Ralph Chappell
Book

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THE

MODEL ARCHITECT.

A SERIES OF

ORIGINAL DESIGNS

FOR

COTTAGES, VILLAS, SUBURBAN RESIDENCES, ETC.

ACCOMPANIED BY

Explanations, Specifications, Estimates,

AND

Elaborate Details.

PREPARED EXPRESSLY FOR THE USE OF

PROJECTORS AND ARTISANS THROUGHOUT THE UNITED STATES.

BY SAMUEL SLOAN, ARCHITECT.

IN TWO VOLUMES.
VOL. II.

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S. W. CORNER OF FOURTH & RACE STS.

PRESERVATION OF TIMBER.

IN the previous article, the general uses and different varieties of timber were discussed. The properties of each, which rendered it available for building purposes, and the quality, dimensions and value of the tree were described. It now remains that we should indicate some more general properties which are in a greater or less degree common to all, and more especially to treat of decay and the many cautions to be observed and methods requisite to retard its final coming. If the cross section of a tree be examined, it will be found to consist of three distinct parts, the pith, the wood, and the bark. The wood in many cases is visibly traversed by thin vertical plates emanating from the central pith, which is the same in substance, and producing, when exposed on the surface of a board, that beautiful appearance called silver flowered grain, so very conspicuous in the oak. The wood itself is composed of minute elongated cells, through which the sap ascends. Between these are the pores, which aid by their capillarity in the ascent of the sap. In the spring the sap, charged with matter dissolved from the soil, is drawn up into the trunk, it passes to the leaves, is there digested, receives additions from the carbonic acid of the air, and then descends through the bark, portions of it, in the form of a viscid gelatinous liquid, being deposited against the wood inside of the bark, and changed into woody fibre. This process continues through the season until the leaves become filled with earthy matter, left by the evaporation of the water which brought it up in solution, and having lost their singular power, die and fall. It is thus that trees grow. Every year a quantity of wood is formed between the bark and trunk, thus slowly increasing the size of the tree, and compressing by contraction the inner portions. This compression often so diminishes the pith as to make it invisible. The wood formed near the close of the season, when this process is somewhat retarded, is much more hard and compact than the other. The difference is distinctly visible in a cross section, of pine in the annual rings, as they are called, by which, each representing a year's growth, the age of the tree may be ascertained.

After a tree has been growing for some years the inner cells gradually become filled with earthy matter in the same manner as the leaves in Fall, and no longer are channels for the ascent of the sap which now must pass through the outer portions of more recent date. This outer part is called the alburnum, or sap wood and the inner portion duramen or heart wood. It is generally known, that this last only is fit for building purposes, since the sap wood is comparatively soft and quickly decays after being hewn. The sap wood is also generally of a light color, often presenting a strong contrast in this respect to the heart. The great variety of color which the different kinds of heart wood present is owing to various foreign matters, the pure woody fibre as in linen being entirely white. The natural secretions as resin, often color the wood, but variations thus produced are more frequently owing to the character of the soil from whence the depositions before spoken of which fill the cells are derived. The difference in the Spanish and Honduras mahogany is thus caused, and a great variety of colors are produced in woods for fancy articles by allowing them to absorb while growing, different coloring matters.

The age of a tree should be considered before it is felled for timber. The body of a young tree is nearly all of sap wood, and therefore not trustworthy; that of one advanced beyond its prime is affected with incipient decay in the heart, which renders it brittle, and of little value. The best period must be judged of in each, since it varies both with the kind of tree and its locality. We may be more definite, however, regarding the season for felling. The fermentation of the sap is one of the principal causes of rot, and it is desirable to rid the timber of it as much as possible. In spring, the trunk is full of sap, and it is therefore the worst season. Midsummer or autumn is much better, for then the sap is considerably expended; but winter is generally better than either, though some kinds of wood work better, in many respects, when felled in summer. It would be an excellent practice if all trees were first stripped of their bark. This would allow the sap wood to harden considerably, and improve the quality of the whole in many respects. Except in the case of the oak, whose bark is valuable, the improvement thus made seldom justifies the expense of stripping.

Seasoning the timber after it is felled is an important, but very simple process. It is nothing more than to expel the water and fluids of the sap by evaporation or drying. The tree should be allowed to remain in log for some time, at least until the following spring, while seasoning, as the wood is then less liable to warp; but if this time is extended until the wood is entirely dry, it inevitably cracks and splits, because the outside always contracts more than the heart. If the purpose requires a piece of large circumference, as for columns, this liability is avoided to a considerable extent by boring out the centre from end to end. The same cause which cracks large pieces of timber will warp smaller ones, and this may be illustrated by sawing the plank or boards in a particular way. If a plank be taken out so as to contain the centre of the tree, it will not warp, but shrink laterally. If it be taken from one side of the tree, next the slab for instance, the outer surface will shrink more than the inner, and warp the piece. In preparing shingles or clapboards, it being highly important that they neither warp nor crack, they should be split from the centre to the circumference of the log all around. This will not do however for a long piece, since then, the outer edge contracting most, it bends in that direction, or, as the workmen say, it springs. After the log is cut up, place the boards in a dry airy place, not exposed to the sun, but so arranged that warm dry air may have a free circulation between them. If they touch each other, or the circulation be otherwise retarded, the sap ferments, induces the growth of fungi, and the dry rot ensues. Some seem to think that the mere position, whether horizontal or vertical, makes a great difference, but it is of little consequence, so the other point be attained. The process of seasoning should not be a hasty one, as it has been noticed that the timber which has been dried slowly is tough, and lasts better, than that which has been dried quickly. It is an excellent plan to immerse the timber, plank, or boards, immediately after being prepared, in a stream of clear running water for a fortnight. There is much in wood that is soluble, as is evident from the slime that covers a log after lying in water for some time, and it is the soluble portion that mostly forwards decay. By the above means much of this is washed out, and boards thus treated are less liable to shrink, and warp, and will endure far better than those subject to years of dry seasoning. A large portion of our timber is floated down rivers to its destination, and in this case the precaution is unnecessary. but in others it should be adopted. For carpentry, timber should never be used within two years after it is felled, and for joinery a much longer time is necessary to secure good material.

Wood is composed principally of woody fibre or lignin, as it is technically termed. We have an instance of pure woody fibre in linen, but in timber it is mixed with and colored by other bodies. This fibre is in the form of elongated cells, and is essentially the same substance in all kinds of wood, the difference in their properties being caused by the thinness or thickness, the shortness or length, and the compactness of these cells which make the wood either brittle or strong. The cells are in a manner woven together, and contain the various substances which compose the sap. These are starch, juices, resins and earthy salts, all of which are left when the water is driven off in drying. Besides these, they contain a most important substance, known as vegetable albumen, which is entirely similar in its nature to the white of an egg. This albumen is more prone to decomposition than any other part of the wood, and those trees which endure the longest as the oak, chesnut and locust, are found to contain the least quantity. The porosity of wood, rendering it more or less penetrable, also seriously affects its capability of endurance.

It is a somewhat remarkable fact, but well known to chemists, that the burning and rotting of wood are the same process. As in burning, the products are carbonic acid, water and ash or earthy matter, so in rotting, the final products are also carbonic acid, water and earthy matter. The difference consists only in this; in the first case, the result is produced at once, but in the latter, it is a slow process, and exhibits several intermediate stages. In view of this fact, the German chemist, Liebig, has called slow decay, eremecausis, the derivatives of which word signify, burning by degrees. On the same principle, therefore, that rapid oxidation or burning cannot take place where air, with its oxygen, is excluded, so is it also a complete preservative against decay. Timber will remain sound beneath water, where the air cannot reach, for a thousand years. Pieces have been taken from the bed of the Thames, in excellent preservation, supposed to have been placed there by the Romans. Still, some air is dissolved in the water, and finally by its aid wood in such situations will decay. This decay is remarkably accelerated by the presence of other decomposing organic matter, as in marshy places, in which case the wood putrifies and marsh gas takes the place of carbonic acid, to which, however, it finally changes. In very dry air, the process is also exceedingly slow, and indeed it is believed that the intervention of a certain amount of moisture is essential to decay, though it only acts as a medium between the air and wood. But if the situation of the wood is not exposed, and the circulation about it is free, it will endure for a long time, but if it be confined, fermentation and the dry rot ensue. A fungus or mouldiness, often accompanied by minute insects, now appears, which grows sometimes to the length of several feet, insinuating its delicate fibres throughout the pores of the wood, feeding upon it and promoting disintegration. If wood be exposed to the weather, or the occasional action of water in any way, decay is accelerated, for the water washes away soluble and partially decayed portions, and leaves a new surface exposed. Wood embedded in the earth, especially in that which contains much decaying organic matter, is put to the most severe test. The continual presence of moisture and a sufficiency of air constitute the circumstances most favorable to decomposition. It is also a fact, as before hinted, that the mere contact or presence of fermenting matter, as in the case of yeast, has a great tendency to induce like action, which is the first step in decay. Now, of all these substances, albumen is the most prone to decompose, and by its presence induce decomposition in the woody fibre. Pure woody fibre is very slow to decay, and were it not for the albumen in the wood, we would seldom be troubled with its rotting.

Timber is seasoned with a view as much to its preservation as to secure it from warping and splitting. It is not, however, in all cases sufficient, and many other means have been suggested and tried to prevent decay, but the most of these are too expensive to be adopted in all cases, and very many are entirely useless. It will require but a few words to describe those which are really practicable and valuable. Laying timber in water has already been mentioned. Cold and tepid water slowly dissolve out the albumen, and in this way it may be partially removed. It has been thought well to place the timber in salt water until it is thoroughly impregnated with the salt. This doubtless will give security against worms, and may postpone decay, but is liable chiefly to this objection. The salt is highly hydroscopic, and in wet weather absorbs a great amount of moisture, which in dry weather exudes again, thus keeping the timber always damp. Again it has been suggested to boil or steam the timber. It is often necessary to practise this in order to bend wood in some particular form, and it has been stated that such pieces are less liable to rot. This process removes the soluble portions more rapidly, but instead of dissolving out the albumen merely coagulates it, as the white of an egg is coagulated in boiling. In this a great object is gained, for the coagulated albumen is by no means so prone to decompose. But too much of other soluble matter is removed, as is also the case when timber is washed for a long time by cold water, which considerably impairs its strength.

Many other methods have been successfully tried to preserve wood. Smoking it is an excellent practice, but charring is better where the use of the timber admits it, as in posts. The plan has been in some cases adopted of placing the wood in a large air-tight chamber, and producing a vacuum. This rapidly evaporates the juices of the wood which are condensed in another chamber, but the process is mostly used when the introduction of foreign substances as oil is intended. Tar is an excellent preservative, and for railroad sleepers and the like is advantageously used, but the increase of inflammability renders it objectionable. It acts principally by the creosote coagulating the albumen, and by excluding the air, which last is the chief value of paint as a preservative. Some paints have a tendency also to prevent the burning of wood, but the best means of securing this end is to steep it in a solution of alum. Alum also coagulates the albumen, but it forms with woody fibre a weak chemical compound that rapidly tends to decompose, and detracts much from the value of this process. Wood impregnated with tannin is much increased in durability. Lime has also been considered a preservative, but this is a great mistake, and the powerful action of quick lime should be guarded against in timbers bedded in mortar by tarring them. Whitewash made from hydraulic lime is far better for fences than that made from the ordinary quick lime. The process invented by Mr. Kyan, usually termed Kyanizing, is generally considered the best. The timber is placed in a large tank and secured by cross beams to prevent its rising, and a solution of cheap corrosive sublimate is let in. For a time all is quiet, but in the course of ten or twelve hours the water is agitated by the chemical action of the corrosive sublimate in combining with the albumen. This ceases in a short time, and in the course of a week or two the action is complete. Now let it season for two or three weeks more, and it is fit for use. This method has been severely tested. A piece of prepared timber was allowed to remain for five years in the fungus pit at Woolwich dock yard, a place celebrated for producing rapid decomposition, and was taken out as sound as when put in, whereas a precisely similar piece, but unprepared, under the same circumstances was completely rotten. This process deserves the attention of our builders.

The impregnation of the timber with these substances is effected in various ways. The best, but most expensive, is to produce a vacuum, and then let into the chamber the impregnating substance, enough to cover the timber, and on the readmission of air it is forced into the pores of the wood. Ordinary steeping and the practice of placing salts in holes near the base of the tree, before it is felled, in the season of autumn, are generally very effectual. In the latter case, the substance ascends into the tree as the sap descends through the bark. These processes are in general too much neglected.

Timber is usually put together without any other preparation than ordinary seasoning, and even this is too often badly done. Very simple precautions may be taken, that will make a house last long beyond its builder's time. First the timber should be naturally sound, and thoroughly seasoned. Then use white lead in all small joints, and in the larger ones, a preparation like the following. "Take one pound of pitch, a quarter of a pound of grease, and as much powdered chalk as will make the boiling mixture of a proper consistence. The mortice and tenon must be covered with this while hot, and then secured by pins." Lastly, attend to a much neglected point, ventilation. Admit a circulation of air through all the timbers, everywhere, beneath the sleepers, beneath the floors, within the roof, and even, if possible, between the studding. Nothing is so bad for timber as close confinement. It rapidly induces the dry rot, which not only destroys the building, but the health of its inhabitants. Secure these points, and we will seldom see our buildings decay.

THE FARM.

DESIGN TWENTY-SEVENTH.

In this volume we introduce a new feature. All the principal designs are exhibited in landscapes taken from nature. There are surrounding us in all directions a thousand of beautiful spots, suited in every respect to become delightful places of residence, which are altogether neglected, and by many unnoticed. It is believed that many valuable thoughts will be suggested by locating our designs in the midst of scenery suited to their character, and being engraved in a superior style they will furnish also pictures of various interesting localities.

The view presented on Plate I. is taken from the neighborhood of Gray's Ferry near Philadelphia. This is a spot interesting to every student of American history, and well known also for abounding in beautiful quiet views. In the engraving the building is placed at the intersection of two roads, now occupied by a stone mansion. In front is an orchard, and in the rear is spread out a large tract of excellent farm land. The creek winds its way to the Schuylkill seen in the distance. The road which crosses the bridge is private, and leads to the farm; the other in front of the house is a highway. There is nothing very striking in the view, but for a quiet pleasant farm scene we think it has no superior, though it may have many equals.

Plate II. presents the floor plans of the design. The building is frame work throughout, and we subjoin a comprehensive description and a bill of quantities which render many remarks here unnecessary. The posts of the front verandah may be either of iron or wood, and the apartments on the extreme of the wing may be placed elsewhere. It will be seen at a glance that the building is large and roomy, furnishing sufficient space for the dwelling of ten persons, which is a large number to constitute one family. From the hall of the second floor the winding steps ascend to the observatory. The hall below is separated from the entrance by an arched door-way.

Plate III. exhibits a geometrical projection of the front in a scale of sixteen feet to the inch. Below is an isometric or bird's eye view of the gable over the drawing room, showing the method of framing the roof and double window. The figures a. b. c. and d. are easily understood.

Plate IV. is an isometric view of the framing of a corner, showing the manner of putting together the braces, sills, ties, joists, etc.

Plate V. exhibits two vertical sections of the frame work. The first is made through the line AB on the plate of plans, and second through the lines CD. and E. F. These two sections exhibit all important points in the frame work, and any one on examining them in connection with the other plates, will find no difficulty in understanding the construction of the whole building.

The building is to have a cellar beneath its entire extent, at least six feet six inches deep in the clear of the joists of the first floor, with all necessary trenches for the foundations at least six inches below the cellar floor. All the earth must be graded around the building, as may be directed.

The walls throughout the cellar must be composed of good quarry building stone, laid in the best lime mortar. They are to be sixteen inches thick, and have all facings smoothly dashed and whitewashed. The fues for warm air and gas are to be built of bricks, and so arranged that either stoves or a furnace may be used. They are to be well pargetted and topped out with press bricks, at least four feet above the roof from which they issue. The flues of the main building pass through the observatory. There is to be a well beneath the extreme wing of the building as deep as the water gravel, walled in and provided with a ventilating flue.

The superstructure is to be constructed entirely of framework. The sills are to be six by six inches, the corner posts, four by eight inches, the girts four by eight inches, the plates four by six inches, the door and window studs four by six inches, the braces four by four inches, and the intermediate studding three by four inches. The joists of the first floor are to be three by twelve inches, and all others are to be three by ten inches. They are to be placed sixteen inches between centres, to have three quarters of an inch crown, and each tier must have a course of lattice bridging through the centre. The ceiling joists are to be three by five inches, and also placed sixteen inches between centres. The rafters are to be three by seven inches at the foot, cut in the usual form, placed two feet between centres, and strongly spiked at the plate and ridgepole. The sills are to be of good oak timber, and the frames of the verandahs are to be of oak inferior in quality. All other framing timbers are to be of white pine, except the studds, which are hemlock.

The exterior is to be enclosed with half inch pine siding, well seasoned, planed, jointed, not over three inches wide, and secured, overlapping, by six penny nails. The cornice and observatory are to be constructed according to the drawings. The floors throughout are to be laid with one inch Carolina heart pine of a good quality, well nailed to the joists, and afterwards smoothed off. The roof is to be close sheathed for metal covering.

The windows are all to have a plank face with a large sized moulding. The sash must be one inch and a half thick, and double hung with axle pullies and patent cord. The first story windows are all to have three panneled shutters one inch and a half thick, with fillets and mouldings on the face and bead, and butt on the back. The second story and windows are to have Venitian pivot blinds, one inch and a half thick.

The doors throughout the principal rooms are all to be one inch and three quarters thick, in six panels, with fillets and large moulding on both sides. They are to be hung with four by four inch butts, and secured by four and a half inch upright mortice locks. The closet doors are to be one and a quarter inches thick, with moulding on the outside. The principal doors in the wing are to be one inch and a half thick, in six panels. The entrance doors are to be made in like manner to those first described. Those on the front are to have an eight inch upright rebate lock, and iron plate flush bolts of a suitable length. All other outer doors are to be secured with a knob latch and two bolts to each.

The dressings of the principal rooms on the first floor are to be eight inches, and moulded. The washboard must be ten inches wide, including a three inch base. The moulding on top is two inches and a half high. The dressings in the second story main building are to be five inches wide. The washboards are to be nine inches wide, with a moulding on top.

The stairs are to have a continued rail, and be put up in the best manner, with one and a quarter inch step boards of the best quality. The newel is to be ten inches at the base, and tho balusters three inches, neatly turned. The rail and newel are to be of black walnut. The private stairs are to be constructed in the usual manner.

All the walls in the building are to be lathed, plastered and hard finished. The principal rooms are to have cornices in the angles of the ceilings. The roofs are all to be overlaid with the best one cross leaded roofing tin, painted on both sides, the upper receiving two coats. All the exterior and interior must have three coats of pure white lead paint. The newel rail and balusters must have three coats of varnish.

A GENERAL ESTIMATE

OF THE COST IN ERECTING DESIGN TWENTY-SEVENTH.

Excavation, 650 yards @ 20 cts. - - -	$130.00
Masonry, 500 perches @ $2.00 - -	1,000.00
Bricks and Laying, 20,000 @ $10.00 per. M.	200.00
Plastering, 2,500 yds. @ 20 cts. - - -	500.00
Joists for floors, 20,000 feet @ $12.50 per M. -	250.00
Joists for ceilings, 3,600 " " " " -	45.00
Ties and Plates, 1,500 " " " " -	18.75
Scantling, 6,500 " " " " -	75.00
Rafters, 4,000 " " " " -	50.00
Corner posts, 1,200 " " $18.00 " -	21.60
Oak sills, 1,000 " " $20.00 " -	20.00
Sheathing and Scaffolding, 7,000 ft. @ $15.00 per M.	105.00
Verandah Rafters, (oak,) 2,000 ft. " "	30.00
Weather Boarding, 6,500 ft. @ $30.00 per M.	195.00
Assorted Lumber, 10,000 ft. @ $25.00 "	250.00
Window frames, shutters and sash @ $12.00 "	420.00
Doors, $1\frac{3}{4}$ inch, 15 @ $4.25 - - - -	63.75
Doors, $1\frac{1}{2}$ inch and $1\frac{1}{4}$ inch, 20 @ $2.75 -	55.00
Workmanship, - - - - - - - -	150.00
Tinning, - - - - - - - -	900.00
Furnace and Range, - - - - -	300.00
Hardware, - - - - - - -	450.00
Painting and Glazing, - - - - -	500.00
Total,	$6,879.10

WAYSIDE COTTAGE.

DESIGN TWENTY-EIGHTH.

Two elevations represented on Plates VI. and VII. accompany this design. The latter of these is ornamented in a rustic style, and is supposed to face the highway. The first, which is essentially the same design, but with a different façade, looks towards a river, and is termed a Summer Seat. The general appearance of this is well adapted to such a situation. Its walls are of brick, rough-cast, without pointing, and it is covered by a ribbed tin roof. .

Plate VIII. presents the floor plans. They are adapted more particularly to the second elevation on plate seventh. There is a cellar beneath the entire building except the laundry, lighted by windows on the sides and rear. Beyond the laundry is a well, sunk to the water gravel, and walled in. The walls of the house are of hammer dressed stone, sixteen inches thick, as high as the level of the second floor. The roof is of slate, laid diamond pattern, and the chimney cans are of terra cotta ware. The roof of the front verandah is of tin, painted in colored stripes. The verandah posts, the rails of the balcony above, and the finial are of unbarked wood, after the fanciful patterns represented. The whole house is intended to be warmed by grates or stoves, but it might easily be arranged for a furnace. It is evident on an inspection of the plans, that the house is quite small and compact, but we think not inconveniently arranged. There are ample accommodations for a family of five or six, including the servants. The laundry may be used as a kitchen, and the scale of the whole enlarged, if it is found desirable.

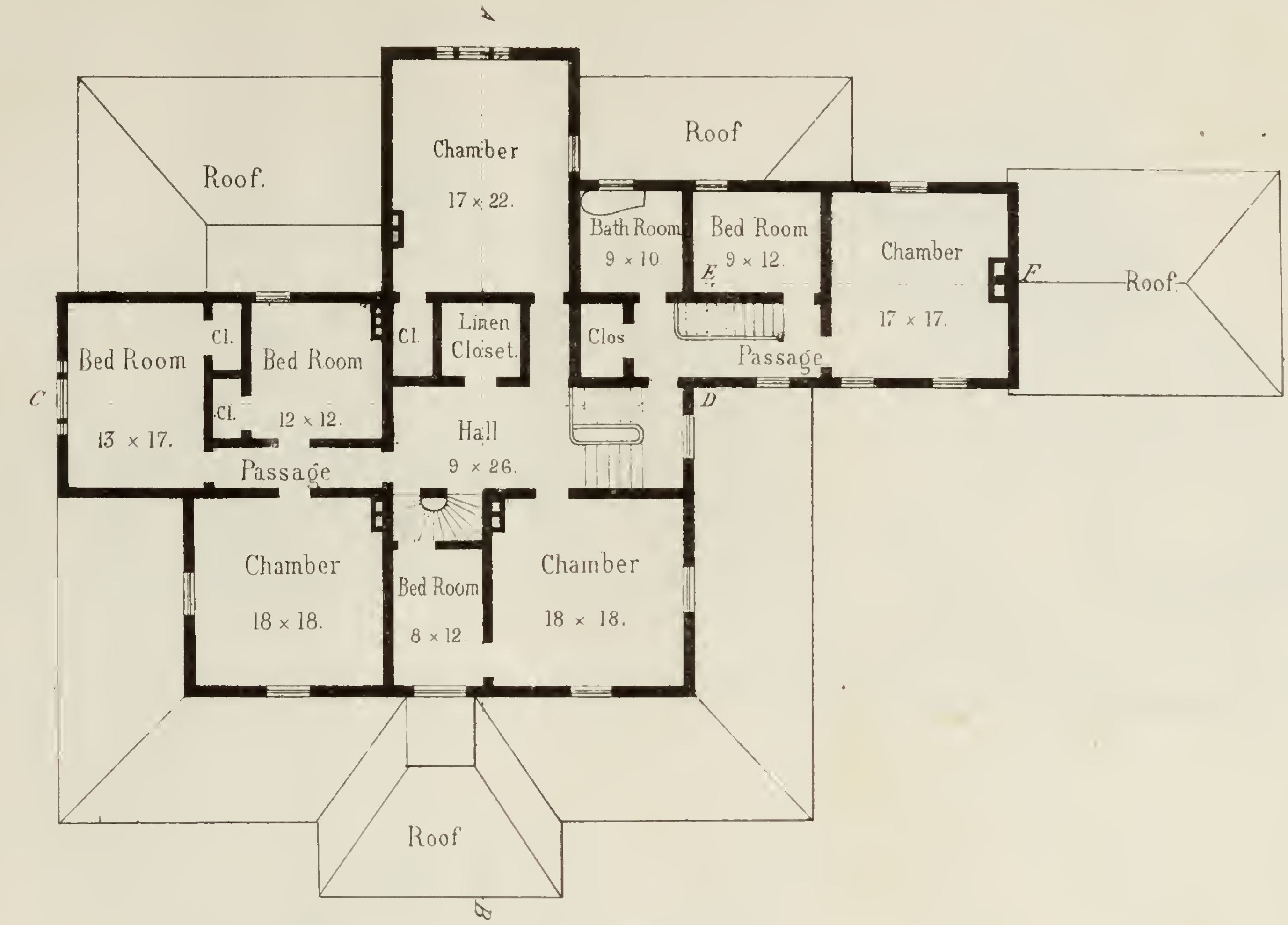
Plate IX. exhibits the details of the second front, those of the first being simple and similar to many given heretofore. Fig. 1, a design for the verandah post and bracket. Fig. 2, another design for the same. Fig. 3, gable and finial of the front dormer window. Fig. 4, the window. Fig. 5, a section of the window. Fig. 6, rails of the balcony. Fig. 7, the eaves and the side post of the dormer window.

Sloan Arch.

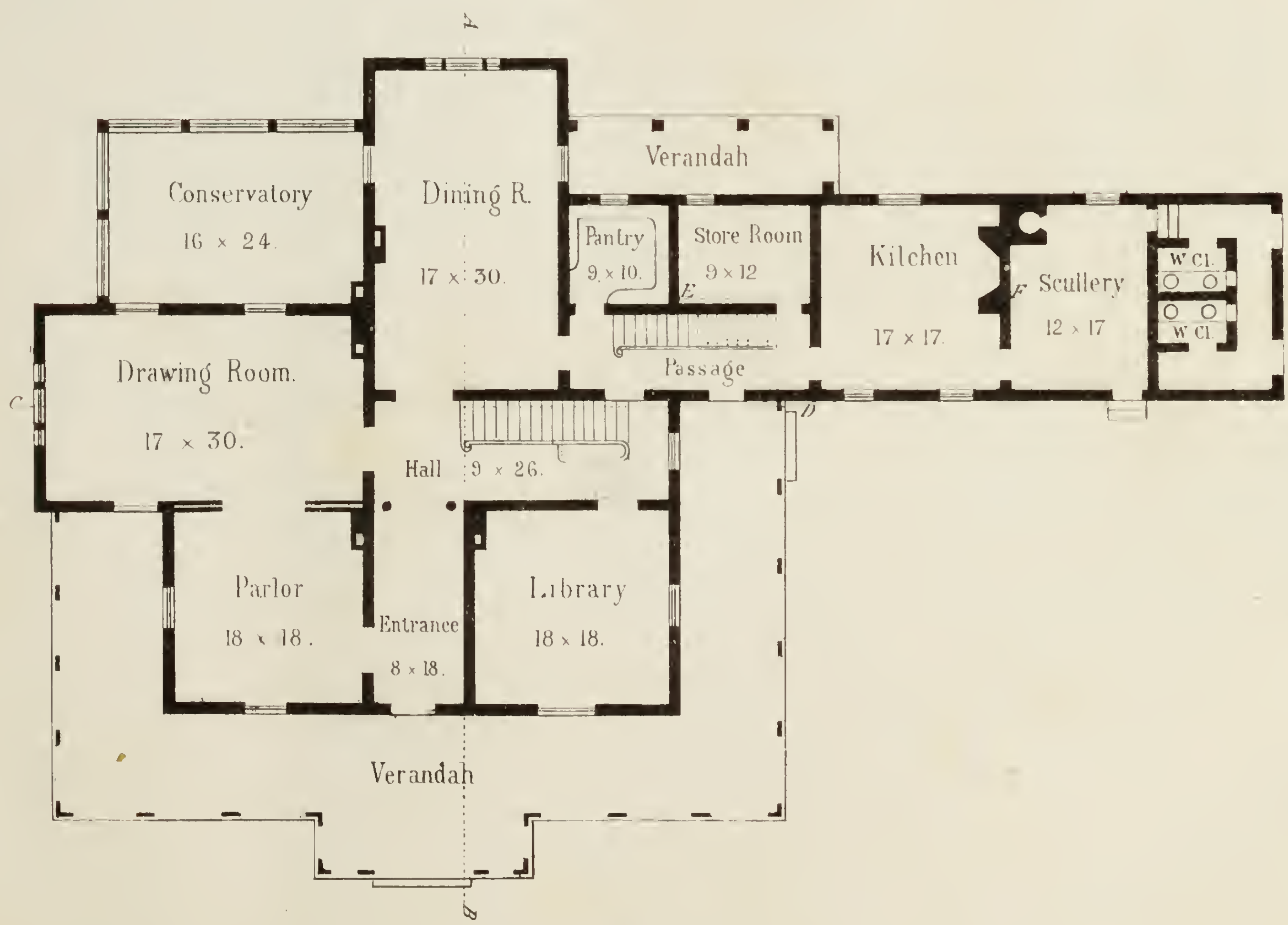
P. S. Duval & Co.'s Steam Lith. Press Phila.

THE FARM.

A Scene near Gray's Ferry Phila Co. Pa



SECOND FLOOR.



FIRST FLOOR.

Scale 16 ft to the inch.

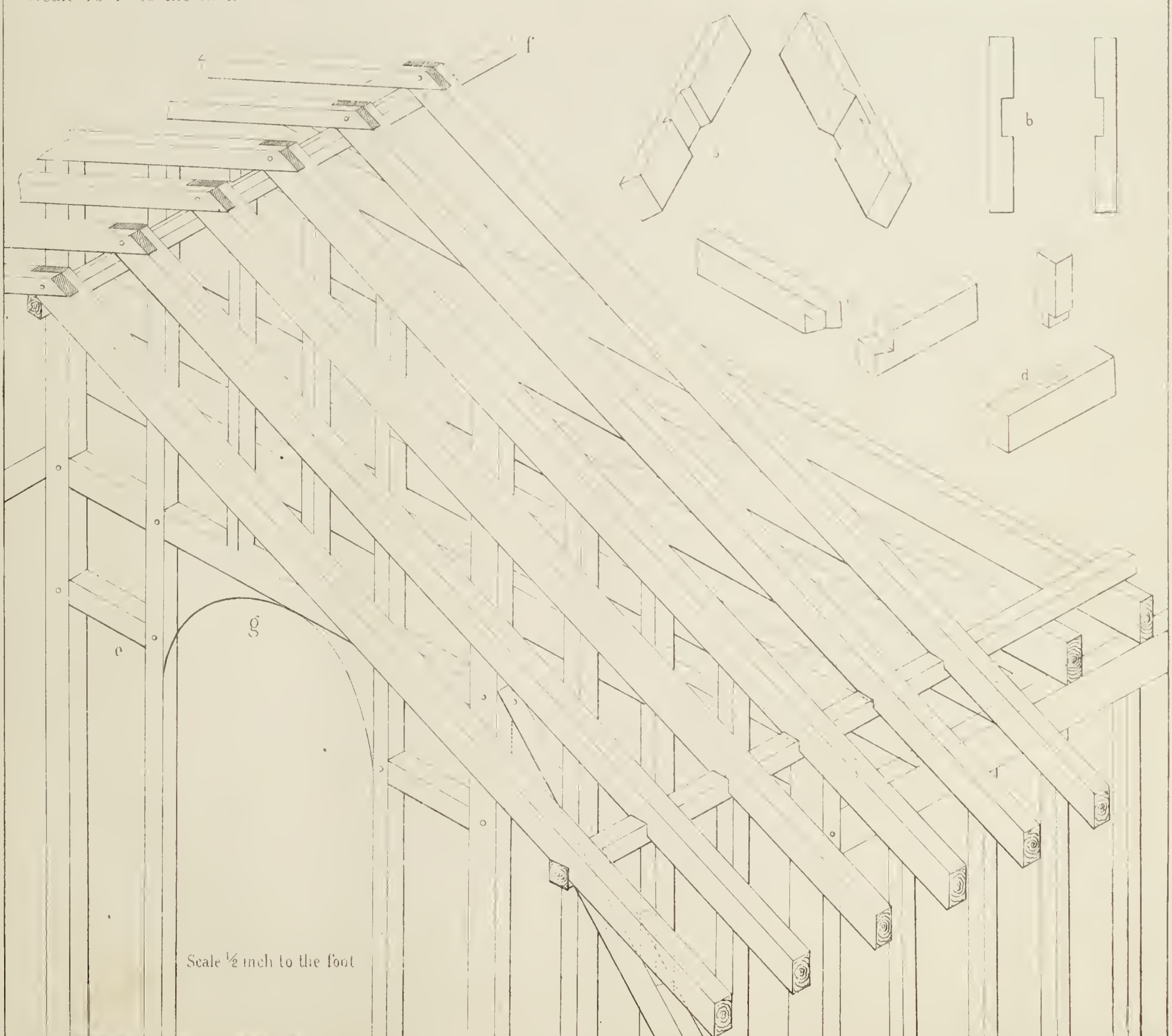
Saml Sloan Archt

P S Duval & Co's Steam lith Press Philada

GROUND PLANS.

Scale 16 f^{t} to the inch.

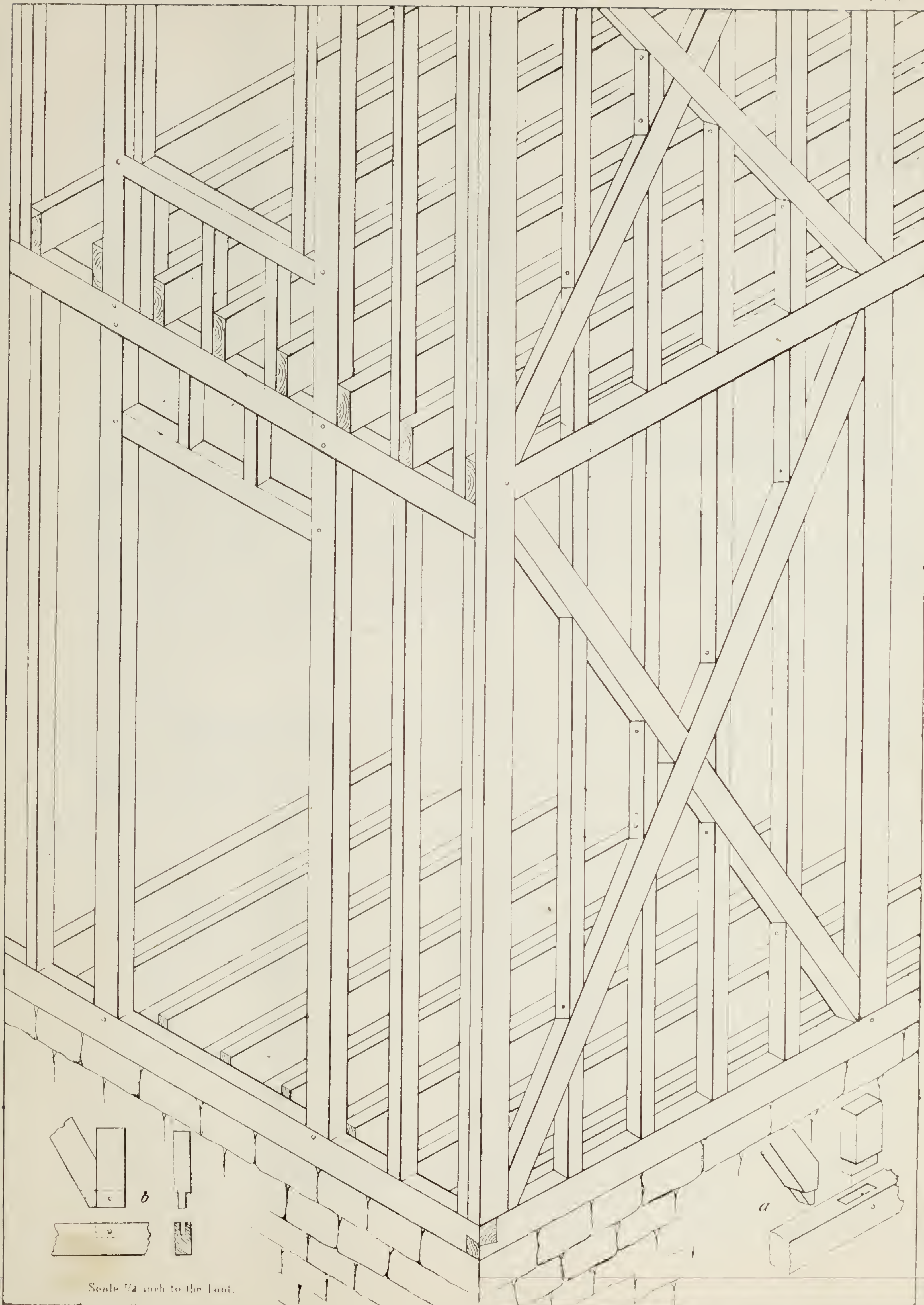
FRONT ELEVATION.



Saml Sloan Arch

P S Duval & Co's Steam lith Press Philada

DETAILS.



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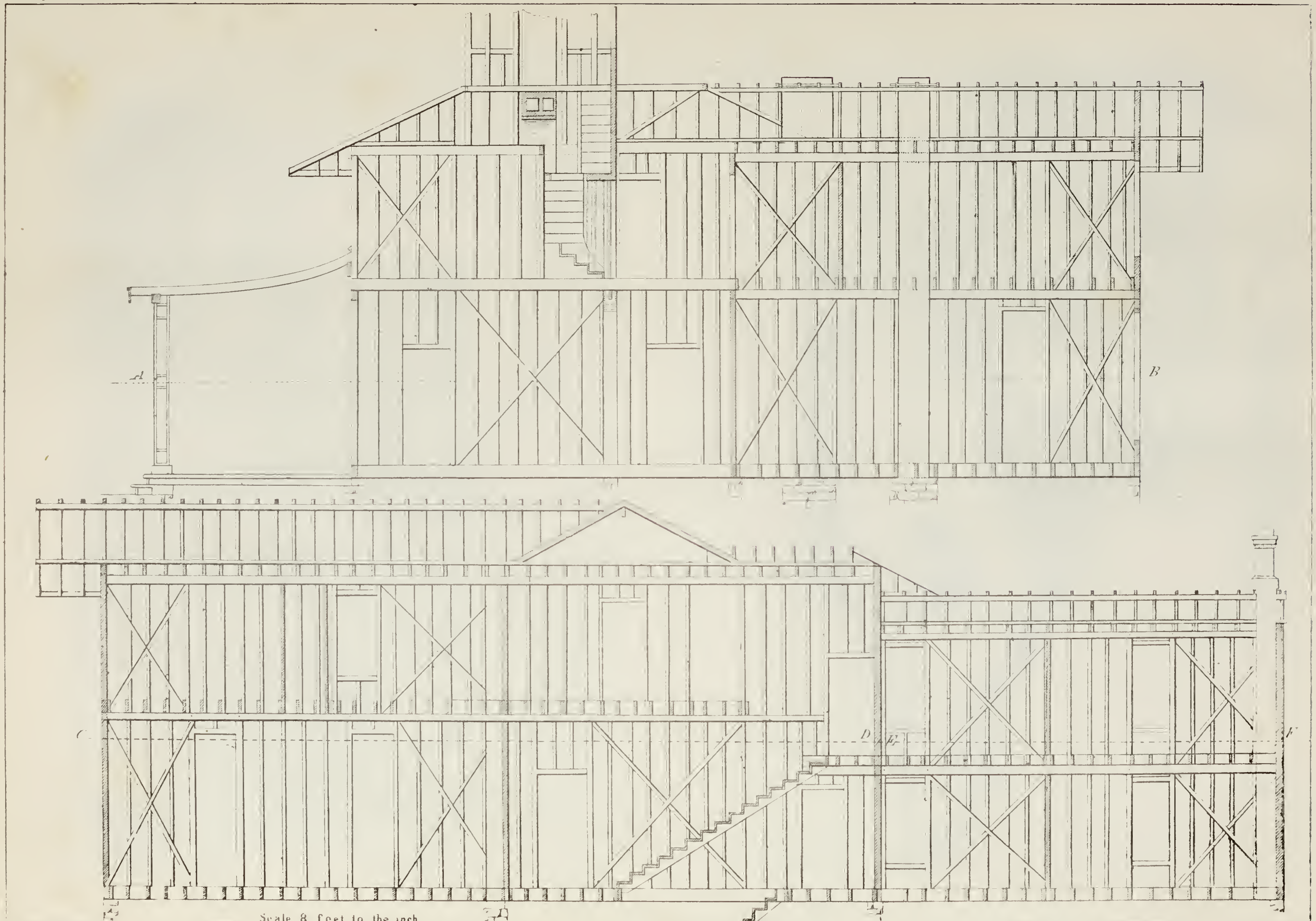


Saml Sloan, Archt

P.S. Duval & Co's Steam lith. Press, Phila.

DETAILS.

Design XXVIII. | *Pl. VI.*

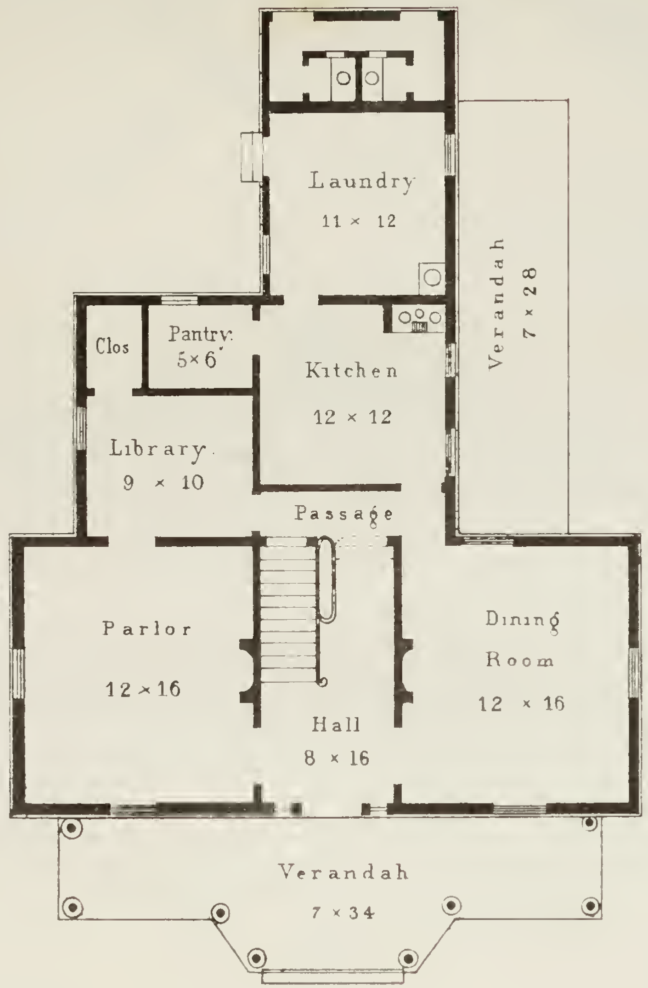
Sam^l Sloan, Arch^t | P. S. Duval & Co's Steam lith Press Phil^a

A SUMMER SEAT.

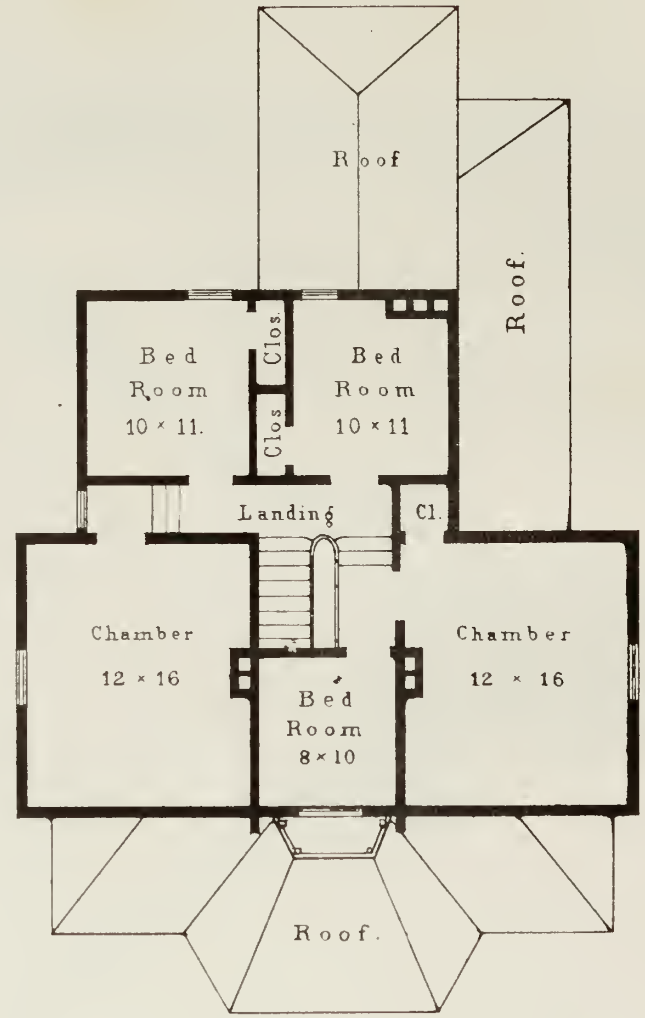
Design XXVIII. | *Pl. VII.*

Sam^l Sloan, Arch^t | P. S. Duval & Cos. Steam lith Pres. Phil^a

WAYSIDE COTTAGE.



FIRST STORY



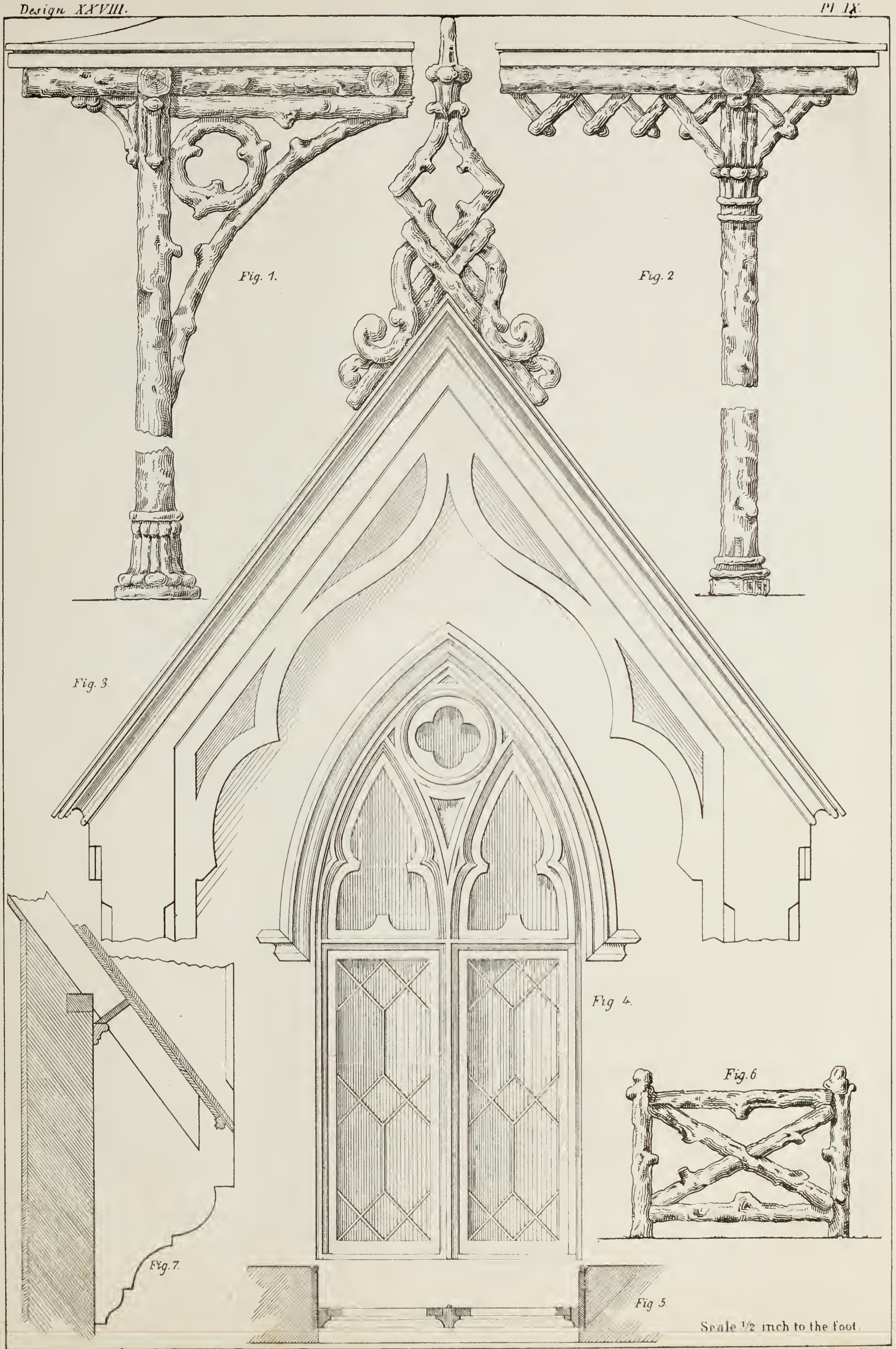
SECOND STORY

Scale 12 feet to the inch

12 10 8 6 4 2 0 12 24

GROUND PLANS.

Saml Sloan, Archt. P.S. Duval & Co's steam lith Press, Phila.



Saml. Sloan, Archt.

P. S. Duval & Co's Steam lith Press, Phila.

DETAILS.

CARPENTRY.

THERE is nothing in the art of building which requires so much mathematical skill as carpentry. The bricklayer and mason regard only the force of gravity, which is the downward tendency, the lateral force exerted by arches, and the resistance to crushing or compression; whereas, the carpenter must study in addition the relative disposition of parts, so as to resist tension, torsion, or whatever strains the structure may be liable to undergo. He must be well acquainted with the strength of materials, both in reference to the amount of weight they can sustain, besides their own, and also in reference to their capability of resisting these forces, to which they may be subjected in various positions. There is a point which it is desirable to find, between a scantiness of material insufficient for the purpose, and a dangerous over-loading of the building, which economy also requires us to avoid. Maximum strength can only be attained by skillful combinations, avoiding both of these extremes.

The chief use of framework is to give support. The great strength of an upright piece, such as a corner post, in resisting perpendicular force is amply sufficient in itself, but when a long horizontal beam has to bear weight in addition to its own, native strength is not enough, and art must be used to prevent not only its breaking but even bending. There is a principle of natural philosophy involved here which ought to be thoroughly understood by every carpenter, not only practically, but theoretically. It is evident that to overcome a force another must be opposed. If it be opposed directly, then the resisting force need only be equal in magnitude to the acting force. It is not always convenient to do this, and indeed if fully carried out it would amount to placing a post under every weight in the building. We must then oppose oblique forces such as occur in all kinds of trussing. A study of the "Composition and Resolution of Forces," will give an understanding of the principles on which oblique forces act, and of the relation between their magnitude and inclination. There are many forces acting upon the framework of a building besides mere gravity, all of which must be provided against. The winds subject it to great strains frequently, and the existence of the oblique forces mentioned argues lateral pressure, though this should be avoided as much as possible by methods hereafter described.

It is not out of place to urge the necessity of mathematical and theoretical study to a carpenter. Often he has to design the framework himself, and without a knowledge of principles he must work clumsily, and in the dark. If he has never done just such a piece of work before, he is totally at a loss how to proceed. His own personal experience does not aid him, and he has no other resource, for the experience of

This was certainly a most inconvenient and laborious method of building, and would only be suitable for such purposes, and in such a climate.

In countries where protection from the rain was necessary, we find of course that the roofs have an inclination. It was found easier to cover a large building by having two inclined roofs than one, and this gave rise to that beautiful architectural feature, the pediment. This is first found among the Greeks, though many of their temples were intended to be without covering. It is impossible to tell their attainment in this art, as there are no remains of it, and but slight indications of its existence among them. Among the Romans, however, carpentry attained a very high state of perfection, and there are very few purposes to which it is now applied that were not in use among them. There are some remains still in existence, and some of which we have descriptions. But in the beautiful arches which adorn and support their edifices we have abundant evidence of their skill in carpentry, for these arches must all have required centering, which is one of the most difficult branches of the art.

The carpentry of the middle ages is peculiar to the style of building which then prevailed. Oak timber was principally used, which, owing to its strength, gave great apparent lightness to the work, and admitted of many devices that cannot be practised with other wood. The roof which principally displayed the advances made in carpentry was generally open beneath, and the architect endeavored to produce by it as ornamental an effect as possible. No tie beam was used, but the collar beam and the strength of the walls was depended upon to resist the lateral thrust of the rafters. There are some beautiful specimens, however, in which, although without the tie beam, yet by a judicious system of trussing all lateral pressure is avoided, and the weight of the whole roof rests perpendicularly upon the wall plates. The present system of building differs essentially from this, and except in direct imitation of the style we seldom use an open roof. The high pitch of the Gothic roofs was adopted to throw off the snows of the north, and is a marked feature of the style also in little use at present. The mode of constructing these roofs is consequently of little importance to us, and does not display that skill which the excellence of the masonry might lead us to expect.

In modern times carpentry has probably advanced beyond any point ever heretofore attained. The roofing of some of the enormous edifices in Europe, and the centering of the wide arches now used for bridges, exhibit a constructive skill and an ingenious application of philosophical principles which we cannot believe has ever been excelled. With such great works we are not at present engaged, but the construction of the simplest building requires to do it well, a judicious application of scientific principles; and by such an application the carpenter can perhaps do more to give the building great strength at the least cost than any other one concerned in its erection. There are many, however, who from simple ignorance still hold fast to old clumsy practices. They scribe and fit all their work before putting it together, and from a simple lack of mental energy and the spirit of improvement—remain ignorant, incompetent, and poor.

In this country, where timber is so cheap, the great majority of dwellings are entirely of wood. In the old world the remains of the immediate forests are too valuable to be used in this way, and all the timber is transported from great distances, thereby becoming costly. Even in those parts of the houses which are necessarily framework, iron is often substituted for wood. As yet we have an abundance of timber and are not forced into such devices, though indeed by a skillful management of iron the carpenter has much improved his art. Buildings of stone or brick are best on account of their stability, comfort and architectural expression, but where economy is of the first importance, framehouses are preferred. In such there is, of course, the greatest display of carpentry, but every building contains the floors, partitions and roof, each of which involves principles essentially different. The next article will contain a general description of these.

THE MANSION.

DESIGN TWENTY-NINTH.

The scene before us on Plate X. is not marked by those distinguishing characteristics which would entitle it to rank as a landscape. It is such a view as may be obtained on almost any of our streams skirted by a railway. The idea was originally suggested by an excursion up the Schuylkill, where there are many such scenes. The western bank of the Hudson also abounds in country seats, having spacious lawns in front, gently sloping towards the river. The introduction of the railroad upon the edge of the stream was regarded by the owners of these seats as an intolerable nuisance, not only because of the danger, smoke and noise made by the cars, but also because it destroyed the pretty effect of the lawns gently inclining and passing beneath the rippling surface of the water. This is certainly disagreeable, but the frequent passing of a majestic locomotive with its long train, is decidedly picturesque, to say nothing of the convenience of having the rapid conveyance near. A word may be said of the situation on the banks of a river. If the house is intended simply as a summer residence, then the western bank is far preferable, the building facing the river. This is so chiefly for two reasons. We get a cool shade upon the lawn early in the evening, and avoid the reflection of the afternoon sun upon the water. On the eastern bank we have often experienced very warm afternoons in moderate weather, arising from this cause. Besides the heat, the light is also reflected to the eastern bank in such a manner as to be very disagreeable to the eyes. If the building is intended to be occupied throughout the year, then this objection may be counterbalanced by having on the eastern side a high bank, affording shelter from the eastern winds. The warm reflection, too, at this season would be agreeable. A southern prospect towards a river running east and west would perhaps, in this case, be best.

The present design is in the Tudor style, or as we have before termed it, debased Gothic. It is very similar to many of the old family mansions in England and Germany, somewhat modernized, of course, to suit the wants of our times. The general effect of the building is displayed in the perspective view, and needs no description to make it thoroughly understood. To be entirely true, it should be built of dressed gray stone, but it will answer very well if built of rubble, or brick, and rough-cast. The roof, which contains an attic, is overlaid with slate in diamond pattern. The parapets should be finished either with heavy slate or slabs of stone, to protect them from the action of the weather.

On Plate XI. are delineated the Ground plans. Entering front we pass up the covered steps into the vestibule, which opens into a large Ante room or Hall, lighted by a small stained glass window, having the Parlor on one side and the Drawing room on the other. With these it communicates by sliding doors, so that on occasion the whole may be thrown into one large room. At the end of the parlor is a bay window, and at the corresponding end of the Drawing room is a small Conservatory for the reception of a few choice plants. The Dining room, Library and domestic offices are in the rear. The Library also has a bay window. Passing above stairs we find five large Chambers and two smaller bed rooms, thus exhibiting accommodations for a family of ten or twelve persons, including the servants. It will be remembered that there are two large rooms in the attic above. At the end of the passage there is a small apartment, which may be used either as a linen closet or bath room.

Plate XII. exhibits an isometric view of the first floor naked, the section of the walls being made just above the window sills. The floor is single joisted, there being no necessity for a ceiling to the cellar below. A close examination of this floor will discover many of the principles described in the first part of the article on Framing. The floor of the porch and vestibule is supposed to be paved with tiles. The general effect of a drawing of this description is very false, but, it being isometric, accurate measurements of the bearing of the joists, the thickness of the walls, the height of the windows, &c., &c., may be taken. The flues from the furnace in the cellar are also exhibited.

Plate XIII. presents the details of the outside of the building. Fig. 1 is the tower or buttress which stands at the corner of the vestibule. Fig. 2 is the base of the same. This buttress is constructed of wood, and is merely intended as an ornament. Fig. 3 shows the parapet. A section is also given which exhibits the construction of the inside gutter. Fig. 4, a ball finial. Fig. 5 is a vertical section of the projecting window over the vestibule. Fig. 6 is a part of the bay window of the parlor or the conservatory. Fig. 7 is a horizontal section of the same.

THE FLOWER STAND.

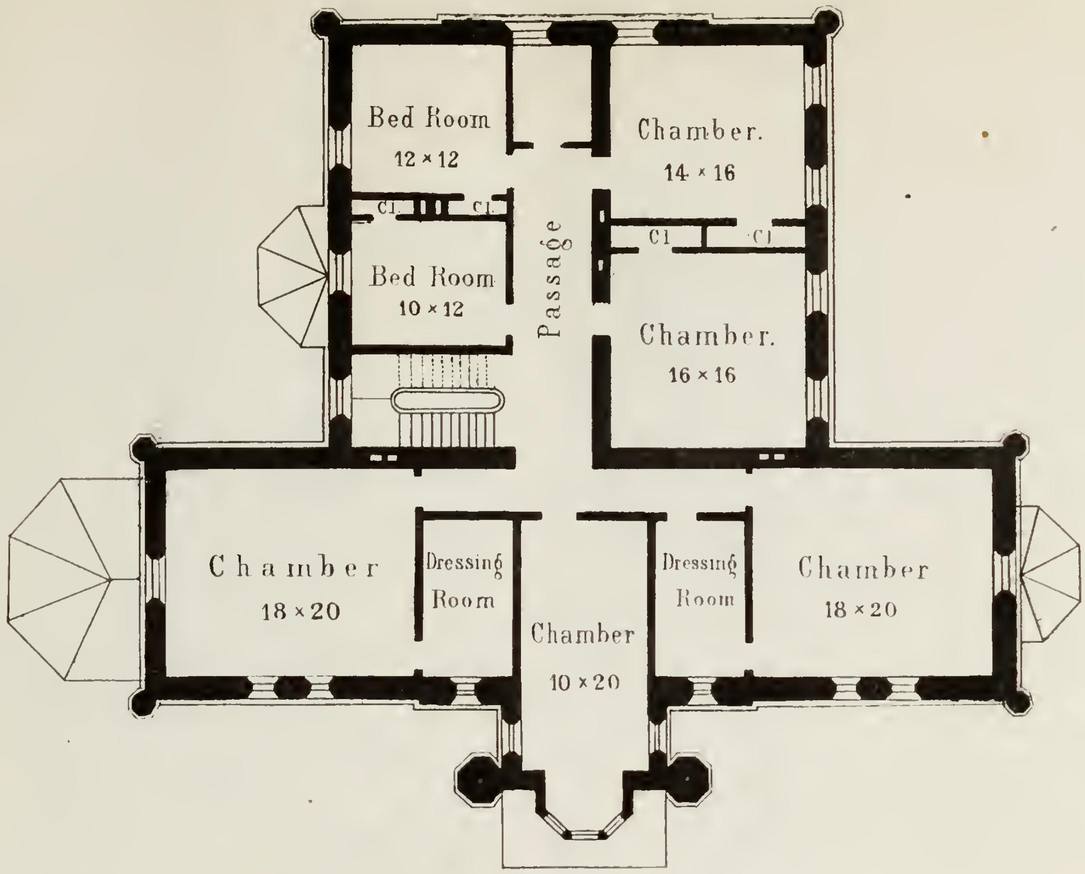
Accompanying the above design, and numbered with it, is a flower stand, exhibited on Plate XIV. It is to be constructed of wood, carved after the Gothic fashion, and is supposed to be placed in the conservatory, at the end of the drawing room. Only a few vases are shown, but places are prepared for placing many others on it. The stand itself is surmounted by a bird cage, which may be made movable, and is thought to be a proper accompaniment to the flowers. It is in the Decorated style.

Design XXIX. Pl. X.

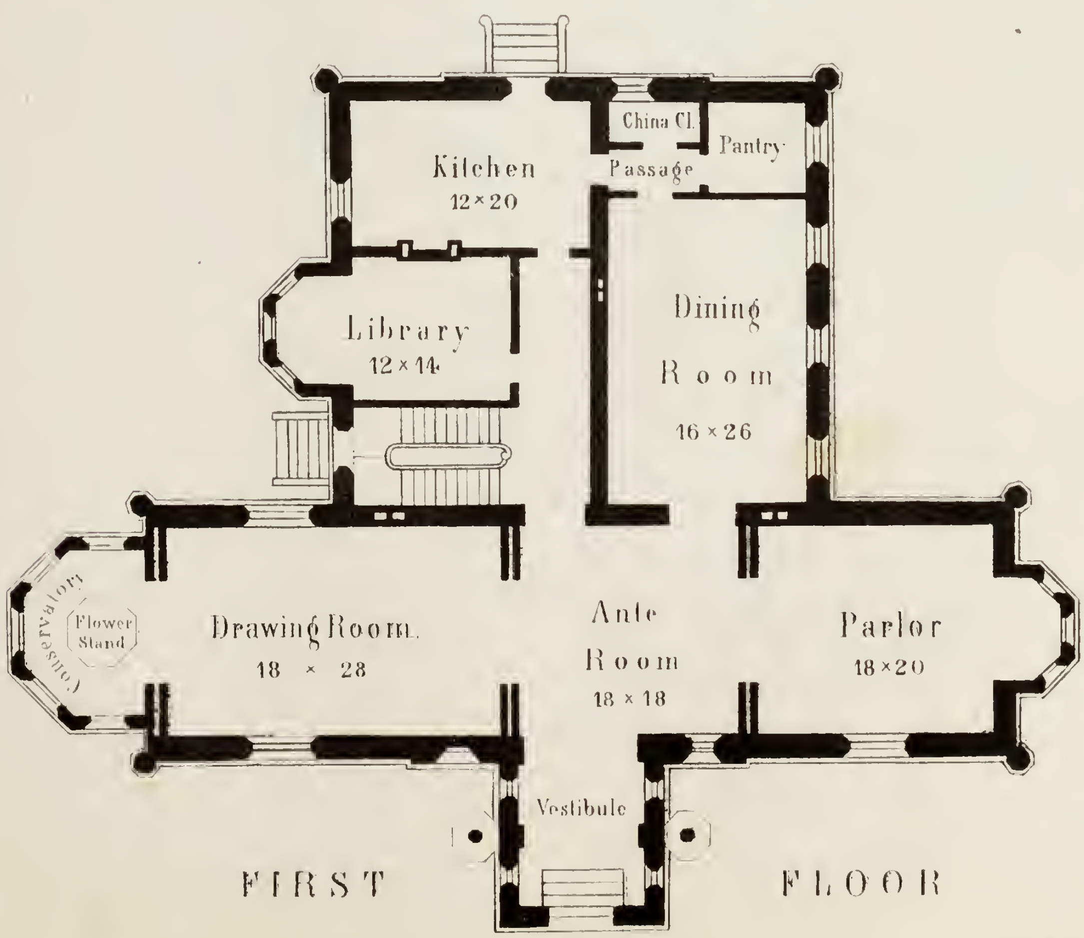
Saml Sloan Archt

P. S. Duval & Co's Steam lith. Press Philada

THE MANSION.



SECOND FLOOR.



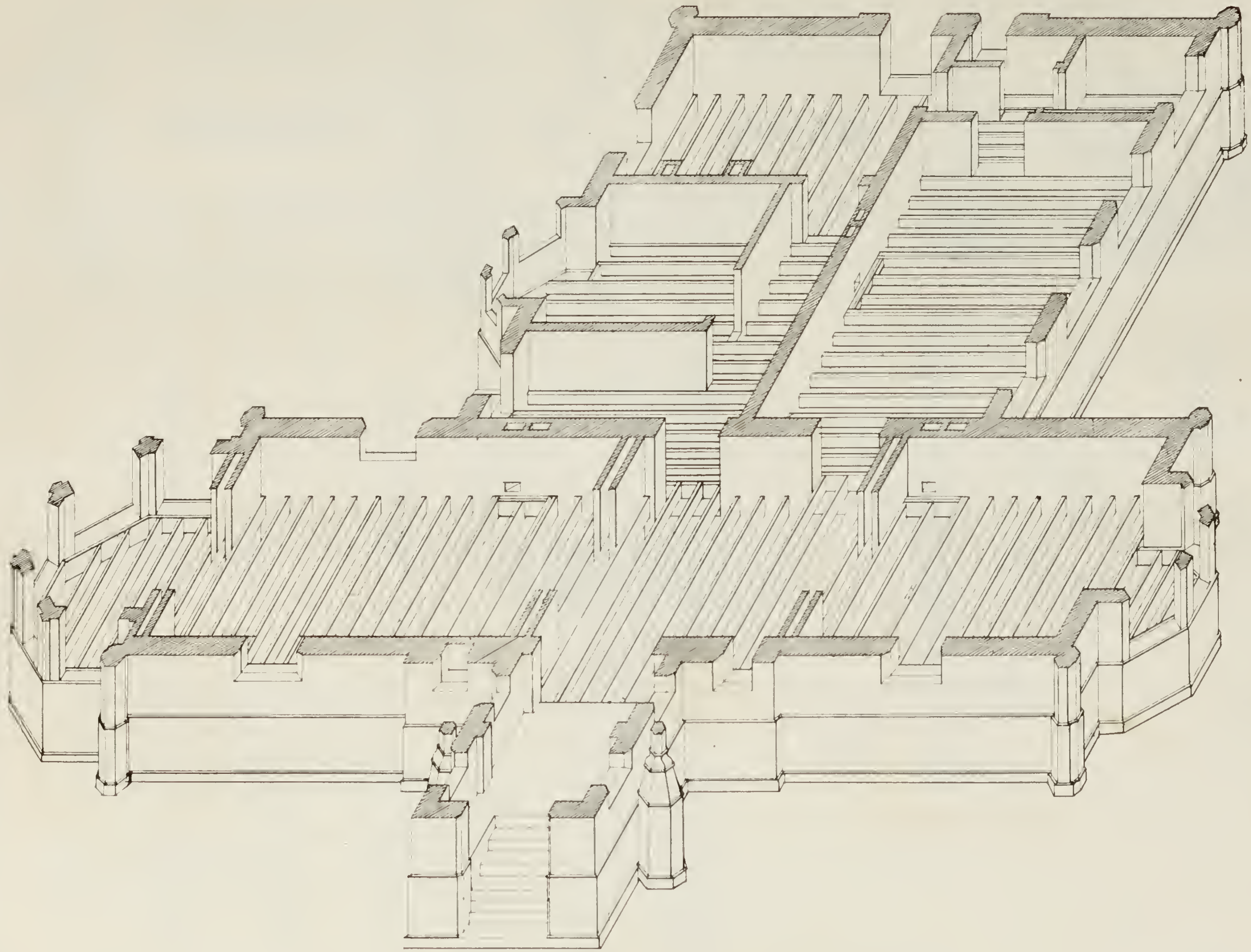
FIRST FLOOR

Scale 16 feet to the inch

Saml Sloan Archt

P.S. Duval & Co's Steam lith Press Philad.

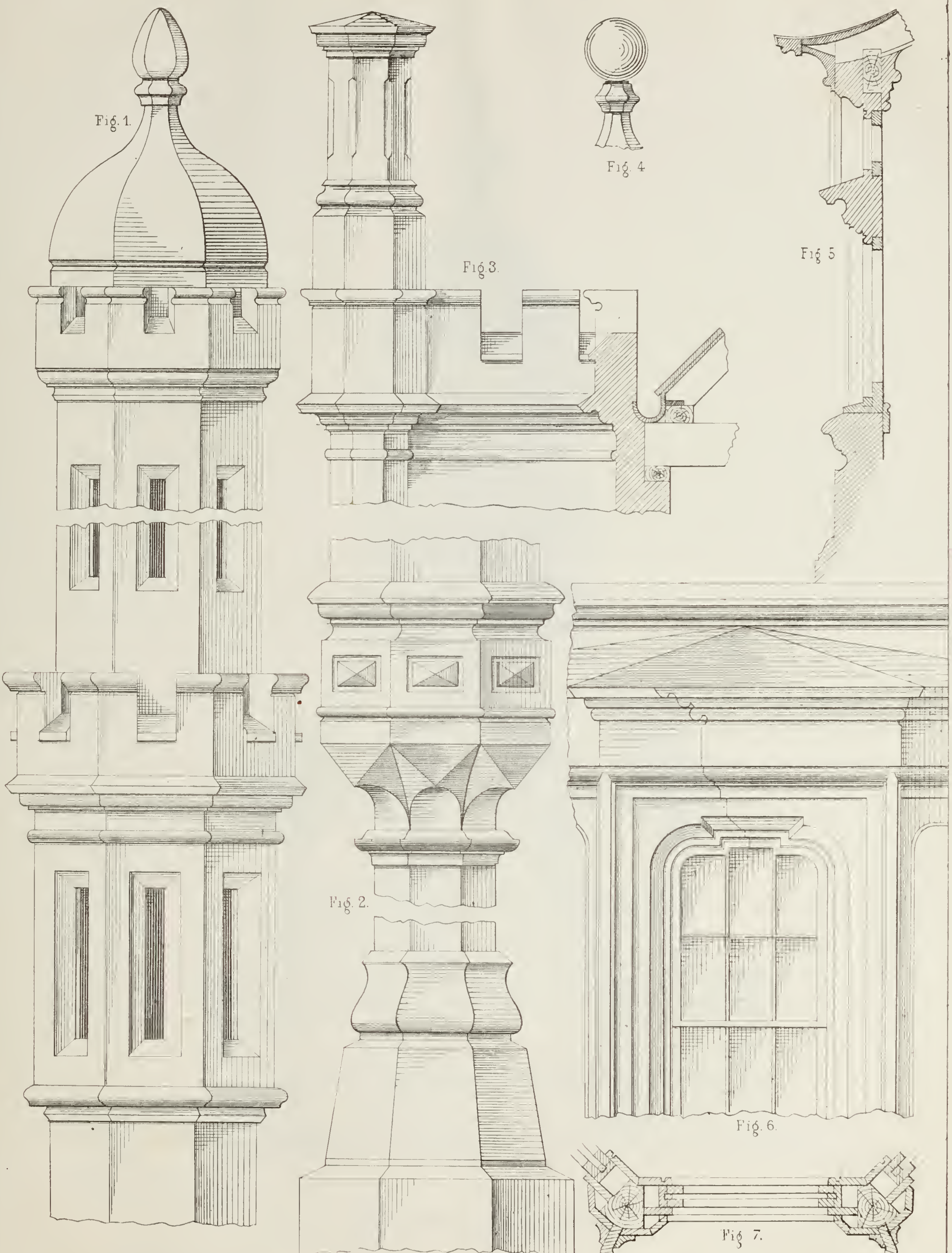
GROUND PLANS.



Scale 8 feet to the inch

ISOMETRIC VIEW.

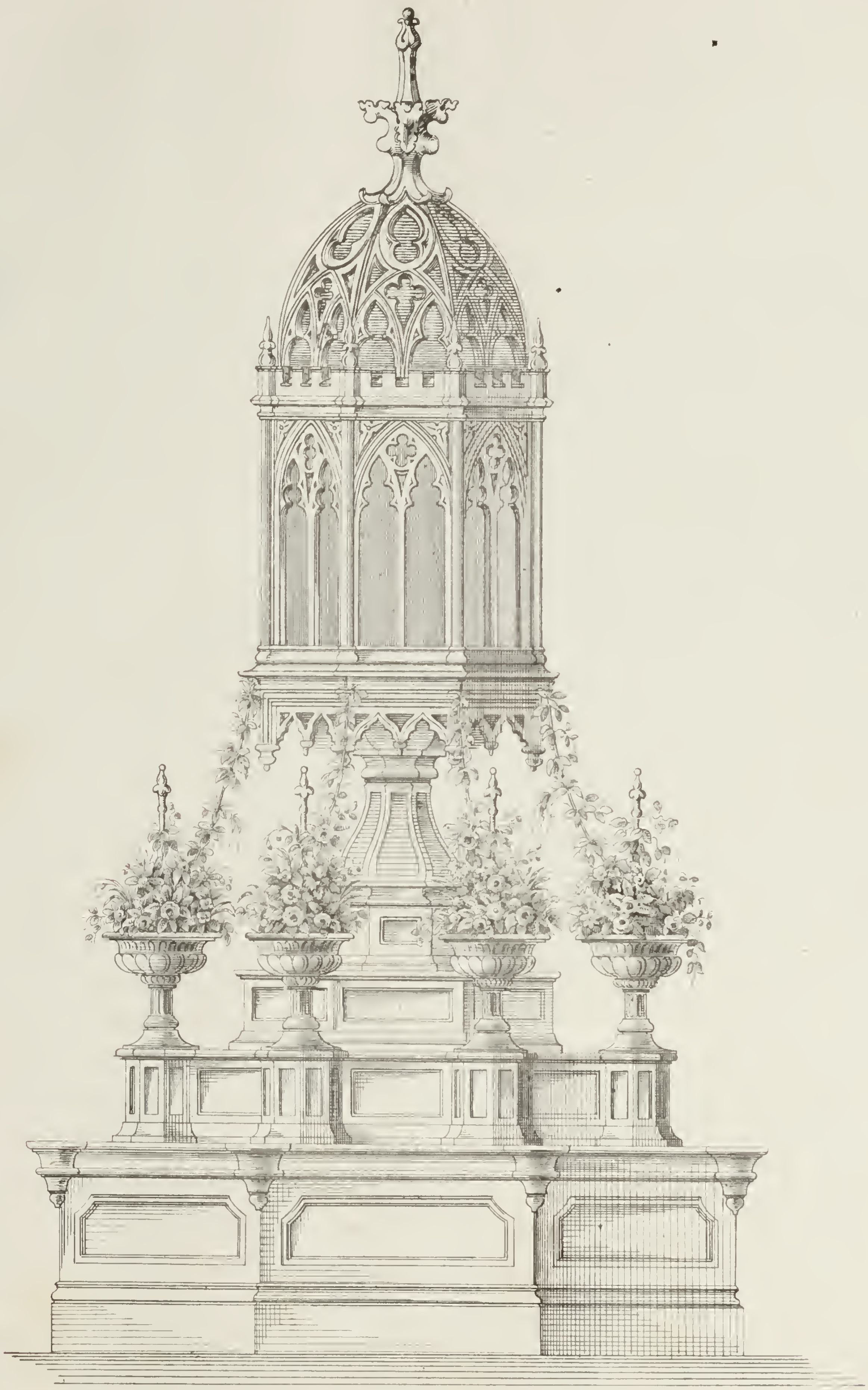
Saml. Sloan Archt. P.S.Duval & Co's Steam lith Press, Philad.



Scale ½ inch to the foot.

Saml. Sloan, Archt. P. S. Duval & Co's Steam lith Press, Philada.

DETAILS.



FLOWER STAND.

Scale 1 inch to the foot.

Saml Sloan, Archt

P S Duval & Co's Steam lith Press Philada

FRAMING.

THE work of a house carpenter, as mentioned in the previous article, chiefly consists in the framing of the floors, the partitions and the roof. He is frequently called upon to do lighter work, but those particularly belong to his art, and call forth all his abilities. In the march of improvement many different ways have been devised for accomplishing the same object, and variations in the size of work, or the difference of position, require an essentially different style of framing. But let this fact be ever present to the mind. The most simple combinations, provided they be sufficient, are always the best. It is often the case that a vast amount of labor and material are literally thrown away in complicated systems of framing. The roof of the Imperial Riding House at Moscow is one of the most splendid specimens of carpentry in existence. Its principal feature is an arched beam, whose span is two hundred and thirty-five feet, constructed in a curious and scientific manner. But there is no doubt that a large sum of money was unnecessarily expended; for the same thing might have been done more securely in a much more simple manner. Not only are the simplest methods the cheapest, but they are almost always the strongest. All sawing or cutting of timber weakens it, and therefore should be avoided as much as possible. Nothing exhibits this fact more forcibly than the various methods of scarfing timber. This consists in joining two pieces of timber lengthwise, so as to form one long piece. Many methods have been devised for securing the pieces so as to offer resistance either to cross strains, as in a girder, or to a strain in the direction of its length, as in a tie beam. None are so efficient as ordinary splicing, either with a parallel or diagonal joint, and fastening with bolts or bands of iron. These are the most simple methods, and by far the best. The principle should mark all carpentry, and will always produce more strength and durability, with less labor.

The horizontal timbers, which are arranged at different heights in the building, in order to support the flooring boards, are called the naked flooring. The particular arrangement depends, of course, to a great extent upon the form and size of the room, and the amount of weight which they may be required to support; but there are three kinds of floors, each of which is adapted to suit particular circumstances. They are termed single joisted floors, double floors and framed floors. Floors have been and may yet be constructed on entirely different principles from those designated, but we find that they prevail almost universally in civilized countries, and are regarded as the best methods for combining cheapness, strength and durability. There was executed in Amsterdam a singular floor that deserves notice, since it was constructed without the aid of any supporting timbers whatever. "The room is sixty feet square, and surrounded by strong wall plates framed at the angles, and firmly secured by iron straps. The plates are rebated to receive the edges of the flooring. The flooring consists of three thicknesses of one and a half inch boards. The first or lowest thickness is laid diagonally with its edges resting in the rebates of the wall plates, and rising about two inches and a half higher in the middle than at the sides of the room. The second layer of boards is also diagonal, at right angles to the first. The two thicknesses are nailed together. The boards of the third layer are parallel to one of the sides of the room, and form the upper side of the floor, being well nailed to the boards below. All the boards are tongued and grooved together, and form a solid floor four inches and a half thick." This floor is supported by its crown in a manner similar to a vault. It is firm and secure, so long as the weight upon it is tolerably distributed, but it would be endangered by very unequal bearing, since then there would be a liability of its rising in opposite parts.

The first description of floor named, i. e., a single joisted floor, consists of a series of joists supported at either end by walls or partitions. The flooring boards are nailed directly upon these, and the lathing of the ceiling is attached to the under edge. Sometimes every third or fourth joist is made deeper, and ceiling joists fastened to these. This method deafens somewhat, and the ceilings are less apt to crack. The flooring joists should be thin, but deep. Three inches, by about nine or ten, is the best proportion.

It often happens that there are places where the joists cannot have a bearing upon the wall, as in front of flues, in which case the ends have to be framed into cross joists, called trimmers. These trimmers should always be much thicker in proportion to their length than the joists, as is also the case with the trimming joists, which are the two joists which support the ends of the trimmer. They are commonly made by nailing two ordinary joists together.

There is a tendency in the joists when supporting a heavy weight to twist, and if they can do so, the floor will yield much more readily. Wherever the bearing exceeds eight feet, this tendency must be provided against by the use of struts, which add much to the stiffness of the floor. In a bearing of twelve or fourteen feet, two rows of struts should be used, and so on. The struts consist of a row of blocks placed between the lower edges of the joists, the nailed flooring above giving sufficient security to the upper edges. These will effectually prevent any twisting of the joists; but there is another advantage gained by the use of lattice work bridging, or as it is sometimes called, herring bone bridging. By this means, not only are the joists effectually prevented from twisting, but each receives a certain degree of support from the two adjacent ones, and cannot yield without they also do so. Thus the floor is made to possess more uniformity of strength, and is consequently more reliable. The good effects of this arrangement in single joisted floors especially, belong principally to the ceiling attached, which is less apt to crack. It is well to run an iron bar through the middle of the joists close to the bridging, in order to draw them together, then the effect of the shrinkage will be to tighten the whole.

It is highly desirable in constructing a good floor, to use some means to prevent the passage of sound into the room beneath. This process is termed by the carpenters, deafening, and is much more necessary in a single joisted than in a double framed floor. The best method of accomplishing it has already been described in the specifications attached to the various designs in this work. It consists in nailing cleats on either side of each joist, about two inches from its upper edge, for the support of an intermediate floor, composed of short boards lying between the joists. Then the space included by this floor and the upper one is to be filled with coarse mortar. The mortar being a very bad conductor of sound, almost entirely prevents its passage, and deadens to a great extent the sonorous vibrations of the timber. It is evident that this arrangement adds greatly to the weight of the floor, but the weight, being so uniformly distributed, gives greater steadiness without endangering it to any considerable extent. If, however, the floor is originally weak, other methods must be resorted to. It is recommended in this case to lay strips of list or thin slices of cork on the upper edge of the joists, before laying the floor.

The floors of a cellar or basement are generally composed of joists resting upon sleepers, bedded in the cellar bottom. Sometimes the joists themselves are bedded in the earth, and the sleepers dispensed with. The joists in these cases need not be so deep as for an ordinary floor. The sleepers should be either of chestnut or of locust; the latter is the best to resist rot. They should be laid in concrete, especially if the ground is damp. The concrete should not come quite as high as the upper edge of the sleepers, so that there may be a passage for air beneath the joists. All the enclosed spaces then communicate with each other, and there should be also some arrangement for them to communicate with the upper air, in order to secure ventilation beneath, thereby hindering rot, and preventing a great source of unhealthiness. If this arrangement cannot be made and the joists only are used, then an inch should be added to their breadth, and the spaces had better be filled entirely flush with the floor. The air is thereby mostly excluded, and the rot retarded. In all cases it is recommended to strew the ground with ashes, which will prevent to a considerable extent the growth of fungi.

The double floor differs from the single joisted floor in having ceiling joists attached to cross beams, called binding joists, which rest upon the wall plates, and also give support in some cases to the flooring or bridging joists. This arrangement throws the whole weight of the floor upon fewer points in the walls where the ends of binding joists are inserted. Since, however, these joists should not be more than six or eight feet apart, we may disregard this matter here. The bridging joists had better not rest entirely upon the binding joists, but may be slightly notched upon them, and ultimately rest upon the wall plates. The binding joists should be about six by twelve inches.

Ceiling joists may be much smaller than the bridging joists. Two inches thick, by eight wide, is sufficiently large. They are attached to the binding joists in various ways, and sometimes very carelessly. The fall of the ceiling, mentioned in the article on school houses, was caused by the joists being simply nailed to the underside of the binding joists. This method, being the easiest and cheapest, is often adopted, but is highly reprehensible, since the joists depend entirely for their support upon the mere tenacity of the nail. We are surprised to find the plan recommended in some works upon carpentry. It is not best to mortice the joists in, because this is a laborious method, and weakens the binding joists. The best way, as practice has shown, is to nail firmly, continuous strips one inch by three against the sides of the binding joist flush with its lower edge. Notch the end of the ceiling joist one inch from its lower edge to fit this cleat, and this will leave four inches of the eight inch ceiling joist above to give support. A strip should be nailed upon the upper edge of these joists to tie them together. In this way it will be seen that the edges of the ceiling joists extend one inch below the edge of the binding joist. This is done for the sake of the ceiling. When the lathing is to be done, a strip is nailed across the underside of the binding joist, connecting the ends of the ceiling joists, and thus forming a continuous edge to nail the laths against. If we plaster immediately upon the binding joist the ceiling will certainly crack. This can not be avoided in single joisted floors where a girder is introduced, for it occupies the whole depth. Indeed, the double floor is only used in order to obtain a perfect ceiling, since it is but little if any stronger than a single joisted floor.

There remains the double framed floor. The difference here consists in the introduction of a girder. The girder is frequently used in the construction of a single joisted floor where its extent is greater than the length of the joists. In the double framed floor, proper, the ends of the girders rest upon the wall plates. The binding joists are framed into them, and the bridging joists also. The best plan for connecting the bridging joist with the girder, is to make a dove-tail notch in the girder to receive the end of the joist. The double framed floor is only used where the extent is so great as to be beyond the reach of joists. The single joisted floor with girders may be used in all cases, but the double framed floor secures a good ceiling, and prevents the passage of sound entirely.

The girder, which is the principal feature in a double framed floor, consists of a long, strong beam, supported at the ends, as before stated, by the walls. The whole weight imposed upon the girder, together with its own, is therefore transmitted to these two points. Hence it is important that the ends of the girder should always rest over piers, and not over an opening. The bearing should be distributed too by a wall plate. It is bad to have a girder pass obliquely through a floor, and if this cannot be otherwise avoided, it may be best to let the end be placed over the opening with an arch and wall plate to throw the weight on the piers. The size of girders, and their distance apart, depends of course in a great measure upon their position and service, but they should always be as deep as possible.

The girder spoken of consists of a simple beam. There are methods, however, which have been adopted for strengthening it, when the length is necessarily great. It is recommended in all cases to saw a girder down the middle, turn one piece end for end, and bolt them together with the sawn sides outwards. By this means the stiffness of the beam is much increased, especially if the grain is at all irregular; and if strips be placed between the pieces so as to allow a free circulation of air, its proneness to decay is lessened. Some have imagined that the strength of the girder is increased by this operation. It is in fact diminished, but in so small a degree as to be of no comparative consequence. If there be any difference, the side having the straitest grain should be turned down. All mortices near the middle of the girder where the strain is greatest, must be avoided. There are methods, however, by which its strength may be increased. The truss described in the last edition of the Carpenter's New Guide, is good, but is more valuable, as adding to the stiffness of the girder, than to its strength. The plan now in general use, consists in having an iron bar extending from end to end, between the pieces, in such a manner, that the girder hangs upon it. The arrangement is admirable, and should always be adopted. Girders trussed in this manner, will bear weights without sensible deflexion, which otherwise would break them. Therefore, in the same floor we may use a much smaller girder trussed, than one untrussed. In large edifices, whose importance justifies the expense, girders are often made of cast iron. These are of course best, but a description of them would lead us somewhat beyond our present limits.

A crown is sometimes given to floors, by planing the joists, so as to make the floor rise in the middle, about half an inch in ten or twelve feet. This is a good practice, for the best constructed floors will settle to some extent. It is always difficult to make the flooring boards fit tight, for in shrinking, the joints open. A suggestion found in Evelyn's Silva, may not be out of place. "To prevent all possible accidents, when you lay floors, let the joints be shot, fitted and tacked down only the first year, nailing them for good and all the next; and by this means they will lie staunch, close, and without shrinking in the least, as if they were all of one piece: and, on this occasion, I am to add an observation that may prove of no small use to builders, that if one take up deal boards that have lain in the floor one hundred years, and shoot them again, they will certainly shrink (toties quoties,) without the former method."

But few remarks about partitions are necessary. They are generally constructed more carelessly than any other part of the carpenter's work. If it be practicable, they should rest mainly on the walls, and be attached to the floor above, being entirely independent of that below. In this way, the cracking of the cornice may be avoided. It must be remembered, that a partition is, in itself, a very heavy piece of framing, and, therefore, the lightest material should be used, and the whole should be trussed in a secure manner. The doorways often render this a difficult matter, and there are many cases in which it requires much skill to construct one so firm, that the plastering shall not crack at all. It is best to delay the plastering as long as possible, in order to give time for settlement. The next article, will be a continuation of this general subject, and will treat more particularly of roofs.

A PLAIN DWELLING.

DESIGN THIRTIETH.

The side and front elevations of this design are given on Plate XV. They are engraved in lines, which is a style much preferred by many persons for architectural drawings, to the tinted plates, heretofore given. It requires quite as much labor, and is, therefore, quite as expensive as the other method. The advantage consists in having a sharper outline, from which measurements may be taken, while at the same time the general effect is retained, so as to present a truthful and pleasing picture. Some few buildings in the preceding parts of our work have been delineated in this way, and have met with decided approval, while we must confess that to us it is preferable, as being more in the usual style of the best architectural drawings. The plate before us, as close examination will show, has been lithographed with a pencil instead of a pen, and hence presents more the appearance of a sketch, thus affording the artist an opportunity of producing better effects than can be produced by the engraver's pen.

The building itself is quite plain, and has, according to the proper meaning of the word, a homely appearance. It is two stories and a half high in the body, and two stories in the wing; the rooms not being as high as those in the main building. The fronts are almost destitute of ornament. The walls may be built of stone or of brick rough cast. The roof would be best of tin, painted both above and below, but may be shingled. Indeed the whole house would do very well if built entirely of wood, the walls being closely boarded, painted and sanded. The half story above might be left off, which would bring the eaves down to the string course above the second story windows, but the appearance of the whole would be much injured because of the height of the wing. Beside the front porch there are two verandahs represented, which are to be built of wood. Iron posts, of fanciful patterns, might be substituted. The roofs of these are of tin, drawn over slats. The small flower shelf beneath the gable window, is made of wood, with a wire railing. Beneath the front first story windows are panels. The one to the left is of wood, that to the right is an iron railing, and the sash extend to the floor. This is so arranged to be consistent with the other windows of the parlor which also extend to the floor, so as to lead out to the verandahs.

Plate XVI. presents the ground plans. The vestibule is paved with plain tiles. To the left is the hall, containing the stairway, which extends directly up with a continued rail into the third story. The main building contains two spacious rooms, a parlor and dining room; the back windows of which last also extend to the floor. The end window is panelled below, similar to the window on the left of the front. The wing contains the kitchen and two closets, with a bed and bath room above. The whole house, including the story above, will accommodate a family of six persons, including a servant. The plan of the third story is entirely similar to that of the second story main building.

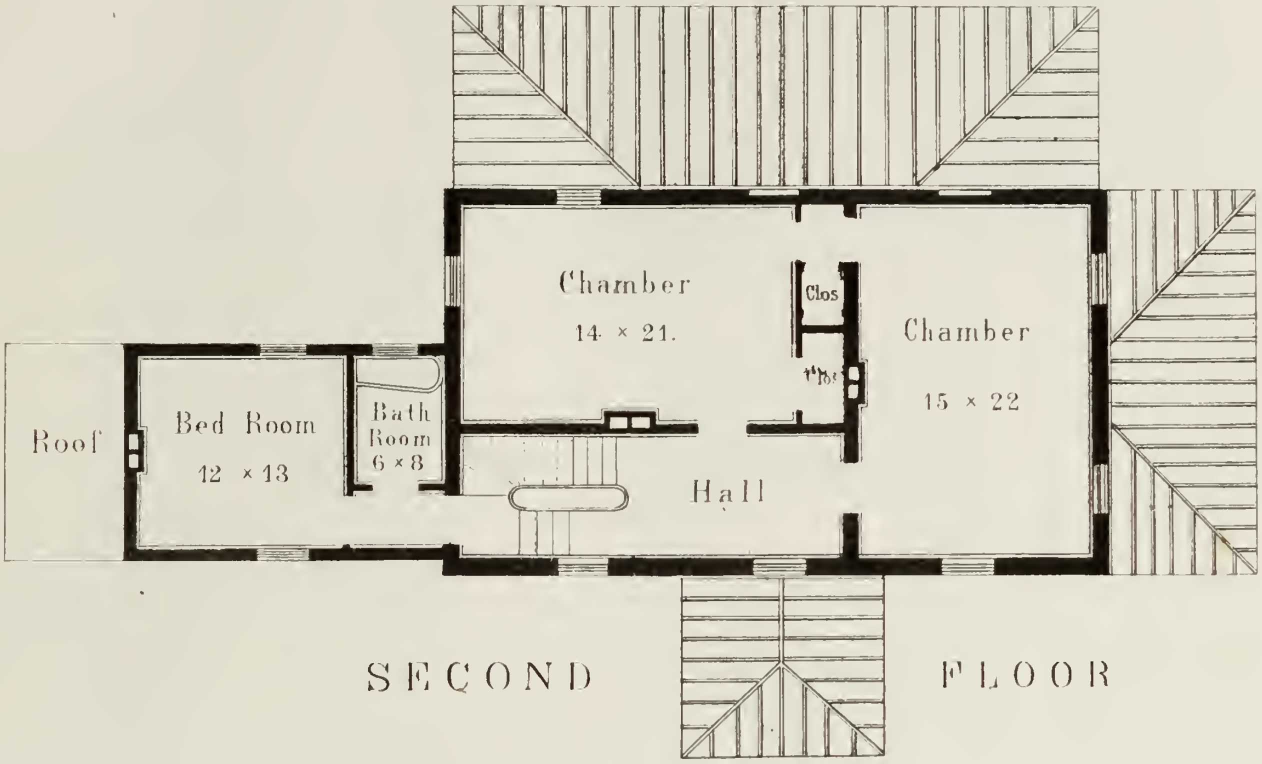
There are no details accompanying this design, such as we have been accustomed to give. On plate XVII. is represented a section of the building instead, supposed to be made through the line A. B. on the first floor of the ground plans. We have here exhibited in the most advantageous manner, the interior of the building, explaining all the principal constructive features and the style of finishing. The cellar extends only beneath the main building, and is therefore cut off from the well of the water closets. Only a close examination is necessary to comprehend the whole.

SIDE ELEVATION.

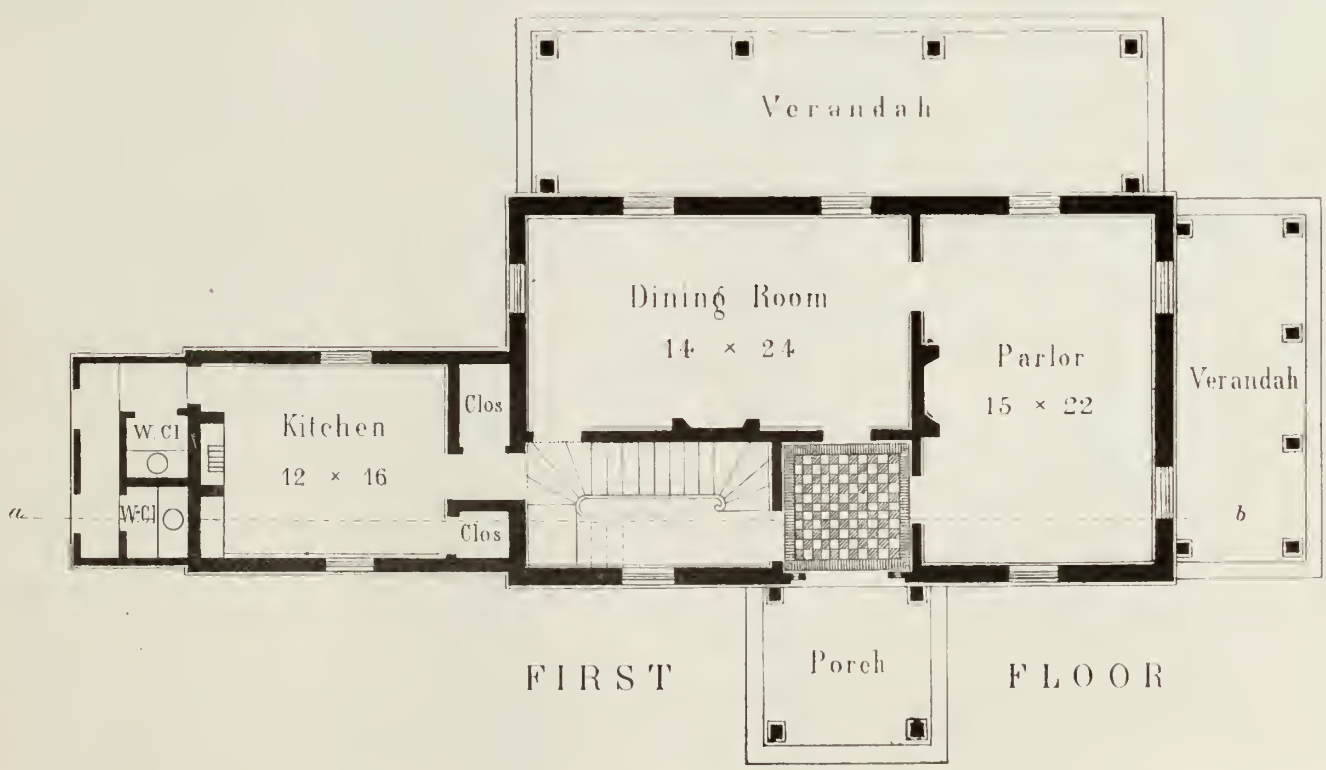
FRONT ELEVATION.

Saml. Sloan Arch.

P S Duval & Co. Steam lith press Ph.



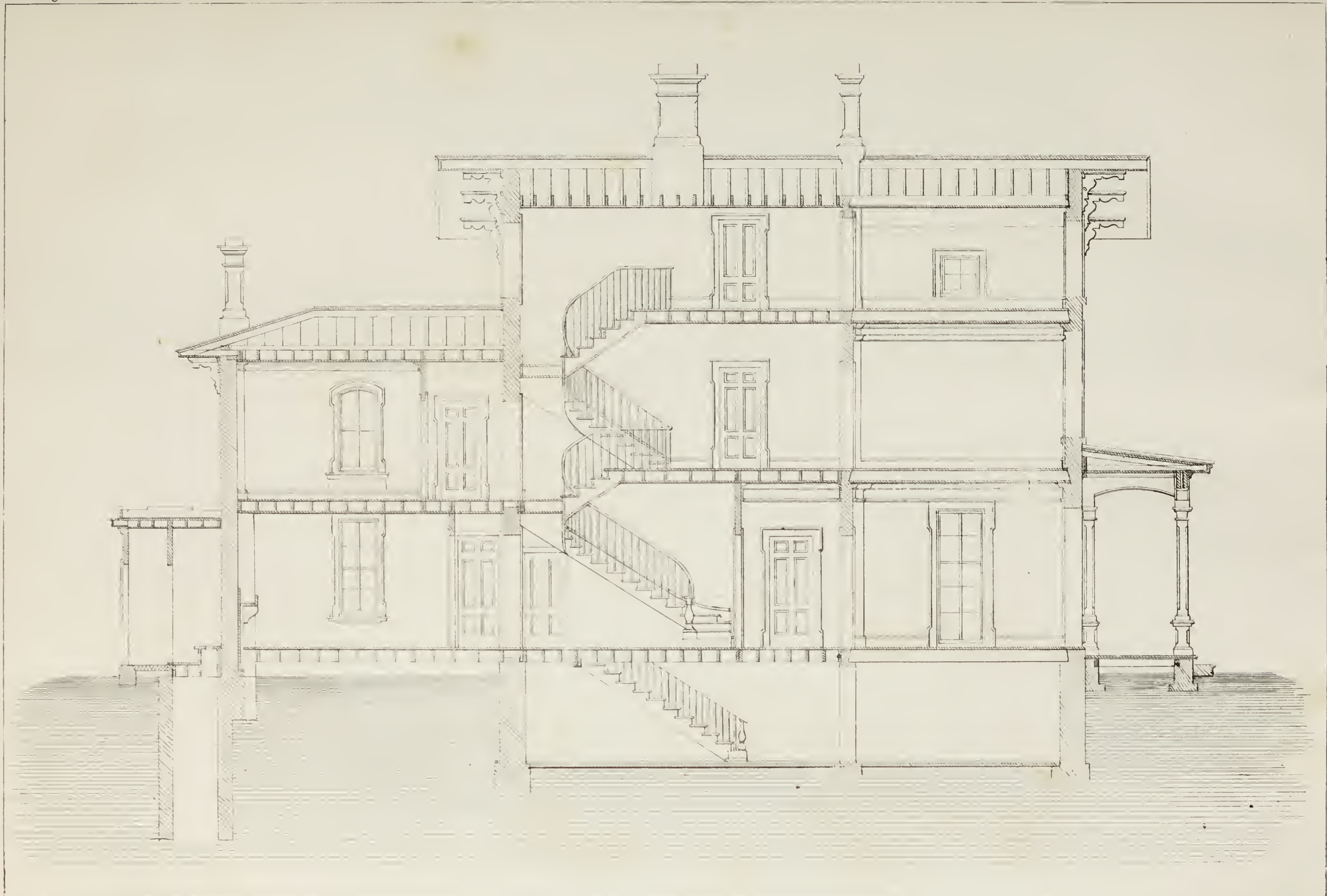
SECOND FLOOR



FIRST FLOOR

Scale 12 feet to the inch

GROUND PLANS.



Saml Sloan, Arch.

P. S. Duval & Co. steam lith. press Ph.

SECTION.

A TABLE

EXHIBITING THE RELATIVE RESISTANCE OF VARIOUS WOODS TO CROSS STRAINS.

Kind of Wood.	Specific gravity.	Length in feet.	Breadth in inches.	Depth in inches.	Deflexion at the time of fracture in inches.	Weight that broke the piece in pounds.	Authorities.
Oak, English, young tree, . . .	·863	2	1	1	1.87	482	By trial.
Ditto, old ship timber, ...	·872	2·5	1	1	1.5	264	Idem.
Ditto, from old tree, ...	·625	2	1	1	1.38	218	Idem.
Ditto, medium quality, ...	·748	2·5	1	1		284	Ebbels.
Ditto, green, ...	·763	2·5	1	1		219	Idem.
Ditto, from Riga, ...	·688	2	1	1	1.25	357	By trial.
Ditto, green, ...	1·063	11·75	8·5	8.5	3.2	25812	Buffon.
Beech, medium quality, . . .	·690	2·5	1	1		271	Ebbels.
Alder, ...	·555	2·5	1	1		212	Idem.
Plane Tree, ...	·648	2·5	1	1		243	Idem.
Sycamore, ...	·590	2·5	1	1		214	Idem.
Chestnut, green	·875	2·5	1	1		180	Idem.
Ash, from young tree, ...	·811	2·5	1	1	2.5	324	By trial.
Ditto, medium quality	·690	2·5	1	1		254	Ebbels.
Ash, ...	·753	2·5	1	1	2·38	314	By trial.
Elm, common	·544	2·5	1	1		216	Ebbels.
Ditto, wych, green	·763	2·5	1	1		192	Idem.
Acacia, green	·820	2·5	1	1		249	Idem.
Mahogany, Spanish, seasoned . .	·853	2·5	1	1		170	By trial.
Ditto, Honduras, seasoned . .	·560	2·5	1	1		255	Idem.
Walnut, green, ...	·920	2·5	1	1		195	Ebbels.
Poplar, Lombardy	·374	2·5	1	1		131	Idem.
Ditto, abele	·511	2·5	1	1	1·5	228	By trial.
Teak	·744	7	2	2	4·00	820	Barlow.
Willow	·405	2·5	1	1	3	146	By trial.
Birch	·720	2·5	1	1		207	Ebbels.
Cedar of Libanus, dry	·486	2·5	1	1	2.75	165	By trial.
Riga fir	·480	2·5	1	1	1.3	212	Idem.
Memel fir	·553	2·5	1	1	1.15	218	Idem.
Norway fir, from Long Sound, .	·639	2	1	1	1.125	396	Idem.
Mar Forest fir, ...	·715	7	2	2	5.5	360	Barlow.
Scotch fir, English growth . .	·529	2·5	1	1	1.75	233	By trial.
Ditto, ditto	·460	2·5	1	1		157	Ebbels.
Christiana white deal	·512	2	1	1	.937	343	By trial.
American white spruce	·465	2	1	1	1.312	285	Idem.
Spruce fir, British growth . .	·555	2·5	1	1		186	Ebbels.
American pine, Weymouth . . .	·460	2	1	1	1·125	329	By trial.
Larch, choice specimen . . .	·640	2·5	1	1	3	253	Idem.
Ditto, medium quality	·622	2·5	1	1		223	Idem.
Ditto, very young wood . . .	·396	2·5	1	1	1·75	129	Idem.
Riga fir	·610	4	3	3		4530	Fincham.
Red pine	·544	4	3	3		3780	Idem.
Yellow pine	·439	4	3	3		2756	Idem.
Cowrie	·579	4	3	3		4110	Idem.
Poona	·632	4	3	3		3990	Idem.

THE VILLA.

DESIGN THIRTY-FIRST.

We have presented on plate XVIII. a perspective view of this design. The building is in the Italian style, of which we have given various specimens heretofore. As a pretty full description of this design is requisite, we will not delay here to remark upon its different features, or upon the landscape in which it is placed. It was originally designed for Mr. L. A. Godey, the accomplished editor of the Lady's Book, to insert in the pages of that magazine, and has already appeared in its pages. It is, therefore, his property, and by his consent we transfer it to our volume.

Plate XIX. exhibits the interior of the drawing room. It will be seen that the style of finishing is quite elaborate, and adapted in style to the exterior of the building. The ceiling of the room is frescoed in the same general style of the ceiling given in the first volume of this work, though the pattern is entirely different. The cornice and pilasters on the sides of the room, are to be executed in plaster. At the end of the room is an opening, the lintel above which is supported by two columns. Beyond these is a large bay window, finished in the same general style, and admitting light. The view of the room is taken from the main entrance, and there is an additional door upon the left hand, leading into the parlor. The plan may be more readily comprehended by an examination of the next plate.

Plate XX. exhibits the ground plan. In front of the house is a cistern, with a fountain in the middle. Immediately before the vestibule is a coach way covered. The balconies on either side of the vestibule are approached through the front windows of the parlor and sitting room, which reach the floor. The dining room is of the same size and plan as the drawing room, which has just been fully described. They both communicate with the hall by means of sliding doors, directly opposite each other, so that when thrown open the whole will form one large room. Back of these are the stairs, library and domestic offices. The stairway is lighted by the semicircular projecting window. There is also a private stairway near the kitchen, for servants. The second floor of this part of the building, it will be seen, is not so high as the other.

In the second story main building are two large chambers and five good sized bed rooms, containing closets. Between the chambers is a dressing room which may be shut off from either. In the wing are two bed rooms and a bath room.— The whole will comfortably accommodate a family of ten, including servants.

It will be observed that there is a tower on the front of the perspective view. The approach to this tower is by means of a step ladder at the end of the hall. Nothing more was thought necessary, as the ascent is not often made, but if it be preferred the dressing room may be made shorter, and a small permanent stairway built.

GENERAL DESCRIPTION

Of the workmanship and materials, to be used in the erection of this design.

There is to be a cellar throughout the entire extent of the building, including all appendages, at least ten feet deep, below the level of the principal floor. The trenches for the foundations must be at least eight inches below the cellar bottom.

All the exterior walls of the basement are to be of quarry building stone, of the best quality, and they should be flushed in mortar of the best quality, and grouted every two feet, if the material used be of an absorbent quality. These walls

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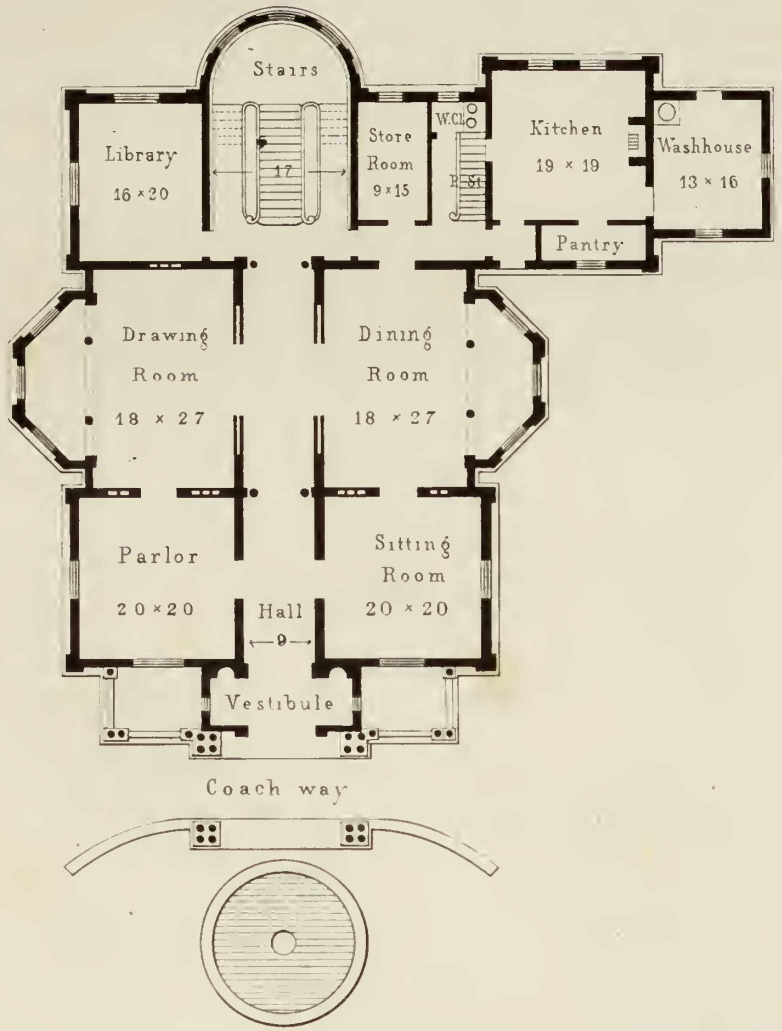
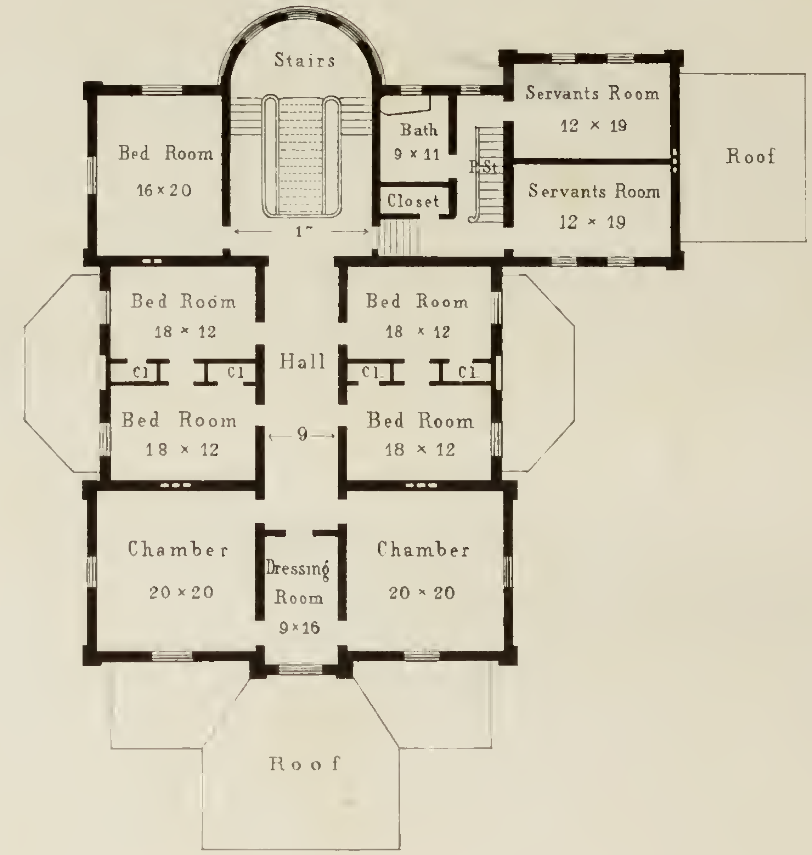
THE VILLA.

Saml. Sloan Arch. P.S. Duval & Co's Steam lith. Press Philada.

DRAWING ROOM.



FIRST STORY



SECOND STORY.

Scale 24 feet to the inch.

GROUND PLANS.

Saml. Sloan Archt.

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must be two feet thick to the level of the first tier of joists. The foundations of the cross walls need not be more than eighteen inches thick. The steps of the front porch, all outer sills, the base course and water table around the building, are to be of the best Connecticut granite, neatly tooled. All the walls of the superstructure are composed of the best burnt bricks. The exterior course should be of hard brick, no soft brick coming within four inches of the face of the wall. The mortar must be removed from all the exterior joints at least a half an inch deep from the surface. The exterior walls of the building are to be fourteen inches thick to the roof, with a hollow space one inch and a half wide in the middle, between the inner course and the body of the wall, the two being tied together by making every fifth a heading course. The division walls in the first and second stories are also to be of good brick work, nine inches thick. The principal openings of the interior must have arched heads to correspond with the apertures in the exterior walls.

The joists of the principal floor are to be of spruce pine, three by twelve inches. Those of the second floor are to be three by ten inches, of hemlock. All are to be placed sixteen inches between centres, to have one course of lattice work, bridging through the centre, and to have three-fourths of an inch crown. The wall plates at the foot of the roof, and those for the gable timbers to rest upon are to be three by nine inches, and are to project two inches from the face of the wall. The rafters are to be of the usual cut, and three by eight inches, those in the vallies being three by ten inches, and those for the flat over the hall three by nine inches. All must be placed sixteen inches between centres, and are to be closely sheathed for a tin or galvanized iron covering.

The floors in the principal story are to be composed of the best Carolina heart pine boards, one inch and a quarter thick. Those of the second story are one inch thick, and this floor must be deafened in the usual manner.

The stairs must be built of one and a quarter inch heart pine, step boards of yellow pine, with one and a quarter inch white pine risers, placed on four three by twelve inch bearers, of hemlock. The newel is to be ten inches at the base, with a richly carved shaft, and the balusters are to be three inches at the base, turned. The rail is to be two and a half by five inches, moulded, and all are to be of black walnut, well varnished. The private stairs are to be constructed in the usual manner.

All the windows in the first story are to have inside shutters, and are to be finished otherwise, together with the doors, in the usual manner, or according to working drawings, furnished for the purpose. All the exterior walls are to be rough cast in the best manner, painted and sanded to represent brown stone. This description will be amply sufficient for a builder, but if more is required a specification must be drawn up.

VERANDAHS.

DESIGN THIRTY-SECOND.

On Plate XXI. are presented two designs for verandahs. They are to be built entirely of wood, with tin roofs. The one below is much the richest, and has the addition of a balcony above. The patterns of the upper one are merely to be sawn out, but that below has carved spandrils, posts and brackets. Verandahs of fanciful patterns are often constructed of iron. These are more lasting, of course, than the wooden ones, but at the same time much more expensive.

A SMALL COTTAGE.

DESIGN THIRTY-THIRD.

There is perhaps a much greater demand for small cheap cottages of tasteful designs than for buildings of any other description. The millionares in our country, who wish to retire into a quiet country home, are but few in number, compared with those in moderate circumstances, whose tastes lead them away from the city, at least during the hot summer months. Persons of this class find quite as much comfort and pleasure in a little rural home as they could in a lordly mansion. For such this design, plate XXII., was prepared. It is simple, unostentatious, cheap, and at the same time is not destitute of ornamental effect. The house is framed, and covered upon the outside with vertical weather boarding. The roof may be either of tin, or shingled. The eaves are made very projecting, and are supported by wooden brackets.

On the upper part of Plate XXIV. are the ground plans of the first and second stories of this design. The house is small and simple. There is to be a cellar beneath its entire extent, which has a stairway leading from the kitchen. The cellar walls should be of stone, as high as the first tier of joists. There are four good sized bed rooms in the second story, showing that the house will comfortably accommodate a family of four or five persons. The stairs are enclosed.

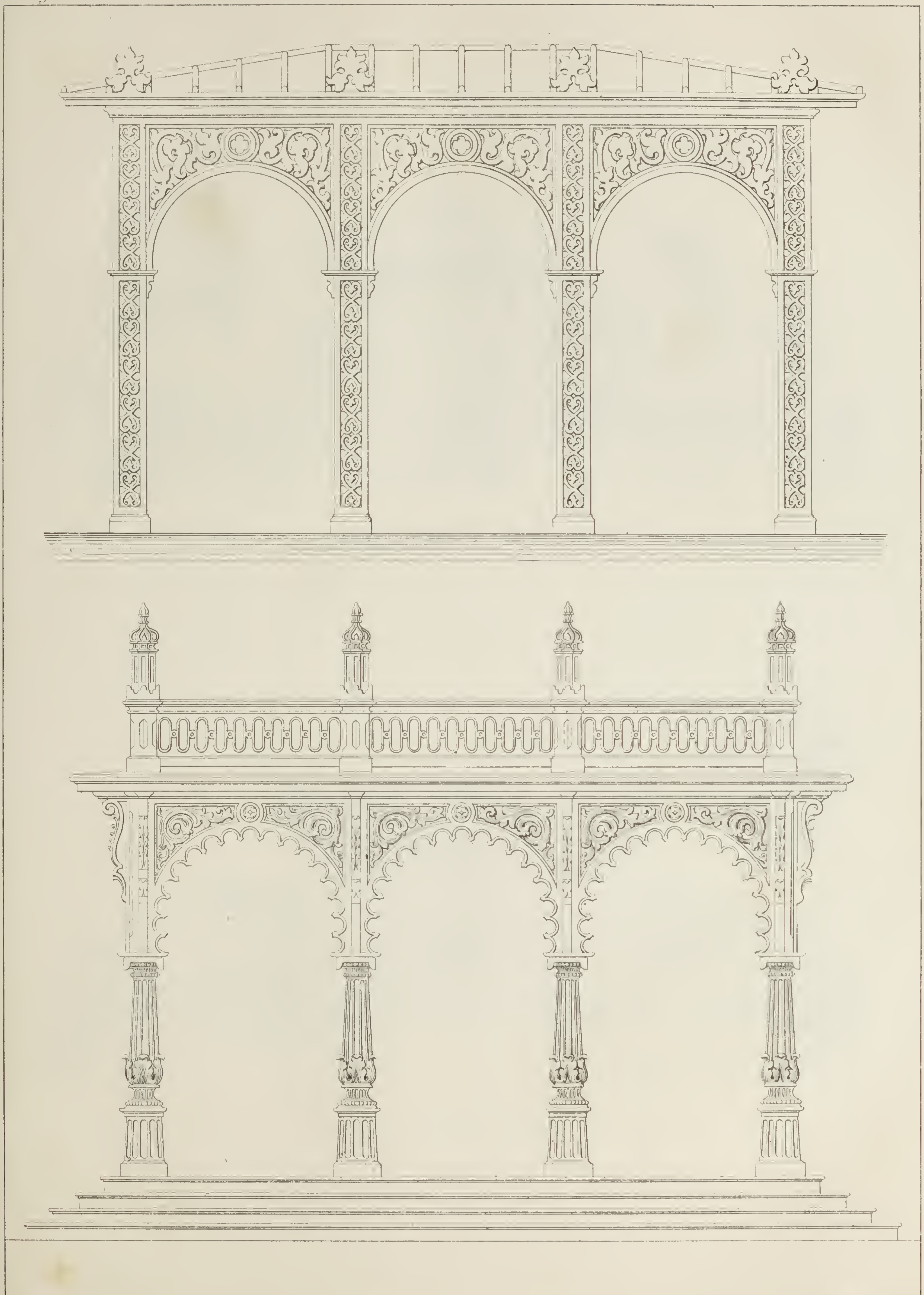
LABORER'S HOME.

DESIGN THIRTY-FOURTH.

Plate XXIII. presents a design for including several small dwellings under one roof. The mode of building is cheaper than if each was erected separately, and therefore for the same total sum, more comfortable accommodations can be provided within. It is often the case that a large number of small dwellings are needed near to a large manufactory, for the accommodation of the hands. For such a purpose, a design of this kind is admirably suited. The building represented is to be framed, and closely boarded outside. The roof is to be shingled; and there are small attic rooms, as may be seen by the gable windows.

The floor plan of the design, together with the little gardens in front, are exhibited on Plate XXIV. It will be seen that each dwelling is completely shut off from all others, so that there can be no interference in the families. In each there is a dining room, and a small kitchen back. The stairs ascend into a commodious bed room, which, with the attic room above, is sufficient for a small family. There should be a range of cellars under the buildings, having stairs beneath the main stairway.

In some future number another design of this description will probably be given.



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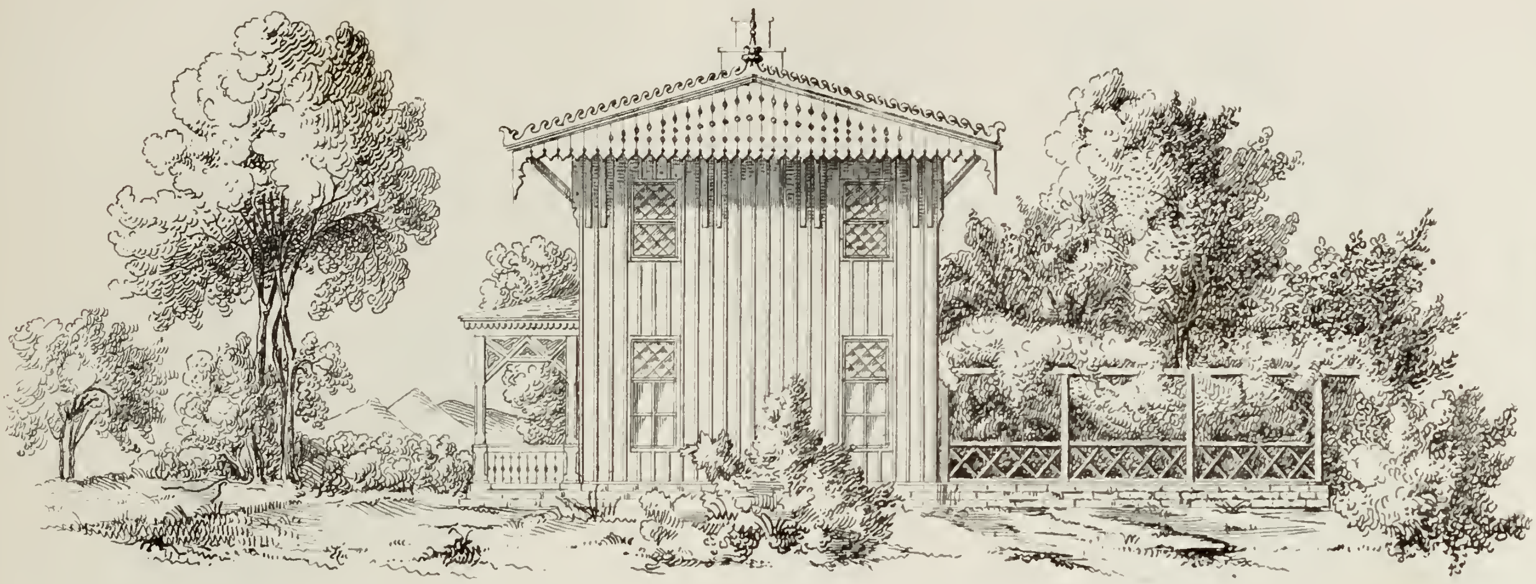
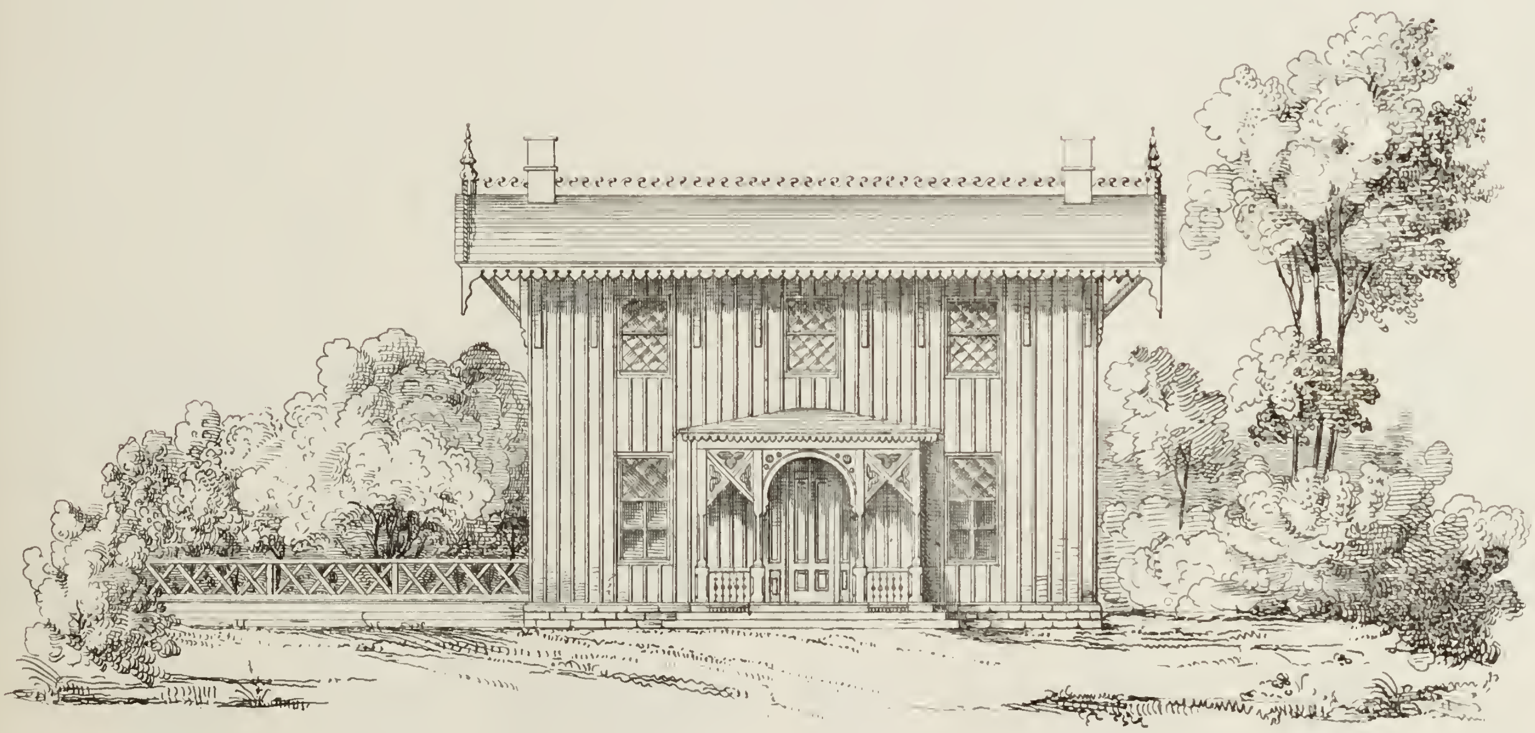
VERANDAHS.



SIDE ELEVATION.



FRONT ELEVATION.

SIDE ELEVATION.

FRONT ELEVATION.

Sam Sloan Arch

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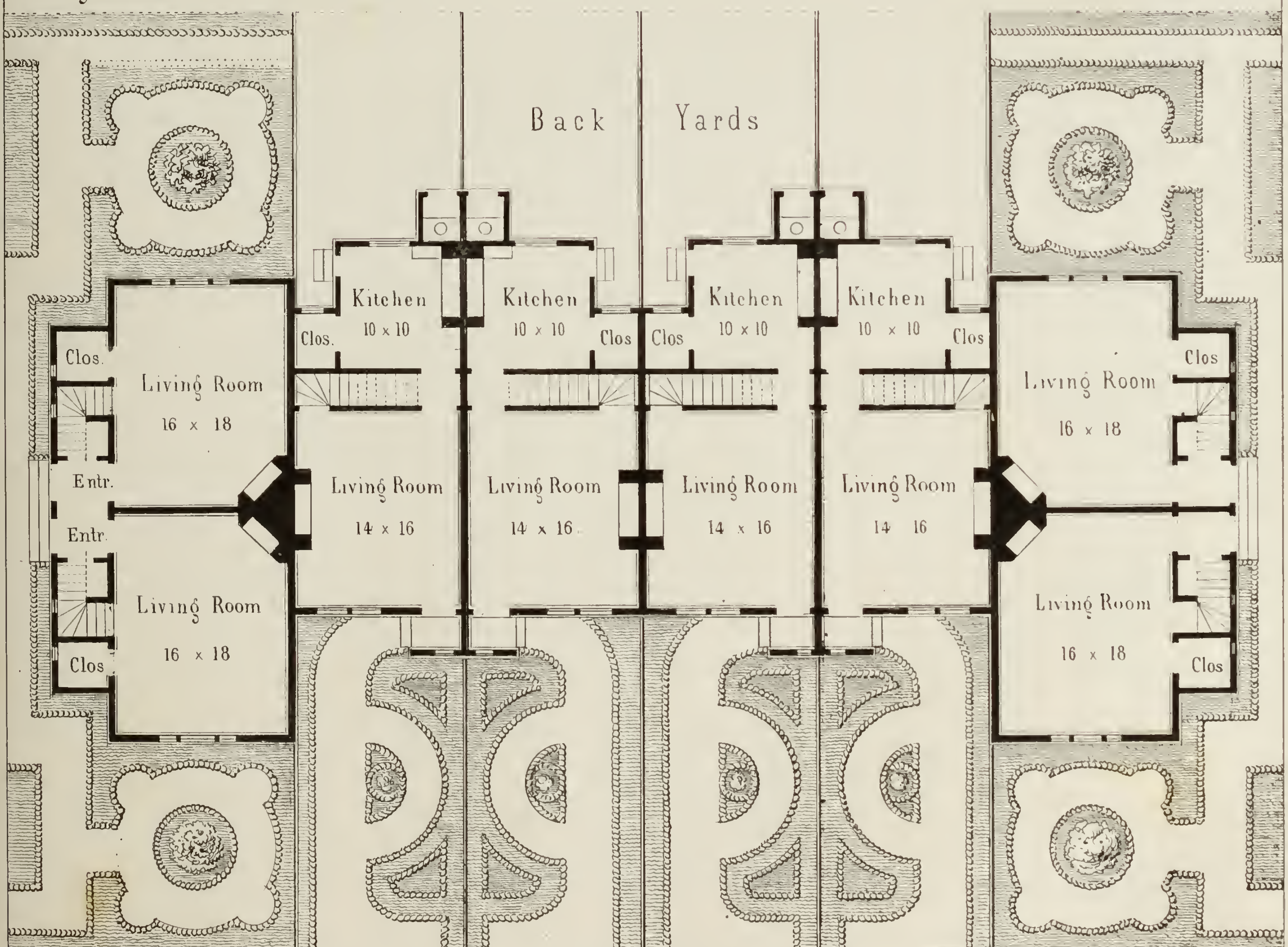
FIRST STORY. SECOND STORY.

Design XXXIV.



Scale 12 feet to the inch.

GROUND PLANS

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FRAMING.

Continued.

SOME allusion has already been made, in the article upon Carpentry, to the roofs used by the ancients. The most simple kind were flat, composed of timbers laid from wall to wall.— Such are still used in those countries of the East where rain seldom or never falls. They are covered with metal, tiles or turf, and are pleasant places for evening resort. This is the weakest kind of covering, and can only be used for small buildings. An improvement is the simple inclination, in constant use at the present day. All our small city buildings are covered in this way, which is preferred because there is the least loss of room, and with a metal covering the pitch is sufficient to throw off the rain. In large buildings, where a considerable extent of ceiling is required, other methods must be resorted to, and the roof must be so braced as not to require more than two points of support. The old Gothic roofs always have a high pitch. The outline is a striking feature, and is, in general, gracefully proportioned to the magnitude of the building. The high roofs are in perfect unison with the aspiring character of Gothic architecture, and are best adapted to throw off the northern snows. They were so framed as to resemble an arch resting on the wall as an abutment, which is in principle bad, since the lateral thrust must be provided against. This style of roof has consequently gone entirely out of use, except, as before stated, in direct imitations of the style.

The large roofs of the present day, more closely resemble those of the Greeks and Romans. Of the Grecian roofs we judge only by the pediments, since there are no remains of roofs whatever. The Romans often exhibited wonderful skill in carpentry, and in some respects we are still much behind them. The pediments of the Greek temples vary in their inclination to the horizon from twelve to sixteen degrees; the latter corresponds very nearly with one seventh of the span. The pediments of the Roman buildings vary from twenty-three to twenty-four degrees. Twenty-four degrees is nearly two ninths of the span, and is the angle that Palladio recommends for roofs in Italy. Some of the Roman domes are perhaps the grandest coverings in existence. They are built of entirely stone, and are nothing more than huge circular vaults. The modern domes are mostly constructed of wood, being mere imitations of the other. The building of these, however, has led to the construction of arched roofs where the span is very great, and the successful erection of some of these is among the greatest triumphs of modern carpentry.

The term Roof in carpentry, is applied to the framework which supports the covering of the building. The pitch of the roof is the angle which its inclined side makes with the plane of the horizon, and is varied with us according to the extent of the roof and the nature of the covering. At the present day we are accustomed to roofs much lower than those used formerly under entirely similar circumstances. The whole height need never be above one-third of the span, and it never should be less than one-sixth. The most usual pitch for slate covering is one-fourth, which makes an angle of about twenty-six and a half degrees.

That part of the roof which requires most skill, and on which the whole mainly depends for support, is the frame; usually in the form of an obtuse isosceles triangle. A series of these is ranged across on the wall plates, and give support to the common rafters. The various timbers which are used in this construction have received distinct names, and are entitled to separate consideration. The principal are the Wall Plates, Tie Beams, Collar Beams, King Posts, Queen Posts, Struts, Principal Rafters, Ridge Piece, Pole Plates, Purlins and Common Rafters.

The wall plates are stout pieces laid along on the top of the walls, on which the ends of the tie beams rest. They are intended to distribute the weight of the roof, and to hold the last courses of brick work in their place. Sometimes they are not so wide as the top of the wall, and are laid with the inner edge flush with the face of the wall. Where the walls are very thick this is unavoidable, but it is much the best plan, when the thickness of the walls admit it, to have them, wide enough to cover the whole. Their object plainly shows this. The tie beams are oftentimes cocked down upon them, or otherwise attached. Although it is recommended in many books on carpentry, yet we do not hesitate to say that the plan is a bad one, since any settling of the roof, or shrinkage, must inevitably exert a thrust upon the walls, or draw them from their perpendicular. If this does not result, the wall plate is at least moved from its position, which is bad. Let the tie beams simply rest upon the plates. The mere weight of the roof is amply sufficient to keep it in position.

The tie beam is the piece which extends directly across from wall to wall. The principal rafters are attached to the ends, and the centre is supported by the king post. There is very little strain upon the tie beam, and it is generally made much heavier than there is any necessity for. The thrust of the principal rafters exert a strain in the direction of its length, which, however, is easily resisted. The only cross strain is the weight of the ceiling, but since the tie beam is supported in the middle, and, if it is long, at other points, we can easily see that it does not require much timber to perform its office. If there are rooms within the roof and floors, more strength is, of course, necessary. All morticing into tie beams should be avoided, as it weakens them very much. If a king post is used it should have a very short tennon, just sufficient to keep it in place, and the attachment should be by an iron strap passing beneath the beam. It is a common practice in framing roofs to force the tie beam to a certain degree of camber. This is often done with the notion that then it partakes of the properties of an arch. Were it so, the result would be very disastrous. The only object in this, which is, nevertheless, a good plan, is that the ceiling may have a slight curve, so that in case of settlement it will come to a level, and not sag. The collar beam is a mere modification of the tie beam, and is used in the absence of the latter, being placed above, connecting the principal rafters near their middle. Dovetail joints have been condemned by high authority, but they are the best mode of attachment we have, unless an iron strap be used.

King and Queen posts are going entirely out of use, iron bolts being substituted. They are sustaining pieces. The upper end of the king or crown post fits between the ends of the principal rafters quite similar to the keystone of an arch, the lower end is attached, and gives support to the middle of the tie beam. In some cases the ends of the rafters abut directly against each other, and the king post is attached by means of a strap. In this way the lateral shrinkage of the king post is avoided. Queen posts perform the same office as the king post, and are used when the one central support is not sufficient for a tie beam, owing to its length. Straining beams are placed between the heads of the queen posts to prevent their coming together.

The foot of the principal rafter is framed in to the end of the tie beam, and the head of the king post receives the other end. This is the most important piece in the roof, since it gives support to all the others. The covering rests upon it, and from it are suspended the king post or queen posts, the tie beam and the whole ceiling. The principle on which it gives support, is the same as that of the arch. It is important that these pieces should be strong, and not weakened by mortices. The joint at the foot should be particularly attended to so as to avoid shrinkage, and give it the firmest abutment possible. Between the principal rafter and the tie beam. struts are often placed, to prevent its bending in the least beneath the weight of the covering. The proper disposition of these struts often requires much skill.

The ridge piece, as its name indicates, passes along the apex of the frames, thus connecting them together, and giving support to the common rafters. The pole plate lays at the foot of the principal rafters, just above the wall plate, and gives support to the foot of the common rafters. The purlins are intermediate pieces to give additional support to the common rafters. These are notched to the purlins, lying parallel to the principal rafters, and receive the slats or sheathing.

We mentioned that king posts and queen posts were little used at the present time. The introduction of iron into carpentry has worked a great revolution. The great difficulty which carpenters have heretofore encountered, has been the shrinkage of timber and the consequent settlement of their work. This shrinkage is almost altogether in the breadth of timber, that in the direction of its length being insensible. If, then, we can manage to have the points of contact occur only at the ends of the pieces, the settlement will be much reduced. In the roof this is accomplished by having an oaken block placed lengthwise between the ends of the principal rafters, or by allowing them to abut directly against each other, and then having an iron rod passed through this block to support the tie beam in place of the king post. Iron rods, bolts and straps are introduced at many other points with great advantage, but our limits will not permit us to enter into a detailed description of these, and we can only refer the reader again to Nicholson's Carpenter's New Guide, where he will find all parts carefully delineated. Roofs may be constructed on several principles different from those described, such as the lattice work, arch, &c., but they are only used where a great span is requisite, which places them beyond our present limits.

It has been previously stated that in the roof there is more occasion for the exercise of skill than in any other part of carpentry. It is impossible in so short a description as the present to do more than barely glance at general principles. The Carpenter should give to this important branch of his art, close mathematical study, and by no means be satisfied with following in the footsteps of our forefathers. Practice, experience and the use of iron, has developed principles heretofore unknown, and even the best roofs, at the present day, may be looked upon as capable of great improvements.

There are many other offices which the carpenter is called upon to perform, but none of a very important character, in an ordinary building. The arches used in dwellings, are never large, and the centering which they require is simple, and easily managed. Perhaps the most difficult of all works of this nature, is the centering for large stone bridges. They have, for a long time, occupied the attention of our engineers, but the results are still very unsatisfactory, and the works are generally performed at great expense and waste of material. The time is soon coming, we hope, when our carpenters and artizans, will be a body of educated, scientific men. Then, but not until then, may we look for rapid advances in the constructive art.

THE CHURCH.

DESIGN THIRTY-FIFTH.

In all sections of our country, the construction of handsome buildings, for religious worship, is receiving attention. In both town and country the uncouth, uncomfortable structures built fifty years ago, are gradually giving place to neat and commodious edifices—some of them erected at a heavy expense. All who love the beautiful in art must be glad of this, for there is no building in the city or village around which so many associations cluster. Its spire is a prominent object in the landscape, and no building so well repays an expenditure of money, used judiciously, and with correct taste. The design we have given is in the Roman Corinthian style, and may be used in any section of country, and by any denomination. The general features of all specimens of this style are similar. Some variety is allowable in the proportions, as the great masters of the art have seldom agreed in this particular, in the specimens now extant. The form and arrangement of the mouldings and ornaments are arbitrary, and may be varied according to the judgment of the architect.

On Plate XXV. are shown the front and side elevation of the building, and the grave yard that usually surrounds the church, in a country town. The building is intended to be built of undressed stone or brick, and to be rough cast, in imitation of cut stone. The portico is hexastile, and the columns are to be of brick, with capitals of terra cotta, a material cheaper than either wood or stone, and quite as durable. The steeple is of wood, and its whole height, from the basement

Saml. Sloan Archt.   P. S. Duval & Co's Steam lith Press Philad.a

THE CHURCH.

Design XXXV. Pl. XXVI.

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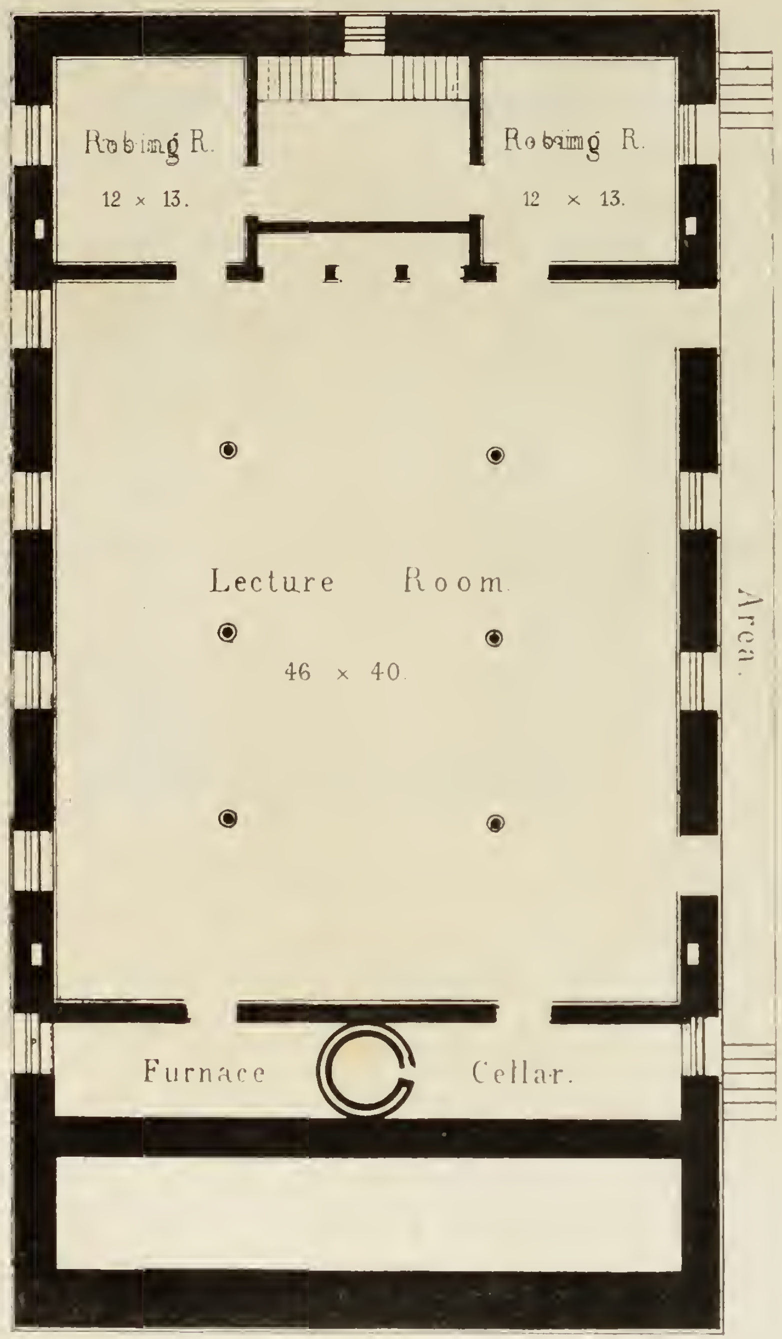
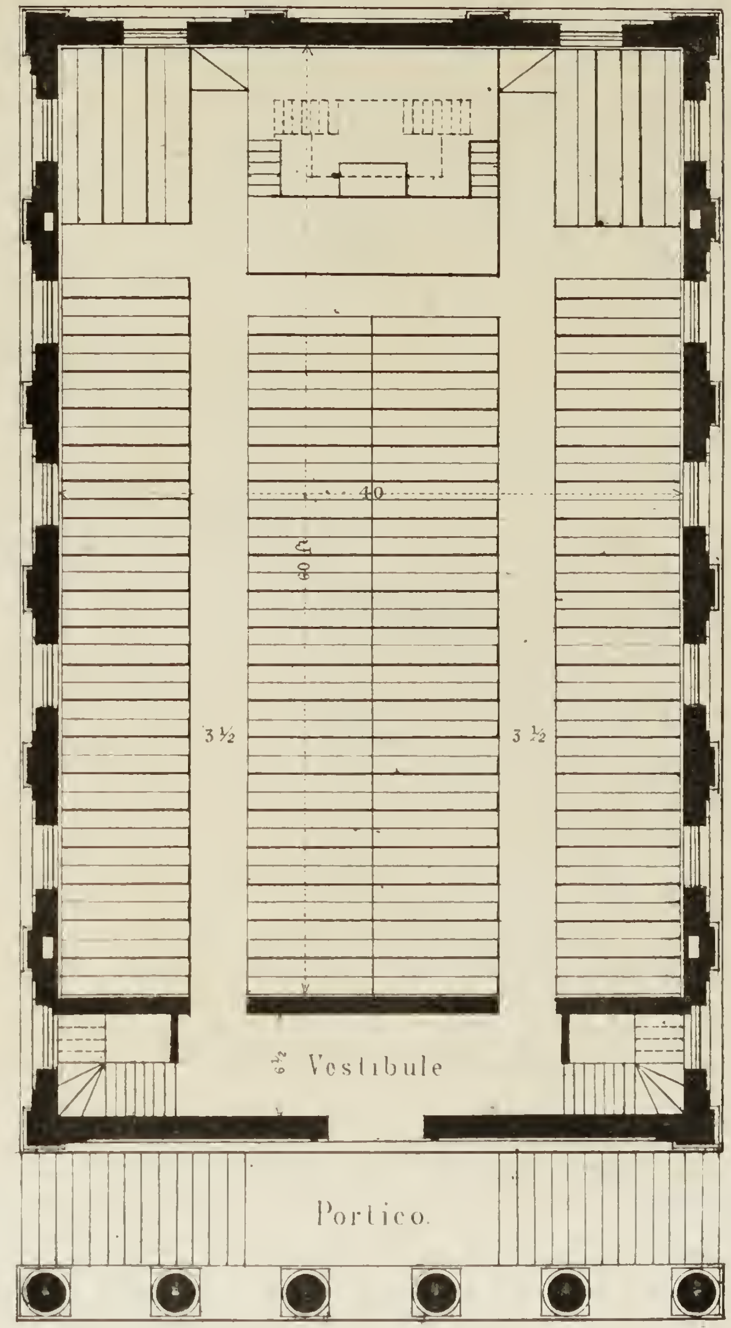
INTERIOR.



BASEMENT.

Scale 12 f.t to the inch.

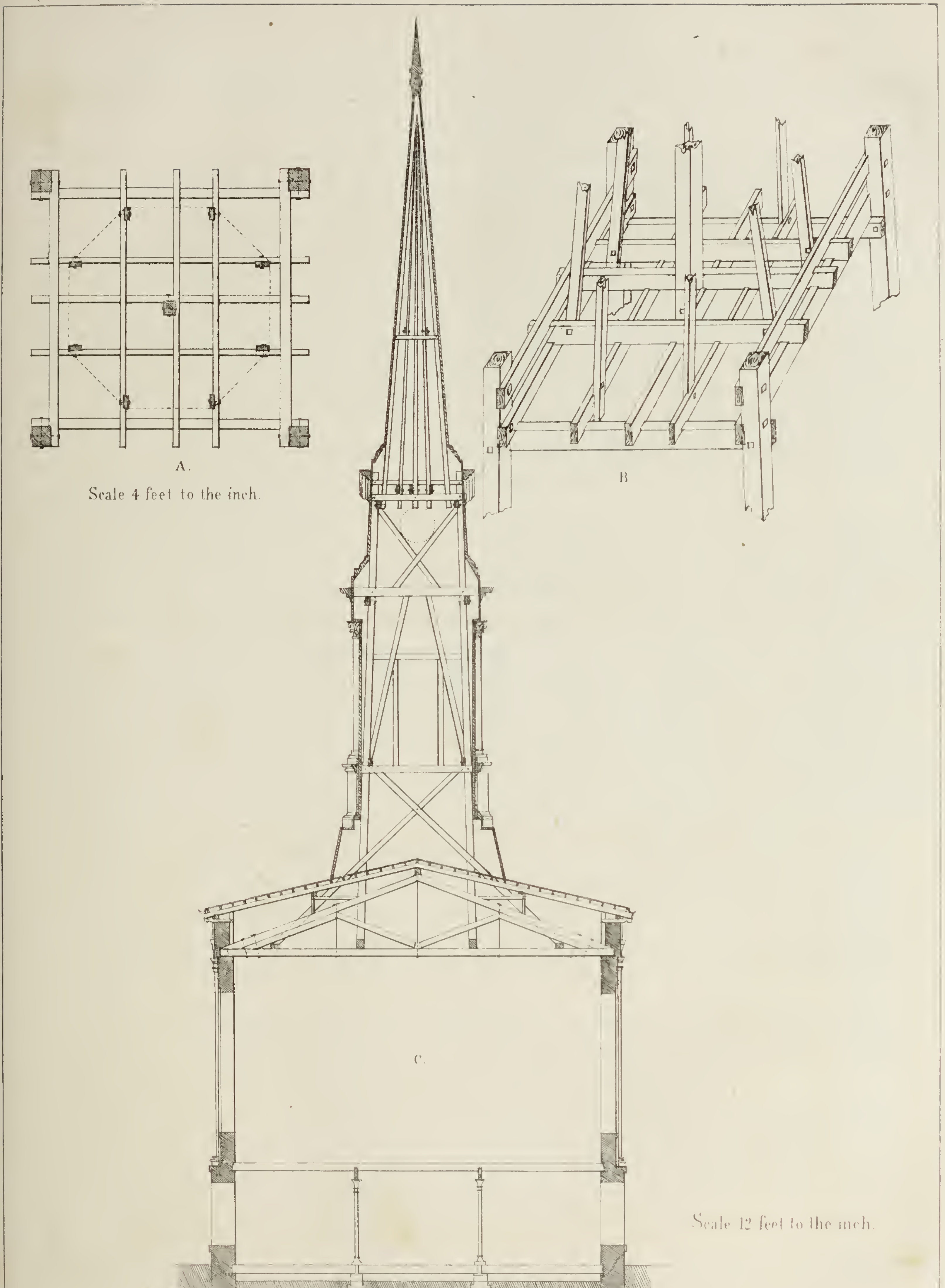


PRINCIPAL FLOOR.

Sam. Sloan, Arch.t

P. S. Duval & Co's Steam lith. Press Ph.a

GROUND PLANS.



Sam^l Sloan Arch^t

P. S. Duval & Co's Steam lith Press Philad^a

VERTICAL SECTION.

floor is one hundred and twenty-five feet. The dimensions of the building are seventy-two feet long by forty-four feet wide. The portico, extending ten feet from the main building, makes the entire length eighty-two feet.

Plate XXVI. shows the interior of the building. In the Cathedrals and Churches of Europe, much expense is lavished upon internal decorations. The walls are covered with monuments of those who have been buried within the church, while the altar is ornamented with paintings of religious subjects, by the ablest masters of art. In our country, custom has not yet sanctioned the erection of monuments, or the use of pictures, to any great extent. Certainly there can be no good reason for neglecting every thing that tends to make the building attractive, and though we may not make our decorations the counterpart of those used on the other side of the Atlantic, the day is not far distant when bare walls and flat ceilings will no longer be thought the only appropriate ornaments of a church. The style of architecture we have chosen for our design does not admit the profusion of ornament that would be appropriate in a Gothic building. The walls may be plain, either papered in panels or painted in fresco. The general effect is heightened by suitable mouldings around the cornice, and by a handsome centre piece. The design we have given includes a view of the pulpit and platform on which it is placed, sometimes called the altar.

Plate XXVII. explains the internal arrangements of the building. The basement story contains a furnace cellar, lecture room, and two robing rooms, with a lobby between them, in which are stairs leading to the pulpit or to the principal floor of the church. In Baptist churches, the Baptistry (represented in the plate by dotted lines,) is constructed in the platform, on which the pulpit is erected. The desk being made moveable, is rolled back to the wall, and the floor of the platform is raised by means of hinges, exposing the Baptistry to view. It is approached from either side by stairs leading down into the water, from the top of the platform, while the bottom of the Baptistry is placed far enough below the floor to give sufficient room for administering the ordinance. The same arrangement, with the exception of the Baptistry, is equally convenient for other denominations. The small rooms below may be used as Vestry Rooms, and the stairs give the minister a private approach to the pulpit. The pews on the principal floor will accommodate about five hundred persons. The vestibule contains two flights of stairs, leading up to the gallery, which extends across the building, and four feet beyond the wall, separating the vestibule from the body of the church. If no organ is placed in it, pews may be arranged in the gallery to seat one hundred persons comfortably. Should more room be desired, side galleries may be added, which will accommodate three hundred more. But the erection of these destroys the beauty of the interior, and renders the house uncomfortable, for both speaker and hearer. Except in those erected upon the most primitive principles, few new churches have these additions. In the country, where space is no object, the expense of increasing the capacity of the body of the building is very little beyond what would be incurred by the erection of side galleries.

On plate XXVIII. is shown, at Figure C., a transverse section of the church and steeple. The two additional figures, marked A. and B., are a vertical and isometrical view of the points where the octagonal part of the steeple is connected with the square. These are all drawn to a scale, and will be found useful to the practical builder.

The whole building may be erected for about nine thousand dollars,—the price varying with the quality of the materials and the nature of the ornaments. Its capacity may be easily increased from seven hundred to nine hundred or one thousand for a slight additional expense. The general effect is much improved by a stone or brick wall around the church yard, with an iron railing of appropriate design, in front of the building. This enclosure is at first more expensive than a wooden fence, but in the end is much more economical.

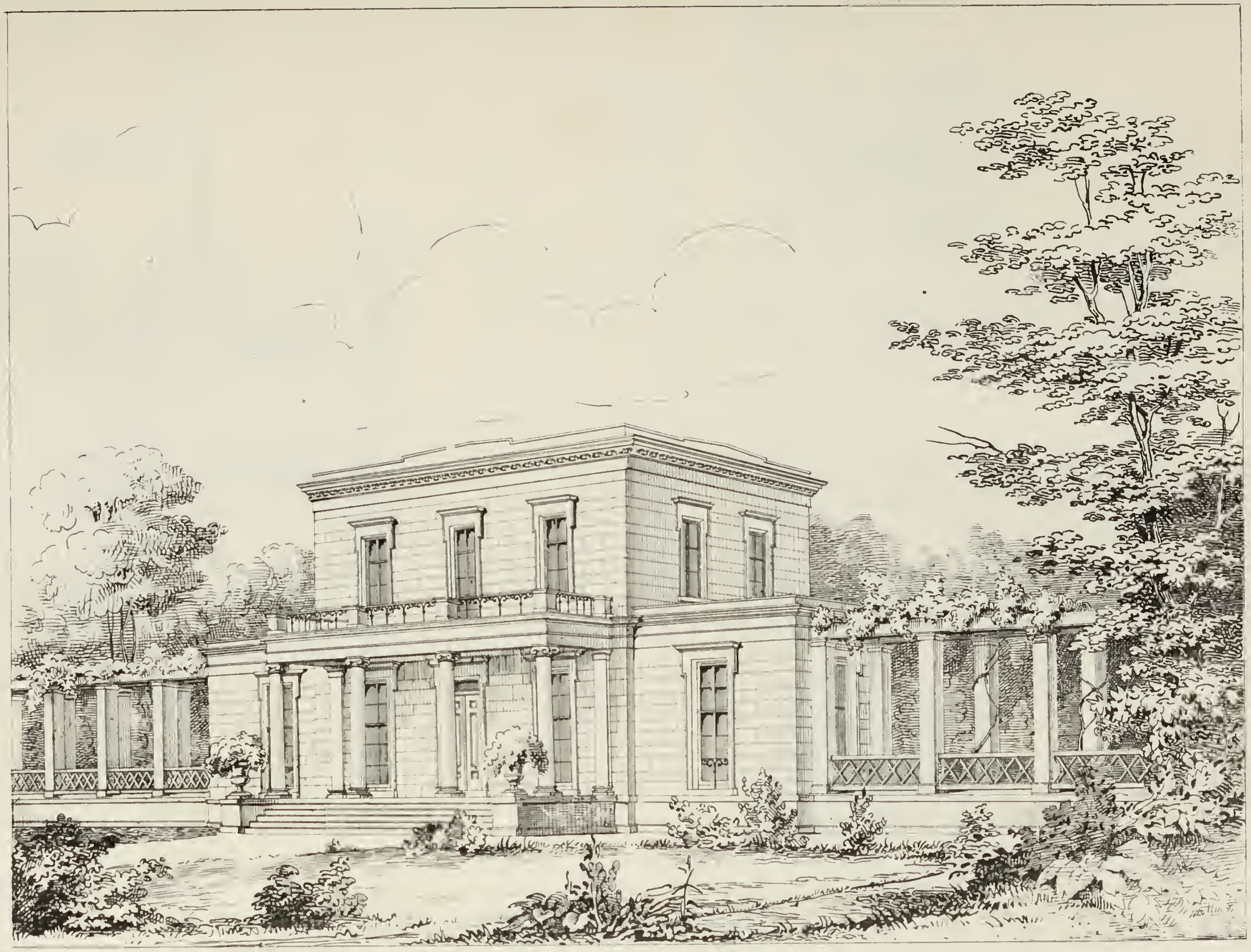
THE PARSONAGE.

DESIGN THIRTY-SIXTH.

In England, and indeed in all Christian countries, except our own, the Parsonage is always considered a necessary appendage to the church. Regarding present outlay as of more importance than future benefits, we are, in general, content with the erection of a house of worship, as yet acknowledging no obligation or custom which would require an additional building for the use of the future incumbent. It certainly is essential to the comfort of a clergyman, who in many respects is a public servant, that he should be provided with a house suitable to his station and calling. In some sections of our country, houses have been erected in connexion with the church, but generally, the minister is compelled to shelter his family in any house he may find to rent on his coming into a village. The design we have given, may be appropriately joined to that of the church just described. It is a neat and commodious building, in the Ionic order, one of the simplest forms of Grecian Architecture, with internal arrangements adapted to the purposes for which it is intended. It will accommodate a family of five or six persons, with servants, and may be erected for about three thousand dollars. A location near the church is desirable, both for the sake of architectural effect and the comfort and convenience of the occupants; but in making the selection of a site, the proper authorities will be governed by the circumstances of each case.

Plates XXIX. and XXX., represent a perspective view and elevation of the building. The front is two stories high, with an attic, and the rear three stories high. The first landing place of the stairway leads into the second floor of the back part of the building, the second into the second floor of the front part. This arrangement decreases the height of the ceilings of the back rooms, but with nearly the same materials gives two additional chambers. The walls are intended to be of brick or stone, rough cast, and laid off in squares, to imitate cut stone. The columns of the portico are to be of wood, with wooden caps and base: and the windows of the second story open on the Roof of the Portico, which is surrounded by a Parapet, on the eave. The dimensions of the main building are thirty-five feet front, by thirty deep: the wings each extend sixteen feet in front, by fifteen in depth. The whole is to be roofed with tin.

Plate XXXI. shows the ground plan of the building. The first floor contains a large drawing room, divided into equal parts by columns or folding doors; a hall seven feet wide, with a stairway in the back part; a sitting or family room, a dining room; study or library, kitchen and pantry, with doorway into the dining room. On the second floor are four large chambers. The portion cut off by the hall may be made into closets, or one small chamber. The third floor in the rear contains two large chambers, corresponding to those below, and the attic in the front of the building, two large bed rooms, for servants, and a large closet.



THE PARSONAGE.

Saml Sloan Archt

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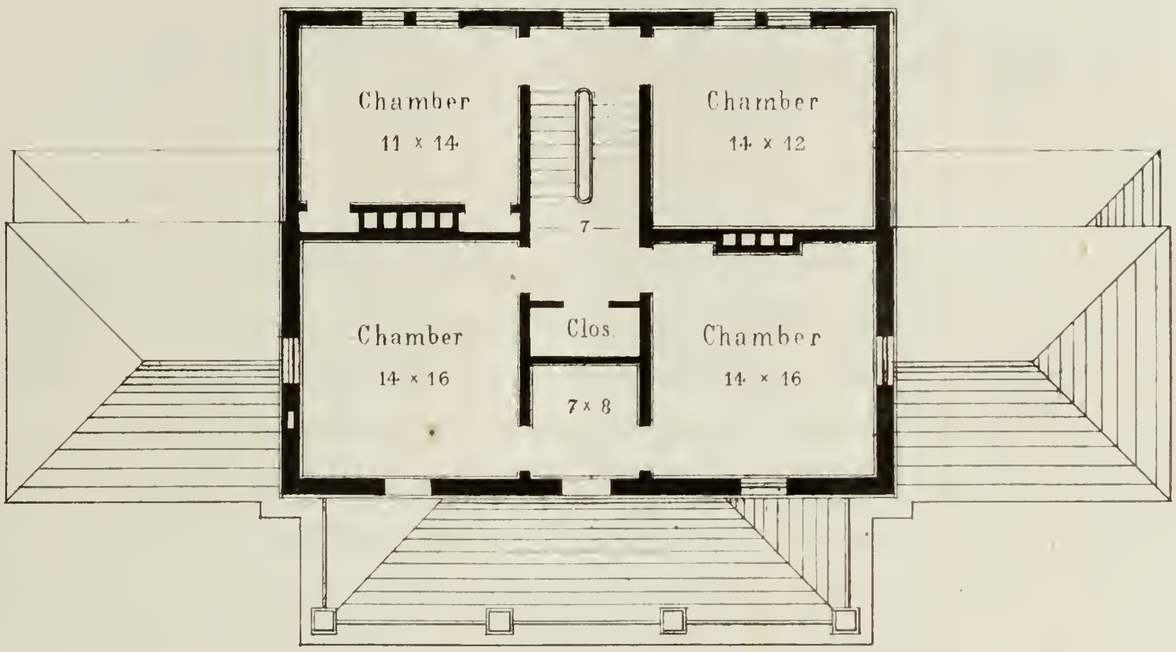
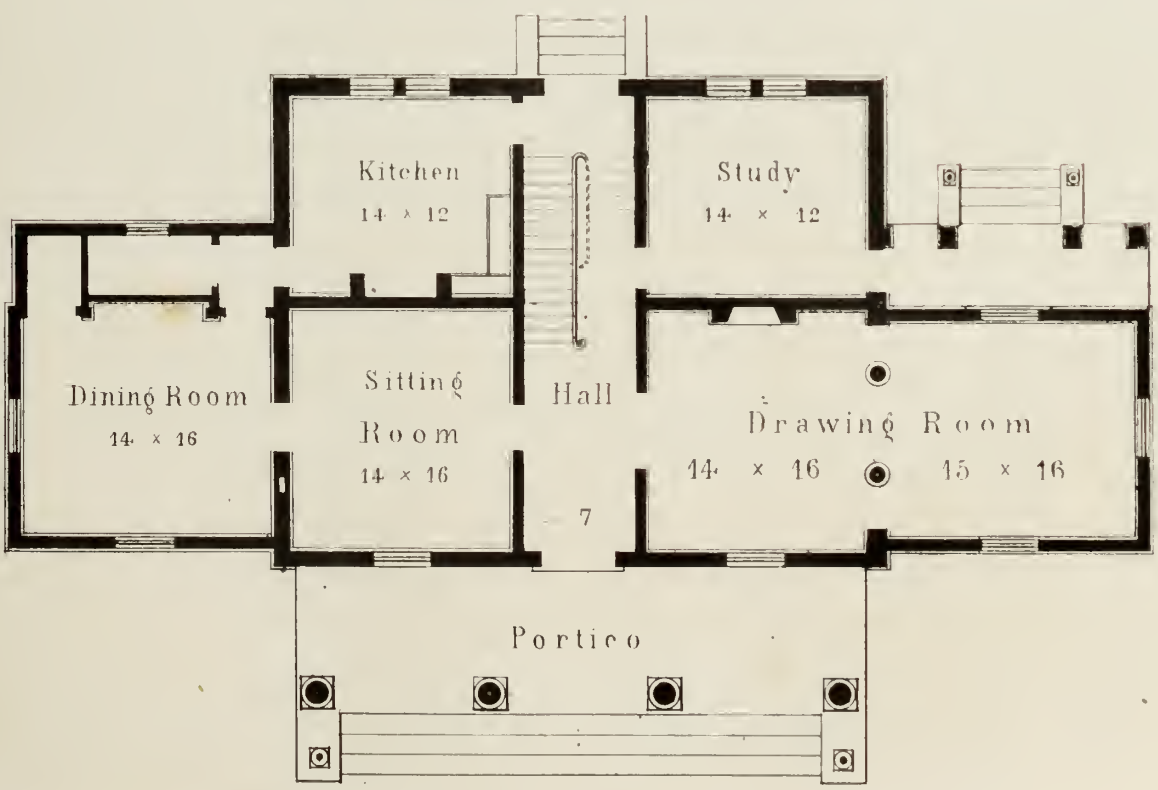
REAR ELEVATION.

FRONT ELEVATION.



SECOND FLOOR.



FIRST FLOOR

GROUND PLANS.

Scale 12 feet to the inch.

GRECIAN ARCHITECTURE.

THE origin of Grecian Architecture is hid in remote antiquity. From our little knowledge of the history of nations, we surmise that the Greeks must have received the rudiments of the art from Egypt, but it is evident that they must soon have abandoned their prototypes, since we have no remains in Greece, bearing the least resemblance to the architecture of Egypt. One great cause of admiration is, that the art, as practised by the Grecians, began, and was perfected, among them; the mechanical rudiments only having been brought from abroad. When we remember that all the boasted skill of modern times has been expended in the attempt to produce mere imitations of the ancient temples, without success, and that they still stand in their grandeur, unapproachable, surely the enthusiastic and seemingly extravagant admiration, which has been lavished upon them, does not seem without reason.

Shelter was certainly the first object for which buildings were erected. We can readily believe that a desire for security prompted the first important additions and alterations. Hence arose the disproportionate and astonishing exertions bestowed on those walls, the remains of which are common in different parts of Greece, and which by their polished posterity were regarded as the work of supernatural power, performed by gigantic Cyclopeans. Of these remains Tiryus and Mycenæ are among the most ancient and most celebrated. It is supposed that in Greece, treasuries were built next, for the retention and preservation of the rich spoils gathered in conquest. The exquisite appreciation of the beautiful in form, which seemed inherent in the Greek nation, soon rid their edifices of clumsiness and superficial weight, and began to establish graceful proportion, and elegant decoration. As early as six hundred and fifty years before our era, traces of distinct orders begin to be evident. These soon grew to a richness and perfection unsurpassed. This growth was not luxuriant, but was rather the result of the pruning, which gives strength. The beauty of the Grecian orders does not consist in the abundance of ornament, but in their truth or purity, and their proportions. The few decorations admitted are quite simple, but so wonderfully expressive, that no addition or alteration since made has been considered an improvement. The pure Grecian style has been called severe, but it is that severity which results from uncompromising truthfulness. If, at the present day, our architects would adopt the principles of these, their ancient predecessors, depend but little on the ornamenting chisel, study grace in proportion, truth and the expression of member, we would at once behold, with astonishment, great and unprecedented advances in the art. Until they do, we can expect no advance but in extent.

The treasuries of the Greeks were soon dignified into temples, and then their religious feeling urged them to still greater exertions. One of the oldest is the temple of Jupiter, at Ægina, which is said to have been built before the Trojan war. The temple of Jupiter, at Olympia, is supposed to have been built as early as six hundred years before the Christian era; and the remains of the Doric temple, at Corinth, prove it to have been a work of remote antiquity. Next in order of time, we may class the Grecian cities in Italy, which were built by colonies from the several Grecian states. The remains of these cities contain some of the finest early specimens of the art. Next to these, in relation of time, come the Athenian temples. Here we may pause on the full perfection of the art. After this period nothing was added, but in a few years the decline commenced.

The Orders of Grecian Architecture are three in number,—the Doric, the Ionic, and the Corinthian. They are distinguished from each other, principally by the columns which front or surround the building, though in many minor points the differences are characteristic.

The Doric order is the oldest and most original of the three. Mr. E. Aiken, who has thoroughly studied and written elaborate essays on this subject, says:—"In considering the buildings of antiquity, and particularly of Greece, the first circumstance that strikes us is their extreme simplicity, and even uniformity. The temples of Greece were invariably quadrilateral buildings, differing only in size and the disposition of their porticos, which either ornamented the front alone, or surrounded every side with their beautiful shady avenue. The system of Grecian architecture is founded on the simple principles of wooden construction. A quadrangular area is surrounded with trunks of trees, placed perpendicularly, with regular intervals. These support lintels, upon which rest the beams of the ceiling, and an enclosed roof covers the whole. Such was the model. When touched by the hand of taste, the post and lintel were transmuted into the column and entablature, and the wooden hut into the temple. It appears probable that the earliest Greek temples were really of wood, since so many of them were consumed during the invasion of Xerxes; and that large and magnificent edifices were principally of this material, is rendered evident by the example of the temple at Jerusalem, which was surrounded by columns of cedar. But builders soon adopted the more noble and durable material, stone; and though the general system of architecture was already established, its forms received some modifications by being thus translated into a new language.****** These alterations led to the perfection of the Grecian style. The original model secured simplicity of form and construction, while the superior material preserved it from the meagreness attendant upon wooden buildings. Thus arose the Doric, or as it might be emphatically called, the *Grecian* order,—the first-born of architecture, a composition which bears the authentic and characteristic marks of its legitimate origin in wooden construction transformed into stone.

In contemplating a capital example of this order, as for instance, the Parthenon, at Athens, how is our admiration excited at the noblest as well as earliest invention of the building art! What robust solidity in the column! What massy grandeur in the entablature! What harmony in its simplicity! Not destitute of ornament, but possessing that ornament alone which dignifies and refines the conception of vigorous genius. No foliage adds a vain and meretricious decoration, but the frieze bears the achievements of heroes, while every part, consistent in itself, and bearing a just relation to every other member, contributed to that harmonious effect which maintains the power of harmonious impressions, and excites increasing admiration in the intelligent observer. Other orders have elegance, have magnificence, but sublimity is the characteristic of the Doric alone."

The account here given, of the origin of this order, is undoubtedly the true one, but many others, more fanciful, have been invented. That given by Vitruvius is interesting, from its antiquity, but is believed to be entirely fabulous. He says:—"Dorus, the son of Helenus, and of the nymph Optice, King of Achaia and all Peloponnesus, having once caused a temple to be built to Juno, in the ancient city of Argos, this temple was of the style we call Doric. Afterwards, this order was employed in all the other cities of Achaia, without having, as yet, any established rule for the proportions of its architecture. But as the Greeks were unacquainted with the proportion it was necessary to give to columns, they sought means to make them sufficiently strong to sustain the weight of the edifice, and to make them agreeable to the view. For that end they took the measure of the foot of a man, which is a sixth part of his height, after which they formed their columns, in such a manner that in proportion to this measure, which they gave to the foot of the column, they made it six times that height, including the capital. Thus, the Doric column which was first employed in the edifices, had the proportion, force and beauty of the body of a man." This is a very absurd, but amusing story, amusing to think that Vitruvius should calculate so largely on the credulity of his readers.

The Doric order is heavy, and expresses great strength. The column has no base, not even tori or fillets. The shaft is sometimes fluted, and sometimes plain. Authors, who are fond of telling wonderful stories, have endeavored to account for the flutings in various ways. Some say that they are in imitation of the bark of an oak. Others say that they were made to lean spears in, and that the Greek armies stacked their arms in this way, when they went to sacrifice. The origin of this surmise may be found in the first book of Homer's Odyssey, where Telemachus, receiving Minerva in the form of Mentes, takes from her a spear, and places it within a spear holder, against a column. We can readily imagine this to have been merely a channel.

It cannot be expected, in a work like the present, that any allusion should be made to the drawing of the orders. Mr. Nicholson's work on the five orders, including the two Roman orders, Tuscan and Composite, is, or ought to be, in the hands of every student of architecture. It may be useful, nevertheless, to give, in a tabular form, the details of one or two of the best specimens of each order.

		Temple of Theseus, at Athens. Height of the Members.			Temple of Minerva, at Athens. Height of the Members.		
		MODULES.	PARTS.	FRACTIONS.	MODULES.	PARTS.	FRACTIONS.
Entablature,	Cornice,	—	25	$\frac{1}{2}$	—	26	—
	Frieze,	1	25	—	1	19	—
	Architrave,	1	20	—	1	14	$\frac{1}{5}$
Column,	Capital,	1	—	—	—	28	—
	Shaft,	10	—	—	10	2	—
Height of the Column,		15	11	—	—	15	—

The Ionic is a lighter and more elegant order than the Doric. It differs from it in many essential respects and although richer in ornament, is not, by any means, so true and unexceptionable as the Doric. The volutes of the capital may be considered the distinguishing feature of this order, and it is written that they were made to imitate the curling hair of a woman, and, also, that the proportions of the column were taken from the perfect female form. Others have thought that the whole were invented to express elasticity and consequent lightness; this is a much better opinion. The Ionic order appears to be quite as old as the Doric, though usually regarded as its successor. It was at first chiefly confined to the Asiatic states, and the earliest specimen of it, which has yet been found, is the temple of Juno, at Samos. Two of the best specimens are the temple of Minerva Polias, which was erected during the Peloponnesian war, and the temple of Ilissus, at Athens. The proportions of these are here given.

		Temple of Ilissus, at Athens. Height of the Members.			Temple of Minerva Polias, at Athens. Height of the Members.		
		MODULES.	PARTS.	FRACTIONS.	MODULES.	PARTS.	FRACTIONS.
Entablature,	Cornice,	1	2	—	1	7	$\frac{1}{4}$
	Frieze,	1	19	—	1	18	$\frac{1}{2}$
	Architrave,	1	25	—	1	21	$\frac{1}{2}$
Column,	Capital,	—	27	$\frac{1}{4}$	1	13	—
	Shaft,	14	2	$\frac{3}{4}$	16	22	$\frac{1}{2}$
	Base,	1	—	—	—	24	$\frac{1}{2}$
Height of the Column,		20	16	—	23	17	$\frac{1}{2}$
Volute,		1	6	—	1	5	$\frac{2}{3}$

The Corinthian order, an after invention, is the richest in ornament of the three, and is considered the most beautiful. All the members are enriched to a greater or less degree by mouldings and sculptured foliage, and the design of the column is of the most elaborate character. Vitruvius tells quite a romantic story about the origin of the capital, which is ornamented with acanthus leaves. It is this:—"A young lady at Corinth fell ill and died. After her burial, her nurse collected together sundry ornaments, with which she used to be pleased, and putting them together in a basket, placed them near her tomb, and lest they should be injured by the weather, she covered the basket with a tile. It happened that the basket was placed on the root of an acanthus, which in growing shot forth its leaves. These, running up the side of the basket, naturally formed a kind of volute, in the turn given to the leaves by the projecting tile. Happily, Callimachus, a most ingenious sculptor, passing that way, was struck with the beauty, elegance and novelty of the basket, surrounded by acanthus leaves; and, according to this idea, or example, he afterwards made columns for the Corinthians, ordaining the proportions such as constitute the Corinthian order." Whether this story be true or not, it is certain that the Corinthian capital is a most remarkable and happy invention, and was probably the first introduction of foliage as an architectural ornament

The first examples of this style, in Greece, appear to have been produced during the last few years of the Peloponnesian war. Many of the ornamental theatres, so numerous in Asia Minor, may, perhaps, be referred to a period considerably before the Roman conquest. This conquest spread the Corinthian order throughout Greece, almost to the exclusion of every other; and although the buildings of the period which followed, are often more splendid and costly, they are deficient in the pure taste and correct design of the preceding ages. The proportions of two principal specimens are given below.

		CHORAGIC MONUMENT OF LYSICRATES. Height of the Members.			TEMPLE OF JUPITER OLYMPUS, AT ATHENS. Height of the Members.		
		MODULES.	PARTS.	FRACTIONS.	MODULES.	PARTS.	FRACTIONS.
Entablature,	Cornice, . .	1	20	—	1	18	—
	Frieze, . .	1	9	$\frac{1}{2}$	—	21	$\frac{1}{2}$
	Architrave, . .	1	21	—	1	11	$\frac{2}{5}$
Column,	Capital, . . .	2	23	—	2	7	—
	Shaft, . . .	16	16	—	16	7	—
	Base, . . .	21	21	—	1	1	—

The proportions and arrangements of the parts of these orders are so perfect, that any innovation is received with little intolerance. Hence arises the great difficulty in adapting them to modern buildings. Nevertheless, we have many modern buildings, which so far as measurements and form of ornaments are concerned, are excellent imitations of their originals, but they always lack the beautiful material, the pure white and almost translucent Grecian and Italian marbles. But indeed, latterly, the architectural world has been startled and astonished by the discovery of the fact that the Greeks painted their temples. How and in what colors, we know not, but the fact sadly interferes with the usually received notions of the purity of Grecian architecture. Another thing which the moderns lack, is that skill in sculpture which gave the marble leaf a vital grace. In short, we lack the refined taste requisite even to throroughly appreciate the thousand beauties that lurk in every part of a Grecian temple. To properly understand them, one must study within the very shadow of the great originals.

For the use of the builder, proportions of other models are added:

		TEMPLE OF THESEUS, AT ATHENS. Projection from the Axis of the Column.			TEMPLE OF MINERVA, AT ATHENS. Projection from the Axis of the Column.		
		MODULES.	PARTS.	FRACTIONS.	MODULES.	PARTS.	FRACTIONS.
Entablature.	Cornice, . .	2	4	$\frac{1}{2}$	1	26	$\frac{1}{2}$
	Frieze, . . .	—	29	$\frac{1}{2}$	—	28	$\frac{1}{2}$
	Architrave, . .	1	2	$\frac{1}{4}$	1	—	$\frac{1}{2}$
Column,	Capital, . . .	1	4	$\frac{1}{2}$	1	2	—
	Shaft, . . .	—	23	$\frac{1}{2}$	—	23	$\frac{3}{4}$
		1	—	—	1	—	—
Intercolumniation from axis to axis, .		5	6	—	4	20	—

		Temple of Ilissus, at Athens. Projection from the Axis of the Column.			Temple of Minerva Polias, at Athens. Projection from the Axis of the Column.		
		Modules.	Parts.	Fractions.	Modules.	Parts.	Fractions.
Entablature,	Cornice,	2	11	—	2	7	½
	Frieze,	—	28	¾	—	—	—
	Architrave,	1	2	½	1	7	—
Column,	Capital,	1	1	—	1	—	—
	Shaft,	—	25	½	—	25	—
		1	—	—	1	—	—
	Base,	1	11	½	1	15	—
Pedestal,	Cornices,	—	—	—	—	—	—
	Die,	—	—	—	—	—	—
	Base,	—	—	—	—	—	—
Volute,		1	15	¾	1	15	¼
Intercolumniations from axis to axis,		6	15	—	8	—	—

		Choragic Monument of Lysicrates. Projection from the Axis of the Column.			Temple of Jupiter Olympus, at Athens. Projection from the Axis of the Column.		
		Modules.	Parts.	Fractions.	Modules.	Parts.	Fractions.
Entablature,	Cornice,	2	15	—	2	19	—
	Frieze,	—	29	¼	1	2	½
	Architrave,	1	3	½	1	9	½
Column,	Capital,	1	17	—	1	25	—
	Shaft,	—	25	—	—	26	½
		1	—	—	1	—	—
	Base,	1	15	—	1	12	—
Pedestal,	Cornice,	—	—	—	1	13	—
	Die,	—	—	—	1	5	½
	Base,	—	—	—	1	14	½
Intercolumniation from axis to axis,		—	6	—	—	—	—

GATE OR ENTRANCE LODGES.

DESIGNS THIRTY-SEVENTH, EIGHTH AND NINTH.

In Europe, where the law of primogeniture passes estates undivided from generation to generation, and where the example of prodigal royalty is constantly exciting aristocratic emulation, embellishments are necessary to complete the grandeur and magnificence of the designs adopted by many of the landed proprietors. The entrance lodge, the park lodge, the mansion lodge, the game-keeper's lodge and hunting lodges are often found upon the same estate, all properly disposed, and so constructed as to give architectural effect to the landscape. The varied scenery which nature, assisted by skilful art, has grouped together upon the grounds of the same proprietor, has each its appropriate style. In one place may be found a building after the Grecian style, in another, among rocks and ravines, a Swiss cottage. A Gothic design meets you at one turn, while some distance beyond is an Italian villa. Nothing is lost of which the taste and ingenuity of the artist, or the skill of the builder can take advantage.

SIDE ELEVATION.

Saml Sloan Archt

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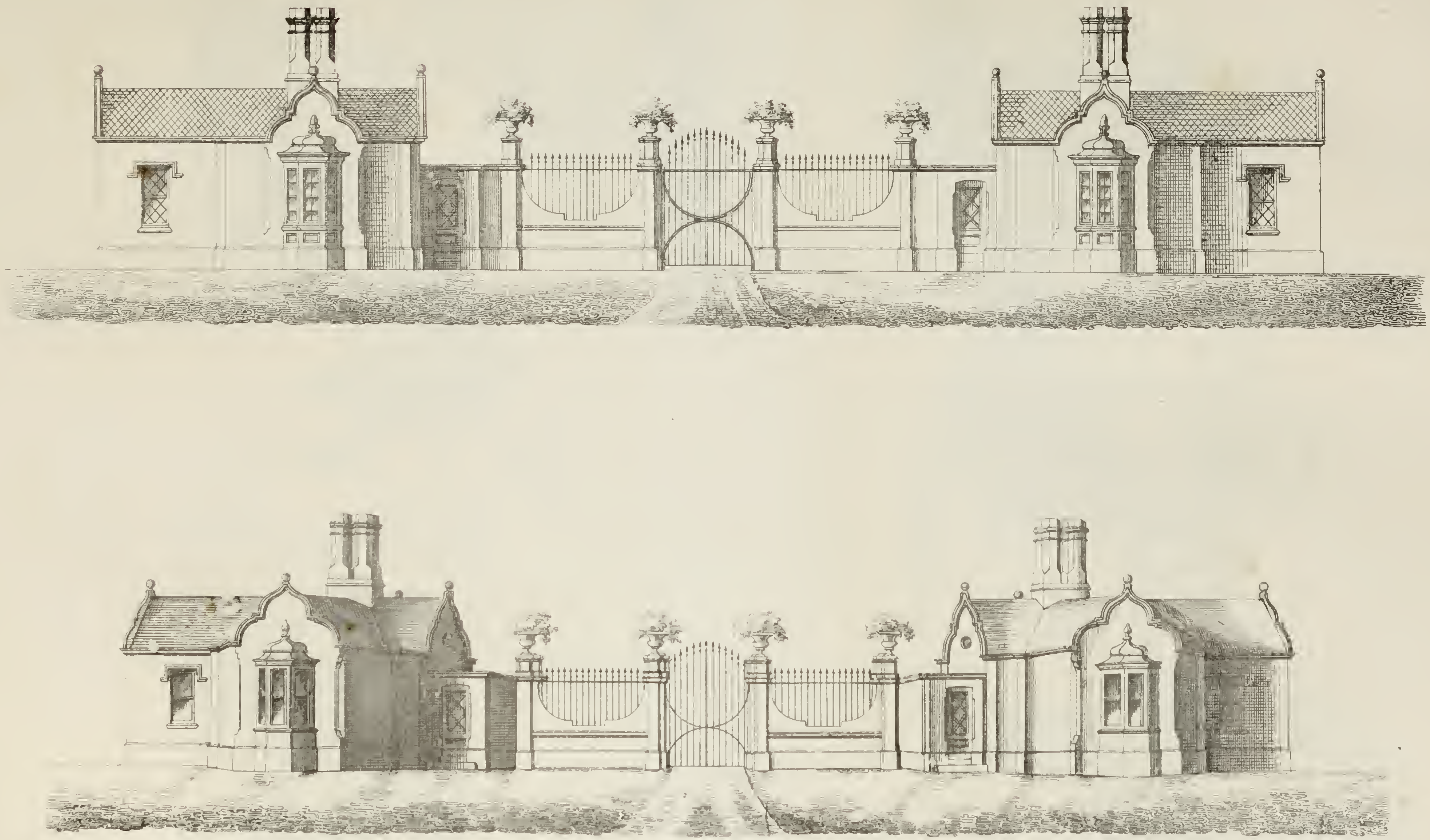
A GATE LODGE.



Sam'l Sloan Arch't P. S. Duval & Co's Steam lith Press Phila

GATE LODGES.

FRONT ELEVATION.

SIDE ELEVATION.

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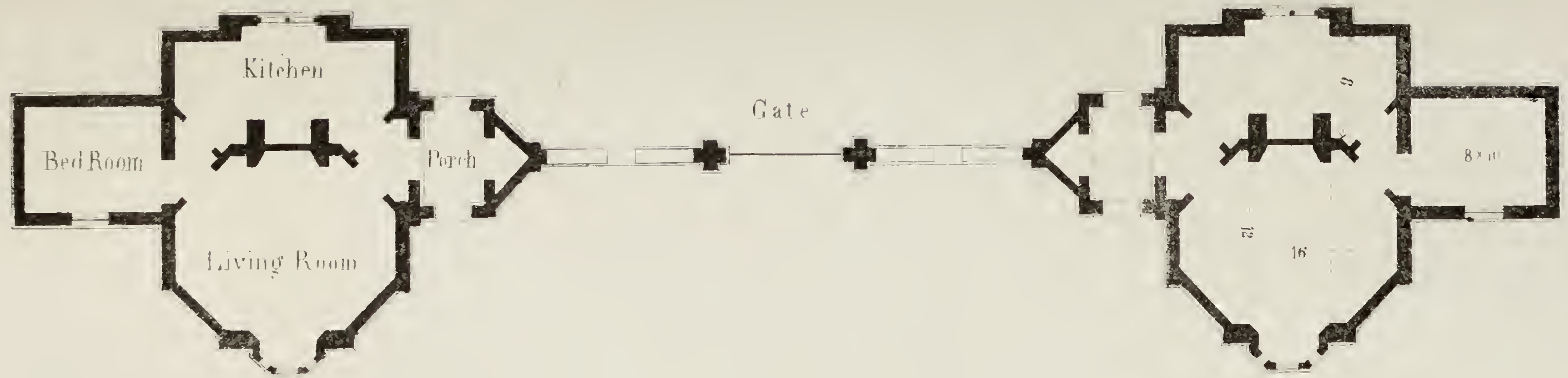
GATE LODGES.

Design XXXVIII. Pl. XXXV.



Design XXXVII

Saml Sloan Archt

GROUND PLANS.

In this country, unfortunately for the architect of magnificent views, but fortunately for the people, the effect of our peculiar institutions is such as to prevent the indulgence of similar tastes. A hundred farms, with commodious and comfortable homes for their owners, take the place of one vast estate. The eye searches in vain for densely wooded parks, ancient manor-lands, of four or five thousand acres, and hunting grounds, stocked with every variety of game. In their stead, are fields of standing grain, and well watered meadows. To a certain extent, however, the ability and inclination of many permit them to add to their country seats more than is requisite for the mere purposes of habitation, but as yet the idea of utility has not been separated from that of ornament. Whatever has been done in this "ballad-making of architectural poetry," as some one has fancifully termed it, includes only such embellishments as may be made to serve a useful purpose.

Plate XXXIII. represents a design of this kind. It is a Gate Lodge, constructed in the old English style. The first engraving represents the side elevation of the house, and the carriage way, over which the gate extends. The lower engraving presents a front view of the Lodge and Gate. The gate is a Gothic pattern, and to be constructed of wood or iron, hung between stone pillars. It is a simple and pleasing design, appropriate to the style of the Lodge. This should be of brick or stone, rough cast, to represent hewn stone. The roof is shingled or covered with slate, cut into diamond shape. The chimney-tops are of terra-cotta.

On Plate XXXV. are seen the ground plans. The first floor contains a living room, bed room and kitchen, with spaces that may be made into convenient closets. The second floor contains only a square chamber. The house is intended for a small family, and may be erected for about twelve hundred dollars.

On Plate XXIII. are a front and perspective view of another Gate Lodge, having a tenement on each side of the carriage way. Some architects have objected to this arrangement because "it has an air of too great formality, and unless there be some kind of an arched Gateway between the cottages, they have withal a solitary look." By far a more reasonable objection is that "two buildings, each of which have the appearance of being fit for a dwelling, render the elevation by far too extensive, unless the mansion itself be on a very large scale." We leave our reader to exercise his own taste in making a choice between the two.

The ground plan of the structure is shown on Plate XXXV. Each building contains a living room, kitchen and bedroom. The shape of the body of the building is hexagonal. One may be occupied by the gate keeper; the other by the head gardener.

We have, on Plate XXXVI., a third design for a Gate Lodge, consisting, like the first, of a single building, on one side of the gateway. A front and side elevation are given. The shape, dimensions and ground plans are the same as those of that first described. It may be erected for about one thousand dollars.

FENCING.

DESIGN FORTIETH.

None of the appendages to a country seat, better repays an expenditure of taste and money than the fencing. Whatever the size of the grounds attached, the enclosure is an important feature in the landscape. On large estates, both in this country and England, hedges have been used for many years, and when properly disposed, add greatly to the effect of the view. Lately, in some sections, wire fencing has found favor, but more for the sake of economy than ornament. Immediately around the dwelling house, an enclosure more expensive and more ornamental than either of these, has generally been thought desirable. It may be of stone, brick, iron or wood. The two latter admitting greater variety of pattern, are more suitable than a wall of either stone or brick.

Plates XXXVI. and XXXVII. represent some specimens of fencing, and among these will be found one at least, suitable for any style of building. It is difficult to classify them, or to give a name to any of the individual specimens. The architect, in their composition, is guided more by his own taste and the rules of proportion, than by any models he may have studied. The builder, in selecting any one for use, must consider the shape and size of the grounds, the building to be enclosed, and the material to be used.

No. 1., on Plate XXXVI. might be appropriately used around a large villa. The gate is a fine specimen of the Elizabethan style. It might be erected for about two dollars per foot. No. 2. is suitable for a Gothic cottage, and would cost about one dollar and a quarter per foot. No. 3. is somewhat similar in style to the last, and would suit a cheaper building. Its cost should not exceed one dollar per foot.

No. 1., on Plate XXXVII. represents fine specimens of rustic patterns, and might be erected around any ornamental villa for the same price as No. 3. on the last plate. No. 2. costs about one dollar and a half, and is suitable for an extensive building. At No. 3. are neat patterns for enclosures around Cottages and Farm Houses. They can be erected for about seventy-five cents per foot.

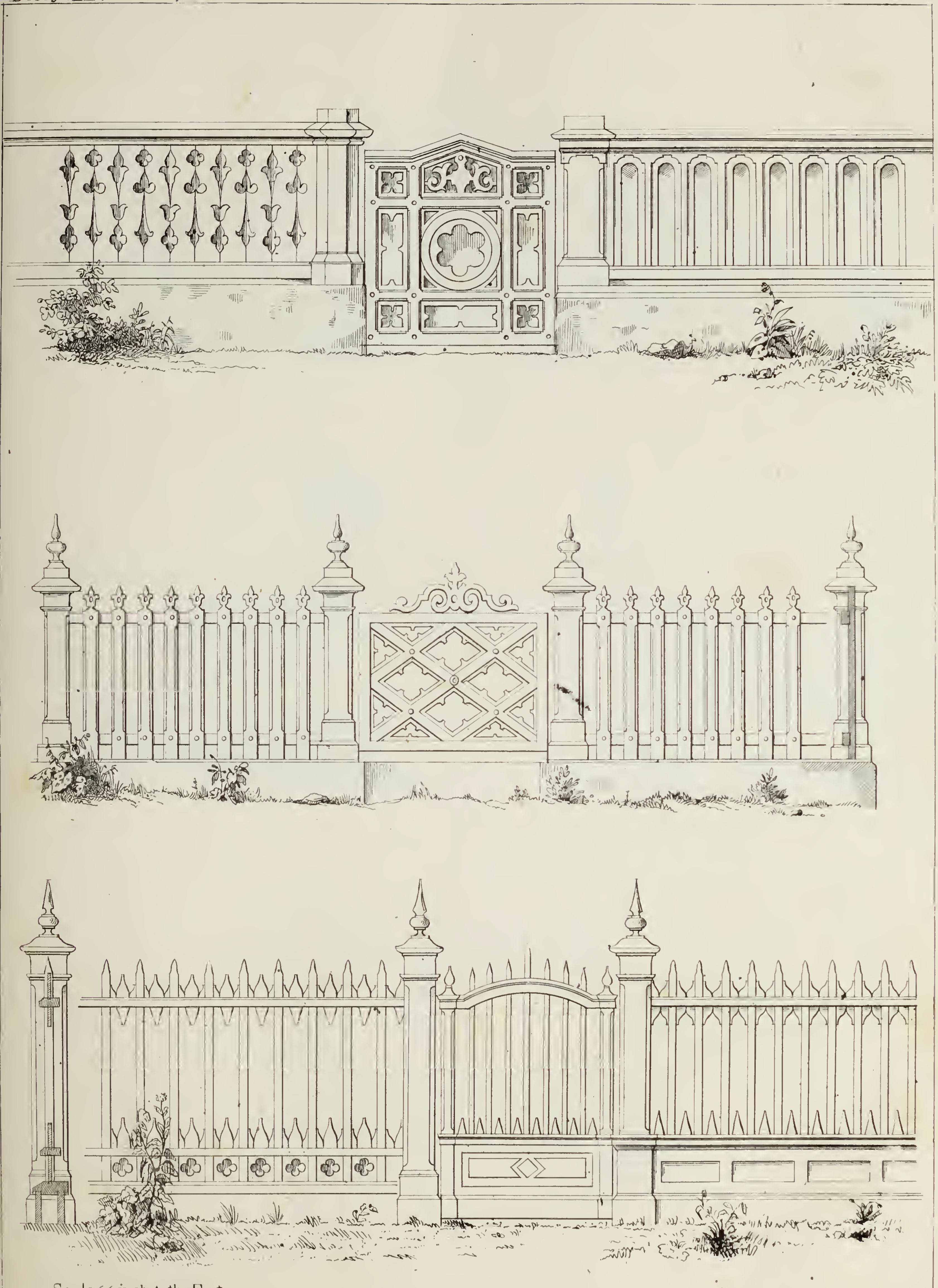
ORNAMENTAL OUT-HOUSES.

DESIGN FORTY-FIRST.

We have already given ornamental designs for a fountain, flower stand, bird cage, summer-houses, &c. These all contribute to the comfort, cheerfulness and beauty of the grounds around the dwelling, and could not be properly omitted in the progress of our work. Plate XXXVIII. contains three designs of small structures, partly useful and partly ornamental. The first is a Squirrel House, made of wood, and wired like a bird cage. The openings for feeding and cleansing are in the rear.

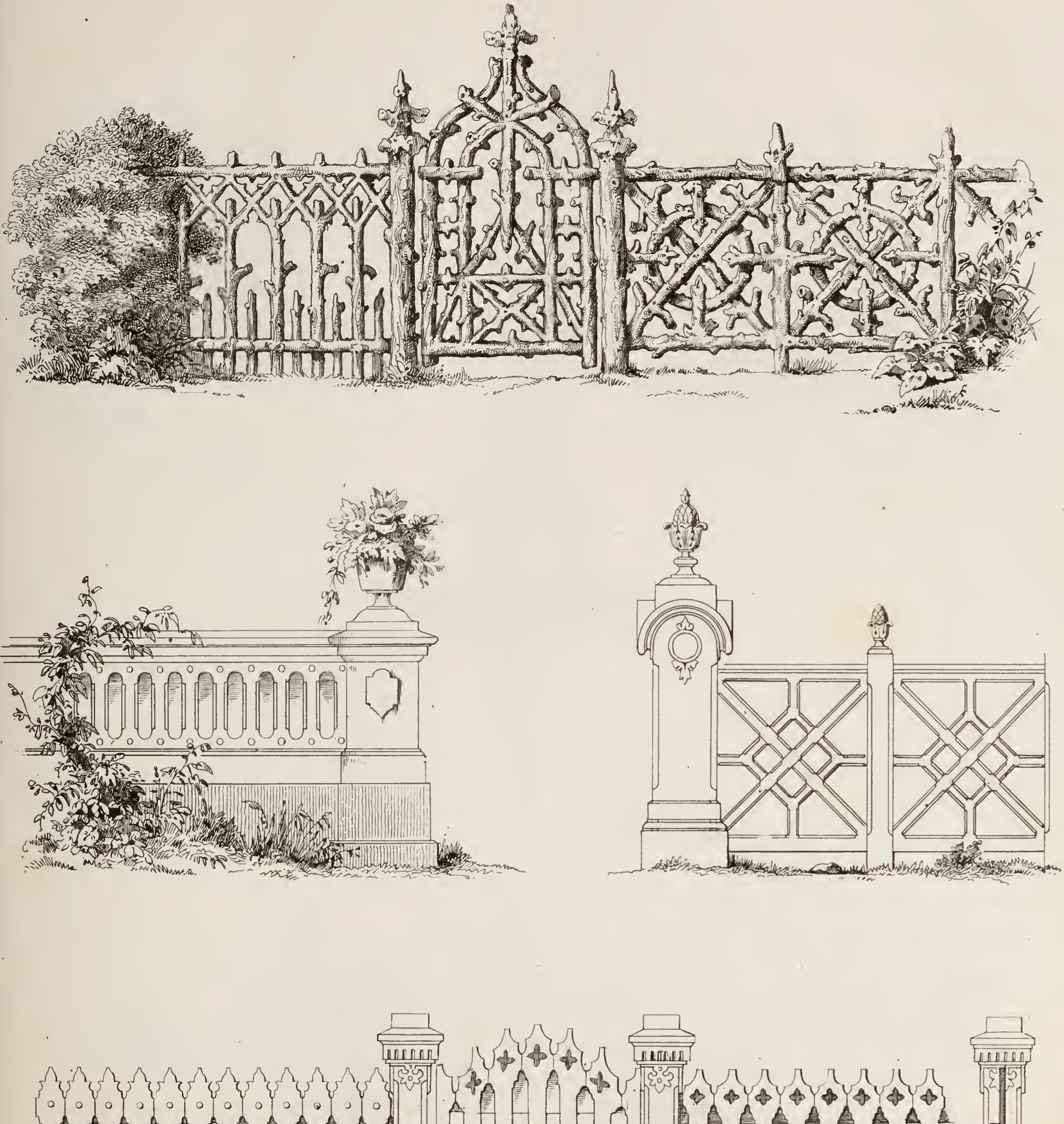
The second is a Fountain, somewhat peculiar in its style and construction. The water issues from the mouth of the figure. If placed in a small pool, it might be made to bear the semblance of utility, and a very slight descent from a natural artificial reservoir would be needed to make it operate constantly. The best material would be stone, iron or terra-cotta, painted and sanded. The last is but little more expensive than wood.

The third is an ornament for a small Lake, the object of which is explained by the engraving. It is novel in design and would be a very pleasant object in such a location. In Europe, these miniature palaces are very common, and when skilfully arranged, contribute very much to the beauty of the landscape.



Scale ½ inch to the Foot.

FENCING.

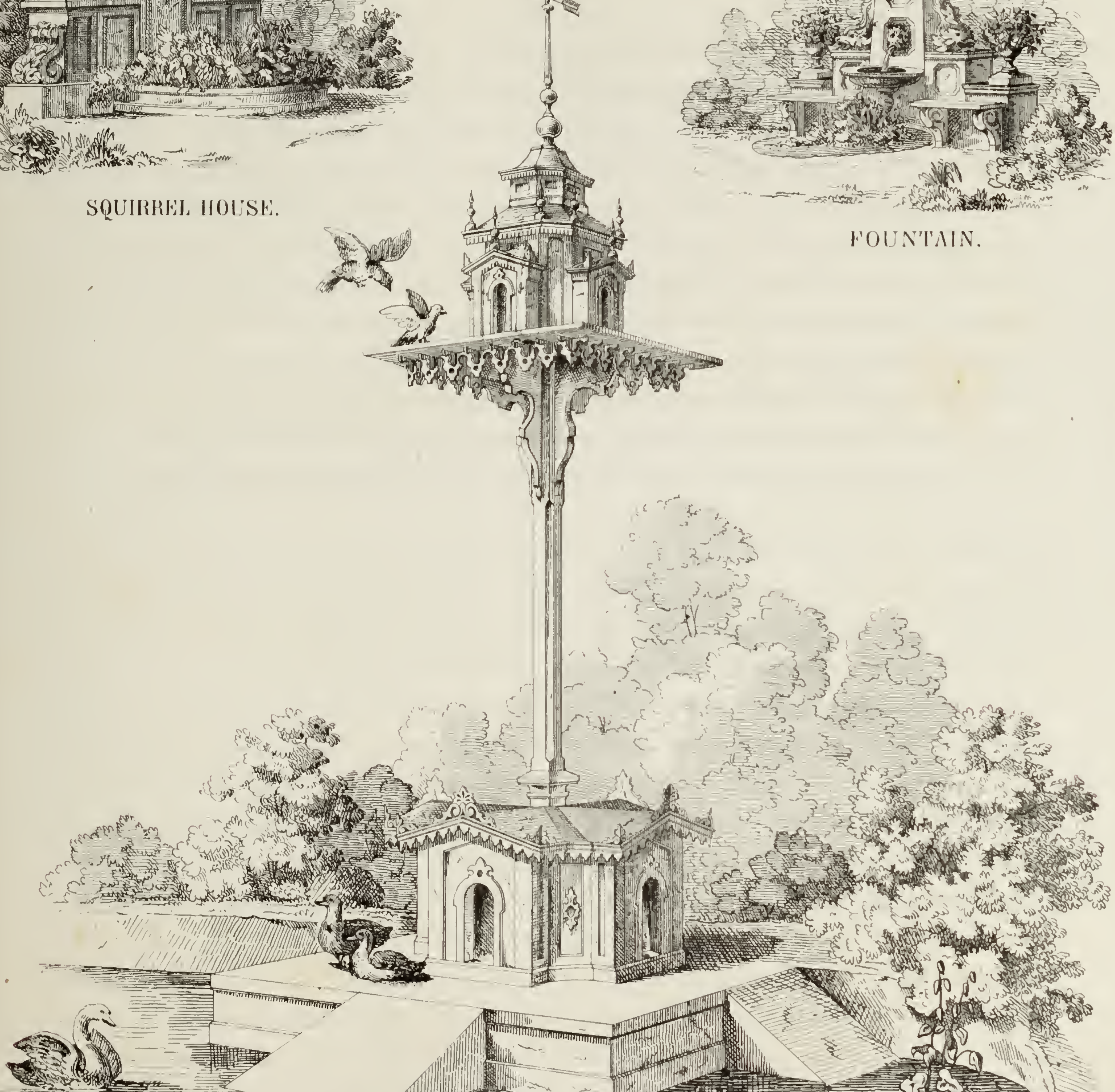


Scale ½ inch to the Foot.

FENCING.

SQUIRREL HOUSE.

FOUNTAIN.



POULTRY HOUSE.

Saml. Sloan, Archt.

J S Duval & Cos Steam lith Press Philada.

OUT-HOUSES.

JOINERY.

THIS branch of the building art relates more to the ornamental than the useful parts of the edifice. The distinction which obtains between joinery and carpentry has already been fully pointed out, so that no further remarks upon this are necessary. The joiner requires a neat manipulation, in order that his work may please the eye. The beauty of a design can have but little effect if it be executed in a bungling or careless manner. But the joiner must possess more than this. In that beautiful but difficult part of his art, stair building, it is absolutely necessary to have thoroughly studied geometrical lines, such as are given in a former part of this work. To understand these well, much thought and practice is necessary, and the joiner cannot claim to have advanced far in his avocation until this be accomplished. The nature of the present work precludes the possibility of our giving more than some general instructions of this subject. The little work of Mr. Smeaton contains an article which gives so much valuable information respecting joinery, that we cannot refrain from following his method, and quoting him in many places verbatim, in connexion with our own observations.

There is not much that is new in joinery, but there are many joiners who might much improve their work by giving attention to a few general facts. One of the most important agents in joinery is glue, and as its quality is of great importance to the joiner, we must speak of the tests by which to ascertain its adhesive properties, that the workmen may know how to select that which is best, and to reject that which has not the requisite adhesive property. Glue is made from the skins and sinewy parts of animals, or from the skins and cartilage of fishes. The glue that is made from animal substances is considered to be better than that made from fishes; though isinglass, which is made from the air-bladders of a large fish found in the Russian seas, is one of the strongest with which we are acquainted; but its price in the market prevents the joiner from employing it. From the chemical experiments which have been made, it appears that the glue manufactured from the skins of animals is superior to that which is made from the sinewy or horny parts, as well as that which is made from the skins of fishes, not being so readily affected by the moisture of the atmosphere. The workman, therefore, always prefers animal-glue to that which is called fish-glue, though the latter is often sold as glue of the best quality. Some directions may be given to enable the joiner to choose this necessary cement, and to judge of its adhesive qualities. All glue, in the cake, is subject to the effects of dryness or moisture, which, in the atmosphere, are constantly changing, becoming soft in damp weather, and brittle in dry. But the different kinds are differently affected. Glue should be purchased in dry weather, for that which is then soft is not of so good a quality as that which is crisp Some opinion of the quality may be formed by its transparency, for that which is most transparent is best. If it be possible to make an experiment with a sample of the article before a quantity is purchased, a cake may be immersed in water, in which it should remain two or three days, and, if the glue be good, it will not dissolve, but swell; but if it be of inferior quality, it will partly, if not wholly, dissolve in water; from which it will follow that that which is least dissolved in cold water is the best, or possesses superior qualities of adhesion, and will be least affected by moisture or damp. Another test is that, being dissolved in water by heat, the glue is best which is the most cohesive, or may be drawn into the thinnest filaments, and does not drop from the glue-brush as water or oil, but extends itself in threads when falling from the brush or stick; and this it will always do if the glue possesses the requisite properties. These tests will enable even the inexperienced workman to judge of the quality of the material offered to him for sale; and, in a very short time, he will find no difficulty in selecting that which will give firmness and solidity to his work. It may be worthy remark that the glue made from the skin of old animals is much stronger than that of young ones.

In general, nothing more is necessary to glue a joint, after the joint is made perfectly straight, or, in technical terms, out of winding, than to glue both edges while the glue is quite hot, and rub them lengthwise until it has nearly set. When the wood is spongy, or sucks up the glue, another method must be adopted, one which strengthens the joint, while it does away with the necessity of using the glue too thick, which should always be avoided; for the less glue there is in contact with the joints, provided they touch, the better; and when the glue is thick, it chills quickly, and cannot be well rubbed out from between the joints. The method to which we refer is, to rub the joints on the edge with a piece of soft chalk, and, wiping it so as to take off any lumps, glue it in the usual manner; and it will be found, when the wood is porous, to hold much faster than if used without chalking.

In bending and glueing-up stuff for sweep-work, much judgment is necessary, and, as the methods are various, we shall mention a few which the workman may apply, as occasion may require, one method being preferable to another, according to the nature of the work in hand.

The first and most simple method is that of sawing kerfs or notches on one side of the board, thereby giving it liberty to bend in that direction; but this method, though very ready and useful for many purposes, weakens the work, and may cause it to break when strains are thrown on the piece. But a tolerably strong sweep may be made in this manner, if, after sawing the kerfs (particular care being taken to make them regular and even, and to saw them at regular depths,) some strong glue be rubbed into each kerf. When bent into the required sweep, a piece of strong canvass should be glued over the kerfs themselves, and the glue be left to harden in the position to which the stuff is bent.

Another method is to glue up the stuff in thin thicknesses, in a cawl or mould, made with two pieces of thick wood cut into the required sweep. This method, if done with care, that is, making the several pieces, of equal thickness throughout, of wood free from knots, is perhaps the best that can be devised for strength and accuracy. It is also a practice sometimes to glue up a sweep in three thicknesses, making the middle piece the contrary way of the grain to the outside and inside pieces, which run lengthwise. This method, though frequently used for expedition, is much inferior to the above, as the different pieces cannot shrink together, and consequently the joint between them is apt to give way.

A solid piece, if not too thick, may be sometimes bent into the form required. If a piece of timber be well soaked upon the intended outside of the curve, it may be bent into position, and if kept in that position till cold will retain the curvature that is given to it.

The only other method of forming a curve, necessary for us to mention, is that of cutting out solid pieces to the required sweep, and gluing them upon one another till they have the thickness required, taking care that the joints are alternately in the centre of each piece below it, something in the manner of courses of bricks one above the other. In this case, it will be necessary, if the work be not painted, to veneer the whole with a thin piece, after it has been thoroughly dried and planed level, and then made somewhat rough with either a rasp or toothing-plane. But the joiner must adopt one plan or another, according to circumstances.

Scribing is the operation by which a piece of wood-work is made to fit against an irregular surface. Thus, for instance, the plinth of a room is made to meet or correspond with the unevenness of the floor. To determine the portion which is to be cut off from a partition, or any wood-work where a floor or ceiling is irregular, it is only necessary to open the compasses to a width equal to the greatest distance between the plinth and the floor; and, passing one leg over the uneven surface, the other leg will leave a mark on the plinth. If the wood be cut away on that line, a surface will be obtained which will make a good joint with the floor or ceiling. But the chief use of the art of scribing is to enable the joiner so to connect the moulding of panels or cornices, that, when placed together, they shall seem to form a regular mitre-joint. This method has certainly one advantage over the common method of mitring, for, if the stuff should shrink, little or no alteration will be made in the appearance, but, under the same circumstances, a mitre would open, and the joint would be shown. The method adopted is this. To cut one piece of the moulding to the required mitre, and then, instead of cutting the other to correspond with it, cut away the parts of the first piece to the edge of the first moulding, which will then fit to the other moulding, and appear as a regular mitre.

As joiner's work is generally intended to increase the beauty of a building, and as the appearance much depends upon the manner in which it is finished, we shall mention a few principles which must be attended to; for, however well the work may be executed, so far as regards the strength and accuracy of the several joints, if the finishing be disregarded, whether the wood be intended to have its natural appearance or to be varnished or painted, the elegance required cannot be obtained if the joiner does not properly finish his work. When a joiner works in wainscot, oak, or mahogany, his chief object must be to obtain a surface perfectly smooth and even. When the framing is glued together, the glue which oozes out, and may be spilt upon the work, must be allowed to remain a few minutes and chill, and may then be carefully scraped off with a chisel, and the parts which cannot be thus cleaned may be washed with a sponge dipped in hot water and squeezed nearly dry. This not only saves trouble in operations which follow, but prevents staining, always produced when glue is suffered to remain till quite hard, particularly on wainscot, which turns black in every joint or place where the glue is suffered to remain. After this operation, which, though it may appear tedious to some workmen, will be found a saving of time, the work should remain till perfectly dry; and, when the joints and other parts have been leveled with a smoothing plane, the whole surface may be passed under a smooth scraper, and finished with fine glass-paper. It will be sometimes necessary, when the grain is particularly cross, to dampen the entire surface with a sponge "to raise the grain," and then again to apply the glass-paper. The work will then be ready for polishing with wax, or for oiling or varnishing, and the good appearance of the work will be in proportion to the time and trouble expended in the process.

In cleaning deal, the same precautions must be taken for the removal of glue left upon the joints, or spilt upon the work, as already described. This being done, the work may be cleaned off with a piece of glass-paper that has been rubbed with chalk, or, in some cases, with a piece of hearthstone. The work is then ready for the painter; but, as there are knots and other places where the turpentine contained in the wood is apt to ooze out, either with or without the increase of heat, and thus spoil the appearance of the finishing, those parts are done over with a composition, and the process is called priming. This is properly the painter's business; but it must sometimes be done by the joiner for the sake of saving his work. The composition used for this purpose is made with red lead, size, and turpentine, to which is sometimes added a small quantity of linseed oil. Priming has also the advantage of preventing the knots from being seen through the paint. Some workmen omit, in this composition, the oil and the turpentine, but the size of itself is apt to peel off, and does not thoroughly unite itself with the wood.

Another method of cleaning off deal is sometimes adopted. When the surface has been made quite smooth with the plane, it is rubbed with a piece of chalk, and the whole is cleaned with a piece of fine pumice-stone, as in the former process it was done with glass-paper; but, if the grain should be still rough, the work may be damped with a sponge, and the operation repeated when dry.

As, in finishing interior work, it is now customary to imitate the graining of different kinds of wood, it is necessary that the joiner's work should be well finished; for, if a good, even surface be not provided, it will be impossible for the painter to produce the effect he desires. Every defect in the ground will, in fact, be more visible under a delicate graining than when the surface is covered with successive coats of color; but, even in the latter case, work well prepared will not only look better, but the color will not be so apt to chip and peel off as when the surface is not properly leveled.

ITALIAN HOUSES.

DESIGN FORTY-SECOND.

THE Plates of this Design represent the plans and elevations of two suburban dwellings in the Italian style. This is a style admitting of much ornament, and has heretofore found much favor in our country. Originally adapted to the wants of social life in a climate nearly corresponding to that of the middle and southern sections of the Union, it requires less alteration than any other style to adapt it to our tastes and habits. In our oppressive summers, the broad roofs, ample verandahs and arcades, are especially agreeable, and though not strictly Northern, there are many of its features that will always render it a favorite in the Middle and Western States. The prominent features of the style are flattened roofs, projecting upon brackets or cantilevers: windows varied in form, with massive dressings, frequently merging into the round arch, and always permitting the use of the Venetian blinds: arcades, supported on arches or verandahs, with simple columns: and chimney-tops of tasteful and characteristic forms. Above all, when the composition is irregular, rises the *campanile*, or Italian tower, bringing all into unity, and giving an expression of power and elevation to the whole composition. One of the greatest merits of the style, is, that it permits additions, wings, &c., &c., with the greatest facility, and always with increased effect. As a rural style, it is inferior to the pointed and high roofed modes. Expressing, rather, the elegant culture and variety of accomplishment of the retired citizen, or man of the world, it will ever be, as it were, a medium between the spirit of the town and country life.

The plan selected, the elevations of which are shown upon Plate XXXIX. comprises two houses. To give it proper effect the lot should be a hundred feet front, allowing fifty for each building, thirty for the house, and twenty for the yard. The entrance door is in the side, and the front and rear of each house are ornamented by bay windows, with a small balcony above. The houses should be constructed of stone or brick, and rough cast, to represent cut stone. The ornaments of the exterior are of carved wood or terra cotta, a cheaper material, and one answering the same purpose. The window and door frames are of wood: the front steps of cut stone: and the roof is to be covered with tin.

The ground plans are shown on Plate XL. The basement contains a large kitchen, a cellar for fuel, store room, furnaces; and convenient closets connected by well lighted passages. On the first floor are a parlor and dining room, each twenty feet by seventeen, and sitting room. A hall six feet wide, into which the front door opens, extends the width of the house. At right angles with this, is another hall, containing a commodious stairway. Connected with the dining room, are a large fire-proof and china closet. The chambers on the second floor correspond to the rooms on the first, except that a bath room is constructed over the fire-proof. The third floor can be made to contain two additional bed-rooms, by reducing their size, and making use of the space over the halls. Thus each building might accommodate a family of ten persons with servants.

Plates XLI., XLII., and XLIII. are details of the external ornaments. They are drawn to a scale of half an inch to the foot, and measurements may be taken directly from them. Figure 1 is a view of the front door-way. Figure 2 is a section of the same, showing the side of the bracket. Figure 3 the front of the window directly over the front door. Figure 4 a section of the same showing the side of the bracket and the projection of the balcony.

Figure 5 is a view of the side windows in the first story. Figure 6 the windows directly above these, and a section showing the side of the bracket. Figure 7 shows two of the pillars of the piazza, and the adjoining wall of the building. Figure 8 the twin window over the Bay. Figure 9 the attic windows in the side, and a portion of the panel, with the enrichments extending along that story.

Figure 10 is a full drawing of the Bay windows. Figure 11 the attic window in the front, and enrichments of the gable. Figure 12 exhibits the face of the raking cornice, and side view of the level. Figure 13 the front of the level, and the side of the raking.

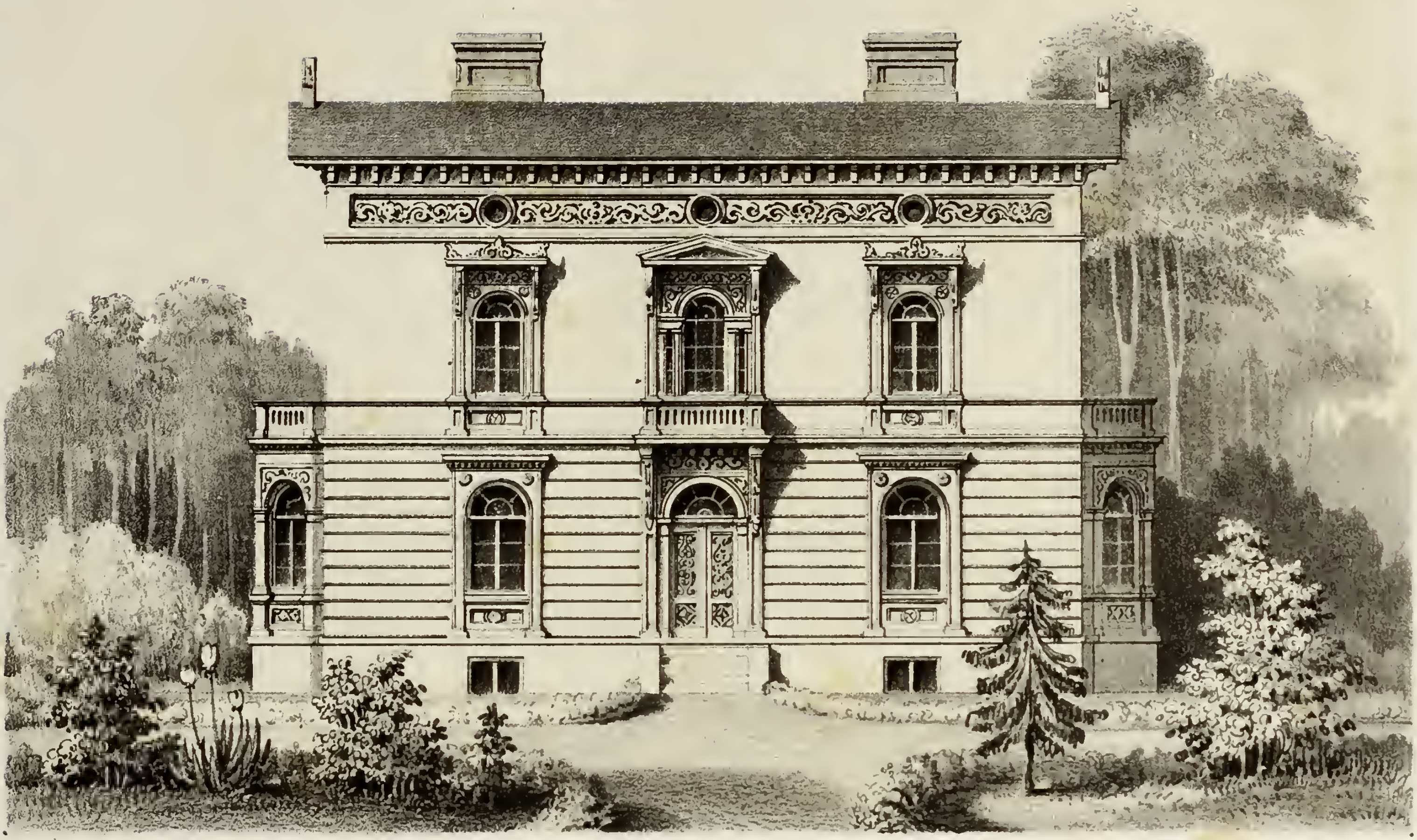
Each building should not cost above five thousand dollars. This, however, would be determined by the amount of ornament used, and the materials of which the ornaments are composed. In the estimates given below, all the items are rated at the market cash price in this city.

Excavation, 275 yds. @ 20 cts. per yd. - -	$55.00
Stone, 65 perch, @ $2.00 per perch, - -	130.00
Bricks, 100,000 @ 10.00 per M. - - -	1000.00
Rough Casting, 400 yds. @ 40 cts. per yd. -	160.00
Plastering, 1800 yds. @ 20 cts. per yd. - -	360.00
Plaster Cornice, 400 feet Lineal, @ 18 cts per ft.	72.00
Hemlock for joists and scantling, 20,000 ft. @ $12.50, per M. - - - - - - -	250.00
Flooring, 7000 ft. @ $30.00 per M. - -	210.00
Sheathing and scaffolding, 4000 ft. @ $15.00 per M.	60.00
Assorted lumber, 8000 ft. @ $27.00 per M. -	216.00
Window frames, inside shutters and sash, 18 @ $20.00 each, - - - - - - -	360.00
Window frames and sash inside shutters, 6 @ $12,00 each, - - - - - - -	72.00
Window frames and sash, 6 @ $6 each, - -	36.00
Doors, 6 @ $5.00 each, - - - - -	30.00
" 6 @ $3.50 each, - - - - - -	21.00
" 15 @ $2.50 each, - - - - - -	37.50
Cut stone, - - - - - - - - -	100.00
Hardware and nails, - - - - - - -	150.00
Smith work, including fire-proof doors, - -	100.00
Painting and glazing, - - - - - -	250.00
Roofing, 250 ft. @ 10 cts. per ft. - - -	250.00
Mantles, 4 @ $37.50 each, - - - -	150.00
Furnace and registers, - - - - - -	200.00
Terra cotta ornaments, - - - - - -	75.00
Carpenter work, - - - - - - -	600.00
Turning, - - - - - - - - -	25.00
Bells, 6 @ $3.50 each, - - - - - -	19.50
	4889.00

A SCHOOL-HOUSE.

DESIGN FORTY-THIRD.

In Vol. I. of this work, Design XVII. will be found the plan of a school-house, which, as there mentioned, had been adopted by the Board of Controllers of the Public Schools in the city and county of Philadelphia. This was accompanied by full details of the internal arrangements, and lengthy specifications. Since the publication of that number of the work, the authorities have been using every means in their power to perfect the plans that had been adopted, and have paid especial attention to the warming and ventilation. To profit as much as possible by the experience of others, suitable persons have been sent to other cities to examine the different modes in use, and report to the Board. The result of their labors and investigations is presented to our readers in the accompanying Design. In external appearance, it is similar to a building for a Normal school, now in the course of erection in Philadelphia, under the superintendence of the author, and will accommodate about seven hundred and twenty pupils. Plate XLIV. shows the front and side elevation. The



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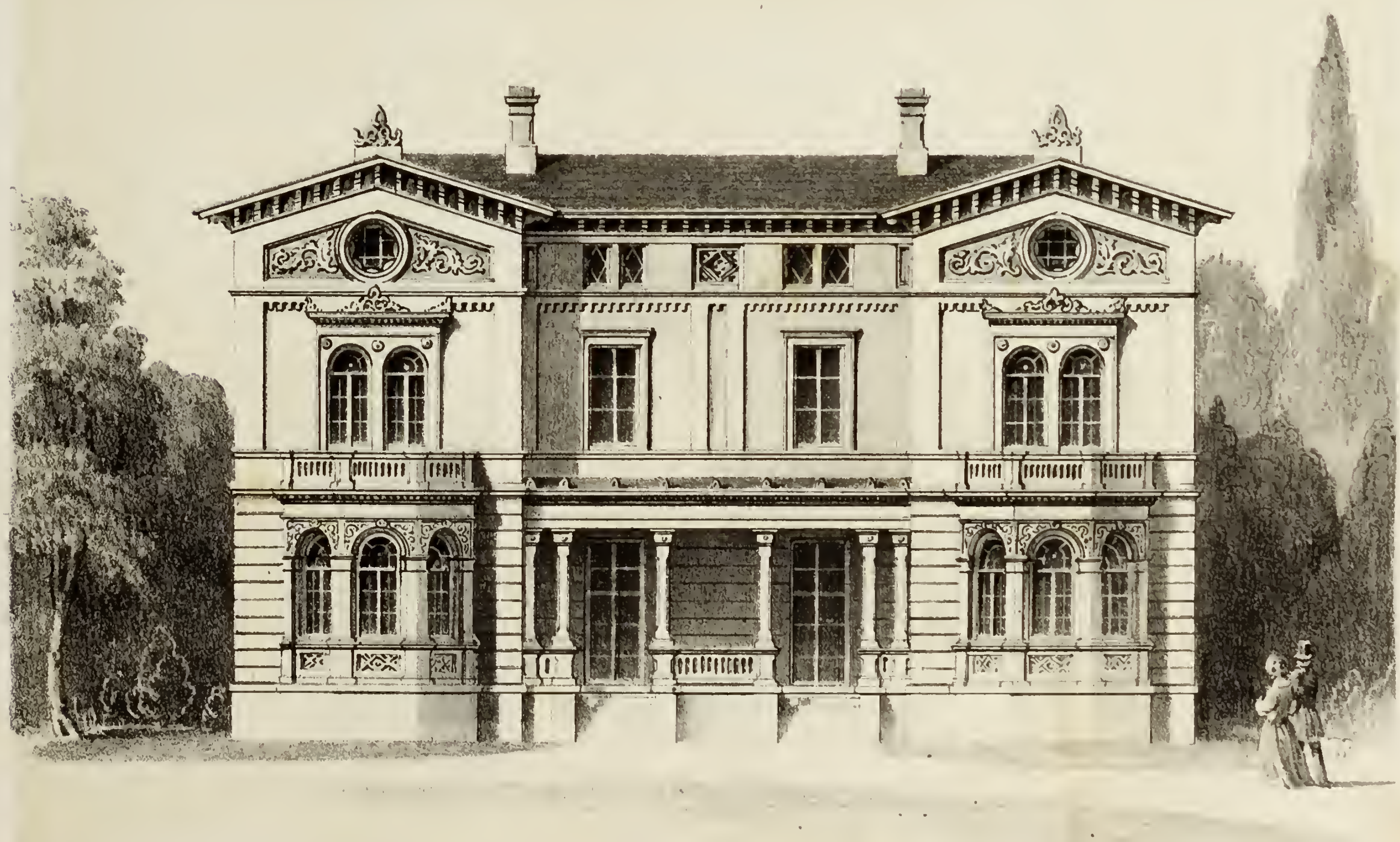
ENTRANCE FRONT.



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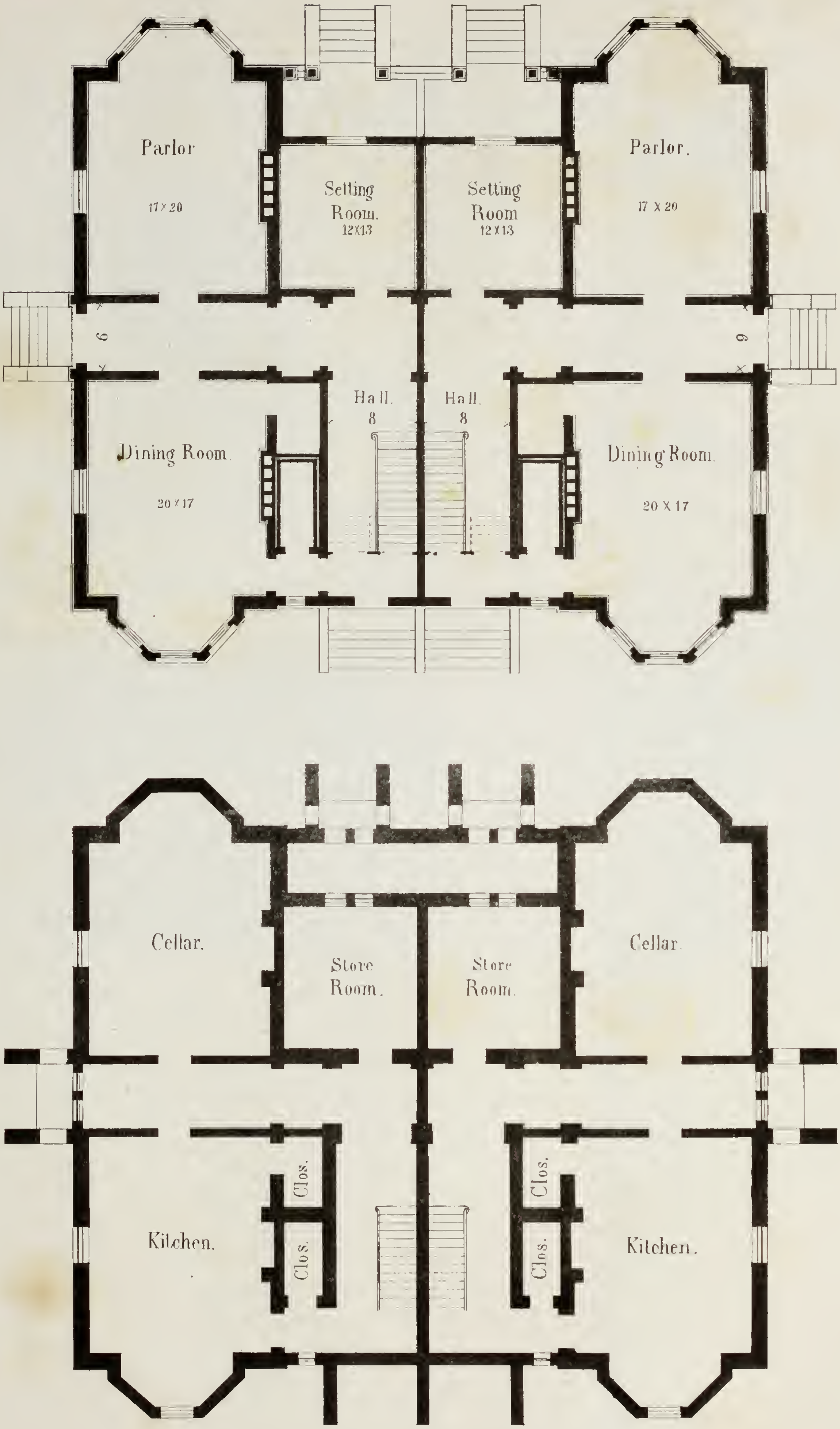
LAWN FRONT.

ITALIAN HOUSES.

Scale 12 feet to the inch.



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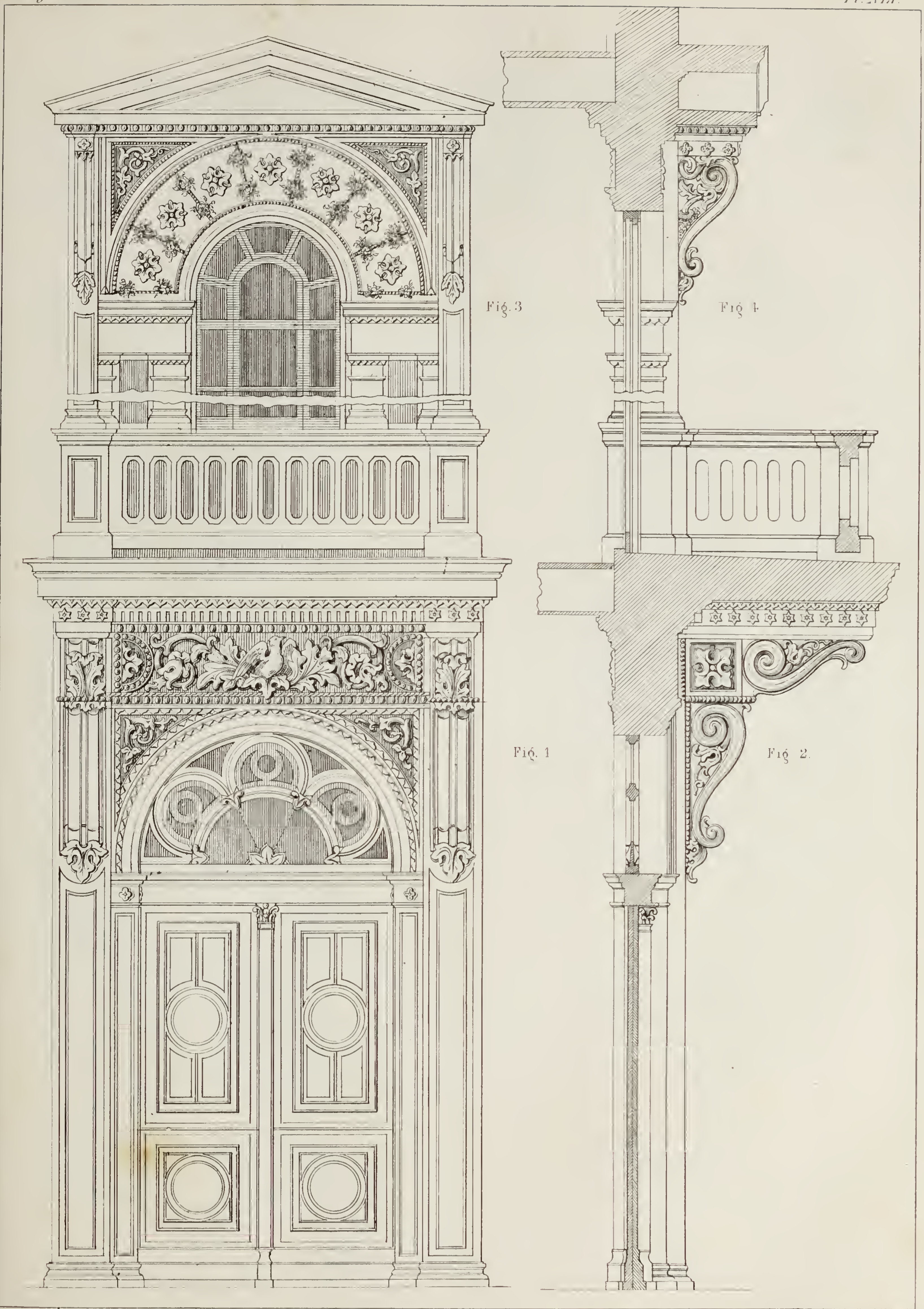
GROUND PLANS.



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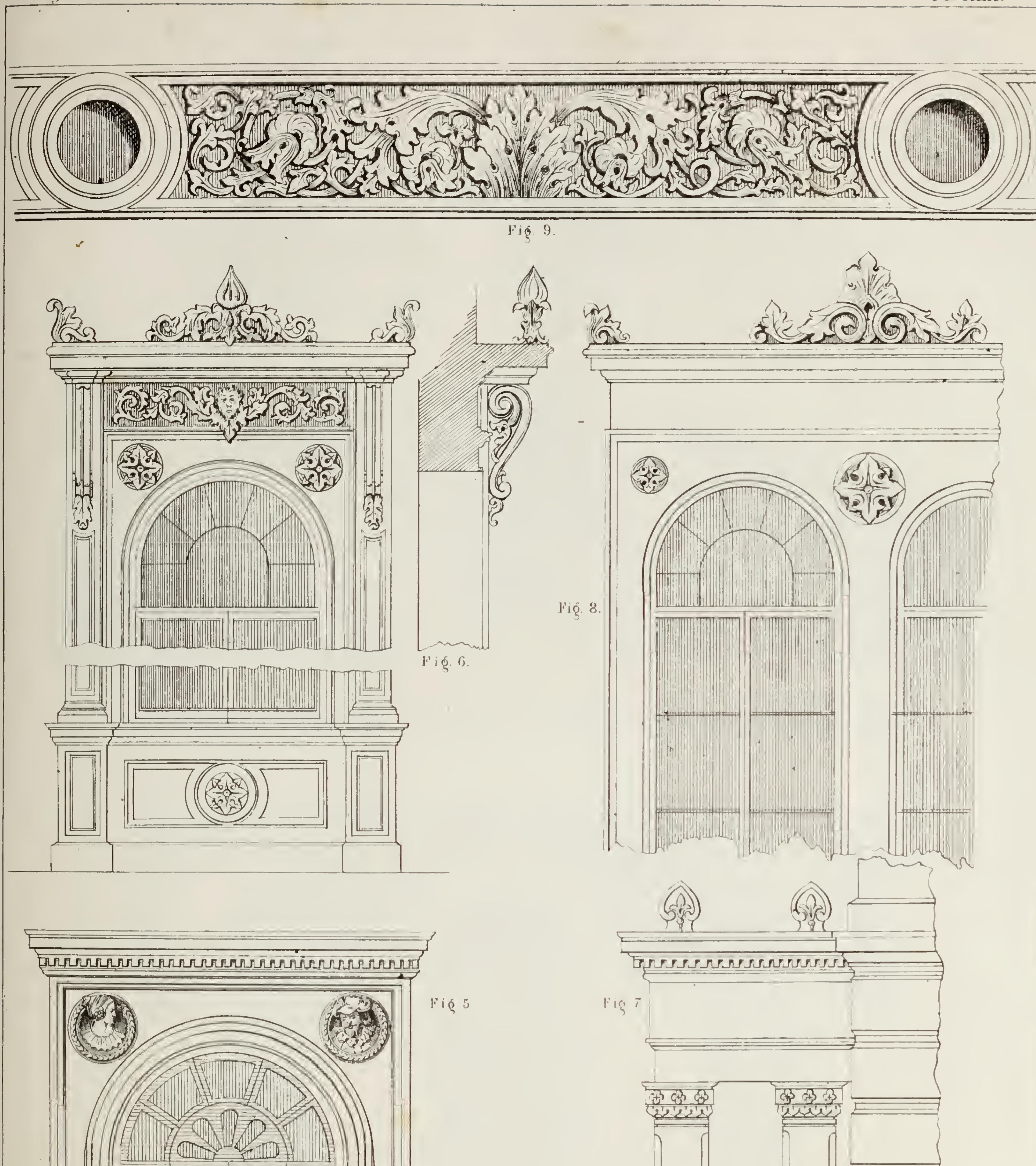
DETAILS.



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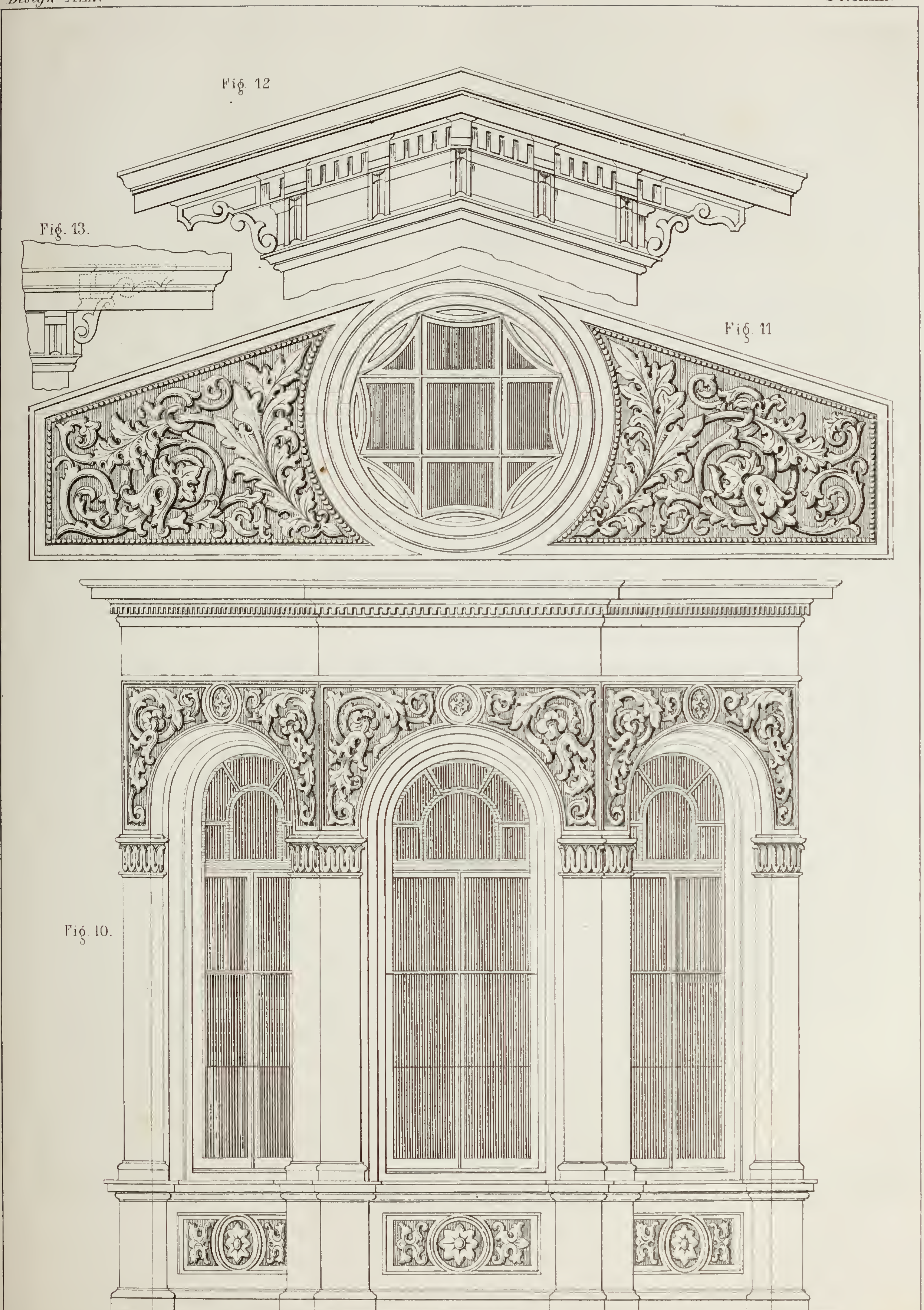

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DETAILS.

most suitable material for such a building, and that generally used in this city, is pressed brick. The base and belt courses are formed of moulded brick, as are the corbal courses. The heads and sills of the doors and windows, and the outside steps are of cut or dressed stone, the cornice of wood. The shutters should be on the inside, and in such buildings they are hung to open against the jamb, without boxes, a plan not more expensive than the usual cost of outside shutters.

The internal arrangements, as regards partitions, &c., are the same as those recommended in Design XVII., already alluded to. Plate XLV. is a transverse section of the interior, exhibiting the manner of framing, the roof, and hanging the sash.

Plate XLVI. exhibits the first story complete. There are four entrances, with the doors opening outwards, the platforms extending to the lines of the doors: and two vestibules, each containing a commodious stairway, with landing or resting places about two-thirds the height. These are enclosed with plank partitions, dressed and grooved together. The other Diagram exhibits one-half the Basement, showing the location, &c., of two of the furnaces: and one-half of the second and third floors, which are alike in their construction. The same system of ventilation is pursued in this building as in the school house shown in the first volume. For the general principles of this subject, we refer the reader to the remarks in the essay on warming and ventilation.

BUILDING HARDWARE.

We subjoin a list of many articles of Hardware indispensable in the erection of almost every building, with the prices annexed. The value of such items is apparent to every one who has ever engaged in building practically, and our only regret is that want of room does not permit an enumeration of any except the most important articles. The list was furnished by Messrs. Wm. McClure & Brother, 287, Market street, who have for years devoted their attention to this branch of the Hardware business.

Sash Pulleys.—Of these there are two kinds, the axle pulley, which are the best, and the sham axle pulley; of these two kinds there are many sizes and prices. The axle pulleys. Sizes, 1¼ in. to 2½ in.; prices 40 cts. to $1.50 per doz. The 1¾ and 2 in. are most used. The sham axle pulleys. Sizes, 1½ to 2 in.; prices 20 cts. to 50 cts. per doz. The 1½ and 1¾ in. are most used.

Shutter hinges,—Two kinds, the reveal, for fronts of houses, and the strap shutter hinges, for back fronts, made of wrought iron, though some are made of cast iron, they, however, are very poor, and the material is not adapted for this use. Wrought iron reveal hinges. Sizes, 14 to 24 in. long, prices $1.50 to $2.00 per sett, complete, which comprizes the rivets and turnbuckles, and rings and staples necessary for 1 pair of shutters. Wrought iron strap hinges. Sizes, 12 in. to 22 in., prices 62½ to $1.25 per sett, complete as above.

Sash weights,—Made of cast iron. Sizes 2 lb. to 30 lb. each; price 1½ to 2 cts. per lb. Sash cord, two kinds, the patent and the common; is sold in pieces of 12, 24 and 36 yards length, or by the lb. Patent cord per lb. 30 to 33 cts. according to the quality. Common cord per lb. 20 to 25 cts. according to the quality.

Cast iron butt Hinges, for doors.—In this article, there is a great variety of sizes and qualities. Those made by Baldwin are the best, although some very excellent ones of other makers are sold. Sizes, narrow butts, for thin doors, $1\frac{1}{4}$ to 5 in.; prices, 31 cts. to $1.25 per doz. pairs. Sizes, broad or wide butts, edge or zigzag holes, 2 by 2 in. to 6 by 6 in.; prices, 40 cts. to $5.00 per doz. pairs.

Screws.—Iron, some five hundred sizes, $\frac{3}{8}$ to 5 in.; prices 12 cts. to $3.00 per gross.

Locks and Latches.—Of these articles, the variety is immense, there being no less than four or five hundred different sorts. They are, however, divided into two kinds, mortice and rim, the mortice being set into the edge of the door, and the rim upon the outside of the wood. These, some twenty years ago, were all imported from England, but at present are almost exclusively manufactured in this country, in the eastern States principally, where immense capital and manufactories are employed in this branch of industry, and by the introduction of machinery, they are produced at almost incredibly low prices. To attempt to describe the many kinds of locks and latches, would be impossible; we shall, however, give a description of a few kinds, and the range of prices, commencing with those used for front doors. When the door is thick enough, the mortice lock is generally preferred, with the night latch attached. If it is a single door, the plain faced lock is used, but if a double door, opening in the centre, then the rabbetted lock is used. These locks are put up with many kinds of knobs, such as the silver plated, the white porcelain, dark mineral and brass. In cities, the silver plated is most prefered. Sizes, 6 in. to 9 in. upright, prices $3.00 to $15.00 each; without the night furniture attached $2.00 to $7.00 each. Rim front door locks, with the night furniture attached, and the same variety of knobs, &c. Sizes, 6 in. to 8 in. upright; prices $1.50 to $9.00 each; without night furniture, prices, $1.00 to $4.00 each. Vestibule mortice latch, for vestibule doors, with keys to match the night keys of front door, can always be opened by the knob from the inside, and can be opened with the knob from the outside or not, and make it necessary to use the night key, according to the pleasure of the occupants. Sizes, $4\frac{1}{2}$ to 6 in. upright; prices, $3.00 to $6.00 each. Mortice locks, for inside doors, are the most numerous in variety. The builder or owner will, however, invariably find that a good article is the cheapest, for if a common lock is put on, and afterwards a better one is required, as is frequently the case, it cannot be changed without spoiling the door. The knobs used for this description of locks, are very numerous. Beside the silver plated knobs, the porcelain, plain white or decorated are at present the most preferred. Some of the decorated are very beautiful, in both design and finish, and of these there are some hundreds of patterns, with the knobs for the closets, inside shutters, sash knobs, bell levers and finger plates, to match. Sizes of mortice locks, 3 in. to 6 in. upright; prices, with knobs, &c., complete, 35 cts. to $5.00 each. Mortice latches, for doors, where keys are not required; sizes $2\frac{1}{2}$ in. to 5 in.; prices, with knobs, as above, 25 cts. to $2.00 each. Closet locks, mortice or rim, as the thickness of doors will permit. Sizes, $2\frac{1}{2}$ to 4 in.; prices 15 cts. to 50 cts. each. Rural rim locks and latches, with or without a slide bolt, for thin doors, with knobs as above; sizes, 3 in. to 5 in.; prices, 25 cts. to $1.25 each.

Shutter Bolts.—Wrought and cast iron, the first being preferable. Sizes, 6 in. to 18 in.; prices $1.25 to $7.00 per doz. Round bolts, wrought or cast iron. Sizes 4 in. to 10 in.; prices, 75 cts. to $3.00 per doz.

Silver plated Hinges,—For front and parlor doors, are much used in good houses, and present a handsome appearance. Sizes, 3 by 3 in. to 7 by 7 in.; prices $4.00 to $6.50 per pair. Sliding door locks and latches, mortice, with the usual variety of knobs or flush knobs, where the doors are required to be entirely within the casing, complete, with sheaves and rail; prices, $3.00 to $20.00 per sett.

French Window Fastenings.—The Espagnlette bolts, an article used altogether in France, is the most complete fastening, for drawing the sash close, both top and bottom, with every style of knobs to match the other furniture, $3.00 to $5.00 each for one pair sash.

WARMING AND VENTILATION.

IN fulfilment of a promise made in the first volume of this work, we propose to offer our readers some practical suggestions upon the proper ventilation of houses. Its importance need not be urged, yet there is, perhaps, no subject connected with domestic life, about which there prevails so much ignorance, among all classes. To Dr. Franklin belongs the honor of first calling public attention to it, and discovering principles whose value will be felt so long as men inhabit artificial dwellings. Count Rumford and Dr. Arnott, of London, also made it a study, and to them the public are indebted for many valuable improvements. Lately, it has, in the hands of scientific and professional men of known ability, become almost a science, and a distinct and important branch of the builder's art. We cannot, of course, in the space allotted to us, do more than give some of the results of their investigations. For details, and the process by which these results were reached, we must refer the builder to standard works on the subject, in which he will find its different branches treated at length.

A few facts will demonstrate the necessity of a constant supply of fresh air, not only for the purposes of health, but to sustain life itself. The atmosphere, when pure, is composed of about seventy-eight parts of nitrogen, twenty-one of oxygen, and one of carbonic acid. Oxygen is the vital portion, and when absorbed, as in a close room, in which charcoal has been burned, life becomes extinct. After the air has been used for the purposes of respiration, its proportions are changed by the action of the blood and lungs, and when exhaled, the same quantity of air contains eight parts less of oxygen and eight more of carbonic acid. This last is deadly hostile to animal life, and air is unfit to enter the lungs in proportion as it is impregnated with this gas. A healthy man takes in about forty cubic inches of air at each breath. He thus *poisons* every hour nearly two and a half hogsheads. Though we are often unconscious of the presence of this vitiated air, because invisible, yet the oppression of the lungs and the enervating feeling experienced from confinement in a crowded and poorly ventilated room, for which many are unable to account, are unerring detectors of its presence. Familiar illustrations of the remark are also seen in the haggard and sickly countenances of children confined to the nursery, or to the close air of towns and cities, or in the delicate frames and colorless cheeks of the majority of American women, who voluntarily, for almost five months in the twelve, subject themselves to imprisonment, in close and badly ventilated apartments.

The object of the builder should then be to construct edifices in such a manner that this constant destruction of the vital principle of atmosphere be compensated for by a never failing supply of pure and fresh air, for the purposes of respiration; and the removal of all impurities, generated by combustion or other causes. In climates where fire is never needed for comfort, this is easily done, and houses are so arranged that there is but little difference in this respect, between being under the roof and in the open air. But in our climate, every precaution is adopted to exclude every particle of air, for the purpose of obtaining proper warmth during the winter months. Windows are often made double, and door frames air tight, to keep out the bleak winds. Heretofore, the evil consequences of such construction have been remedied by the plans devised for warming. The common fire-place and chimney secure the escape of the vitiated air from within, and the introduction of pure air from without, for there is always a strong current of air from the floor towards the fire, to support combustion and supply the partial vacuum in the chimney, occasioned by the ascending column of smoke and rarified air. But these are now, for economical and other reasons, yearly going out of use, and their places supplied by furnaces and flues, or in large buildings by pipes for heating by steam or hot water. These supply warm but not fresh air. The loss of the chimney as a ventilator, must be supplied by some arrangement that will produce the same results.

The means provided for ventilation, must be sufficient to secure the object, independent of windows and doors, and other lateral openings, which are intended, primarily, for the admission of light, passage to and from the apartments, and similar purposes. Any dependence on the opening of doors and windows, except in summer, subjects the occupants of the room to currents of cold air, and extreme and rapid changes of temperature. There should be in every living room one or more openings, both at the top and bottom, of not less than a foot square, capable of being closed wholly or partially by a slide of wood or metal, to regulate the quantity of air passing through them, and placed at such points, and at such distances from the openings for the admission of pure warm air, that a portion of the heated air will traverse every point of the room, and impart as much warmth as possible, before it becomes vitiated and escapes from the apartment. These should be connected with flues of a capacity equal to at least eighteen inches in diameter, air tight, smooth, (if of boards, they should be seasoned, matched and planed; if of bricks, the inside must be finished round and clean,) and carried up on the inside of the room, or in the inner wall, with as few angles and deviations from a direct ascent as possible, above the highest portion of the room. All such flues, even when properly constructed and placed, and even when acting in concert with a current of warm air, flowing into the room, should be supplied with some simple, reliable, exhaustive power, acting at all seasons of the year, and with a force varying with the demands of the season, and the condition of the air in the apartment. The most simple, economical, available and reliable power is heat, or the same process by which the natural upward movements of air, are induced and sustained. This can be applied to the column in a ventilating flue, by carrying it up close behind, or even within the smoke flue, which is used in connection with the heating apparatus, or by carrying the smoke pipe within the ventilating flue, either the whole length, or in the upper portion only. When several apartments are to be ventilated, the most effectual and economical way of securing this power, is to construct an upright brick column or shaft, in which is the smoke pipe of the stove or furnace, and then to discharge the ventilating flues from the top and

Design XLIII. Pl. XLIV.

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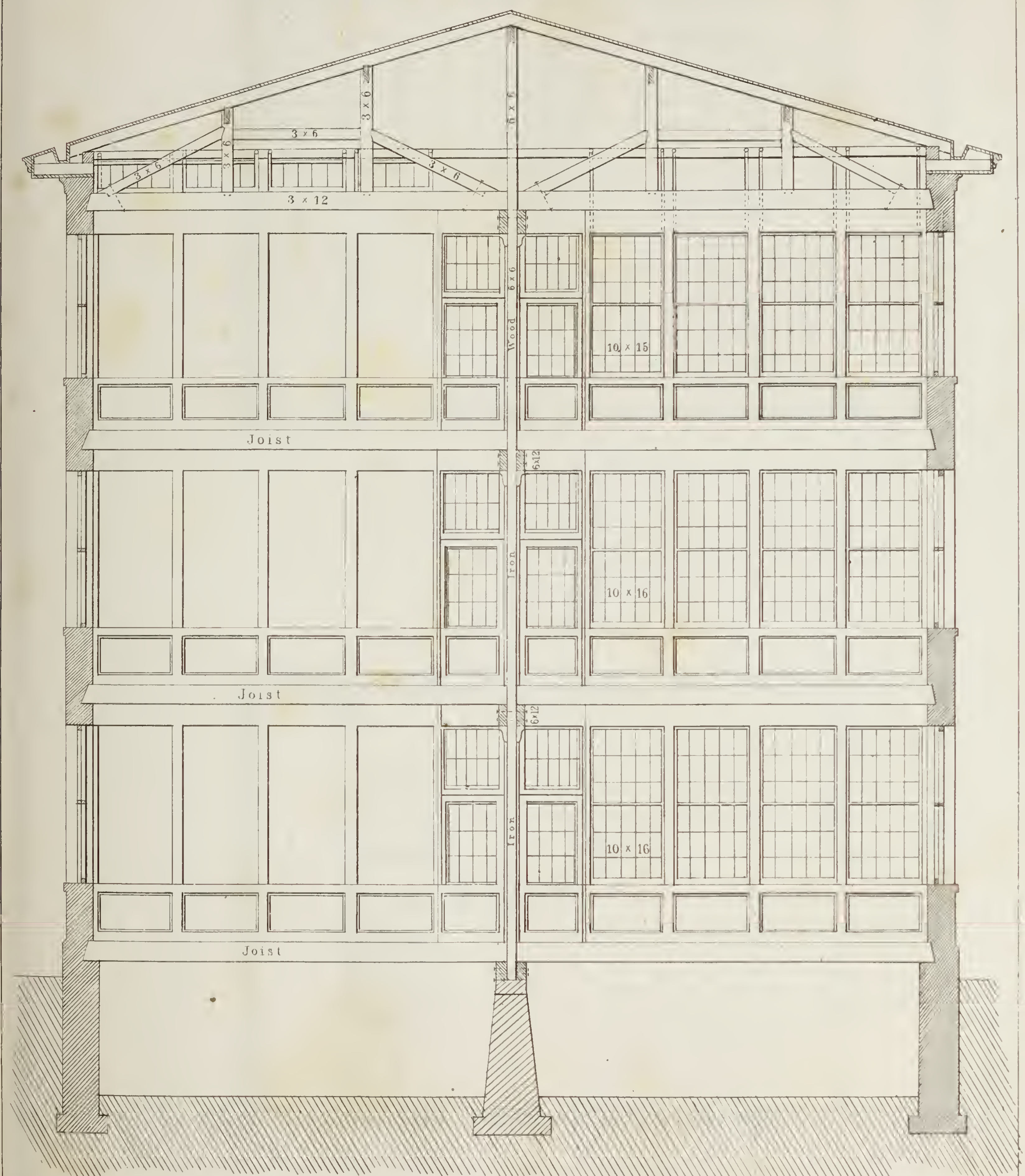
SCHOOL HOUSE.



Scale 6 feet to the inch.

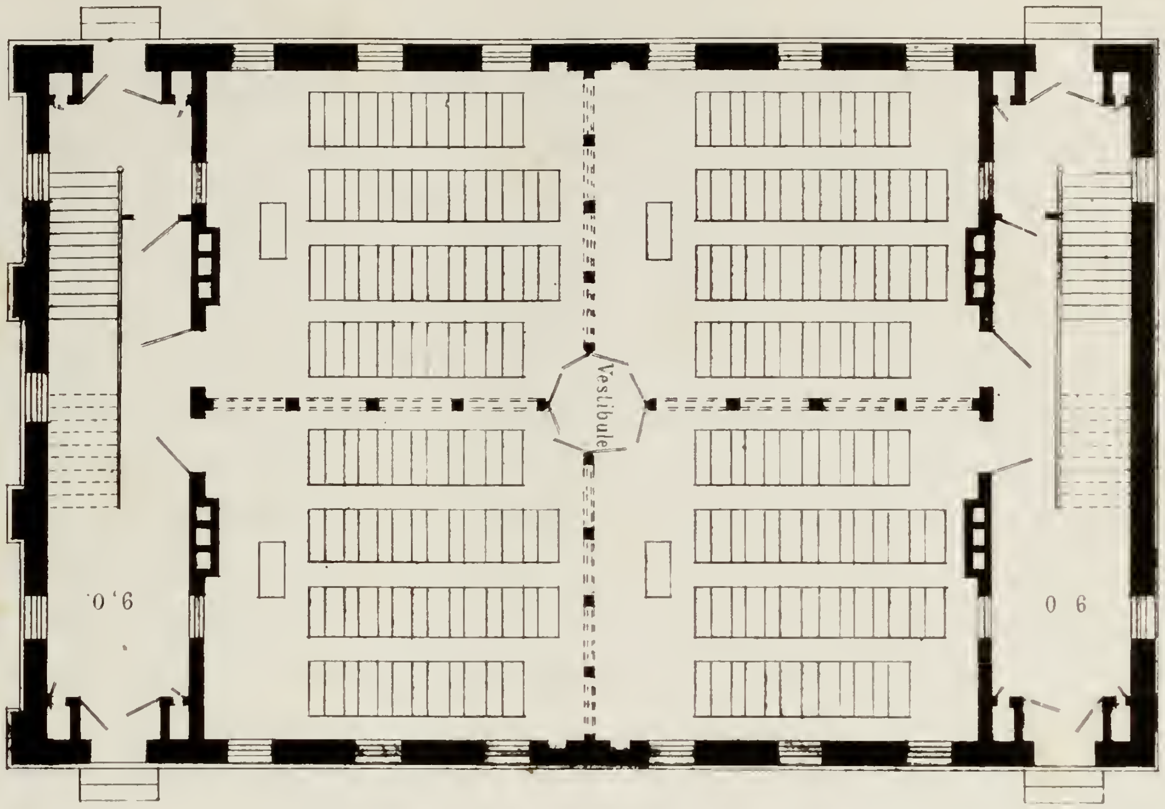
TRANSVERSE SECTION.

Saml. Sloan, Arch.t

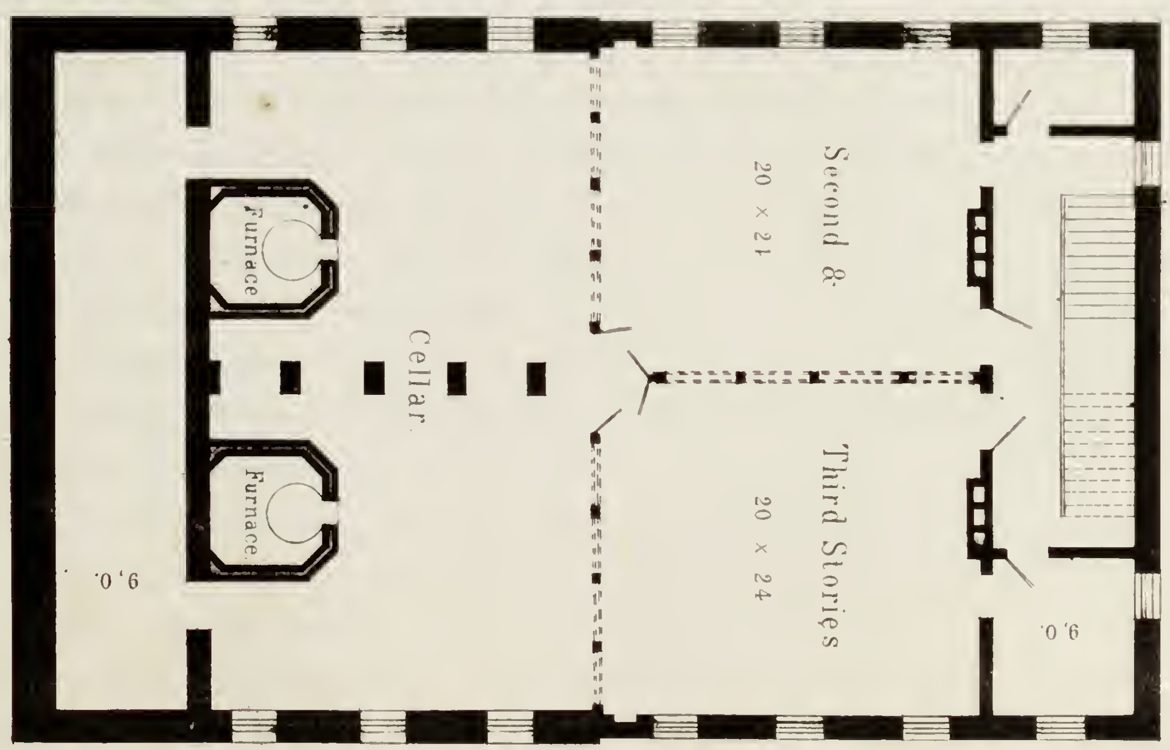
P S Duval & Co's Steam lith Press Phila.

DETAILS.

FIRST STORY.



CELLAR & UPPER STORIES.



Scale 12 feet to the inch.

Saml. Sloan Archt.

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GROUND PLANS.

bottom of each room, into this upright shaft. Then the flues may be lateral, and the openings into them inserted near the floor. At the roof of the building, the shaft should be terminated, by an ejecting ventilator, like that invented by Mr. Emerson, of Boston, or any other that will answer the same purpose. By the use of some arrangement of the kind, downward blasts are avoided, and no matter how light, or from what quarter the wind may be, there is always an active, upward current of air. For a house or room intended for twenty-five persons, the diameter of the shaft or principal ventilating flue should be ten inches. If two are used, each should be at least seven inches. For larger houses or rooms, intended for the accommodation of a greater number of persons, the size of the flues must be increased in the ratio of one to one-third. The area of flues for the admission of fresh air should exceed those for the discharge of vitiated air by about twenty-five per cent.

One advantage gained by the use of such ventilators, is that they exhaust the bad air at all times, and their action is increased by the difference in the temperature of the air, within and without the house. For this reason they ventilate equally well in summer and winter, and serve to cool an apartment in the oppressive days of July, as well as to supply pure air in December, when doors and windows are kept shut. The difference between a house ventilated in this manner, and one in which no such means are used, is not trifling, whether considered in respect to permanent health, or the mere pleasurable sensations at the moment. The lassitude, the debility, the blanched complexions, which invariably result from the pernicious habit of heating by furnaces or stoves, with the fire-places all closed, and no means of ventilation, would no longer exist, and the inmates of such houses, after the introduction of a proper ventilating apparatus, would be surprised by the elasticity, freshness, and purity of the air, always changing, yet always of an agreeable temperature. Many persons have been at great pains and expense to warm their houses comfortably, yet, when all is done, they find there is something oppressive and distressing about the very comfort they have thus procured. This is wholly owing to the want of fresh air, from the total neglect of all means of ventilation. The house itself must *breathe* by means of some plan that will rid it of vitiated air and supply in its place, air fit for the purposes of respiration. Those who are in delicate health, and fear to sleep with windows raised, even in summer, would find their slumbers sounder and more refreshing, without the least danger of taking cold from draughts of air passing over them, if their rooms were provided with a simple chimney valve, or the houses with a proper ventilating apparatus. The former may be fixed in any room for a few shillings. The latter can be constructed at a less cost than the price of some article of furniture purchased more for show than use.

After ventilation, the most desirable mode of warming dwellings, demands the attention of the builder. It is, to a certain extent, only ventilation reversed, and is governed by the same general principles. Two ends are to be accomplished, the production of a uniform temperature, in all weather, and to do this by the most economical and least troublesome method. The antiquated fire-place, with its capacious chimney, as has already been intimated, serves for the purposes of both warming and ventilation. But it is computed that only about one fiftieth of the heat generated in this manner, becomes of actual use in the room, an objection that at once proves the necessity of adopting some other plan, without stopping to consider the constant care and attention to the fire, devolving upon the housekeeper, who is desirous of having comfortable apartments. In the northern portions of Europe, where the intensity of the cold has compelled the inhabitants to greater activity in seeking the means of relief, much has been done to obtain warmth, consistent with that economy of fuel so necessary in countries where wood alone is burned. By the proper construction of their buildings to this end, the warmth of one fire is diffused through several rooms and passages. Although this is done on the pernicious principle of impregnating air with heat, by close stoves, composed of masses of iron or brick work, such means are better calculated to procure comfort and preserve health, than those often resorted to among us. Here the effect of a single fire in a room is counteracted by cold vestibules, passages and sleeping apartments, and the extremes of heat and cold to which the inmates are constantly subjected, cannot fail to be prejudicial to the most robust. The system of warming houses by close and unwholesome stoves, that in many instances have supplanted fire-places, cannot, therefore, be regarded as an improvement, when its effects upon health are considered. Economy of fuel, is the only advantage many of them can claim. Yet such a mode involves the necessity of conveying fuel to second and third stories, and a perpetual supervision of a number of fires.

Heating by steam or hot water, is a plan that is not likely to meet with general favor, except in public buildings, manufactories, &c., or in the most expensive and luxurious mansions. The necessary pipes and apparatus are expensive, and need more care and attention than it is practicable to give them in ordinary dwellings. The best mode is by pure heated air, from a properly constructed furnace, placed in the cellar, with flues attached, by which its effects may be felt in any part of the house. Among the many inventions for this purpose, that will claim the builder's attention, we cannot confidently pronounce any to be the best. In making a selection, circumstances and a number of contingencies, it is impossible now to consider, must have due weight. Reference has been made, in other parts of this work, to those of Mr. Chilson, of Boston, and the experience of the author has so fully tested their merits, that it is believed they will be found to answer every desired purpose. Before advising the use of any, the builder should satisfy himself that the fire in them can be maintained without noise, and without throwing dust or smoke into the rooms. The offensive odors and impurities of burnt air, or rather, of particles of vegetable or animal matter, floating in the air, should not be experienced, and the heat should be so conducted into the house, at different points, and diffused throughout the rooms and halls as to secure a uniform temperature, whose height can be regulated by a mere arrangement of the flues and registers, without increasing or decreasing the quantity of fire. No furnace is fit for use in which the air is warmed by coming in contact with plates of iron heated to a high temperature, often red hot. When this is the case, the air is deoxygenized as soon as it comes in contact with the metal, and thus robbed of its vital element before passing to the room where it is to be breathed. Besides this objection, cast iron always contains some carbon, sulphur, and even arsenic itself, and the air that passes over it when in an incandescent state, becomes saturated with these gases, not only offensive to the smell, but destructive to the organs of respiration.

In conclusion, we would enjoin upon the builder the consideration, necessarily involved in our opening remarks, that no system of producing artificial heat, is advisable or even endurable, unless connected with some arrangement for securing ventilation. The use of any furnace and flues in a new building, or their erection in an old one, is a fruitful source of disease and death, when not accompanied by means for supplying pure and fresh air. That apparatus, therefore, which throws into an apartment the greatest amount of air, which warms it sufficiently, without a red hot surface, which diffuses it rapidly and effectually throughout the room, which furnishes the means of removing the foul and poisoned air, and which yields a never failing supply of fresh and untainted air, is alone entitled to the favorable consideration of the builder, or any one contemplating the erection of a healthy and habitable dwelling.

A SOUTHERN MANSION.

DESIGN FORTY-FOURTH.

The most of the designs already furnished for our work, have been prepared with reference to the habits and manners of the inhabitants of the Middle or Eastern States. That now offered is of a dwelling suitable for the southern sections of the Union. There are many reasons why the principal features of the buildings North and South are and will be essentially different. Here, land is an object, and the architect is compelled to compress his plans into the smallest possible space; our climate requires a house that will prove equally habitable in the sultry days of June and July, and during the severe weather of December and January: and our habits need but one tenement,—kitchen, servants apartments and dwelling all being under the same roof. On the contrary, the southern gentleman is not circumscribed in the construction of his house, or the laying out of gardens and lawns, by the walls or fences of his neighbors, and the number of laborers at his command, the entire year, render him less chary in the indulgence of his taste in these particulars, than he would be, if, to keep them in order, required a constant drain upon his purse. Instead of building upward, he prefers increasing the area of his ground floor, and having fewer stories to ascend. The climate of the Carolinas or of Louisiana, does not demand, for the comfort of the inmates, windows with double sashes, and doors set in air-tight frames, and those houses are most suitable whose openings are so constructed as to permit, at pleasure, such an union of rooms and verandahs as to make them almost one and the same apartment. The laws of hospitality, observed there, require a larger number of sleeping apartments, for a family of the same number of persons, since, at many seasons of the year, the southern householder takes a pride in converting his mansion into a sort of honorary hotel. The kitchen, which is there the dwelling for the house servants, is rarely under the roof of the mansion, but is made a separate tenement, so connected with the main building as to furnish ready communication in all weathers, and is often furnished with bed rooms on the second floor.

The design we have chosen, the elevations of which are seen on Plate XLVII. will, on inspection of its details, be found to combine all the features desirable for a southern residence. It is of Italian origin, though it cannot properly be classed in any distinct style. The roof is Tuscan, and projects considerably beyond the face of the walls, protecting them from the heavy rains and shielding the bed room windows from the rays of the sun. The porch or verandah extends entirely around the building, sheltering the entrance doors and bay window, besides affording an agreeable place of retreat during the cool of the day. The value of these wide-spreading roofs, is two fold; they keep the walls or sides of the house cool, protecting them from the direct rays of the sun, and by the strong contrasts of light and shade, made by such projections, produce a fine architectural effect. The windows of the first floor extend to the floor, and all open on the verandah. Those in the second story are all to be furnished with green venetian shutters, designed more for protection from the sun than for security, this being a feature seldom observed by a southern builder. The kitchen is detached from the main building, and approached from the Dining Room and Hall, by an enclosed passage. The building is designed to be forty-eight feet square, and three stories in height. The first story and verandah is twelve feet four inches high in the clear, the second, ten feet four inches, and the third seven feet.

Plate XLVIII. is a plan of the grounds around the house, and of the first floor of the mansion and out houses. The kitchen yard and vegetable garden, are hidden from view by an arbor, separating them from the rest of the grounds. The space on both sides of the house from the front line of the porch back to the arbor is appropriated to flower gardens. This arrangement gives a pleasing effect to the view, both from the parlor, and the library and dining room windows. In front of the house is an extended lawn, ornamented with clumps of trees, a fountain, serpentine walks, and a carriage way leading to the steps of the front porch. In the first story are a parlor or drawing room, seventeen feet by forty-five, a hall, twelve by forty-five, containing a commodious stair-way, and affording a free passage of air, the entire length of the house, a dining room, seventeen by fifteen, with a water closet and lobby in the rear. On the right of the house, and in the rear of the flower garden, is a small edifice, intended as a play house for children.

Plate XLIX. exhibits the plans of the cellar and second and attic stories. The second story contains four chambers seventeen feet by eighteen, one twelve by twelve, two bathing or dressing rooms, each nine by twelve, and four wardrobe closets. In the third story are the same general arrangements as in the second, except that the space appropriated for dressing rooms may be used for bed rooms. The observatory is approached by steps leading from the hall of this story. The cellar should be seven feet deep, and divided on each side the hall into three divisions. The centre divisions are for the furnaces and fuel. The others, for wine, vegetable, provision and storing cellars. The cellar walls are designed to be of stone, twenty-one inches thick to the level of the first floor. Those above of rough brick, thirteen inches thick, and coated with rough casting. The roof is to be covered with leaded roofing tin, and the porches are of cast iron.

On Plate L. are the building details drawn to a scale of half an inch to the foot. Figure 1, is an elevation of the observatory. Figure 2, an upright and bracket of the porch. Figure 3, a view of the eave and bracket supporting the roof. Figure 4, the upper part of a window in the second story.

We annex a bill of quantities, with the cost of each, including labor and materials. Every item has been carefully calculated and may be relied upon. The prices marked are those prevailing in and near Philadelphia.

Excavation, 700 yds. @ 15 cts. per yd. - -	$105.00	Laying them, @ $2.00 per M. - - -	460.00
Stone for foundation wall, 190 perches @ 90 cts.	171.00	Lime, 345 bu. @ 19 cts. per bu. - - -	65.55
Laying stone, 217 perches @ 55 cts. - -	119.35	Sand, 230 loads @ 50 cts. per load, - - -	115.00
Lime for masonry, 200 bu. @ 19 cts. per bu. -	38.00	Rough casting, 900 sq. yds. @ 45 cts. per yd., including materials, - - - - -	405.00
Screened gravel, 200 loads @ 30 cts. per load,	- 60.00	Plastering, 2980 sq. yds. @ 25 cts. per yd., do.	745.00
Bricks, 230,000 @ $6 per M. - - - -	1380.00		

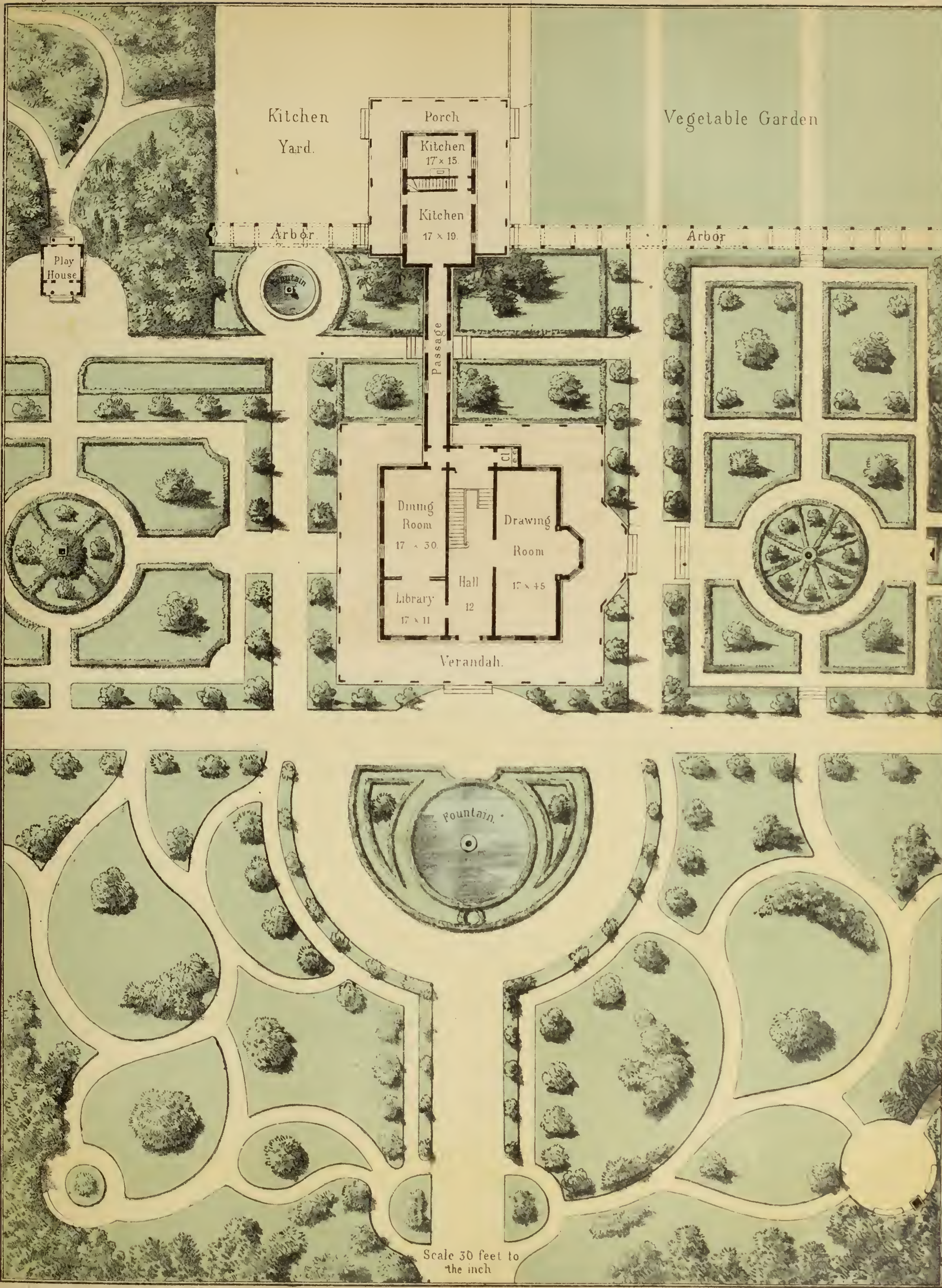
FRONT ELEVATION.

Saml Sloan, Archt.

P.S. Duval & Co's Steam Lith. Press Phila.

SIDE ELEVATION.

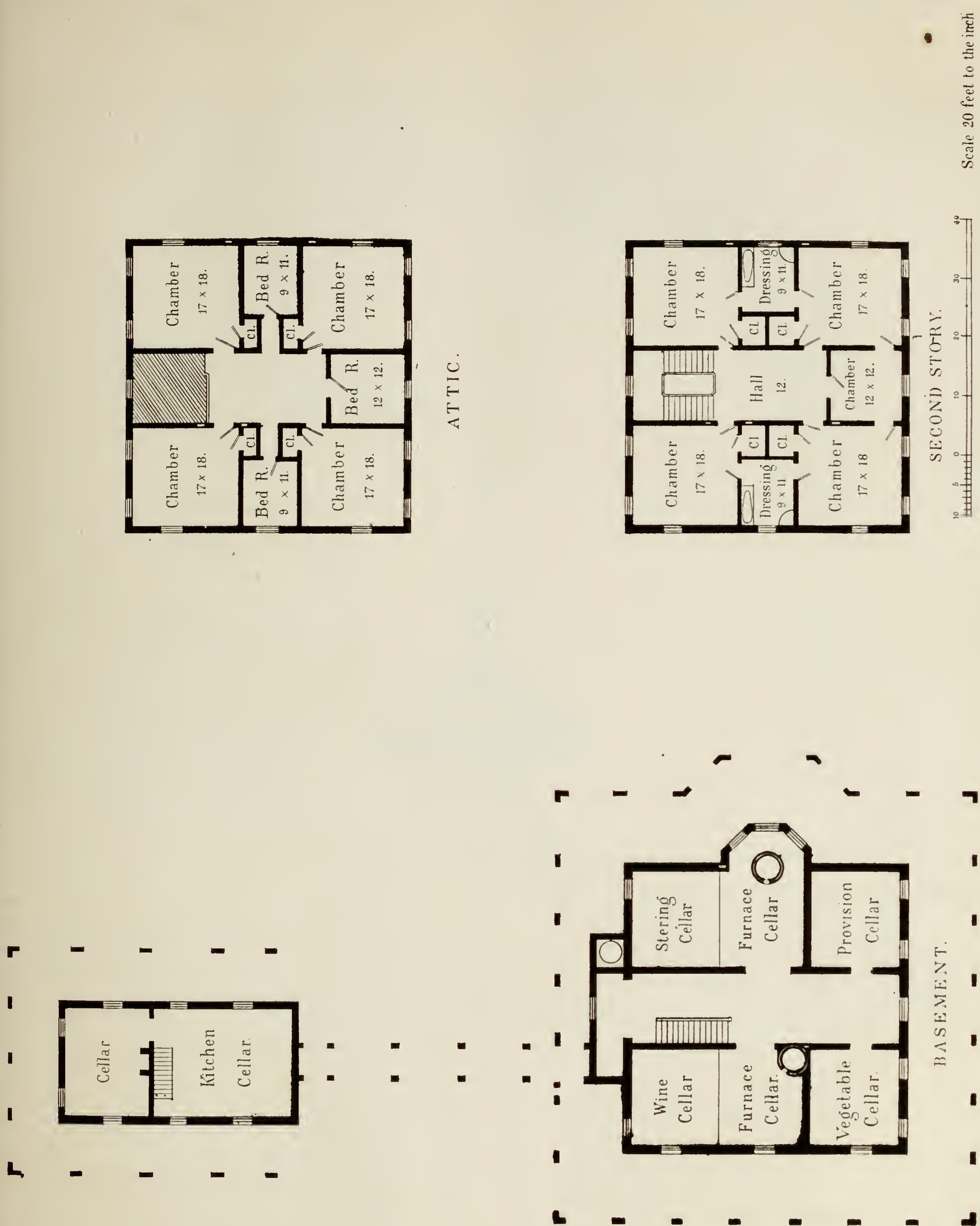
SOUTHERN MANSION.



Sam! Sloan Arch!

P. S. Duval & Co's Steam lith Press Philad.

GARDENS & GROUND PLAN.



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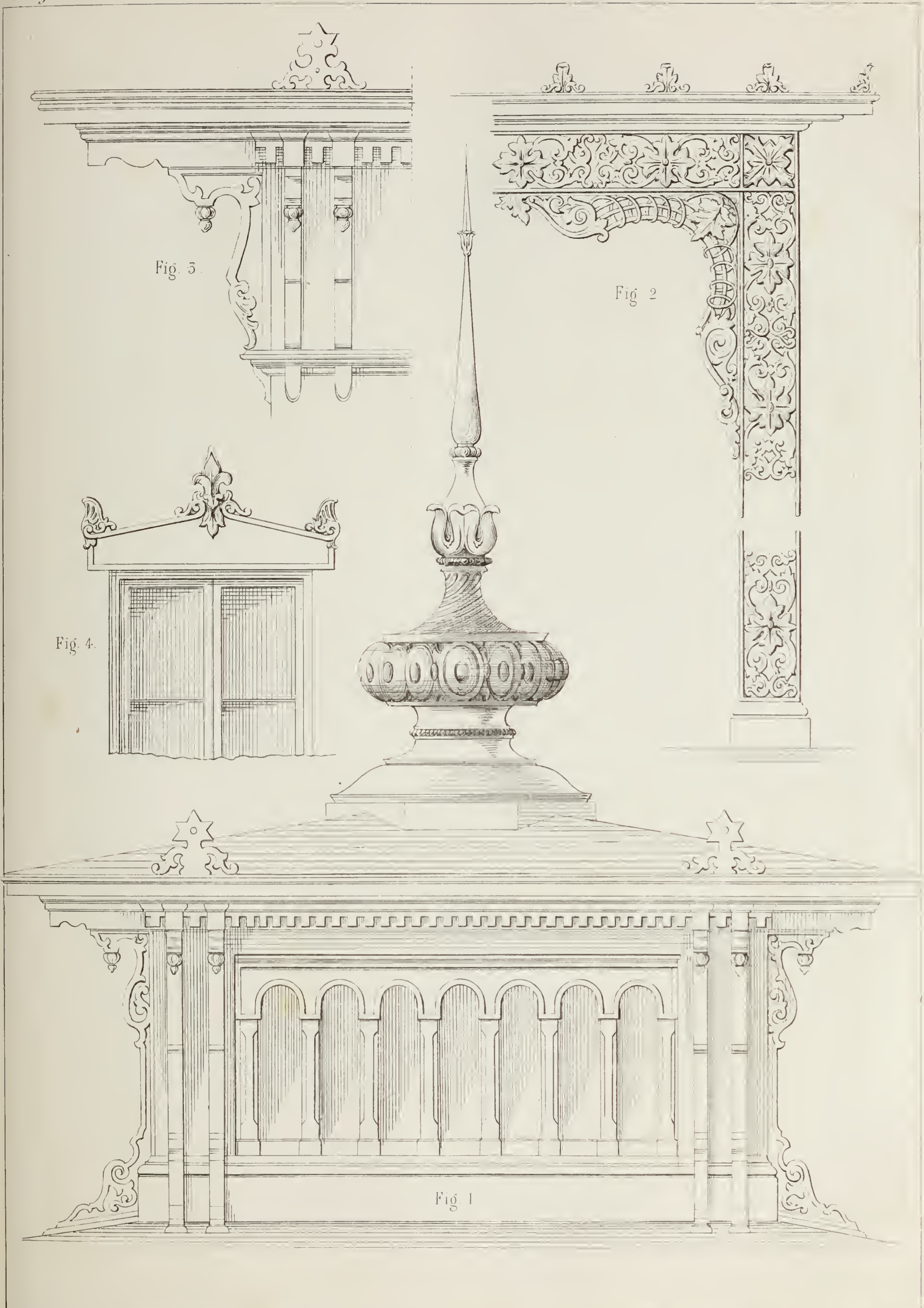
PLANS.



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P. S. Duval & Co's Steam lith Press Phil[a]

DETAILS.

Tin roofing, 7834 ft. @ 10 cts. per ft. - -	783.40
Stucco cornice, in Drawing Room, 132 ft. @ 80 cts. per lineal ft. - - - - - -	105.60
One centre ornament for do. - - - -	20.00
Cornice in Hall, 120 ft. @ 35 cts. per ft. lineal,	42.00
Cornice in Dining Room, 98 ft. @ 30 cts. per ft. lineal,	29.40
Cornice in Library, 68 ft. @ 20 cts. per ft. lineal,	13.60
Centre ornament for Hall, - - - -	12.00
" " " Dining room, - - -	10.00
" " " Library, - - -	8.00
Hemlock flooring joists, 3 by 12 in. and 18 ft. long, 12,960 ft. @ $12.50 per M. - -	162.00
Do. for Hall, 3 by 10 in. and 12 ft. long, 1200 ft. @ $12.50 per M. - - - - - -	15.00
Do. for ceiling over the room, 2 by 10 in. and 18 ft. long, 2400 ft. at $12.50 per M. - -	30.00
Do. over Hall, 2 by 12 in. and 12 ft. long, 800 ft. @ $12.50 per M. - - - - - -	10.00
Wall plate, 2 by 9 in. double, 1176 ft. @ $12.50 per M.	14.70
Rafters for framing observatory, 3100 ft. - -	38.75
Joists for porch floor, 4200 ft. @ $12.50 per M.	52.50
" " ceiling, 1800 ft. @ $12.50 per M.	22.50
Rafters for do. 1650 ft. @ $12.50 per M. -	20.62
Plate around porches, 600 ft. @ $20 per M. -	12.00
Joists for kitchen, 3 by 12 in. and 18 ft. long, 1512 ft. @ $12.50 per M. - - - -	18.90
Ceiling joists, 2 by 10 in. and 18 ft. long, 600 ft. @ 12.50 per M. - - - - - -	7.50
Rafters for do. 1300 ft. @ $12.50 per M. -	16.25
Sheathing boards, on main roof, 4200 ft. @ $15 per M.	63.00
Do. for porches, 2850 ft. @ $15 per M. - -	42.75
Do. for kitchen, 2070 ft. @ " per M. - -	31.05
Flooring boards, 8084 ft. @ $30 per M. - -	242.52
Do. for porch, 2950 ft. @ $30 per M. - -	88.50
Do. for kitchen, 1870 ft. @ $28 per M. - -	52.36
Window frames in first story, 12 @ $4.50 each,	54.00
do. second story, 16 @ $3.75 each,	60.00
do. attic story, 16 @ $2.25 each,	36.00
Front door frame, with side and head lights, -	5.00
Back " do. - - -	4.50
Window frames for kitchen passage, 10 @ $3.25 each,	32.50
Door frames for kitchen passage 4 @ $2.50 each,	10.00
Shutters, 9 pair, 10 ft. high @ 50 cts. per ft. -	45.00
Inside shutters, to Bay window, - - -	15.00
Blinds, 16 pair, 7 ft. long, @ 50 cts. per ft. -	56.00
Lights, $1\frac{3}{4}$ sash, 296 @ 12 cts. each, - -	35.52
" $1\frac{1}{2}$ " 108 @ 6 cts. each, - - -	6.48
Stairs, 36 steps @ $5.50 per step, (including all materials,) - - - - - -	182.50
Doors, double framed, $1\frac{3}{4}$ in. thick, 23 @ $4 each,	92.00
do. $1\frac{1}{2}$ " 18 @ $3 each,	54.00
Scaffolding, 4000 ft. @ $15 per M. - - -	60.00
Lumber for inside dressings, 6400 ft. @ $35 per M.	224.00
Carpenter's work, 630 days, at $1.75 per day, -	1102.50
Water closets complete, - - - - -	125.00
Two bath tubs, leaded complete, - - -	40.00
Two permanent wash basins, with spigot, draw cock, &c., complete, in walnut stands, - -	75.00

Plumber's bill, - - - - - - -	175.00
Iron verandah, - - - - - -	650.00
Cellar window bars, 350 lbs. @ $4\frac{1}{2}$ cts. per lb.	15.75
Nails, 1200 lbs. @ $4 per hundred, - -	48.00
Nine sett shutter hinges, for first story, @ $3 per sett,	27.00
Do. for second story, 16 sett @ $2 per sett, -	32.00
Do. " kitchen and passage, 10 sett @ 1.12\frac{1}{2}$,	11.25
Axle pullies, 12 doz. @ $1.00 per doz. - -	12.00
Sham do. $3\frac{1}{2}$ doz. @ 50 cts. per doz. - -	1.75
Patent sash cord, 16 lbs. @ 33 cts. per lb. -	5.28
Sash weights, 1840 lbs. @ 2 cts. - - -	36.80
Butts, 4 by 4 in., 23 pair @ 20 cts. per pair, -	4.60
" $3\frac{1}{2}$ by $3\frac{1}{2}$ in. 18 " @ 16 cts. per pair, -	2.88
" $2\frac{1}{2}$ by 2 in. 15 " @ 7 cts per pair, -	1.05
Two sett sheaves to brass, 6 in. wings, - -	12.00
Two 10 in. frame plate flush bolts, - - -	1.25
Two 2 ft. 6 in. do. - - -	2.00
Back flaps, 10 pair @ 5 cts. per pair, - -	50
One 8 in. front door mortice rebet lock, with night key and porcelain furniture, - -	12.00
One 7 in. do. for back door, - - - -	7.00
Fifteen $4\frac{1}{2}$ in. do. @ $2.00, - - - -	30.00
Thirteen, $3\frac{1}{2}$ in. do. @ $1.75, - - - -	22.75
Five 3 in. knob mortice latches @ $1.25, - -	6.25
Brass clothes hooks, 4 doz. @ $1.50, - -	6.00
Sash lifts, 28 sett @ 25 cts. per sett. - -	7.00
" fastenings, 28 sett @ 25 cts. per sett, -	7.00
Nine 12 in. shutter bolts @ 37$\frac{1}{2}$ cts. - -	3.37
Sixteen 10 in. do. @ 25 cts. - - -	4.00
Screws, 2 gross, $1\frac{1}{2}$ in. @ 30 cts. - - -	60
" 6 " 1 in. @ 20 cts. - - -	1.20
" 2 " $\frac{3}{4}$ in. @ 19 cts. - - -	38
Lightning Rod, with platinum point, - -	30.00
White lead, 650 lbs. @ 8 cts. per lb. - -	52.00
Oil, 36 gallons @ 75 cts. per gallon, - -	27.00
Turpentine, 8 gallons @ 60 cts. per gallon, -	4.80
Litherage, 10 lbs. @ 8 cts. per lb. - -	80
Varnish, 1 gallon, - - - - - -	3.00
Sand paper, 4 quires, 20 cts. per quire, - -	80
Lights, 160 14 by 18 in. @ 12 cts. - -	19.20
" 120 14 by 20 in. @ 15 cts. - -	18.00
" 132 10 by 15 in. @ 6 cts. - - -	7.92
" 28 12 by 28 in. @ 18 cts. - - -	5.04
Putty, 83 lbs. @ 4 cts. per lb. - - -	3.32
Painter's bill, 125 days @ $1.75 per day, -	218.75
Italian marble mantle, for drawing room, -	60.00
One Chilson's No. 6 furnace, - - - -	125.00
Setting the same and materials, - - -	50.00
Two silver plated registers, for parlor, - -	12.50
One do. for hall, - -	9.00
One do. for dining room, -	5.00
One do. for library, - -	4.50
Four do. for second story chambers @ $3.50 -	14.00
" do. for third " @ $1.00 -	4.00
Kitchen range, - - - - - - -	40.00
	9805.49

GOTHIC VILLA.

DESIGN FORTY-FIFTH

Is that of a Gothic Villa, in the Elizabethan style, about to be erected in the vicinity of this city. Plate LI. is a perspective view, showing the effect of the design when surrounded by shrubbery. Plate LII. is a geometrical elevation of the entrance front, drawn to a scale of thirteen feet to the inch. The outer walls are intended to be of quarry building stone, and in the cellar, are twenty inches in thickness, up to the line of the first floor ; thence to the square, sixteen inches; and the gables and dormers, fourteen. A projection of two inches on the level of the first floor, extends entirely around the building. The division walls are to be of brick, and nine inches thick. There is a furnace in the cellar, under the division wall of the dining room and hall, near the dining room wall, by which all the rooms in the main building are warmed. The nursery over the kitchen, is warmed by a flue from the range below. The exterior is to be finished with rubble work, and ridge pointed with mortar. The windows have all inside shutters; those of the bay windows in the dining and drawing rooms, parting in the centre and folding into soffits constructed in the side jambs. They are all double hung with weights and cord. Those under the verandah, extend to the floor. The head mouldings and corbels on the exterior are of wood, and also the balconies, porches, and the carriage drive at the entrance door. The corner piers of the porch, supporting the library, are of brick, rough cast, and sanded. The roof is covered with slate, cut in diamond form, and laid on sheathing boards, secured by two nails in each piece. All the cornices, barges, window frames and sash, balconies and verandahs are to be painted in imitation of old oak. The head mouldings, corbels, porch supporting the library, and the carriage drive, should be painted and sanded to represent stone.

On Plate LIII. are the ground plans of the first and second stories. The first floor contains a drawing room, a hall, a dining room, sitting room, a kitchen and wash house in the rear, a large store room, a carriage drive, porch and verandah. The second floor, three chambers and dressing rooms, library, nursery, bath room, closets and a water closet approached by a gallery on the outside. The attic may be made to contain five bed rooms, with a passage extending from the library to the private stairway, by which arrangement, each room may be approached from the passage. The cellar extends under the whole of the main building, including the private stairway and store room. It should be at least seven feet deep, in the clear, below the joists, and have a window under each of the windows in the first story, extending, at least, eighteen inches below the surface of the ground. These should be protected by the segment of a circular nine inch brick wall, laid in cement, and the top course placed upon the edge. By this means, the whole is made secure, and protected against the action of the frost. Each window should have square or round one inch iron bars, with the ends flattened, and set in the jambs, not more than five inches apart, with cast iron or wire guards, on the outside: and glazed windows hinged to a casing on the inside, as a protection from the winter's cold. The door is under the window of the store room, and to facilitate the storing of fuel, there is an iron gate between the carriage drive and the angle of the dining room wall. The floor should be coated with a bed of concrete, at least six inches thick, composed of stone chips, and well filled with liquid cement. This must be applied at intervals of at least three days, till the whole becomes flush, and when dry, coated with mortar, to produce a smooth surface. The expense of such a plan would be merely nominal, as the whole can be done

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GOTHIC VILLA.

ENTRANCE FRONT.

Scale 12 feet to the inch

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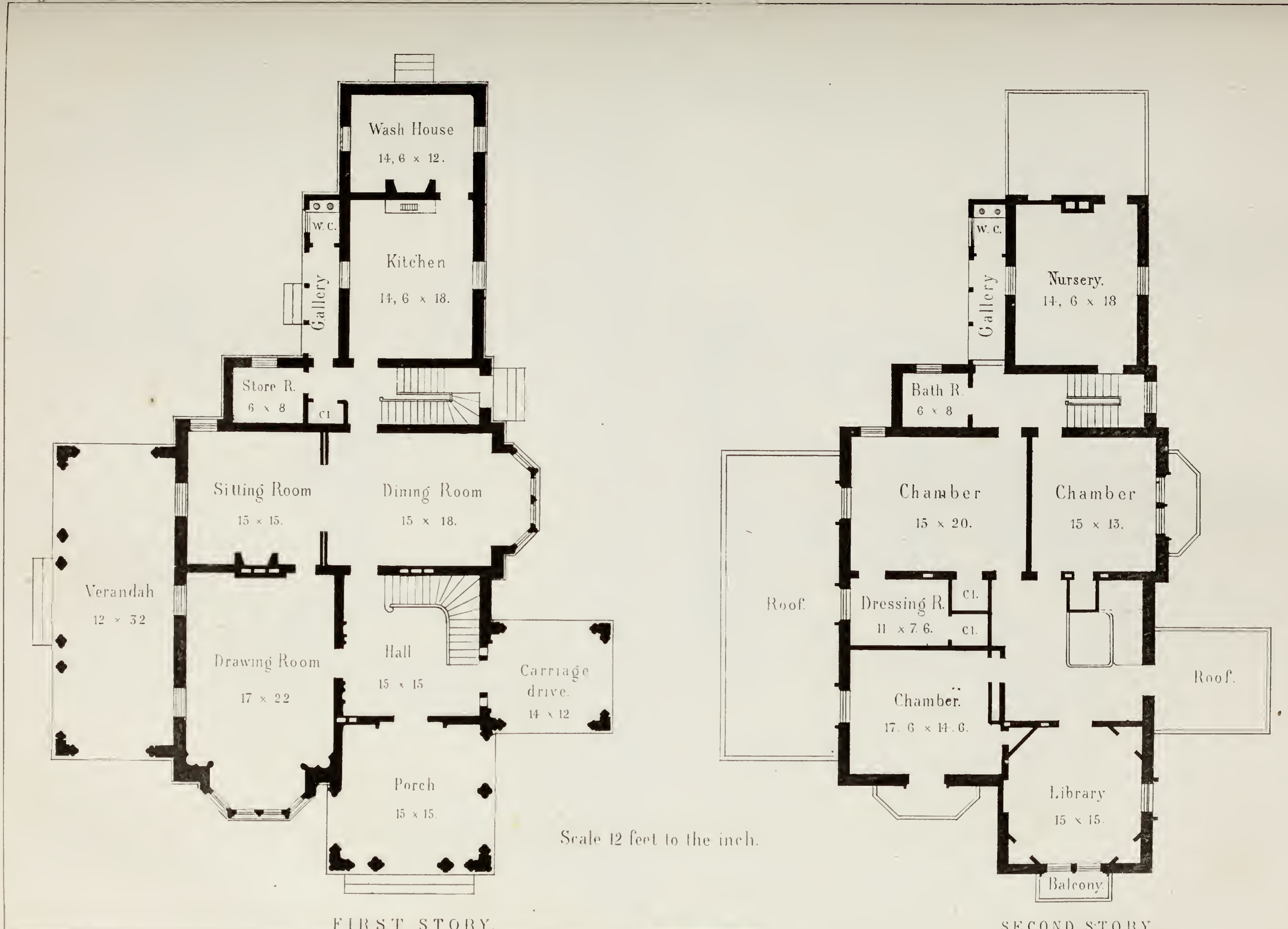
GOTHIC VILLA.



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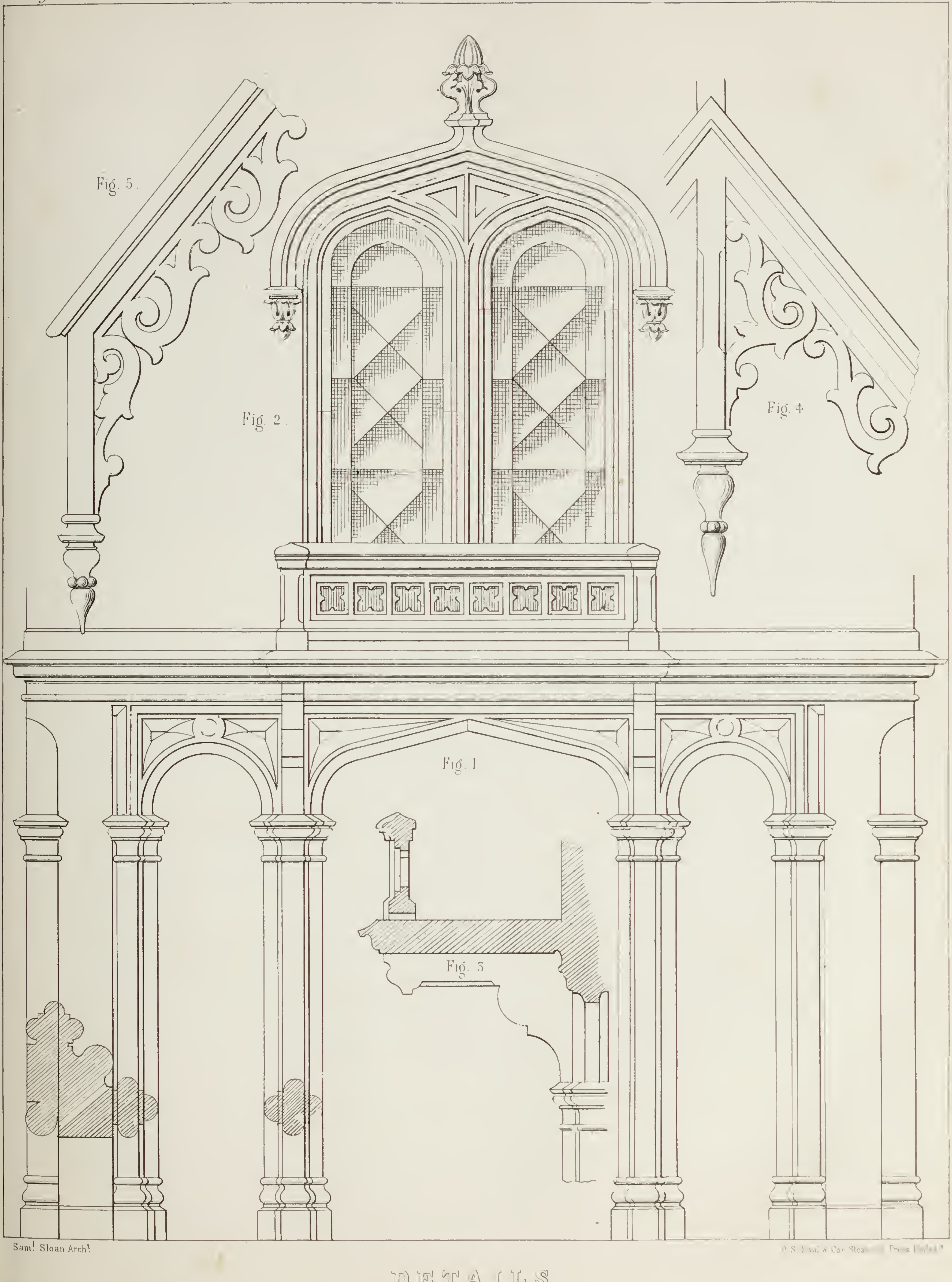
PLANS.



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DETAILS.

during the erection of the building, by any laboring man who understands the mixing of mortar. By its use, dryness, cleanliness, and a protection from rats and vermin are secured. A well ventilated and properly constructed cellar, is an important appendage to any building, and one which neither pains nor expense should be spared to secure, even though it be necessary to diminish the expense of another part of the house. In too many instances, the custom prevails of making the cellar the depository of vegetable and animal matter. Its decay, especially in the summer time, is ever a prolific source of disease, for its effects must be felt throughout the entire building. All such articles of food should be stored in vaults or apartments detached from the main building. The practice of depositing in the cellar refuse matter of any kind, is too manifestly pernicious to need remark here.

Plate LIV. contains building details. Figure 1 represents the porch, under the library. Figure 2, the library window, over the centre arch of the porch, with a projecting balcony. Figure 3, a section of the balcony. Figure 4, an ornamental barge and its connection with the pendant, at the apex. Figure 5, the barge, and its connection with the pendant at the eave.

The above description of the principal features, with the aid of one of the general specifications already given, would enable any one acquainted with the builder's art, to prepare complete specifications for the erection of this design. Its entire cost in a vicinity where proper stone could be delivered at the rate of ninety cents per perch, and other materials at a proportionate rate, would not exceed nine thousand dollars.

BELLS AND SPEAKING TUBES.

Formerly, bells were only found in the most expensive houses. Lately, they have been introduced in nearly every dwelling constructed with a proper regard to the convenience of the inmates. The most approved method of hanging, is to have the tubes for the wires introduced before the house is plastered. These tubes are of either copper or tin. The first is preferable, but the latter lasts nearly as well, and can be procured for about one-fifth the cost of the copper. Annealed iron wire is used in dry places, but where there is much dampness or exposure to the water, copper wire should be substituted. The best cranks, springs and other apparatus, are the same as those that have been in use for many years, but the styles of levers, pulls, &c., have been much changed. Formerly, they were made of lacquered brass, bronze, &c., but now they are made more ornamental. Those with silver plated caps and knobs are the most expensive; those of plain white, or decorated porcelain, can be had for a less price, and make a neat finish.

Speaking tubes are found of great convenience to a housekeeper, and may be introduced without incurring much expense. They are made of copper, tin, or gutta-percha. Tin is, perhaps, the best article for the purpose, and most mechanics, who attend to this branch of house-finishing, give it the preference over either the copper or gutta-percha. Mouth pieces are to be had of almost every material, and at all prices. Those to be preferred are of silver plate, ivory or porcelain.

JOINERY.

Continued.

IT is designed, in the succeeding article, to particularize those parts of the building which properly belong to the joiner's art. We have already described his work to be of a more ornamental character than the carpenter's, being intended to give finish to the building, and therefore requiring neater manipulation. The carpentry of dwellings, is always covered and hidden from sight by the joiner and plasterer, and hence requires only strength, endurance and firmness, but the joinery, in addition to these qualities, must please the eye, and conduce to comfort. Not only is the joiner required to be skillful in handling tools, in gluing, and in polishing, but a very considerable knowledge of practical mathematics is requisite, for him to attain the higher branches of the art. Any one who examines "Nicholson's Guide for the Carpenter and Joiner," will find propositions there, many of which would trouble a good mathematician to demonstrate, yet it is necessary for the mechanic to understand and put into practical operation all these, before he can be called a good workman. This branch alone of the mechanic's art, requires more intellectual exercise than many occupations whose votaries affect to despise all manual employment.

The work which principally calls forth the joiner's skill, is the Stair Casing. The general design and position of the stair case is left to the architect, but the minutiæ of the general plan constitute the difficulties. The old Italian architect, Palladio, to whom reference has before been made, has some quaint but sensible remarks on this point. He says:—"Stair cases will be commendable if they are clear, ample and commodious to ascend, inviting, as it were, people to go up; they will be clear if they have a bright and equally diffused light; they will be sufficiently ample if they do not seem too scanty and narrow for the size and quality of the fabric, but they should never be less than four feet in width, so that two persons may pass each other; they will be convenient with respect to the whole building, if the arches beneath can be used for domestic purposes, and with respect to persons if their ascent is not too steep and difficult, to avoid which the steps should be twice as broad as high." The stairway should occupy a central point in the building, for the convenience of the different apartments. The front hall is the best place, because it is not used as a sitting room, hence the draught of air, created by the open well, does not subject the inmates of the dwelling to inconvenience, nor are the stairs in the way of the furniture, both which would be the case if they were placed in an occupied apartment. The effect on entering the house, is pleasing, if the stairs are well planned and executed. It connects the upper and the lower floors, and makes the visitor understand the building, and feel that he is introduced at the principal point.

There are various kinds of stairs, one of which is termed by the workman, indifferently, half-pace, half place, and half-space. There are also the doglegged stairs, the fliers and French fliers, besides others. It is unnecessary to define the different kinds. The winding stairs, whether describing a part or the whole of a circle, can generally be made more elegant than any other kind, but they are really far more inconvenient to ascend than the straight stairs. For public buildings the elliptical stairway is most handsome. The most convenient is the half-place stairway, where the landing is about two-thirds or three-fifths of the way up. They not only conduct a person in a straight line, but give him an opportunity for rest.

The height and breadth of the step is a matter of some considerable importance. They should never be higher than seven inches nor more than one foot in breadth. They are sometimes made lower and broader, but the measurements given will most generally be found best in appearance and easy in ascent. The construction of the hand-rail is the most difficult work about the stair casing. Frequently, in cheap half-place stairs, newel posts are fixed at each turn, connected by a straight hand rail. Here there is no great difficulty. The continued rail is far more beautiful than this, and at the same time, more difficult to execute. It begins with a scroll at the foot, and whether the stairs be half-place, winding or circular, it continues up without another newel, and finally passes into the well. The newel properly is the long upright post of close winding stairs, but the word is commonly used in referring to the posts at the ends of the hand rail. The cutting out of a continued rail is no easy matter. The well of the stairs is regarded as a cylinder around which the rail winds, following in each quarter revolution the line of an inclined section, which is part of an ellipse. When we add to this the twist requisite to give the proper position, we may understand something of the difficulty. In order to comprehend and execute such work, a close study of mathematics, and the practical lines is necessary. The lines for one kind of stairs, is given in the first volume. A machine has been invented for cutting out hand railing, that produces very perfect work.

It is always very convenient in a private dwelling of ordinary size, to have a private stairway for the use of domestics. If the half-place stairs are used, it is the most convenient plan to have the private stairs land on the half-place, whereby we prevent the passing up and down in the front of the house, and also economize room as well as expense. If there are back buildings, the second floor may be one riser higher than the half-place of the main stairs, and the private stairs may be placed any where in the rear, with a passage approaching the half-place. Various conveniences of this description are extensively illustrated by the plans contained in this work.

There is nothing more ornamental about the interior of a building than a handsome flight of stairs. Above all other points let them be roomy, of easy ascent, and well lighted. The light should be equally diffused, and the best way of accomplishing it is by means of a sky light. This throws the light perpendicularly and equally on the steps, and by it we avoid dark shadows. The general objection to this sort of light is its tendency to leak, and the trouble of repair. If it be constructed in the first instance as it should be, there is no sort of excuse for its leaking, and it only wants protection from hail. Skylights, besides affording the most pleasant and best diffused light for a stairway, can be made otherwise highly ornamental, and hence add to the finish of the building. Numerous designs for skylights, may be found in the books of practical lines. Another good and more usual method for lighting stairs, is by means of a window on the half-place or landing. This throws a body of light down the stairway, and if the window be of stained glass, has a very fine effect. Side lights, though sometimes unavoidable, seldom appear well.

The window, at the present day, is a very prominent feature. We say at the present day, because, in former times, among the Greeks and Romans, it was little regarded. How the Greeks managed in their private dwellings, we do not know, but the remains of their temples do not exhibit any traces of apertures for the admission of light. Strange as it may seem, these temples were mostly intended to have no roofs, and therefore did not need windows. The apartments of the Romans were lighted by means of small apertures, which were sometimes closed, to exclude the weather, by oiled paper or alabaster. Among the relics in Herculaneum, however, glass has been found, but doubtless was too expensive to have been extensively used. Not until the latter part of the middle ages, did the window form a marked feature, and then it seemed to affect the whole character of the architecture. To us, the window is of the greatest importance, and has been the object of much study, not for the sake of its appearance and position merely, but in its construction. In general, it is placed too high from the floor, and is made too small. Two windows, of a good size, are amply sufficient to light any apartment of ordinary size, and they should both be placed, if possible, on one side of the room, to avoid the bad effect of cross lights and shadows. The original aperture in the wall should always, in the first story, extend to the level of the floor, and the lower part of the inserted frame should be panelled as high as the sash sill. By far the best plan is to make the frames with pullies and boxes for weights, such as may be seen in many sections of windows given in the detail plates. This arrangement, although somewhat more expensive than the old plan of lifting sash, has proved after years of trial, to be much the best, and no well finished house is now built otherwise. The French casements have unquestionably a better architectural effect than the poised sash, but are objectionable on many accounts, chiefly because it is almost impossible to make them weather tight. The ventilation of a room in summer is much more readily managed with poised sash, where the one also moves, than with any other. The sash themselves, are now almost always made by machinery, and therefore require no further comment.

AN ITALIAN VILLA.

DESIGN FORTY-SIXTH.

We have already remarked upon the popularity of the Italian style. Nearly one-half of the suburban dwellings that have been erected in this country within the last ten years, are in this style, modified to suit tastes and climate. The facilities it offers for alteration and addition of any kind, recommend its use in almost every section. The details, shown on Plate LV. are less elaborate than those of many designs already given. Should more ornaments be desirable, they can easily be added from buildings of the same style, already furnished in other parts of this work. The principal floor of this design is elevated five feet above the surface of the ground, and is approached by a flight of eight steps, leading to the base of the campanile, which is open the height of the first story, affording a kind of lobby at the main entrance. By this arrangement, a commodious basement is obtained for domestic purposes, and a better light and freer circulation of air are secured for the upper stories. The outer walls should be of building stone, and rough cast, to imitate cut stone, sanded and tinted the desired color. Those of the cellar are to be twenty inches thick: those of the first story, eighteen; of the second, sixteen. The tower walls are eighteen inches in thickness to the third floor, and sixteen thence to the square. The partition walls are of brick. In the cellar, those supporting partitions above, should be thirteen inches thick; all others, nine. Those of the first and second floors are also nine. The roof is to be covered with leaded tin, painted on both sides. The eave projects three feet ten inches, showing the ends of the supporting rafters. The steps on the exterior, and the dressings of the doors and windows are all of wood. The conservatory is to be enclosed with sash in the usual manner, and finished throughout in accordance with the design.

Plate LVI. contains two line drawings, of the front and side elevations, drawn to the scale of sixteen feet to the inch. As has been before remarked, the value of this style of engraving consists in the fact that the lines are all so distinctly brought out as to admit of measurements being taken correctly from them.

On Plate LVII. are the plans of the first and second floors. On the first are a drawing room, eighteen feet by twenty-eight, parlor thirteen by twenty-three, library fourteen by seventeen, dining room eighteen by thirty, a vestibule, eighteen by eighteen, fire proof, large closets, lobby, verandah, and porch. The second floor contains seven sleeping apartments, including the tower, which in this story may, if desired, be converted into a small bed room, a bath room, wardrobe closets, water closets, a gallery over the vestibule, and a stairway to the upper stories of the tower.

The basement floor, and roof are shown on Plate LVIII. The first extends four feet below the surface of the ground, and contains the kitchen, with dumb waiters, closet and pantry, servants' hall, laundry, store room, pump room, apartments for the storing of fuel and two furnaces. The plan of the roof shows the sky light over the vestibule and gallery.

Plate LIX. contains building details. Figure 1 is the circular and upper window, and part of the roof of the tower. Figure 2 is a vertical section of the same. Figure 3 is a section of the roof. Figure 4 is a section of the balcony, and drawing room window.

The cost of the entire building would not exceed four thousand eight hundred dollars, when materials can be procured at prices prevailing near this city.

A BUILDING IN THE CASTELLATED STYLE.

DESIGN FORTY-SEVENTH.

THIS novel style will doubtless meet with favor among those in search of a plan at once beautiful, yet differing in general effect from the magority of buildings. It might properly be called a Romanesque Villa, yet by the use of the term we would wish to be understood only as indicating the style from which certain ideas of composition have been obtained. There are, properly speaking, no Romanesque villas in the whole of Southern Europe, but the architecture which bears this name, and which flourished before the origin and prevalence of the Gothic styles, offers a rich field of study to the architect, who would work out of the materials of the past, a new construction, suited to the wants of the present age. The distinguishing features of the plan we have drawn, are the projecting bastions at the four corners and centre of the flanks. These and the semi octagonal vestibule or entrance, are sufficient to break the monotony and regularity of the plain square of the body of the building, and by varying the outline, redeem the elevation from the charge of tameness and poverty.

Plate LX. shows the front elevation and a perspective view of the building. It is fifty feet in front by forty in depth, and constructed entirely of timber. In many sections of our country, wood is the only available material for building purposes, and there is no prospect for years to come of any perceptible diminution of the abundance that nature has afforded. This fact has given rise to a style of architecture, that though rude enough in many particulars, may almost be considered as national. It becomes the duty then of the architect to suit his designs to the peculiarities of the district for which they may be intended, and to endeavor to extract beauty from the materials thus thrown in his way. Attempts to produce in wood bold and striking effects that properly belong to stone or other material, may, for a time, please an uneducated eye, but cannot fail ultimately, to be condemned as they deserve. Were it not for the consideration that all such paltry imitations and ridiculous pretences, cannot, in their frailty, last long enough to outlive the attacks that improving taste and maturer experience are preparing for them, some comments might seem necessary upon the entire unfitness of the material and the failures that many recently erected wooden structures exhibit. The material itself is a beautiful and manageable one, and examples are not wanting to show in how attractive a manner it may be used by a skillful artist. While we condemn any attempt at imitation, which by its magnitude and want of good taste, would prove a failure, we would not be understood as condemning, entirely, every imitation of stone, but would rather recommend it as giving more solidity in appearance, and more durability in fact. In this instance, the style of the building would warrant painting and sanding the whole exterior. In our design, the boards are nailed on vertically, are all of an uniform width, and terminate under the string course, above the first floor, and at the eave, with Gothic heads, connecting one with the other, and extending around the whole building. All the joints are to be carefully ribbed. The semi octagonal vestibule is one story high, and its crowning mouldings terminate and connect with the string course. A break, both front and rear, projecting one foot, extends to the eave, and on this is placed the gable, surmounted by a battlement, corresponding to the crownings of the bastions. The chimneys are also ornamented in a style corresponding to the principal features of the building. The cellar extends under the entire building, with division walls under the partitions above. These may be of stone, sixteen inches thick, or of hard burnt brick, nine inches, with the necessary communicating doors. The outer walls should be of stone

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ITALIAN VILLA.

FRONT ELEVATION.

SIDE ELEVATION.

Scale 16 feet to the inch.

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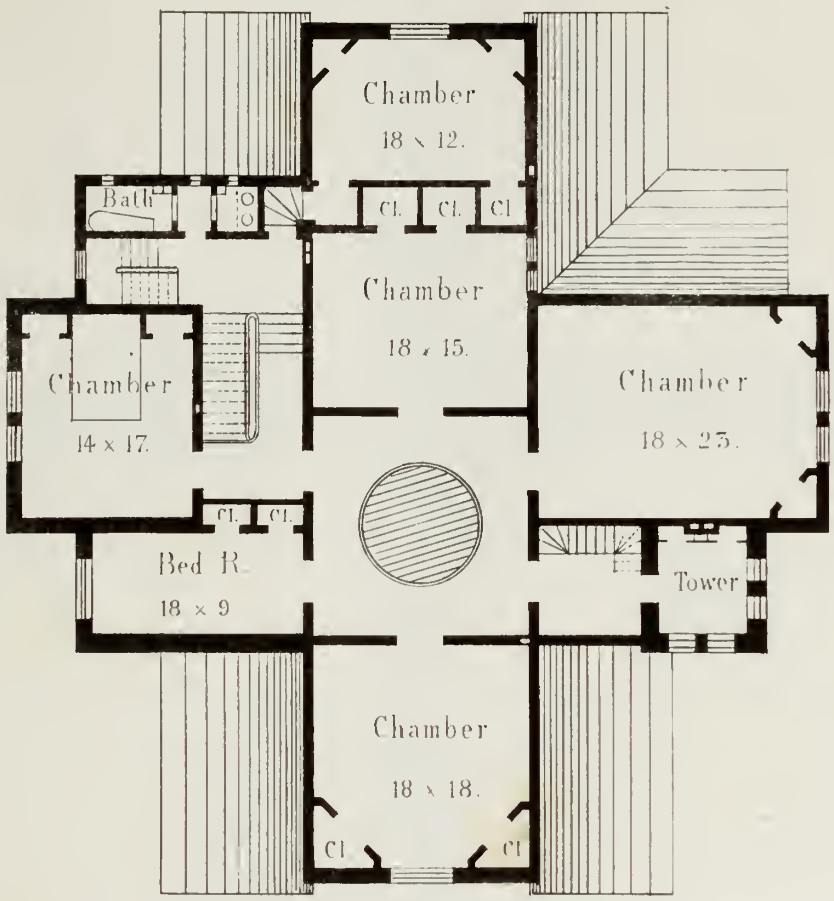
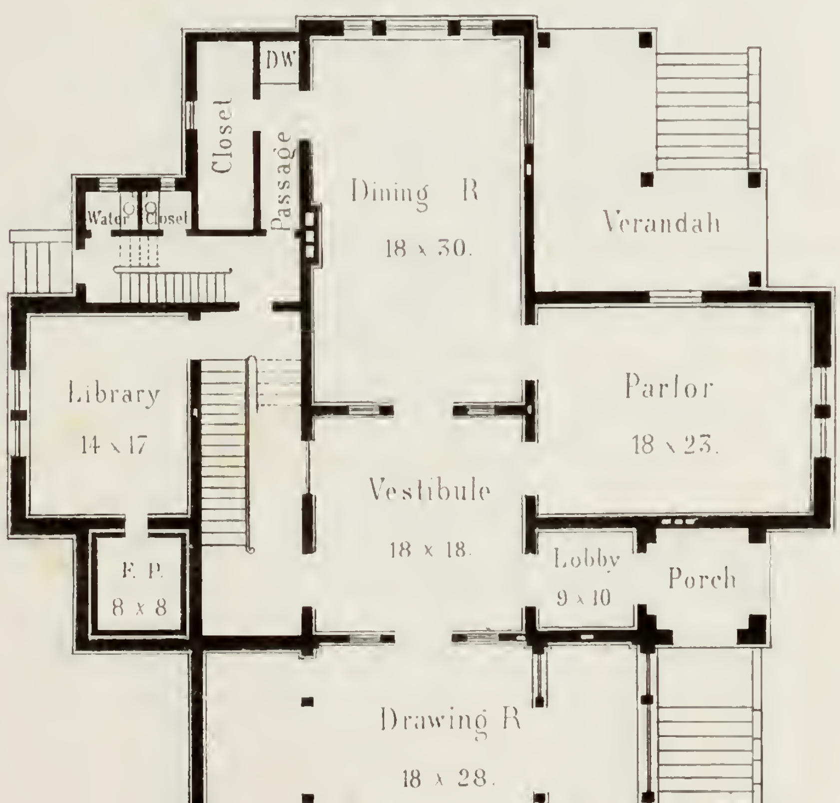
ITALIAN VILLA.

SECOND STORY.





FIRST STORY.

Scale 16 feet to the inch.

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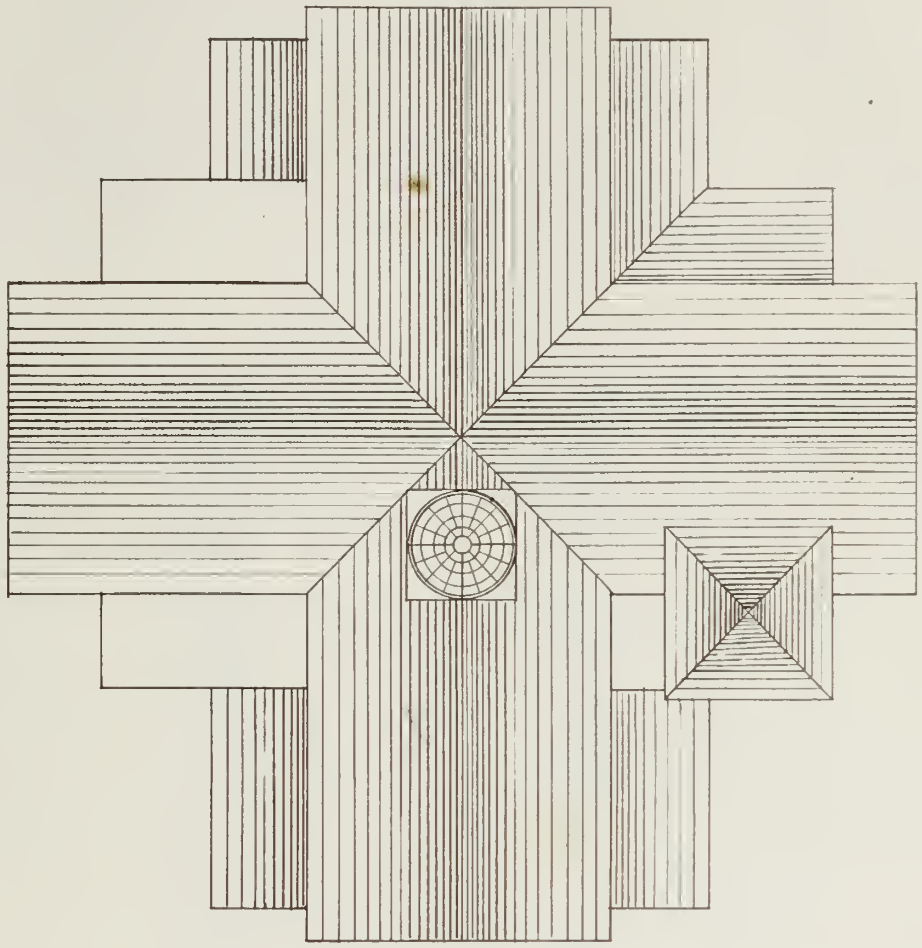
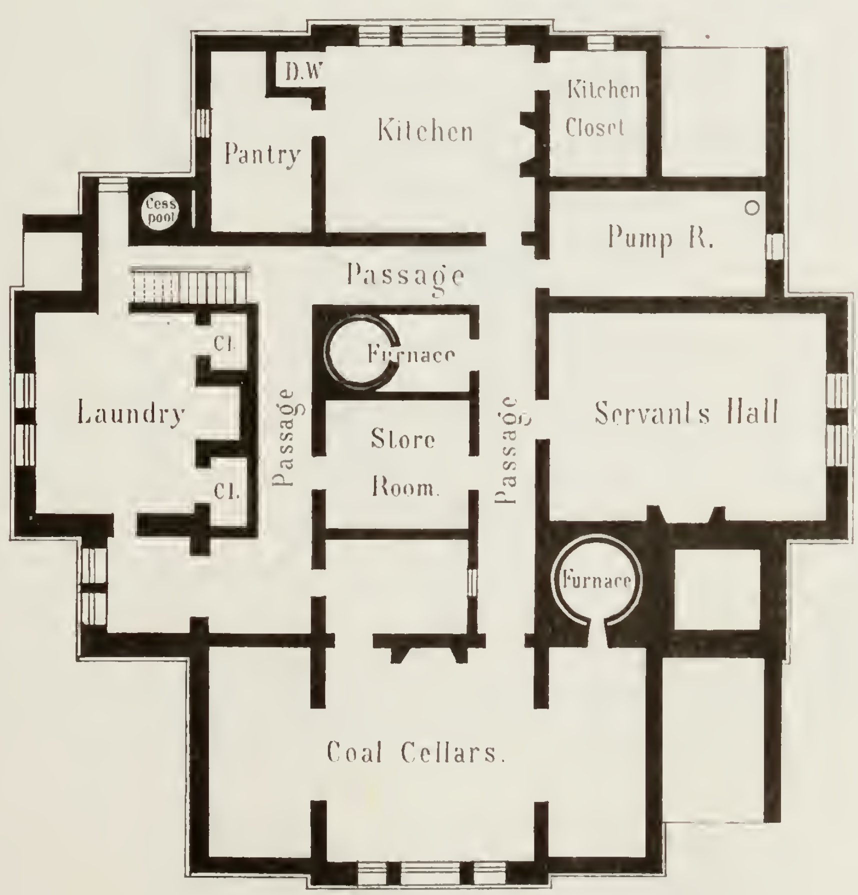
PLANS.

DIAGRAM OF THE ROOF.





PLAN OF BASEMENT.

16 feet to the inch.

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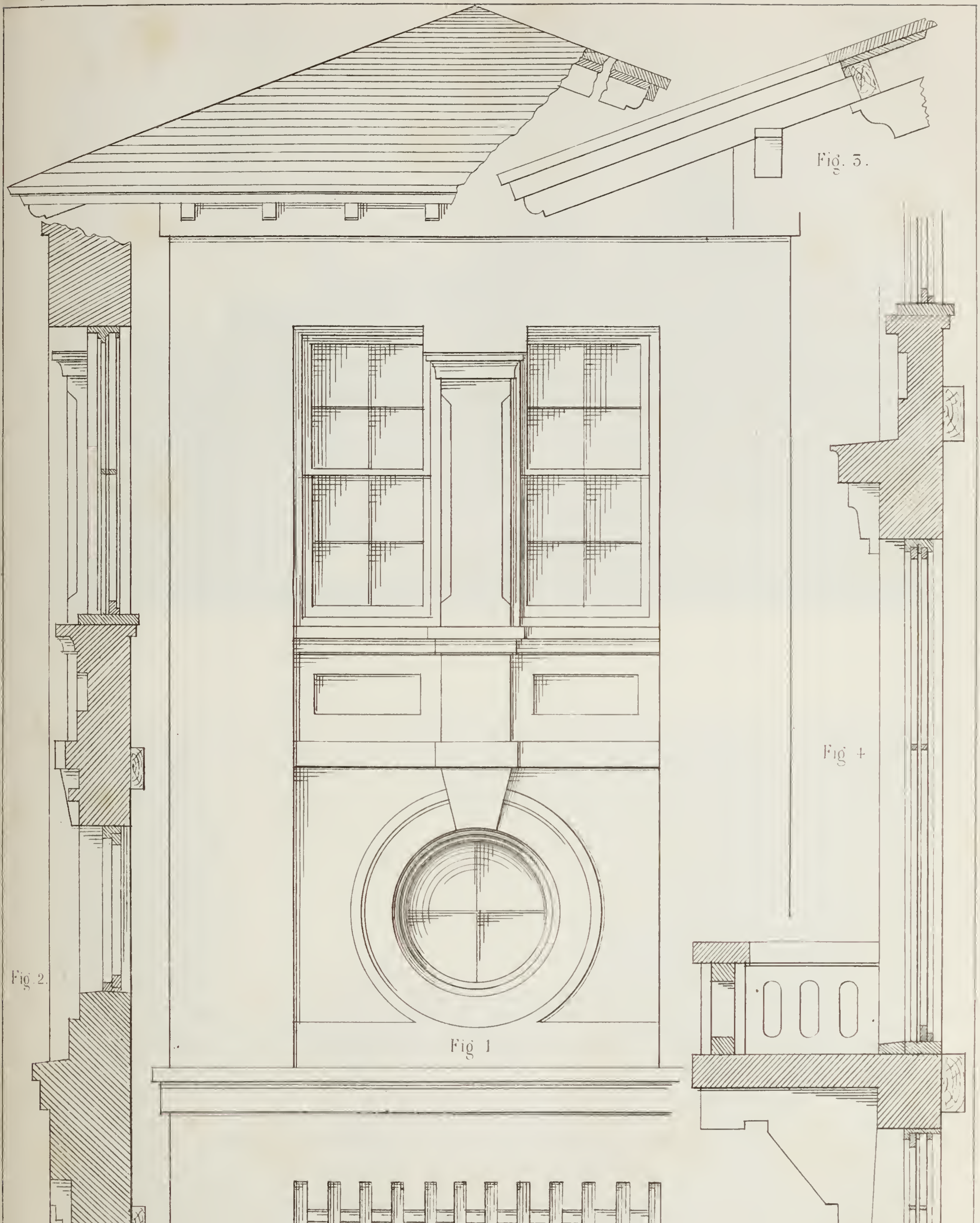
ROOF & CELLAR PLAN.



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BUILDING DETAILS.

Saml. Sloan, Archt. P. S. Duval & Cos. Steam lith Press Philada.

A BUILDING IN THE CASTELLATED STYLE.

and sixteen inches in thickness, projecting three inches beyond the line of the heavy timbers of the main building. Above the surface of the ground, their exterior is to be coated with cement, and jointed in blocks, of a color corresponding to that of the wooden part of the elevation.

On Plate LXII. are the plans of the first and second stories, showing accommodations for a family of eight persons. On the first floor are a parlor, dining room, library, kitchen, vestibule and hall. On the second, are five chambers. The closets on both floors, are constructed in the bastions on the corners and centres of the flanks.

A FULL ESTIMATE

OF THE COST OF ERECTING DESIGN FORTY-SEVENTH.

The whole cost of erecting this design of timber, should not exceed four thousand four hundred dollars. If stone is used, and rough cast, four thousand nine hundred: if brick, five thousand two hundred. An estimate and bill of quantities is added. The prices marked, are those prevailing in the vicinity of Philadelphia.

Excavation for cellar and foundation, 420 yds. @ 15 cts. per yd. - - - - - - -	$44.10
One hundred perch of stone for cellar walls, @ 60 cts. per perch, - - - - - - -	60.00
Laying 135 do., including lime and sand, @ 90 cts. per perch, - - - - - - -	121.50
Brick, for cellar and partition walls, and chimneys, 15,000 @ $6 per M. - - - - -	90.00
Laying do., including lime, sand and materials, @ $4 per M. - - - - - - - - -	60.00
Norway sills, 6 by 8 inches square, 1140 feet @ $18 per M. - - - - - - - - -	20.52
White pine do., 1500 feet @ $20 per M. - -	30.00
Scantling 3 by 4 in., 8000 feet @ $12 per M. -	96.00
Joists and rafters, 12600 ft. @ $12 per M. -	151.20
Flooring boards, 5500 ft. @ $27 per M. - -	148.50
Weather boarding, 4800 ft. @ $22.50 per M. -	108.00
Sheathing boards, 2600 ft. @ 15 per M. - -	39.00
Tin for roofing, 2900 feet @ 10 cts. per ft. -	290.00
Lumber for ribs and exterior, 1100 ft. @ $20 per M. - - - - - - - - - -	22.00
Eight windows in first story, including inside shutters, sash and frames delivered @ $12 each, -	96.00
	1376,32

Ten windows, including sash and frames for second story, delivered @ $10.50 each, - - -	105.00
Twenty-two small windows and frames, delivered @ $4 each, - - - - - - - - -	88.00
Nine doors, for first story @ $4, - - - -	36.00
Six doors for closets, @ $3, - - - - -	18.00
Five do. for second story rooms, @ $3.50, - -	17.50
Eight do. for closets, @ $3 each, - - -	24.00
Stair way, including materials, - - - -	160.00
Lumber, for inside dressing, 4300 ft. @ $30 per M.	129.00
Carpenter's bill for finishing, exclusive of articles here mentioned, - - - - - -	635.00
Plasterer's bill, including materials, - - -	460.00
Painting and glazing, including materials, - -	275.00
Hardware bill, including locks, - - - -	210.00
Sanding the exterior with an extra coat, - -	115.00
Cooking range, - - - - - - - - -	45.00
Furnace in cellar, and registers for rooms, all complete, - - - - - - - -	175.00
	2494.50
	1376.32
	3870.82

A PLAIN DWELLING.

DESIGN FORTY-EIGHTH.

Our work is intended, if possible, to convey valuable hints upon the subject of building, as well to the man of slender means as to those who can afford to disregard economy in the construction of their dwellings. Every one, it is true, cannot possess extensive domains, or erect with the most expensive materials, large and showy houses, but all can alike exercise correct taste, and by a judicious use of the means in their power, collect around their dwellings, however humble, those attractions that contribute to make home happy. There are thousands of working men in this country who wish to give something of beauty and interest to the simple forms of cottage life. The author has, in the selection of these and similar plans heretofore given, avoided all useless and unsuitable ornaments, and chosen cheap materials, so that not a dollar more would be expended in the execution of his designs than the same accommodation would cost in the usual plain modes of building.

On Plate LXI. are designs of cottages of this kind, drawn to the scale of sixteen feet to the inch. The upper one is a double cottage, whose ground plans are seen on Plate LXII. On the first floors, are a living room and kitchen, and on the second, two chambers. The cost of erecting the two, would not exceed eighteen hundred dollars. The other is that of a single cottage. On the first floor, also shown on Plate LXII. are a living room, bed room, kitchen, pantry and vestibule. On the second, are two chambers, over the bed and living rooms of the first floor. If of timber, this structure can be erected for twelve hundred dollars. If of stone, and rough cast, the cost would be increased a hundred dollars.

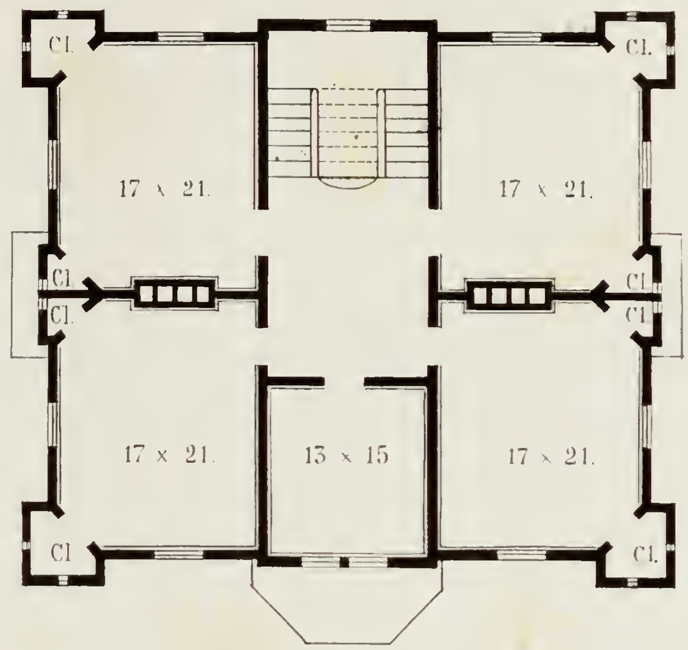
Scale 16 feet to the inch.

Sam^l Sloan Arch

P S Duval & C^o Steam lith. press Phil

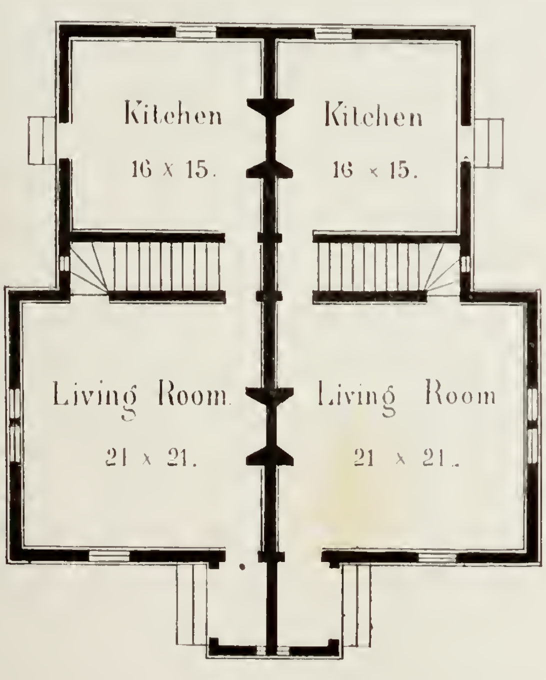
CHEAP COTTAGES.

FIRST STORY.



SECOND STORY.

Design XLVIII.



GROUND PLAN OF DOUBLE COTTAGE.

GROUND PLAN OF SINGLE COTTAGE.

Scale 16 feet to the inch

JOINERY.

Continued.

IN no art has greater advances been made than in the manufacture of glass. When we remember the expedients to which the ancients were compelled to resort, we cannot appreciate too highly this beautifully transparent and durable material. It seems that no improvement is possible, unless we could take away its frangibility, and give it instead malleability. As it is, our comforts are increased a thousand fold by this simple material. We cannot remark here, at length, upon its use in windows, as the subject is out of place, but a word about stained glass may not be amiss. The Egyptians were the greatest artists in stained glass that have ever been known to exist, and there were valuable processes, known to them, which have been lost. The Gothic architects well knew the effect of stained glass, and employed it in all their churches. For dwellings, at the present day, it is coming somewhat into use, and by its aid we can much improve the internal appearance of the building. The head and side lights of the front door may be of stained glass, and any other windows which the hall may contain, especially that which lights the stairway. Besides the beautiful appearance within, in this last case, the stained glass also shuts out, to a great extent, the view of the back premises, which is often very desirable. This obstruction to the view, constitutes the great objection to the use of such windows, in the sitting apartments. This may be obviated, in some degree, by using diamond sash, and having the colored glass alternate with purely transparent glass. By this arrangement, a beautiful effect is produced, which, in rural cottages especially, is admirable. The patterns for the windows are composed by the architect, but frequently are left to the artist, who puts it together. To do it skillfully, requires not only great taste, but a considerable knowledge of the properties of light. This may be illustrated by one example. The effect of the colored light upon the eyes is objected to the use of stained glass in private apartments, such as the sitting room or library. But the artist knows that if he combines his colors in the same proportion in the window, that they exist in the spectrum, a clear white light will be diffused through the room, although there be no white glass in the window, and hence the eyes are no more affected than by the light without, except when looking directly at the glass. To maintain this proportion in each, and at the same time produce various patterns, must evidently require skill.

The window shutters, whether internal or external, come properly within joinery. The ordinary Venitian blind is now generally made by machinery, and we would only urge that the pivot blind be always used. Outside shutters, in large buildings, destroy much of their architectural effect, and hence are never represented in architectural drawings. They are nevertheless often preferable, since they combine security with but a partial exclusion of light, and may be used for either. The panelled outside and inside shutters only are used for security, and in their case the light must be excluded by curtains or drawing Venitian blinds. Still we much prefer the inside shutters, that fold into the jamb. They afford sufficient security, they can be managed without opening the sash, which, in rainy weather, is unpleasant, and no injury is done to the architectural effect of the building without. The construction of these inside shutters may be more readily and satisfactorily ascertained by an examination of the various sections of them, given in the detail drawings, than by any description.

In the construction of doors there is great variation, and indeed, they too are most frequently made by machinery. More attention than is usual should be paid to the door dressings. They and the window dressings are frequently so meager that no sort of furnishing can make a room look well. The architrave should be broad and bold, with simple but rich mouldings. It is sometimes well to surmount the whole with a cornice, in correspondence with the style, but never place a pediment over this. The door itself, to look well, should be of some rich wood, as mahogany or oak, or if these be too expensive, it should be painted in some color to accord with the object of the apartment. We have seen an elegant drawing room, with a frescoed ceiling, with crimson velvet paper on the walls, furnished with a rich Turkey carpet, and handsome rosewood furniture, the whole effect of which was marred by a huge, white, badly designed door, on one side of the room. This is very bad taste. It is no longer customary to use large folding doors between apartments. Sliding doors are substituted, and are much more convenient, since they slide into the partition and are out of the way. Heretofore, these have been placed on sheaves moving on iron ways set into the floor. It is much better, as recent practice has proved, to have them suspended on sheaves. We then can dispense with the ways below, and the doors move more easily.

A vast number of contrivances have been patented for fastening doors and windows, but for ordinary doors there is no better lock than the mortice, frequently referred to in our specifications. It is essential to a well hung door that it should shut itself tightly, and that it should clear the carpet of the apartment into which it opens. There are various means by which these may be accomplished at the same time. There is an excellent method, not now much in use, of having hinges made on the principle of a spiral, so that when the door opens, it generally raises and closes again by its own weight. A carpet sill is generally laid, however, and if the door be well hung, there is no necessity for its rising. In this case, it closes with a spring. The springs generally used are very clumsy, but there is one recently invented, we believe, which consists of a small rod three feet long, placed between the hinges and having one end fastened to the door and the other to the jamb. Now when the door is opened, the simple torsion of the rod acts as spring, and shuts it again. The contrivance is excellent, because it performs admirably, and may be entirely hidden.

There are many parts of the exterior of a building which properly come within the province of the joiner's art, much of the exterior wood work, though not altogether superfluous, being of an ornamental character. The crowning feature of the exterior is the cornice. Properly, a cornice is part of the Grecian entablature, supported by columns, which consist, in addition, of the frieze and architrave. The term is used quite loosely, however, and serves to describe any mouldings which run along the upper edge of a wall or lintel. Each of the Grecian orders has an accompanying entablature of definite proportions, which should not be deviated from in strict imitations of the style. The Romans were not so definite, and in modern Renaissance, any cornice is used that the individual taste of the architect may suggest. The best specimens of the Gothic style are without cornices, and not until latterly has the parapet been used. The cornices of small buildings, are almost always of wood, and for this reason require the skill of the joiner. Their construction is simple, but judgment must be exercised in the arrangement of the profile. It should be remembered that they are to be placed at a considerable elevation, and hence the effect of small members will be lost. Again, we look up to the cornice, and it should present the best appearance to a spectator when looking at an angle of about 30°. The members or different mouldings of which the cornice is composed, should, of course, be proportioned to its depth, but in general they should be simpler and bolder than is customary. The projections should be distinct, and the depressions should be very deep, so as to make a decided shadow. The size of the cornice is also, in general, too small in proportion to the size of the building. There is nothing which has the effect of giving weight and richness to the building more than a deep, well designed cornice.

The Grecians seem to have understood all branches of architecture better than the Romans, and in no respect is it more strikingly exhibited than in their mouldings. Sections of all the Grecian mouldings discover the curves of the cornice sections, mostly elliptical and parabolic. These curves are very expressive, and their management requires refined taste. For instance, the echinus, which forms the principal part of the Doric capital, immediately beneath the abacus, expresses, with great emphasis, vast upheaving might; the abacus is the point of repose, and the entablature is the weight. The Romans seem not to have appreciated this, or they did not understand the making of the curves. All their mouldings are formed of parts of circles, which express nothing, mean nothing, and their meagerness could only be disguised by profusion, just as we say "he that thinks least, talks most." The mouldings of the Gothic architects were also taken from the circle, but in this style they were comparatively unimportant members, and so much was expressed by other means, that we can excuse the seeming want of force in this. From these statements, it may be inferred that the joiner should always, except in direct imitations of other styles, use the Grecian mouldings, for the eye never wearies with their beautiful combinations.

In sunny climes, it is highly desirable that the walls of dwellings, especially, should be protected, as much as possible, from direct rays. This fact has given rise, in Italy, to a style in which the eaves of the building project considerably. This projection is often so great, that unless there be some apparent support for the eaves, the eye is offended by a sense of insecurity. The defect is remedied by the use of cantilevers and brackets; whence the name bracketed style, in use among some authors. The style is growing among us, and deserves high commendation, for country residences especially, since, in addition to cooling shade, it gives many other pleasing effects. The simplest form of a bracket is a straight piece, one end of which is fastened to the outer edge of the soffit, and the other to the wall. From this we may pass to an almost endless variety of forms, affording scope for the display of taste. Many designs are given in this work, in all of which we have endeavored to express the principle of yielding support. Sometimes beautiful brackets are made of terra cotta; and these are well fitted to support heads and sills to doors and windows.

In order that a bracket should look well, its base, or the part against the wall, should be longer than its upper edge. In cantilevers, the base is much shorter than the upper edge, and hence they must be understood to give support on a different principle. They represent, or are supposed to be the ends of joists, extending out to give support to the eaves. These ends left naked and shaped into some ornamental form, present cantilevers. Hence, the cantilever should never be placed where this principle cannot be expressed. We may place it, however, on the gable, and then it represents the end of a purlin.

The growing taste for porches and verandahs, indicates that their many merits are beginning to be appreciated. We speak of them as used in country buildings, where they play an important part in effecting the embellishment of the exterior. They tell of fresh air and shelter, they give deep masses of shade, protect the walls from the weather, and serve to break up the rectangular outline of the building. A porch is any covered platform before the main entrance, which affords an opportunity for rest and shelter before crossing the threshold. It varies in size according to that of the building, and admits a vast number of modifications, to suit different styles. The Grecian portico was generally a magnificent colonade, extending across the entire breadth of the edifice, and is by far the most elaborate part of the building. The Romans endeavored to give still greater grandeur to their porticoes, and failed in every thing except massiveness and multitudinous detail. The Gothic architects used small porches, but made them a most graceful and highly finished member. At the present day, considerable taste is exercised in this matter, the principal faults being a meagerness in size. The verandah differs from the porch principally in being of lighter construction, and in having greater length. The piazza is properly an inner court, such as are common in oriental countries, but the word is frequently used to indicate a sort of two storied verandah, the floors corresponding to the first and second floor of the building. These are in constant use at the south. For country houses, the verandahs with open work, supports, and curved, tent-like roofs are the prettiest, though much depends on the size of the building. The supports are often of iron, and these are much the best. These parts of the building being comparatively light and ornamental, are referred to the joiner. We will only remark that as the work is exposed, he should be careful to use white lead in every joint, otherwise, decay speedily begins.

Here close our somewhat lengthy remarks upon this subject. It necessarily introduces a variety of points, and we are conscious that in speaking of them we have not in each, confined our remarks to the *work*, but it must be remembered that we write not so much for particular instruction as for general information. No abstract rules can teach a man to perform his labor well. Practice, and a close study of "the lines" alone can give him skill. Had space permitted, it would have been well to have spoken of carving as closely allied to joinery, and perhaps we will yet remark upon it. The art, in consequence of its great cost, has been in little use recently, but it deserves more serious attention, and is rapidly growing into much favor.

AN ORIENTAL VILLA.

DESIGN FORTY-NINTH.

The style of architecture chosen for this design is little known in this country. It has never, we believe, been chosen for any public building, and there are few instances in which private individuals have selected it for their houses. There are, probably, good reasons why it is not desirable that it should be generally adopted. A large edifice is necessary to give it proper force and expression. When adopted in one of slender pretensions, it loses its characteristic richness, and soon degenerates into absurdity and insignificance. The necessity of ornaments, that are mere ornaments, to render it at all pleasing, will prove another obstacle to its obtaining general popularity; for these increase the expense, without adding to the comfort or convenience of the edifice.

There are, however, some cases where these objections are of little force; and many persons, contemplating building, seek for a design, at once original, striking, appropriate and picturesque. Our work would be incomplete without such an one; and that now offered, cannot fail to meet the approbation of many of our readers. The origin of its style, it would be difficult to trace. The Arabians, from whom it is derived, were originally a simple, frugal people: but when they extended their conquests over more luxurious nations, they acquired a taste for the fine arts, and began to adorn their cities with edifices built with magnificence and splendor. Many of these soon became celebrated for their imposing and original effects. The great mosque at Damascus, then the seat of empire, was the first instance in which the lofty minaret was admitted. This innovation has since become a characteristic of that style of architecture. The effect produced by its proper use, is light and graceful, and its marked outline, the pointed arch, was subsequently used, with great prodigality, in the Gothic style, that had its rise in Europe, centuries afterwards. When the seat of empire was removed from Damascus to Bagdad, neither labor nor expense was spared to make the new capital eclipse the old, and the magnificence of the architecture of this city, so luxuriously described by the author of the Arabian Nights' Entertainments, might be thought an Eastern fable, were it not amply attested by cotemporary authority. Some of the buildings erected by the caliphs of Spain, yet remain to attest the genius and liberality of those who constructed them. The mosque at Cordova, and the Alhambra, described by Irving, are still in existence,—the latter, a perfect model of pure Spanish-Arabian Architecture. Probably one of the finest specimens of this style, is found in the mosque of St. Sophia, at Constantinople, rebuilt by the emperor Justinian, and which, to use the words of Gibbon, "remains, after twelve centuries, a monument of his fame. The architecture of this church, now converted into the principal mosque of the city, has been imitated by the Turkish sultans, and that venerable pile continues to excite the fond admiration of the Greeks, and the more rational of European travellers." The same author closes a polished description of the building with the remark that "a magnificent temple is a laudable monument of national taste and religion, and the enthusiast who entered the dome of St. Sophia might be tempted to suppose that it was the residence, or even the workmanship of the Deity."

Plate LXIII. is, we think, a proof of the fact, that the important features and characteristics of this style may be judiciously, and with much effect, made subservient to the uses of domestic life. The facade of the building is sufficiently modest for a private dwelling, yet striking in conception, and bold in outline. The design is octagonal and the elevation of each side is alike. The second story recedes from the first, and the whole is surmounted by a magnificent Persian dome. The cornice of each floor, is a parapet whose angles are flanked with turrets, from which spring the minarets, the peculiar feature of this style. The walls are intended to be of cut stone, or brick roughcast. The piers, and entrance steps should be of stone. The columns, arches, and ornamented friezes of the verandahs are of iron, and the floors laid with tiles upon iron joists. The parapets, minarets, turrets, and dome are all of wood, and should be well painted and sanded.

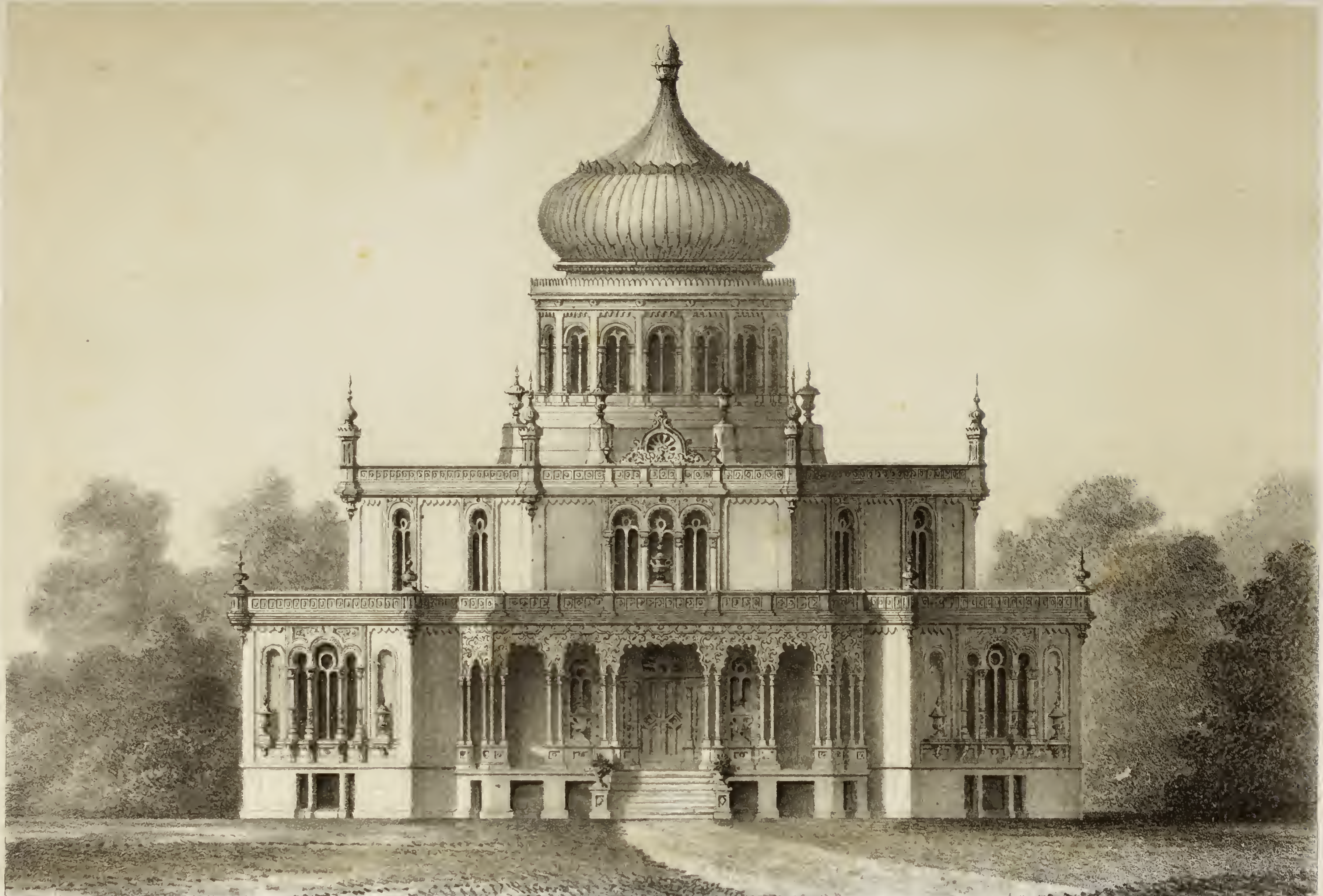
Plate LXIV. shows the plans of the first and second floors. On the first, are four porches or verandahs, a drawing-room, parlor, dining-room, and entrance hall, containing the stairway, each seventeen feet by thirty-six, a conservatory, sitting-room, library, and boudoir, each fifteen feet by twenty-two, and an inner hall immediately under the dome with the floor laid in tiles, as represented in the plate. The second floor contains five chambers, each seventeen feet by twenty, one, seventeen by eighteen, a bath-room, water-closets, and gallery under the dome.

On Plate LXV. are plans of the roof and basement. The latter contains the kitchen, laundry, wash-room, house-keeper's or steward's room, servants' hall and bedrooms, with apartments for the stowing of wine, provisions and fuel. The entire building is to be heated with furnaces.

Plate LXVI. is a vertical section of the main building from dome to foundation drawn to a scale, and will be found of great value to the builder. It shows the end of the vestibule, parlor and hall on the first floor, and, on the second, the gallery and entrance doors to the chambers, with the stairway leading out on the roof. One-half the dome is also represented, showing the ceiling and enrichments of the interior. For these it is not intended to employ the jeweller or lapidary, as was the custom in ornamenting dwellings in the East. We would recommend painting in fresco, as being at once both chaste and economical. By the exercise of skill and good taste, the most pleasing and striking effects may be produced, at a moderate expense. The use of plate glass, ground into appropriate designs, or stained glass, may be recommended in such a building; while the effect of well selected pieces of statuary, judiciously placed, should not be overlooked.

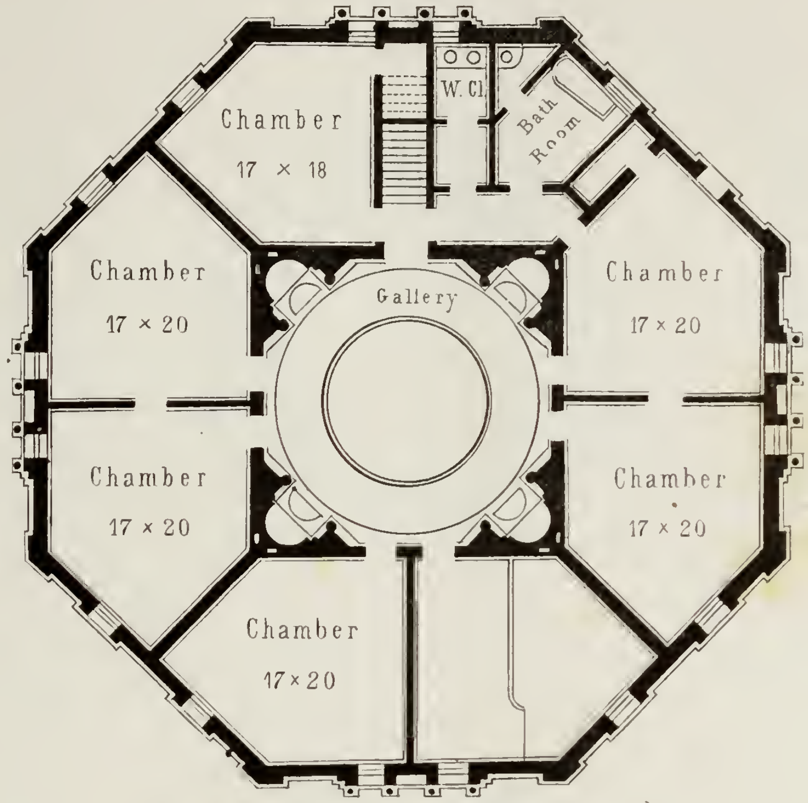
Design XLIX

Pl. LXIII

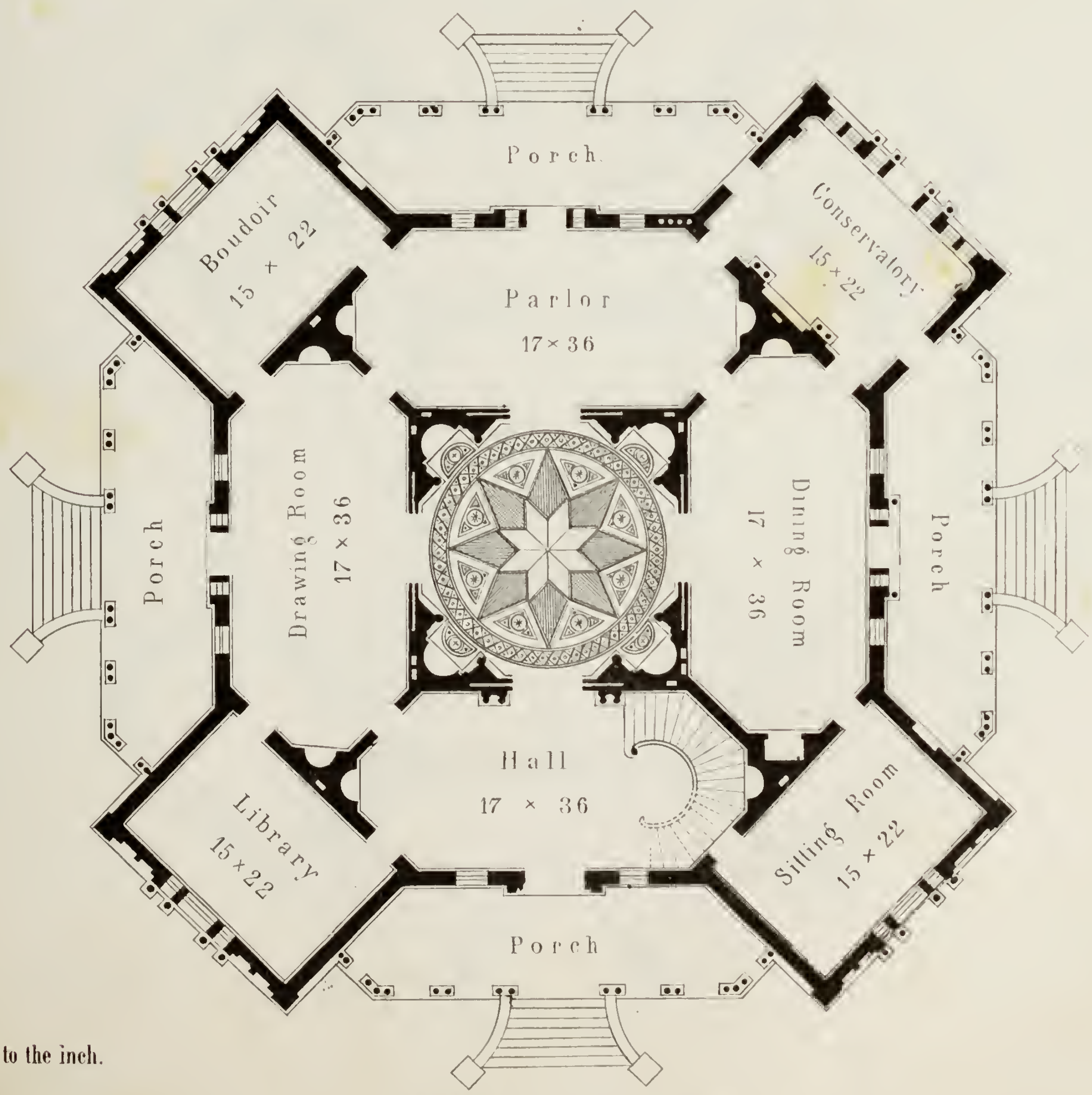


ORIENTAL VILLA.

Scale 12 feet to the inch



SECOND STORY.

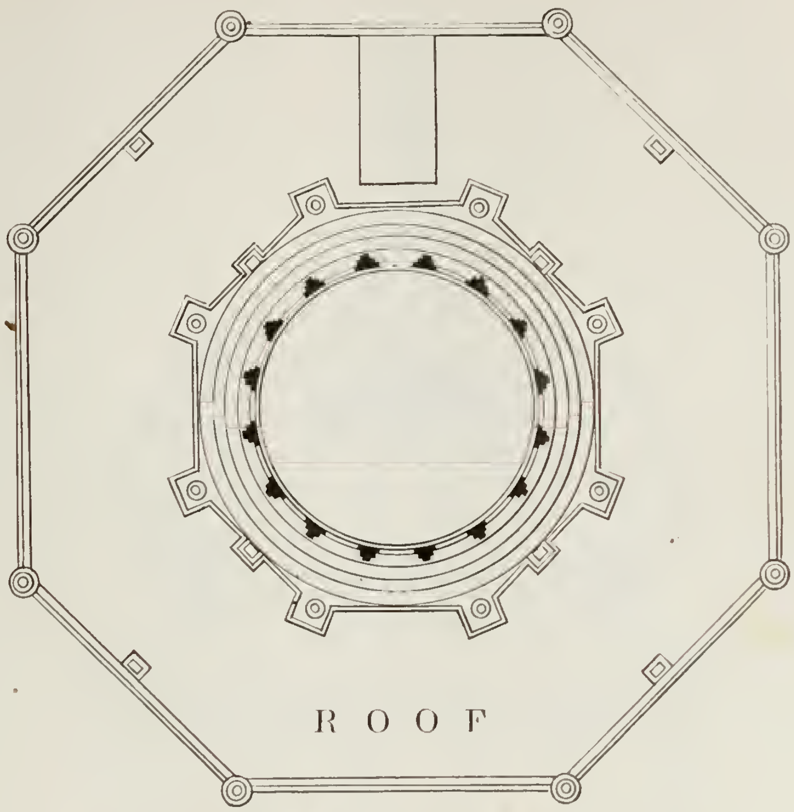


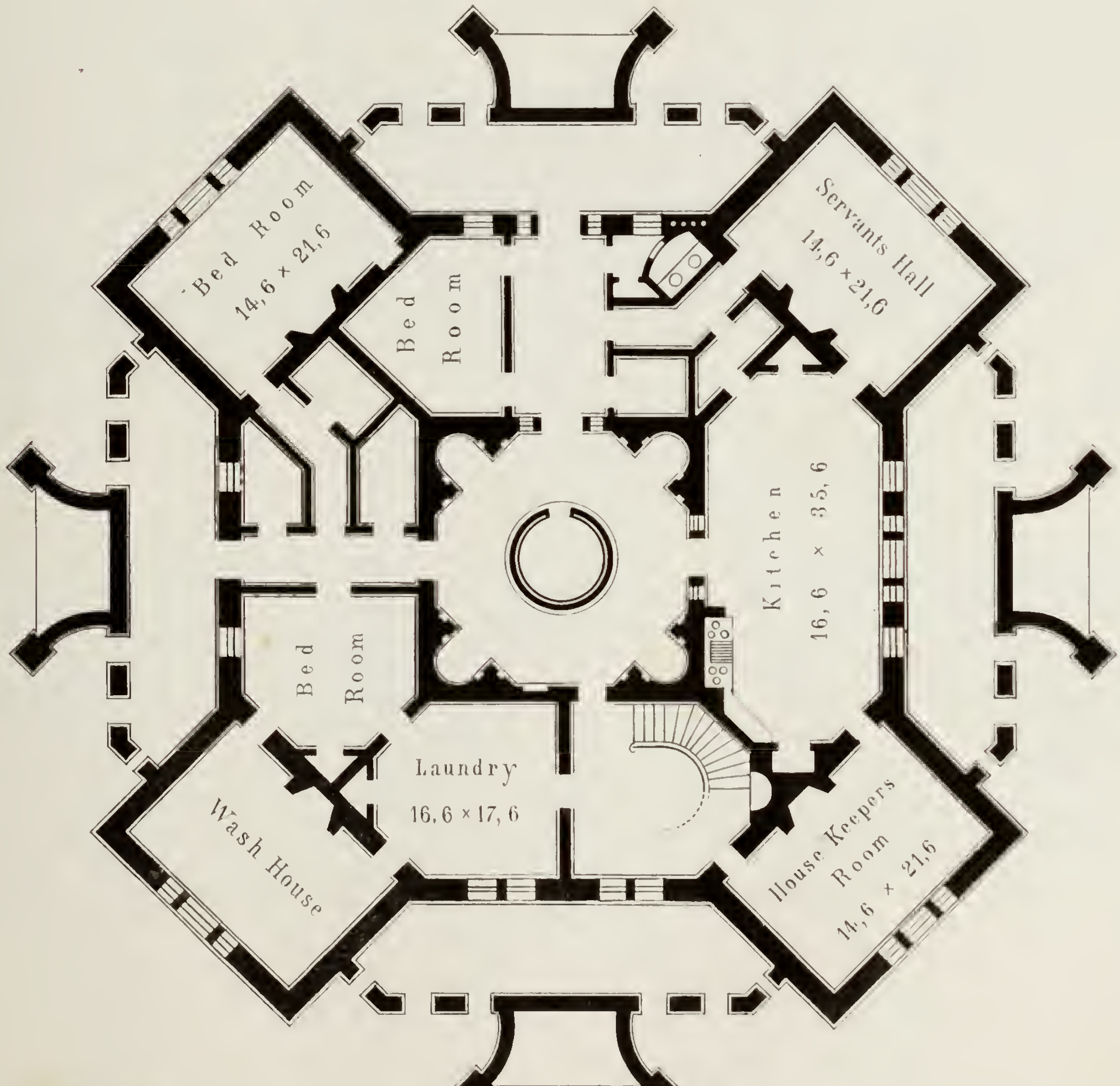
Scale 16 feet to the inch.

FIRST STORY.

Saml. Sloan Archt. P. S. Duval & Co's Steam lith. Press Phila.

PLANS.



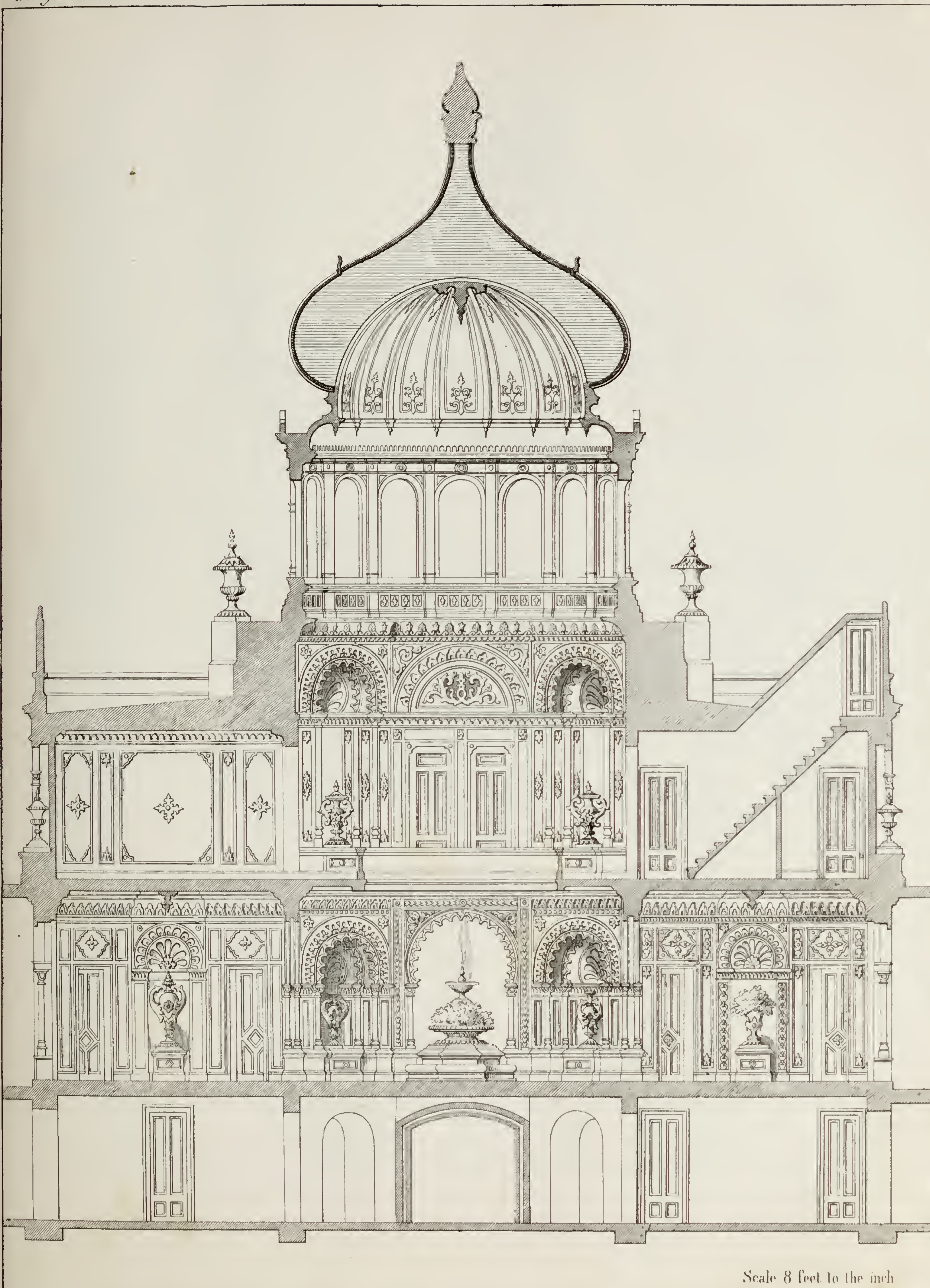


Scale 16 feet to the inch.

BASEMENT.

Saml Sloan Archt. P.S. Duval & Co's Steam lith. Press Philada

PLANS.



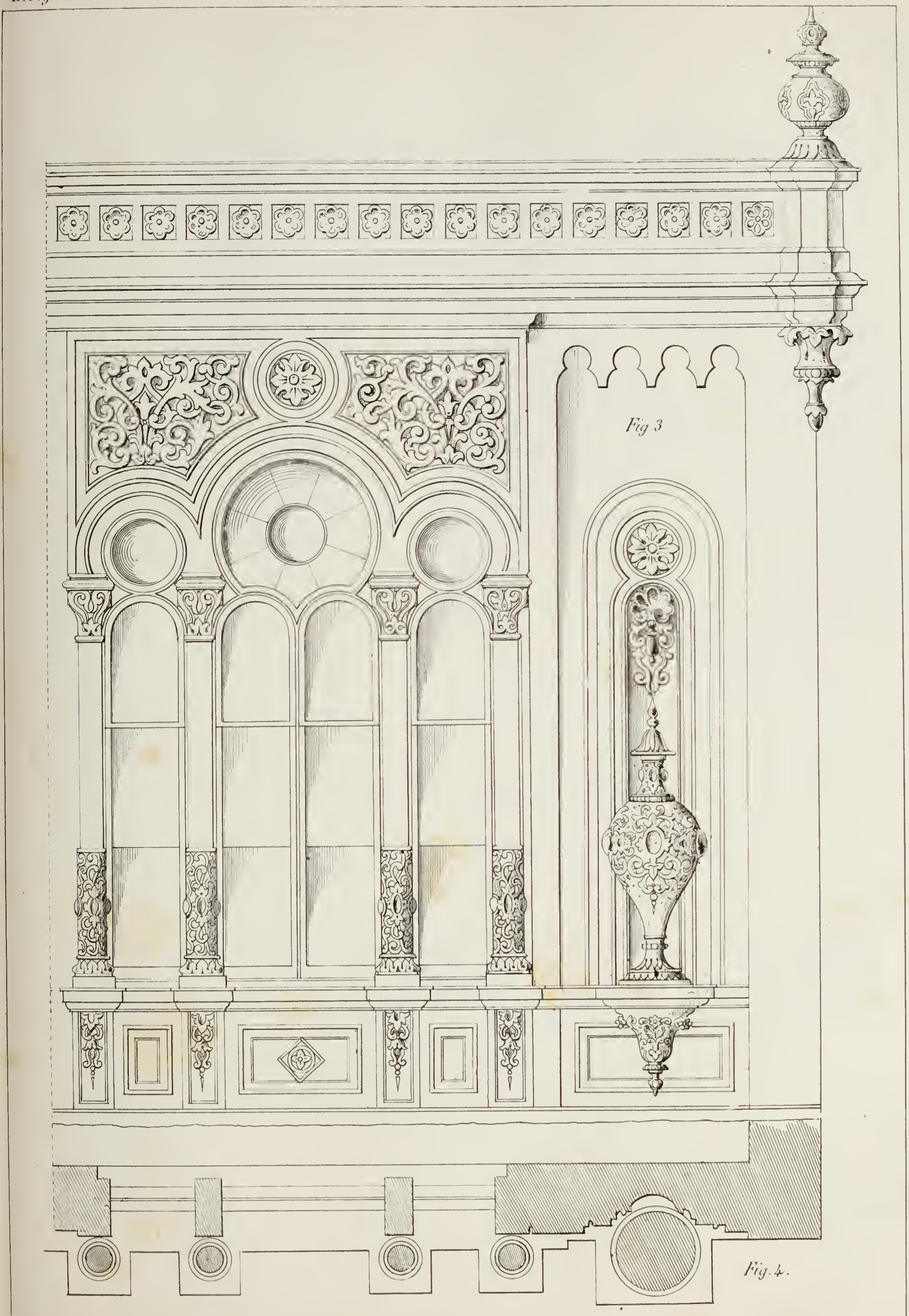
Sam^l^ Sloan Arch^t^

P S Duval & Co's Steam lith Press Philad^a^

VERTICAL SECTION.

Sam. Sloan Arch.t P. S. Duval & Co. Steam lith press Ph.

DETAILS.



Sam. Sloan Archt

P. S. Duval & Co. Steam lith press Ph

DETAILS.

The building details are represented on Plates LXVII. and LXVIII. Figure 1 is a front view of the windows over the verandahs drawn to the scale of half an inch to the foot. Fig. 2 is a sectional view of the same. The ornaments should be either of wood or iron. The windows of the library, boudoir, and conservatory are seen in Fig. 3, showing the whole end, with the parapet on the top, and the termination of the turret on the angle of the parapet. Fig. 4 is a ground plan of the same windows, showing the base of the columns and the base of the urn.

The entire cost of this building may be seen in the following bill of items. The estimates are, as heretofore, at the prices of labor and materials prevailing in and near this city.

Excavation 1000 yds., at 25 cts. per yd.	$250.00
Stone, 800 perches, at $2.00 per perch,	160.00
Brick, 275,000, at $10 per M.	2750.00
Plastering, 5000 yds. @ 20 cts. per yd.	1000.00
Roughcasting, 1000 yds. @ 50 cts. per yd.	500.00
Plastic enrichments,	500.00
Joist and scantling, 65,000 ft. @ $13 per. M.	845.00
Sheathing, 10,000 ft. @ $15 per M.	150.00
Flooring lumber, 17,000 ft. @ $32 per M.	544.00
Best common lumber, 10,000 ft. @ $30 per M.	300.00
Second best do. 10,000 ft. @ $25 "	250.00
Third best do. 10,000 ft. @ $17.50 "	175.00
Fourth best do. 5,000 ft. @ $20 "	100.00
Scaffolding, 8000 ft. @ $13 per M.	104.00
Doors, 75, average each, of $4	300.00
	7928.00
Sliding doors, 4 pair, @ $35	140.00
Carpenters' work,	3000.00
Carving and Turning,	1500.00
Cut stone,	3000.00
Tiles, and laying them,	1600.00
Roofing 7000 ft. at $10 per M.	700.00
Lead, 1000 sq. ft., 3 lb. lead, 3000 lb.	1800.00
Iron Verandahs	2500.00
Hardware, and smith work,	1200.00
Painting and glazing,	3000.00
Plumbing,	500.00
Furnaces and registers,	1000.00
	19940.00
	7928.00
	27868.00

CHEAP DOUBLE HOUSES.

DESIGN FIFTIETH.

On Plate LXIX. are front and side elevations of double houses intended for small families. By erecting houses in the same block the cost of each is lessened, and the expense incurred for fuel when they are heated by furnaces is greatly diminished. The entrance to one of these houses is in the side, to the other, in front. By this arrangement, economy of room is gained, and for the plan presented a location on the corner of a street or road would be desirable.

Plate LXX. shows the plans of the basement and three stories drawn to a scale. On inspection, they will be found to contain accommodations for a family of six persons. The two could be built of smooth brick or stone roughcast for $2400.00.

PLASTERING.

IN a previous article, we mentioned the principles to be observed in the composition of mortar. They were there applied directly to its preparation when used as a cement, and directions were given, necessary to enable any one, not only to understand the principles of its action, but to prepare the material and perform the work. Since the mortar used in plastering is essentially the same in its composition, and acts in the same way, it is unnecessary to repeat those principles, and the inquirer is accordingly referred to the article headed, Mortar. There are, however, some slight variations in the proportions of the ingredients of plaster according to its use and position, as it is intended for the floor or walls, the first, second, or third coat. These variations are of such a nature that they can be learned only from actual practice, and are, therefore, much better understood by the plasterer than by any theorist. A few general directions, however, may not be out of place.

The plaster for the first coat should be of harder setting material than that intended for the others, because it has more weight to bear, and is supported only by the space between the laths. This, however, is not the case where the plaster is laid upon a brick wall. Then it has the firmest hold possible. It is always desirable that this coat should set quickly and become firm before the second is applied. The second coat should be composed of finer material than the first, in about the same proportion, though it is not so essential that the mortar should be hard setting. With these two first coats it is customary to mix a quantity of hair in order to bind the parts together more strongly. Usually for economy's sake, too little hair is used, and that not sufficiently disseminated through the mass by long continued working. The third coat is composed almost entirely of lime, and is called the hard finish. If it is desired to make a floor of mortar, as is often the case in a basement or on hearths, hydraulic lime laid on a brick pavement should always be used. Whenever a floor of this kind is wanted, it should be made so as to reject moisture entirely; and in order to improve the qualities of hydraulic mortar in this respect, it is well to intermix a quantity of asphaltum. Some such composition should always be used on the walls of a basement for the same reason. Sometimes small pebbles are mixed with floor mortar that it may better resist wear. This is a good plan, but small stone chips are preferable, for the mortar does not cling to the pebbles as firmly as to stone chips, and they besides are found to wear with the floor.

The laths upon which the plastering is spread, are usually of hemlock, cut out by machinery. In the South and West they are often split from blocks, and these when well made are the best, because they are stronger and rougher, giving the mortar a better hold. In nailing them on it is a very common fault to place them too close together. The plasterer often uses his mortar too much diluted, because it is thus easier to manage; and then, if the laths are at the proper distances, it falls from between them, and gives him trouble. To avoid this, he has them placed near each other, and the consequence is, that the mortar cannot get sufficient hold, and when the wall receives a heavy jar, the plasterer's work falls bodily. How often do we hear of half a ceiling tumbling down, endangering the life of those beneath. Another cause of such mishaps is, that the mortar is generally laid on too thick, thereby giving too much weight to the mass. The first coat should be just thick enough to remain in its position, the second, just thick enough to give an even surface for the hard finish, which should be as thin as possible. There is a limit to this, however, for by diminishing the thickness we greatly increase the liability to crack. The cracks in plastering are most frequently caused by the shrinking and saging or springing of the timbers. The first is in a measure unavoidable, but the second when it occurs, displays bad carpentry.

The finishing of plastering is very nice work. One chief aim must be to make a perfectly smooth and level surface. The latter is attained by frequent applications of the straight edge in all possible directions. If the wall is to be papered, there is no necessity for the third coat, since the paper may be laid directly on the second. The third coat is often superseded in cheap buildings by white wash, which besides its roughness is objectionable, since paper cannot afterwards, if desired, be put on the wall. The paste takes hold only on the wash, and both peel off together.

Some of the most elegant ornaments in modern buildings are made of plaster. We refer to the cornices placed in the angles of the wall and ceilings, and to the centre pieces. When the pattern of these is simple, they are frequently made by the workman who does the plain plastering; but when they are more elaborate, an artist must be employed. He prepares the design in moulds, and puts it in place after the other work is completed. The material is generally plaster of Paris, which is nothing more than calcined gypsum or sulphate of lime. Such work is costly, but nothing adds more to the elegant appearance of an apartment. The correct name for this kind of work is stucco. The term is frequently applied to the plaster on the exterior of a building, but we now use it in its strict sense. The material is sometimes varied by mixing pulverized marble with plaster of Paris, the whole sifted and wrought up together. Architectural and sculptural ornaments, such as fruits, flowers, garlands and festoons, are made with this composition. When the stucco is mixed, it forms a very soft and ductile paste, which soon hardens, and then the desired form is given to it, either by moulds or by a little spatula of iron. During this operation it continues to harden. It may even be cut, and those ornaments may be executed which require a nice finish. In time, it becomes as hard as stone, and takes a beautiful polish. Vitruvius makes mention of stucco, and the art of preparing architectural ornaments in this way, was well known to the Romans.

It now seems conceded on all hands that brick buildings are out of place in the country. Wooden buildings are too perishable to satisfy most proprietors, and stone is difficult to obtain. How then can we erect a handsome and permanent dwelling? The walls must be built of brick, and the exterior roughcast or stuccoed as the word is commonly used. The greatest objection to this style of finishing has been, that after a few years' exposure to the weather, the plaster falls off; but a careful attention to a few important points will obviate this difficulty. In the first place, the mortar must be removed from between the bricks to the depth of half an inch from the face of the wall. These interstices will afford a strong hold for the plaster. Then when the work is about to be commenced, the whole wall should be well swept with a stiff dry brush to remove all loose mortar from the brick work and all particles of dust which interfere much with the adhering of the plaster. Again, as the work proceeds, the wall should be well soaked or washed with water, in order that the mortar of the plaster may have full time to set and become hard. Otherwise the dry wall will rapidly absorb the moisture of the mortar, before the setting process is complete, and leave a crumbling mass that will soon yield to to the weather. If the precautions mentioned be taken, and good hair mortar used, the coating of plaster will stand as long as the wall.

After the mortar is laid on, several methods are used to give it a finished appearance. In roughcasting, a pricking up coat of hair mortar is first put on; upon this, when tolerably dry, a smooth coat of the same mixture is laid, and a second workman follows with a vessel full of a thinner mixture which he throws over the work as fast as it is finished. This last produces uniformity of color and the rough appearance, whence its name. Many have thought to introduce an improvement here by pointing the surface in imitation of stone. If a design for a stone building is executed in rough cast, then this artifice must be resorted to; but if the building be for roughcast, such an imitation destroys the original effect. The present tastes and economical views of the times, demand such imitations; but if architects were allowed to exercise their own taste, they would exclude all such absurdities. In stucco work, as it is called, the surface is smoother, and is often painted and sanded for the purpose of preserving it, of giving uniformity of color, and to take away the gloss arising from a smooth surface, which, though sometimes allowed to remain, has generally a bad effect.

Another, and better method of producing a desired color, is to imbue the whole mass of the mortar, when making it, with some substance that will produce the tint throughout the whole. This is a comparatively cheap method, and is preferable for other reasons which are bringing it into constant use. A patent has been taken by Mr. Silver of Philadelphia, for a method of forming this mortar, which we think superior to any other. We have no interest in this invention, but unhesitatingly recommend it, simply because we are convinced of its excellence. Not only are the most delicate and uniform colors produced, but the plaster is also made impervious to moisture by a mixture of oleaginous matter, and hence, walls coated with it are kept perfectly dry in every condition of the weather, while this admixture does not interfere in the slightest degree with the firm attachment of the plaster to the wall.

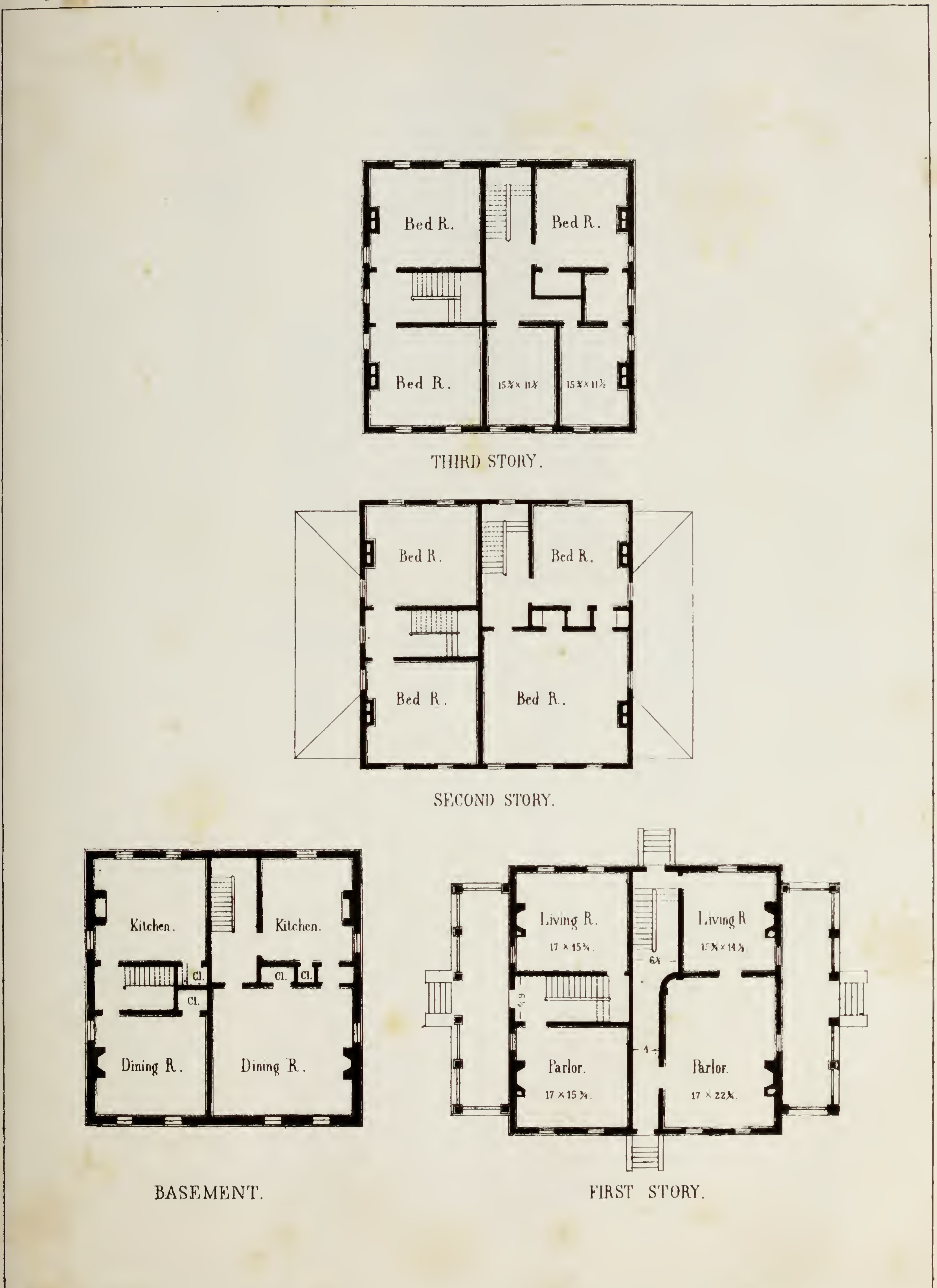
SIDE ELEVATION

Sam[l] Sloan Arch[t]

FRONT ELEVATION

Scale 16 feet to the inch

DOUBLE DWELLINGS.



Saml. Sloan Archt.

P. S. Duval & Co's Steam lith Press Philada.

PLANS.

PAINTING.

IT is unnecessary to descend into the details of this familiar subject. In the space we have devoted to its consideration, it is of course impossible to do more than state a few important facts, and lay down some very general rules and suggestions, for the information of all interested in such matters. When we reflect that painting is itself the chief ornament of a building. and serves to finish or adorn nearly all other ornaments, and that in addition to this, it is a great preservative against decay, its importance becomes strongly apparent.

For many years past, white lead has constituted the principal ingredient and body of almost all paints. This substance is a carbonate of lead, obtained from the metal by various processes, and its manufacture has become of national importance in those countries where it is practised on a large scale. The Dutch process, one of the most common, and quite ancient, is this. "A great number of earthen jars are prepared, into each of which are poured a few ounces of crude vinegar; a roll of sheet lead is then introduced in such a manner that it shall neither touch the vinegar nor project above the top of the jar. The vessels are then arranged in a large building side by side upon a layer of stable manure, or, still better, spent tan, and closely covered by boards. A second layer of tan is spread upon the top of the latter, and then a second series of pots; these are in turn covered with boards and decomposing bark, and in this manner a pile of many alternations is constructed. After the lapse of a considerable time, the pile is taken down, the sheets of lead removed, and carefully unrolled. They are then found in great part to be covered by a carbonate which merely requires washing and grinding to be fit for use."

Several other substances have been used, but not so extensively, as the basis of paints. Lamp black, which is simply a form of nearly pure carbon, is used for black paint, and when mixed with white lead forms lead color. Latterly many changes have been introduced into this art. Zinc has been substituted for lead with admirable effect, and extensive manufactories for zinc paints are now in operation. Many mineral substances have been found native, in a state to be worked up into excellent pigments. Patents have been taken out for the preparation of these, some of which are valuable and others worthless. Among them is one for the preparation of paint from Parker's cement, which is remarkable, and has proved valuable. Most of the mineral paints are represented as imparting the property of resisting the action of heat, and hence are termed fire proof. If, however, we can obtain a basis for paint that is cheaper than white lead, that will resist the action of weather, and will retain its body longer, and more effectually preserve wood work from decay, it is all we can expect.

The bases of paints, when unmixed, are fine dry powders. It is necessary that some ingredient be added which will render them plastic. Sometimes water is used, and paints of this class are termed water-colors. They are but little used about buildings, as they do not endure exposure. For ages, linseed oil has been preferred to any other substance, principally because of its extraordinary fitness for resisting moisture. When the paint has become dry, a thin transparent pellicle from the oil will be found to cover the whole surface. It is this which renders it impervious to moisture. There is also a gloss formed over the entire work which it is desirable to remove. This is done by mixing turpentine with the last coat, causing it to dry quickly, and leaving a clear soft white surface. Sometimes turpentine is mixed with every coat, but this is a practice that should be avoided. Varieties in color are obtained by intermixing with the basis used different substances that impart the desired hue.

On entering some of our villages, the only color which meets the eye is white. Everything is white; the houses, the fences, the stables, the dog kennel, aud sometimes even the trees cannot escape, but get a coat of white wash. There are in our opinion only two excuses for this. It gives a neat and cleanly appearance, and when the house is embowered by trees and overrun with vines, the effect, by way of variety, is not unpleasant. On entering the house, everything except the carpets and furniture is found to be of the same color, save perhaps an unlucky mantle, which mourns its exclusion in deep black. Is this taste? Whether it be or not, one thing is certain, that a great change is coming over our people in this respect. They are beginning to see that there are beauties in color as well as form. Many of the attempts to improve in this matter are ridiculous enough we know, and the result is often some absurd combination of color. But this cannot last, and improvement is certain. It will soon be attained by observation and a cultivation of taste, but one thing must be remembered always, that there is to the eye harmony and discord among colors, just as the ear detects harmony or discord in the notes of the musical scale. Whenever colors are to be combined, attention must be given to general effect as well as to the tint, tone, and shade of each. They may be beautiful separately, but excessively disagreeable to look upon when blended together. In architectural painting, strong or even positive colors are always to be avoided. Soft neutral tints are only proper to be used. For the exterior of a dwelling, nothing is more beautiful than the soft delicate tint of the Connecticut brown stone. The depth of the shade must be varied to suit circumstances. In truth, it is a safe rule, to adopt, for artificial purposes, the colors of natural objects. These seldom fail to suggest the most beautiful tints.

There is one species of decoration, however, to which we would more particularly allude. Fresco painting is of great antiquity, having been practiced to some extent by the Egyptians, and afterwards perfected by the Greeks. Some of the ceilings made by their artists, were considered so beautiful and so difficult to reproduce, that their vain and not over scrupulous conquerors, the Romans, cut them bodily from the walls and had them transported entire to their own capitol. During the middle ages, the art of Fresco painting having been lost, tapestry was substituted, and the walls were hung with representations of hunting scenes and military achievements. The discoveries at Pompeii and Herculaneum have contributed not a little to revive a taste for this kind of decoration. Our method of papering was doubtless originally an imitation of it, but has now become a distinct and might be made a legitimate and separate branch of the decorative art.

In the first volume of this work a design for a ceiling is presented. As there stated, it might be executed either in stucco or fresco, or both, since it is entirely allowable to paint the carved stucco ornaments. The painting is done in water colors and requires skill and experience, though we believe there are some who practise the art injudiciously upon any wall, satisfied if the work look well on pay day, but totally regardless of its durability. The true and tested plan is as follows. Two operators are engaged, the painter with the plasterer in constant attendance. To prepare the work for the painter, a rendering and a finishing coat are required, and the colors are prepared only with water. No alteration or amendment can be made, and the artist must possess great ability and judgment, with quickness of execution. This is the ancient method. An improvement has been introduced by the Germans. While fresco paintings of the former kind are not very durable, except in a few cases, as at Pompeii, where their preservation is due to the entire exclusion of light and air, and artists have reason to mourn over the destruction of the greatest master pieces; those obtained upon the new principle are capable, not only of withstanding the action of water, weak acids and alkalis, but also the great changes of climate during a severe German winter, without injury to the freshness of the coloring. The colors are so firmly attached to their ground that they exhibit no tendency to separate from it, nor can they be removed by mechanical agency. The particulars of the process have not been made known, but it is probable that it consists in the silification of the lime mortar. Though this branch is one of the most difficult as well as most expensive of architectural decoration, the day is not far distant when it will be fully revived.

THE GRAPERY.

DESIGN FIFTY-FIRST.

We have already furnished many designs of ornamental buildings intended for the embellishment of the grounds around the mansion house. In fact no work of the kind would be complete without them. The elevations of a dwelling may be conceived and executed in the best taste, the interior may be commodious, and admirably adapted to the wants of its inmates, the shrubbery may be planted with care, and at a heavy cost to the owner, but the effect of all these is often destroyed by the erection of out houses in a style totally at variance with the requisitions of beauty and fitness of design or location. It is not now our purpose to lay down any rules to be observed by those who are in quest of such ornaments for their grounds. The principles that must guide them are in a measure arbitrary, and dependent upon the particular circumstances of each case. Climate, the nature, size, and location of the grounds, the shrubbery, the elevation of the dwelling house, must all be taken into consideration in making selections. Those who would pursue the subject further are referred to the essay on Landscape Gardening, of which beautiful art it is an important and legitimate branch.

The uses of the Grapery need not be discussed here. We have only to remark upon the design presented on Plate LXXI., which on inspection, will be found to answer every purpose for which such a building is intended. It is to be constructed of glass and iron, or if wood is used, the ornaments may be made of terra cotta. It is drawn to the scale of eight feet to the inch, but the scale may be enlarged or diminished, to suit the taste and wants of the projector.

On Plate LXXIII. is the ground plan, drawn to the same scale. The heavy lines show the position of the walls, doors and windows. The shape of the foundation, the steps, the position of the vases on the exterior, and the racks for pots within the building, are indicated by the lighter lines.

OBSERVATORY.

DESIGN FIFTY-SECOND.

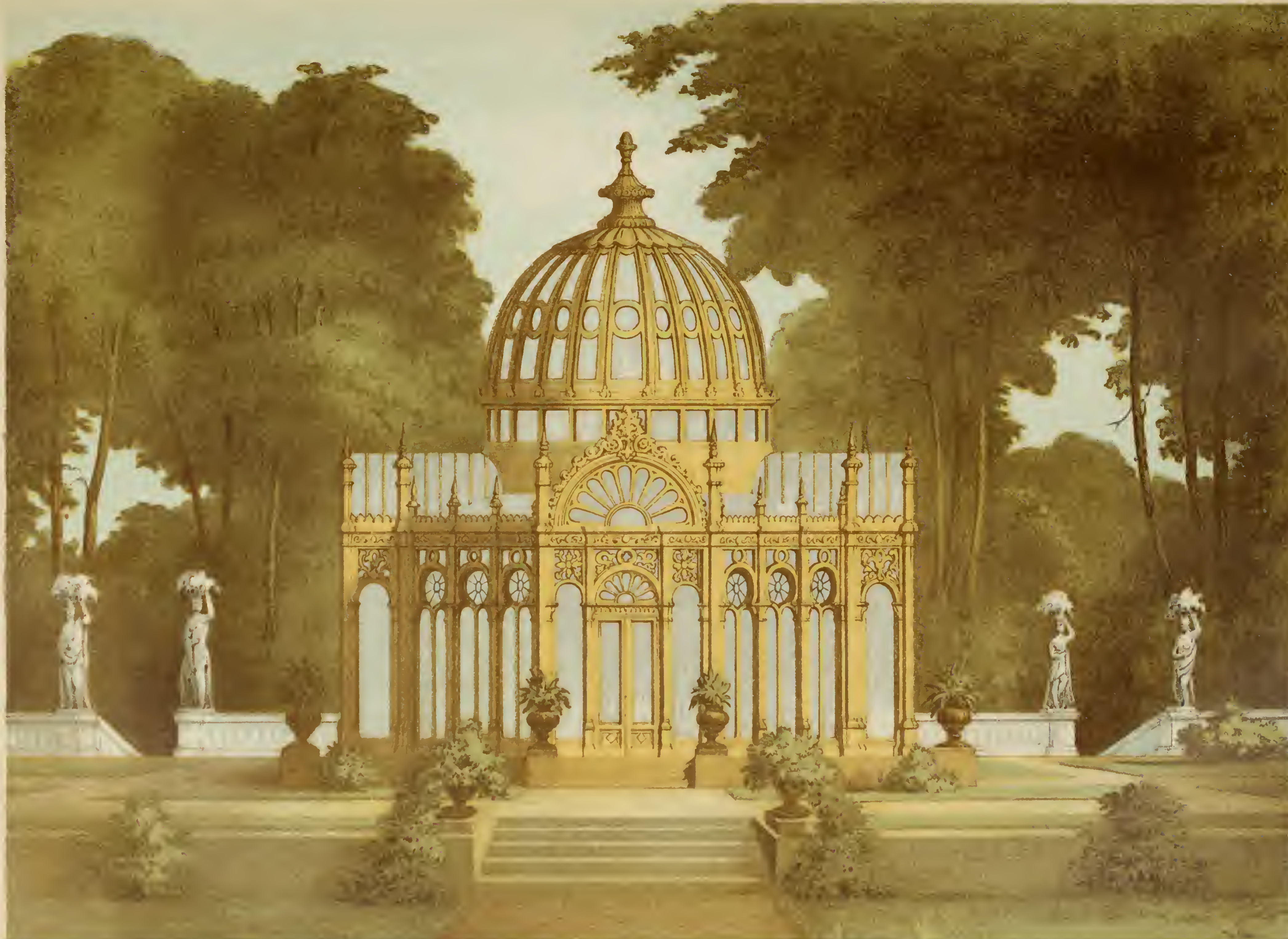
As an accompanying design to the last, Plate LXXII. is the elevation of an observatory. The object of such an edifice is obvious. It is intended to be one hundred feet high, and to contain five stories. A spiral stair case extends from bottom to top. Forty feet from the ground there is a gallery, projecting four feet, reached by a door in each side of the building, and serving as a landing place during the ascent.

On Plate LXXIII. is the plan of the gallery floor, showing the walls of the tower, and the doors, drawn to a scale of sixteen feet to the inch.

If constructed of timber, boarded and sanded, the cost would not exceed $3.800: if of brick, and rough cast, $5.000.

Design LI

Pl. LXXI



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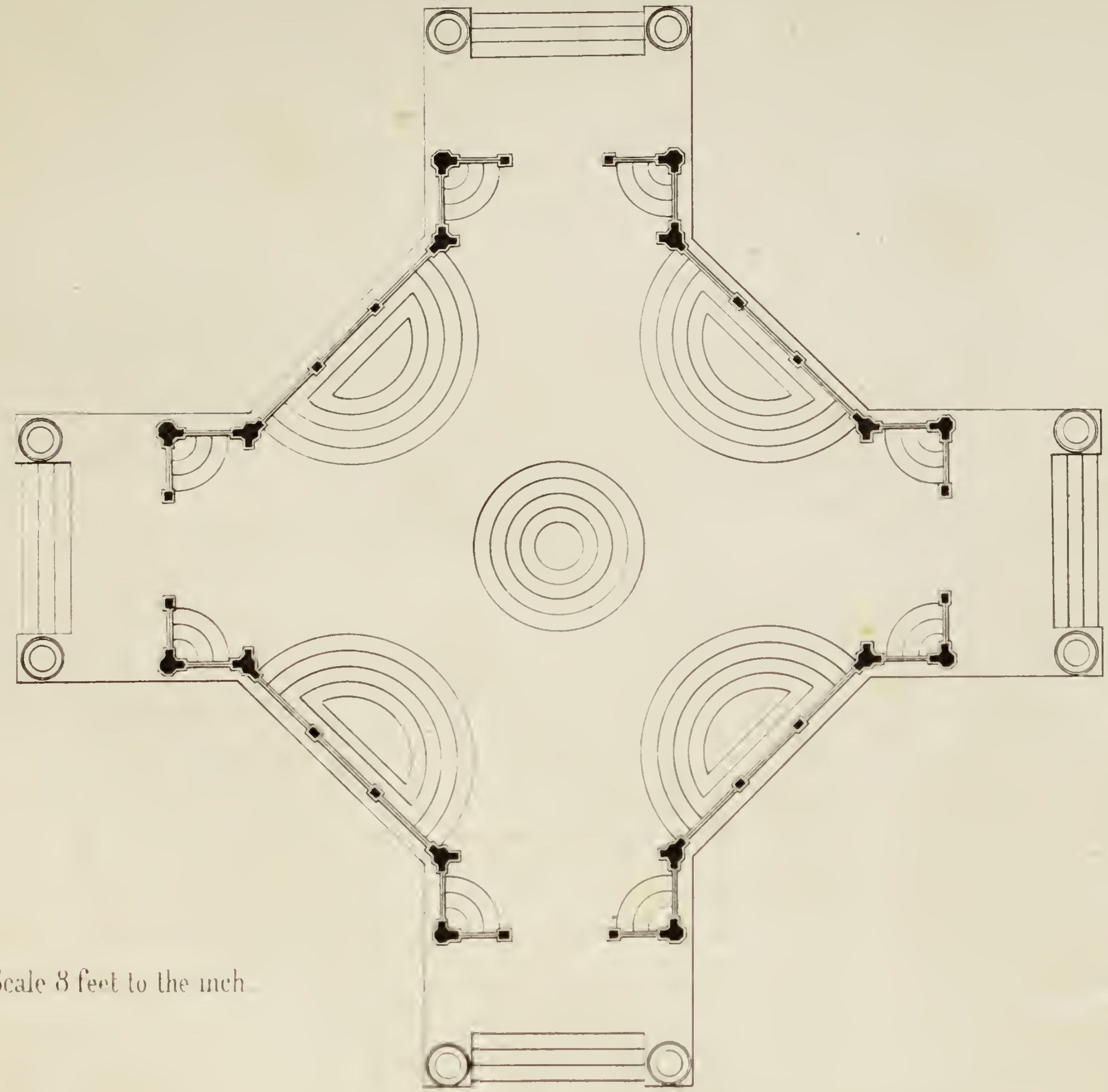
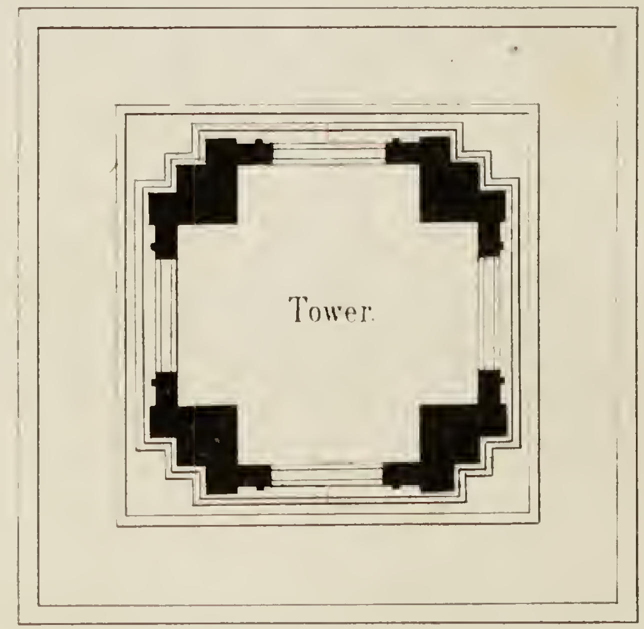
OBSERVATORY.



Scale 8 feet to the inch.



Scale 16 feet to the inch.

... Arch^t P. S. Duval & Cos Steam lith Press Philad^a

PLANS.

A SOUTHERN HOUSE.

DESIGN FIFTY-THIRD.

To meet the wishes of many of our correspondents, we present another design of a building intended for the south and south-west. We have already spoken at some length of the objects to be attained in the erection of a dwelling in warm climates, and of the peculiarities of construction required by the social and domestic habits prevailing in those sections of the country. The detachment of the kitchen from the main building, the size of the ground floor, the necessity for large windows, wide doors and ample verandahs, the difference in the number of stories, and many other considerations all tend to render a design prepared for a northern mansion totally unfit for the wants and convenience of a southern family.

A perspective view of the building, is given on plate LXXIV. It is in the Italian style, and the campanile or tower is a marked feature of the elevation. The entire design is similar in most of its features to plans prepared by the author for J. S. Winters, Esq., of Montgomery, Alabama. The site most suitable for such a dwelling is a broken or rolling country, and may be on a plantation with the same propriety as in the vicinity of a town or city. For a section unbroken by hills, we would recommend, as more appropriate, the elevation of Design XLIV. of this volume.

The front and side elevations are on Plate LXXV. drawn to a scale, and will be found of great value to the practical builder, as measurements may be taken directly from them. The first floor is elevated six feet from the surface of the ground. The walls are to be built hollow, or with a space of two inches from the foundation course upwards, between the inner and the outer wall. By this arrangement, the house is kept perfectly dry, and the rooms of the basement are as effectually protected from dampness as those of the upper stories. In buildings of every class we would recommend the construction of the walls on this principle. It can be effected with the least difficulty when brick are used. In ordinary buildings, the walls should be one and a half bricks or thirteen inches thick, and by adding two inches for the desired space, we have a wall of fifteen inches. The inner course should be a single thickness, and bonded to the outer with alternate headers, in the heading courses, which should always be laid every fifth course. In smaller buildings, where the walls are only one brick, or eight and a half inches thick, the two inch space gives a wall of ten and a half inches. The outer and inner courses are then of a single thickness, and should be bonded in the same way. In such cases, the timbers or flooring joists bear upon the inner course four inches, this support being sufficient for ordinary purposes. In buildings of a larger class, where the size of the timbers and the thickness of the walls are increased, a larger bearing, of from six to seven inches, is required. In walls from nineteen to twenty-three inches thick, that is constructed of two bricks and a half with the space of two inches, the inner courses should be an entire brick, or eight and a half inches. In stone walls the same object can be effected by making the stone or outer wall of the required thickness to sustain the whole, and constructing an inner wall of one course of four inch brick, two inches from the stone, the two to be braced together by iron clamps. Though this is more expensive than the common mode of erecting cleats and lathing for the plastering, it is much more durable, and more likely to secure the object desired. The moisture penetrates the outer wall, and the wood work and plastering must soon decay, but when the other plan is adopted, we have never known an instance, even in the most exposed localities where the slightest dampness has been detected in the dwelling. The walls of the main building, represented in the design, are intended to be nineteen inches thick, from the foundation to the level of the first floor; those of the wings, will also be nineteen inches thick from the foundation to the surface of the ground to obtain sufficient strength for resisting the pressure of the earth against them, and then reduced to fifteen inches from the surface of the ground to the level of the first floor by a break of four inches on the outside. The walls of the main building from the first floor to the roof, are fifteen inches thick; those of the wings, eleven inches. The walls of the tower are to the first floor, twenty-seven inches; to the second floor, twenty two; to the fourth, eighteen; and thence to the roof thirteen. The roof is of tin, cross leaded, and painted on both sides, the top with two coats.

The verandahs, the window heads, sills and all the large ornaments are to be of iron. Plate LXXVII. shows at Figure 1 the enrichments and projection of the windows of the first story. Figure 2 is the base of the windows of the second story, the upper part being similar to those of the first. Figure 3 is the main entrance and base of the second story window in the tower. The upper part of the same window is seen in the elevations on Plate LXXV. Figure 4 on Plate LXXVIII. shows the windows of the basement and first floor, with a section of the verandah.

On Plate LXXVI., are the ground plans. The basement contains two cellars, two store rooms, a housekeeper's apartment, the dining room and furnaces. The first floor contains the parlors, two chambers, a bed room, library or sitting room, entrance through the tower, lobby and hall. The second floor, two chambers, a dressing room, a room in the tower, closets and hall. The kitchen is constructed apart from the main building. The accommodations are intended for a family of ten persons.

The cost of the entire building, in a section where materials and workmanship could be obtained at the prices prevailing in the neighborhood of Philadelphia, would not exceed seven thousand five hundred dollars.

Design LIII. Pl. LXXIV.

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SOUTHERN HOUSE.

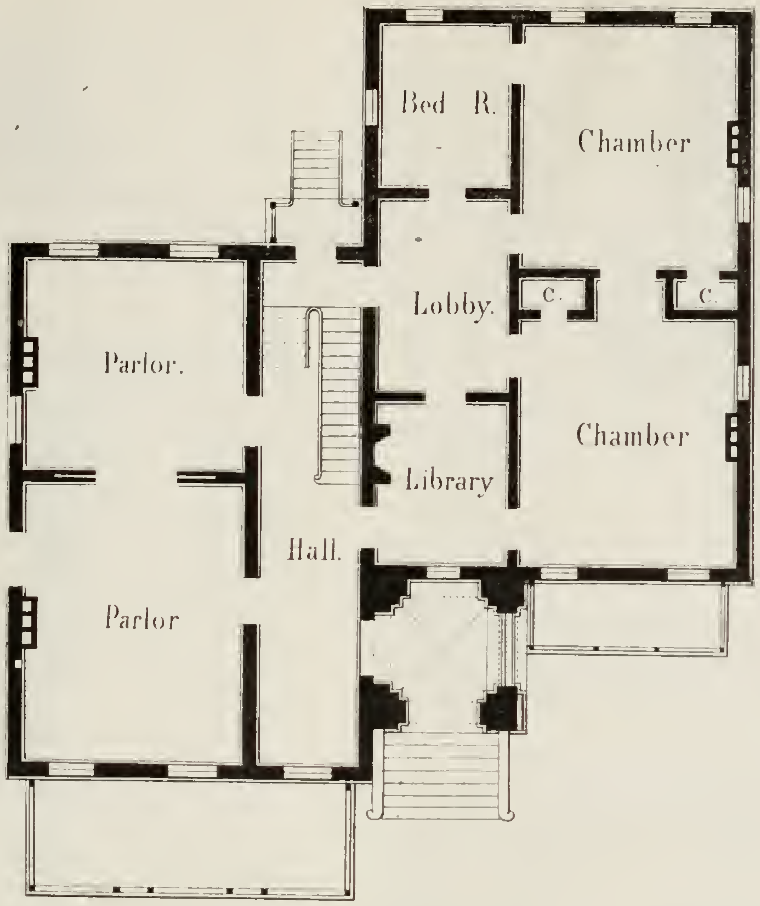
Design LIII. Pl. LXXV.

FRONT

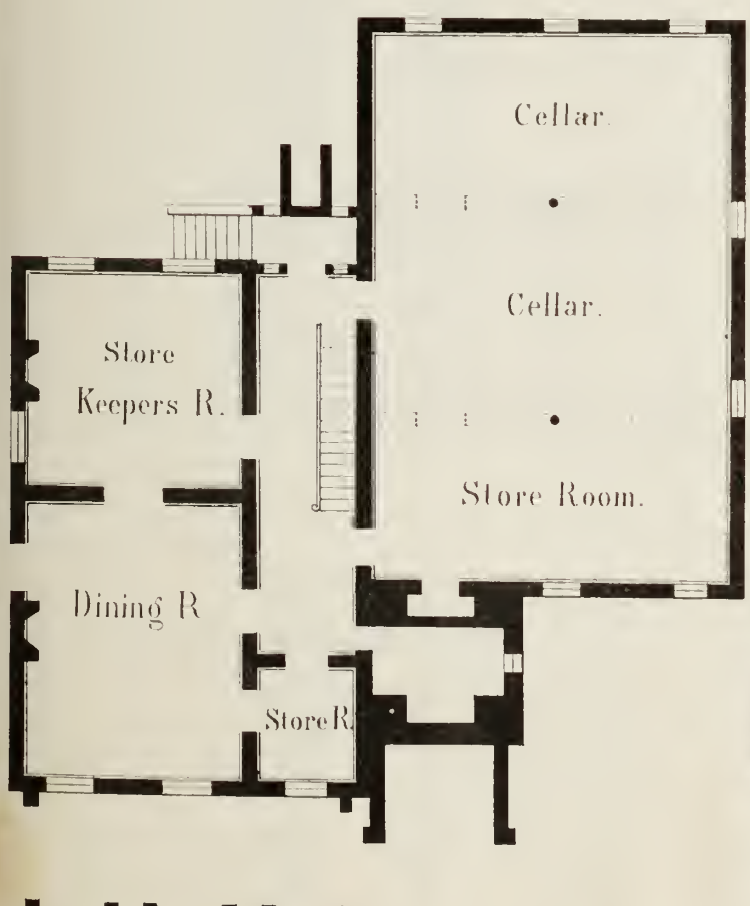
SIDE

Sam. Sloan Arch^t. P. S. Duval & C^o. Steam lith press Ph.

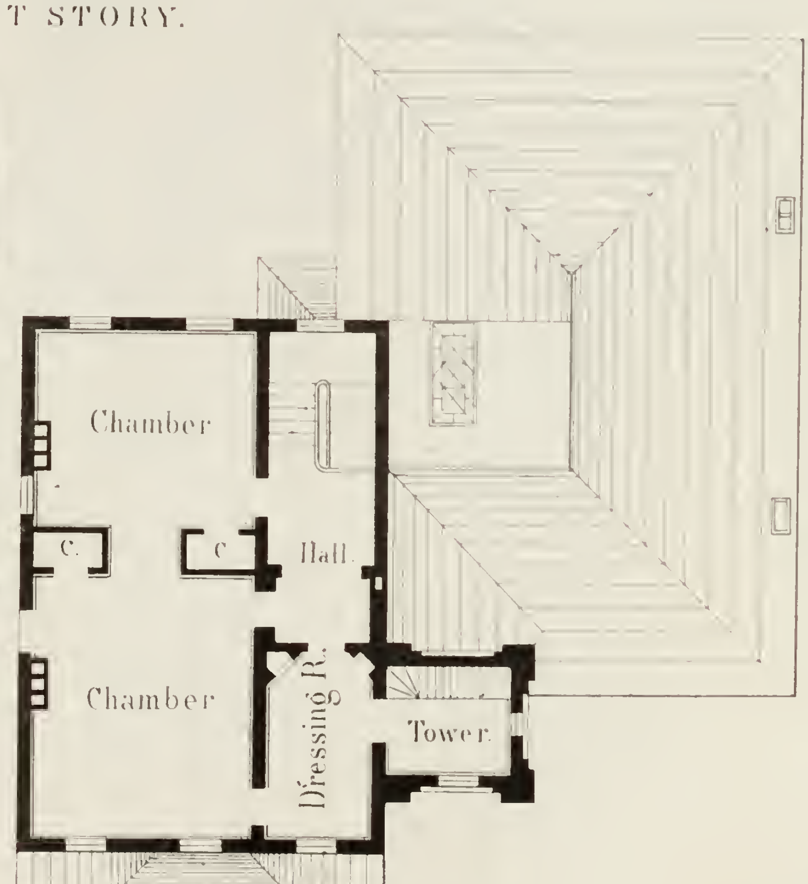
ELEVATIONS



FIRST STORY.



BASEMENT.



SECOND STORY.

Scale 16 feet to the inch

Saml. Sloan Archt.

P S Duval & Co's Steam lith Press Philada.

PLANS.

Fig. 1.

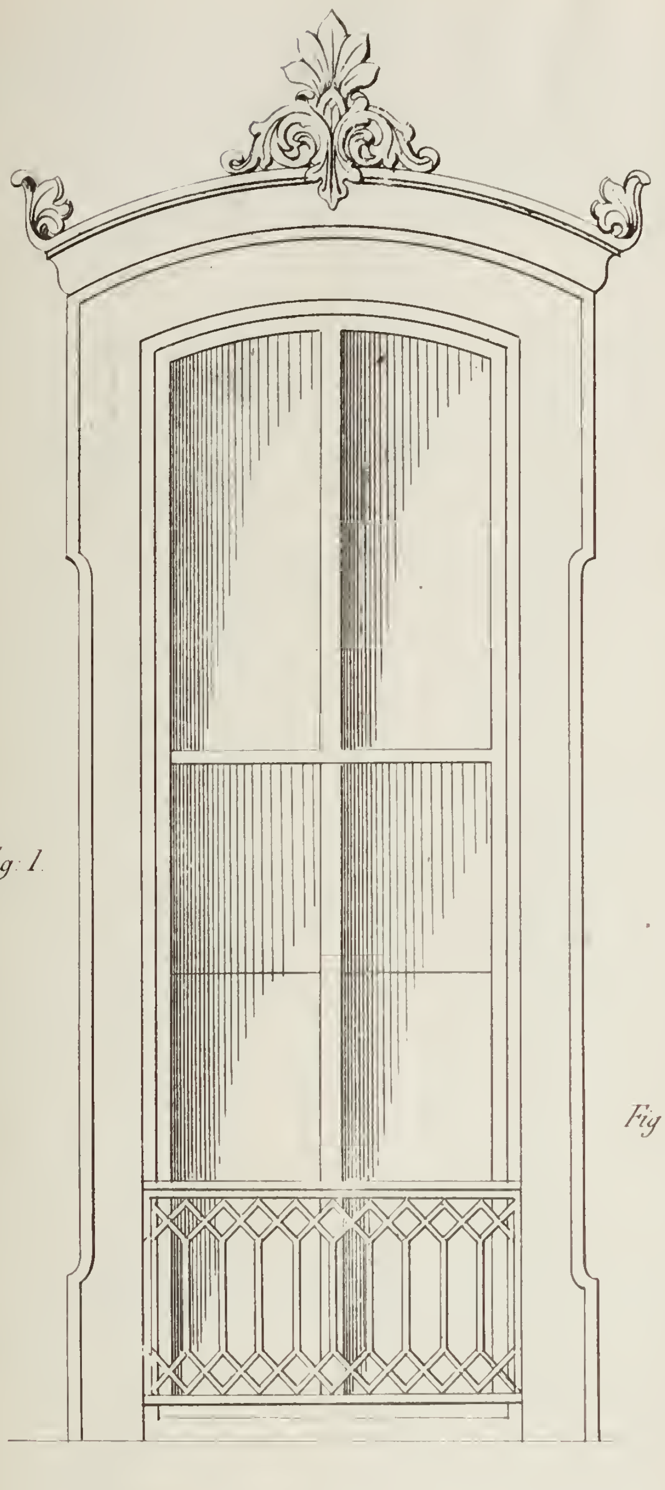


Fig. 2.

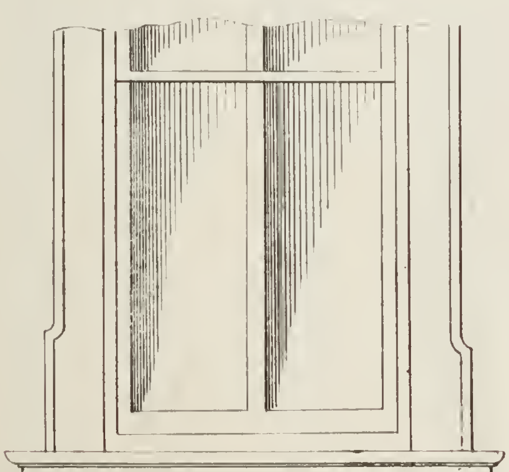
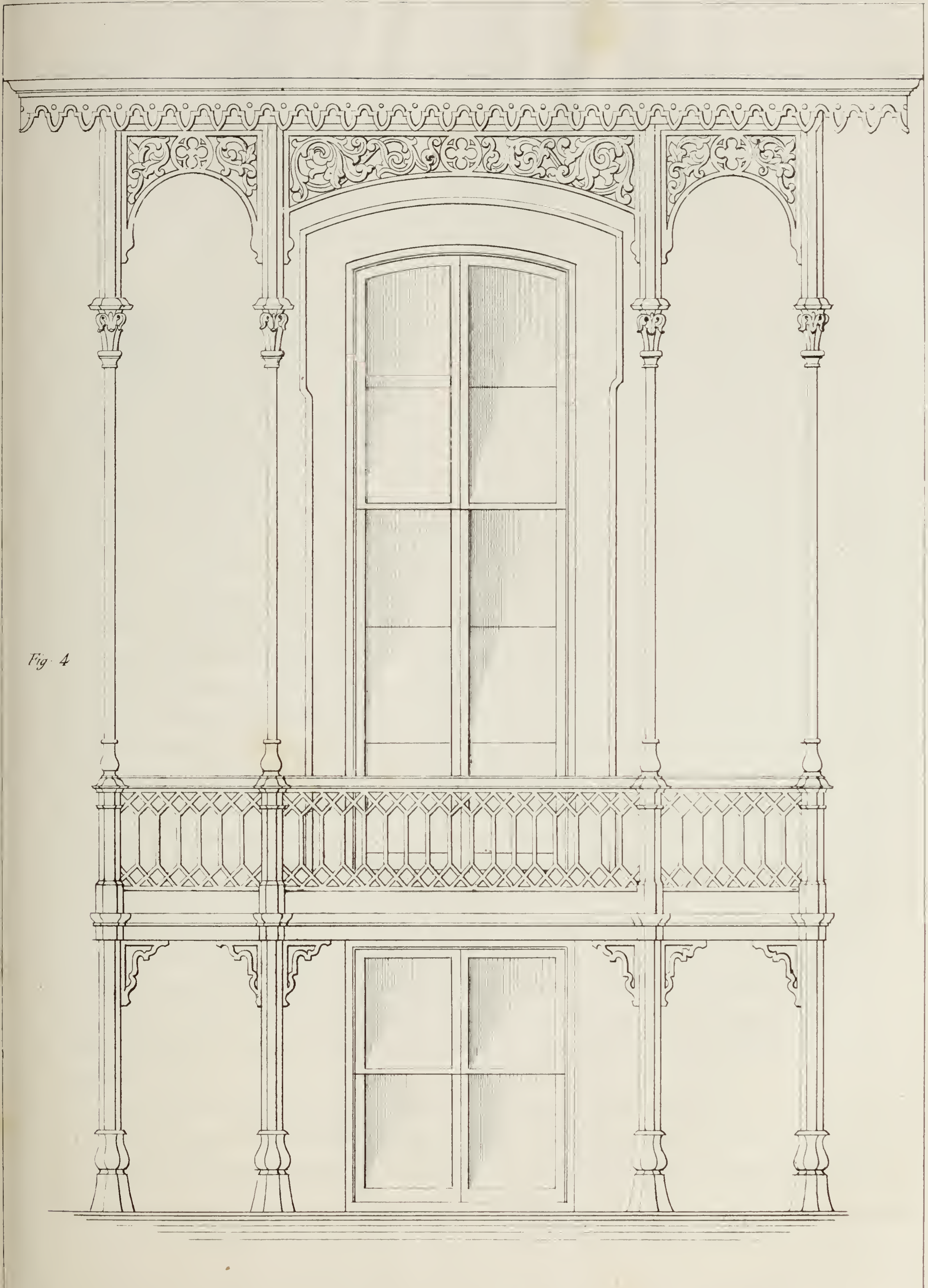


Fig. 3

S. Sloan Archt.

P. S. Duval & Co. Steam lith press Phil.

DETAILS.



Sam. Sloan Arch.t

P. S. Duval & C.o Steam lith press Ph.

DETAILS.

FINISH OF ROOFS.

A DWELLING affords protection to its inmates, by means of its roof as well as by its walls and floor. Indeed, regarding the weather alone, this is a far more important part than either of the others, and it is probable that in many climates, walls were originally erected for no other purpose than to support the roof. As no rain ever fell in Egypt, the people only wanted protection from the sun, and all the roofs were constructed of large stone slabs, laid horizontally. Flat roofs are still found in oriental countries, and may be regarded as nothing more than upper floors, especially as the top of the house is often used as a sleeping apartment. Wherever it became necessary to provide protection from the rain, it was accomplished by giving inclination to the roof. On large buildings it is easier to fix two inclined planes than one. The use of these gave rise to the pediment which first appears among the Greeks, though strange to say, many of their buildings having this feature were never intended to be covered at all. Then came the magnificent Roman dome rising above stupendous piles, and giving unity and grandeur to the whole. Of these three forms, we have endless modifications. Roofs have been built at every angle beyond thirty degrees according to their requirements. In all countries north of the line of occasional snow, they have a high pitch, in order that the snow may slide off readily, and not weigh upon the structure. The pitch of a roof is the angle which an inclined side makes with the plane of the horizon, and the angle of the roof is that which the inclined sides make in meeting.

Latterly, roofs have been made with much less pitch than formerly, the use of metal covering having introduced great changes in this respect. When they have sufficient pitch to be visible from the ground, they should be so constructed as not only to prevent their marring, but as to cause them to increase architectural effect. The high pitch of the Gothic roof made it a prominent feature in the building, and much pains was often spent in making it highly ornamental; as in the instance of the roof of Westminster Hall. Always, when using shingle or slate, the roof is necessarily high. It is only by the use of metallic covering that we can in our climate make it nearly flat. In long buildings, a roof hipped at the ends has a good effect. This arrangement is most suitable for a wing or a lean-to, but should always be avoided in short buildings. It gives the edifice a pyramidical and peaked contour that tends to destroy the general effect.

The cheapest covering for a permanent building is of shingles, or perhaps it should be said they involve less expense at the outset. Whether they are or not more expensive in the end is a matter for inquiry. When cypress shingles can be obtained, they are much to be preferred, since they will last for nearly forty years, while white pine shingles must be renewed every fifteen or twenty years. A roof of this description cannot be made very ornamental, though some relief from excessive plainness may be obtained by pointing the end of each shingle. The durability of the roof is not however increased by this means. The pitch of a shingle roof should be about twenty-six and a half degrees, making the height about one fourth the span.

A slate covering is for many reasons much better than one of wood. The slates differ in quality, and the excellence of the roof depends much upon this. The best are from Westmoreland, England, but a much greater quantity of the Welsh slates are imported, and are considered the next in quality. There is no doubt that we posess in this country beds of slate fully equal to those of the old world, that only want developement. The purple slate presents the best appearance, though the blue and green are equally durable. The coarser varieties are not so good, and generally are lighter in color; the fine grained being dark, and splitting into thinner plates. All are originally separated from their beds like other stones, by gunpowder, after which the masses are divided into plates through the planes of cleaveage. These plates are then shaped by various means.

Oaken slats, one by two inches, are nailed across the common rafters at proper distances. To these the slates are attached by means of nails passing through two small holes in each, made by sharp strokes from a pointed instrument called the pick. Copper nails are often used; and though expensive, are the best for the purpose. Small iron nails, boiled in linseed oil to preserve them from rust, are substituted. All vallies and gutters must be lined with leaded tin, painted of a sombre color, to resemble the slate. If nothing more than this is done, a pelting rain will beat up between the slates, and drip upon the ceiling. To prevent this, the lower side of the slating is plastered with strong hair mortar, or if the plates are very large, simple pointing will be sufficient. For common slate, the pitch of the roof should not be much if any less than that for shingles; for large slate it may be about twenty-nine and a half degrees, or one fifth of the span. The weight of common slates on the square yard of roofing is from five to nine hundred pounds; that of the larger slate may be as much as twelve hundred. The appearance of the roof is often enhanced by laying the slate in the lozenge, or some other fanciful pattern. Sometimes a good effect is produced by mingling several patterns together on the same roof. These modes shown are in several of the preceding designs.

In many countries of Europe, and on some of our own buildings, erected many years ago, we find tiles used as a covering. They are nothing more than baked earth, of various shapes. There are some objections to their use which have caused them to fall into disrepute. They are the heaviest covering known, if we except the slabs of marble which are sometimes placed on expensive public buildings, and are liable to be cracked in frosty weather if unglazed. They nevertheless may be made to form a most excellent fire proof roof, if properly managed. The pan-tiles are often met with in Italy, and give a picturesque finish to the buildings, forming a feature in the style which with us is badly imitated by placing round slats under metal. The pitch of a tile roof should be about the same as for those of common slates.

Metal coverings are now supplanting all others. We have been long accustomed to tin and leaden roofs. The only difference now observable is in the quality of the material used, which has been vastly improved in the manufacture. Lead, owing to its expense, has gone much into disuse, but the use of tin has increased. Zinc is in many instances taking the place of both lead and tin, in the useful arts; and has been found much more lasting upon roofs, than either of the other metals, from the fact, that it resists corrosion better. The preparation of zinc, corresponding to that of tin, is called galvanized iron, and has of late years attracted the attention of architects and engineers, on account of its many valuable qualities. Simple sheet iron is sometimes used, but is expensive, and rusts easily, unless protected by heavy coats of paint. All metal coverings, however, should be painted, since the thin pellicle of linseed oil, as well as the metallic substance contained in the paint, tends greatly to retard oxidation. In the specifications prepared for this work, we have always directed two coats of paint above, and one beneath.

If the metal roof is so inclined as to be seen from the ground, it is necessary that its smooth and dead appearance be relieved by some means. This is frequently well and effectually done by nailing slats at short intervals on the sheathing, parallel to the rafters, and about as far apart as the width of the plates used. The metal is bent carefully close over these, and the roof then presents somewhat the appearance of being covered with pan-tiles. Though the effect is not what could be desired, it is better than that produced by leaving the roof plain. One of the greatest advantages resulting from the use of metallic covering is, that the roofs may be made almost flat, and yet exclude the damp as effectually as those of a greater pitch. It is customary now, in all cities, to give the roof so little inclination that it is not only altogether invisible, but affords a platform on which one can walk with safety. This plan is far preferable to the old peaked roof, and economizes room, for instead of having garrets with sloping sides, we may have in their place, without increasing the cost of the building, square, airy rooms. For country dwellings, we cannot so highly recommend flat roofs, since the usually received styles of rural architecture require a display of the roof. The floors of observatories and balconies however, should be overlaid with metal, and their inclination should always be sufficient to permit the rain to fall off readily. The curved, tent-like roofs for verandahs and bay windows have been mentioned in other places of our work. They are necessarily of metal, and are usually painted in colored stripes, to relieve the monotonous effect of the uniform surface.

The arrangement of gutters and pipes for conveying off the water, at the eaves, is a matter worthy of some consideration. Usually plain tin gutters are hung just beneath the eaves, leading to long tin tubes that reach the ground. These last are often placed in the middle of some front pier, or perhaps, pass down the angle formed by a pilaster and the wall. They are most generally left unpainted, and the white tin glistens in glory, being the most prominent object about the house. Is this taste? If the building has any architectural pretensions whatever, this practice is certainly enough to enrage its designer. The appearance of the cornice, if there be any, and of the piers or pilasters, is spoiled. It is a much better plan to conceal the gutter entirely, and thus obviate this objection. Various explanatory sections are given here and there among our details. But this expedient does not do away with the pipe. If there must be pipe on the exterior of the building, by all means place it in the rear or at the ends, or in some place less prominent than the front, and for the sake of appearances, as well as for its preservation, paint it the color of its back ground. Pipes made of terra cotta ware are now to be had, the ends of which fit into each other with the inner surface glazed. These can be built within the body of the wall for the purpose of conveying the water from the roof to the ground. The time will come when these, and the iron pipes, will be universally used in all buildings that aim at something more than barren utility. While speaking of terra cotta ware, it may be well to mention the chimney cans, various representations of which have been given in different places. These are not only highly ornamental, but resist the action of the weather and of the escaping gases much better than a plain brick finish. They generally have sufficient weight to make them firm, when well set in strong mortar.

Lastly, the lightning rod should receive a due share of attention. We have seen hundreds so arranged, through neglect or ignorance, as to be an injury instead of a protection. Should a heavily charged cloud chance to come within their influence, they would be most surely the means of bringing certain destruction to the building and its inmates. For carelessness in this particular, we can suggest no remedy. To those who may not be aware of the reasons why a lightning rod is at any time a protection, a word or two may be invaluable. Most people seem to think that its object is to attract the fluid. This is not the case. "The finest needle, held in the hand towards the knob of one of the jars of a highly charged electric battery will silently discharge it in a few seconds." Herein we have the principle. The sharp points of the lightning rod rapidly conduct to the earth the electricity of the surcharged cloud, and when within striking distance, it is discharged by the rod and rendered harmless. The rods are sometimes struck, nevertheless, and then also protect the building, but this is not their chief original purpose. The following remarks, unabridged, will be acceptable. "Lightning rods are at present usually constructed of wrought iron, about three-fourths of an inch in diameter. The parts may be made separate, but, when the rod is in its place they should be screwed together, so as to fit closely, and to make a continuous surface, since the fluid experiences much resistance in passing through links, and other interrupted joints. At the bottom, the rod should terminate in two or three branches, going off in a direction from the building. The depth to which it enters the earth should not be less than five feet; but the necessary depth will depend somewhat upon the nature of the soil; wet soils require a less, and dry soils a greater depth. In dry sand, it must not be less than ten feet, and in such situations it would be better still to connect by some convenient conductor, the lower end of the rod with a well or spring of water. It is useful to fill up the space around the part of the rod that enters the ground with coarsely powdered charcoal, which at once furnishes a good conductor, and preserves the metal from corrosion. The rod should ascend above the ridge of the building to a height determined by the following principle: that it will protect a space in every direction around it, whose radius is equal to twice the height of the rod. It is best, when practicable, to attach it to the chimney, which needs peculiar protection, both on account of its prominence and because the products of combustion, smoke, watery vapor, &c., are conductors of electricity. For a similar reason the kitchen chimney, being that in which fire is kept during the season of thunder storms, requires to be especially protected. The rod is terminated above in three forks, each of which ends in a sharp point. As these points are liable to have their conducting power impaired by rust, they are protected from corrosion by being covered by gold leaf, or they may be made of solid silver or platinum. Black paint, made of charcoal, forms a better coating for the rod than paints of other colors, the bases of which are worse conductors. The rod may be attached to the building by wooden stays. Iron stays are sometimes employed, and in most cases they would be safe, since electricity produces the most direct route; but in case of an extraordinary charge there is danger that it will divide itself, a part passing into the building through the bolt, especially if this terminates in a point. Buildings furnished with lightning rods, have occasionally been struck with lightning; but on examination, it has generally, if not always, been found that the structure of the rod was defective; or that too much space was allotted for it to protect. When the foregoing rules are observed, the most entire confidence may be reposed in this method of providing for safety during thunder storms."

A GOTHIC CHURCH.

DESIGN FIFTY-FOURTH.

Architects have differed on no subject more than in the erection of edifices for Divine worship. The models of the great masters of all ages and nations have been the temples of the ancients. For a long period, simplicity and uniformity were the only objects sought to be obtained. After Italy had been overrun by the fury of the Visi-Goths, the structures that had been the pride of Rome, were buried in the dust. All the edifices afterwards constructed, were from the precious remains that ignorance or avarice had gathered from the ruins. The inappropriate application of these fragments resulted in a confusion, and unnatural perversion of the principles of architecture. The art fell into a real chaos; and from the ruin rose what is called the Gothic style. Subsequently, when the state of society permitted a return to the arts of peace, and patronage was afforded to those men whose genius still lives in their works, the wants of Christianity opened to them an extensive field. The fitness of their construction for the new form of worship, had suggested the use of the *basilica* of ancient Rome, for the early churches. Many of these edifices were altered to suit the purposes of the worshippers, and others were erected after them as models. Modifications and additions were made from time to time, and in the twelfth century, the Gothic was the prevailing order of church architecture. The facility it offers for producing appropriate effects with the use of almost every material, has gained for it popularity in this country, and some of the most expensive and elaborate structures we can boast, serve as authority for its adoption.

The plates of the design represented, contain full details of all matters necessary to be known by any competent builder, to enable him to erect an edifice of the kind. Plate LXXIX. is a perspective view. The size is forty-eight feet front by seventy in depth, measuring from the outside of the walls. The tower projects five feet, and the vestry rooms two, from the body of the building. The basement is ten feet in the clear, and its floor is four feet below the level of the pavement. The principal story or audience room is twenty-five feet in the clear, and a gallery sixteen feet wide extends over the vestibule. The walls are to be of hard burnt brick, and in the basement are twenty-three inches in thickness; from the main floor to the roof, nineteen inches, the outer wall thirteen inches, the inner four, with a space of two inches between them. The buttresses are eighteen inches on the face.

The tower is one hundred and twenty-five feet high, eighty from the ground to the base of the spire, and thence forty-five to the summit. Its walls are two feet seven inches thick to the main floor, two feet, three inches to the gallery joists, twenty-two inches to the battlement course, and eighteen inches to the base of the spire.

The exterior is to be roughcast in the best manner, with a coat of fresh wood burnt lime and clean sharp, sand mixed with a preparation of tallow. This coat and the whole of the wood work on the exterior, should be well painted and sanded.

The finials, brackets, corbels, the head mouldings over the windows, and the crochets over the entrance door, are of wood or terra cotta. The spire is of wood, and covered with the best narrow purple Welsh slate. The roof is also covered with the same kind of slate cut into diamond form. The floors are of one and a quarter inch Carolina heart pine, of uniform width, and smoothed over after they are laid. The sash are alike in their construction, double hung, with two and a half inch patent axle pullies, and the best Italian hemp cord. The pullies of the windows in the basement are one and three quarters inch axles. The front doors are three inches thick, double, hung with five by five inch butts, and fastened, one by an eight inch mortice rabbit lock, the other by two iron plate flush bolts. The inner doors are one and three quarters inches thick, moulded on both sides, hung with four by four inch butts, and fastened by four inch mortice locks. The pews all have panelled ends and doors. The ends have scroll tops, and the backs are moulded with black walnut. The rostrum is elevated one foot from the floor. The pedestals for the pulpit and reading desk are made of black walnut, and panelled. The chancel has a railing of five inch hexagonal balusters, capped with eight inch moulded rail, also of walnut. The chancel windows are of stained glass, and may contain any appropriate device. The others are of the best American clear glass. The effect produced by a good quality of stained glass, for all the windows, should not be overlooked. The plain plate glass, however, is preferable to an article poorly stained, whether with or without devices. The interior, throughout, is to be plastered, floated and laid off in blocks, to represent stone. The ceiling is curved, ribbed and tinted. This is sometimes made of wood, and when well finished, has a good effect, but increases the expense of the building. The organ loft is within the tower, in the gallery.

Plate LXXX. is a front elevation of the building, representing the ornaments over the door, and the effect of the tower and spire.

Plate LXXXI. is the side elevation, done in lines. The cornice, turrets and window mouldings, are accurately displayed. The whole is drawn to the scale of twelve feet to the inch, and measurements may be taken directly from the engraving.

Design LIV.

Pl. LXXIX.

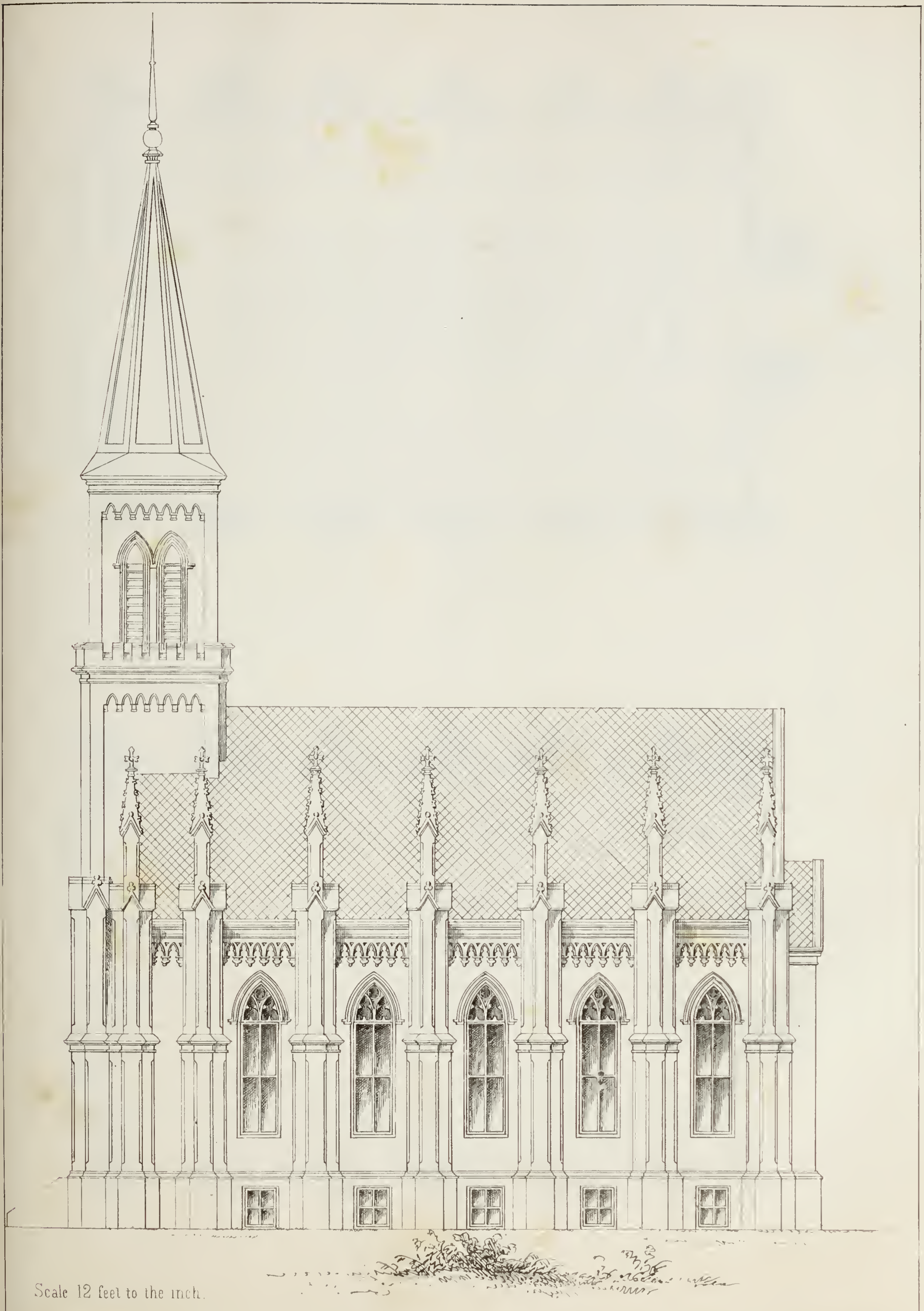
Saml Sloan Archt

GOTHIC CHURCH.

Sloan Arch.

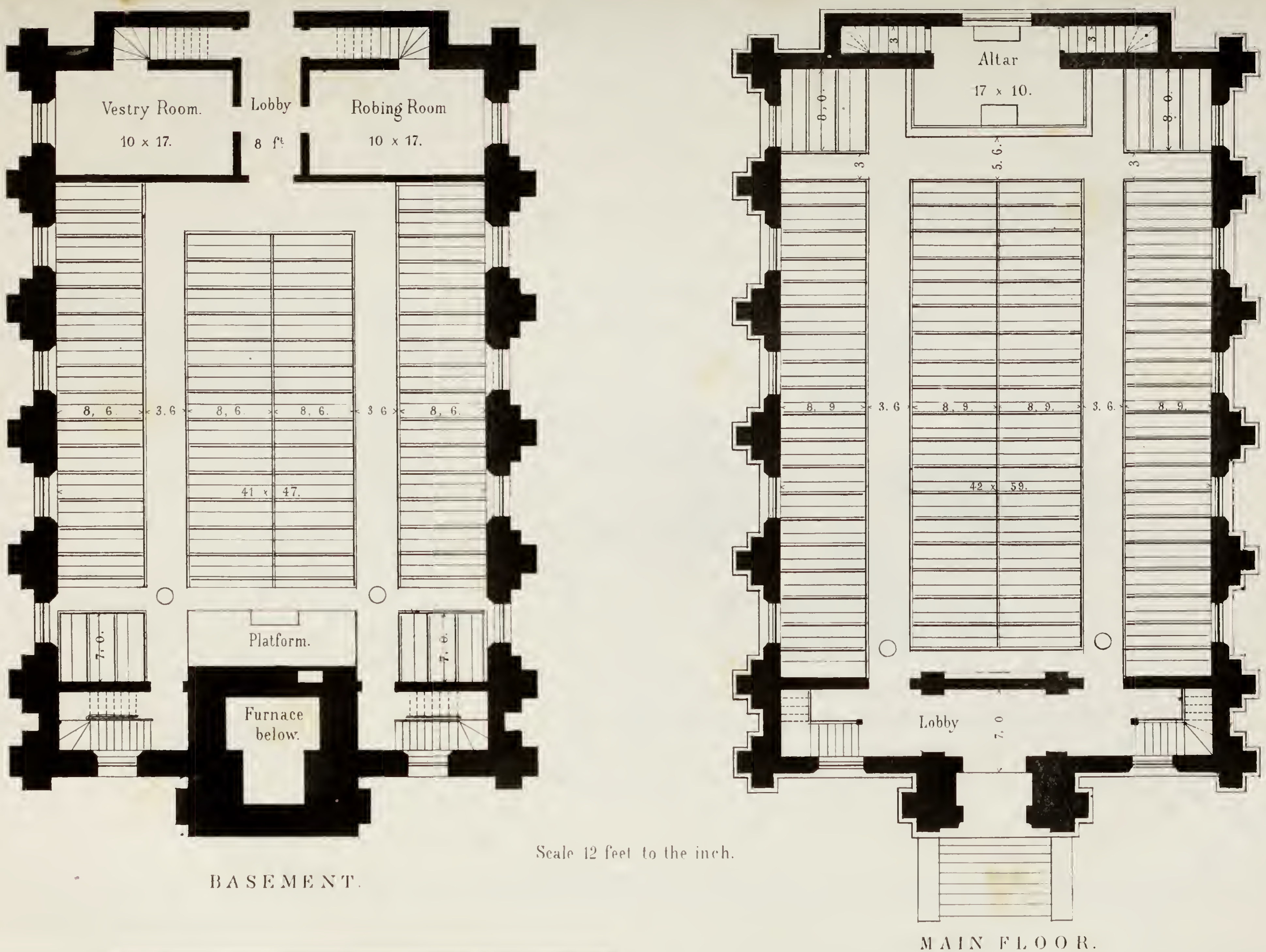
FRONT ELEVATION

GOTHIC CHURCH.



S. Sloan Archt. P. S. Duval & Co. Steam lith. Press. Ph.

SIDE ELEVATION.



Scale 12 feet to the inch.

Saml. Sloan Archt.

P. S. Duval & Co's Steam lith. Press Philad.

PLANS.

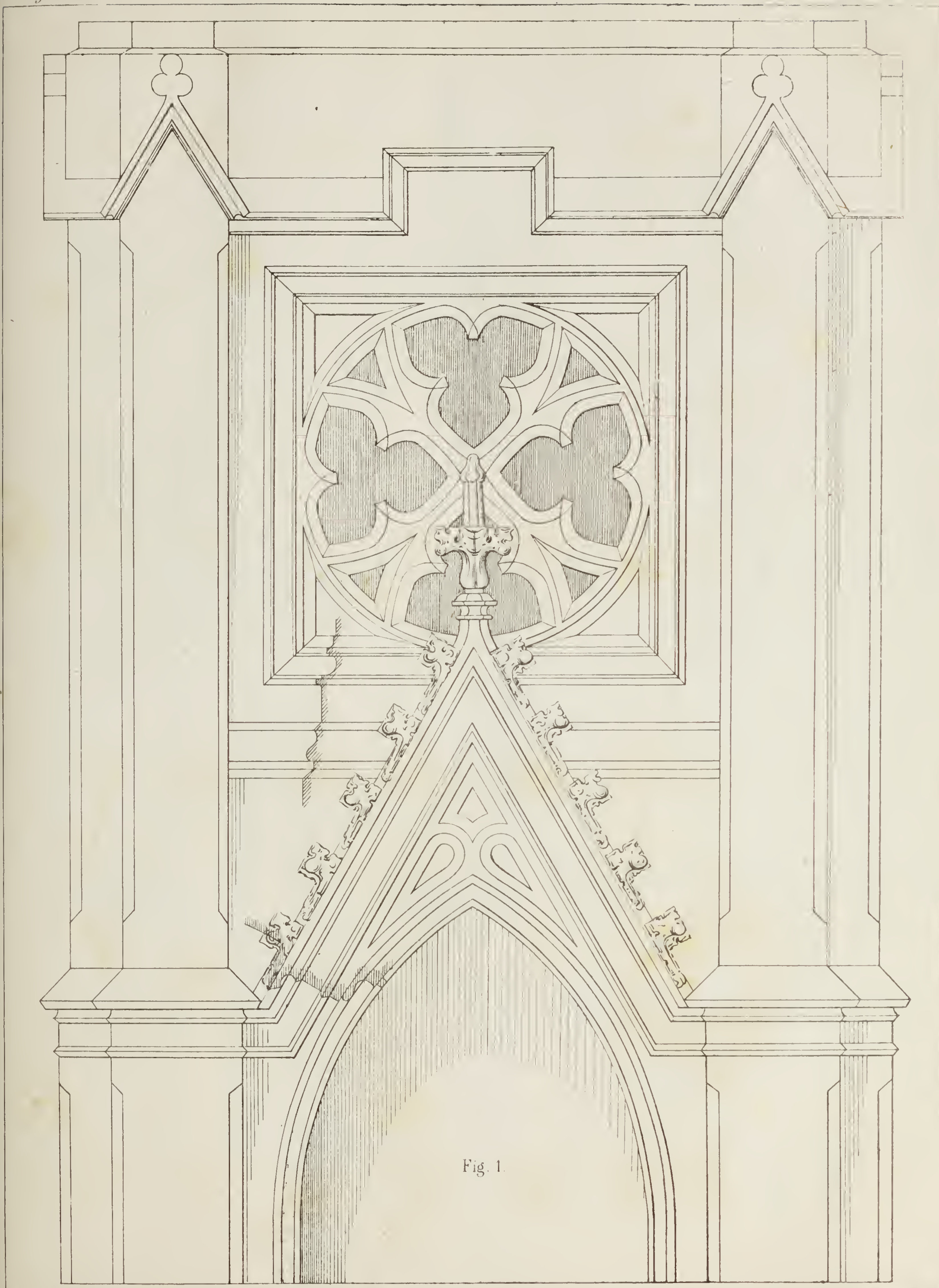
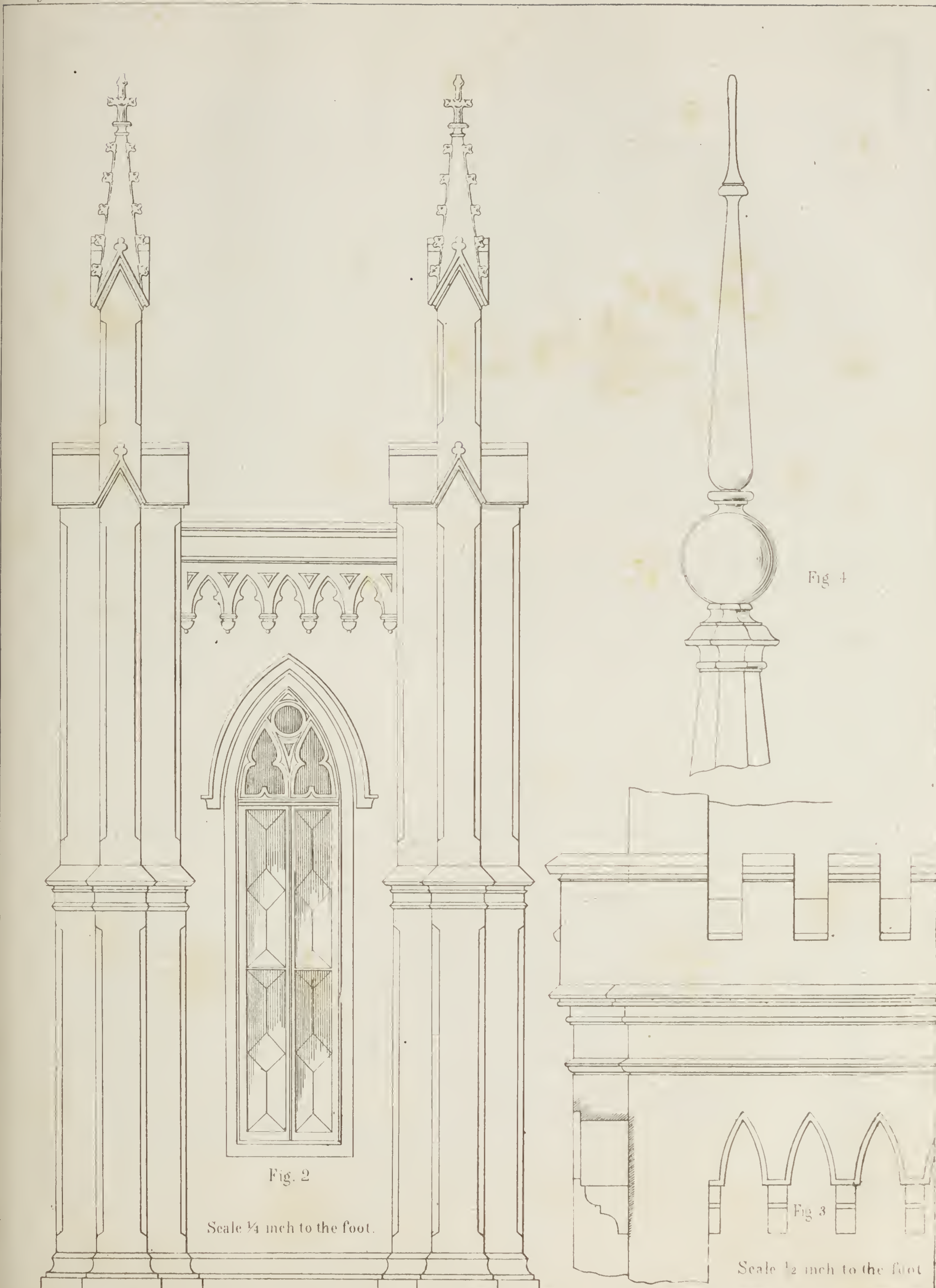


Fig. 1.

Sam[l] Sloan Arch[t].

P. S. Duval & Co's Steam lith. Press Phila.

DETAILS.



Saml. Sloan Archt.

DETAILS.

On Plate LXXXII. are the plans of the first floor, and the basement. The first is approached by steps leading to the front doors, or by two stairways, leading from the basement to the vestibule. These give access to the body of the church from the lower floor without leaving the building, and are much used in inclement weather. The rostrum is approached by a stairway leading from the robing or vestry room, which are intended for the use of the officiating minister, or if the building is erected for the Baptist denomination, give access to the Baptistry, usually placed under a moveable pulpit.

The basement floor contains a lecture room, and two rooms in the rear, that may be used for a library, robing or vestry room, a study, or for Sunday School purposes, according to the wants of the congregation. The furnaces are within the walls of the tower, and require an excavation eight feet deeper than that of the body of the building. They are to be reached by steps under one of the stairways, leading to the vestibule above. The position of the registers is indicated in the engraving, showing two for each floor. The warm air is conducted from the chambers of the furnace by tin flues, those extending to the main floor being in the walls of the tower. To warm the building comfortably, a Chilson's No. 6 furnace, or one of other makers, of similar power, will be required. Ventilating flues should be constructed in the walls, opposite the buttresses, with ventilating registers placed below the cornice and near the floor. For the reasons why this mode of ventilation is preferable to any other in use, the reader is referred to the essay on that subject. An additional reason why it is of value in a church or hall, is that the acoustic qualities of the room are always injured by the ordinary ceiling ventilators.

On Plates LXXXIII. and LXXXIV. are shown the building details. Figure 1 represents the front door and buttress, the finial, crochets and corbel course, with its cornice, drawn to the scale of one quarter of an inch to the foot. Figure 2 is a side window, with two buttresses, finials and corbel course, with its cornice. Figure 3 is a section of the tower, showing the corbels, the battlement course and belting cornice. Figure 4 is the top of the spire. The scale of the three last is half an inch to the foot.

BILL OF QUANTITIES,

SHOWING THE NATURE AND COST OF MATERIALS, USED IN THE ERECTION OF DESIGN FIFTY-FOURTH.

THE prices marked in the following bill of quantities, are those prevailing in and near this city.

Bricks laid in the wall, including all materials, 260.000 @ $10 per M.	2600.00
Stone, including all materials, 250 perches, quarry measurement, @ $2 per perch,	500.00
Excavation, for foundation and basement, 540 yds. @ 20 cts. per yd.	108.00
Brown stone, 750 ft. @ 95 cts. per ft.	712.50
Plastering, including materials, 2100 yds. @ 20 cts. per yd.	420.00
Roughcasting, 2500 yds. @ 40 cts. per yd.	1000.00
Framing timber, 35000 ft. @ $20 per M.	700.00
Slating, 5000 ft. @ 8 cts. per ft.	400.00
Flooring boards, 1¼ inch, 10800 ft. @ $35 per M.	378.00
Sheathing boards, for roof, 6000 ft. @ $15 per M.	90.00
Joists and scantling, 23000 ft. @ $15 per M.	345.00
Assorted lumber, 18000 ft. @ $3 per M.	340.00
Scaffolding, 6000 ft. @ $12 per M.	72.00
Tin gutters, 800 ft. at 12 cts. per ft.	96.00
Conductors, 120 ft. @ 16 cts. per ft.	19.20
Painting and glazing, and sanding exterior,	760.00
Carving for exterior,	275.00
" interior,	110.00
Hardware, including locks,	170.00
Smith work,	190.00
Iron posts to support basement floor,	36.00
Chilson's No. 6 furnace, and setting it,	210.00
	9531.70

MODEL COTTAGE.

DESIGN FIFTY-FIFTH.

THE line engravings, on Plate LXXXV. represent the front and side elevations of a cottage. Its external appearance renders it peculiarly suitable for a suburban residence. The internal arrangements are intended for both summer and winter. The material used for its construction is timber of the best quality and thoroughly seasoned. The sills are of oak or heart pine, six by eight inches, and securely imbedded in mortar on the wall. The corner posts, girts and plates, are of white pine, four by eight inches. The frames are four inches square, and the intermediate studding three by four inches, with sixteen inches between the centres. The studding of the doors and windows is four by six inches. The rafters are tapering, eight inches at the foot, with two feet between the centres, and well secured to the plates and ridge-pieces. The joists are three by eleven inches, with sixteen inches between the centres, bridged, backed, &c. The floors are of one inch second quality Carolina heart pine, mill worked, well laid, and then smoothed off. On the exterior, the boards are placed vertically, of uniform width, grooved together, with joints cleated with three and a half inch moulded cleats, all finished for painting. The interior is also boarded with grooved hemlock boards, laid horizontally, and firmly nailed to the studding. The boarding is afterwards cleated with one and a quarter by three inch hemlock cleats, one to each stud, thus measuring sixteen inches between centres, being the proper distances for lathing. By this means; the frame work of the building is much more firm, and the cold winds are prevented from penetrating, as is the case when the lathing and plastering is put on the frame work in the usual way.

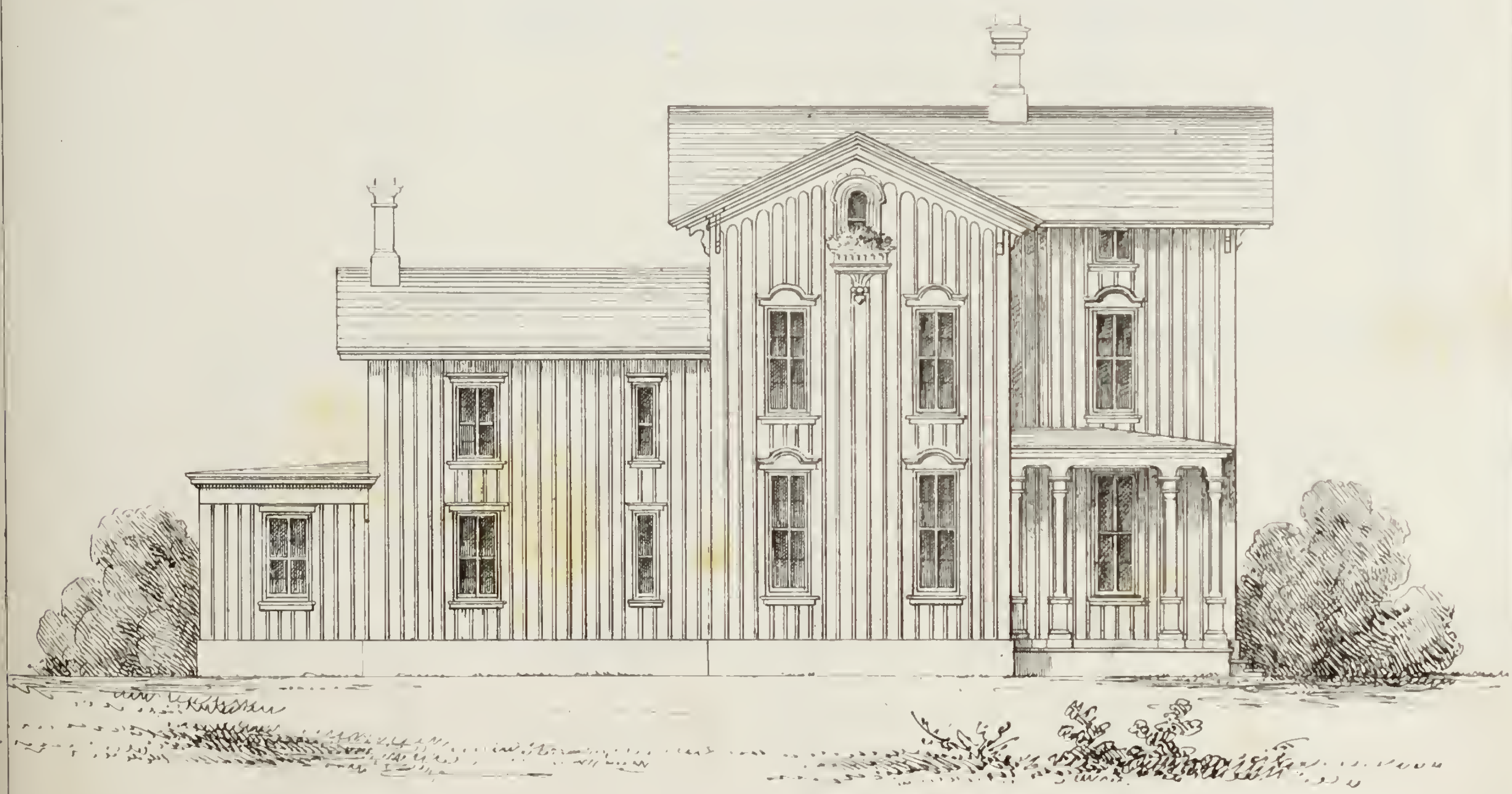
The roof is to be overlaid with the best leaded roofing tin, and furnished with the usual gutters, pipes, conductors, &c. The windows are furnished with inside shutters. Those in the gables have brackets, and are inclosed with a balcony. The room doors are all one and a half inches thick, those of the closets, one and a quarter. The whole is to be plastered with three coats. The parlor, hall, library and dining room, have a neat cornice and centre flowers. All the wood work, on the exterior and interior, has three coats of white lead, or one of zinc paint. The glass is the best American.

The cellar is seven feet deep in the clear, below the joists, and extends under the entire building. The wall is of quarry building stone, sixteen inches thick. The division walls are fourteen to the same level. The furnace flues are so arranged as to warm all the rooms of the main building, including the bath room, which is furnished with an iron tub. A No. 3 Chilson range is placed in the kitchen, with a twenty-five gallon boiler, and an iron sink attached.

Plate LXXXVI. shows the ground plans, drawn to the scale of twelve feet to the inch. The first floor contains the parlor, dining room, library, kitchen and store room, with a shed or wash house in the rear. The second, four large chambers, servants' bed room, bath room and closets, and the third, four bed rooms. The accommodations are ample for a family of ten persons.

The entire cost of the building would not exceed four thousand three hundred dollars, where work and materials can be had for the prices prevailing in and near this city.

FRONT ELEVATION.

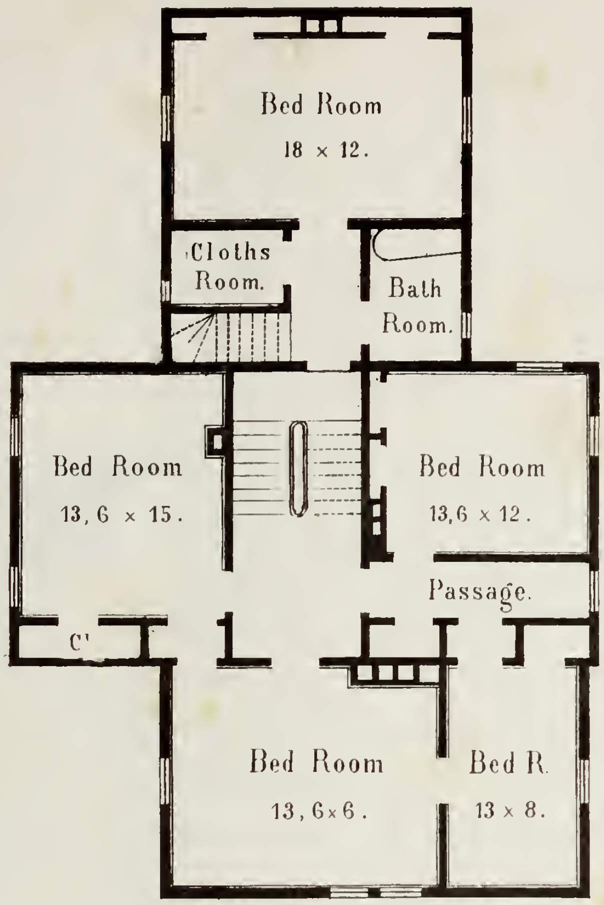


SIDE ELEVATION.

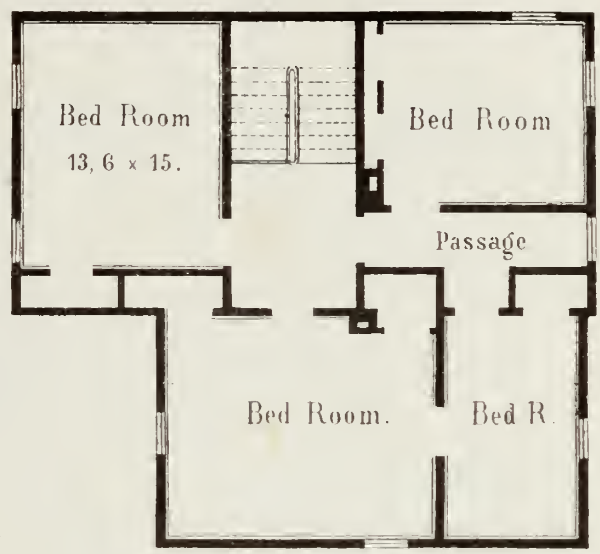
Scale 12 feet to the inch.

Saml Sloan Archt. P S Duval & Co Steam lith press Phil.

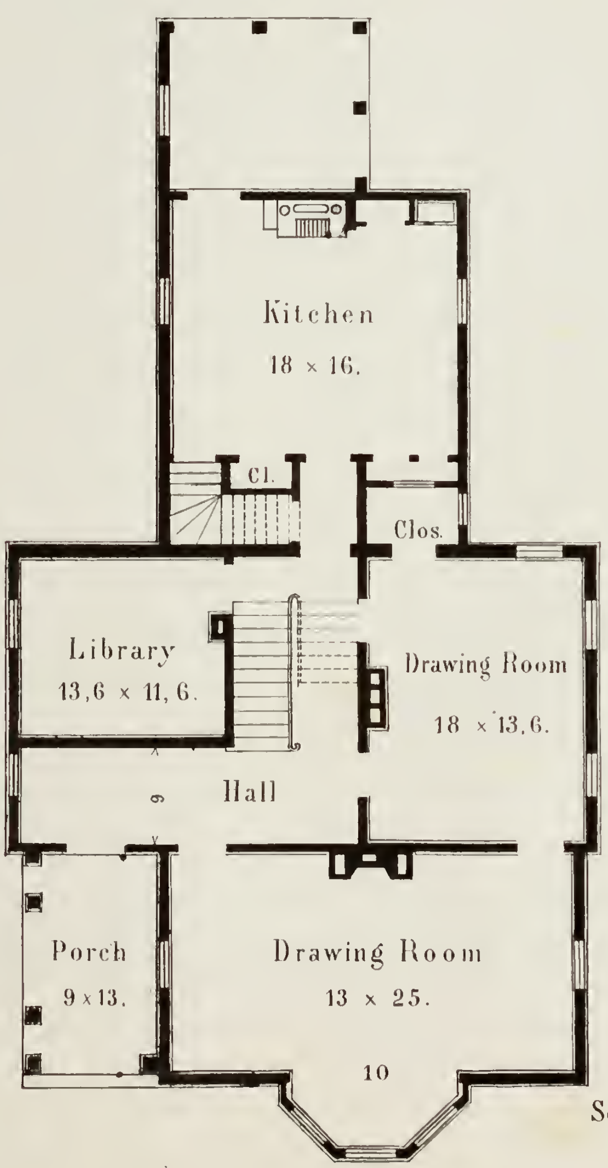
COTTAGES.



SECOND STORY.

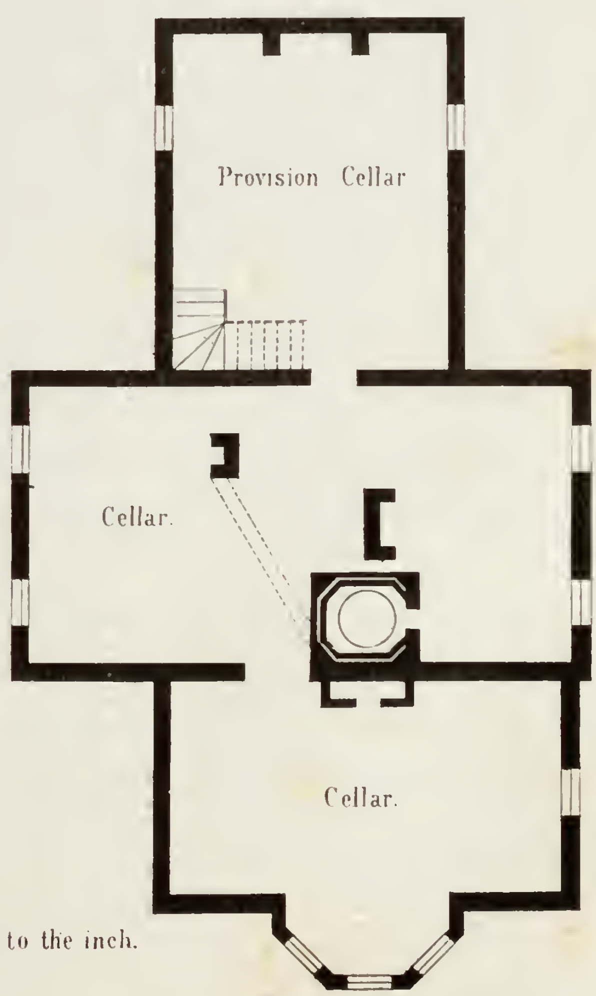


THIRD STORY.



Scale 12 feet to the inch.

FIRST STORY.



CELLAR PLAN.

Saml Sloan Archt.

P S Duval & Co's Steam lith Press Philad.

PLANS.

LANDSCAPE GARDENING.

HERETOFORE our remarks have been confined to the construction of the building, and its different parts. In treating of the grounds adjacent to it, and their embellishments, it is not pretended to offer a full discussion of the subject. Many volumes have been written upon it, and the reader desirous of making it an especial study, must be referred to them. The art is not a new one. The magnificent hanging gardens of Babylon, rising in a series of terraces, one above the other, three hundred feet in height, were thought worthy of being styled one of the seven wonders of the world. The gardens of Versailles, the Villa Ludovisi, the Villa Albani, and the Villa Borghese, at Rome, are familiar to the European traveler. Our own country too, furnishes instances of a successful application of the principles of the art. As early as 1805, Woodlands, near Philadelphia, then the seat of the Hamilton family, now used as a cemetery, was highly celebrated for its beauties. The Bartram gardens, now the property of a private gentleman who is rescuing them from the decay into which they had fallen, the country seat of the late Judge Peters, and Lemon Hill, now owned by the corporation of Philadelphia, were all known to those who had studied the condition and prospects of the art in America; while New York and the Eastern States contain many models of this beautiful art.

The style and pretensions of the garden, by which term we mean to include all the ground belonging to a building, should be determined by the general aspect of edifice to which it is attached. For a town residence, the regular and confined surface employed, the importance of the building, and the influence it should naturally have over the limited space attached to it, render a symmetrical distribution necessary. Neatness and order ought to constitute the ruling features around villas and country residences. As the grounds immediately adjacent to the residence may be considered a part of the site, they may be distributed with regularity, governed by the general plan of the seat. Yet it should be the object of the amateur or artist to avoid the mathematical precision and exactness that, for many years, prevailed in England, known as the productions of the Dutch School. In these, the elements of both grace and beauty were wanting. They pained the eye with their unerring uniformity, and the constantly recurring geometrical figures, in which the shrubbery, or trees, were trained and clipped.

By Landscape Gardening is not meant merely an imitation of the agreeable forms of nature, but an expressive, harmonious and refined imitation. It should be the aim to separate the accidental and extraneous, and preserve only the spirit or essence of those beauties that pervade every part of nature. Where circumstances compel the cultivation of the Beautiful, rather than the Picturesque, it should be strictly adhered to, for blending the two styles, as is often the case, on a diminutive scale, is productive of effects more ludicrous than pleasing. In the shape of the ground, there should be no abrupt elevations or depressions, but changes are rather to be effected by a series of gentle undulations. The trees chosen should be those with smooth stems, full, round and regular heads of foliage, and luxuriant branches, often drooping to the ground, an effect attained by planting and grouping, so as to permit free developement of form, and by selecting trees of suitable character, as the elm, the ash, the silver leaf poplar, and the like. In the use of roads and walks, they should be made to proceed by easy flowing curves, following natural shapes of the surface, with no sharp angles or abrupt turns. Where water may be permitted to enter into the scene, it should be in a smooth lake, with curved margin, embellished with flowing outlines of trees, and full masses of flowering shrubs, or in the gentle winding curves of a brook. The additions to such an effect, are grass mown into a velvet-like softness, and gravel walks kept perfectly hard, dry and clean. Among the trees and shrubs should be conspicuous, the finest foreign sorts, distinguished by beauty of form, foliage and blossom.

The Picturesque aims to produce outlines of a spirited irregularity, surfaces comparatively abrupt and broken, and growth of a bolder and wilder character. The smoothness of the ground may be broken by sudden variations, and occasionally run into rocky groups, ravines and broken banks. The trees may be old and irregular, cut out, as it were, from their native wilds, and grouped in every variety of form. In water, all the wildness of romantic spots in nature is to be imitated or preserved, and the lake or stream with bold shore and rocky margin, or the bold cascade may be a characteristic feature. Though firm gravel walks near the mansion are indispensable for comfort and fitness in all modes, the lawn may be less frequently mown, and the edges of remote walks less carefully trimmed. For such grounds, the Gothic, old English, or Swiss style, should be chosen for the main building.

In the selection of trees, the advice of an experienced gardener should be procured. There is no branch of the art of ornamenting that requires greater care and attention. The round and full species, of which the oak and horse chesnut are familiar examples, are always preferable, where but few are to be planted. When young, they are generally beautiful, from the smoothness and elegance of their forms. They harmonize with almost all scenes, buildings, and natural or artificial objects, uniting well with other forms, and offering no violence to the general effect. In all grounds where the surface is abruptly varied by steep banks, or rocky precipices, trees with spiral tops, as the pine and fir, have a pleasing effect. From their sameness and uniformity, when planted in large bodies, the eye soon becomes weary. Their chief value on level grounds, is the pleasing variety produced by planting them with trees of a different species to relieve or break into large masses of foliage. They are mostly evergreens, but are seldom of much value as shade trees. Conical trees, of which the Lombardy poplar is a well known example, have been frequently used by proprietors in different sections of the country, to destroy the beauty of many a fine building and its surrounding prospect. If indiscriminately planted, by their tall and formal growth, they invariably diminish the apparent magnitude as well as the elegance of the house. Like the spiral topped species, they should be used sparingly, and only to increase the effect produced by large bodies of round headed trees, forming pyramidal centres to groups, where there was only a swelling and flowing outline. The prominent characteristics of drooping trees, as the weeping willow, or the drooping elm, are grace and elegance, and they are unfit to be employed to any extent in scenes where it is desirable to keep up a wild or picturesque expression. They show to the best advantage on the borders of groups, or the boundaries of plantations. All strongly marked trees, like bright colors in pictures, only admit of occasional employment, and the very object aimed at in introducing them is defeated, if they are brought into the lawn or park in masses, and heedlessly distributed on every side.

The management of the walks and roads, connected with the mansion, must be determined by the circumstances of each case, and constitute a branch of the subject concerning which it is impossible to do more than offer a few general remarks. They serve as the means of displaying the finest points of prospect, and the most attractive beauties of an estate. Since the rejection of the rectangular style, many act upon the impression that nature has a horror of straight lines, and invariably run into the other extreme, filling their grounds with zigzag and regular serpentine walks and roads. A safe rule to adopt is, that a curve should never be constructed without some reason, real or apparent. The most natural method, when the ground gently undulates, is to follow, in some degree, the depressions of the surface, and to construct curves around eminences. In the straight walk of half a mile, the whole view is seen at a glance, and the eye soon becomes wearied with the monotony. By a judicious use of the curve leading the walk to agreeable retreats or pleasing points of view, every new turn opens a new prospect, and "leads the eye a kind of wanton chase," continually affording novelty and variety.

Fencing and hedging must not be overlooked. The detail plates of our work contain many suitable designs for enclosures, immediately around the mansion. The prevailing practice of subdividing ground of a limited or even a great extent into a vast number of lots or small fields, is reprehensible. It destroys the general effect of the prospect, and gives unnecessarily the idea of contraction. Where divisions are requisite for agricultural purposes, they may be made with wire fencing, or skilfully placed hedges. Though the latter have heretofore been but little used, their value, permanence and beauty will one day recommend them to general favor. Five or six years are, in our climate, under ordinary circumstances, amply sufficient to produce ornamental hedges, forming barriers secure from all attacks to which they are liable, and lasting for many generations. The common Arbor Vitae, found in great abundance in many districts, and the New Castle or Washington Thorn, are much better adapted to this climate than the English Hawthorn. The Buckthorn is rapid in its growth, is not liable to be infected by insects, and makes an efficient screen sooner than most other plants. In all cases where hedges are employed in the natural style of landscape, a pleasing effect is produced by allowing them to grow somewhat irregular in form, or varying the outline by planting near them small trees or flowering shrubs. For cottage residences, a pretty enclosure may be formed of rustic work, made of stout rods of any of our native forest trees, with the bark on. These are sharpened and driven into the ground in the form of a lattice, or wrought into any figure of trellis work. When covered with luxuriant vines, or climbing plants, such a barrier adds much to the general appearance of a small building.

In the management of bodies of water, good taste forbids the attempt of any thing beyond graceful or picturesque imitations of natural lakes or ponds, brooks, rivulets or streams. In this way alone, can they be made to harmonize, agreeably with natural scenery. There can be no apology made for the introduction of straight canals, round or oblong sheets of water, or any of the forms of the geometric mode. All appearance of constraint and formality should be avoided, and however used, it should be permitted to take its own flowing and graceful forms. In architectural or flower gardens, where a more artificial arrangement prevails, a departure from these principles may be allowed. More regular shapes, with various jets, fountains, &c., are admissible, since they combine well with the other accessories of such places. Fountains are highly elegant decorations, but are rarely seen, not so much from the cost incurred by their erection, as from the fact that so few of our artizans have made their construction a study. Designs for these ornaments may be found in great numbers in the works of rural embellishment. A single jet is one of the simplest and most pleasing. Weeping or Tazza fountains require a very moderate supply of water. The conduit pipe rises through and fills a vase so constructed as to permit the water to flow over its margin. A species of rustic fountain is made by introducing the pipe or pipes among groups of rock work, and the water issues either in the form of a cascade, a weeping fountain or a single jet.

The employment of statues in the embellishments of villas and country seats, may considerably increase their beauty. They ought not only to present all the perfection of art, but likewise possess the power of exciting those sentiments suitable to the situation. The statues of Jupiter, Mars and Hercules, should not be placed where we expect to find those of Ceres, Bacchus, Pomona and Flora. With these ornaments might be classed vases, and their pedestals, arches, sundials, &c. Those made of marble or granite are too costly to obtain general favor. Terra cotta, or artificial stone of any kind, and cast iron, are much less expensive, and are manufactured with great skill and taste. When well painted, they will endure exposure for a long time, and contribute to the animation of the scene.

Among the designs prepared for our work, are many of decorative out buildings. These are erected for every purpose, and in all grounds, of any pretensions, are necessary to complete the effect. The conservatory, grapery, gate-lodge, arbor, ornamental bridges, aviary, bath and boat house, have all their appropriate places and uses. No one can fail to remark the impression on the landscape that fabrics of this kind spread around them. They not only determine the character of the grounds, but produce in them as it were, a new energy, and augment the degree of pleasure, gaiety, gravity or melancholy of the scenes of which they form a part. An open rotunda, situated on an eminence, will increase the aerial aspect produced by the tall and thinly planted shrubs that surround it on all sides. A temple imparts a solemn, a hermitage, a melancholy, and a thatched arbor, a rural character. If, instead of making these buildings accord with the character of each scene, a pavilion of a noble style be raised on a wild site, if ruins be erected on one that is level and carefully cultivated, a cabinet for study, adjacent to a principal walk or promenade, or a bath on the summit of an eminence, the laws of fitness would be outraged. When a number of these structures are introduced into grounds, they should be distinguished by the diversity of their forms and appearance, and all symmetry and equality of position should be avoided. Though a single architectural production requires in its construction an exact observance of the laws of symmetry, this rule cannot be extended to the situation, distance and position of a number of rural buildings, each of which has an insulated being and governs the particular portion of the grounds belonging to it. A capricious medley of the architecture of different ages and nations should be carefully avoided. There ought not to be, in the same perspective, an Egyptian obelisk, a Grecian temple, a Roman arch, a Gothic tower, and a Chinese pavilion. This absurd assemblage and confusion of productions, differing both in time and space, that so ill accords with the charms of nature, and the simplicity of pleasure grounds, can only be the result of a perverted taste, and an inordinate mania for imitation.

SUBURBAN VILLA.

DESIGN FIFTY-SIXTH.

The elevation on Plate LXXXVII. is that of a residence in the Italian style, lately erected near Philadelphia. It is simple, and free from ornament, but commodious, and constructed with all modern appliances.

On Plate LXXXVIII. are the plans of the different stories. The cellar contains apartments for stowing away fuel and provisions, and the furnace. The first floor, a parlor, dining room, library and kitchen, with a large hall and closets. The second, two chambers, two bed rooms, a nursery, bath and closets. The private stairway is represented on the plate. In the attic, are sleeping apartments for servants. The accommodations are ample for a family of ten persons.

Complete specifications of the workmanship and materials are annexed. These are usually prepared by architects for the erection of buildings of even moderate pretensions, and constitute part of the contract made with the builder. They are his guide, and, when carefully prepared, often prevent misunderstanding between him and the owner.

CONDITIONS.—The contractors severally, are to provide such material, set forth under their respective heads, as may be necessary for the erection and completion of the building, in all its parts, to the full intent and spirit of the design and specifications, either expressed or implied. They must bear all loss from accident, or neglect during the progress of their respective divisions of the work, and hold the owner free from all responsibility, until the building shall be fully completed, according to agreement. The materials thus required to be furnished, are all to be of the best quality, and it is hereby fully understood that the owner or his superintendent shall have full power, at all times during the progress of the work, to reject any materials either may consider unfit to be used, or different from those described, also the power to cause any defective work to be taken down, or altered, at the contractor's expense. Either of them shall also have the privilege of making any alterations or additions they may deem proper, without in any way interfering with, or lessening the agreements and contracts made upon said plans, and without additional expense, unless such alterations or additions cost more than is here specified or contracted for, the additional expense in such case to be agreed upon in writing, between the parties, in all particulars.

GENERAL DIMENSIONS.—The whole extent of the building is to be thirty-six feet by fifty-two feet deep, and two stories high, with attic. The first story is twelve feet six inches from floor to floor. The second story, eleven feet three inches from floor to floor. The attic, five feet at the wall and seven feet six inches in the centre. The kitchen and store rooms ten feet eight inches from floor to floor. The nursery and bath room, ten feet nine inches from floor to floor, and the attic over them is seven feet four inches in the clear. These heights will bring the cornice of all on the same level. For the divisions and general arrangements, reference must be had to the plans upon which they are all figured.

EXCAVATIONS.—The cellar extends throughout the entire extent of the building, and six feet below the intended level of the surface of the ground, being seven feet in the clear of joists. The first floor is elevated twenty-eight inches, being four risers of seven inches each. The foundations for the porches, &c., of sufficient depth to ensure them against frost; the top soil from the excavations to be removed to the rear end of the lot, and remain for the owner. All surplus earth not required in grading the yard, must be removed from the grounds.

MASONRY.—The walls of the cellar must be of good quarry building stone, laid in a proper manner, upon their broadest beds. The walls are all sixteen inches thick up to the top of the first floor of joists, and project two inches out from the face of the brickwork, forming a base course around the building. All windows and cellar doors to be formed as shown upon the ground plans; said masonry to be laid in mortar composed of fresh wood-burnt lime, and sharp gravel.

BRICK WORK.—All the outer walls from the aforesaid stone walls are to be of brick, nine inches thick; the outside to be faced with good dark stretchers, with joints made flush for painting. No soft brick are to be used, in any part of the outside face. The two division walls in the cellar are also of hard brick, and nine inches thick. Construct all flues, &c., for warm air and gas, as marked upon the plans, and topped out above the roof with rough hard bricks, as per elevation, and afterwards roughcast. The flues are all to be smoothly pargetted on the inside. The mortar for said brick work must be composed of fresh wood burnt lime, one half river sand, and one half grey gravel, in such proportions as will ensure an approved cement.

CARPENTER'S WORK.—The joists of all the floors front, from the flues are to be three by eleven inches, and all in the rear, three by twelve inches, of good sound hemlock, and backed, with one course of bridging, through the centre of each tier, and all to be placed sixteen inches between centres. The partitions on each side of the parlor, and upwards, to be constructed with three by six inch scantling, set the six inch way, framed sufficient to support the tiers of joists. All other partitions are to be three by four inch, set three inches, very strongly nailed at the floors aud ceilings; all placed sixteen inches between centres. The roof has four gables and valley rafters, with ridge pole. The ridge pole to be three by twelve inches, the valley rafters three by ten inches and the wall plate four by eight inches, in two thicknesses, cross jointed and well nailed together. The common rafters to be the usual rafter cuts, all to be fitted up, and firmly nailed at all ends, and to be closely boarded and prepared for metal. The floors are of the second best quality Carolina Heart Pine, mill worked, well seasoned, and well nailed to the joists, and afterwards smoothed off.

STAIRS.—The main stairs are constructed in the hall, from the first to the second floor, with a closet beneath. The steps are one and a quarter inches, with inch risers glued and blocked together, and secured on four strong carriages. The rail is four and a half inch moulded, the newel will be eight inches, turned cap and base, and octagon shaft, all of mahogany. The balusters are curl maple, two inches hexagonal. The private stairs are constructed in the usual manner, and extend from the cellar to the attic story, with a door at the head of the private stairs, and also at the foot of the second story stairs.

WINDOWS.—These are all alike in their construction, with a six inch face and mouldings; the sills to be heart pine; the second story front, and each of the wings to have heads as per elevation. The sash are all double hung, those of the first stories, one and three quarter inches thick, and all the others one and a half inches thick; the front and ends of the wings, each to have a circular window in the gable. The rear has two windows in the attic room, also double hung. The front windows, first story, are two lights wide, five lights high, twenty-two and a half by fifteen inch glass. The store room and kitchen windows, and second story front wings, and those over the dining room, to be two lights wide, four lights high, nineteen and a half by fifteen inch glass. The front window, first story, to have side lights. The three dining room windows also to be two lights wide, and four lights high, twenty-two and a half by fifteen inches glass. Those in the nursery, bath room and private stairs to be in like manner, with glass eighteen by fifteen inches, and those in the rear of the attic will be twelve lights, ten by fourteen inch glass. The circular windows to be hung with three inch butts, and secured by a six inch bolt. The cellar windows will all have sash hung with two and a half butts, to a narrow casing, and secured by small bolts.

DOORS.—The front entrance doors to be one and three quarter inches thick; six panels with mouldings on the one face, and bead and butt on the other, hung with four by four inch butts, and secured by an eight inch upright rabbet mortice lock, with night latch. The frame to be made with side and head lights. The entrance doors, from the hall to parlor and dining room, and the one from parlor to library, to be one and three quarter inches thick; six panels, with mouldings on both sides, hung with four by four inch butts, and secured by four inch mortice locks. All the other room doors, including bath room, store room and china closet to be one and a half inches thick, six panels, with mouldings on both sides, hung with three and a half inch butts, and secured by three inch mortice locks. The back door of the hall and kitchen each to have two iron plate flush bolts. The closet doors all to be one and a quarter inch thick, six panels mouldings on one side and raised panels on the other, hung with three and a half by two inch butts, and secured by the best closet locks, with knobs corresponding with those on the other room doors. The closets and store rooms are all to be fitted up and fully shelved, and clothes hooks where desired. Kitchen dressers are to be fit up on both sides of the kitchen store room, with panel doors top and bottom, and drawers in the centre. The washboard in the parlor, dining room, library, and hall will be twelve inches wide, including two and a half inch sub., and two inch mouldings. In the chamber above, they are to be ten inches wide, including two inch sub., and one and a half inch moulding. Those in the kitchen and room above will be seven inches wide, with one and a half inch moulding, planted on the top and in the closets and store rooms, they are to be four inch, with one inch bead, planted on the top, the attic from the private stairs front to have no washboard. The dressings of the doors and windows in parlor, dining room, library and hall will be architrave and mouldings, eight inches wide. The rooms over, including the nursery, to be five inch moulding. The store room, bath room, and servants' attic all to be three and a half inches. The cellar door to be made on the west wing, four feet wide by three and a half feet, in two parts, of one inch white pine grooved boards, firmly put together, with wrought nails, with white lead in the joints, hung with wrought hooks and straps, and secured by a swinging bar on the centre. The checks to be five by six inch heart pine, with four by eight inch sill of the same material. A shed also to be constructed across the rear, eight feet out, supported by four pine posts, four by four inch, planed, cornered, and extend down within seven feet of the pavement, with pitch outwards, and boarded over for tin. The front porch to be constructed according to the drawings. The floor will be one inch white pine grooved boards, of a good quality, not over four inch wide, and laid with white lead in the joists. The sleepers will be hemlock, three by seven inch, and bear upon a cross beam four by eight inches, all firmly secured. The dimensions can all be measured from the drawings. The cornice of the building to be constructed according to the drawings. The brackets to be required to all sides.

SHUTTERS.—The first story windows are all to have outside shutters, one and a half inches thick. Those on the front will be four panels each, or eight panels to the window, and the others to be three panels each, hung with hooks and straps, and secured by ten inch shutter bolts. All the above shutters will be moulded on one side, and bead and butt on the other. All the second story windows to have inside shutters, one inch thick with eight folds to the window, or four to each jamb, with mouldings, hung and secured in the usual manner. The windows of the dining room are to have panel backs, and the principal chamber doors are to have Venitian pivot slats that serve for ventilators. Provide also a trap door in the roof, hung and secured as usual, with a step ladder to approach the same.

PLASTERING.—All the walls and ceilings, including that of the front porch, to have two coats of brown mortar, and one of a hard white finish. The ceiling of the parlor to have a cornice in the angle to girt fourteen inches, one in the dining room to girt twelve inches, one in the library and hall to girt ten inches. The parlor to have a centre flower to be three feet six inches in diameter. One in the dining room, to girt two feet six inches, and a small flower in the library and hall. Tho mortar for said plastering must be composed of river sand, and wood burnt lime, in such proportions as will ensure the most approved mortar. All laths to be sound and free from bark.

PAINTING AND GLAZING.—All the wood work that is usual to paint interior and exterior, to have three coats of pure white lead, and best linseed oil. The brick walls are all to be coated four coats, and sanded in the best manner, and also the wood work of the interior and exterior in such tints as the owner may desire. The sash all to be glazed with the best quality American glass, well bradded, bedded and back puttied.

PLUMBING.—The water to be introduced to bath room, hot and cold, and to the water closet, and to the sink in the kitchen, also hot and cold. The bath tub to be made in the usual manner, panelled front and neatly capped, the tub to be lined with lead. The water closet to be fitted up in the best manner, self-acting, with china hopper, and incased. The seat to be made walnut with hinged lids, &c. The sink in the kitchen to be of iron, large size, fitted up with a closet beneath, all pipes to be extra strong, with all necessary stops and draw cocks, to make the whole complete. Also, with all necessary waste pipe. The said pipe from the water closet, to be five inch iron, and to extend to a well at least twenty feet from the building. The supply pipe will extend to the outer wall, below the surface of the ground, at the nearest accessiblo point, to connect with the main in the street, from that point to the street to be provided by the owner.

GAS.—The Gas is to be introduced from the main in the street, and arranged through the building for burners, in the ceiling of the parlor, the dining room, kitchen, and in chamber over library, two over parlor, one hall, two over dining room, one in the passage, one in bath room and one in the nursery, all of which are marked on the plans.

BELLS.—A bell from the front door to the kitchen, one from the dining room, and one from front chamber to tho servants' room, and also one from front chamber to the kitchen.

HARDWARE.—All the hardware to be of good quality. The locks to be American, with patent silvered glass knobs, to all the first story, except the kitchen, and porcelain to the second story chambers. All the others to be mineral. The cellar windows are to have cast iron ornamental guards. The pullies to be patent axle, and the sash cord to be of the best patent hemp made cord. The bell pull to correspond with front door knob. The posts of the front porch to be set with cast iron boxes.

TIN WORK.—All the roofs are to be overlaid with the best quality leaded roofing tin, painted on both sides, the top side to have two coats. All gutters to be properly formed to convey water to four eave pipes. Provide also, four three inch conductors, to convey the water to the ground, with three spouts.

FURNACE AND RANGE.—The iron work of the furnace, including the registers and tin work, to be purchased and set by the owner. The brick and mortar to be provided by the contractor. The range and boiler also to be purchased by the owner. The brick and mortar to be furnished by the contractor.

COUNTRY HOUSES.

DESIGN FIFTY-SEVENTH.

On Plate LXXXIX. are two elevations. The upper one is that of a building suitable for a farm house, two stories high, and with ample accommodations for a family of twelve persons. The plans of the two stories, with the position of the verandah and porches are seen on Plate XC. A hall ten feet wide, extends through the building. On one side is a drawing room, on the other a sitting room, dining room and stairway. Two kitchens and a large store room are in the rear. The second story contains six chambers and a bath, with a sufficient number of closets.

The lower elevation is that of a cottage, with more pretensions to comfort and convenience than beauty. Its plans are shown on the right of Plate LIX. of Vol. I. The first story contains a parlor, hall, dining room and kitchen, the second four chambers, and the attic, two chambers suitable for servants' apartments.

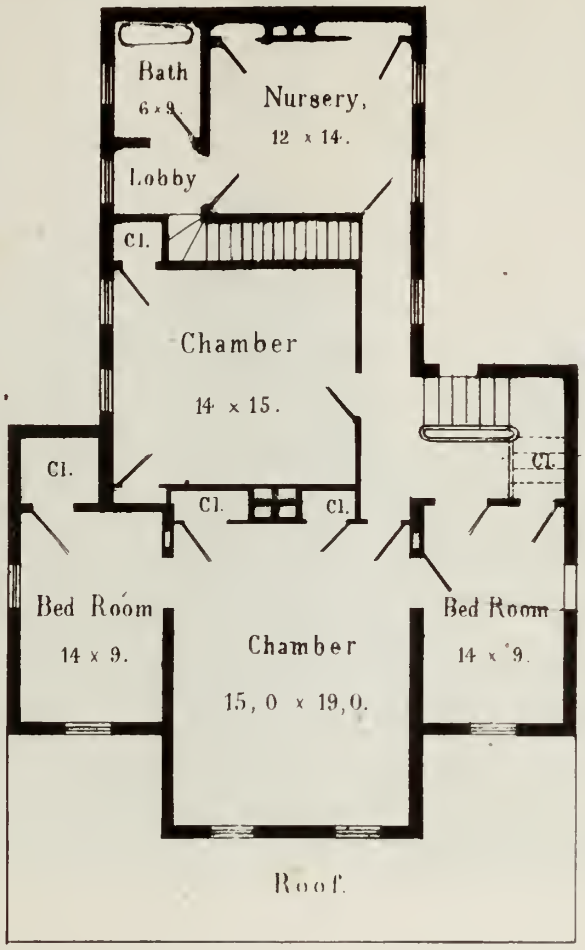
DOORS AND CEILING.

DESIGNS FIFTY-EIGHTH, FIFTY-NINTH, AND SIXTIETH.

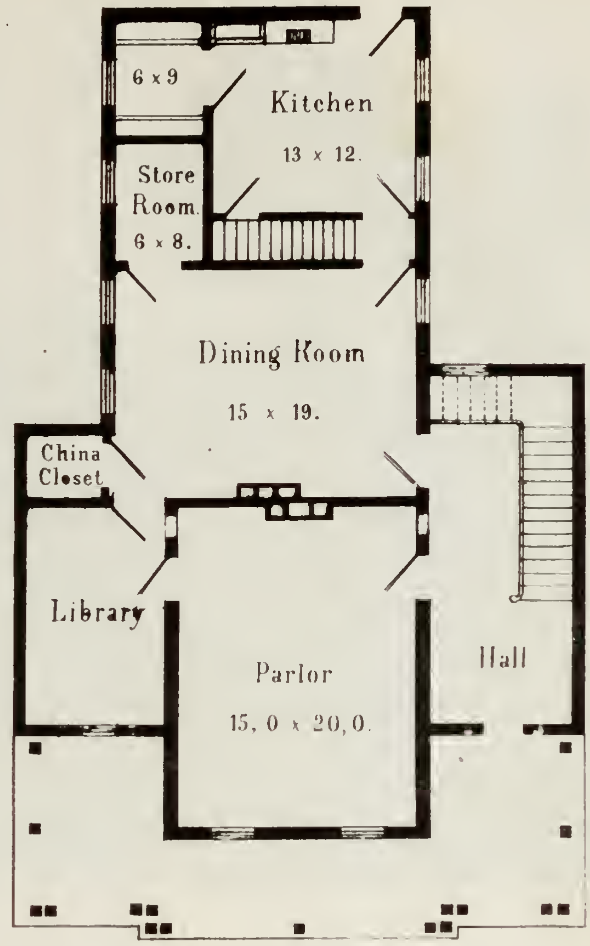
Plates CXI., CXII., and CXIII., are drawings that will prove of great practical value to the builder. The two doors are on the scale of one inch to the foot. The ceiling ornaments are two inches to the foot. A section of the cornice is displayed.

Saml. Sloan Archt. P. S. Duval & Co's Steam lith. Press Philada.

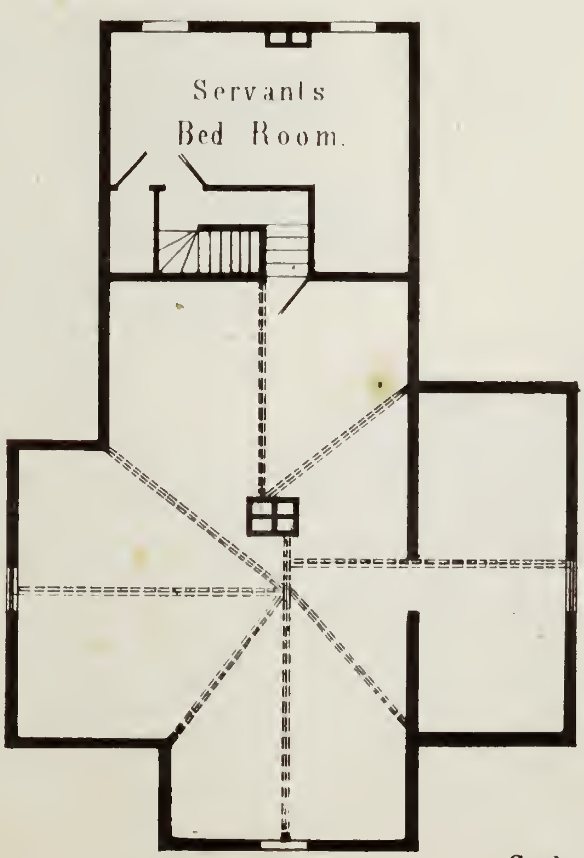
SUBURBAN VILLA.

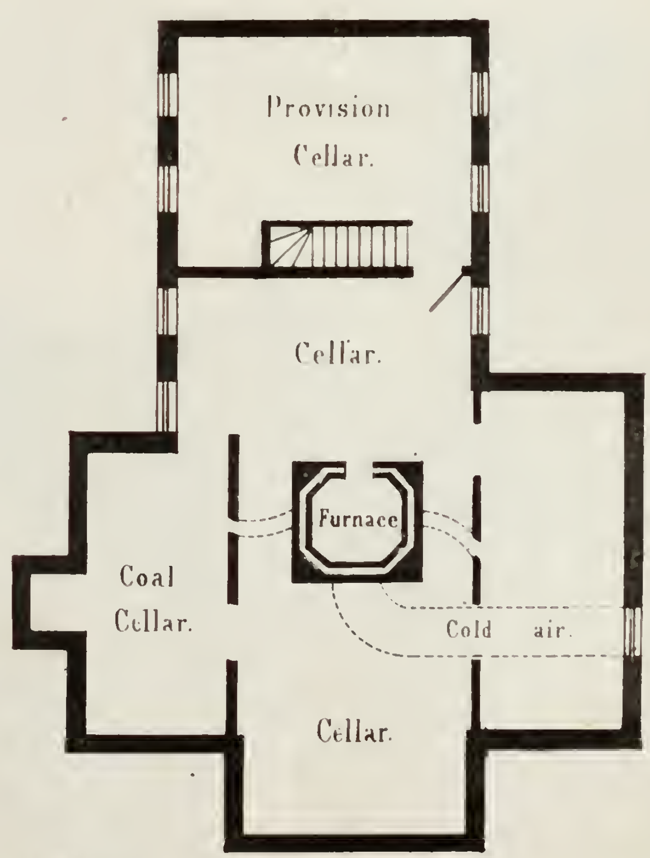


SECOND STORY.



FIRST STORY.





Scale 12 feet to the inch.

ATTIC STORY. CELLAR.

Sam! Sloan Arch! P. S. Duval & Co's Steam lith Press Phila.

PLANS.

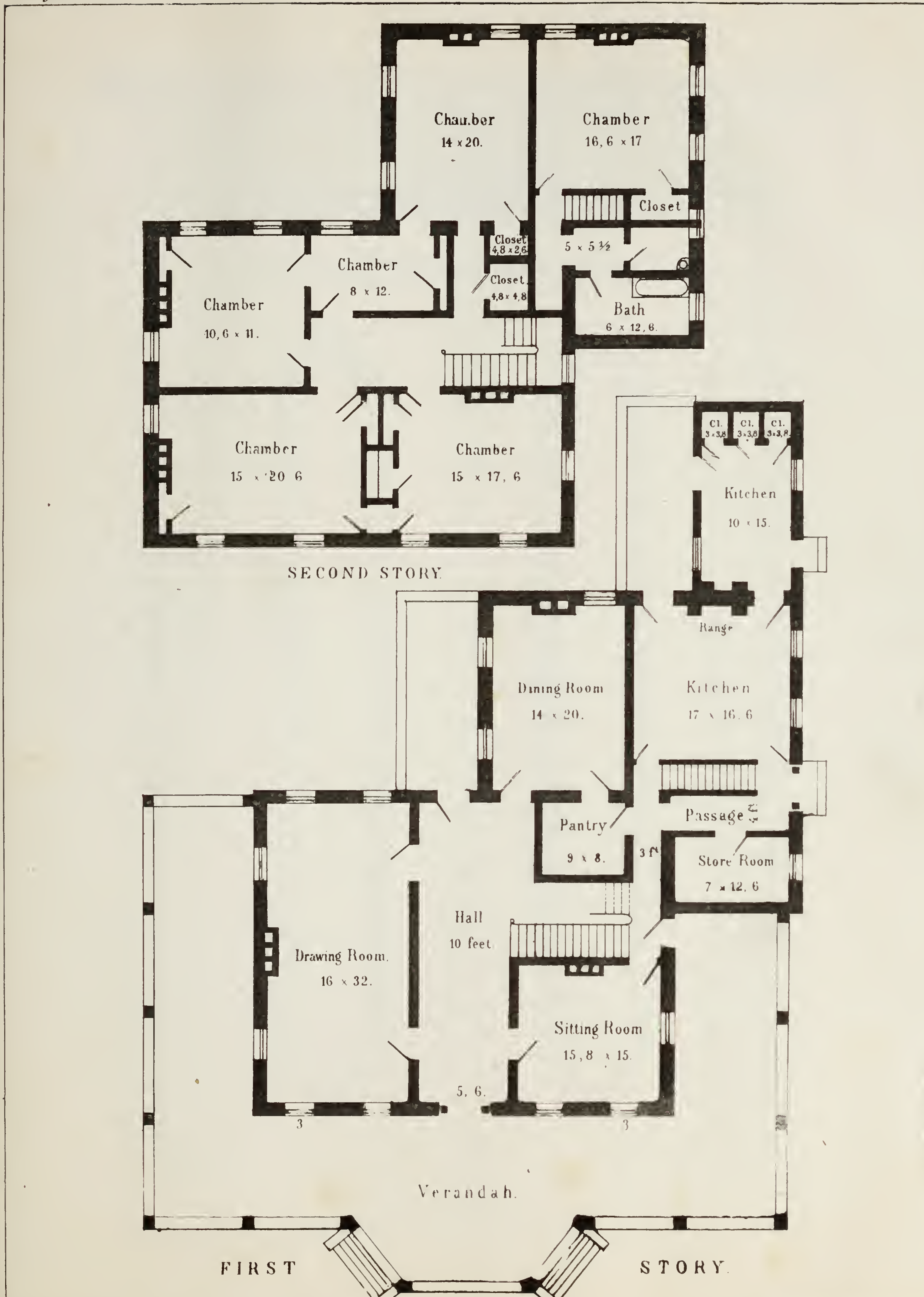
FARM HOUSE

Saml Sloan Archt

P. S. Duval & Co's Steam lith Press Philad.

ITALIAN STYLE,

COUNTRY HOUSES.



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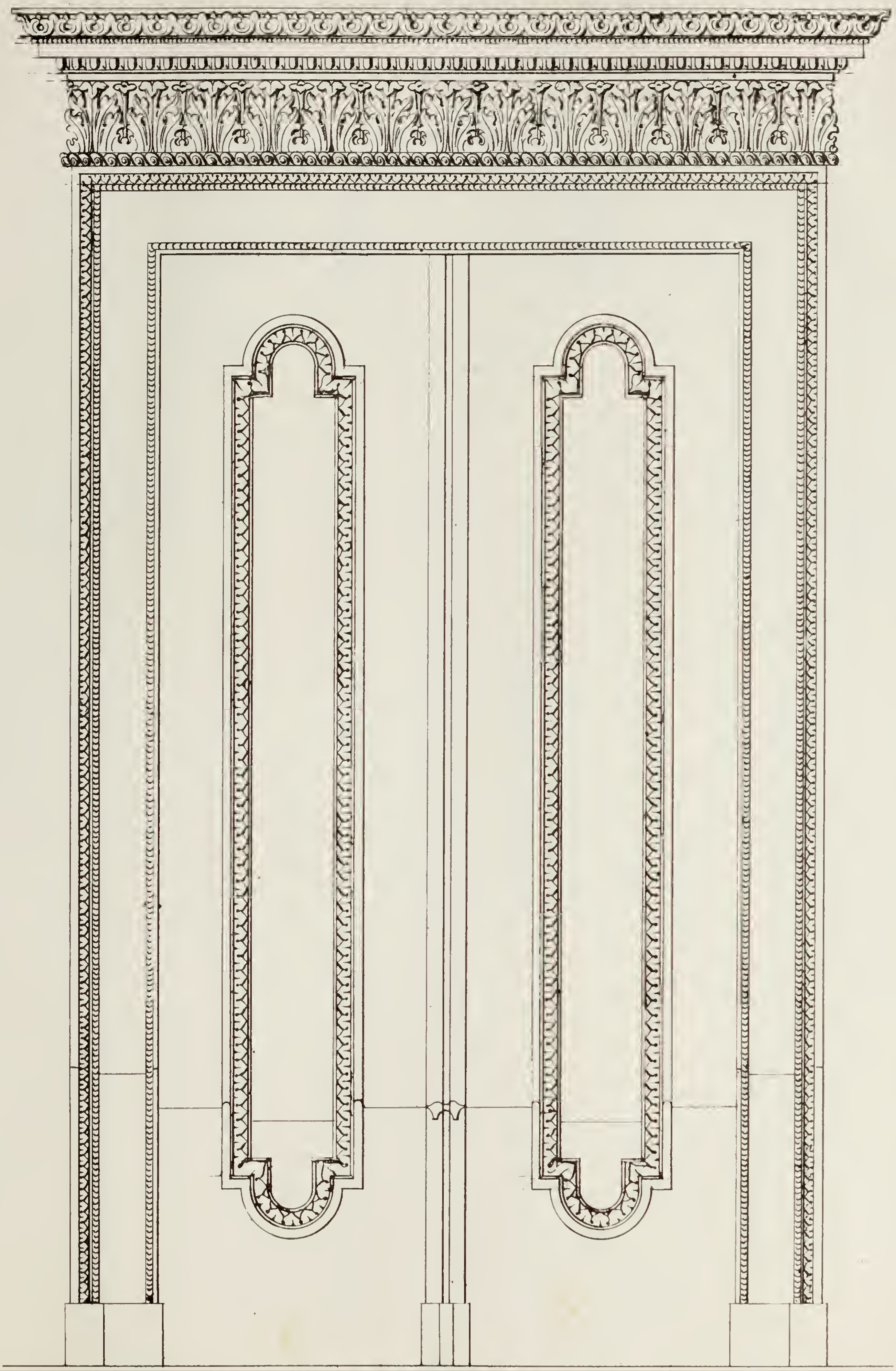
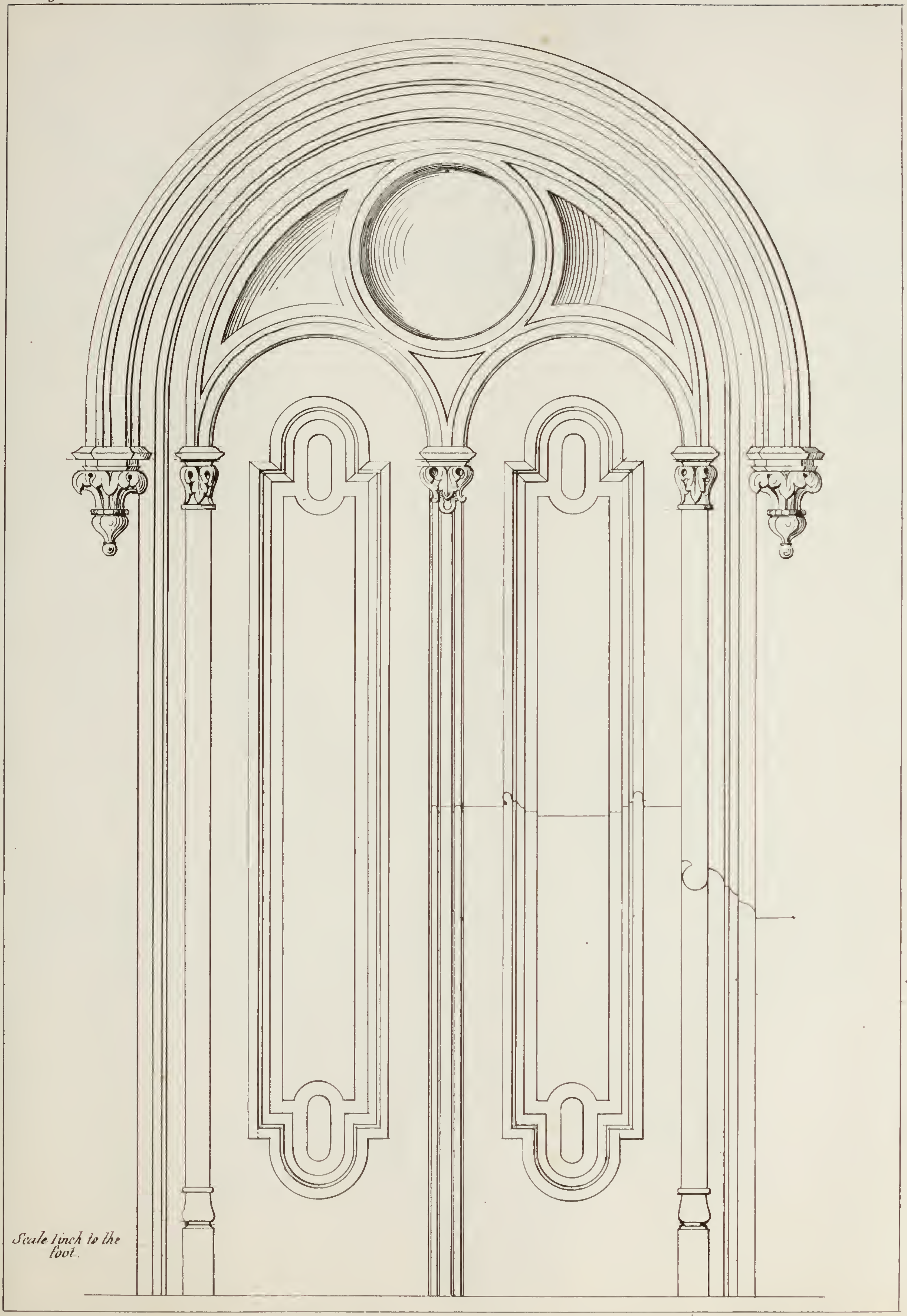
PLANS.



Scale 1 inch to the foot

Sam. Sloan Archt. P. S. Duval & Co. Steam lith press Phil.

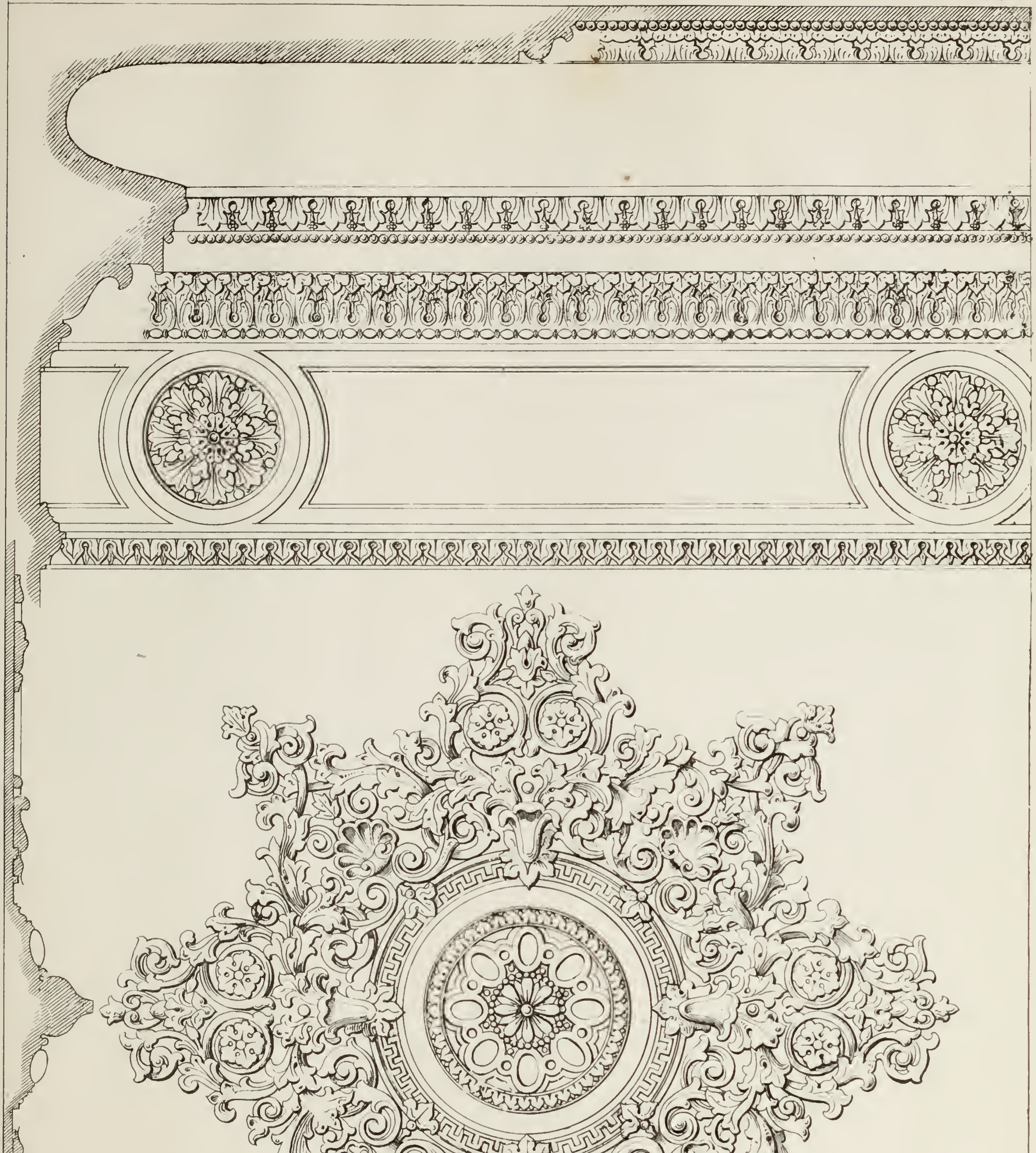
DOOR & ENRICHMENTS.



Saml. Sloan Archt.

P. S. Duval & Co. Steam lith press Phil.

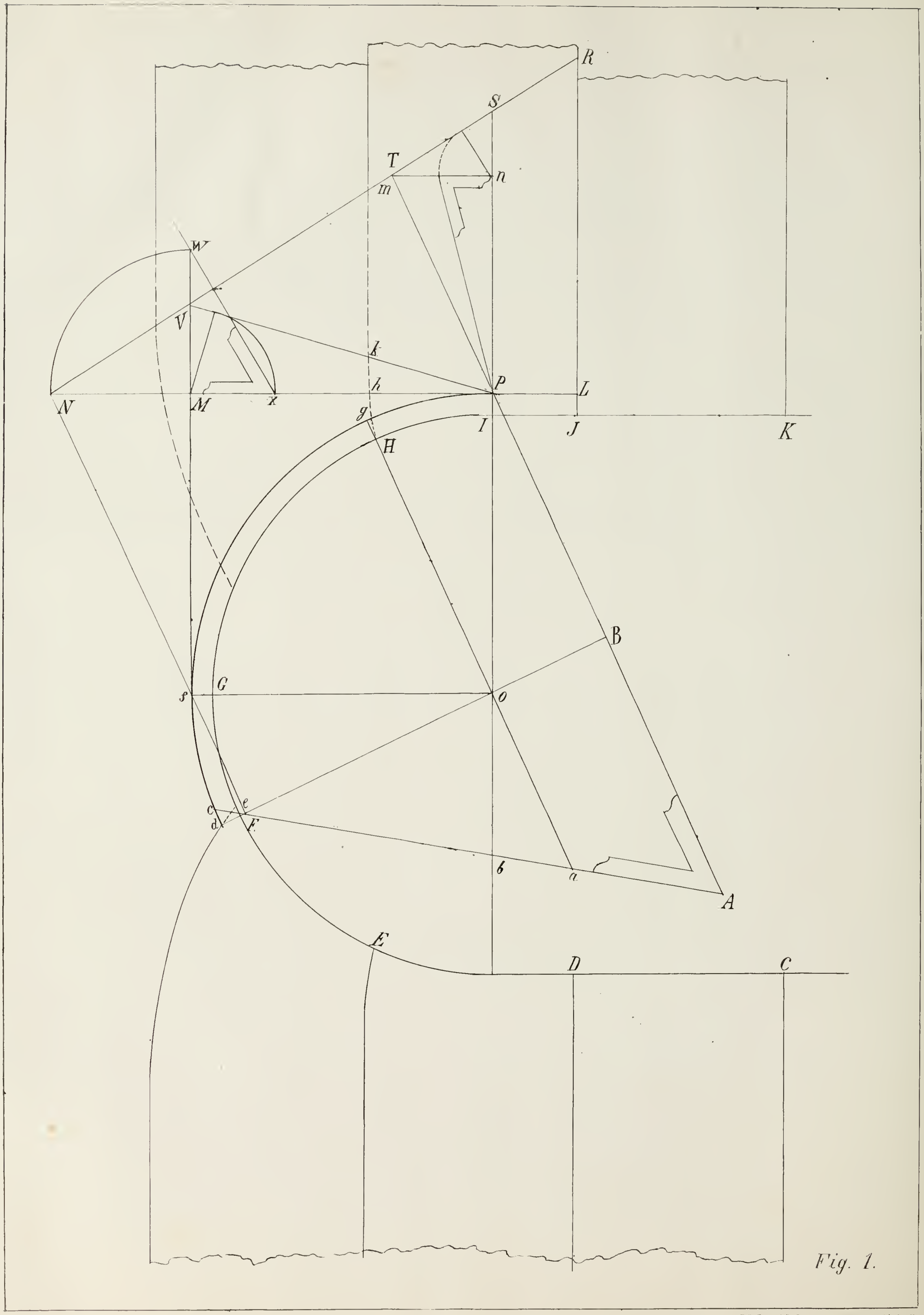
DOOR IN THE NORMAN STYLE.



Sam^l Sloan Arch

P. S. Duval & C^o. Steam lith press Phil

STUCCO CENTER PIECE & CORNICE.



P.S. Duval & Co's Steam lith Press Philad.

DIAGRAM OF STAIR LINES.

Plate 2.

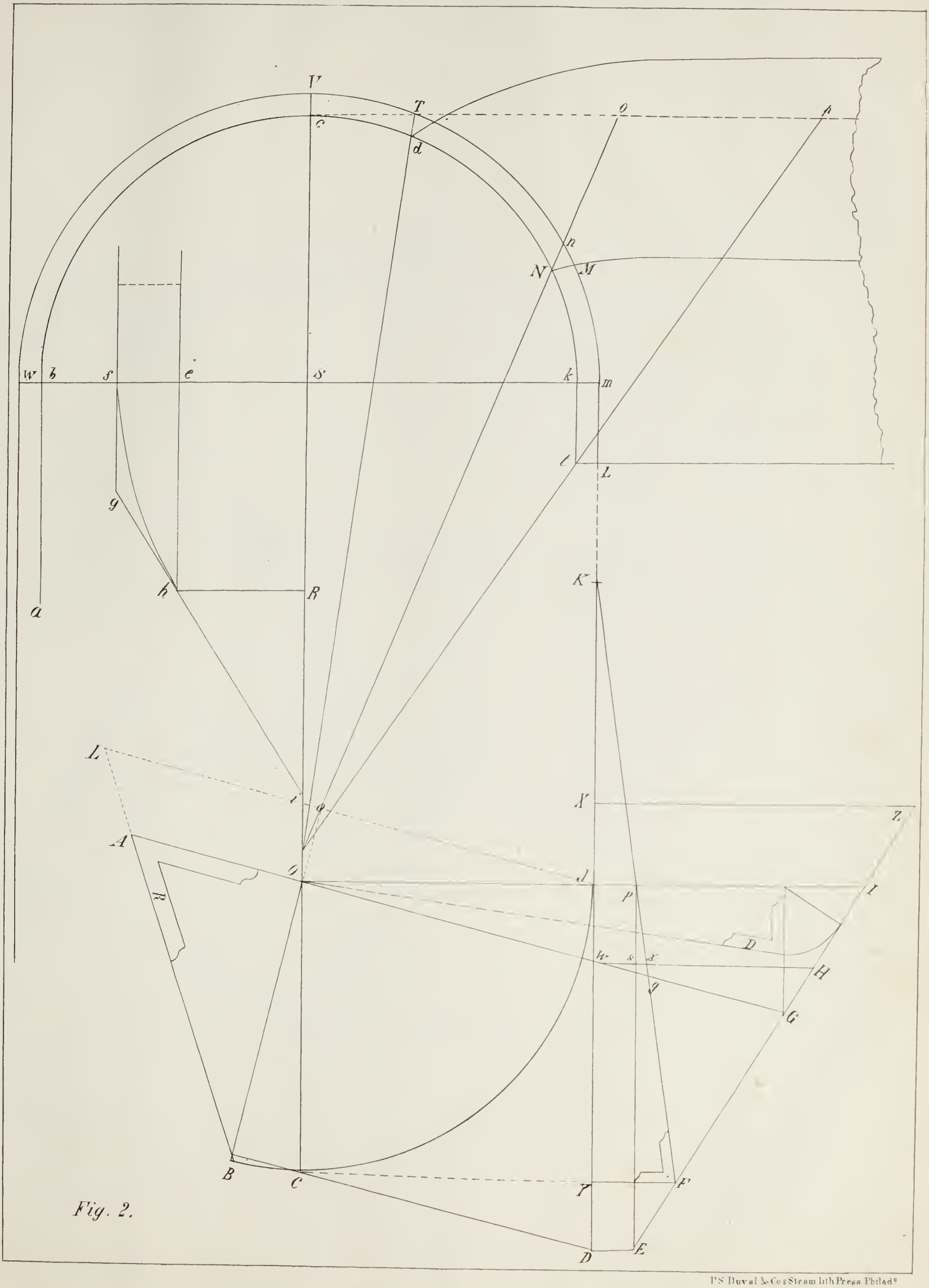
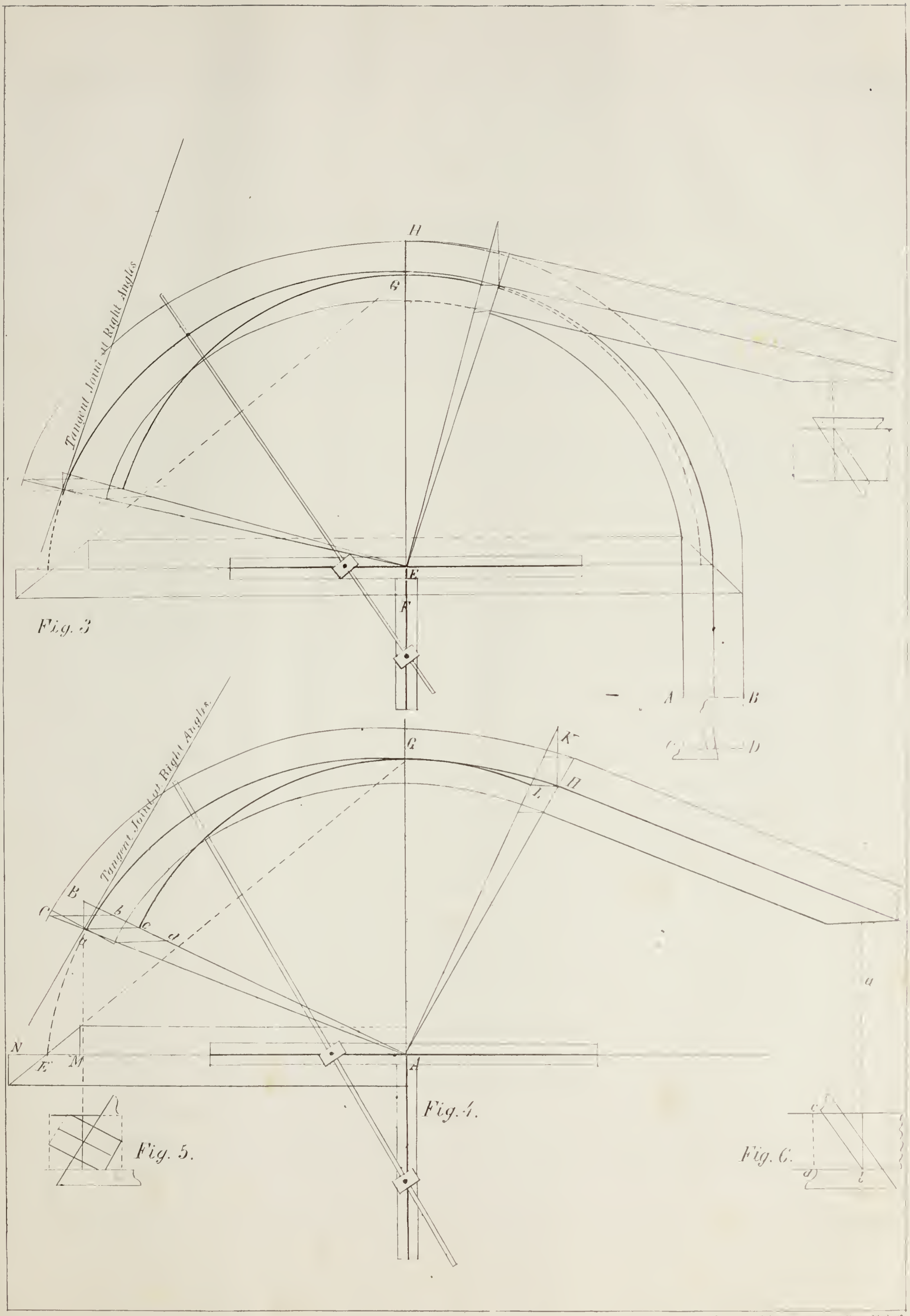


Fig. 2.

P.S. Duval & Co's Steam lith Press Philada

DIAGRAM OF STAIR LINES.



P. S. Duval & Co's Steam lith Press Philad.

DIAGRAM OF STAIR LINES.

CIRCULAR STAIR BUILDING.

The accompanying plates of stair lines were prepared by Robert Riddell, Esq., well known as one of the most accomplished stair builders of this city. They form a part of the mode which he proposes making public in a work soon to be issued. Those who have paid attention to this branch of art will at once see the value and meaning of the diagrams. Those desirous of making a practical use of the plates will be able to understand their meaning from the following explanations.

Fig. 1, ground plan on the line A W; lay off one half the number of steps that is required in the cylinder; in this there is five; the half pace is considered equal to one; the manner of doing this is shown in Fig. 2; from the line of the string draw C P at right angles to C S; from C to T half a step; the distance from T to P equals two steps; with a radius from *b k* make an intersection, the line V O; from the point of intersection, draw lines T *o* P, and where these lines cut the cylinder at *d* N, *t* gives the position of the risers. We will now return to Fig. 1. Draw the tangent L N through the centre of the rail; make L R equal to the height of two and a half risers; make the line R S T equal to the common plane or pitch board, cutting the tangent at N; from N draw the intersection N S, extended to *e;* draw *e o* B through the centre of rail and at right angles to intersection; draw H *o* and P B parallel to N *f;* extend P B both ways; make B A equal to P S; draw A F, extended to C, cutting the intersection at *e.* This gives the required plane, also the semi-major axis, and the plumb bevel, which is shown at A, and also at Fig. 6, Plate 3. To obtain the bevel for the joint, draw *f* W, and where it intersects at V, draw V *k* P. The line that intersects at M is at right angles to V P; and with M for a centre, draw the quadrant; with the same centre extended to N, draw the quadrant N W; then M X W is the bevel for the end of the joint and is shown at Fig. 5, Plate 3. For the spring bevel at the intersection at T, draw *m n* at right angles to P S; at *n* as a centre draw the quadrant, from which the line extended to draw P is the required bevel. This will not be required if a tip is taken off each end of the mould, and slide the mould on the square edge of the plank according to the plumb bevel, shown on Fig. 6, Plate 3; draw the centre of rail G C, Plate 3, Fig. 4, equal to P *f*, Fig. 1, Plate 1. The chord P *g*, Fig. 1, Plate 1, transfer to G L, Fig. 4, Plate 3; draw the line A L K extended, and at right angles draw A B, which gives the quadrant of the rail; draw L H and *c a* at right angles to A G; on the major axis, with a radius of A E, with A for a centre, make an intersection on the lines A K, A B; draw the lines L H *c a* at right angles to A G or parallel to the major axis; at the points of intersection drop perpendiculars to cut these lines. This at once gives the exact quantity of the ellipses for the rail. Draw the lines A H and A C, at G, shows the centre of rail, with half the width in the compasses, with L and C for a centre; mark the width of rail on the line A K A B; these lines extended, cutting A H and A C, give the points that the trammel will pass through. Any quantity of straight wood may be added and is drawn, parallel to the line A C. In order to determine the width of the mould on the major axis, and also to set the trammel, a new and beautiful principle is shown. Draw the diagonal G E, extended with one half the width of rail, on each side of the major axis; cutting the diagonal line G E let fall perpendiculars, then M N is the given width of mould. In its application, the stuff may be cut square through or vertical, at the discretion of the workman. Either way produces the same results, the edge of the plank perfectly square. The manner of sliding the mould is shown at Fig. 6, Plate 3, half the distance that the plumb bevel makes through the plank with the centre line marked on the edge of the mould, which is shown at *b a*; this equally divides the plank from its centre; the thickness of plank is shown at *d c*.

Fig. 2, Plate 2, the half twist. The drawings are so near alike that a brief description will be sufficient. The only difference is that the height of both wreaths is taken together on the line X Z; the height, which is equal to two and a half risers at the intersection of tangents at Y, make Y K equal to the whole diameter; extend Y both ways to F C; draw F K where P *i* is intersected; at P draw P E parallel to *j i* D *c*, extended to B. To the tangent Y K draw D E, at right angles to Y X; from D through the centre of the rail at C, draw the intersection; the remainder of the drawing is the same as plate 1, Fig. 1; make *o* L equal to P I; the distance A B is the semi-diameter of the rakeing mould, Fig. 3, Plate 3; the distance F P is the semi-diameter of the mould for the level part; the right line E H is the joint; all the centre joints are at right angles from the face of the plank; the bevel, as applied to the level, is shown at A B C D, Fig. 3, Plate 3; and its application the same as Fig. 6; the position of the rail landing is shown in plate 2; the line R *h* is the last riser; *g h* extended is the common plane or pitch board; *f e* half a riser. This makes the balusters on the level, the same height as the long balusters on the steps.

In drawing the moulds, the centre of the rail is first laid down, and from this, as a basis, the moulds are constructed. The wreaths, when sawed out, at once give an outline of the required curve; and as we have adopted a centre line for its formation, the centre on each end of the wreath piece is taken as a point to square from, which is all that any workman wants. Falling moulds we discard, from the fact that their application to cylindrical surfaces, in nine cases out of ten, produces a deformed and crippled curve.

CONCLUDING REMARKS.

THE twenty-fourth number of our work is at last completed. For two years, the author has spared no pains to collect and prepare for publication such matter as he thought would be of practical value to all who are interested in the progress of the building art in our country. His object has been to furnish useful and valuable designs, regarding beauty and ornament as matters of secondary importance. The plates of details and ground plans, though perhaps, the least attractive, have not been the least valuable part of the book. In their preparation, originality has not so much been his aim as practical and suggestive drawings, that by the aid of a competent mechanic would contribute to the comfort and happiness of those who cared to make application of the hints they afford. The approval many have bestowed upon this portion of his labor, has not been to him the least gratifying portion of the pleasure he has derived from the preparation of the work. As was said in the opening remarks, in the first volume, his desire was to produce a "matter of fact, business like book." He has attempted to let this idea govern the preparation of every page. How far the attempt has succeeded, others will judge.

A difficulty encountered during the entire progress of the work, has been the fact that the author was without precedents to guide him. American works on architecture are few in number, and no works on American architecture have yet been written. Yet there is no country in the world where more houses are projected and built in the course of a year, than in our own. Towns and cities spring into existence, south and west, almost daily. In the eastern cities, the frail fabrics erected but a few years since, are constantly giving place to substantial and magnificent edifices. Throughout the length and breadth of the land, the idea seems to pervade all classes that at some period of his life, every man must build his own house and homestead. The erections of others are invariably regarded as temporary dwellings, soon to be vacated for more congenial and convenient residences. All these causes conspire to create a demand for the services of professional architects, and for a building literature adapted to our wants and condition. Yet, strange to say, it is only within a few years that such a profession has been recognized in our large cities, and in the country at large, carpenters, master masons and others are made to perform its duties, while we have been, and still are dependent upon foreign publications for hints and suggestions upon the subject. As works of art and literature, many of these are perfect in themselves, but are not adapted to American tastes and American habits. Our buildings are necessarily, and, in some respects to our loss, unlike those erected in European countries. We are unwilling to expend either the time or the money required to erect similar edifices. The American architect therefore, often to his regret, is compelled to arrange his plans and project his designs accordingly. By the circulation of works upon the subject adapted to our tastes and wants, this spirit must inevitably undergo a change, and every architect owes it to himself and his profession to hasten such a time by every means in his power. It was to supply, in some measure, this deficiency in our national literature, as well as to lend his influence to correcting the prevailing abuses in the noble art, that the author has ventured to turn aside from the daily routine of his profession. It may be that others will follow the example, and we shall soon possess valuable American works on the art of building in our own country.

The sale of the present work has already far exceeded the expectations formed at the outset, thus fully attesting the interest of the public in the subject of which it treats. This fact, and the belief that such a work is much needed by artizans throughout the country, has induced the author to prepare a work on Street Architecture, or the erection of public and private buildings in towns and cities. In its execution and principal features, it will be similar to the work just concluded. The first part will make its appearance at no distant day.

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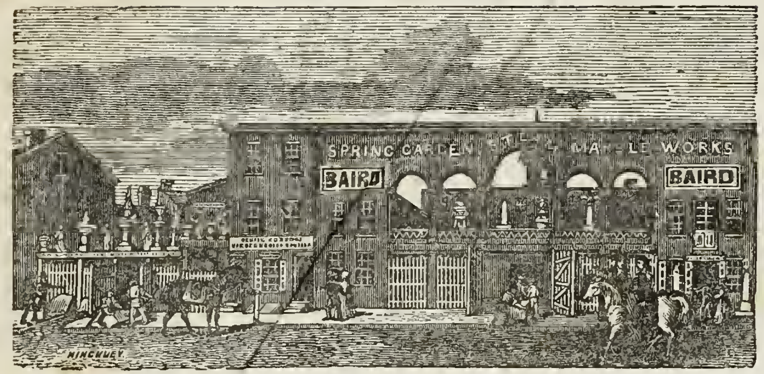

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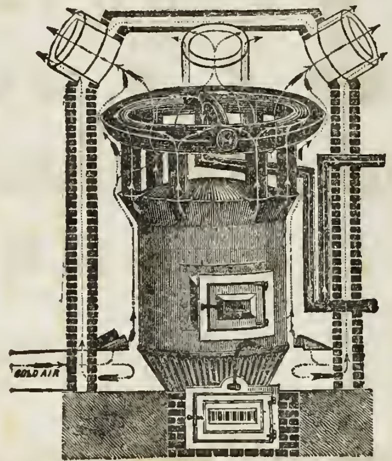

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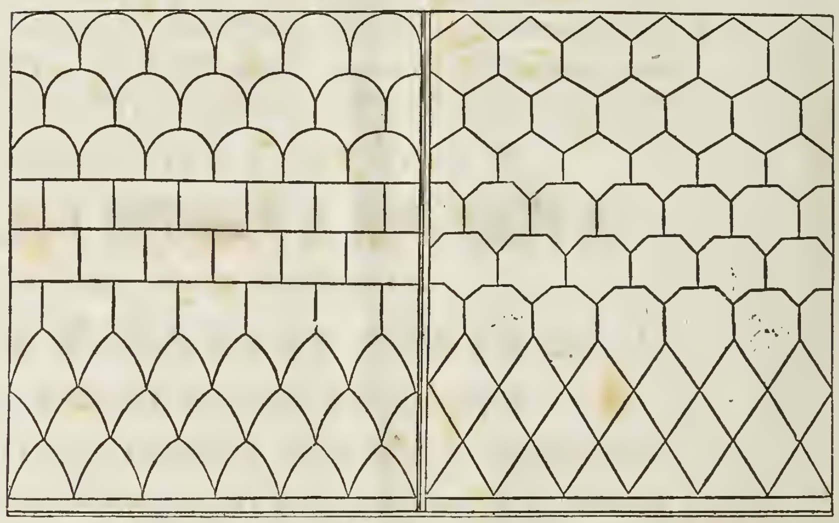

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