half of the "text-book" pressure corresponding to the given slope of repose.

The author's experiments on the direct lateral pressure of ballast and large stones were next summarized, the results being in general considerably lower than those obtained by Lieut. Hope. His experience on the thirty-four miles of deep timbered trenches and other works of the underground railway, also furnished many examples of the actual pressure on timber walings, tunnel headings, retaining-walls and vaults. Exceptionally light works standing perfectly, and apparently very heavy works which had failed, alike served to prove that the designing of retaining-walls was in most instances more a matter for judgment and experience than for calculation. Thus one of the walls on the Metropolitan Railway, which should have failed with a fluid pressure of 19 lbs. per cubic foot, had stood perfectly, whilst another wall capable of resisting 107 lbs. had occasioned much trouble. During the construction of the line, the wall on the west side of the Farringdon Street station failed bodily, by slipping out at the toe and falling backwards onto the slope of the earthwork. This wall was 29 feet 3 inches high above the footings, and 8 feet 6 inches thick, and the soil consisted of 17 feet of made ground, 3 feet of loamy

gravel, and 9 feet of clay. On the opposite side of the station the ground was retained by vaults, 29 feet high by 17 feet deep, but these also slid forward and came over at the top, the movement continuing even after the work had been doubled in thickness. The softening and lubricating action of water on clay was the proximate cause of these failures, as otherwise the latter vaults would have resisted a fluid pressure of 92 lbs. per cubic foot.

The failures of dock walls, though numerous and instructive, afforded no direct evidence as to the actual lateral pressure of earthwork, because in nearly every instance the failure was traceable to defective foundations. Reference was made to the original Southampton Docks wall, constructed forty years ago, having a height of 38 feet from foundation to coping, and a thickness at the base of 32 per cent of the height between the buttresses, and of 45 per cent at the buttresses. If founded on a rock bottom, a fluid pressure of 40 lbs. per cubic foot would have been required to overturn the walls, but before the backing had been carried to the full height, the wall moved forward in places as much as 3 feet. In the recent extension of the same docks, the wall had an effective thickness of 45 per cent at the base, and a fluid resistance of from 60 lbs. to 70 lbs. The Whitehaven Dock wall, 38 feet high, and 13 feet 9 inches thick, stood perfectly, whilst the Avonmouth Dock wall, of the same height, and 16 feet thick, failed. A somewhat similar case of sliding forward occurred at the New South Dock of the West India Docks, London, where the wall was 35 feet 9 inches high, and 13 feet (or 36 per cent of the height) thick at the base. The fact that the stability of a dock wall depended far more upon the foundation than upon the thickness was well illustrated by the quay wall at Carlingford, which had a height of 47 feet 6 inches, and a thickness of only 15 feet at the base. In contrast with this slight structure was cited the Marseilles Dock wall, having a thickness of 16 feet 9 inches for a height of 32 feet. . . .

Walls made of large concrete blocks resting upon a mound of rubble had been constructed in many of the Mediterranean ports, generally with success, but occasionally with failure, as at Smyrna, where, owing to the great settlement, six and seven tiers of blocks had to be superimposed instead of four, and the quay wall had, after all, to be supported by a slope of rock in front. The proportions arrived at by experience were a width of 9 metres at the top, and a thickness of not less than two metres for the rubble mound, a depth of 7 metres below water, and a thickness of 4 metres for the concrete block wall resting on the mound, and a minimum thickness of 2.5 metres, and a height of 2.4 metres for the masonry wall coping the concrete blocks. Examples were not wanting of walls founded on rubble mounds where the thickness held a smaller ratio to the height than the 42 per cent considered necessary by French engineers. The lightest of all, perhaps, was the dry masonry of the outer wall of the St. Katherine's Breakwater, Jersey, which was only 14 feet wide at the base, for a total height of 50 feet. The most cursory examination of the cases of failure alluded to would serve to justify the statement that the numerous failures of dock walls did not afford any direct evidence as to the actual lateral thrust of earthwork. Thus, remembering that General Burgoyne's battering-wall, only 17 per cent of the height in thickness, supported perfectly the heavy sodden filling at its back, no calculation was required to show that the 32 and 45 per cent Southampton Dock counterforted wall, the 42 per cent Avonmouth Dock wall, the 36 per cent West India Dock wall, the 50 per cent Belfast Harbor wall, and the 30 per cent Victoria Dock wall, would all have stood perfectly had the foundation been rock, as in the instance of General Burgoyne's experimental walls, instead of mud, clay, and silt, as was actually the case.

The aim of the author in the present paper had been to set forth, as briefly as possible, what he knew regarding the actual lateral thrust of different kinds of soil, in the hope that other engineers would do the same, and that the information asked for by Professor Barlow more than half a century ago might be at last obtained. Although the acquirement of the missing data would probably lead to no modification in the general proportions of retaining structures, since these were based upon dearly-bought experience, and not upon theoretical treatises, it was none the less desirable that it should be obtained, for an engineer should be able to show why he believed a given wall would stand or fall. To assume upon theoretical grounds a lateral thrust, which experiments proved to be excessive, and to compensate for this by giving no factor of safety to the wall, was not a scientific mode of procedure.

As a result of his own experience, the author made the thickness of retaining-walls in ground of an average character equal to one-third of the height from the top of the footings, and if any material was taken out to form a panel, three-fourths of it was put back in the form of a pier. The object of the panel, as of the one and a half inch to the foot batter which he gave to the wall, was not to save material, for this involved loss of weight and grip on the ground, but to effect a better distribution of pressure on the foundation. It might be mentioned that the whole of the walls on the Metropolitan District Railway were designed on this basis, and that there had not been a single instance of settlement, or of falling over or sliding forward.

A PROTEST.

APRIL 26, 1881.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Gentlemen, — Allow me to enter my protest against the character of the illustrations in your periodical, and to express my disgust with the revelation made by them of the extent to which the craze for "Queen Anne" alleged architecture has prostituted true art, and paralyzed the spirit of progress in architectural design. All the illustrations of current work since January 1 have been of the most beastly type, with the sole exception of the United Bank Building, whose projectors evidence in this work progressiveness and capacity, and a true conception of the leading principles of architectural art.

Your journal, to be worthy the support of the profession, should be, not a re-hash of text-books, but the index and expositor of the progress of architecture, both in construction and in artistic design and finish, instead of illustrating depraved taste and the chimeras of dilettanti, and echoing the ill-formed opinions of alleged political economists on the labor question, or the screeds of amateur plumbers against the "ignorance" of architects on those principles of which these "sanitary engineers" claim to hold exclusive knowledge.

Respectfully yours, CHAUNCEY N. DUTTON.

[WE feel it our duty to publish this letter, as a warning to those who still continue to favor us with their kind interest; that they may escape in time from the evil influence of those "chimeras of dilettanti" and other mysterious, but no doubt pernicious things which, as it appears, fill the columns of this journal. One thing has always seemed to us very strange, — that these disdainful souls should not make an attempt to rescue us from our evil ways by sending us some of those "expositions of the progress of architecture," or illustrations of "artistic design and finish," to which they always refer so obscurely. We are always glad to welcome new contributors, and it is quite possible that our "depraved taste" might be regenerated by the assiduous efforts of those who possess "a true conception of the leading principles of architectural art." — EDS. AMERICAN ARCHITECT.]

A QUESTION OF PARTY-WALLS.

WINONA, April 26, 1881.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Sirs, — I would like your opinion as to the law in the following case: A certain party builds a one-story brick building, one wall of which is a "party" wall, with a "party-pier" in front, but at that time no special agreement is made with the owner of the adjacent lot, on whose land one-half the wall and pier rest. After some years the said owner of the adjacent lot desires to build and of course uses the party-wall referred to, for his half of which he now pays. But he cannot use the pier on the front of the wall, as it is a cheap, twelve-inch brick pier, ill-looking and not of nearly sufficient strength to sustain the half of the weight of his front which it must carry. His front is so narrow that he cannot afford to build a pier alongside the party-pier, therefore he desires to cut away so much of the brick "party-pier" as is on his lot, and replace it with a stone pier, the whole of which will be on his own property, leaving but one-half of the original pier. The cutting away of one-half the brick pier can be done without damage to the first party, excepting as regards appearance. Now is there any law to prevent the second party cutting away *his half* of the pier and replacing it with a stone pier, provided that the safety of the first party's building is not endangered thereby? An early answer in your valuable journal will oblige

AN ARCHITECT.

[To cut away half of a twelve-inch brick pier seems to us likely to leave a rather slender support for the adjoining front, but if it can be done with safety, the right of either proprietor to extend his front to the centre of the party-wall is practically established by custom, in default of any legislative enactment to the contrary. — EDS. AMERICAN ARCHITECT.]

BUILDING-PAPER.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Gentlemen, — Your paper comes duly to hand every Monday, through the local news agent. In it I find many good things. Perhaps by asking a question something may be added to the good things to follow. I have been seeking for a long while for a something to use in place of lath and plastering, say a paper board from one-eighth to one-quarter inch thick, from two to three feet wide, and from eight to ten feet long, to fasten directly to the studding or beams. It should be impregnated with some chemical to make it vermin-proof. When on, it could be finished with paint or paper-hangings. Can you tell me where such an article can be procured, and give your views on the use of it? Very respectfully yours truly, A. C., JR.

P. S. — What is the best known method of deafening the floor of an ordinary dwelling-house? Yours, etc., A. C., JR.

[IN the West and South it is not unusual to tack common sheathing felt paper to the studs of a house, instead of lathing and plastering, the felt being afterwards whitewashed, painted or papered, according to circumstances. A thick sort of paper-hangings was once also manufactured for applying directly to the studs, by parties in Wisconsin. No doubt such articles answer a good purpose in warm climates.

The best way of deafening house-floors is to put in ceiling beams altogether independent of the floor above. Next to that, a deafening of plaster or "counterceiling" is most effective, but a double flooring of boards, with two thicknesses of felt paper between, is good; and the combination of plaster deafening with a double and felt-lined floor is all that need be desired in most cases. — EDS. AMERICAN ARCHITECT.]

FIRE-PROOFING WOOD.

NEW YORK, April 22, 1881.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Sirs, — Possibly some of your readers or yourselves can inform me whether there is any establishment that undertakes to render wood

incombustible by some chemical application. If you will kindly give room to this in your journal you will greatly oblige

One of your Subscribers.

[The application generally employed for this purpose is the tungstate of soda. We have an impression that it has been used on a large scale in one or two of the theatres in New York. Perhaps the proprietors of the Madison Square Theatre could give further information on the subject. The silicate paint imported by Mr. Howard Fleming, New York, gives a certain protection against fire, but of course a superficial coating cannot confer any lasting power of resistance. Burnettized or kyanized lumber, again, is much less combustible than ordinary wood.—Eds. American Architect.]

NOTES AND CLIPPINGS.

Protecting Baltimore School Children.—It is proposed to put iron stairways on the outside of the school-houses in Baltimore that are now supplied with but a single stairway within the building. The city has appropriated ten thousand dollars to furnish additional means of egress from such buildings.

Venetian Glass.—Mr. James Jackson Jarves, the United States Vice-Consul at Florence, will, it is said, ship in a few days a collection of rare old Venetian glass, numbering two hundred pieces, as a present to the Metropolitan Museum of Art, New York.

The Washington Memorial.—At the last session of Congress an act was passed appropriating $30,000 to erect a monument to the memory of George Washington, at his birthplace in Virginia, and lately Secretary Blaine has authorized Messrs. Howe & Dodd, architects, of Boston, to prepare working drawings and estimates of the cost of erection.

The Isthmus Canal Project in 1521.—The San Francisco *Mining and Scientific Press* says that any one who thinks the idea of a canal connecting the Atlantic and Pacific a new one is mistaken. As long ago as 1521, a Portuguese navigator, Antonio Galvao, proposed to Charles the Fifth to make an inter-oceanic communication by the Panama route; and in 1780 Nelson proposed a canal through Nicaragua. Humboldt took it up in 1804. The first work actually done was in 1841, by Henry de Puydt, who moved a colony to Honduras, to dig a canal. This colony went the way of so many that had preceded it. A few years later, Garilla and Courtinez were sent out by Guizot to study the matter, and pronounced the undertaking an impossibility. About the same year, Louis Napoleon was solicited by the Nicaraguan Government to lend his name to the undertaking, and did actually make an appeal to the public in a pamphlet entitled *Le Canal de Nicaragua*. Thus it is that the isthmus has received a pretty fair pavement of good intentions.

Building-Stones in California.—A correspondent writes: "At the State Museum in San Francisco is a very fine specimen of a reddish sandstone obtained from an island near San Diego. In formation it is a close, even-grained stone, finer if anything in texture than that from Connecticut or Nova Scotia, and about as near as I can remember the color of the latter. No reliable information is at hand as regards the cost of the stone laid down in the city, but it is to be hoped it may become used here and take the place of the florid plaster and galvanized-iron fronts which now are no credit to the city. If business men who build would only study into the economy of building properly there are unbounded quarries of all kinds of stones, granites and marbles, which could be opened at little expense, and would be were there any demand for them." In a subsequent letter he writes: "I have just received information of the stone mentioned in my last. It is from an island formed entirely of stone same as sample, one mile long, three-quarters wide, and about six hundred feet high, and lies about fifteen miles from San Diego, in the bay of the same name. The island is of a stratified formation, from six inches up in thickness, and rises abruptly from the water, so that vessels of the heaviest tonnage can come within a few feet of the quarries, thus allowing the stone to be hoisted with derricks, then swung onto the decks of the vessels. With such natural advantages, a stone of such good qualities, having fine even grain, warm color, and taking a fine finish, should soon be in demand, and no doubt will be, at least in Southern cities, where it can be brought in barges at slight expense."

Pointed *vs.* Ball-Capped Lightning-Rods.—On June 18, 1764, the steeple of St. Bride's Church, London, was struck by lightning and almost entirely destroyed. The Chapter of St. Paul's, apprehending a similar calamity to the cathedral, sought the advice of the Royal Society, and a committee was appointed to consider the matter. Franklin was in London at the time as representative of the American States in relation to their disputes with the mother country; he was nominated a member of the committee, and the result of their deliberations was that in 1769 a number of lightning conductors were erected on St. Paul's. On the occasion a controversy arose as to whether the conductor should be pointed or surmounted by a ball. Franklin recommended points, while some other members of the committee recommended balls. The decision of the committee was in favor of Franklin's opinion, and pointed conductors were adopted for St. Paul's. But the controversy did not end. It was a time of political excitement, and party spirit ran high. The Tories generally were strong advocates of the use of balls, while the Whigs were equally enthusiastic in favor of points. For a time the Tories seemed to prevail. Experiments on a grand scale were conducted in the presence of the king at the Pantheon; and being assured that those experiments were in favor of balls, His Majesty directed that a large cannon-ball should be fixed on the end of the lightning conductor attached to the palace at Kew. The committee of the Royal Society, however, remained unconvinced. In course of time the ardor of party spirit subsided: experience as well as reason was found to be in favor of Franklin's views, and the battle of the balls and points has long since passed into the domain of history.

The New Eddystone Lighthouse.—The works at the Eddystone Lighthouse have been recommenced. The masonry up to the fifty-second course, which is eighty feet above low-water mark, has been completed. It is now on a level with the light of the old tower; thus the new tower already intercepts the light from the old tower over a very perceptible area, viz., twelve degrees near the reef. This would soon be passed over by a ship, but at five miles distance there would be a mile of darkness on a true south-west course. It was intended in the original specifications to provide for this interception by placing a second light in the new tower at the same level as that in the old tower, so screened as to be visible only within the limit of the dark arc. There was also to have been a temporary bridge from one tower to the other, so that the second staff of light-keepers might have communication between the two towers. This, however, is not to be carried out, and the Trinity Corporation have given public notice to mariners that there is such a dark arc, and the cause of it. The fifty-first course, which was laid a few days ago, is a floor course, and completes the fourth apartment above the well. The room just completed is the crane-room, and is provided with two doors besides a window, one facing south and the other north, so that stores may be taken in from either one side or the other, according to the state of the weather. The three rooms below this will be occupied as oil and general store rooms. The room immediately above the crane-room was to have been occupied by the white fixed subsidiary light, which is to cover the reef of rocks known as the Hand Deeps. The rocks bear from the Eddystone Lighthouse three and a quarter miles in a direct line between it and Lool Island. At low water there is a depth of four fathoms of water upon them. Although this would be ample for ordinary craft in fair weather, yet in rough weather it may go ill with even a small vessel in the trough of a sea, much less one of a larger class, or, perchance, an ironclad. This subsidiary light will only be seen within the area above named, and when in the vicinity of danger. It is now intended that this subsidiary light shall be placed a room higher, so changing places with the living-room. These modifications, together with the preparation of the light itself, are being carried on in the yard at Oreston, and afford occupation for the men when they are not able to work at the rock. In external appearance the new tower will be a complete alteration from the old both as to height and color, being nearly double as high, and of uniform granite, like the breakwater lighthouse. The light itself is to be a modification of the plan recommended by Sir William Thompson. Instead of a fixed white light, as at present, it will be oscillating. The light will be a powerful white double-flashing half-minute light, showing two successive flashes of about two and one-half seconds' duration divided by an eclipse of about four seconds, the second flash being followed by an eclipse of twenty-one seconds. The light will be visible all round the horizon, but from its more elevated position it will be seen in clear weather seventeen and one-half miles, and its field of visibility will overlap that of the Lizard, instead of there being, as now, eight miles of darkness. Out of two thousand two hundred stones, of which the tower will consist, over eighteen hundred are already in position. At the present rate of progress, therefore, it is probable that next autumn's excursionists will witness the completion of the tower, and mariners are informed by public notice that the new tower will be ready for the exhibition of a light early next March.—*The Architect.*

How Whistler Painted his Peacock Room.—"Probably you have heard of Whistler's extravaganza in houses. He was engaged to decorate a noble mansion in Belgravia; the price was no object to the owner, and for that matter neither was it to Whistler. One day a friend asked me to go over and see one of the rooms that was nearly completed, and I hastened to accept the invitation. This is what we saw on entering: A very slim, spare figure extended on a mattress in the middle of the floor; beside him an enormous palette, paints, a half-dozen long bamboo fish-poles resting on a line with their butts close at hand, and a very large pair of binocular glasses. Whistler, dressed wholly in black velvet, with knickerbocker pantaloons stopping just below the knee, black silk stockings and low pointed shoes, with silk ties more than six inches wide and diamond buckles, was flat on his back, fishing-rod in hand and an enormous eye-glass in one eye, diligently putting some finishing touches on the ceiling, his brush being on the other end of the fish-pole. Occasionally he would pick up his double glasses like some astronomer peering at the moon, and having gained a nearer and better view of the effect, he would again begin to agitate the paint-brush at the other end of the long pole. 'Now wouldn't I be a fool,' said he, 'to risk myself on a scaffolding and nearly twist my head off my shoulders trying to look upward, when I can overcome the difficulty and annihilate space so easily thus?' and he gave a wave of his fish-pole. And such a room! one mass of gorgeous purple and blue, ornamented solely with an enormous number of the eyes of a peacock's feathers. It was a room to make a man a lunatic in a week. It was as if all the peacocks in Christendom had settled down upon one, and were about to smother one in tail-feathers. And this was the celebrated 'peacock room' about which all London went wild not long afterward."—*Correspondence of the Providence Press.*

Lightning and Explosions.—From official records it appeared that damage has been done to the extent of from £6,000 to £10,000 a year. Between the years 1810 and 1815 no less than thirty-five sail of the line and thirty-five frigates and smaller vessels were completely disabled by lightning; and this was irrespective of missing ships of which no account had ever been received. A forty-four-gun ship called the *Resistance* was struck by lightning in the Straits of Malacca, and her powder-magazine exploding, she went to the bottom with all her crew save three, who were picked up by boats. In 1769 a powder-magazine in Brescia, in Italy, in which there were two million pounds of gunpowder, was struck by lightning. The magazine and a great part of the city were shattered to pieces, and thousands of the inhabitants were buried in the ruins. In 1856 the Church of St. John, in the Island of Rhodes, in which a large quantity of gunpowder was stored, was struck by lightning, and the building was reduced to ruins, together with a large part of the city in which it stood, and a number of the inhabitants were killed.

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.*]

240,497. COVERING FOR STEAM-PIPES, ETC. — Isaac H. Babcock, Lockport, N. Y.

240,505. CANT-DOG. — Milton C. Cantrell, Harrison, Ark.

240,521. — MOULD FOR MAKING CEMENT PIPES. — John Masten, Milwaukee, Wis.

240,557. DIVIDERS. — Edward Soetbeer, New Bremen, Ohio.

240,575. HAND RATCHET-DRILL. — Isaac N. Cherry and Robert N. Cherry, Jersey City, N. J.

240,603. GROUND-COVERING FOR PAVEMENTS AND CELLAR-BOTTOMS, OF GLASS. — Christopher W. McLean, Chicago, Ill.

240,605. MANUFACTURE OF BRICK. — Jacob Miller, Allegheny, Pa.

240,609. CANT-DOG. — Edward A. Peasley, Pancoastburg, Ohio.

240,625. SASH-FASTENER. — William G. Vessels, Kentland, Ind.

240,649. STEAM-HEATING APPARATUS. — Thomas Bonner, New York, N. Y.

240,667. SAWING-MACHINE. — Thomas J. Crump, Buena Vista, Tex.

240,689. CURTAIN-FIXTURE. — Chas. E. Fritts, Oneonta, N. Y.

240,706. EARTH AND ROCK DRILLING MACHINE. — Phineas Helm, St. Louis, Mo.

240,718. HOLLOW BUILDING-BLOCK. — Charles H. Houghton, Perth Amboy, N. J.

240,724. WOOD-PLANING MACHINE. — Jeppe Jeppesen, Provo City, Utah.

240,729. CLAMP FOR SLATE ROOFS. — John O. Jones, Washington, D. C.

240,736. MEANS FOR ATTACHING RAIN-SPOUTS TO BUILDINGS. — Jeremiah W. Leeds, Philadelphia, Pa.

240,742. ARTIFICIAL STONE. — Geo. W. Mason, Sharon, Pa.

240,746. FIRE-PROOF PAINT. — Orion B. Mellick, Bloomsburg, Pa.

240,757. FIRE-ESCAPE LADDER. — Silas R. Owen, St. Joseph, Mo.

240,760. SHUTTER-FASTENER. — Joseph W. Pearson, Newton, Mass.

240,761. COMPOSITION FOR ROOFS, ETC. — Darwin D. Pennoyer, Dover, N. H.

240,768. ANNUNCIATOR. — David Rousseau, New York, N. Y.

240,782. HOISTING-APPARATUS. — John George Speidel, Reading, Pa.

240,799. FIRE-EXTINGUISHING COMPOUND. — Max Windsperger, 125 Saffron Hill, Holborn, County of Middlesex, England.

9,684. (*Reissue.*) DEVICE FOR MAKING WATER-TRAPS. — Robert Cunningham, Chicago, Ill.

SUMMARY OF THE WEEK.

Baltimore.

BUILDING PERMITS. — Thirty-six building permits have been issued since the last report, the following only being of sufficient importance to be mentioned: —

Thos. Kensett, three-st'y brick warehouse on Falls Ave., near Eastern Ave., 29′ x 46′.

Samuel Taylor, five-st'y brick building, on Pratt St., between Albemarl St. and Falls Ave., 29′ x 94′.

Hugh McVey, three-st'y brick building, on Hillen St., between Forrest and Eden Sts.

German American Bank, one-st'y brick bank-building, 173 Broadway, between Canton and Eastern Aves.

F. A. Schlutter, three-st'y brick building, on Bond St., between Thames and Lancaster Sts.

Barbara Schultz, two-st'y brick addition to dwell., Central Ave., between Eager and Chase Sts.

Lewis Wagner, three-st'y brick building, n w cor. Patapsco and Berton Sts.

Wilson & Hunting, two-st'y brick building, s w cor. Falls and Canton Aves.

PIERS. — The Universal Produce and Fish Exchange has concluded a contract with Benjamin Glenn for the construction of two piers at Hooper's Wharf, Fells Point, each to be 175′ long and 80′ wide.

SCHOOL-HOUSE. — The School Commissioners have leased the lot of ground, 74′ x 219′, cor. Charles and Ostend Sts., for the purpose of building, at an early date, a new school-house for the English German School No. 2.

CHURCH. — The old Strawbridge M. E. Church, n e cor. Linden Ave. and Biddle St., is to be sold, and a new church to be built on a site northwest of the present church. The plans have not yet been adopted.

DWELLINGS. — Mr. Geo. A. Blake is building a dwelling-house for Mr. Frederick M. Colston, on St. Paul St., between Chase and Eager Sts., 25′ x 85′, three stories high, to be of pressed brick with brownstone finish; cost, $15,000.

Mr. Geo. A. Blake is also building a house for Mr. Osmun Latrobe, on St. Paul St., near Biddle, 40′ x 70′, two stories high, of pressed brick, with Cheat River stone finish; cost, $18,000.

Mr. John Henry Keene, Jr., is about to build a house on the n e cor. of John and St. Paul Sts., 20′ x 70′, of pressed brick with brownstone finish; Mr. Chas. E. Cassell, architect.

Boston.

BUILDING PERMITS. — *Wood. — Allston St.*, near Brighton Ave., for John W. Hollis, dwell., 24′ x 32′, two stories; Jacob W. Berry, builder.

Woodward St., near Dorchester Ave., for Mrs. Martha B. Abbott, 3 dwells., 21′ x 32′, three stories; Horace Manson, builder.

West Fourth St., Nos. 303 and 303½, for John P. Mullen, 2 dwells., 20′ x 36′, three stories; John P. Mullen, builder.

West Fourth St., No. 305, cor. D St., for John P. Mullen, dwell. and store, 20′ x 36′, three stories.

Forest Hills St., near Green St., for A. D. Weld, Jr., stable and carriage-house, 33′ x 47′; John D. Wester, builder.

Saratoga St., near Riverside Ave., for Eli W. Hoyt, store-house, 32′ x 77′, three stories; Charles H. Brown, builder.

Medford St., No. 231, for Clark & Smith, dry-house, 18′ x 100′, two stories; Geo. Barker, builder.

East Second St., No. 520, Jones & Cook, store-house, 20′ x 140′; Holbrook & Harlow, builders.

South St., near Commercial St., for D. J. Cutler, 2 storehouses, 37′ x 100′ and 25′ x 80′; J. H. Wilder, builder.

Garden St., near Spring St., for Highland Ice Company, ice house, 67′ x 106′.

Pynchon St., No. 65, for Henry Pfaff, stable, 31′ x 136′; Frank Schell, builder.

Dorr St., near East St., for Christopher Blake, manufactory, 35′ x 85′, three stories; Wm. H. Lee, builder.

Webster Ave., near Cambridge St., for Ebenezer A. Hollis, 2 dwells., 20′ x 40′, two stories; Henry M. Perry, builder.

Green St., near Forest Hills St., for Owen Cassidy, dwell., 24′ x 32′, three stories; F. J. Tobin, builder.

Sparhawk St., near Murdock St., for Edward C. Sparhawk, dwell., 34′ x 38′, two stories; Samuel N. Davenport, builder.

Monadnock St., near Dudley St., for Benj. B. Converse, dwell., 24′ x 37′, two stories.

Norfolk St., No. 41, for Nathan J. Cottle, dwell., 21′ x 30′; Samuel F. Towle, builder.

Millet St., near Wheatland Ave., for George E. Savory, dwell., 23′ x 31′ two stories; John Horsfield, builder.

Elmore St., near Wilmont St., for Chas. A. Dean, 2 dwells., 20′ x 46′, two stories; Chas. H. Blodgett, builder.

Mills St., near Dale St., for Bean & Abbott, 4 dwells., 20′ x 30′, three stories; 5 dwells., 20′ x 30′, two stories; Benj. F. Bean, builder.

Brick. — West Dedham St., No. 80, for Thomas Ray, tenement-house, 25′ x 40′, four stories; Ripley & Stearns, builders.

Beacon St., No. 274, for Francis L. Higginson, dwell., 53′ x 75′, three stories; Norcross Bros., builders.

HOUSES. — Messrs. Rotch & Tilden are architects of 2 brick and stone houses for Dr. H. C. Haven, to be built at the corner of Commonwealth Ave. and Exeter St. They will be three stories high, with mansard.

THE PAST MONTH. — During the month of April there have been issued 24 permits for brick buildings, 100 for wooden buildings, 280 for additions and alterations, 34 for boilers, furnaces, etc., 33 notices of intention to put in heating apparatus, 176 permits for use of streets, and 2 special for wooden buildings: a total of 649 permits.

Brooklyn.

BUILDING PERMITS. — *Schermerhorn St.*, s e cor. Hoyt St., 4 three-st'y brownstone dwells.; cost, each $8,000; owner, A. P. Preterre, 130 West Twenty-second St., New York; architect, J. Correja; builders, John De Mott & Son.

Hoyt St., e s, 81′ 6″ n Schermerhorn St., three-st'y brick dwell.; owner, A. P. Preterre, 130 West Twenty-second St., New York City; architect, J. Correja; builders, J. De Mott & Son and W. H. Noe.

Underhill Ave., w s, between Wyckoff and Warren Sts., three-st'y brick tenement; cost, $4,500; owner, Caroline Phileox, Underhill Ave.; builder, J. H. Townsend.

Sackett St., s s, 142′ w Sixth Ave., 5 two and three st'y brownstone dwells.; cost, each $5,500; owner, Mary Magilligan, 30 St. Mark's Place; builder, John Magilligan.

Sackett St., s s, 262′ w Sixth Ave., 4 two-st'y brownstone dwells.; cost, each $5,000; owner, Mary Magilligan, 30 St. Mark's Place; builder, John Magilligan.

Eighth Ave., s e cor. Seventh St., two-st'y brick dwell.; cost, $15,000; owner, George Engs, 145 West Forty-sixth St., New York; architect, R. B. Eastman; builders, T. B. Rutan and E. Dennigton.

New York Ave., No. 46, three-st'y brick flat; cost, $6,500; owner, J. R. Wood, 75 New York Ave.

Jefferson St., s s, 100′ w Nostrand Ave., 27 four-st'y brownstone flats; owner, architect, and builder, Geo. W. Brown, 728 Fulton St.

Penn St., s s, 50′ e Marcy Ave., 3 two-and-one-half st'y brick dwells.; cost, each $5,000; owners and builders, Jenkins & Gillies; architect, W. H. Gaylor.

Twenty-third St., s s, between Fifth and Sixth Aves., two-st'y brick stable and storage; cost, $7,600; owner, Atlantic Ave. Railroad Co.; architect, Geo. W. Anderson; builder, J. Q. Anderson.

Schermerhorn St., s e cor. Nevins St., three-st'y brick dwell.; cost, $8,000; owner, W. E. Griffiths, Third Ave., cor. Schermerhorn St.; architect, M. J. Morrill; builders, Shanly, Cody, Hart & Bogart.

Seabring St., s s, 125′ e Richards St., one-st'y brick foundry; cost, $3,500; owner, Robt. A. Cheseborough, 110 Front St., New York; architect, J. H. Kelly; mason, J. W. Crawford.

Halsey St., n s, 13½′ w Stuyvesant Ave., 2 two-and-one-half st'y brownstone dwells.; cost, $5,000; owner, D. C. Chapman, 92 Sixth Ave.; architect, etc., John Erickson; mason, E. Matthews.

ALTERATIONS. — *Willow St., No. 127*, two-st'y brick extension; cost, $5,000; owner, L. Thomas, 127 Willow St.; architect, etc., E. H. Burnett; mason, J. W. Campbell.

Atlantic Ave., No. 139, raise extension two stories, etc.; cost, $3,000; owner, Joseph O'Brien, 151 Atlantic Ave.; architect and builder, W. H. Murphy.

DEPOT. — For the Brooklyn & Newtown Railroad, a brick depot, 200′ x 275′, bounded by Stockholm, De Kalb and Central Aves., is to be built at a cost of $120,000, from designs of Mr. Ed. E. Raht, of New York.

Chicago.

STORE. — Messrs. Wheelock & Clay are preparing plans for a four-st'y store on Wabash Ave. and Jackson St., for L. L. Coburn, Esq.

HOUSES. — A double house for R. S. Burger, to cost $6,000, is to be built, cor. Goethe and State Sts., by H. M. Hanson, architect.

BRICK-WORKS. — Buildings and kilns costing $25,000 are to be built by the Chicago Anderson Pressed Brick Co.

Cincinnati.

BUILDING PERMITS. — Since our last report the following permits have been issued: —

G. H. Grieve & Co., one-st'y stable; cost, $3,600.

Mrs. H. Kolfschulte, three-st'y brick, Pearl St., between Plum and Elm Sts.; cost, $4,000.

J. W. Cotteral & Co., three-st'y brick, 133 Everett St.; cost, $5,000.

J. W. Cotteral & Co., two-st'y brick, Seventh St., e Race St.; cost, $3,000.

Jos. Longworth, five-st'y brick store, Second St., between Elm and Plum Sts.; cost, $15,000.

Fred Merker, four-st'y brick, Harriet St., near Front St.; cost, $4,300.

W. C. Peale & Bro., four-st'y brick, 334 Central Ave.; cost, $3,500.

Denver, Col.

BANK-BUILDING. — Messrs. Nichols & Canman are the architects of the new stone building, 50′ x 87′, at the cor. of Larimee and Seventeenth Sts., for the Colorado National Bank; cost, $65,000.

STORES. — Hon. G. G. Symes is to build a block of stores, 100′ x 125′, cor. Champo and Sixteenth Sts.; cost, $50,000; Messrs. Nichols & Canman architects.

SCHOOL-HOUSE. — The corner-stone of the new brick High School building was laid April 23. Only one wing, 77′ x 107′, two stories high, (about one-third of the building) is to be built this summer, at a probable cost of $60,000; R. S. Roeschlaub, architect for the Board of Education.

New York.

BUILDING PERMITS. — *Forty-fifth St., Nos. 319, 321 and 323* e, 3 five-st'y brick tenements; cost, $40,000; owners, Anna Ruppert, *et al.*, 1639 Third Ave.; architect, W. Kuhles; builders, C. Eberspacher and Grissler & Fausel.

Forty-sixth St., No. 312 e, five-st'y brick tenement; cost, $13,000; owners, Anna Ruppert, *et al.*; architect, W. Kuhles; builders, C. Eberspacher and Grissler & Fausel.

Ninth Ave., s w cor. Seventy-ninth St., 6 four-st'y brownstone dwells.; cost, each $8,000; owner, architect and carpenter, Christian Blinn, 106 West Fifty-second St.

Broadway, Nos. 162 and 164, six-st'y sandstone and brick office-building; cost, $180,000; owners, F., F. A., Allan and Henry Marquand, 21 West Twentieth St.; architect, R. M. Hunt; builders, D. Campbell & Co. and Morton & Chesley.

Eighth Ave., No. 206, five-st'y brick tenement; owner, W. K. Thorn, 13 West Sixteenth St.; architect, J. I. Howard.

Madison Ave., e s, 62′ n Eighty-fourth St., four-st'y brownstone dwell.; cost, $22,000; owner, Thomas Walsh, Madison Ave., e s, between Eighty-fourth and Eighty-fifth Sts.; architect, J. McIntyre; builder, Mr. Bowen.

One Hundred and Twenty-fifth St., n s, 160′ w Fifth Ave., 4 four-st'y brownstone dwells.; owner and builder, E. L. Pierson, 57 Third Place, Brooklyn; architect, F. C. Merry.

Seventy-first St., No. 106, five-st'y brick apartment-house; cost, $16,000; owner, F. Wiener, 114 Seventh St.; architect, Wm. José.

Sixty-ninth St., n s, 175′ e Fifth Ave., 2 four-st'y brownstone dwells.; cost, $40,000 and $50,000; owner, Anthony Mowbray, 104 e Eighty-fifth St.; architects, Lamb & Wheeler.

Fifty-first St., No. 529 w, four-st'y brownstone flat; cost, $15,000; owner, H. C. Folkmas, 798 Tenth Ave.; architect, W. Kuhles.

Eleventh and Twelfth Aves.. Thirty-fourth and Thirty-fifth Sts., 26 two-st'y brick market buildings; cost, $115,000; owner, New York Central & Hudson River R. R. Co., Fourth Ave. and Forty-second St.; builder, Joseph Richardson.

Grand St., s e cor. Norfolk St., five-st'y brick tenement; cost, $20,000; owner, S. Bacharach; architect, Wm. José.

One Hundred and Twenty-seventh St., s s, 125′ e Sixth Ave., 6 three-st'y brownstone dwells.; cost, each $12,000; owner, Sutherland G. Taylor, 159 West One Hundred and Twenty-eighth St.; architect, M. C. Merritt.

Eighty-third St., n s, 95′ w Madison Ave., 5 four-st'y Connecticut brownstone dwells.; cost, total, $110,000; owners, Messrs. Murphy & Co., 155 East Forty-fourth St.; architects, Babcock & McAvoy.

First Ave., n w cor. Seventy-second St., 4 five-st'y brick stores and tenements; cost, $50,000; owners, Messrs. Dwyer & Fee, on premises; architects, Babcock & McAvoy.

Seventeenth St., Nos. 332 and 334 e, 2 five-st'y brick tenements; cost, each $15,000; owner, Samuel D. Folsom, 135 Second Ave.; architect, Julius Boekell.

Third Ave., n e cor. One Hundred and Nineteenth St., five-st'y brick store and tenement; owner, John Miller, 2180 Third Ave.; architect, Bart. Walther.

Fourth Ave., w s, 67′ 11″ s Sixty-ninth St., 3 four-st'y brownstone dwells.; cost, each about $25,000; owner, Wm. A. Hankinson, 213 West Thirty-first St.; architects, Lamb & Wheeler.

Ninety-seventh St., n s, 151′ e Fourth Ave., four-st'y brick tenement; cost, $11,000; owner, William Smith, 39 Nassau St.; architect, A. Spencer; builders, C. Keys and F. Dwyer.

First St., No. 99 e, extending through to Houston St., five-st'y brick store and tenement; cost, $17,000; owner, John A. Dinkel, 239 East Fifth St.; architect, W. Kuhles.

(*Continued on next page.*)

Publishers' Department.

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New Advertisements.

BUILDING INTELLIGENCE.

Eighty-Ninth St., n s, 150′ w Ave. A, two st'y brick laundry; cost, $5,000; owner, St. Joseph Orphan Asylum, Eighty-ninth St., Ave. A; architect, W. José.

Seventy-fifth St., s s, 90′ e First Ave., 3 four-st'y brownstone tenements; cost, each $14,000; owner, Jos. L. Maschke, 3 Suffolk St.; architect, J. Brandt.

Seventy-first St., s e cor. First Ave., 3 four-st'y brick tenements; cost, each $14,000; owner, Jacob Wicks, Eighty-fourth St.; architect, J. Brandt.

Broadway, Nos. 361 and 363, six-st'y iron and brick store; cost, $250,000; owner, James L. White, Litchfield, Conn.; architect, W. W. Smith; builders, F. Bloodgood and J. Hardley; iron-work, Cornell Bros.

Eleventh St., Nos. 232 to 236, two-st'y brownstone church; cost, 40,000; owner, H. P. See, President Board of Trustees; architect, L. B. Valk.

Pleasant Ave., n w cor. One Hundred and Twenty-first St., four-st'y brick tenement; cost, $18,000; owner, J. B. Haskin, 93 Nassau St.; architect, W. W. Gardiner.

Bleecker St., No. 101, five-st'y iron store; cost, $35,000; owner, M. H. Beers, 410 and 412 Broadway; architect, S. A. Warner; builders, C. H. Tucker & Son and McGuire & Sloane.

First Ave., n w cor. Seventy-fifth St., four-st'y brownstone tenement, 25′ x 60′; cost, $15,180; owner, Quayle W. Hawkes, 443 East Eighty-fifth St.; architect, J. C. Burne; builder, Jas. E. Frame.

First Ave., w s, 25′ n Seventy-fifth St., 2 four-st'y brownstone stores and apartment-houses; cost, each $14,500; owner, Quayle W. Hawkes, 443 East Eighty-fifth St.; architect, J. C. Burne; builder, Jas. E. Frame.

Seventy-fifth St., n s, 73′ w First Ave., four-st'y brownstone apartment-house; cost, $15,500; owner, Quayle W. Hawkes, 443 East Eighty-fifth St.; architect, J. C. Burne; builder, Jas. E. Frame.

Fortieth St., No. 14 w, four-st'y brownstone dwell.; cost, $40,000; owner, Charles Banks, 433 Fifth Ave.; architect, W. H. Hume; builder, T. Sanderson.

Alterations.—*Sixty-first St.. Nos. 1 and 3 e*, one-st'y brick extension, L, new walls, etc.; cost, $4,000; owner, J. A. Bostwick, 140 Pearl St.; architects, D. & J. Jardine; builders, J. W. Hogencamp & Son.

Fourth Ave., n e cor. Eighty-sixth St., interior alterations; cost, $7,000; owner, Moritz Bauer, 150 Broadway; architect, P. F. Schoen.

Thirty-fourth St. No. 207 w, three-st'y brick extension, etc.; cost, $5,000; owner, Louisa M. Melville, 103 West Fourth St.; architect, J. Sexton.

Fifty-third St., No. 243 w, interior alterations; cost, $3,000; lessees, New York City & Northern Railroad Co., 3 Broad St.; builder, J. H. Slocum.

Union Square, No. 39, raised one story, entire inside altered; cost, $15,000; owners, John Duncan & Sons, No. 1 Union Square; architect, W. Schickel; builders, A. Woodruff's Sons and J. Downey.

Bowery, No. 55, raised three stories, also two-st'y brick extension, etc.; cost, $8,000; owner, H. B. Perkins, Fort Washington, N. Y.; architect, R. S. Townsend.

Broadway, Nos. 850, 852, 854, 856, and 858, one-st'y brick extension; new fronts in Nos. 850, 852 and 854; rear walls to be moved back 15′; cost, $14,000; owner, Estate C. Palmer, 850 Broadway; architect, James Renwick; builders, S. Lowden and A. Gibbins.

Pearl St., No. 80, altered for offices; cost, $3,000; owner, D. T. Mills, 30 South William St.; builders, A. A. Andruss & Son.

Church.—The Fifth Avenue Baptist Church two weeks ago collected $22,000 for the improvement of their church on Forty-Sixth St., near Fifth Ave. There is to be a new organ, very handsome stained glass windows, the vestibule is to be widened and elevated, and the church newly upholstered and decorated. Messrs. D. & J. Jardine are the architects.

Mr. Belden's house, n e cor. Fifth Ave. and Sixty-second St., is to have a mansard roof added, also a music-room, 26′ x 36′, and will be generally improved and redecorated, at a cost of about $30,000. Mr. Geo. A. Freeman, Jr., is the architect.

The same gentleman has also the charge of alterations and elaborate decorations of Mr. Alex. Taylor, Jr.'s house, at the cor. of Sixty-fourth St. and Madison Ave., which will cost about $15,000.

St. Louis.

Building Permits.—Fifty-two permits have been issued since our last report, 26 of which are for frame structures of slight importance. Of the rest, those worth $2,500 and over are as follows:—

Owners' Name.	Use.	Sty's.	Rm's.	Cost.
Clevel'd Co-operative W'ks,	Stove-Works,	4	4	$9,000
B. Werner,	Dwell.,	2	6	4,000
Whitman Agricultural Co.,	Manufactory,	3	9	20,000
St. Louis Mutual House Building Co.,	Dwe'll.,	3	8	5,000
F. G. Hariersen,	Dwell.,	2	10	4,200
Thos. Allen,	Print'g House,	4	4	23,000
Meyer & Pollman,	F'nit're fact'y,	3	3	7,000
S. St. L. Turner Society,	Turn Hall,	3	5	10,000
C. Strudel,	Dwell.,	2	8	3,000
Mrs. V. P. Paul,	Dwell.,	2	8	6,000
P. Roettger,	Dwell.,	2	8	6,000
J. & J. Francis,	Store & dwell.,	2	8	4,000
P. B. Brown,	Warehouse,	2	3	6,000
M. Bodefeld,	Dwell.,	2	12	43 000
Budd & Wade,	Store & Office,	3	9	5,500

Insurance Building.—The Equitable Building of St. Louis, owned by the Mercantile Trust Co. of New York, is to be raised three stories in shape of a pavilion mansard roof. The building covers an area 114′ x 140′, and is of sandstone. Two new elevators are to be built. The cost of the improvement will be $150,000. Mr. Ed. E. Raht, of New York, is the architect.

Philadelphia.

Building Permits.—*Canal St.*, opposite Centre St., three-st'y factory, 35′ x 100′; J. B. Winpenny, owner, Roxboro.

River Road, opposite Springfield Station, two-st'y factory, 82′ x 125′; M. Nixon & Co., owners.

Thouron St., No. 2106, three-st'y house, 20′ x 47′; H. M. Martin, contractor.

Howard St., s Lehigh Ave., 6 two-st'y dwells., 12′ x 35′; T. Heffling, contractor.

Second St., n, *No. 2307*, three-st'y store and dwell., 17′ x 56′; Eli Krupp, owner.

Warren St., e Thirty-seventh St., 4 two-st'y dwells., 12′ x 30′; A. F. Brown, owner.

Broad St., s Cambria St., two-st'y factory, 46′ x 100′; Rea & Riley, contractors.

Leithgow St., No. 1211, four-st'y dwell., 16′ x 30′; Myers & Campbell, contractors.

Cornaro St., between Mitchell and Pechin Sts., 5 three-st'y dwells., 15′ x 28′; S. Yardly, contractor, Roxboro.

Cor. Oxford and Bailey Sts., three-st'y dwell., 18′ x 62′; Jno. Klebe, contractor.

Oak St., between Wood and Baker Sts., one-st'y chancel, 24′ x 49′ Jas. A. Davis, contractor.

Oxford St., n Worth St., three-st'y factory, 60′ x 60′; W. Keas, contractor.

Bainbridge St., No. 1216, three-st'y store house, 22′ x 40′; Thos. Little, contractor.

Twelfth St., s, *No. 813*, three-st'y dwell., 20′ x 45′; Thos. Little, contractor.

Hope St., s Cambria St., 4 two-st'y dwells., 18′ x 50′; W. A. M. Fuller, owner.

Spring Garden St., w Eighteenth St., three-st'y dwell., 36′ x 36′; J. W. Patterson, owner.

Cor. Eighth and Jackson Sts., four-st'y factory, 100′ x 114′; W. H. Dutton, contractor.

St. John St., No. 410, two-st'y stable, 40′ x 60′; H. Spahn, contractor.

Market St., No. 940, five-st'y store, 20′ x 120′; J. B. Doyle, contractor.

Second St., n Spruce St., four-st'y dwell. and hotel, 20′ x 45′; Sharp & Kuhn, contractors.

Eighth St., s Girard Ave., three-st'y dwell., 16′ x 26′; Cook & Furman, contractors.

Gordon St., e Tulip St., two-st'y stable, 18′ x 30′; Dickson Bros.

Fifty-fifth St., between Vine and Haverford Sts., one-st'y engine-house, 24′ x 50; J. Revel, owner.

Thirteenth St., s, *No. 1218*, three-st'y dwell., 20′ x 46′; W. E. May, owner.

Twelfth and Watkins Sts., three-st'y store and dwell., 16′ x 32′; J. H. Lingo, contractor.

Twenty-fourth St. and Ridge Ave., two-st'y store, 35′ x 40′; E. C. Smith, owner.

Fairmount Ave., No. 927, three-st'y dwell., 20′ x 60′; T. Y. Severn, contractor.

Lombard St., w Sixtieth St., two-st'y dwell., 16′ x 44′; Harry Pettit, contractor.

Esher St., n Thompson St., 2 two-st'y dwells., 14′ x 34′; W. Charlton, owner.

Marston St., s Oxford St., 3 two-st'y dwells., 12′ x 38′; W. Charlton, owner.

Twenty-seventh St., s Oxford St., 2 two-st'y dwells., 14′ x 40′; W. Charlton, owner.

Fourth St., n Columbia Ave., five-st'y factory, 34′ 80′; J. B. Stetson, owner.

Riley St., between Mitchell and Pechin Sts., one-st'y stable, 25′ x 50′; H. Wanklin, owner.

Houses.—Two double houses on Baring St., for J. G. James, Esq., and M. C. Paul, Esq., each house 34′ x 60′, three stories high, built of pressed brick, with brownstone and moulded brick finish; cost, $22,000; A. W. Dilks, architect.

Alterations.—*South Ninth St., No. 11*, alterations, with red and gray brick front, four stories high; E. Clark, owner; C. M. Burns, architect.

Alteration to front of granite warehouse, No. 132 North Front St.; C. M. Burns, architect.

Franklin Institute Building.—At an adjourned meeting of the Franklin Institute, held for the pur-

(*Continued on next page.*)