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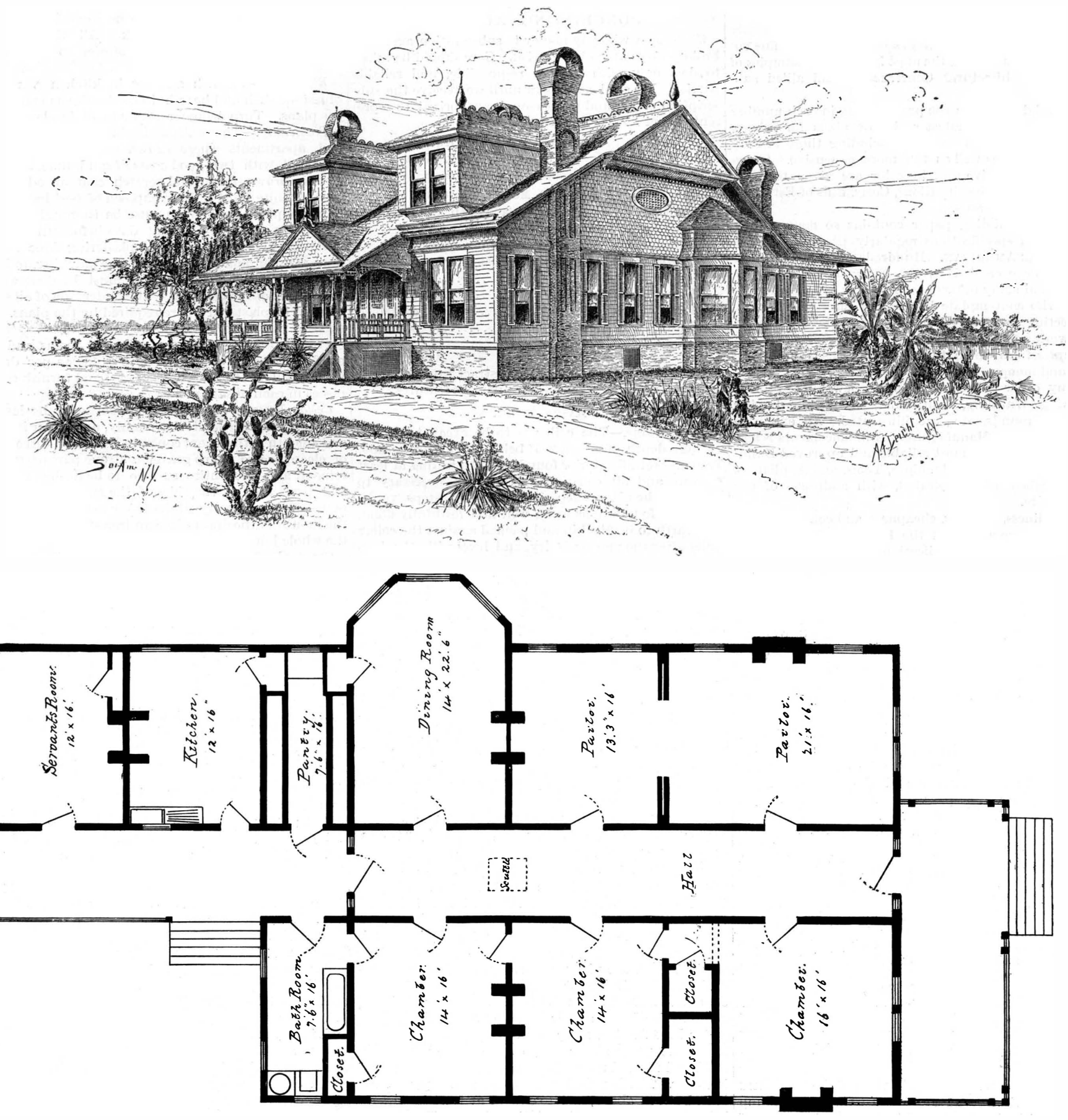

A ONE STORY SOUTHERN RESIDENCE.

[For description see page 83.]

Scientific American.

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THE

Scientific American,

ARCHITECTS AND BUILDERS EDITION.

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A RESIDENCE OF MODERATE COST.

One of our colored plates this month shows a residence designed for erection at the following cost:

Mason work and all excavation	$3,300.00
Carpenter, painting, tinning, slating, all complete	7,300.00
Plumbing complete	650.00
Heating complete	400.00
Mantel pieces, etc	600.00
	$12,250.00

The following is an extended abstract from the specifications, and covers the most important features.

MASON WORK.

Excavations.—The cellar is to be excavated to an average depth of about 2′ 6″ below the natural grade. Trenches for all exterior foundations to be dug at least 3′ deep, and all excavations that are necessary to carry out the plans, such as drains, piers, steps, vault, and other foundations to be well and faithfully done. The earth to be filled in and packed against the cellar walls after the mortar is dry, and level with the bottom of the underpinning. Also trench under foundation walls and interior walls and piers.

Drains.—All drain pipe to be of best quality glazed tile; size from leaders 4″, to cesspool 5″. These pipes to be properly graded. Make all joints clean and tight, of Portland cement, and make perfectly smooth on inside of same. Run a 5″ line from inside of cellar wall to cesspool. Run a 5″ line from cellar bottom to nearest outlet. All 4″ drain tile from leaders to connect cellar drain.

Vaults.—Build privy vault where directed, with hard burnt Jersey brick, 8″ thick, 3′ deep in the ground, and leveled up to a grade 4′ 8″ by 6′ in the clear. The whole inside, including the bottom, to be tightly cemented and made water tight.

FOUNDATIONS AND STONEWORK.

Footings.—Footing to be laid under all walls and piers, both stone and brick. All footing courses under stone walls to be of concrete 4″ wider than the walls resting thereon and 4″ high; well bedded in the top of this footing course, to come level with the top of cemented cellar bottom.

Foundations.—All footings, piers, foundations, and stone walls to be built to correspond with the sizes marked upon the plans. The stone used in the foundations to be of approved medium size stone, the lower courses to be laid with extra large, flat stone; all to be carefully bedded on their broadest faces; all laid in water lime mortar, composed of one part water lime and three parts coarse, sharp sand, each layer well filled and flushed up on both sides and firmly bound together. The foundations for steps, porch, piers, etc., to be built as above, and to extend at least three feet below grade. All the foundations for outside piers to be solid concrete and slightly taper from bottom up. The stone wall coming against the earth to be well cemented on the outside. Run a line of 3″ unglazed tile all around foundation and to grade to cellar drain.

Stonework.—All face walls above grades to be laid with approved quarry stone, with vertical and horizontal joints. All to be carefully set and bedded on their broadest faces, well bonded together and backed with stone of same quality. All well laid in water lime mortar, as above specified, and cleaned off. The face stone to be pointed with red mortar made in the best manner, and cut joints on the outside and flush pointed on the inside with cement mortar. The foundation wall to run to top of the floor beams.

Cut Stonework.—All manner of cut stone represented on the drawings to be of regular broken ashlar, free from flaws and other imperfections, laid in cement mortar and pointed with red mortar. Also furnish all necessary cut stone for cellar windows and cellar door and sills coming under windows on high broken ashlar.

Brickwork.—All brickwork represented by plans to be of well-burned hard brick throughout, which must be laid wet in warm, dry weather, or if laid in damp, freezing weather, the brick must be kept perfectly dry. All brick to be laid up in best and most workmanlike manner, with mortar composed of good lime and clean, sharp sand, in the proportion of two of sand to one of lime, or of such other proportions as shall be considered desirable. All piers and walls to be built as represented by plans and of such dimensions as marked thereon.

The chimneys to be built and carried up as represented by the drawings, with good hard burned brick, laid in mortar as above. All flues to be struck joints on the inside and left free and clean on the completion of the work. All chimneys to be topped out as per elevations, with pressed brick. All the fireplaces throughout first and second stories to be pressed brick.

Bluestone.—Furnish and set in kitchen a rubbed bluestone shelf and hearth, to be the size as marked on the plans. Turn trimmer arches to all fireplaces.

Plastering.—The walls and ceilings of all the rooms and apartments where shown must be lathed and plastered with two good coats of sand, lime, and hair mortar, brown finish, and scratch coat an additional coat of white hard finish composed of best hard finish lime and plaster. All lime must be thoroughly slaked and made up at least eight days before using in the building. The whole job of plastering done in the best manner, and all repairing and patching, to leave the work in perfect condition, must be done at the completion of the building. The under side of all staircases to be plastered where required by the plans. All exposed plaster corners to have rule joint.

Plaster Cornices.—All the principal rooms and hall on first story to have cornice 8″ × 10″ as per detail, which will be furnished. Also set and furnish center pieces in each of said rooms, to cost $3 each.

Cellar Bottom.—The cellar bottom must be leveled off, pack and settle it thoroughly, and cover it flush and smooth with cement concrete 3″ deep, in three parts of clean, coarse, sharp gravel and one part paste and cement, and the entire surface to be flushed up even and true, around the sides of the main walls or gutters, sufficient to carry all the water to the drain. Over the mouth of the drain place an iron strainer, and leave the whole job of work in perfect order.

Cesspool.—The cesspools will be built after the Waring system. All information must be ascertained from parties putting in same.

IRON WORK.

All manner of iron and blacksmith work necessary to make the whole job of work complete to be done and finished in a satisfactory manner, subject to the approval and direction of the architects.

CARPENTER WORK.

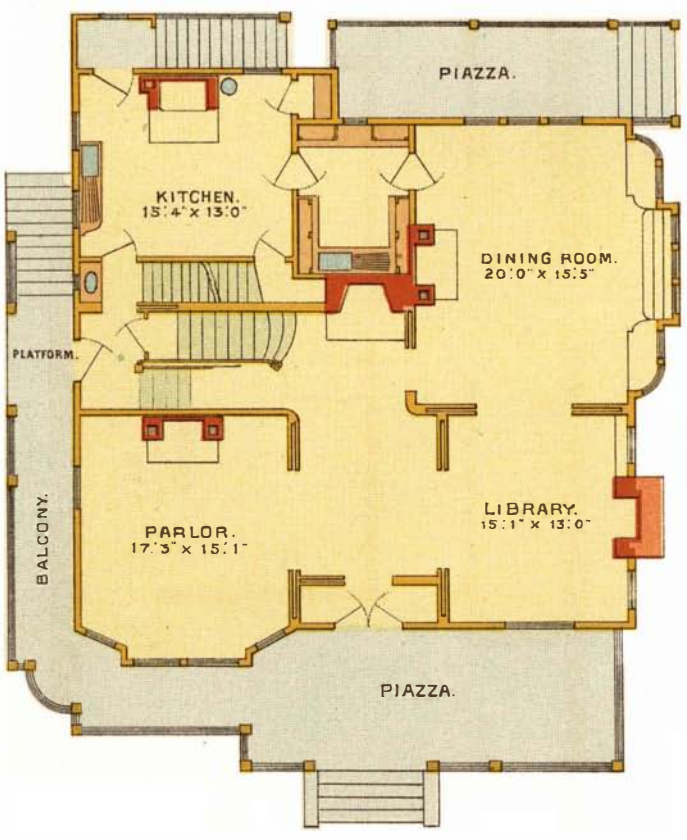
Timber and Framing.—First floor joists, 3″ × 10″, 16″ from centers; second floor joists, 3″ × 10″, 16″ from centers; third floor joists, 2″ × 10″, 16″ from centers; ceiling joists, 2″ × 8″, 24″ from centers; rafters, 2″ × 8″, 24″ from centers; hips, 2″ × 8″; partitions, 2″ × 4″, 16″ from centers; bearing partitions, 3″ × 4″, 16″ from centers; door studs, 2″ × 4″, doubled; wall plates and ties, 4″ × 6″; bridging, 2″ × 2″; sleepers in laundry, 2″ × 4″, chestnut; girders, 8″ × 10″; sills, 4″ × 8″; posts, 4″ × 8″; girths, 4″ × 6″; valleys, 3″ × 8″; ridges, 2″ × 10″; piazza sills and bearing timbers, 4″ × 8″; piazza floor beams, 2″ × 8″, 20″ from center; balcony beams, 2″ × 10″, 16″ from center; collar beams, 2″ × 8″.

The girders will be kept flush with top of floor beams. Spike a 2″ × 4″ piece on each side of girder to rest floor beams on, and spike well thereto, and all other necessary timber required throughout the building, to be good, sound spruce timber, well seasoned, sawn true and square, free from sap, shakes, dry rot, or other imperfections. And all timbers used throughout must be prepared and framed according to the plans, sections, and details. All joists to have the crowning edge placed upward and sized to proper widths. Also prepare and size all studding, etc., cross bridge all joists at distances not exceeding eight feet apart. All trimmers and headers must be framed double, and in no case allow less than four inches between chimney breast and trimmers. The studding may be of hemlock.

Wood Lintels.—The carpenter must provide and set all wood lintels of every kind and description for all windows, doorways, and other necessary places. All lintels to have a bearing on walls of at least four inches on each end.

Partitions.—All partitions throughout and set building to be set according to the plans. Bearing partitions on first floor must foot upon the girders below and be capped on second story with plate for the reception of

A RESIDENCE OF MODERATE COST.



Plan of First Floor.

Plan of Second Floor.

the joists. Bearing partitions on the second floor to foot upon plate. The studs at angles to be thoroughly spiked together before being placed in position. All doors to be trussed over the top thoroughly and substantially. All partitions to be set to a straight edge. Joists in all cases to be doubled up under all stud partitions. Grounds put on for finish throughout the building.

Cutting for Pipes.—The carpenter must do all cutting for pipes of all kinds, using care not to cut off or weaken supporting timbers, and furnish all necessary pipe boards for the plumber to screw his pipes to.

Sheathing—The building to be sheathed on the outside with sound, match ⅞" hemlock boards, not to exceed 9½" in width, nailed to every bearing through each edge with 10d. nails; these boards to be placed on frame diagonally.

Lumber.—The lumber to be white pine, unless otherwise specified. All inside finishing lumber to be clear and dry, free from sap, shakes, or knots, pitch, etc. Piazza columns to be whitewood. The bath room and water closet fittings will be of cherry.

Exterior Finish.—All of the exterior finish for corner boards, window and door casings, cornices, water tables, verandas, bands, sidings, and all manner of finish shown on plans and details to be composed of clear white pine, well seasoned, and primed as soon as put up. Shingle the vertical sides where shown on the plans with 6"×18" pine shingles, laid not more than 5" to weather and cut to pattern.

Furring Strips.—Do all necessary furring of every description. The walls in laundry will be plugged and properly furred off ready for lathing. Ceil the underside of back piazza with ⅞×3" strips planed pine, kept ⅛" apart, no tongue and groove.

Roofs.—All roofs to be covered with rough hemlock boards 1" thick, with good square edges, and of even thickness. All of the rough carpentry necessary to form the projection of eaves, as required for all cornices, gutters, etc, to be done in accordance with the plans and details. All to be composed of good, sound lumber, and put on in a good, substantial manner. All roof boards to be well nailed with 10d. nails. Joints broken at various places. All main roofs to be covered with the best quality of Chapman quarry black slate, 16"×8", not less than 3" lap. All the outer edges on gables to be laid in mortar. These slates to be laid on carbonized felt and nailed on with galvanized nails.

Floors.—All floors, when not otherwise specified, to be of white pine, free from sap, shakes, black, unsound, or loose knots, mill worked, tongued and grooved, one inch thick, not over 4½" wide. The loft floor may be 9½" flooring. All well and secret nailed to each joist. The porch floors to be white pine, tongued and grooved, ⅞" thick, not more than 3" wide, and all joints to be well laid in white lead. The kitchen floor to be composed of white maple, tongued and grooved, ⅞" thick, not more than 2½" wide. All the floors to be composed of lumber, the best of the several kinds specified, and all well and secret nailed to every joist. Also the bath room and water closet will have maple floor, same as kitchen. The floor in laundry will be of yellow pine.

Doors.—All doors in the house, except where otherwise specified, to be made of clear, dry, white pine, free from sap, and must be in strict accordance with the drawings. Size of doors to be marked on floor plans for width, height, etc. All doors that are marked on plans as sash doors to have proper rabbets for receiving glass and suitable provisions for same with beads, etc., etc.

All necessary dwarf doors to be provided where needed for pantries, closets, wash stands, water closet, etc., paneled or battened and beaded, as the case may require. The front and vestibule doors to be made of white pine, to correspond with the sizes and dimensions given on plans. All other doors required by the plans to be made in the best manner, and of good, sound, clear, kiln dried lumber.

The sliding doors to be hung with Warner's patent door hangers, the track boxed in as per furnished directions. The double doors to have astragal joint in center, all to be well and securely done. Pockets for sliding doors to be made perfectly air tight.

Hinges.—Hang all doors throughout with loose joint butts of sufficient size to throw them clear of architraves. Butts on front doors to be of plain bronze 5"×5", three to each door. Butts on principal rooms and hall to be of 4½"×4½", plain bronze. All doors to have 4½" saddles and base pins where needed. All dwarf doors throughout to have suitable butts to match other work, and all door butts to be loose pin joints. All the room and hall doors on principal part of first story to be real bronze plain knobs, roses and escutcheons, front doors to have plain bronze knobs and escutcheons and roses combined. Doors on second story and kitchen to have 4"×4" lacquered butts and jet and bronze knobs. All other doors throughout to have plain iron butts and white porcelain knobs and escutcheons. Sliding doors to have real bronze flush trimmings. Put suitable knobs on all dwarf doors, press doors, etc. The principal part of first story to have bronze face mortise locks The main entrance doors to have a 6" mortise lock, night latch atttachment, with three keys, and to have real bronze fronts and striking plates. All doors in principal part of first story to have a first quality 4½" mortise lock, real bronze front and striking plates. Sliding doors to have locks with astragal fronts of real bronze and flush furniture. All small closets, presses, drawers, etc., to have suitable locks as approved. All door locks throughout to be of the best city manufacture, and all doors to have a key.

All double doors to have sliding bolts at top and bottom, and to correspond with other furniture. Front doors to have mortise bolts of suitable size and finish, to be of real plain bronze. Also put bolts on the outside doors in cellar and laundry.

Picture Moulding.—Put up 2" picture moulding in all principal rooms and halls, first and second stories.

Window Frames and Sash.—All window frames constructed to correspond with the working drawings for same. The sash to be size as shown, and 1¾" thick, and hung on braided sash cords, weights, and noiseless axle pulleys. All glass to be well bedded, bradded, back puttied, and cleaned off. All provided with best approved bronze sash locks and lifts. All made of clear white pine, well seasoned. The cellar windows constructed in accordance with the details for same, and the sash to be all hung on back flaps and secured with hooks and staple and protected on the outside with ⅜" rods placed vertically 3" apart. The dormer windows to be constructed in accordance with the detail drawings, secured in a thorough manner and proof against leak.

Glass.—The glass in front first and second stories to be French polished plate, other rooms in principal part of first story and entire second story to be 26 oz sheet glass, the balance to be first quality French sheet double thick. Furnish and put in stained glass where shown on the plans, design selected by the owner. Allow for this glass, $1.50 per sq. ft.

Blinds.—All windows, except two bays in second story and bay in front of parlor, to be provided with outside blinds made of the best white pine, all hung on wrought hinges and trimmed with approved blind fasts. The windows mentioned above to have cherry Venetian blinds with cornices complete.

Hardware.—All hardware and trimmings used throughout to be the best of the kind specified. Furnish all necessary bronze hardware for bath room.

Interior Finish.—All to be constructed as required by the plans and details, with sound, clear, kiln dried white pine, unless otherwise specified. All put up with neat, close joints, smoothed up and well sandpapered. Base put down in all apartments which are not wainscoted. Beads to be put on all corners, the bath room and water closet to be fitted up with cherry. Panel backs under windows of first and second stories and stair platforms. All windows, including those that have panel backs, to have neat stools and aprons.

Vestibule.—The floor in vestibule will be an ornamental tile floor, selected and put in by the owner.

Stairs.—All stairways to be built where located on plans. The main staircase to be built and supported on three plank strings, the risers to be 1" thick and the treads 1¼" thick. Dimensions in all cases for height of risers and width of steps to be measured from the building. The space under stairs to be finished with a neat cherry panel. All stairways must be put up after the plastering is dry. The attic and kitchen stairs built as required by the plans, of a good quality of stock, to be well supported on two plank strings, to have 1" risers and 1¼" treads, well housed into wall string. The main stairs to be selected cherry.

Newels, Rails, and Balusters.—The newels, rails, and balusters for main staircase to be of selected dry cherry, worked in accordance with the detail drawings. The kitchen stairs to have two inch round cherry newel and rail. All cellar and outside stairways to be built on good, strong plank strings, provided with plank steps of white pine, well put up and thoroughly secured. The main newel will be 10 × 10 base, 8 × 8 shaft, turned and chamfered, main rail 3 × 3½", balusters 2½ × 2½, square and turned; the newel on second story for kitchen stairs 5 × 5, square turned rail for same 2½ × 3½, and 2" turned balusters; furnish and put in steps from third story to loft.

Closets.—The closets to be ventilated by means of a hollow 3" tin tube placed in partition and running up to air space above the loft floor. Also in bedroom closets to have two rows of double wardrobe hooks, placed on beaded cleats and two rows of shelves put in across the top and back and sides where space will permit.

Kitchen Pantry.—The kitchen closet to be fitted up with five shelves on the back, about 14" wide, shelves on each side to be of ⅞" lumber. Put in hanging hooks in space at head of cellar stairs Fit up butler's pantry as shown, to have counter shelf, with small doors or drawers below, as directed, and small glass doors above these lockers. To have small moulded cornice run around the top Furnish and set all necessary hardware to make the job complete and to match that in its immediate vicinity. Closet under main stairs to be fitted up as directed, the drainer in butler's pantry to be white ash. Put small door in front of sink.

Kitchen Sink.—The sink to be ceiled up underneath with narrow beaded battens, and provided with door of same, fitted and trimmed with the required hardware.

Wainscoting.—Wainscot walls of kitchen, bath room, laundry, and water closet with beaded battens. 2½" wide, and cap with a neat beveled and moulded cap. The bath room and water closet to be of cherry and the kitchen and laundry white maple, all to be 3 6" high and 20" above the fittings.

Mantels.—The mantels, either slate or wood, will be furnished by the owner and set by the contractor.

Bathroom.—Bath tub to be cased up in a good and workmanlike manner. The water closet to be fitted up with cover, seat, and riser. Hang the seat and cover with brass butts. The whole should be put together so that at any time it may be easily taken apart for the purpose of attending to or repairing the plumbing pipes. Fit up the wash bowl underneath with narrow ceiling, 2½" wide, and provide batten door of same, properly fitted, hinged and trimmed with appropriate butts and catches. Also fit up other wash bowls throughout in same manner.

Ventilation.—Put in all chimney flues where possible, 8 × 10 ventilating registers in all chimneys and rooms not having fireplaces. Also put 8 × 10 register in kitchen chimney for ventilation.

Bells.—Put in an electric bell from front door to kitchen, also from second story hall to kitchen and from one room to girls' room third story.

Cold Air Ducts.—Build cold air duct of wide pine ceiling boards as directed by the heater men.

Coal Bins.—Build coal bins in cellar of planed and matched spruce boards, with strong stanchions, and leave small doors.

Privy.—Construct a privy of frame clapboards, corniced and have a slate roof. Furnish a panel door, one window, and seats with hinged covers complete, and 5' ×5'×7' high.

Tinning.—All the flat roofs must be covered with the best M F charcoal roofing tin, laid with flat seam. The gutters to be properly lined, and run the tin up under the slate or shingles at least 6". Bring the tin over the face of the cornice and tack it down smoothly. All angles and other necessary places to be covered with tin as above, all well soldered in resin and made perfectly water tight. Leaders of XX tin put up as indicated on plans, or as may be directed, with all necessary curves, breaks, bends, etc., to carry the water from the several roofs to the ground, and connect tile drain, which will be put in by the mason.

PLUMBER'S SPECIFICATION.

Drain.—Furnish and put in where shown on the plans a 5" cast iron soil drain pipe, to run from inside of building out to the tile drain, 4' 0" outside of the building.

Soil.—Furnish and connect with the soil drain in cellar a 5" cast iron soil pipe and run same size up and out of roof at least 4' 0" and cap the same with the "Smith" patent ventilating cap. Use Y branches for all waste connections. All the iron soil pipes to have a coat of asphaltum. The soil pipes to have a cleaning out cap in cellar.

Calking.—All joints of all iron pipes are to be thoroughly calked with picked oakum and molten lead and screwed in position with iron hooks. All joints between iron and lead pipes to be made with brass ferrules, to be calked into iron pipes and the lead pipes to be soldered to it with wiped joints.

Boiler.—Furnish and put up where shown on the plans a 35 gallon round head, heavy pressure copper boiler, and provide with draw cock for emptying the boiler, and shut-off cocks for shutting off water from second story, and provide with circulating pipe, complete. Connect boiler draw cock with the sink waste, have a ⅝" stop cock on supply pipe, and combined safe and vacuum valve on top of the boiler. Boiler to be supplied with a Lockwood stand.

Supply.—Tap and pay for tapping the water main and connect a ⅝ AAA supply and run to the boiler. Supply to have a shut-off cock inside the cellar wall. All pipes are to be graded so they will drain perfectly dry. Each floor to be controlled separately by shut-off cocks. Where pipes will not drain dry, put a small pet cock. Run a ⅝" AAA lead pipe to and through cellar wall to a point where directed, and furnish and fit a stop cock both on the inside and outside of the building.

Sink.—Furnish and set up where shown in the kitchen an 18"×30" Mott's Eastlake galvanized iron sink, with back air chamber and iron legs, and supply with hot and cold water through ⅝" AAA lead pipe and Fuller cocks, and have a 1½" X lead waste pipe, properly trapped and connected with the drain, with a 2" iron pipe to the main soil pipe. To have a cleaning cap on end of pipe under sink. Also fit in complete in butler's pantry one copper sink, 16×20, and supply with hot and cold water through ½" AAA lead pipe, with nickel faucets and waste connection complete.

Bath.—Furnish and put up, where shown, a 16 oz. sheet copper bath tub, 5' 6" long, well tinned and planished. Supply with hot and cold water through ⅝"

AAA lead pipe and nickel plated combination bath cock with rubber spray. To have 1½" C waste, and properly trapped and connected with the soil. Bath to have nickel plated plug and chain. Overflow to be connected with waste.

Bowls.—Furnish and set where shown on the plan three 14" marble Italian ware wash bowls, with marble countersunk top and sub-bases 10" high. Supply with hot and cold water through ½" AAA lead pipe and nickel plated Fuller patent basin cocks, to have 1¼" X lead waste, properly trapped and connected with the soil, to have nickel plated chain and stay and plug.

Air Chamber.—No cocks to be placed at the end of a line, but the pipe to be extended so as to form an air chamber.

Closet.—Furnish and set in the second story where shown on plans, supplied with water through 1¼" pipe from cistern above, an inodorous porcelain wash out closet, with suitable size cistern. The cistern to have the flush tank attached. Supply through ⅝" AAA pipe and have cistern valve and rubber ball complete. Ventilate the closet with a 3" lead pipe connected with the iron vent. Closet cup and pull to be nickel plated and to be inserted in the seat. Closet to have enameled drip tray.

Safe Pans.—The bath tub, bowls, and closets are to be provided with 2½ lb. lead safe pans, edges turned up 2" all around, and to have a ¾" lead waste pipe to the cellar.

Wash Trays.—Supply the wash trays with hot and cold water through ⅝ AAA lead pipe and Fuller patent cocks, with flange and thimble. Provide with a 2" main waste pipe, properly trapped and connected with main soil pipe, also all necessary plugs and chains and flanges, also provide on end of pipe a cleaning cap.

Ventilation.—Every trap through the house to be separately and independently ventilated from the crown, by the same size as the trap.

Gas Pipe.—Put up the gas pipes with outlets where shown on the plans and according to the rules of the gas light company. All outlets are to be capped and all pipes tested. All side lights are to be not less than 5' 6" from floor. All drop lights are to be hung plumb.

A COUNTRY STORE.

One of our colored plates represents a country store and family flat lately erected in an adjoining town, at a cost of thirty-eight hundred dollars. We make liberal extracts from the specifications, which, with the plans, will enable any intelligent builder to duplicate the work.

Quality.—All material used to be of good quality, free from all defects impairing its strength or durability. All timber, except where otherwise specified, to be of good and as well seasoned as the market will afford, square edged and full size hemlock or spruce.

Size of Timber.—The first and second tier of beams 2×12×16" on centers. All headers and trimmers to be doubled and well spiked together. Tail beams mortised and tenoned together. The end of the beams to be cut on *slight* bevel, as indicated on the plans. The girts for trusses to be 6×8. Truss rafters, 6×8. These trusses made as indicated on the plans, fitted on top and bottom, and bolted together as shown. Bolts to be ⅝, and large square washers at each end. Put in 6×8 summer in cellar, where shown on the plans. The filling between the trusses to be 2×6, placed five spaces in the length of rafters, and let into the rafter 1", and sized to 5½", and well spiked thereto. The ceiling beams 2×6, placed nine spaces in width of building. These to be cut between truss girts and notched and rest on a 1×2 furring strip, and all well nailed. The plate will be 3×8, laid flat on wall and bedded thereto. The truss girts spiked well to plate. There will be a regular truss on the extreme end of front. The iron rod for these trusses will be ¾" iron, with large square washers on each end.

Cross Furring, etc.—The entire second story ceiling will be cross furred with 1×2 furring, placed 16" on centers and nailed in each and every nailing with tenpenny nails, and joints broken at least every sixth one. The outside walls of both stories to be furred with 1×2 furring. The second story 16" from centers, and the first story 24 on centers, and nailed in every dry joint left for that purpose by the mason. Use twelvepenny or twentypenny nails, as the case may require.

Bridging.—Bridge the first tier of beams three rows intermediate between summer and outside wall, with 2×2, cut in accurately and well nailed at each end with tenpenny nails. The second tier to be bridged with same material and same manner except located differently. Run a row between the two stair partitions, and two rows intermediate between stair partitions and outside wall. All these to be regular cross bridging.

Partitions.—Set partitions where indicated on the floor plans. The stair partitions on first story will be set with 3×4 joist, placed 16" on centers, and have 3×4 cap and run down to summer, and well nailed at each end, and bridged horizontal twice in their height. Partitions in second story set as shown on the plans, with 2×4, placed 16" on centers, and bridged once in their height horizontal, and accurately cut in, and well nailed. These partitions to have 2×4 cap. All partitions to be set perfectly plumb and straight. All door openings to be double studs, the inner one to be cut off so the door head will rest thereon. All door heads running across floor beams to be doubled, and the whole well nailed together. Also put in blocks at bottom of door studs to make end nailing for bases. Thoroughly spike all angles and corners together, and do not allow the lath to run behind.

Roof Covering.—Cover the entire roof with surfaced hemlock boards, perfectly dry, and nailed in each and every nailing.

Flashing, Tinning, Slating, Leaders, etc.—Tin the whole entire roof with 20×14 I. C. charcoal tin, well soldered and nailed. Turn up not less than 6" against the front work. Lap over large board on rear, and nail in face, and well nailed on top of scuttle frame. Work in all necessary flashing around chimneys and around the front cornice, also tin the balcony floors, well nailed on the edges and well worked in the brick work, and turned up well against bay. Line the gutters on main roof. Turned over on front edge of cap, and nailed on face. Do all necessary tinning of every description to make the job complete and perfectly tight. Also do all necessary flashing whatsoever to make job complete. Furnish and put up on rear of building two 4" leaders, round, made of XX tin, connected to *tubes*, and fastened with strong iron hooks in joints of brick wall, and connect with tile, which will be put in by mason.

Slating.—The hood in front of roof will be slated with black slate and a red slate figure in the center. These slate to be not more than 16×8, laid with a 3" lap.

Scuttle in Roof.—Form scuttle in roof where directed 2'×3', made of ceiling boards, with a 1¼ rim and tinned over on top and sides. This scuttle to have two hooks to hold it down.

Cornice, Rails, Brackets, Gutters, etc.—Form the cornice as shown on the plans, of clear, soft white pine, no sap. The columns may be whitewood, turned as shown, 8×8. The sweeps will be made of 3 pieces, 1¼, fastened together and moulded as will be shown. The filling over sweeps will be 1¼ square and 3½×3½ open spaces left between. These squares must be neatly formed. The cornice will be a 4" crown moulding, crown faced dentals, and a small quarter round planted under dentals. This cornice to be put up on all the different places as shown on the front elevations. Each side of hood will be shingled not more than 3" to the weather. No cutting. The small pediment in front of hood will be plain, and a neat rosette planted on, at least 10" in diameter. Put in two brackets under small pediment as shown. Do all necessary boxing of timber overhead; and ceil overhead with 3" narrow beaded ceiling and brake a small moulding around in the angle. The straight filling on sides will be the same pattern as that of sweeps. The top rail at bottom will be 3×4 moulded. The bottom rail 3×3 moulded. Balusters 2×2 square and turned. The filling under front window of second story will be formed in squares about 3×3 and a small rosette planted on the cornice over show window will be as shown, with fascia crown moulding, and moulding at bottom and rosettes planted on. Make the two large brackets as shown, 8" thick, moulded on face and splayed on edges. Ceil the under side of balconies with 3" narrow beaded ceiling, ⅞ thick. Put in all necessary pieces to make complete. These two large brackets must be held in place by a long bolt running into the brick wall and nutted up tight, and have a small round iron built in wall, and bore a hole in bracket to keep it from settling down. Put up the show window as shown. The sash will be made of clear soft 2" lumber in double sliding sash, no weights, but proper fastenings to hold them up. Head lights made 2" thick and to swing on top and fasten. Form transom as shown. Form moulded sill and base to show window as shown. The under part of show window will have sash to open, with rough plate glass inserted, and hung on top and fastened when shut or open. Anything not mentioned here to finish the front complete will be shown in details, which will be furnished when needed. The floors for balconies will be boarded with hemlock boards, and have a slight cant each way to run the water off. Make and lay a striped floor on each balcony 2" strips, ⅞ thick, screwed to 1¼ bearing strips, these bearing strips to be scribed to tin work, so as to make the floor level. The strips to be ¼" apart, and paint edges before laying down. This floor to be fitted neatly on each side, so it will lie solid, and made in two sections, so it can be easily taken up. Form gutters on main eaves as shown, 6" high, and small cap on top, and line inside and give proper cant to rear.

Cresting and Finials—Furnish and put up the three finials as shown. Allow for finials $3 each. Also put up cresting and allow for same $1.50 per lineal foot. This iron work to be selected by the architect.

Window Frames, Door Frames, Shutters, Blinds, etc.—All the window frames made in the usual way. For brick work jambs, 1¼ thick. Outside casings 1¼×2, back stops ⅞ and 2" sills. Make regular boxes for weights and pockets. The first story will be arranged for sub jambs, but the second story will have jambs proper width, so they will come flush with plastering. All to have proper weights, 2" pulleys, and Italian sash cord, to be fastened with bronze daisy pattern sash locks. The upper edge of top casing on these frames will be made segment, so mason can arch over. All these frames must be primed before setting, and the carpenter must set same and protect them. The cellar frames in rear will be made as usual, for single swing sash, hung and properly fastened when shut or opened. The two windows in bay on second story, one on each side, will be made box heads, so as to permit easy access to balconies. Make the rear door frame in the usual way, wide jambs, and make top of head casing segment same as windows. The frames for front doors will be shown on details when needed. Put fascias on eaves and barge boards on rear gables.

Blinds and Shutters.—All the second story windows will have outside rolling blinds, properly hung and fastened when shut or open, painted three coats at the factory. The two rear windows on the first story will have paneled shutters in pairs, properly fastened when opened and barred when closed

Back Stoop.—Put up back stoop; suit the grade to 1¼ treads, ⅞ risers, ⅞ floor, 4 × 4 post running from ground to proper height of rail, put rail on each side, with plain straight balusters, and ceiled up tight on both sides.

Ceiling in General.—The whole entire first story, including the ceiling, to be ceiled with 3" beaded yellow Georgia pine ceiling, ⅞ thick, clear face and smooth blind nailed. The closet under front stairs to be ceiled in same way. Also make partition between office and main store of same material. Put in small quarter round in angles of ceiling. Top of show window to be finished in same manner. The partition will have sash on right of door as shown. These sash will be properly fitted in frames, about 4 ft. from floor to sash, and the sash about 4 ft. high, made so they can be opened if necessary. The door in this partition will be a sash paneled door. The bottom of show window will be floored to the height of bottom of sash, and the front of same will be ceiled same as other part of store. The front of this to finish with nosing and cove finish.

First or Store Floor.—Lay the entire first floor with yellow Georgia pine, 3" wide, perfectly dry, clear face, and blind nailed in each and every nailing, driven up perfectly tight. Lay entire second story floor with narrow tongued and grooved white pine flooring, perfectly dry, well driven together, and blind nailed in each and every nailing. No loose knots. The first story 1⅛ thick, second story ⅞ thick.

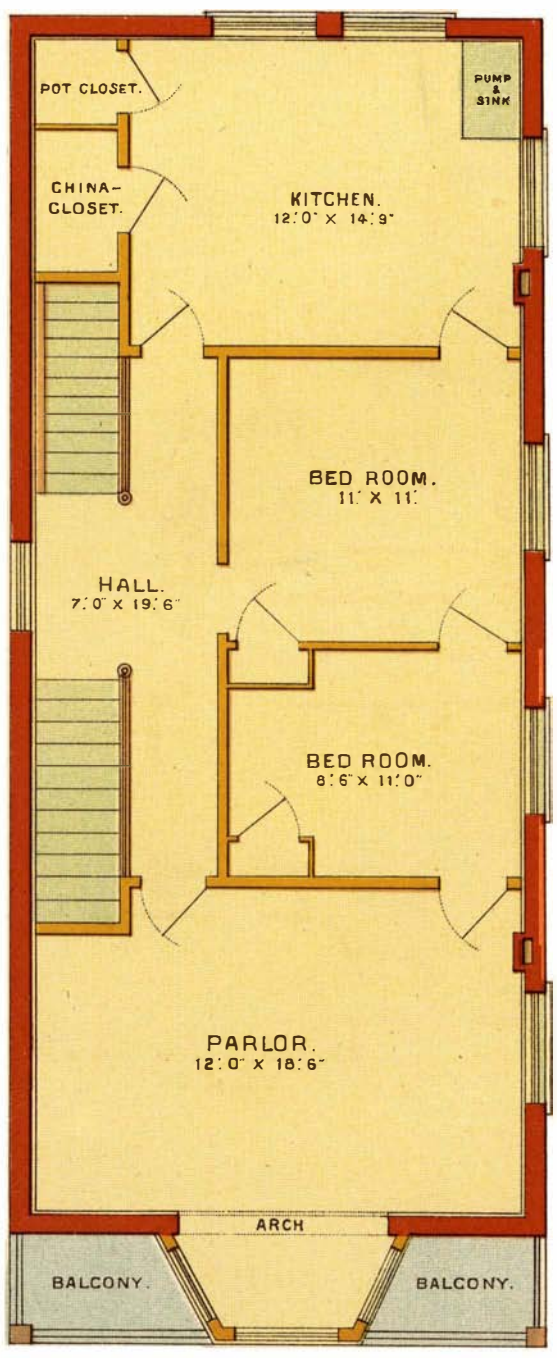
Stairs, Rails, etc.—Build the front and back stairs as shown on the plans, the treads to be 1½" yellow Georgia pine strings, 1¼ white pine risers, ⅞ white pine nosing, and cove finish. House the treads and risers into the strings and wedge with glue, the upper edge of string to match base. The under side of front flight will be ceiled and the under side of back flight will be arranged for plaster. At the head of each flight there will be a 6" turned and square ash newel let in floor and made perfectly solid. Run a 3 × 4 ash moulded rail from each newel back to corner of wall. Insert on each side 2" ash neatly turned balusters, 5" from centers, bored in rail and dovetailed in floor, and driven in with glue. Nosing and cove finish around stairs. The risers and treads will be tongued and plowed together, with three blocks glued underneath on each tread. Put up on either side of both flights a 2" turned ash wall rail, with turned ends and supported on ornamental brackets, put on *close* enough to make strong. Build cellar stairs where shown, of 2" rough spruce planks, strongly put up and to have pine hand rail.

Trimmings, Stools, Bases, etc.—All the trimmings showing in the first story inside will be yellow Georgia pine. Set jambs for windows to be made proper width and tongued into sub casing, window stools made to lap on window sill, and finish with nosing and cove finish with apron. The casing will be 5" wide, with turned corner blocks at angles, these casings to be moulded in solid, as will be shown. All the work on the front which will show white pine in the natural way in finishing front will remain so. Furnish all necessary stop beads, etc., to make windows complete. The entire second stories and both hallways at bottom of stairs will be finished in white pine, clear and good. Door jambs 1¼, rabbeted casings, 5" wide, moulded in solid corner blocks at angles. Small wall moulding to miter around casings and base. Base 8" wide, moulded in solid. Furnish all windows with proper stools, aprons, etc. Stop beads complete.

Doors—The store door will be made as shown, 2" thick. Hall door as shown, 2" thick, wood panels. All other doors ordinary four paneled. All clean and dry for wood filling. All to be per number and size and thickness as marked on the various floor plans, and all to be white pine and moulded. All these doors to have ash saddles. The front and store doors to be hung with 5 × 5 imitation bronze butts, three to each door, all other doors hung with 4 × 4 imitation bronze butts, two to each door, the hall door to have a 6" lock, with night latch attachments, with bronze knob outside and bronze escutcheon with bell pull to match. Furnish and

A COUNTRY STORE AND FLAT.

Plan of First Floor.



Plan of Second Floor.

hang a 5" gong bell in lower hall. The store door to have an improved latch handle, real bronze. All other doors to have brass faced mortise locks, except 1¼ doors. Those to have where in closets reverse bevel rim locks. Cellar door to have 6" plain rim lock. All outside doors and cellar door to have extra bolts. Knobs and escutcheons for inside doors to be jet and imitation bronze mountings. Put on all necessary plaster corner beads where required.

Shelving.—The two kitchen closets will be shelved five shelves high, one side of pot closet and three sides of china closet. Shelves about 14" wide. The bed room closets will have two shelves each and hanging strips underneath. Supply these strips with wardrobe hooks. Also put up other hook strips where requested, and supply with hooks. Rubber tipped bumpers to all doors necessary.

Sink.—Furnish and fit up sink where shown, as directed. 18×30, and a No. 2 Douglas lift pump. This pump to have a 1" A caliber supply pipe, lead, connected to pump and cistern. Also connect 1½" B lead pipe for waste with trap under sink, same size, and run down to cellar and connect to drain tile, which will be furnished and set by mason. Carpenter to do all necessary woodwork for the plumber, and put up all necessary pipe boards.

Blocks, Furring, etc.—The carpenter to furnish all necessary lintels, arches, centers, and furring for mason, of every description whatever.

Sash and Glass, Closing Building, etc.—All the sash throughout, except cellar, to be 1½" thick. Cellar sash, 1¼" thick. The glass all well puttied and tinned in. All glass, except front, to be second quality double thick French sheet glass, the front, including the door and head lights, to be first quality French double thick, put in in the best manner. The building will be tightly closed up for the mason. If the sash are put in, they must be protected, and the carpenter be responsible for all the glass and make good and replace all broken ones.

Coal Bins.—Build the coal bins where shown on the plans, of 2×4 scantling and surfaced hemlock boards, with hinged door complete.

Locker.—Build the locker where shown on the plans, of 3" strips, put ¾' apart, and nailed to cleats with wrought nails and clinched, and to have door hung complete, with lock and key. This locker to be shelved as may be directed.

Hardware.—All the hardware to be of the best city manufacture.

Put headlight over back door, hung on top and properly fastened when shut or open.

Privy.—Build privy on ground where directed, 4' 6" × 5' × 7' high. Built of 4½ ceiling, planed on two sides and ceiled overhead. Put in floor, seat, and small seat, all to have covers, small sash to slide, and batten door. These covers to be hung with flaps, door to be hung and have lock and key. The roof to be shingled and have crown moulding for cornice. Put cover on that part of vault which projects out.

Scuttle in Ceiling and Ladder.—Put scuttle in ceiling in second story hall, 2' × 3', with cover complete. Make a light ladder to same, with rounds instead of steps.

Gas Pipes.—Put in a system of gas pipe outlets where marked on the plans. Side lights 5 6 from floor. Comply with the rules of the gas light company. The company will connect from the street. These pipes to be tested and made perfectly tight.

MASON'S SPECIFICATIONS.

Stone Work.—The stone wall to be 16" thick, the height of 7' in the clear, of cement bottom, wall laid up with good sized quarry stone, laid bonding. After floor beams are laid they will be filled in between with stone and leveled to the top to receive brickwork. This wall to have footing course of solid grouting of gravel and cement, to project at least 3" either side of wall, and to be 4" thick. The same kind of footing course under brick piers in cellar. Stone wall laid up with cement and clean, sharp sand mortar, one of cement and three of sand; flush point the entire inside and out.

Stone Sills.—Furnish bluestone sills for all the side and rear windows. Selected as smooth as possible. Also, same kind of sills for cellar windows. The two doors in front will have brownstone sills, 8" thick, and wash cut in. Also furnish and set 8" water table under show window, with 2×2' wash cut on these sills, and water table, to be set level with top of floor. This to be fine tooled work. The back door sill will be bluestone selected.

Areas.—Build two areas to cellar windows on rear, about 2' deep, surrounded with bluestone flags and brick bottom.

Cistern.—Build cistern where directed, 10' deep and 8' in diameter, all in the clear. Built of imperfect shape, hard burnt brick, laid flat in cement mortar, domed over on top, and form neck and cover with bluestone cap. Cement the entire inside with Rosendale cement and warrant perfectly water-tight. Connect this cistern with leaders with 4" drain tile joints, well cemented together, and put down at least 2' 6" deep in the ground.

Cesspool.—Build cesspool where directed, 8'×8' in the clear, about 50' from the nearest point of building. This cesspool to be built same as cistern, water-tight. Run a 3" drain tile from inside of cellar wall to same, made perfectly tight. Also run a 4" drain tile from cesspool about 20' on the low side, and turn down in cesspool. This pipe is intended to carry off the water and soak away. Both of these pipes to be at least 2' 6" deep.

Brick Piers for Back Stoop.—Build two 8×8 brick piers for back stoop, with foundations 2' 6" deep.

Privy Vault.—Build privy vault where directed, 4 ft. deep, made of stone and laid up with mortar, and cemented bottom, leveled off on top 1 ft. above ground. This to be 3' 10" × 6' 6" in the clear.

Brick Piers in Cellar.—Build the brick piers in cellar where indicated on plan, 12 × 12", built of hard burnt Jersey brick, laid in cement mortar.

Cementing.—Cement the whole entire cellar bottom with Rosendale cement. One part cement and two parts of screened gravel, made 3" thick and smoothed off on top, and have a slight fall to cellar drain. Make a depression about 1" deep next to cellar wall all around.

Brick Work.—The building to be built of hard burnt Jersey brick, except front of the first story to the top of second story. Beams will be 12" thick, balance 8" thick. These walls laid up with sharp sand and lime mortar and a little cement. Headers every sixth course. The joints laid as close as possible, and neatly struck both sides. Build chimney flues where shown, and struck joints. Top these chimneys to the height of roof peak, and capped with bluestone caps. The windows coming in brick walls will have arches turned over with two rowlocks. Mason will assist carpenter in bedding plate. The front will be laid with pressed brick, laid close in red mortar and well joined and bonded to side walls. All the brick which is covered in front may be Jerseys. Turn arch over second story bay, 2 ft. spring, in the strongest manner. Leave dry joint in every tenth course for carpenter to nail furring to. The front to be cleaned down with acid. The rear gable will be bricked up to peak.

Iron.—The mason will furnish all necessary anchors to tie walls to floor beams; and also all necessary iron work to tie front walls to sides, furnish and put in place one iron girder to support second story wall in front. Also furnish and set two 5" iron columns, plain, with large cap and shoe. Particular care must be taken in the foundation under these columns. The shoe to be set in cement, so as to have an equal bearing on every point. The iron beam will be bolted to a wood beam on each side with ½" bolts.

Plastering.—The entire second story, including closets, hallways, and down stairways, back and front halls and underneath back stairs, including each side thereof, to be lathed and plastered three coat work scratch brown, and hard finished. The mortar, made of the best plastering lime and sharp screened sand scratch coat, to have plenty of long hair in, the hard finish to be gauged high. Use white sand for hard finish.

Coal Chute.—Build coal chute where shown on the plans, with round hole cut in flag walk, with iron cover This chute to be covered over on top with flags, and build up sides with brick wall. Also make bottom of brick, so the coal will slide easy, without any obstruction whatsoever.

PAINTER'S SPECIFICATIONS.

The whole exterior of wood and tin work to be painted two good coats of English white lead and linseed oil, of such colors as may be selected. The priming to be done immediately after the work is put up. Putty up all nail holes after priming is done. Shellac all sap, knots, etc., before priming. All tin work painted two coats of Prince's metallic paint, including leaders. The cresting and finials to be painted two coats of such colors as may be selected, with gilded tips and points.

The store part to be finished in two coats of white shellac. The closet under stairs to have one coat of raw linseed oil. All door saddles oiled. The bottoms and tops of outside doors and all sash to be painted. The second story, including stairs, hallways, stair rails, first story halls, and closets, to have Wheeler's wood filler, and well picked out. Then finish with two coats of hard oil finish. The stair rails will be rubbed down, including balusters and newels. All cracks and nail holes to be well puttied up. Putty to match color of wood. Also paint privy and shutters on first story same as other wood work.

The costs are—

Mason work, complete	$1,900
Carpenter work, painting, tinning, etc..	1,900
	$3,800

FULL plans, specifications, and details, ready for the builder, of any of the houses illustrated in this publication, may be had on moderate terms at this office. Special plans and specifications for the erection of buildings of all grades are also supplied by us. Munn & Co., architects, 361 Broadway, New York.

Plans for the alteration and enlargement or improvement of buildings are also supplied.

A ONE STORY SOUTHERN RESIDENCE.

We illustrate herewith a design for a comfortable one story Southern residence. The building has a front of 42 feet, side 84 feet, not including the front veranda. The dimensions of the rooms are ample, as will be seen from the plans. Their height is 13 feet in the clear.

Materials.—Foundation, brick. First story, to the top of the windows, clapboards, the balance shingles. Roof, shingles. Cost, $5,000. No cellar. The airiness and convenience of this dwelling will be readily understood by an examination of the floor plan.

Cost of Brick and Brickwork.

The cost of brickwork depends on the cost of he bricks and delivering same at the building, the wages of brick masons and helpers, the cost of mortar, and the use of tools, machinery, and scaffolding.

CONSTANTS FOR MORTAR PER M. BRICK.

M = 0·50 cubic feet (20 bricks per foot).
Sand = 0·35 cube yard.
Cement = 1·46 barrels of 300 pounds.
Or lime = 1·75 barrels.

Labor per M., including tools, etc., is about seven-eighths of masons' and helpers' wages per day for ordinary city buildings, but for government buildings it is about one and one-fourth times the same wages. This difference is principally because city houses generally have long party walls, with very few openings, and the frames for doors and windows are set in place while the brickwork is being built, whereas, in government work, all four sides of the building are fronts, and there are a great many windows and openings in the walls, which, of course, take more time to measure and build to than if the walls were plain, and the frames of doors and windows are not put in the building until the masonry is completed and the roof is on; besides, as a general rule, the work is better and stronger. Some of the brick walls for the building now being erected at Rochester, N. Y., had to be taken down on account of an extension having to be made, when it was found necessary to drill and split the brickwork with wedges in order to get the walls down, the cement mortar very often being stronger than the brick.

A brick mason with helper should lay in common house walls 1,200 to 1,500 bricks per day of ten hours. In government work, the average is from 800 to 1,000 for common brick, and in pressed and moulded brick from 150 to 300 per day.

COST OF COMMON BRICK PER M. DELIVERED.

1884. Columbus, O.	$6 00	1886. Pittsburg, Pa.	$8 00
1884. Baltimore, Md.	8 00	1886. Des Moines, Ia.	10 00
1885. Jackson, Miss	4 00	1886. Dallas, Tex.	8 50
1882. Toledo, O.	8 00	1886. Jefferson City, Mo.	8 00
1883. Denver, Col.	7 50	1886. Rochester, N. Y.	8 00
1886. San Francisco, Cal.	8 50	1884. Rochester, N. Y.	7 00

COST OF BRICKWORK PER M. LAID COMPLETE.

1884. Poughkeepsie, N. Y.	$21 50	1885. Fort Wayne, Ind.	$16 00
1885. Dallas, Tex.	16 00	1884. Rochester, N. Y.	14 00
1885. Brooklyn, N. Y.	15 35	1886. Rochester, N. Y.	15 50
1885. Pittsburg, Pa.	14 00	1886. Des Moines, Ia.	17 00

PRESSED BRICK.

Bricks alone, delivered, cost from $20 to $30 per M. Selected red, about $15 to $18 per M.

COST PER M., PRESSED BRICK, LAID COMPLETE.

1884. Poughkeepsie, N. Y.	$60 00	1885. Brooklyn, N. Y.	$40 00
1885. Jackson, Tenn	65 00	1886. San Francisco, Cal.	45 00

Moulded bricks cost from $40 per M. up to $120, depending upon the profiles. The average for the profiles ordinarily used is about $70, and the cost of laying averages about $30 per M.

Enameled bricks, on edge, cost about $68 per M. Enameled bricks, on edge and end, cost about $75 per M. Enameled bricks, on edge and flat, cost about $100 per M., and the cost of laying them is from $30 to $35 per M.

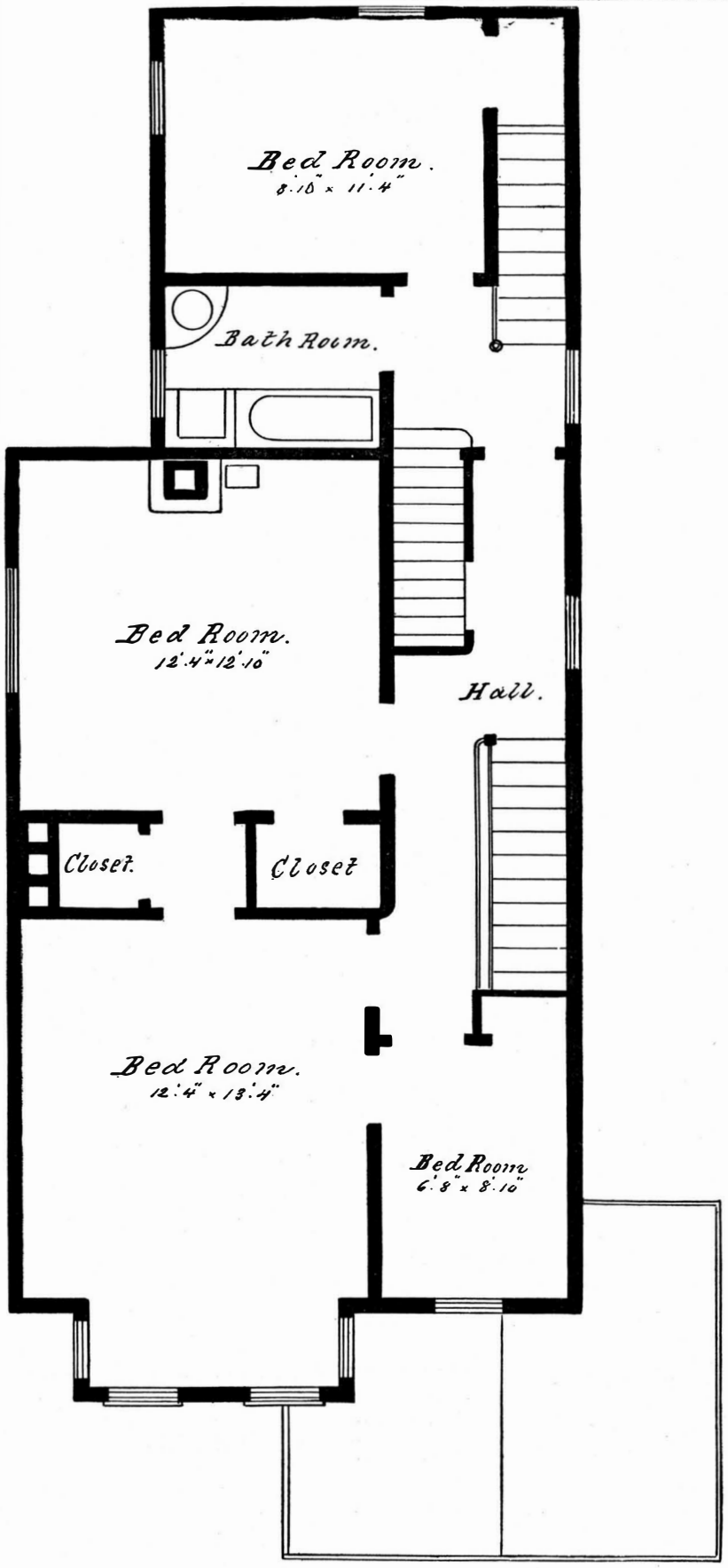
The price of terra-cotta depends upon the pattern or design, the average cost per square foot of exposed surface laid in wall complete being, for stock patterns, about $1.50, and for special designs from $2 to $2.50.—*Jas. E. Blackwell, in Amer. Architect.*

DWELLING FOR A NARROW LOT.

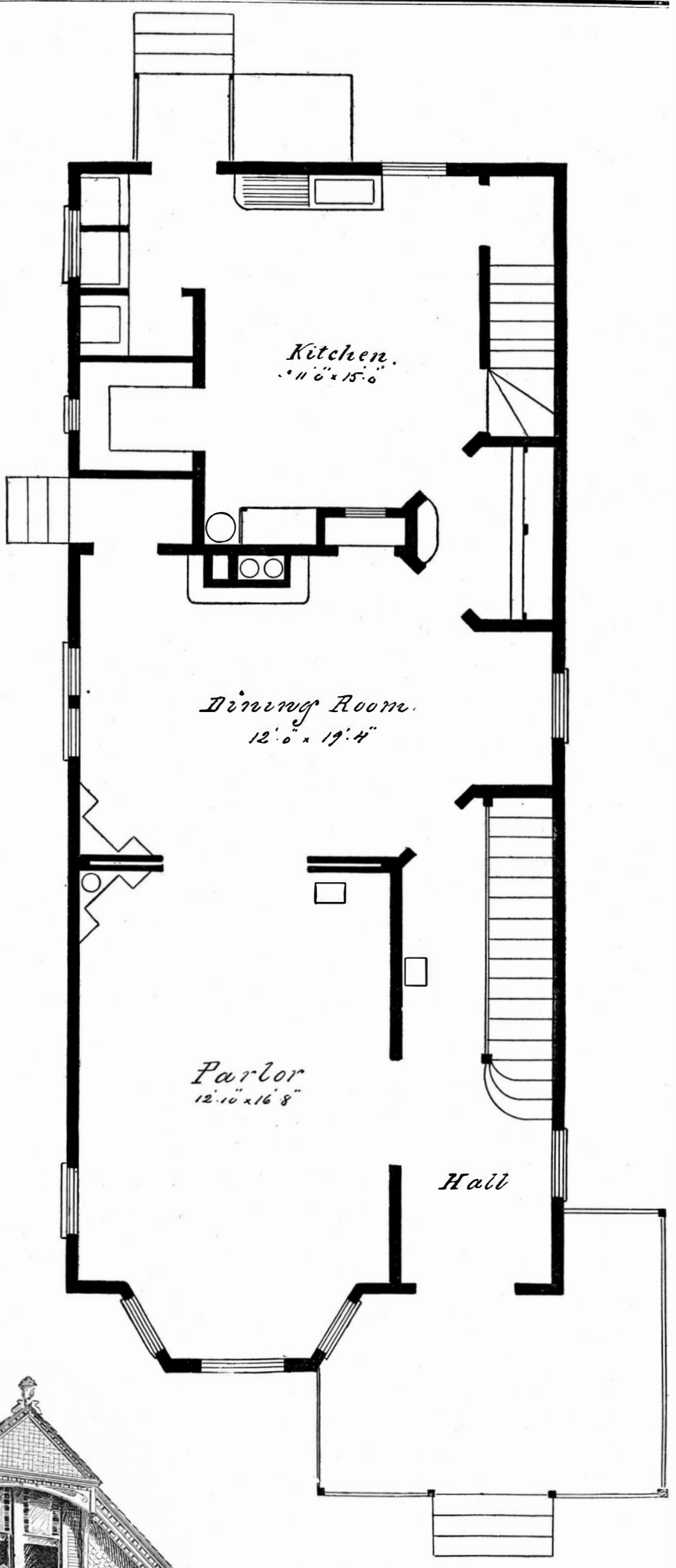
The two story attic house shown in our engraving has been erected in the vicinity of New York, at a cost of thirty-five hundred dollars. It has a good cellar, is provided with furnace and all the modern conveniences. Presents a handsome appearance and gives much satisfaction. In some localities where materials are cheaper the house could be built for less than the sum above mentioned.

A HOUSE FOR $2,800.

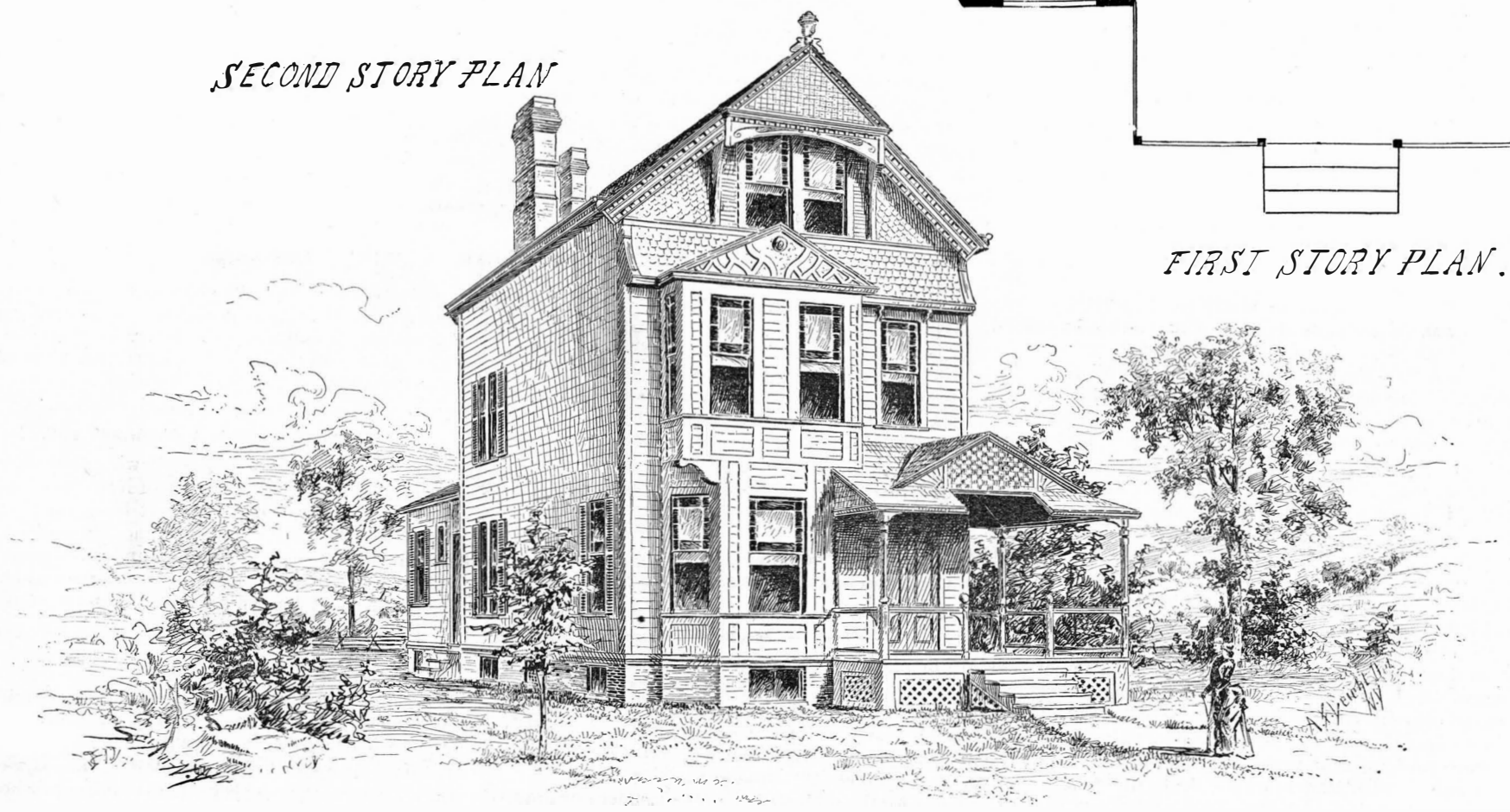
Our illustration shows a compact two story and attic dwelling erected at Arlington, N. J., at a cost, without plumbing of $2,800. It is 33 ft. in length by 28 ft. in width. Has a good cellar and attic. The exterior presents an agreeable variety in its details and shows to good advantage.



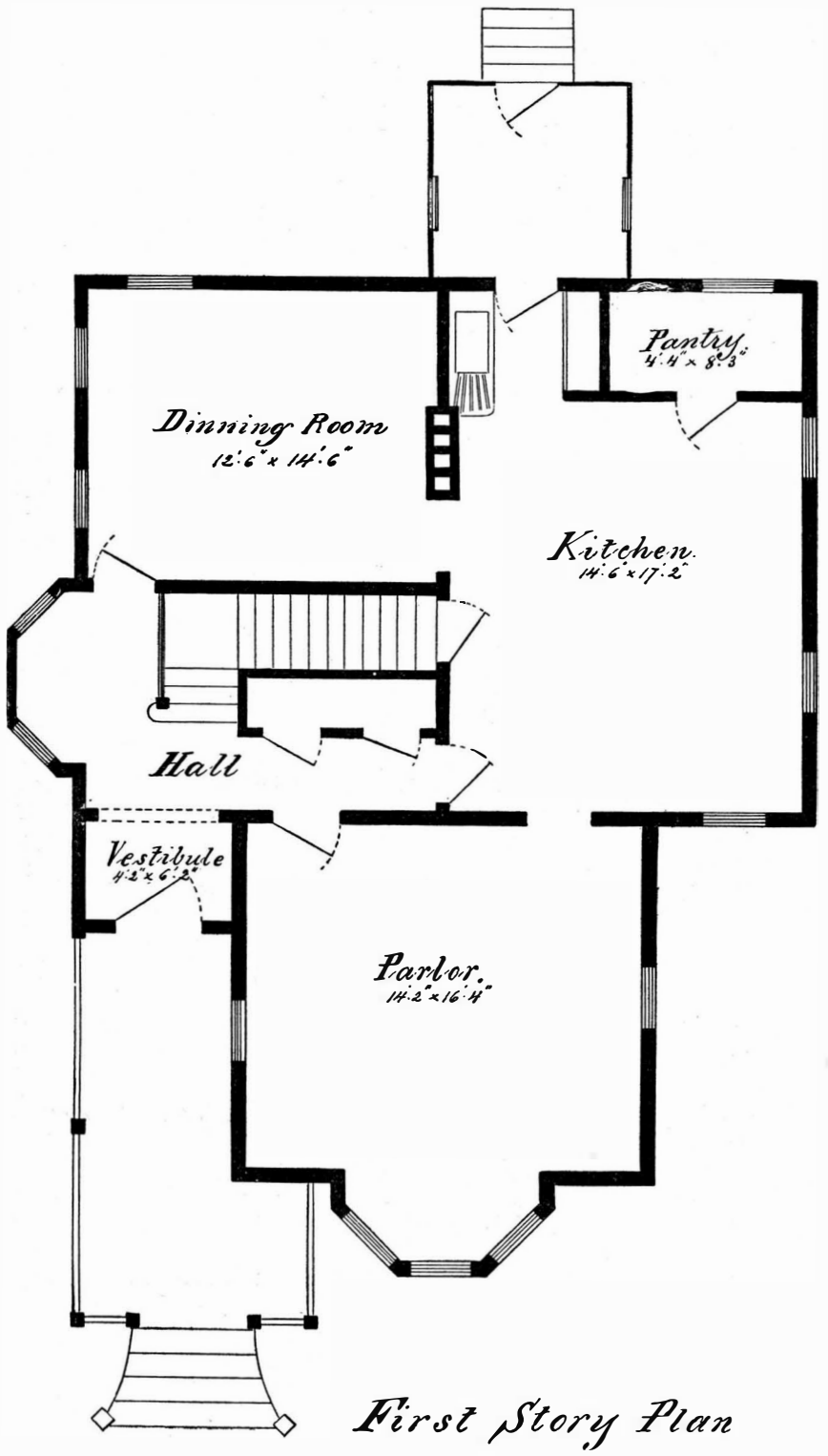
SECOND STORY PLAN



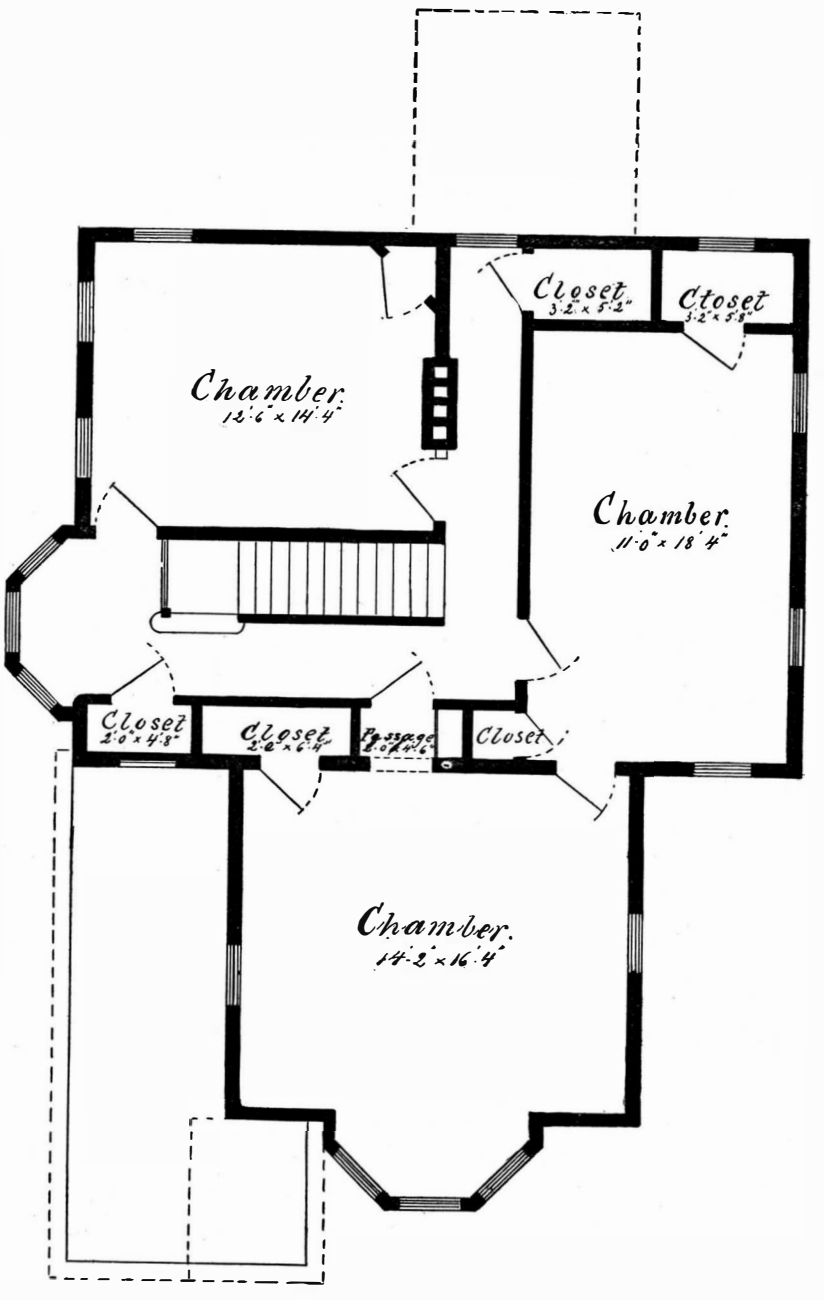
FIRST STORY PLAN.



DWELLING FOR A NARROW LOT.—[For description see page 83.]



First Story Plan

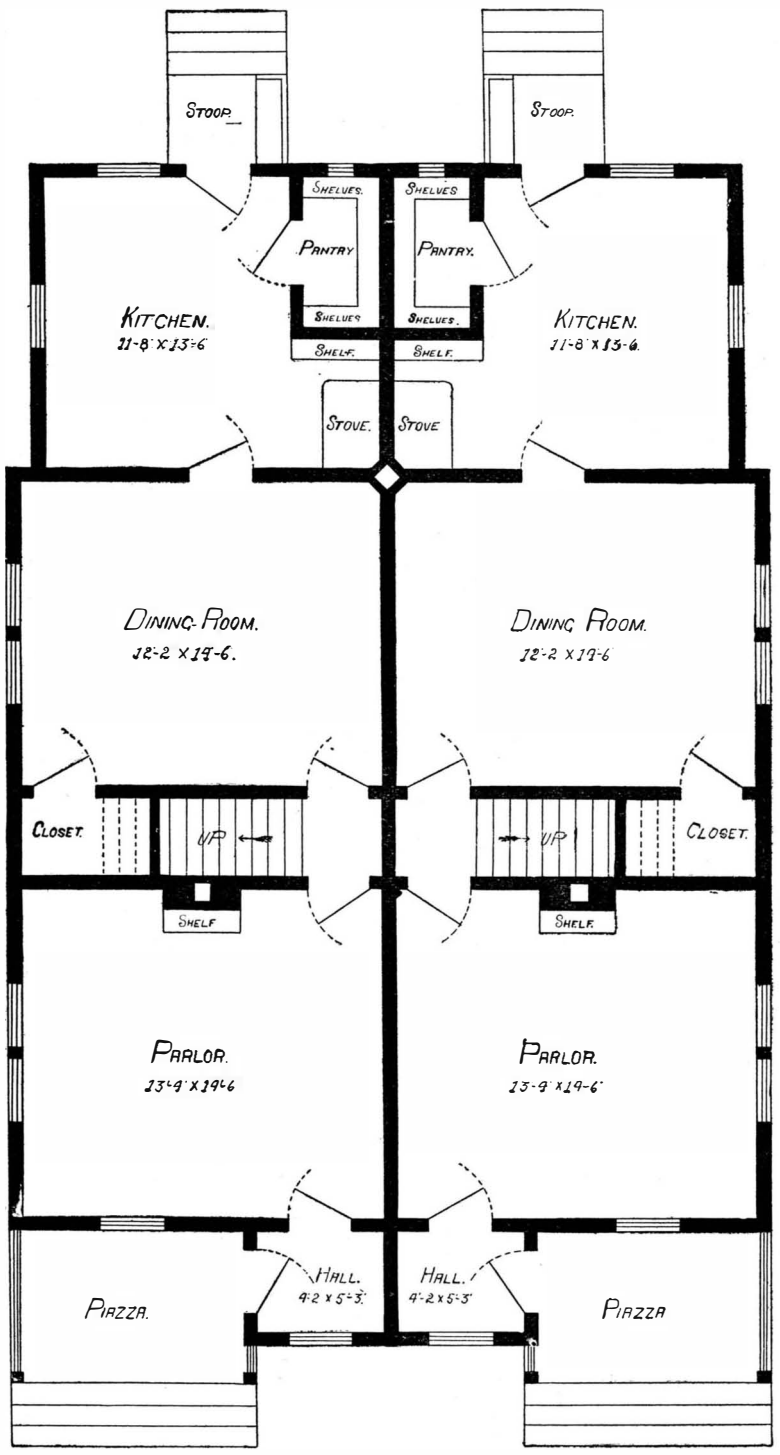


Second Story Plan

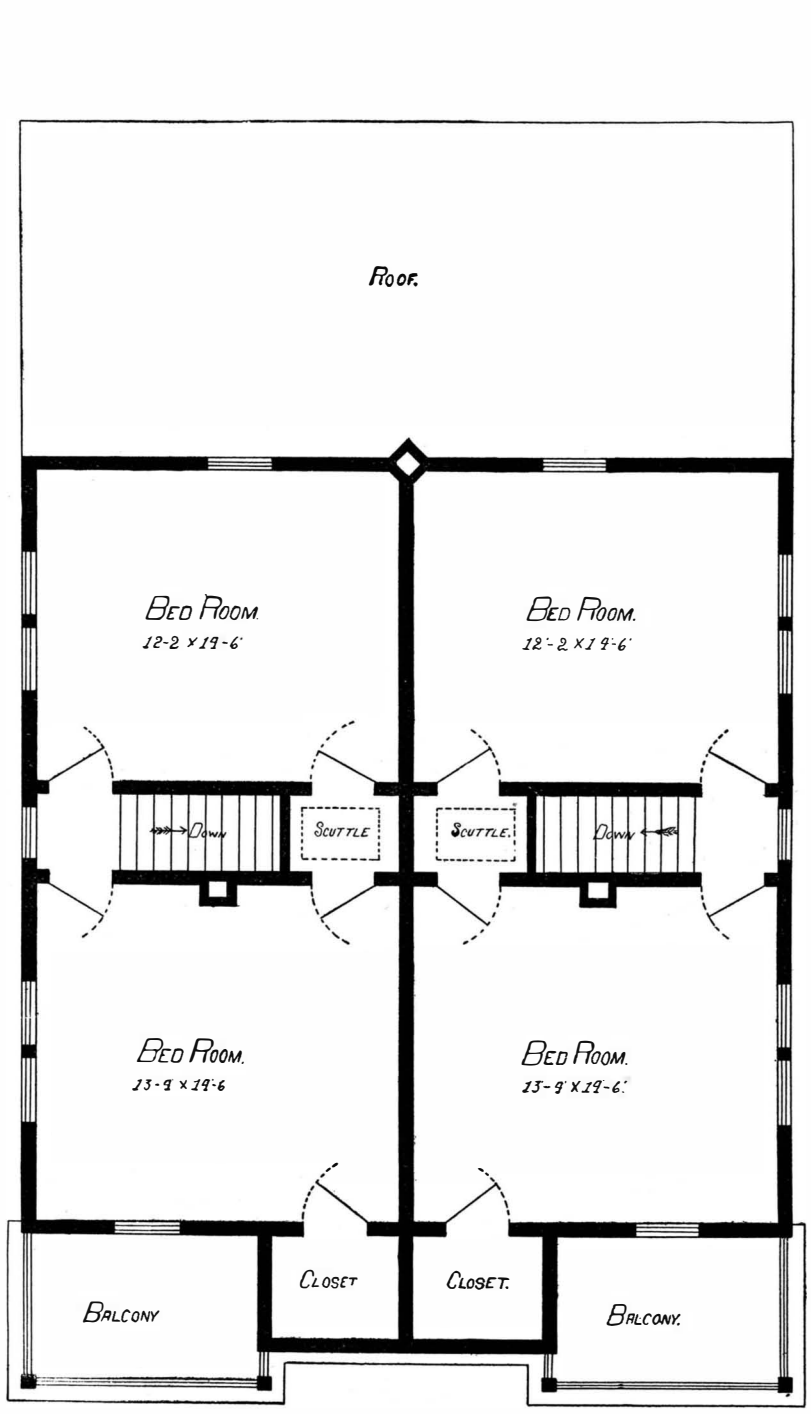
A HOUSE FOR $2,800.—[For description see page 83.]

A DOUBLE HOUSE OF MODERATE COST.

This double dwelling was designed for erection in Iowa, and the builder's estimate for that locality was $1,800. It is 28 ft. wide over all and 45 ft. long, contains ten rooms, five for each tenant, all conveniently arranged. The piazza entrances are entirely separated, provided with vestibule doors. There is ample closet room. Altogether the plan gives much satisfaction, while the exterior is pleasing.



First Floor Plan.



Second Floor Plan.

A DOUBLE HOUSE OF MODERATE COST

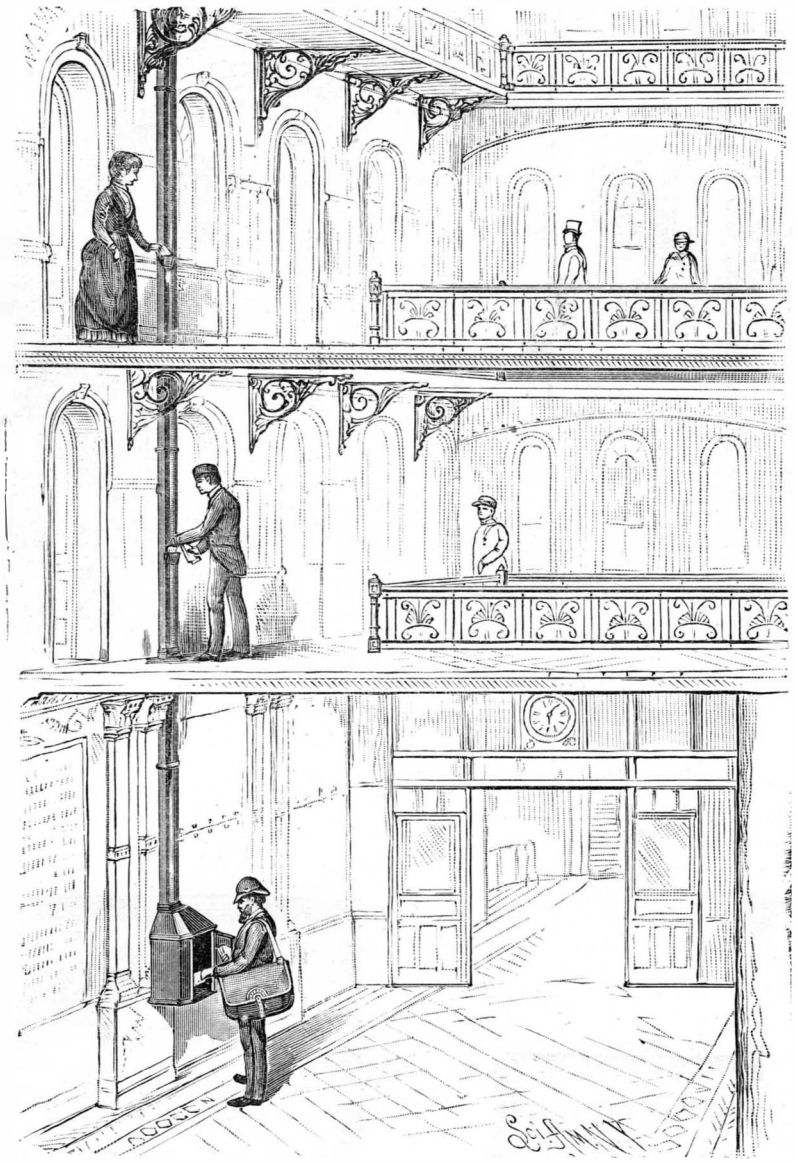
UNITED STATES MAIL CHUTES FOR INTERIORS OF BUILDINGS.

The government provides, in all large cities, most excellent facilities for collecting letters for the mails, the collectors making tours of the streets for this purpose from two or three to a dozen times a day, and taking up the letters deposited in the lamp post boxes, or receptacles placed in the most convenient public places, often as frequently as every hour. Business men are thus enabled to dispatch their correspondence with a promptness almost as marked as if they had special messengers and chartered express trains constantly ready for service.

Everything which in any way contributes to quick service needs only to be known to be duly appreciated and adopted, a fact which is now becoming apparent in regard to the Cutler mailing system, or patented mail chute, at present acknowledged to be the proper supplement and accompaniment of the passenger elevator in all high commercial or office buildings. The illustration herewith shows the working and explains the utility of the mail chute. After obtaining the consent of the postmaster, a United States mail box is located in the lower corridor of a building, and to it is joined a conductor made of metal and plate glass, handsomely finished, which runs up through the building, and is provided with openings in each story. Here the occupants deposit their mail, instead of having to descend to the street for the purpose, and so deliver it directly into the United States mail box.

The chute in its present improved form is made in ingeniously constructed sections about four feet long, so arranged as to be readily taken out in case of accident. A simple but efficient means of rendering the point of passing through each floor waterproof is employed, and in buildings whose height makes it necessary an elastic bottom is placed in the mail box to break the fall of heavy matter. Adjustment is made in each story to permit expansion and contraction to take place without affecting the joints between the plates of glass and metal, and the mail openings are protected from improper use or crowding large packages into the tube by a balanced guard of brass with the front edge milled, any effort to force this resulting in closing the opening.

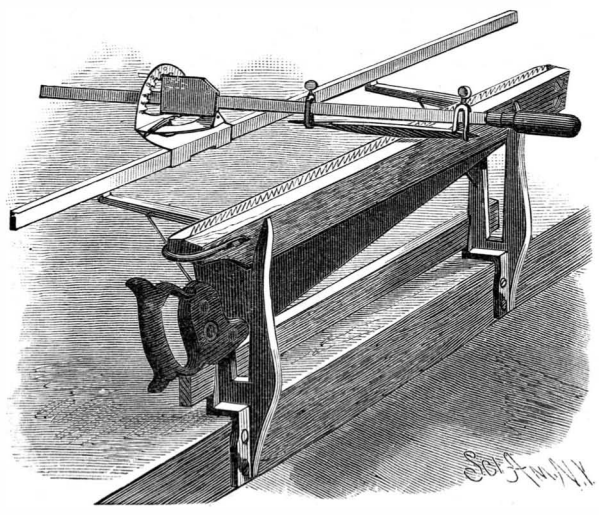
This improvement is now in use in nineteen of the largest cities of the country, and in most of the finest office buildings which have been constructed, so that a structure intended to be occupied for office purposes cannot be said to be completely equipped with all the modern improvements without it. Further information relative to this system, which is fully covered by United States patents, will be cheerfully furnished by the sole makers, The Cutler Manufacturing Co., Rochester, N. Y.



THE CUTLER MAILING CHUTE FOR POSTING LETTERS.

AN IMPROVED SAW FILING MACHINE.

An efficient and easily worked device by which saw teeth may be filed to an accurate and uniform bevel and pitch is shown in the accompanying illustration, and has been patented by Mr. Hamilton Sherman, of Waverly, Pa. It consists of a file frame guide with a base plate sliding on a guide bar. A head piece is pivoted to the base plate, so as to be movable in horizontal plane, and has a guide frame for the file-holding



SHERMAN'S SAW FILER.

frame bar to slide through, pivoted to the head piece, to swing to either side of a vertical line, there being catches for holding the file to the required sidewise, slanting, and axial positions. The saw is firmly held in the clamp of the machine frame, which is so made as to be easily taken apart and put together, and the file frame, in which the file has been set, is adjusted at the required angle to give the proper bevel to the saw teeth, and also to set the file axially, and the file is then held relatively in these same positions to the saw throughout the work of filing. Accuracy and uniformity are thus secured, and the operation can be most expeditiously performed.

Drawing and Engineering Instruments.

With the rapidly growing engineering and manufacturing interests of this country, there naturally comes an increasing demand for fine engineering instruments and supplies. In years past, the bulk of fine drawing and engineering instruments came from Europe, but now such instruments are made in this country in large quantities, and of a quality equaling, if not surpassing, anything produced in other countries.

We have before us a very complete and finely illustrated catalogue of instruments manufactured and sold by Messrs. Keuffel & Esser, of this city. In this catalogue is described every imaginable article for the use of the draughtsman, architect, or civil engineer. All of the recent appliances are illustrated, many of them for the first time.

This firm have an extensive factory in Hoboken, N. J., a store and wareroom at 127 Fulton Street and 42 Ann Street, New York City, and they have recently established a house in Berlin.

We are pleased to note the rapid growth of this industry, not only on account of its importance to this city, but also on account of being a sort of index to the prosperity of manufacturing and engineering interests generally.

Tests of Portland Cement.

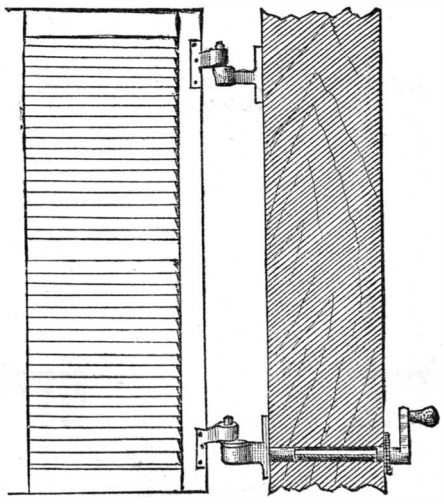
In obtaining reliable results, certain tests are necessary in the use of Portland cement. Weight per bushel is not always to be relied on, unless the cement is fed through a standard hopper into a measure of standard size. One authority, Mr. D. L. Collins, gives rules for this weighing, and a drawing of a hopper. Fine grinding is of more importance, and it makes great difference to the weight, as may be observed by passing the best cement freshly ground through an eighty mesh sieve, and leaving certain percentages of residue. All cement increases in bulk and weighs less with age. Fineness of grinding is one of the safest tests. For engineering works the per cent. residue left should be under ten through a sieve with 2,500 meshes, and for special work the same residue through a sieve of 6,400 meshes. Speaking of the water test, Mr. Collins says it is one of the safest guards as to the soundness of cement; and recommends that thin cakes should be made up and placed upon pieces of glass or other non-absorbent material, and then, when thoroughly set, one cake should be immersed in water, the other being kept in the air. Before immersion, the cakes may sometimes require twenty-four hours to become set. If after this the cakes show cracks in the outer edge, the cement should not be passed unless it can be proved that the defect is due only to freshness of grinding, and can, therefore, be thoroughly remedied by air slaking. A glass test tube filled with gauged cement is a good test. If the tube cracks in two or three days, the cement is good. If the expansion bursts the glass to pieces, it is inferior. Many clerks of works use the test tube, and on all works where good cement is required it ought to be tested in this manner.—*Building News.*

Whooping Cough a Dangerous Disease.

The attorney-general of the State of Michigan has recently handed the secretary of the State Board of Health a decision in which whooping cough is classed among those diseases which are "dangerous to the public health," and which are required by the statutes of Michigan to be reported by the attending physicians to the health officer or clerk of the local board of health. The evidence which was placed before the attorney general, and on which he based his decision, was that while small-pox was the cause assigned to the average number of 53 deaths reported each year to the secretary of state for ten years, ending with 1882, whooping cough was reported to have averaged 156 deaths per year during the same decade. In England whooping cough comes next to scarlet fever in causing deaths, and it is a notorious enemy of infant life. The inclusion of this disease among those which must be recognized by boards of health as dangerous to the public health is a step in advance. We see so many nowadays that the steps sound like the passing of a platoon of infantry, and the progress is very gratifying. Now, when boards of health and health commissioners make recognition of measles as a contagious cause of needless deaths, the pegs can be set up a notch higher to denote sanitary advancement.—*Sanitary News.*

AN IMPROVED DEVICE FOR WORKING WINDOW SHUTTERS.

A simple mechanical device by which a window shutter can be opened or closed, or fixed in any desired position, from the inside of a room, without opening the window, is represented in the accompanying illustration. The fixture takes the place of the lower hinge of the shutter, and has a rod which passes through the side of the window frame into the room, to which is attached a small handle On the outer end of the rod is a worm or screw, which meshes into a worm wheel working horizontally on a small bracket, no larger than an ordinary hinge, this worm wheel carrying a shutter supporting arm, the working parts being incased so as not to be affected by rust, snow, ice, or dust. The handles and escutcheons are made of imitation bronze, brass, bronze, or nickel plate, and the knobs of rosewood, the handle being all that shows on the inside of the house. When it is desired to open or close the blinds, it is only necessary to turn the handle, thereby opening, closing, bowing, or fixing the shutters in any desired position, without raising the windows, screens, or curtains, and in a way so simple that any child can operate it. The pantentee and



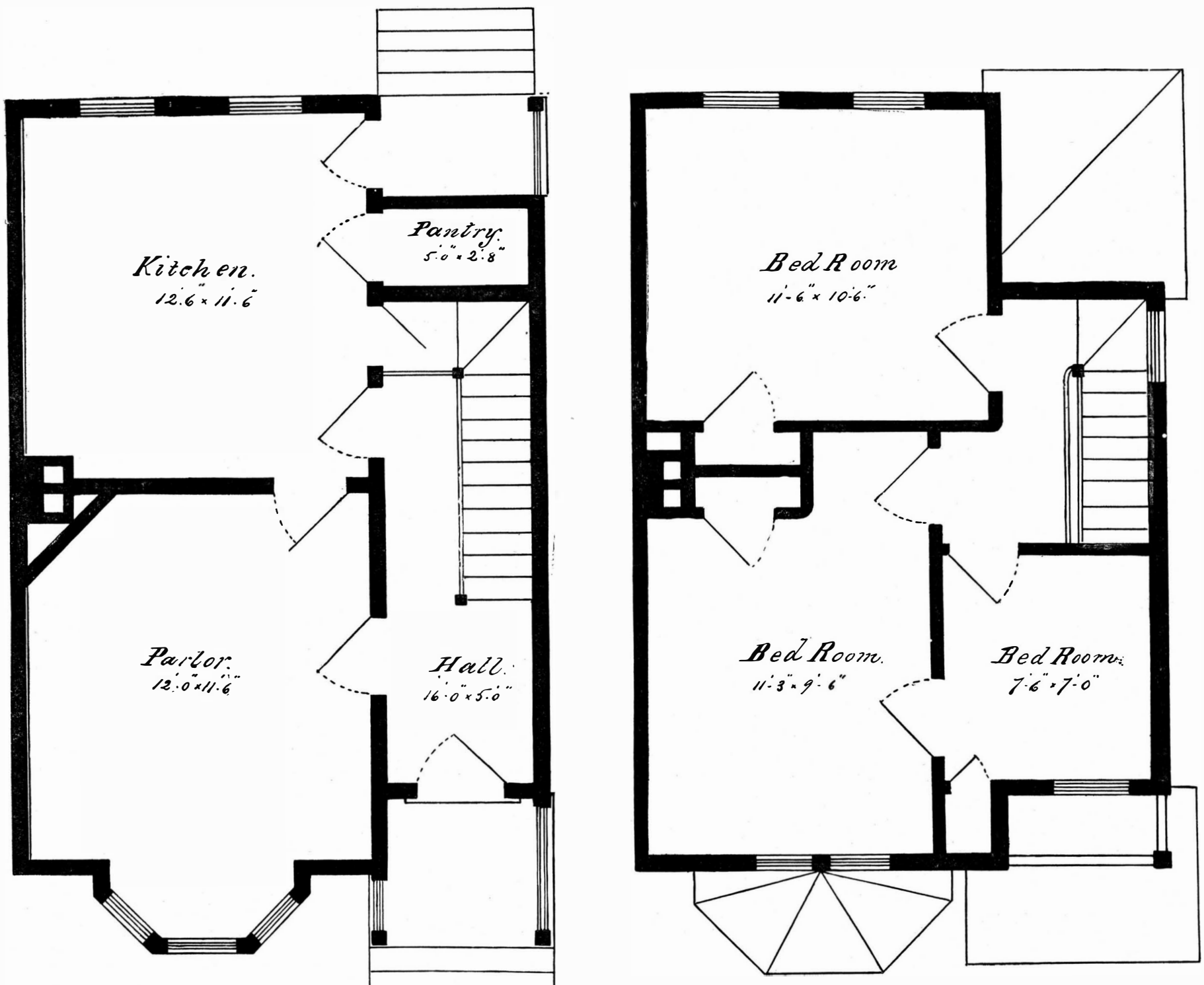
MALLORY'S SHUTTER WORKER.

manufacturer of this improved device is Mr. Frank B. Mallory of Flemington, N. J., and No. 60 Liberty Street, New York.

IT is now an imperial regulation in Brazil that persons who die from yellow fever shall be cremated, the state bearing the whole expense. This decree might be extended judiciously to all contagious diseases.

A $1,250 HOME.

Our engraving shows a perspective of a neat little two-story attic house, designed by E. M. Van Duzer, architect, Newark, N. J., which can be erected hereabout for $1,250, and for less money where lumber is cheaper. The arrangement of rooms is convenient.



A TWELVE HUNDRED AND FIFTY DOLLAR HOME.

A HOUSE AT FLUSHING, N. Y.

We give a drawing of a comfortable and substantial dwelling at Flushing, N. Y., for which we are indebted to *Building*. William A. Bates, architect, New York. We give a floor plan, from which the general arrangement will be understood. Constructed and finished in satisfactory manner, we estimate the cost at about eight thousand dollars.

Painting Brick and Stone Buildings.

To prevent the disintegration of exterior brick or stone surfaces, caused by moisture of the atmosphere and change of temperature, paint should be used to cover the surface. Particularly in our Western cities do we find the stone gradually crumbling away, the same action taking place with the brick. The process of decay is certainly slow, but it is sure. How often do we see magnificent stone or brick edifices gradually scaling and crumbling down, when by the application of a coat of paint the action could be prevented for years.

The great object is how and what to paint these surfaces with. In the first place, it is useless to ruin the outside appearance by an application of cheap trash which can be of no material benefit so far as preservation is concerned. It must be borne in mind that paints are mainly durable, and make the surfaces that they cover durable, because of the water proof quality of the oil out of which they are mixed.

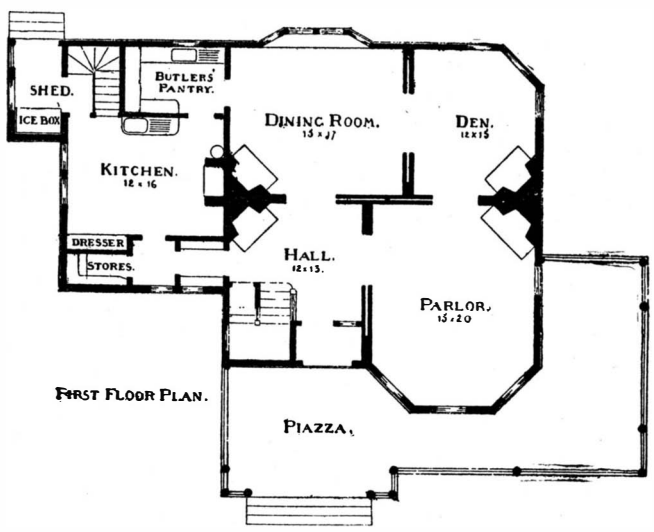
The natural pigments—called ochers or earth paints—do not in any degree act upon the oil; while others, such as white lead and the chromates of lead, do affect the oil chemically, and impair in a measure its tenacity and water proof quality. For these reasons it follows that the natural pigments are not only the most economical, but also the most durable for painting brick or stone houses.

It has been demonstrated that the most durable paint for brick or stone houses is finely ground French ocher, mixed in proportionate quantities with white zinc. The color produced is a soft shade of buff, most pleasant to the eye and permanent to the last degree, both in color and material.

Venetian red, an artificial ocher or red oxide of iron, is in common use, but it does not hold oil like ocher, and makes a coating far less water proof. It is a seemingly durable paint, because the stain which it imparts to a porous surface remains long after the oil has washed away. It cannot be used with zinc, because of the unsuitable color which it produces, and because this pigment (Venetian red) when tinted with white becomes highly fugitive in color.

The condition of the wall is also very important in painting brick or stone surfaces. The work should be done in warm, dry weather, when the moisture which the bricks or stone absorb during the winter and spring seasons has dried out, otherwise the paint will not be apt to adhere tenaciously, but will scale or peel off. The joints require constant looking after in the coping. These should be made absolutely impervious to water by the application of soft putty in a mass both on the top and the edges, and when this hardens to the point of cracking, it should be renewed. Mortar and cement for such purposes are useless, for no matter how water proof the surface may be, if the water be allowed to percolate through the joints, the integrity of the wall will be destroyed.

The first coating of paint for brick or stone should be mixed very thin, more as an oil stain than as a paint, to allow the brick to absorb all that is possible. By being thin, moreover, the paint readily runs into cavities that thicker material would not penetrate. The second coat can be used heavier in body. Then by the application of one coat every few years a building would last indefinitely, and the owner would feel that his building was proof against the atmospheric changes. —*T., in Master Mechanic.*



A HOUSE AT FLUSHING, N. Y.

Frosted Glass.

In building, an artistic use is made of a new glass invented by Mr. Bay, of Paris, and called frosted glass (*verre givree*). It reproduces the pretty patterns that frost produces upon window panes, and that have been called ice flowers. Mr. E. Boulanger, the architect, has brought this product to the attention of the Central Society of Architects. The process of making this glass is very simple. It consists in coating the surface of the glass, which has previously been ground with sand, with a sort of varnish that enters the cavities produced by the sand. The panes of glass thus coated are then put into a stove, or, in summer, are simply exposed to the sun. Under the influence of the heat, the coating dries and contracts, and breaks up into little scales that remove small particles from the surface of the glass.

The roughness is removed at the spot where each scale cracked off, and the effect produced is that of crystallization. As these different crystallizations or fractures take place in every direction, they produce, as a whole, an effect exactly resembling that produced by frost upon a window pane.

The pattern thus formed may be very small if the layer of varnish is thin, and the crystallizations are so much the larger, within certain limits, in proportion as the coatings are more numerous.

As many as six coats may be applied, and at this point the glass is reduced a half in thickness if the operation has been performed upon simple glass.

This same process can likewise be applied to colored glass. The coating, on drying, removes the colored enamel, which is of uniform thickness, and the frosted glass produced exhibits half tint colorations of a very pretty effect. The glass thus frosted, while it allows the light to enter, does not permit of anything being seen through it.

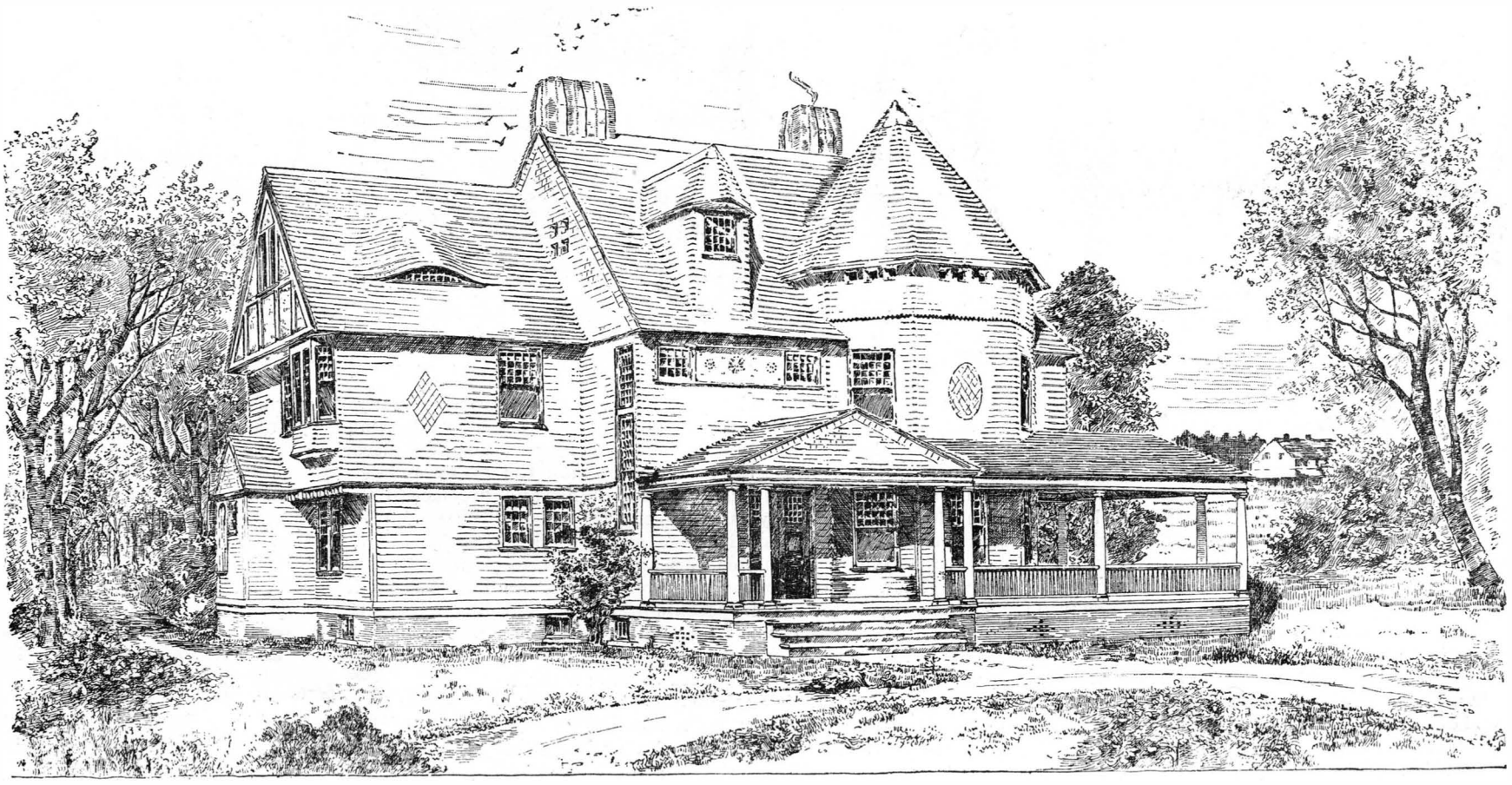
Upon gilding or silvering the frosted glass on the opposite side, we obtain the appearance of enamels of all colors, according to the colored glass employed. Under such circumstances, this glass can be used in the decoration of ceilings, cornices, friezes, window frames, mirror frames, etc. By the same process, the effect of crystallization can be obtained upon lamp globes.—*Le Genie Civil.*

Action of Frost on Cements.

Some experiments have lately been made at Schandau on the action of frost on hydraulic mortars and cements when these materials are mixed with water containing different percentages of salt. In making the experiments a series of stone cubes of about 2·4 in. edge were united with cement, which in one case was mixed with pure water and in other cases with water containing from 2 to 8 per cent. of salt. While the cement was still fresh, these blocks were placed in the open air, and exposed for a period of twenty-one days to a temperature varying from 20 deg. to 32 deg. Fahr., after which they were kept for a further period of seven days in a warm room. At the end of this time the joints were tested, with the result that the cement mixed with pure water was completely disintegrated, having no holding power. The cement mixed with water containing two per cent. of salt was somewhat better, though the results obtained with it could hardly be considered satisfactory, while that mixed with the eight per cent. solution was uninjured by the exposure.

Oil of Bay for Flies.

The bay tree, which the French term *le laurier des poetes*, and its product, the oil of bay, or *huile de laurier*, have been recently mentioned in some of our foreign exchanges as proving an excellent remedy for the nuisance caused by flies during the hot months of the year. We are informed, says the *Monthly Magazine*, that this oil is already extensively used in Switzerland by butchers, to keep their shops free from flies, and that after a coat of bay oil has been applied to the walls, none of these troublesome pests will come near the place. For many years past this same *huile de laurier* has been used in the south of France for preserving gilt frames, chandeliers, etc., from becoming spotted and soiled by insects. No fly will alight, it is said, on a gilt surface thus treated, and rooms in which such an application has been made to the frames of pictures are soon found to be quite devoid of flies.



A HOUSE AT FLUSHING, N. Y.

THE COURT HOUSE AND POST OFFICE AT SAN ANTONIO, TEXAS.

We are indebted to the *American Architect* for our view of the edifice. It is an imposing and substantial structure.

Decorative Novelties.

Among new fireplace facings may be mentioned an artificial lapis-lazuli of great beauty in its depth and variety of shades of blue; this material is set either in small oblongs in brick fashion or broken in pieces and set like mosaic; in either way the effect is rich and pleasing. Another new facing set in mosaic is mother-of-pearl, giving out a hundred lusters of varying radiance and color. Another facing in the richest shades of brown and yellow is shown in tortoise-shell effect tiles set brick fashion. Among the richest colorings in uhese same small tiles is what is called bronze olive, which harmonizes delightfully with birch wood of nattral finish, mahogany, sycamore, and antique oak. A lovely dining room mantel of this latter wood shows the new fireplace, called the hob fireplace, set with shaded creamy yellow tiles of a square shape. On either side of the facing, rising from the hearth, is a square faced with tiles and topped by polished brass about twelve inches high and square, on which the teapot may be set to keep the tea warm. Above the fireplace opening is a fireplace or mantel closet set midway between the shelf and the top of the opening. This closet is lined with polished brass, and shows locked receptacles, one at each end, having doors set with opalescent jewels, the central portion being open. In these closets some of the dishes of a five o'clock tea may be placed to keep warm. Hob fireplaces are not confined to the dining room, but are often attached to a boudoir or drawing-room mantel. A charming example of the latter is of wood finished to an antique ivory effect, the design in old colonial style. In this case the facing is composed of square creamy yellow shaded tiles and the under shelf closet lined with polished wood finished in dead dull gold; the locked receptacles at either end show doors set with heavy beveled plate glass. A pleasing feature of the first-mentioned antique oak mantel is the shelf arrangement, there being two somewhat short shelves, the space between being divided in panels, each panel set with a heavy beveled mirror. Above the top shelf the chimney breast is fronted by paneling in oak, surmounted by a handsomely carved frieze. Something new and effective is the hooded grate opening, the hood composed of ornate brass work set with opalescent or else ruby jewels, or with oblongs of beveled glass. Some of the new fire dogs show animal subjects in polished brass, as a pair of lions, winged griffins, a dog and a cat, a pair of dragons, etc.

Among some mantel ornaments and furnishings may be mentioned a pretty clock, vases and candlesticks in a soft ivory finished ware decorated by paintings of flowers and birds in soft pinks, gold greens, blues and yellows, the set being suited for a boudoir mantel. An attractive ornament for the antique oak mantel is a cast of a majestic lion in fine French bronze of a verd antique shade; a fanciful clock of the same metal and coloring represents a large globe rolled up an incline by the feet of an acrobat.

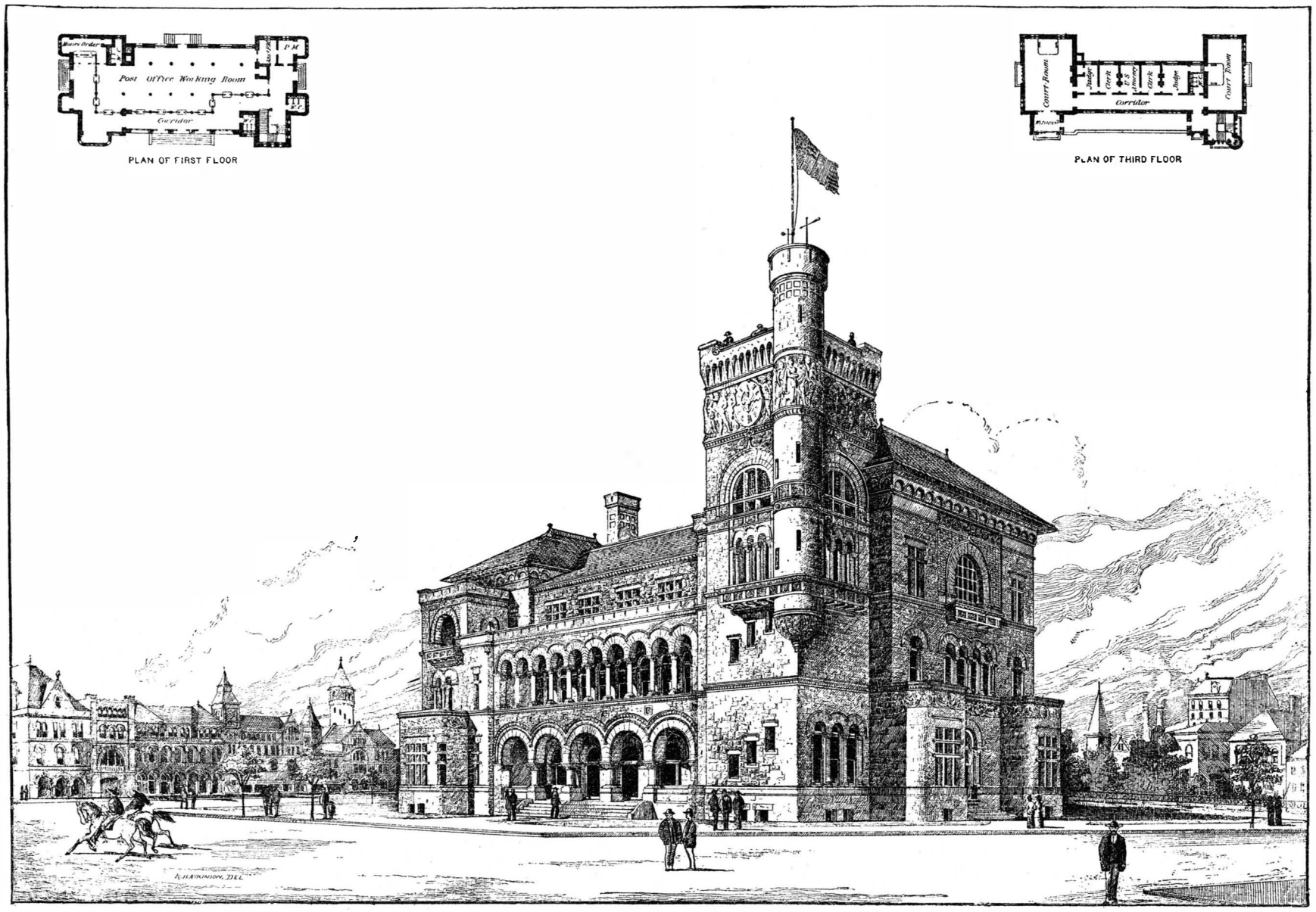
Among attractive and inexpensive upholsterings may be included satin Renaissance, rich in effect, and said to be durable, being composed of worsted and silk; satin de Leon at $1.50 per yard is also a handsome silk and worsted fabric; both are fifty inches wide. A very refined petit point tapestry suited for upholstering or for a portiere shows a gold colored silk ground, brocaded by groups of large flowers in low tones of red, blue, olive, and ecru of very refined effect. Silk brocatella, now so fashionable, in some fine combinations of color may now be had at comparatively low prices. Moleskin is a fairly durable and rich-looking material printed in rich colors; a handsome example shows an all over poppy pattern in yellows, reds, blues, and olives on a black ground, producing the softest effects. Silk warp tapestry is seen in the new tobacco-colored ground, brocaded by low-toned flowers. Among new curtain materials suitable for hall windows are the East India prints of scarlet and cream, and orange and cream, thin, sheer, and very gay in effect.

Some new rugs called Salonicas are attractive and inexpensive, and some combinations and designs are really superior. Among ground colors of some of these rugs the most pleasing are the peachblow, amber, and slate blue, the designs copies from old Eastern rugs. Salonica rugs are of American manufacture, and are reversible. Some are 30 by16 inches in size; a thick, rich, deep ecru fringe finishes these rugs at their ends.

Cushion decoration seems to be a favorite form of needlework for summer exhibition. A very attractive cushion now on exhibition shows an all-over conventional flower and leaf pattern worked solidly in dull purple filoselles and old golds on a deep old gold ground, the design outlined by a fine gold colored silk cord, the sides of the cushion finished with moss trimming. Another cushion covered with ivory white sateen is powdered with whorls of oak leaves surrounding a small disk filled in with honeycomb stitch, the whorls and disks worked in gold color and brown silks. the background of ivory white showing scroll outlines in gold silk. A cushion in electric blue plush and satin shows a central band worked with wild roses in shaded outline. A refined-looking cushion of bronze green plush has for its ornamentation groups of conventional palms worked solidly in low yellows outlined by gold thread; a diagonal band of satin between the palms, which were worked in the corners, was embroidered with figures in blue and gold. Among new yacht cushions is one covered with Bolton sheeting, the sides laced ornamentally with old red cords.

Thanks are due for the above information to the Decorative Art Society, Conkling & Chivvis, Edgar Allien & Co., J. B. Shepherd, Stern & Co., and Conover & Co.

Tiles.—No art tiles in Europe surpass those of American manufacture, in purity, richness, variety of glazes, and picturesqueness of composition. Some lately on exhibition are exquisitely clouded in colors ranging from pale yellows and delicate grays to lustrous browns and strong tones of green. Others, made by a new process of glazing, have the glitter of burnished gold, and the delicate colors and sheen of mother of pearl. Many of the sets which come as borders of fireplaces are of marvelous beauty. One effective set is of chocolate brown highly glazed, painted with a continuous design of deep yellow daisies with black centers. In another set on a white ground are shown great bunches of red and pink carnations. Hearths with borders are made to accompany these tiles. Some tiles of terra cotta show a continuous pattern of hawthorn blossoms and are very decorative. Some lovely eight inch square tiles were lately painted by a lady after designs of a fireplace in the tea house at Eden Hall, one of the Duke of Westminster's seats. These tiles, twelve in number, represent the signs of the zodiac, with quaint lettering describing each tile. They are outlined in blue, in a white glazed ground, the letters being also in blue.—*Art Interchange.*



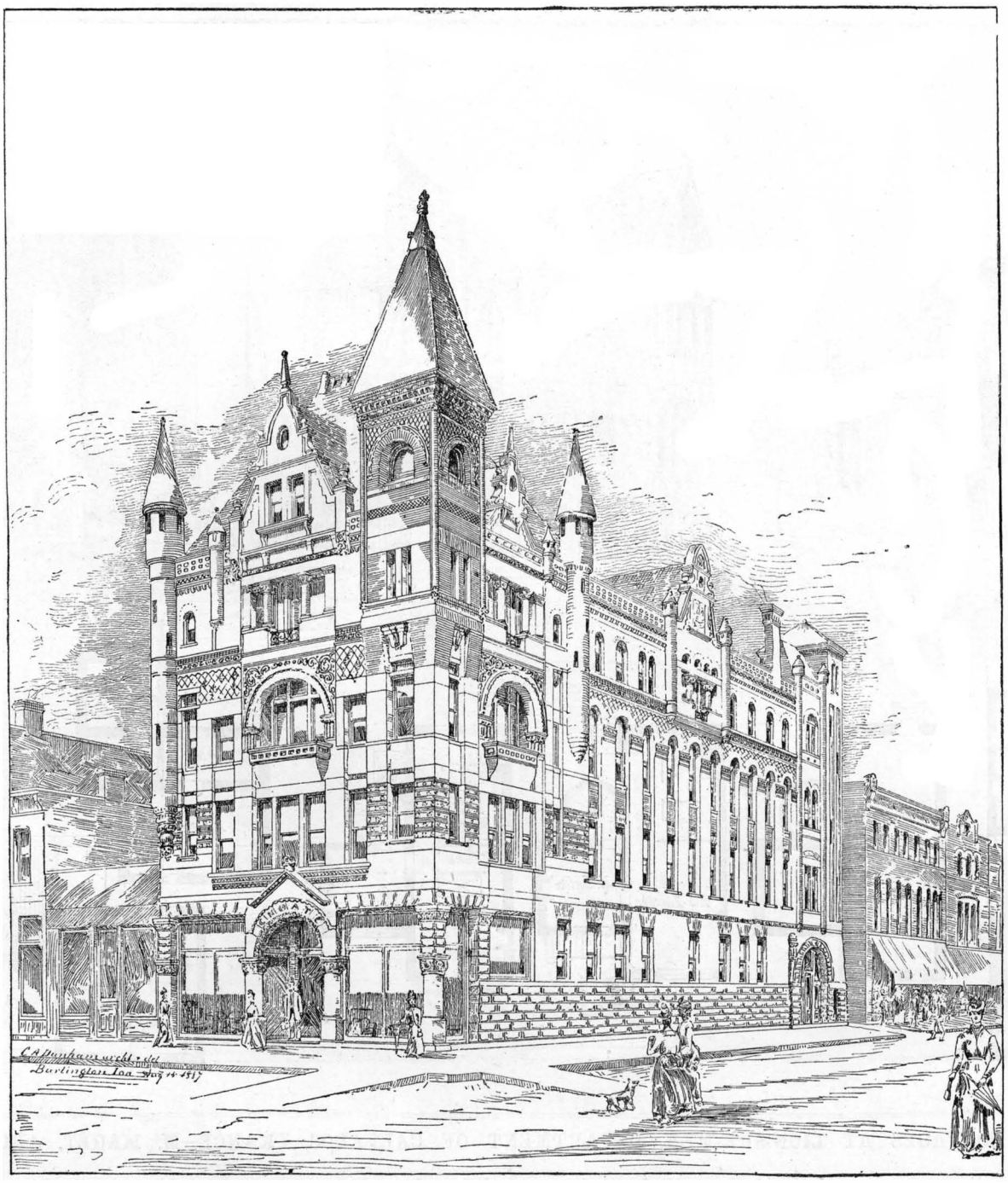
THE NEW UNITED STATES COURT HOUSE AND POST OFFICE, SAN ANTONIO, TEXAS—M. E. BELL, SUPERVISING ARCHITECT.

Colored Mortar for Brickwork.

The common bricks of almost any district may be sorted so as to produce contrast in tint or "tone"—red, and yellow or "cream color." This tint of the bricks may be preserved and heightened by using mortar of the same tone or tint. Furnace ashes and lime will produce a dark mortar, pounded red brick or red tile mixed with lime will give a red tone to mortar, and cheap mineral colors may be added to mortar for pointing. The color of mortar is sadly neglected, as generally the same white lime and sand are used for all tones of color in bricks, and not unfrequently white putty mortar is used for pointing the reddest as well as the lightest colored bricks.

DRY GOODS STORE AT WINONA.

The wholesale and retail dry goods house of H. Choate, of Winona, Minn., shown in the illustration, is situated on the corner of Third and Center streets, and is 40 ft. by 140 ft. The most part of the first story is built of jasper, with red granite columns. The rest of the building is built of pressed brick, with terra cotta and brown sandstone trimmings. In the tower seen in the rear is the elevator, which is entered either by the street direct or inside. The basement under the entire building is finished throughout. The inside will all be finely finished. C. A. Dunham, architect.



NEW DRY GOODS STORE, WINONA, MINN.

Blinds.

The editor of the Minneapolis *Lumberman* says that a prominent manufacturer said to him only a few days ago that, in his opinion, blinds were a fraud, but so long as the trade continued to demand them he should furnish them, while not understanding how any sane and sensible man could think of putting them either on or in a house. The inside blinds are little better than dust catchers. They are dirty to begin with, always catching and tearing drapery if any is hung about the window, and are given to getting out of order. Outside blinds positively preclude the use of storm sash, and in this northern latitude the storm sash has proved to be an economy as well as a comfort. It is time the blind was banished, and it certainly is being from all houses of the better class. Only the builders of the hideous white houses cling to them affectionately, and this class is rapidly being narrowed down to country towns and the farms. The money which this class put into blinds, if invested in storm sash, would add immensely to their comfort and save the cost of the windows in reduced fuel bills in the first three years.—*Builder and Woodworker.*

How to Clean and Polish Top Leather.

New enamel leather tops that have become dingy and soiled by allowing dust to accumulate on them, and clammy hands to handle them, can usually be restored to their former bright and clean condition by the use of castile soap and soft water, as described below.

Before applying the soap and water, the top should be thoroughly dusted off; first with the painter's duster and then with a soft cloth. Then to a quart of warm water add half a teaspoon of common washing soda, dip a soft sponge into the water, squeeze it out, rub the sponge on the soap to form a thin lather, and apply the sponge in a gentlemanner to the leather. There should be no dripping from the sponge, but coat the entire leather work, including the bows and dash, with a thin coating of the lather, rinsing the sponge before applying it to the soap.

After all the leather work of the job has been treated with the soap and water, then rinse the vessel and the sponge, and get clean water without the soda. Dip the sponge into this clean water and squeeze it out until none will drip from it (by this we mean just a damp sponge), and apply the sponge to a part of the top. Then, immediately, with a soft, clean cloth or soft chamois-skin, rub gently but swiftly until the gloss returns. Continue this process until all the leather work has been gone over. Sometimes it is necessary to apply the sponge twice to certain parts of the leather before the stain or gum can be removed.

The above is our method of cleaning soiled enamel leather tops, which has proved successful; but, before dropping the subject, we will offer a few further suggestions that have occurred to us while thinking over the matter.

After the bindings have been trimmed off from the back and front bows, use a stick specially made for the purpose of blacking the raw edges and designed to avoid getting the black smeared over the leather, for all the different blacks contain more or less copperas, which is poison to leather that contains no oil. After the edges have been blacked, apply tallow to them. This can be done with a tickler and a rag. Then take a stick similar to the one used for the black, and coat the edges with top dressing. This will prevent water from getting in under the binding to rot it away, and at the same time it will give a finished appearance to the raw edges, which, after the top has been dusted two or three times, without the tallow and dressing applied to the edges, will otherwise become conspicuous.

When the job leaves the trimmer's bench, it should be placed out of the way and the top covered over; and, when the job is needed, the top should be dusted off before it goes into the warm paint room; and each time the painter dusts the body off, he should also dust the top, but no water should be used on the leather if it can be avoided. If it is a close top, the painter should be careful not to get pumice on the leather, and when the job is rubbed for finishing, the prop blocks, joints, and nuts should be attended to and the leather cleaned up. When the job is varnished and hung off, it is then only necessary to dust off the top.—*U. No, The Hub.*

A NOVELTY in ladies' watch cases is one-half plain, while the other half is ornamented in pink and yellow gold. The central setting of this case is a clover leaf formed of a ruby, a diamond, and a sapphire.

Screens.

Screens are among the brightest bits of house furnishing, and they can be made of so many designs that one is tempted to indulge the fancy, which makes even the largest, dullest room cozy and bright. A rustic screen can be made at home. For the frame secure poles with the bark still on, have the panels filled with heavy hardware paper, and in putting the sections together use leather hinges fastened with leather-headed tacks. Over the panels put moss, the flat moss which one finds upon stones and trees; attach it with glue, putting here and there tufts of long green moss, while upon the center of each panel an artistic group can be made by mounting a bird's nest among some tiny twigs flatly arranged against the background of moss. Another model has a flat frame of plain whitewood, or any wood most convenient. Cover the frame with an outer row of acorns filled in with beans or tiny cones; give the whole affair a coating of varnish. Have the panels filled with handsome paper or a very thin board, which should be gray or light brown in tone. Upon this background, for the center panel use a group of cattails, spread from the lower right hand corner to the left upper, confined by a ribbon in the center, while upon the outer panels (allowing always three panels for a screen) a group of pussy-willow upon the left; and millet, wheat, or corn upon the right. For bedroom screens the light wooden or bamboo frames are used, the panel spaces being filled by silk, cretonne, or muslin over colored cambric. The material is shirred, leaving a tiny ruffle top and bottom. Small square screens are made of lace and ribbon, while the panels of matting in white or color are simply ornamented with acorns, cones, or bunches of grain. Panels of a material made from wood pulp are very artistic, as the surface is raised in tiny mounds, and finished with metallic luster in gold, silver, copper, or bronze. Lincrusta-walton is very serviceable and effective for screen panels to be used in any room, while embroidered panels or painted panels of wood are easily secured. For balcony use in the summer, broad screens filled with panels of common white matting are the most serviceable and appropriate, while the groups of wild flowers which adorn them can be drawn in with a brush, life size. Old-fashioned flowers look best, the hollyhocks, trailing vines of the morning-glory or China rose, while the brilliant glory of the trumpet vine is never more thoroughly artistic than when allowed to mount in bewildering tangles over a balcony screen. Small screens for the table are made in three panels, filled generally with bits of embroidery in floss, linen, or silk. A small square or oval table screen can be made from a fan supported by a tiny brass holder. This fan should be bordered with lace, and upon the center group a cluster of paper flowers or bird's wings; with a bow of ribbon upon the handle the effect is bright and pretty.—*Amer. Art.*

To Transfer Prints to Wood.

The whitewood used, being perfectly smooth, should receive a few coats of French polish. The print to be transferred, having been dampened with a sponge soaked in spirits of wine, is placed on the wood with a piece of thick cloth over it. A warm iron is then passed gently over the cloth, care being taken not to shift the picture. Keep the iron rubbing backward and forward for ten or fifteen minutes, then take off your cloth, and leave it for some hours. Now get some cold water, dampen your finger in it, and rub the paper. Great care must be taken not to disturb the impression. Keep dampening your finger as you go on. When you have got the paper all off, you can polish over. Any kind of print will do which is not glazed. Ink impressions are the most easily transferred.

FRENCH SEASIDE COTTAGES.

Our drawing, which is from *Architektonische Rundschau*, shows the style for small seaside cottages, as recently erected at Lion on the sea, Calvados, by M. Maget, architect.

These cottages are substantially built, are roomy, but not luxuriously finished. The walls are of stone and brick set in hydraulic cement. The house at the left has a parlor 14 × 20 ft., two bed rooms, and bath room on first floor; kitchen, etc, in basement. Estimated cost here about $2,500. The central house is larger, cost about $4,000. The house at the right should cost about $3,000. The scale shows the dimensions in meters.

Rules for Gas Fitting.

The superintendent in charge of affairs at the gas works now being constructed at Waukesha, Wis., and known under the corporate name of the Waukesha American Gas Company, has promulgated the following rules, to be adhered to by the plumbers of that city when piping houses for gas supply:

1. The following table shows the proportionate size and length of tubing allowed to be run:

Size of tubing.	Greatest length allowed.	Greatest number of openings.
⅜ inch.	20 feet.	2
½ "	30 "	3
¾ "	70 "	10
1 "	90 "	15
1¼ "	100 "	30
1½ "	150 "	60
2 "	200 "	100

No quarter-inch pipe must be concealed, and only six feet for one opening can be used as risers and drops for bracket lights of unconcealed work.

2. The riser in any building must not be less than eighteen inches from the floor for two, three, and ten openings; two feet six inches for fifteen and thirty openings; four feet for fifty and one hundred openings.

3. No riser in any building must be less than three quarters of an inch, except when there are but three openings, when one half inch will be allowed. In buildings with double parlors the drops must be one half inch, with a set from the main line of pipe of not less than four inches, dropped square, and well secured by gas hooks to the joists, the same to be observed on all cross lines of pipe. Drops and side openings, where nipples are used, must be made secure by lock nut, or solder, to prevent them turning inside the plaster, and must be well secured by gas hooks; and where a coupling or L is used on the drop, then a strap or lock nut must be soldered to the drop and fastened to the joists with screws.

4. The rise pipes in all buildings must be placed where the meter and stopcock can be readily got at for the convenience of the consumer to turn off the gas, and for the employes of the company to read the index and put the meter in order when required; and in no case will a meter be set where it will be exposed to damp or frost, or be liable to injury from any cause.

5. Service pipes, when extended from where the company has left them, must, in all cases, be continued the same size as said service pipe laid by the company up to the meter.

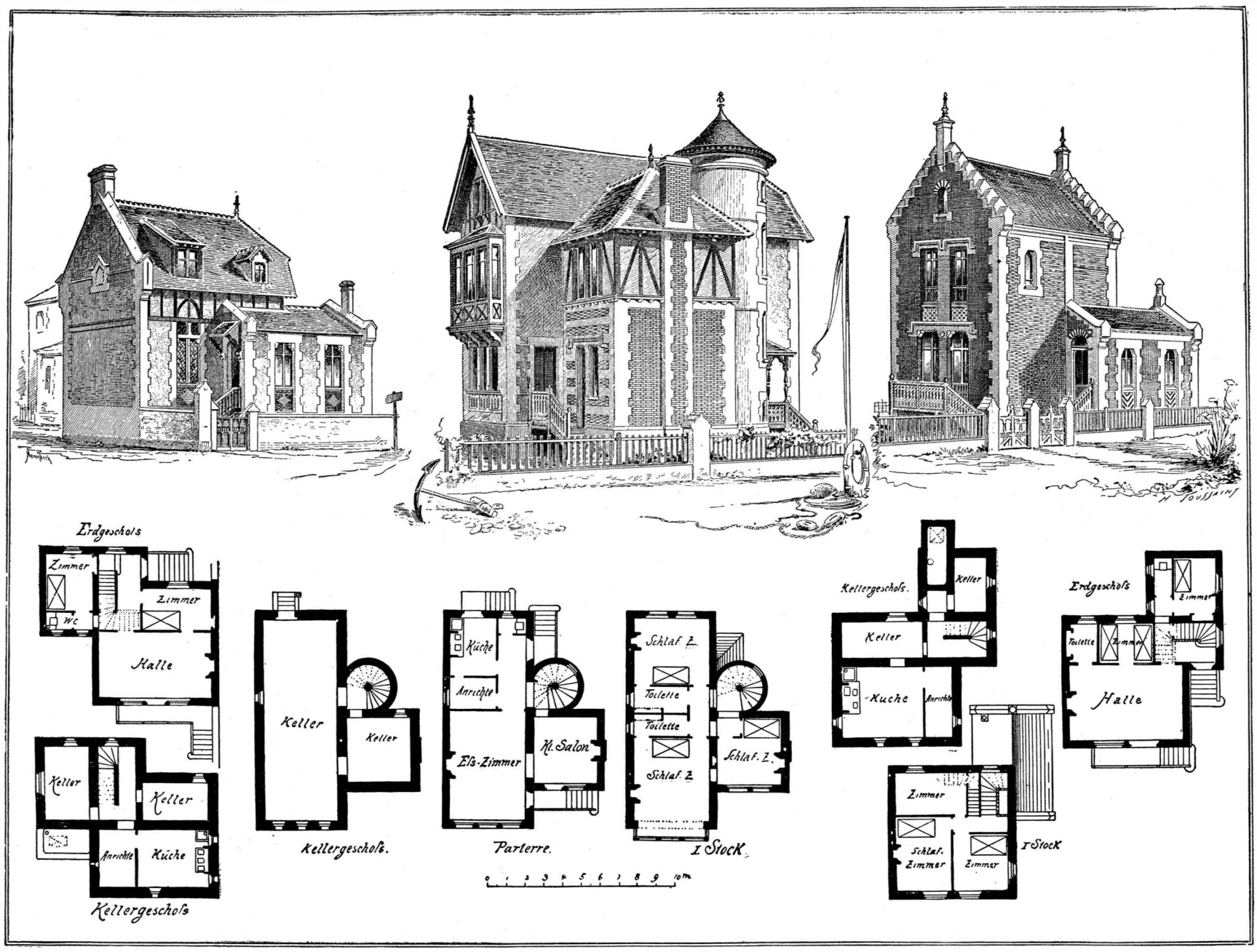
6. In all cases where extensions are made, care must be taken to break the pipe where the rule for sizes can be kept, and in no case must extensions be made from small pipe.

7. All openings must be closed with iron caps, and in no case will lead caps be allowed. No split pipe or broken fittings, repaired with cement or lead, will be allowed

8. All pipes must be examined by the inspector of the company before being concealed, and due notice must be given by the fitter when any pipe is ready for inspection.

9. For churches, theaters or public buildings, where large chandeliers, reflectors, or sun burners are to be used, the pipes must be of sufficient size.

It is the intention of the company to strictly enforce the above rules, and no certificate of inspection will be given when they are not complied with. To avoid trouble, architects and builders are requested to allow no bill for gas fitting unless accompanied by a certificate of inspection.—*Building.*

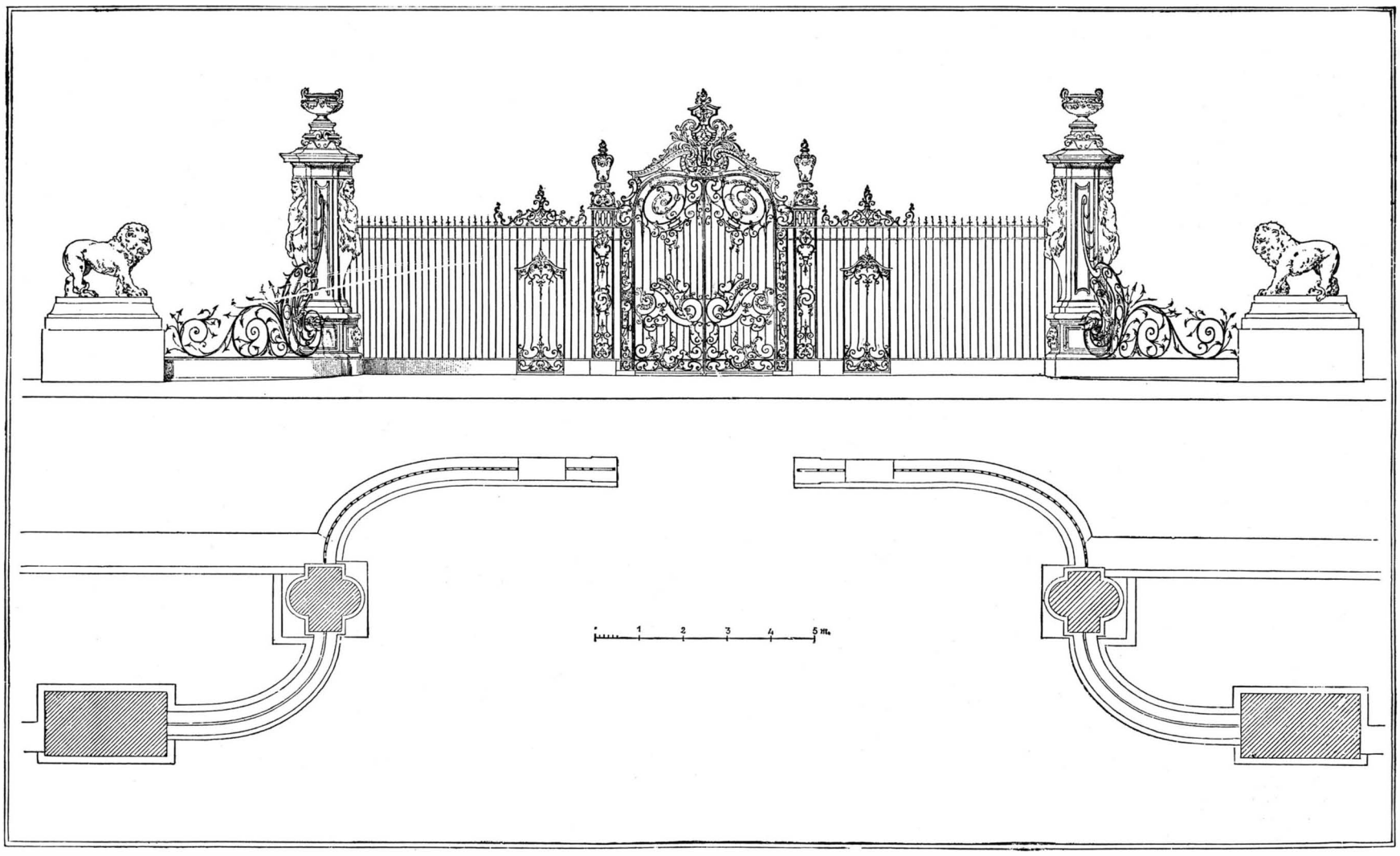


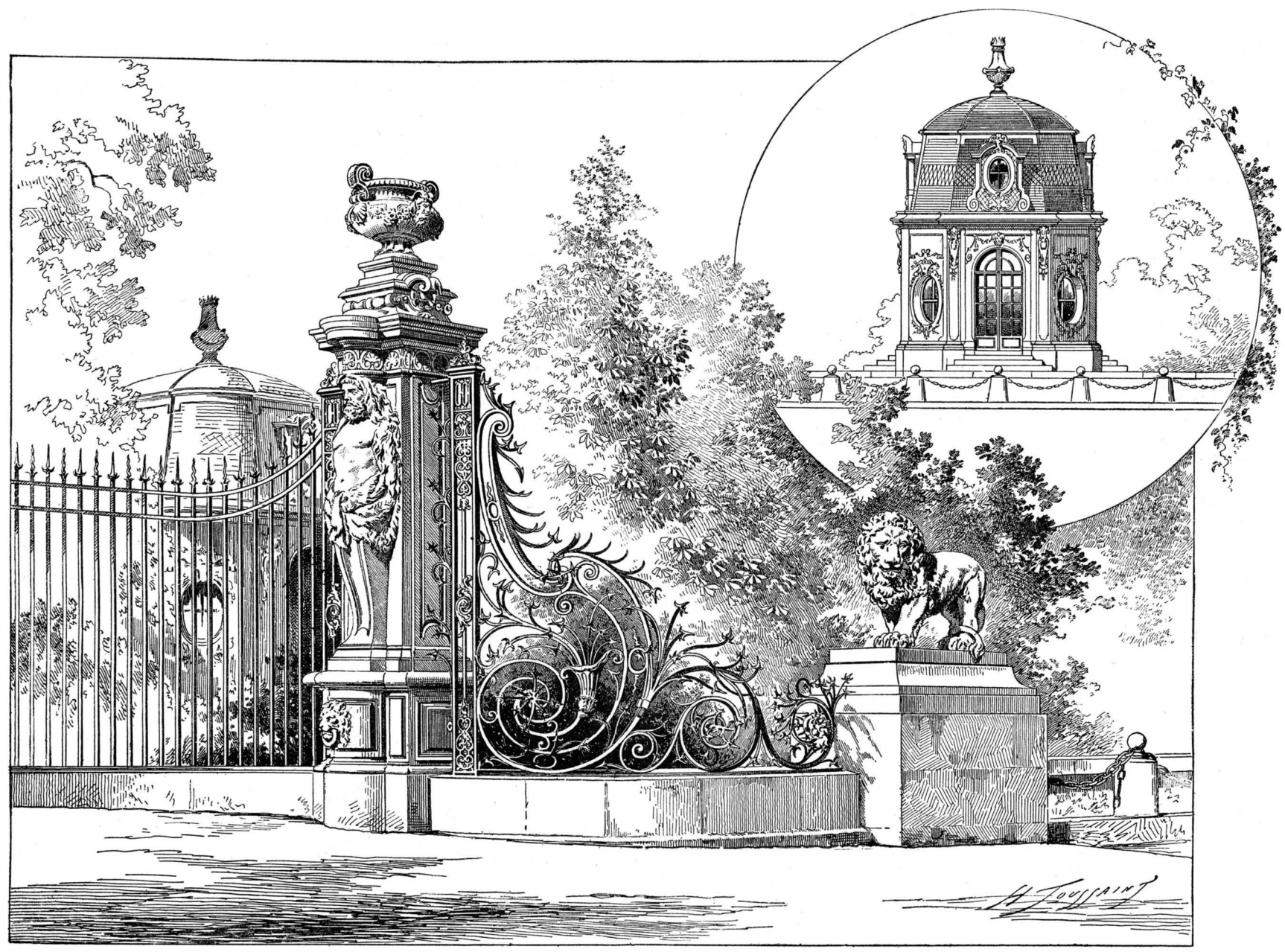
SEASIDE COTTAGES AT LION-SUR-MER, DEPARTMENT OF CALVADOS, FRANCE—M. MAGET, ARCHITECT.

Bichloride of Mercury as a Disinfectant.

Dr. Joseph Holt has the following to say about the use of bichloride of mercury as a disinfectant:

"It is a substance looking somewhat like common salt, exceedingly heavy and difficult to dissolve in water, unless previously mixed with an equal weight of muriate of ammonia. It is dissolved in clear water in the proportion of one part to one thousand parts of water, or about six ounces to forty gallons of the latter. This makes a colorless and ordorless solution, which, when sprinkled over the entire premises, both inside and outside of a house, cannot be distinguished from rain water except by a chemist. This dilution is perfectly safe to handle, and is in nowise dangerous unless swallowed. Unlike the horrid carbolic acid formerly in vogue, this is as inoffensive as rain water, so far as its effect upon sight or smell is concerned. Any article of clothing or bedding infected with an infection, such as yellow fever, scarlet fever, small-pox, or other disease transmissible in clothing or bedding, is at once rendered safe by the immediate destruction of the disease germs. In addition to this treatment of clothing, etc., in this manner, every floor of a house, whether carpeted or not, should be thoroughly sprinkled with the solution, omitting for late treatment that of the sick chamber itself. In the summer season the floor of the room could be lightly sprinkled or mopped without prejudice to the patient. There is no more positive way of preventing the spread of yellow fever or scarlet fever in a family than by such simple, easily applied and inoffensive methods as this. In order to prevent any one by mistake swallowing the solution, a little common bluing added to the water would put a person on his guard. Prior to July, 1884, the bichloride of mercury had come into use as a disinfectant dressing in surgery, having been introduced as such in the German hospitals. It quickly passed for similar use into England and America. Observing its effect as a surgical disinfectant agent, I argued that it must possess the same virtues if applied in municipal and maritime sanitation, and forthwith formulated the proportions and ordered its use at the quarantine station and in the city of New Orleans, at the same time discontinuing the use of carbolic acid. It was speedily adopted by San Francisco, where the information was republished and extensively circulated. It was next adopted by the United States marine hospital service, and has since become the universal disinfectant in fighting the great pestilential infections. For an accurate knowledge and appreciation of its value as a germicidal agent the world is indebted to the great German bacteriologist Koch, and in this country to Sternberg. I am very desirous that the valuable disinfecting quality of bichloride of mercury should be known and thoroughly understood by everybody, and I will certainly do all I can to disseminate the information throughout the world."





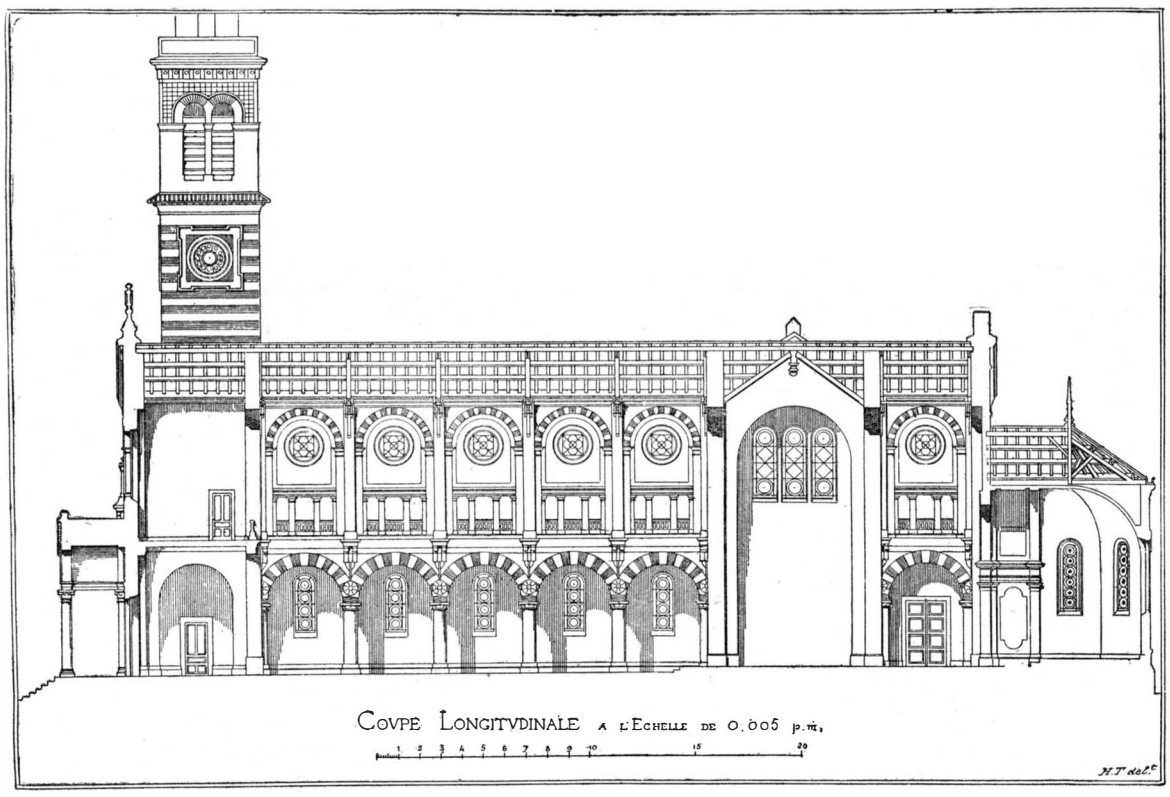
MAIN ENTRANCE GATE, CHATEAU AT BOUGIVAL—M. PASQUIER, ARCHITECT.

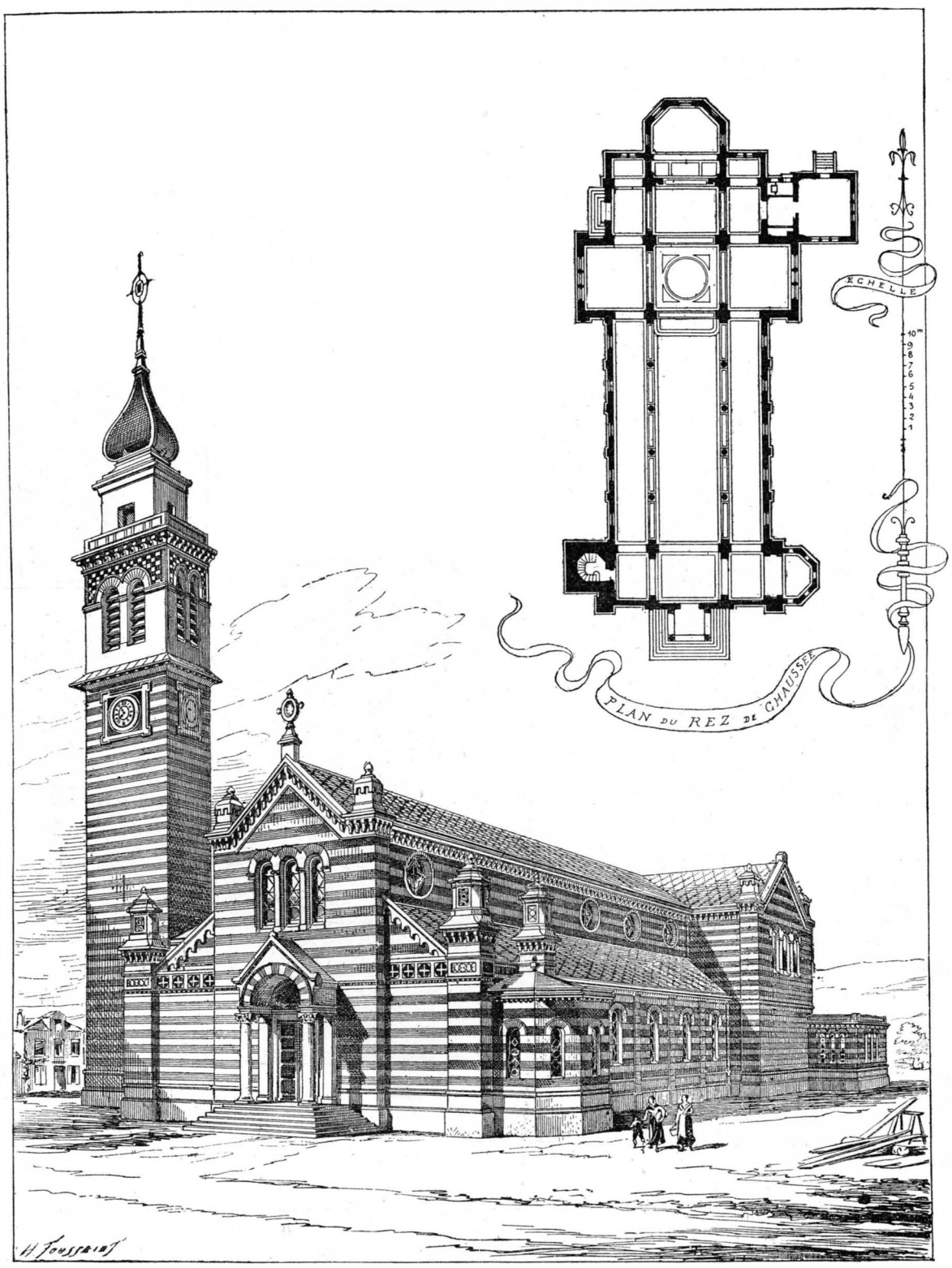
Chinese Brickmaking.

As the Chinese are excellent potters, it is not to be wondered at that they are also excellent brickmakers. This is sufficiently apparent, not only in respect to the perfect forms and durability of their common building bricks and tiles, but in the great variety of forms and different sizes of their brick. For common wall work in courses, their bricks in dimensions resemble those of Europe; but in so warm a climate as that of the south of China, many ornamental lozenged openings are required in the walls of houses to promote ventilation, and many ornamental projections, either vertical, horizontal, or curvilinear, are required by the national taste. To execute these features, the builder never need cut a brick. The proper forms are furnished by the brickmaker according to orders issued from the architect. Hence, there are moulded headers for plinths, beveled stretchers for sills, the same for lintels, etc. For mullions they have bricks of various sizes and designs, which fit as parts of the general structure with great exactness, whether as referable to ornamental effect or security of the building. Economy in all things is the ruling passion of the Chinese, and to this may be attributed the pains they bestow in preserving every particle of their brick earth, and saving the time of the builder, which would be lost in reducing his bricks to the required form, and which, it seems, they consider more than compensates for the expense of the moulds.—*James Main.*

CHURCH AT LA CAPELLE.

We give, from *La Construction Moderne*, views of the interesting church, of modern construction, at La Capelle, France, by M. Charles Garnier, architect. The original talent of this eminent architect will be at once recognized in the present work. The arrangement of the tower, its imposing effect and the style of decoration which characterizes the whole structure, show the resources which art may command to impart interest to a church whose dimensions and importance are in themselves rather restricted. The church in its greatest width is about 87 feet by 168 feet in length. Height of roof, 53 feet; tower, 175 feet, 16 feet square. Built in this country, it would cost about $75,000, and have about 1,100 seats.





CHURCH AT LA CAPELLE—M. CHARLES GARNIER, ARCHITECT.

The Long Leaf Pine.

BY THOMAS C. HARRIS.

That the pine is one of the most useful of all the trees common to the South Atlantic States, no one who has given the subject a thought will deny. In North Carolina there are found eight varieties of pines, of which the long leaf, or *Pinus Australis*, is the most useful, though confined to the eastern counties, and not to be seen west of the center of the State. Its range is from the southern counties of Virginia, all the way to Florida, and occupies most of the dry, sandy soil of those States.

In addition to the useful purposes to which this tree has been applied for many years, other uses and new commercial products have been of comparatively recent application. A brief enumeration of these will probably prove interesting.

It makes the best lumber for general purposes, and is commonly used all over the Union. It is from this pine that the turpentine gum is obtained, by chipping away the bark in spring, and allowing the gum to exude and flow down into a "box" or cavity cut to receive it. As is well known to every one, this gum is distilled, and the product is spirits of turpentine, the resin remaining in the still, from which it is drawn while hot into barrels. On cooling, it solidifies into a solid mass of brittle resin, or *colophony*.

There are some fourteen qualities of resin known to the trade, ranging from a coarse black resin to the finest pale amber colored, known as "window glass resin." The prices range from sixty-five cents to three dollars and a half per barrel, according to quality.

The rich, resinous wood and "lightwood knots" are split, and burned in a kiln, and produce the common tar. In the old-school geographies, this "tar, pitch, and turpentine" is set forth as a leading industry in North Carolina. From the fact that this tree is confined to the eastern counties, which were the first ones settled by white people, this statement was made with some degree of truth say a hundred years ago. Now it is but of small importance in the State. In South Carolina and Georgia it is a large industry. From the sap, leaves, and wood are made several forms of proprietary medicines, more or less useful in pulmonary complaints and for external use in the form of liniments.

Within the last few years, the leaves, or needles, have been first utilized, and put into salable forms. Previous to that time, they were occasionally used as a litter for barn yards, etc., for which they were not well adapted, on account of their non-absorbent character. Now the article known as pine hair, or pine fiber, is a new and growing industry. The needles are gathered in a green state, and steamed in a sheet iron vessel, through which the steam passes to a receiver, and is condensed into an oil having an agreeable balsamic odor and excellent antiseptic qualities. This oil forms the base of some of the best known liniments, and is highly esteemed as a domestic remedy for cuts, burns, bruises, and the like. After the steaming process, the needles are crimped by special machines into a close zigzag form for making mattresses, or are carded into a fiber for general upholstery purposes, to which it is finely adapted. In this form it closely resembles oakum, but is much more elastic.

Aside from its elasticity and cheapness for bedding, it has undoubted medicinal properties by inhalation of the pleasant balsamic odor, and the property of driving away insects, especially the *Cimex lecticularis*. The finer fiber is made into rolls of wadding for hospital use, taking the place of lint in surgical cases with decided advantage. The same fiber is also spun into yarn, and woven into a variety of carpets and matting for floors, and is cheap and popular.

The wood is subjected to a form of distillation by a new process, and produces wood spirit, creosote, "soluble pinoleum," tar and charcoal. From the smoke is produced lampblack. The creosote is used mainly for saturating piles, posts, bridge timbers, and cross ties, to prevent decay. When used on piles, it prevents the ravages of the *teredo*, which destroys so many wharves in Southern waters.

The cones, chips, and barks are sometimes saturated with low grade resin, and sold in barrels for kindling fires. The root has medicinal qualities also, and is sometimes so utilized. In the early spring the bark of the root has a sweet taste, and forms an important part of the food of the native "razor-back hogs" running at large in the forest.

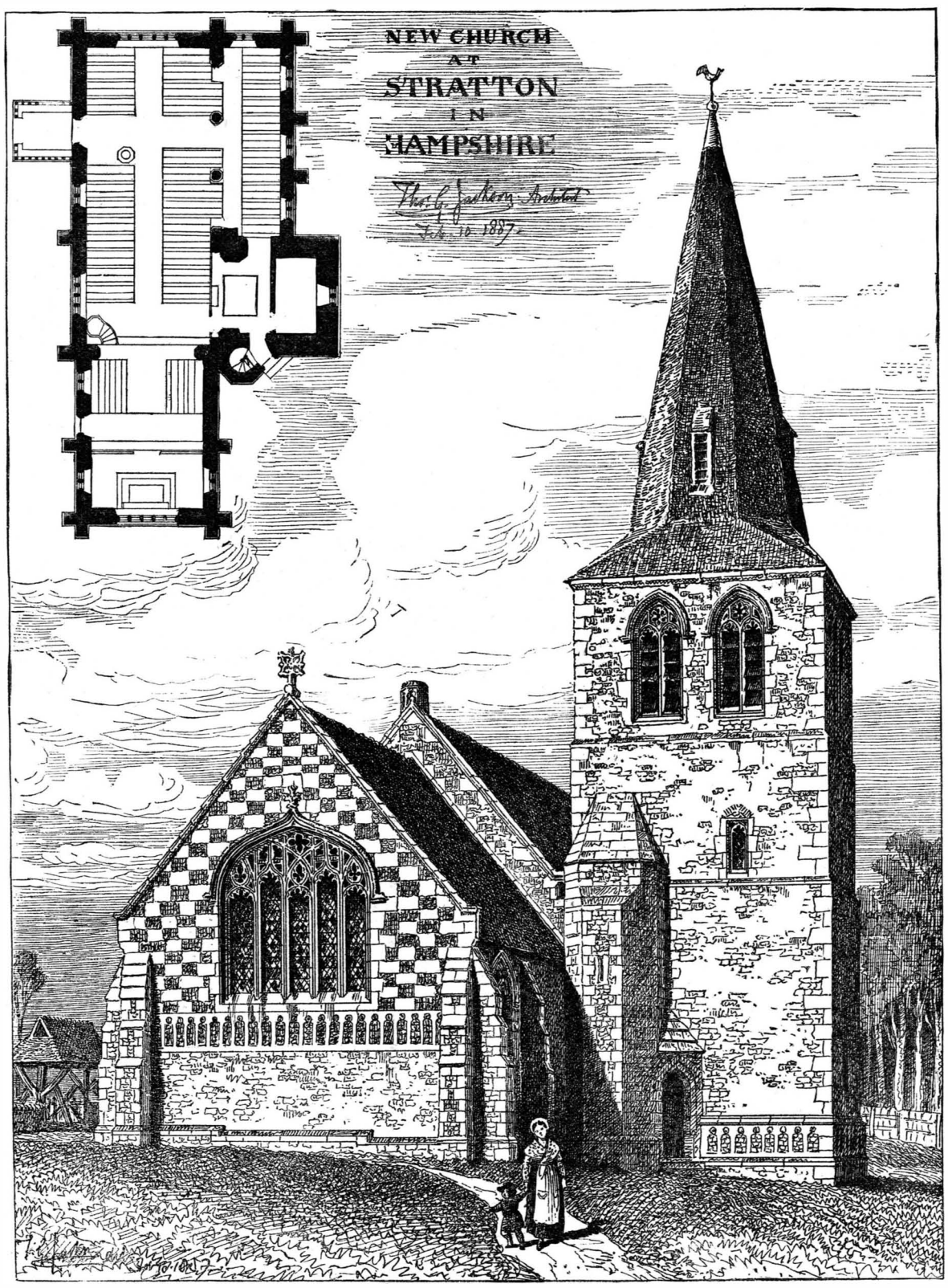
In the dry, upland section, where this pine is the prevailing growth, it imparts some of its healing property to the atmosphere, supposed to be due to a high per cent. of ozone, making it specially beneficial to persons suffering from bronchial or pulmonary complaints. Thousands of well known cases of persons contracting these diseases in colder climates have been much benefited by a winter spent in these pine forests.

Thus we find, as the product of one kind of pine, lumber, shingles, crude turpentine, spirits of turpentine, resin, tar, pitch, lampblack, charcoal, oil from needles, crimped (mattress) needles, carded fiber or pine hair, wadding, carpets, bagging, wood spirit or alcohol, creosote, pinoleum, kindling, and numerous medical preparations. A very useful tree indeed.—*Popular Science News.*

A HUNDRED-ACRE peat bog has been discovered near Ellendale, Dak.

CHURCH AT STRATTON.

The new church now being built from Mr. Jackson's designs at Stratton, in Hampshire, England, is to supersede a very mean modern structure of brick, which stands on low ground in Stratton Park. The new church, which is being erected at the expense of the Earl of Northbrook and the Hon. Francis Baring, is situated on higher ground nearer the village. The materials are brick with flint facings and dressings of Chilmark stone externally and of chalk internally. The spire is of timber and shingled. The seats and other fittings are to be of oak throughout.—*Building News.*



Decorative Notes.

In a handsome dining room finished in old oak, the high-backed oak dining chairs are upholstered in a manner that adds greatly to the beauty of the room: each chair shows a hand wrought back and seat embroidery in the old tapestry work which has recently been revived, and for which come the softest old colors in tapestry wools, and designs of charmingly quaint, mediæval style. The chairs under consideration each shows a different design of fruits and flowers: the pear, plum, grape, fig, pomegranate, apple, and orange and various conventional-looking flower and foliage forms furnishing the *motifs*, being expressed in the most delightful colorings, all subdued and softened as by time, on a ground of deep but rich blue; the quaint forms of the furniture and the rich color of the oak setting off the embroidery appropriately. The portieres in this room, which by the way is really an oaken room, having floor, walls, and ceiling in different tones of this wood, are worthy of mention, being unusual in their way—composed of a coarse, deep blue Irish linen, they are effectively ornamented by a powdering of heraldic-looking figures applied in a coarse, tawny yellow linen buttonholed to the blue linen by various colored polished Kells's threads; the ornament being the heraldic rose with the five petals displayed, and between them the barbs and seeds, the barbs and seeds being embroidered in old pink threads outlined by brown threads. The rose in each figure is set on a stiff stem, showing two stiff leaves on either side in a yellow green linen buttonholed with tawny yellow threads to the blue ground and veined with the same; the stems embroidered in old red threads. The frieze of each curtain shows simply a row of large heraldic roses without stems, in old pink linen buttonholed with tawny yellow threads, and set between two borders of curiously interlaced patterns worked in old reds, old blues, a faded green, and tawny yellow; these portieres are suspended by oaken rings from an old oak pole set in sockets under the lintel of the doorway which opens on the butler's pantry and other closets. The curtains in this room are also of the coarse blue linen, but show no decoration save a conventional frieze design of oranges and foliage in outline, worked in tawny yellows.

Some original portieres seen in a library in antique oak are of golden brown plush lined with old gold sateen; the ornamentation of the frieze is in colored leather. The design is a conventional sunflower border, treated in orange colored and olive bronze leathers, the brown centers worked in French knots in coarse brown silks, and the stems worked in couching and darning stitch boldly executed in heavy olive green filoselles; the large yellow petals of leather are blind stitched to the plush, and then couched in Japanese gold thread, the leaves in olive bronze leather are treated similarly, and the border as a whole is seen between narrow bands of heavy strands of yellow filoselles caught down by heavy brown silks; these portieres are suspended from heavy brass poles. Some book shelf curtains in the same room are also interesting, showing a conventional lotus frieze. These curtains are of fine dark old red cloth, on which is applied a frieze band of old red silk sheeting, showing a running conventional lotus pattern, the flower worked solidly in dull blues and olives against a background of olive formed by the leaves, the curving stems of which and of the flower are worked in brown reds. These curtains harmonize beautifully with the old oak of the book shelves and other furnishings. In this room the window curtains are of rich old red Taikun without ornamentation, the rich, lustrous surface of the fabric being sufficiently handsome.

In an ivory white and gold parlor, an attractive feature is the ornamentation of some small curtains hanging in front of the open cabinets at either end of the over-mantel. These curtains are composed of pale old pink Henri Deux armure, the pattern of which, of graduated circles, is followed in couching of silver thread, forming a silver and rose curtain of very chaste and delicate effect, suiting well with the ivory white wood work. The shelves of these cabinets are lined with an old pink plush, showing a silvery bloom in keeping with the curtains. Another cabinet in this room has curtains of East Indian embroidery in gold, on a creamy cotton ground, between an upper and lower band of old pink plush. The window curtains in this parlor are of pale blue Henri Deux armure, and show deep friezes of pale blue plush, on which appears a design of interlacing disks couched in outline with silver cord, the disks being boldly darned in pale old pink, silver green, and lemon yellow filoselles alternately. The carpet in this room is a Wilton of French Renaissance scroll pattern in warm drabs, on an old gold ground, light, yet rich, in its effect, which resembles the silver and gold Florentine tapestries.

An exceedingly rich mantel valance in a handsome drawing room is composed of silk velours of a dull but warm purple shade, set between two bands of Irish crochet in raw linen thread laid over the rest of the plush, which throws its pattern out in fine relief. The lower band of crochet is finished at the bottom with leaf points, making a lace finish. By the tip of each point is suspended a rich tassel of dull purple silks and raw linen thread, with heading of silver threads. This lace bears no resemblance to the ordinary crochet and has not been, like it, commonized by constant use. To gain its most pleasing effect it must be done in the deep, warm-toned raw linen threads. In this same room the portieres of the same shade show a broad frieze insertion in the same quaint old lace, treated even more boldly than the valance insertions, or rather overlays of the same lace. A very rich effect is gained in a pair of sofa cushions made for a white and gold tete-a-tete sofa, the outer covering being formed of English point in gold threads and braids; the pattern, an ornate rose and foliage pattern, is richly thrown up by an inner cushion cover of rich pink Roman satin. The small sofa has a tufted seat cushion in pink and gold brocade, and these cushions stand upright at either end. In this same room a wall curtain over a satinwood upright piano is composed of pink satin damask, the figure of which is followed in gold thread with very chaste and rich effect.

A table, made by the village carpenter, and covered and decorated by the ladies in the house, is now in use in a Newport drawing room, occupying the center of the room. It is rather large, has a circular top, and four straight legs, inclining outward. A flat piece, about fourteen inches wide, is placed against the legs, about six inches from the floor, forming a sort of square dado or wainscoting around the table. This piece has three round openings in each of the four sides. It is covered, as are also the legs and top, with rich maroon silk plush, drawn tightly, and nailed with small tacks. A deep ball fringe of maroon color edges the top, and is put on with small gilt tacks. Pretty blue and white china plates are inserted in the openings, and a lovely lamp, of blue and white china, stands upon the table.

A rich and effective cover for a small table is a square of dark red or maroon plush, unlined, but trimmed with a wide fringe of gold or maroon silk tassels. When this is placed upon the table, the cloth is drawn up on each side to the top, making an irregular festoon, and is fastened there by a bow of gold-colored satin ribbon.—*Art Interchange.*

New Galvanizing Process.

Johann Arthur, of Rietz, has invented the following process for coating iron with zinc. The tank containing the bath of melted lead and zinc is divided into two compartments by a refractory partition, strengthened by iron framework. This partition does not reach the bottom, so that the metals are kept in fusion, as it were, in two communicating vessels. The objects to be galvanized are first passed through the melted lead, then, passing along the bottom, come into contact with the zinc, which fills the other division of the tank, so that the objects are heated out of contact with the air. The bath of zinc can thus be kept low, thus avoiding oxidation, while the objects receive a thin and highly resistant coating of zinc.—*L'Industria.*

EARTHQUAKE FOUNDATIONS.

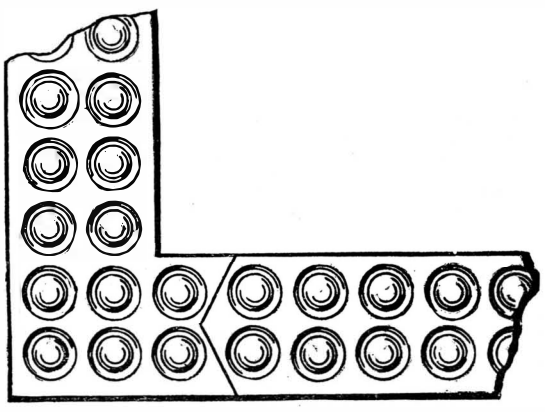
To the Editor of the Scientific American:

I send plans of constructing foundation of buildings, which, if employed, I believe, would save a house or any structure from damage by an earthquake of ordinary violence.

The idea is quite simple, so that little explanation of the plans is necessary to a full comprehension of them.

The structure above the foundation rests on steel balls. These balls are inclosed between two iron plates or castings.

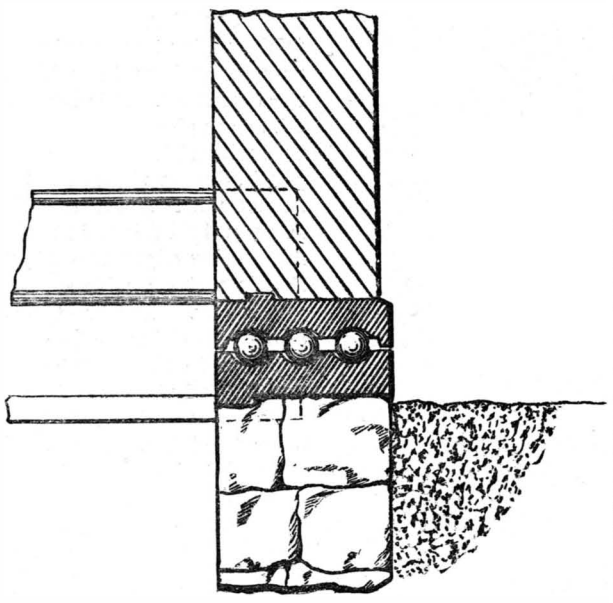
I have supposed that an earthquake would not damage the foundation of a building, provided the grade comes up to the top of what is called the "foundation wall," or if it is otherwise strongly braced; and that if some mode of construction could be employed which would permit the foundation to be moved suddenly in any lateral direction without carrying with it



the structure above, damage by earthquake would be largely if not wholly obviated.

The weight that each ball, according to my plan, would have to bear is represented by a surface of only six inches square. To look at it from another point of view, each ball has to bear as much weight as a layer of mortar six inches square. The weight of massive structures seems to be the main object to be contended with, and it seems that in every case the balls would be more than strong enough to perform their part. The more massive the structure, the thicker must be the foundation. This method of construction can be applied to any form of building.

Braces and binding bolts would be needed that I have not shown in the plans. They should in most cases be secured to the metal plates from parts projecting to receive them. To secure the metal plates both above and below the balls, as well as the balls themselves from rust, it might only be necessary that paint and paraffine should be used. A coat of paraffine alone



would, in all probability, prevent rusting for ages. The opening represented between the edges of the two courses of plates by the letter A, on the full size vertical section, should be pointed with mortar, thus excluding the rain and moisture.

I have supposed iron to be used for stays, braces and joists. If wood should be used for joists, a special arrangement would have to be provided for securing them to the metal plates.

It is probable that a wrought ball of steel would resist more pressure than one cast. Ben. Hill.

Tiona, Warren Co., Pa.

Remarks.—The above plan is practicable, although not new or untried. The noted engineer D. A. Stevenson was the first one to announce the principle of the aseismic joint (see a paper by him in the "Transactions of the Royal Scottish Society of Arts," 1868, vol. vii., p. 557, entitled "Notice of aseismatic arrangements adapted to structures in countries subject to earthquake shocks"). An ordinary Japanese house consists of wooden uprights resting on rough round stones (see article upon floors and ceilings, by C. P. Karr, in our paper), which are virtually aseismatic joints; but the roughness prevents any lateral movement from a slight oscillation. The size of the balls shown in the plans submitted are too large. Any movement within a house resting upon such large balls would cause a violent oscillation of the whole structure, with damage to the furniture, etc. The balls should be reduced to the size of buckshot. Mr. H. S. Ridings, formerly Resident Engineer of the Iquique Railway, Peru, has proposed a simple, cheaper, and effective plan of free foundations, viz: To interpolate a layer of clean, coarse sand one inch thick, in a convenient position, care being taken to prevent it escaping laterally and from being washed out. The free movement foundation principle is admirably adapted to resist horizontal oscillations, which seem to be the most destructive because most common, but the ball arrangement would not provide for vertical oscillation, in fact, it would be detrimental as lessening the inertia of the building. The plan is an excellent one to support a heavy roof upon, but not a light roof, for the latter might be lifted off by a cyclone. The detail instruction about pointing up the interstices with mortar between the foundation and the superstructure would invalidate the whole plan of a free foundation. Instead of being pointed up, an iron collar should be bolted on to the upper side of the iron beam and come down over the lower beam, not touching the latter and hiding the joint and protect it from the weather. The supposition that an earthquake would not damage the foundations of a building will only hold good when that foundation is of the heaviest and most substantial nature, and built at the very least ten feet below the natural surface.—Eds.

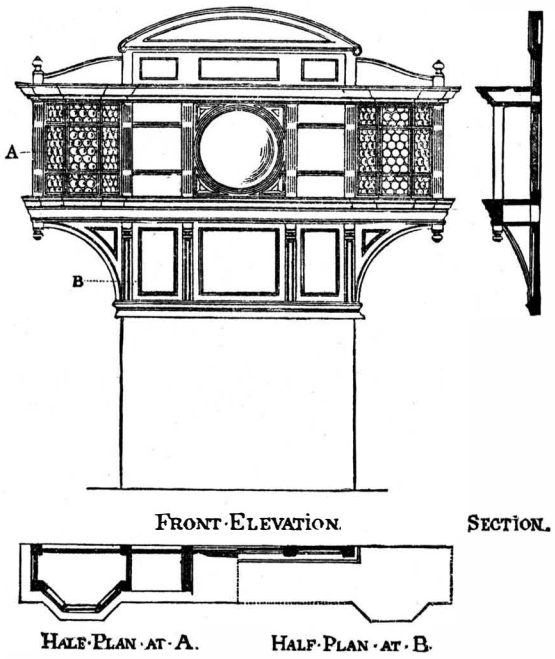
Care in Respect to Fire.

It is wonderful how some property owners hang back when a suggestion is made looking to the safety of their property by the adoption of some simple safeguard. "Am I bound to put in buckets of water?" "Is my insurance vitiated if I don't put them in?" "What reduction will you make in my rate if I do?" It never seems to strike them that it is worth while to make themselves as secure as possible against fire on their own account. It never seems to enter their heads that every establishment that is burned for the lack of ordinary safeguards is being paid for in their present rate. It never seems to occur to them that if the merchants refuse to help to reduce the fire loss, the rates must stay where they are or go up. Above all, it never seems to occur to them that they must pay all the losses, and that the insurance companies are only the agents to collect the money from them. And they can't escape it, either, any more than they can escape any other relation modern society has prepared for them.—*St. Louis Examiner.*

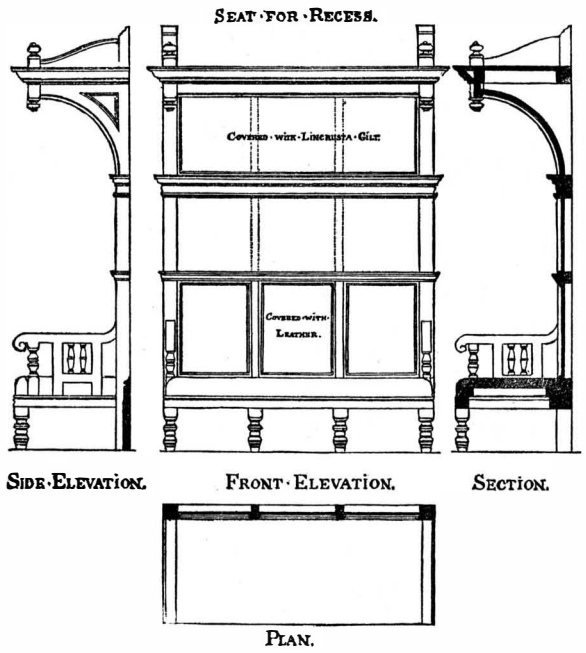
A SIDEBOARD IN WALNUT.

This sideboard is of walnut, the side-projecting cupboard doors being filled with lead glazing, the centers

Hanging Cupboard.



Seat for Recess.



A SIDEBOARD IN WALNUT.

being of beveled glass, and the lead work gilt. Behind the balusters to the top cupboards silvered glass is placed. The sideboard was designed by Mr. R. A. Briggs, London.—*Building News.*

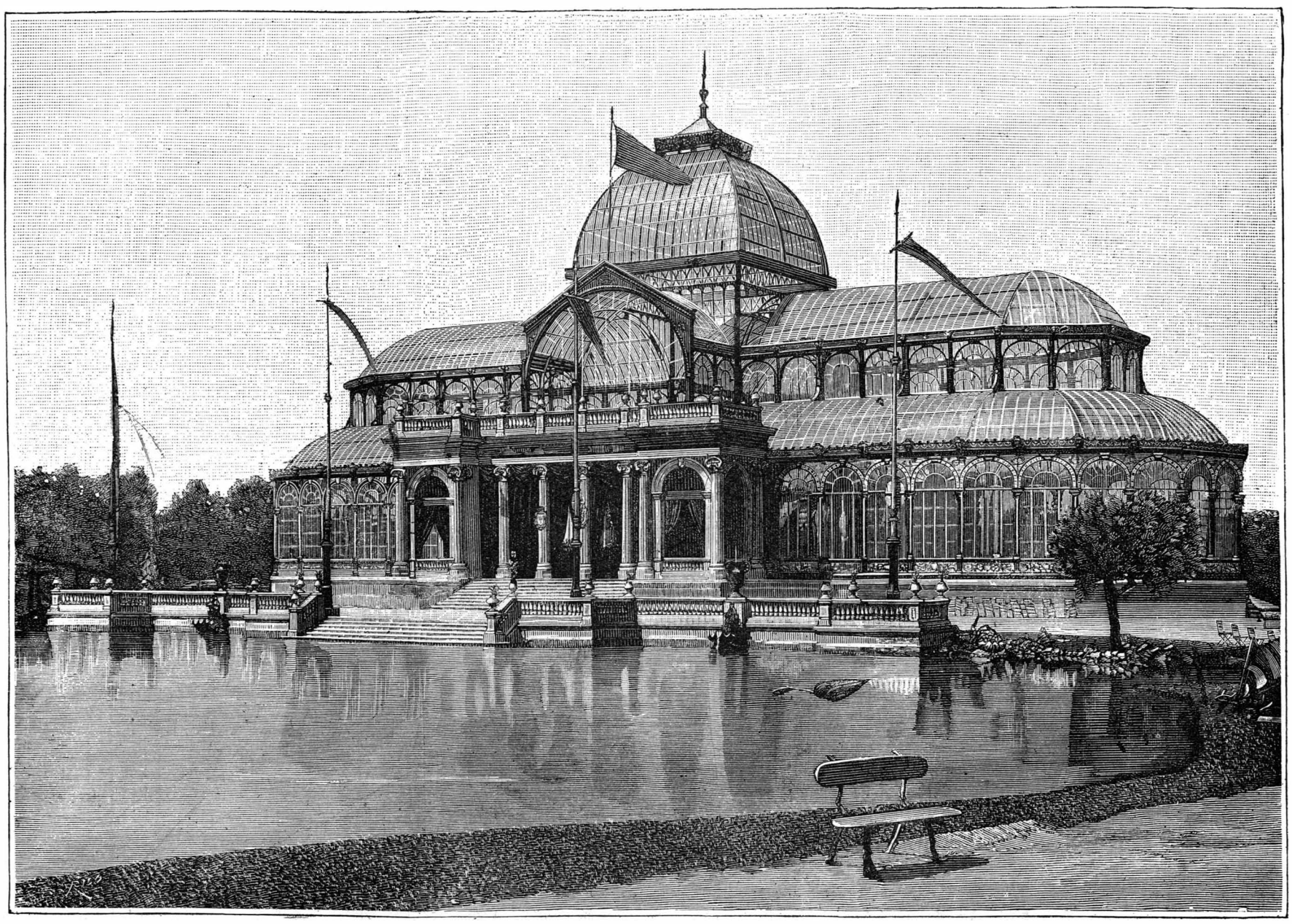
THE PHILIPPINE EXHIBITION AT MADRID.

Among the richest possessions of the Spanish empire are the Philippine Islands, long celebrated for the great variety and value of their products.

An exposition of the principal productions of these islands has lately been inaugurated in Madrid. We present herewith a view of the exposition building, which consists of a light and graceful pavilion of iron and glass, 175 feet long, 90 feet wide, and 80 feet high at the cupola. It has an elegant front, with a fine stairway, and a portal supported on Grecian columns. Ricardo Velazquez was the architect, well known for many excellent works. It was opened on the 30th of June last with great pomp, by her Majesty the Queen Regent.

Among those present were a large number of the aboriginal inhabitants, Philippians, dressed in their native costumes. They presented a rare and attractive appearance. The objects exhibited show the various forms of dwellings of the aborigines. These for the most part consist of cabins or huts mounted on posts at a considerable elevation above the ground.

One of the tribes has a dwelling arranged upon a tree top 30 feet high.



NEW EXHIBITION BUILDING OF GLASS AND IRON, AT MADRID.

A great variety of interesting objects are collected, illustrating the manners and customs of the natives, their manufactures, forest and other productions, fauna, etc.

In future the exhibition building, which is located in the park of Madrid, is to serve as a permanent colonial museum.

Finger Nail Paint.

How to clean the paint and putty from under the finger nails, so as to have them free from all impurities, is a question that often puzzles some painters. It is a well-known fact that more trouble arises from heedlessness in this respect than from almost any other source. In a painter's experience, you often hear the remark made: "We know he is a slouch; why, just look at his nails." And nothing looks so untidy as dirty finger nails. A very good plan, and one that is easily carried out, is to get a stiff tooth brush and a little water, drop a small quantity of ammonia into it, and then use the brush, rubbing well the ends of the fingers. You can wash them off with white castile soap afterward. The ammonia whitens the skin, and takes the yellow stain out, caused by the absorption of the oil into the pores. We are decidedly of the opinion that it is more preferable than just the soap alone, as we have tried both. The ammonia need not be used so strong as to cause the fingers to become sore, or to injure them in any way; just enough to eat the paint or varnish, or whatever has become accumulated there.—*Carriage Monthly.*

Healthy Habitations and Defective House Construction.

An absolutely perfectly constructed dwelling does not exist so-day! This is rather strong language, or assertion, but it nevertheless is true. Science teaches us that to have an absolutely healthy dwelling, we must have uncontaminated air to breathe. Are our present-day houses constructed to guarantee this?

We propose to speak of defects, not strictly applicable to plumbing; but realizing the necessity for other branches in the architectural line to advance with the present-day sanitary improvements, we propose to point out a few glaring defects that plumbers are not responsible for, and many times are unjustifiably held accountable for.

The first defect we desire to call attention to in the present-day mode of house construction is the enormous amount of dead air space in each and every dwelling. To more clearly make this understood, we will designate every empty, unventilated space in any portion of a house, dead air, life-destroying elements that prevail to an alarming degree in every house, as constructed at the present time. These dead air spaces are between floors and ceilings, partitions, hanging ceilings and roof, recesses in party and side walls, front and rear walls, unused flues, under the steps of stairways, under stoops, around plumbing fixtures. The latter we have condemned before, until now fixtures are left open with no casings. This guarantees cleanliness in this particular, and pure air.

The dead air space in sliding-door partitions dumb waiters, passageways, alcove rooms, and last, but greatest of all evils, unventilated closets, soiled clothes receptacles, etc.

Show us a house, to-day, without these defects, and we will acknowledge you have a healthy house to live in. We care not how well we plumb or how expensive the plumbing fixtures are, if the house construction is defective, with thousands of cubic feet of dead air spaces, as mentioned, the good plumbing will often be condemned in consequence of these glaring architectural defects.

The remedy lies in every architect's hands. Who will be the first to institute it?—*Plumbers' Trade Journal.*

Ivory, Silk, and Gold.

The most elaborate example of interior decoration work lately designed in New York has just gone on, says the *Star* of this city, to embellish the San Francisco home of ex-Senator J. B. Flood. The house, which is only two stories high, is in all its parts a wonder of Louis Quinze and *rococo* magnificence; but a boudoir in ivory, silk, and gold, on the second floor, is mentioned as a special bit of luxurious art. This room, which opens from a hall in English oak, arranged as a picture gallery, connects two bedrooms reached from opposite sides. The woodwork is in enameled cherry, with a wainscot three and a half feet high; a border of the wood, with its gilded decoration, marks also the division between wall and cove. This band is on a line and uniting with the upper section of the door frame, which bears the distinction of a handsome piece of carved work.

The walls are covered by hangings of satin damask laid on plain, showing a floriated scroll pattern in tints of blue and pearl. The wide covering is adorned in hand modeled relief, the design showing a continuous lattice work with interlacing vines, and the figures of dancing Cupids breaking through at intervals. Above this is a moulding indicating an oval, and connected with spandrels filled by wreaths. By the introduction of a colonnade an open sky effect is produced in the ceiling with its height of eighteen feet. The perspective, in which the balustrade surrounding this central oval is treated, is enhanced by the added adornment of vines trailing over the rail.

A distinctive feature of the room consists of two wall brackets or cabinets in framing of ivory and gold, with delicate lines in brass work forming a border inclosing beveled glasses around a center mirror. The furniture, of Louis XV. style, is upholstered in silk lampas with exquisite bright figurings on a pearl tinted ground. The doorway hangings are of plush in a pineapple shade, richly embroidered in *appliqué* and with silks of different shades and ribbons in combination. The covering of a white table at one side is made to correspond. A crystal chandelier hung above the doorway is supplied with candles to illuminate so fair a scene in a fortunate man's habitation.

Frosted Glass.

To give glass an appearance as if covered with frost, brush over the surface of it a concentrated solution of sulphate of zinc in water to which a little gum has been added.

ST. GEORGES VILLA AT SAINT LO.

St. Georges villa originally comprised but one parlor, a dining room, and a kitchen on the ground floor, three bed rooms in the first story, and various secondary rooms in the attic. Upon the whole, it was a small dwelling that it was desired to turn to account in a general project looking to the comfortable installation of quite a large family.

Admirably situated, moreover, upon a high hill, it faces in such a direction that one can take in at a glance the picturesque grouping of the houses of Saint Lo around the cathedral and the long perspective of the valley of the Vire to the west. The annex buildings, therefore, could not be allowed to hide this view; on the contrary, it was logical to arrange them so as to take every advantage of the latter.

This explains the longitudinal extension of the present villa, which, on the ground flour, comprises a dining room, a parlor, a library, a winter garden, and a billiard room, connected by a glazed gallery forming a covered terrace.

In the wing to the left are the kitchen and its dependencies, the servants' dining room, servants' stairway, etc. In a pavilion to the right there is a study and the main staircase

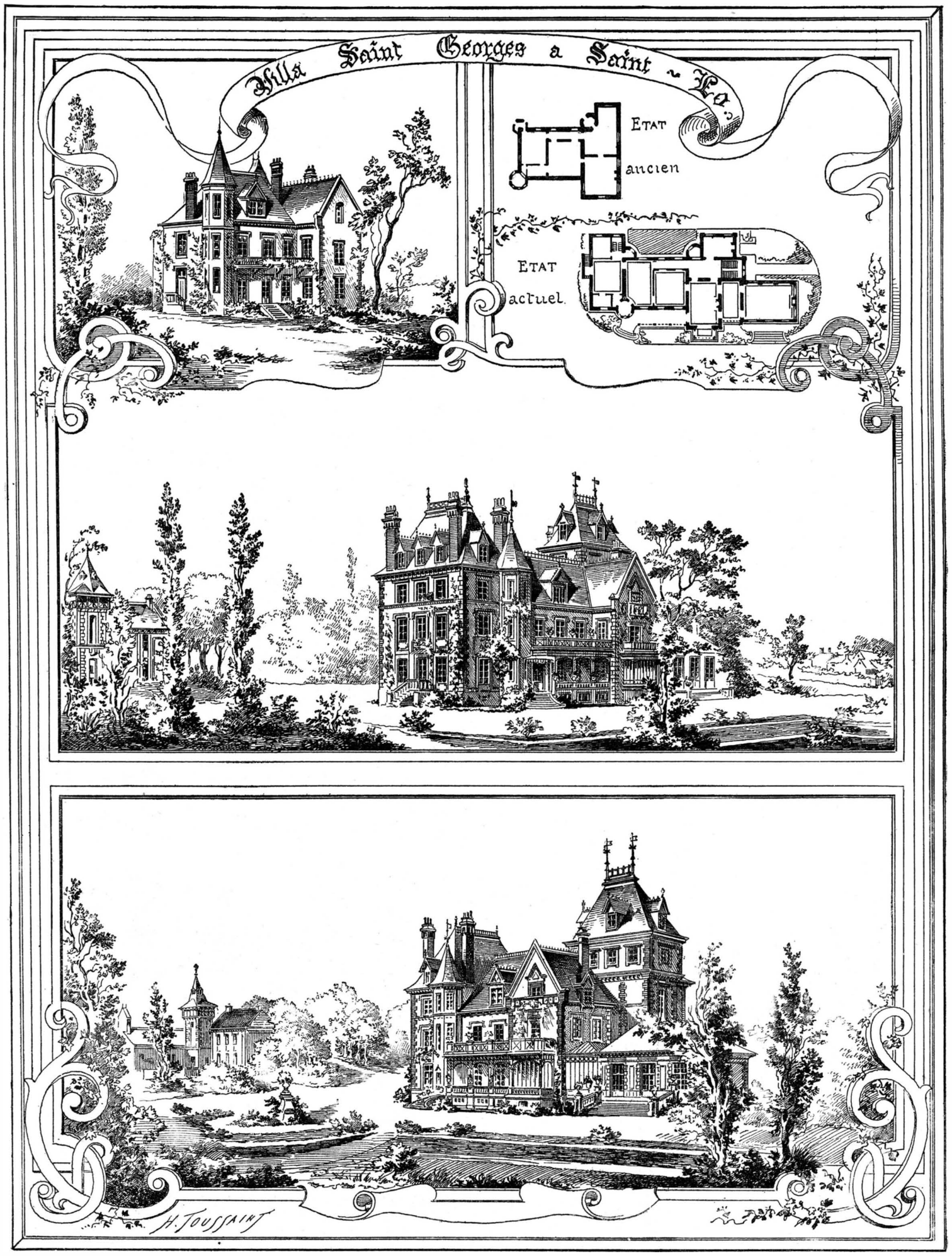
The upper stories contain ten bed rooms, with toilet rooms, water closet, bath room, etc. The attic contains a large number of servants' rooms.

Stalls for five horses, a room for coaches, a laundry, and quarters for the gardener are arranged in a special building.

As frequently the case in the country, water derived from rains is collected either in cisterns or reservoirs, from which it is distributed to the various stories. Iron plate reservoirs of a capacity of 3,280 gallons, placed in the upper part of the pavilion to the right, above the grand staircase, receive water from a well in the kitchen. The water is forced up by a pulsometer actuated by a small vertical generator. This system gives the best results With a minimum expenditure of coal, water is forced to a height of 60 feet to supply the reservoirs.

The main rooms are heated by a hot air stove, and the heat of the kitchen furnace is utilized for warming the atmosphere of three rooms in the upper stories.

The masonry work was executed with the schistose ashlar of the country, laid in Airal mortar of hydraulic lime. The bricks likewise came from Airal.—*La Construction Moderne.*



VILLA S^T GEORGES à S^T Lô (Manche)_ARCH.^TE M. CAMUT.

The Effect of Sea Water on Concrete.

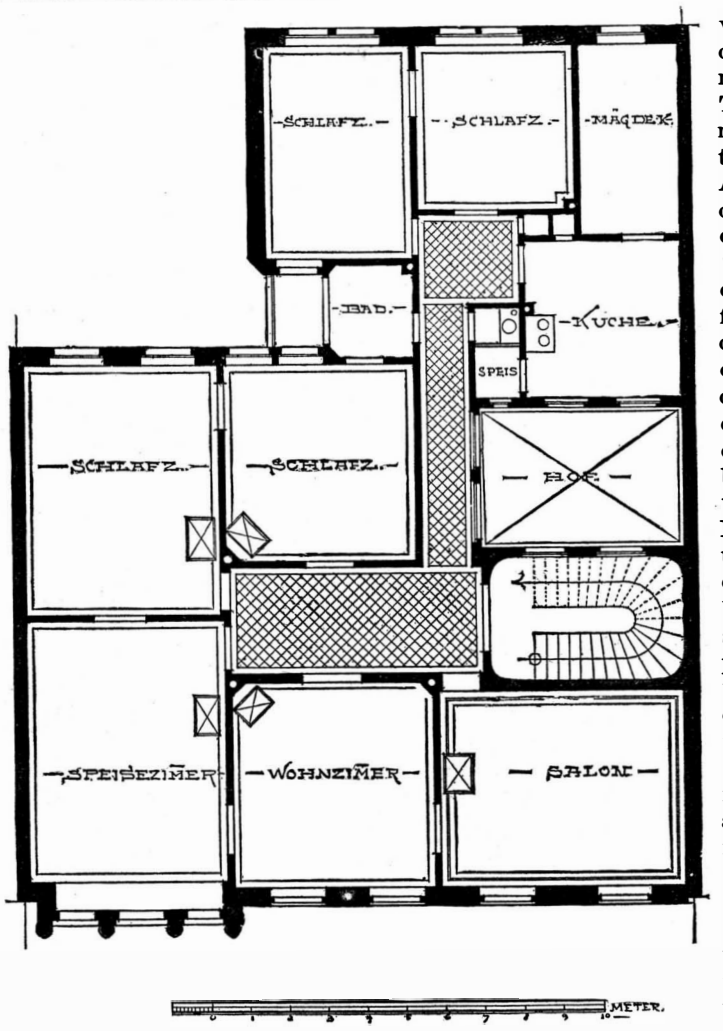
Those who use Portland cement concrete will be interested in the discovery to which the *Scotsman* drew attention recently. It appears that the Aberdeen harbor sea works have suffered considerably. The concrete blocks have been seriously affected by the sea, and the authorities have been rather puzzled to account for its destructive action. Very great reliance has been hitherto placed by engineers and architects on Portland cement concrete; but this good opinion has been somewhat shaken, if all that we hear of certain hydraulic works can be substantiated. We take our information from recent accounts that have come to us. Indications

of failure have been observed for some time in important sea walls constructed of concrete, and the Aberdeen harbor works, if what we learn is true, confirm the misgivings which are entertained. The action of sea water on concrete has been suspected of late years; but up to this time a satisfactory explanation of the damage sustained has not been given. Experiments have been recently made by direction of the Aberdeen authorities by Professor Brazier, of Aberdeen University, and Mr. William Smith, the harbor engineer. The decayed concrete has been ascribed to the force of the sea and wind, though the action was chiefly noticeable in the graving dock in still water.

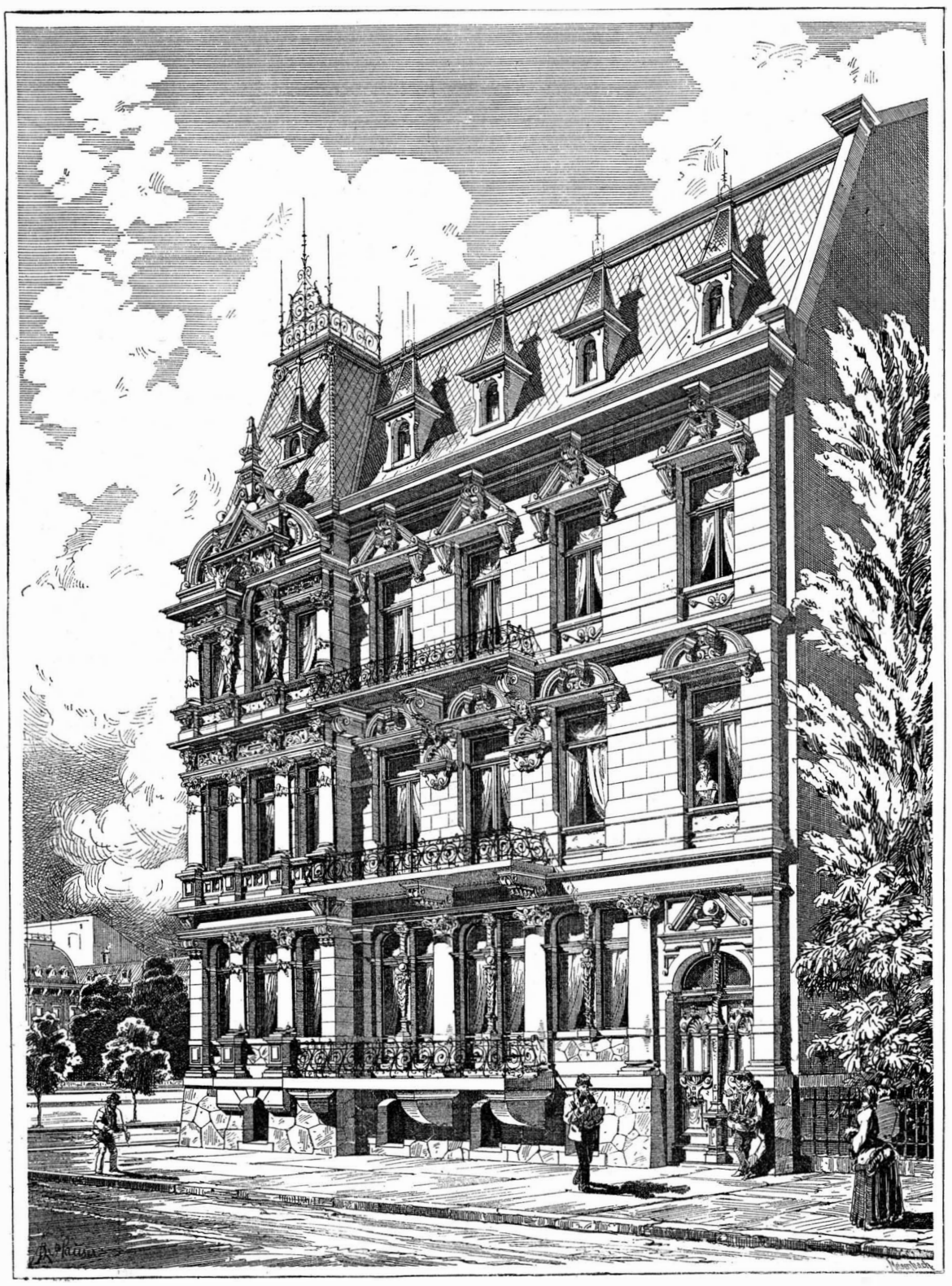
The writer in the *Scotsman* says:

"It is the action of the sea water under pressure in still water that has rendered the nature of the damage in the present instance so conspicuous" The quay walls and breakwater were constructed fifteen years ago, the graving dock two years ago, and in all these works a disintegration of the surface of the concrete by the chemical action of the salt water has been going on. The entrance walls are said to be built of Portland cement concrete, composed of one measure of cement, two measures of sand, and three measures of stones, with large rubble stones incorporated in the walls. The wall surface is plastered with Portland cement mortar up to 3 ft. of low water, the mortar being made of one measure of Portland cement and one of sand. The upper part of wall is faced with granite.

During the process of emptying the water from the graving dock, a hydraulic pressure varying with the tides of from 5 lb. to 11 lb. per square inch is put on this concrete skin, the water forcing its way through the pores of the skin, producing cracks and saturating the quay walls. The chemical action is hastened in proportion to the exposure, and is increased by the passage of water through the body of concrete. Various injuries are reported—*e. g.*, the joints of the ashlar facing have opened in parts, owing to the loosening of the concrete surface beneath. The engineer consulted Professor Brazier. Test briquettes were prepared for analysis with a view of discovering the proportion of magnesia contained, and which was supposed to account for the damage. The Portland cement, it was found, had not contained more than one-half per cent. of magnesia, whereas the decayed concretes showed an increase in the quantity of hydrate of magnesia of 13½, 15, 22, and in one case as much as 40 per cent. This could only have been derived from the sea water. Another deleterious substance found in the decayed concrete was carbonate of lime, which could hardly be traced in the Portland cement of the same standard. The concrete taken from the south breakwater showed it to have undergone a similar chemical change. The outer quay walls surrounding the side of the graving dock were built of plastic concrete or Portland cement concrete, mixed in the usual way with a certain quantity of water, and allowed to set two to four hours, then broken up and deposited within frames under water in skips with opening bottoms, the concrete being left *in situ* in the frame. These walls do not show the same action or decay. Portions have been rebuilt with Roman cement concrete under water, but no decay has been noticed in them, and the only protection to the Portland cement concrete from the chemical action of the sea is apparently a non-porous lining or facing of stone-work. Every care is said to have been taken in the concrete used. The cement had withstood the mechanical tests, and the concrete had set hard. The same failure of Portland cement concrete was noticed by Mr. Harrison Hayter, vice-president of the Institution of Civil Engineers, two years ago. After a time the concrete expanded, vertical walls of the material lifted some inches, and the surface cracked and flaked off. In every case a white "cream like" substance was observed in the concrete, which Mr. Hayter had analyzed, and was found to contain 80 per cent. of magnesia hydrate, consisting of about two-thirds magnesia oxide and one-third water. In every case of decayed concrete, magnesia was present. Professor Brazier's experiments are confirmatory of the fact that these deposits of decayed cements contain magnesia, but he believes the substance comes from the action of the sea water, and is not present in the Portland cement, as Mr. Hayter thought to be the case. We cannot enter into the details of the experiments made by Prof. Brazier on the cement blocks, and the results he obtained by digesting some of the cement in sea water, from which it appears that the amount of lime and magnesia contained in the sea water in its original state is accounted for after the cement had been separated from the water, there being a gain of lime and a loss of magnesia amounting to nearly all the magnesia contained in the sea water. Hence the same authority concludes that Portland cement cannot resist the action of sea water.—*Building News.*



SECOND FLOOR PLAN—CITY RESIDENCE, MANNHEIM.



A CITY RESIDENCE IN MANNHEIM—WERLE & HARTMANN, ARCHITECTS.
From Architektonische Rundschau.

Vassar College Sewerage.

Vassar College, Poughkeepsie, N. Y., has a system of sewage disposal for its 2,000 of population that might well engage the attention of sanitarians the world over. It is simply the dry earth system, and is represented by those concerned to be perfectly successful, inoffensive, and inexpensive. It is also extremely simple; consisting merely of two large but shallow tanks (for alternate filling and emptying), the bottom guttered for the effluent, and covered with a layer of gravel.

Above this gravel bed is a loose flooring of boards, on which is spread a thick layer of soil from the college farm. The sewage from all the buildings flows into one of these tanks, distributed over the area of the soil filter, so long as the effluent passes off clear, into a neighboring stream. When the effluent grows impure, the sewage is turned into the other tank, and the workmen employed on the college farm shovel out the muck created by the mixture of organic matter and soil, and cart it back to the fields to be replaced by a fresh layer therefrom. So powerful and rapid is the bacterial digestion and the absorption of the disengaged products by the salts, carbon, etc., of the soil, that it is asserted, and credibly, that no offensive odors are experienced either from the effluent or in the removal of the muck. The organic matter is so far decomposed and assimilated with soil in the average time of its stay in the bed as to be ready for almost immediate absorption by vegetation, and the fertility produced is said to be most exuberant.

Where there are contiguous farms sufficient to utilize the sewage of any community, it is not easy to imagine anything either simpler, cheaper, or more perfect than this plan. Within a reasonable distance farmers would gladly cart in their soil for the privilege of carting it away again as a rich fertilizer.—*Sanitary Era.*

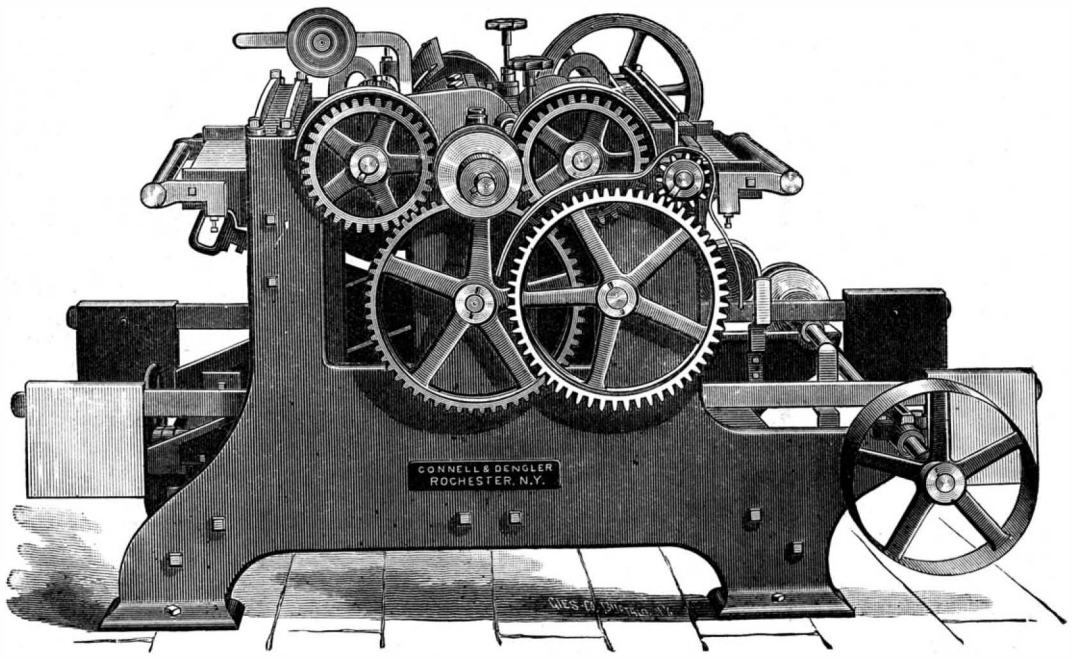
Preservation of Stone.

Limestones are for many reasons eminently suitable for constructive purposes, being cheap and easily worked, but they readily absorb moisture. This, as it usually contains carbonic acid, gradually dissolves away the material of the stone, and in winter serious injury is often caused by the freezing of this water and its consequent expansion. Several methods of rendering this material less porous have been proposed, but not unfrequently the remedy has been worse than the disease. Alkaline silicates were at one time in favor for this purpose, but in its application soluble hygroscopic alkaline carbonates are formed, which seriously affect the utility of the process. Moreover, unless care is taken in the application of these silicates, a hard, impervious varnish is given to the surface of the stone, within which the water used in dissolving the silicates is imprisoned, and on the first frost serious disintegration takes place. MM. Faure and Kessler have recently been at work on this question, and as the result of their experiments, recommend the use of metallic fluosilicates, more especially those of aluminum, magnesium, or zinc. The surfaces to be treated are brushed over with a solution of the salt chosen, causing on the first application an abundant froth, due to the liberation of carbonic acid gas. When dry the operation is repeated once or twice, depending on the quality of stone; on an average for soft stones 1·7 lb. of solution at 4° Baumé are required per cubic yard. The advantages claimed are: That the process is completed in twenty-four hours; it allows the stone to be polished, and by a suitable choice of fluosilicate used, different colors can be communicated to it; and lastly, the process is cheap, and applicable not only to stone, but to all cements and mortars containing lime. The theory of the process is that a double decomposition occurs, forming in the first place silica, calcium, and aluminium fluorides and carbonic acid gas; secondly, a reaction takes place between the limestone and the aluminum fluorides, producing alumina, calcium fluoride, and carbonic acid. In this manner each grain of the limestone is covered with an insoluble coat, materially increasing its resistance to atmospheric influences.

AN IMPROVED SURFACE PLANING MACHINE.

A strong and compact planing machine, of moderate cost, and embodying many late improvements, is shown in the accompanying illustration, and is manufactured by Messrs. Connell & Dengler, of Rochester, N. Y. It can be made to plane as wide as thirty inches, will plane very short stuff and not chip the ends, and will make so fine a surface that it is an especially desirable machine for furniture manufacturers, making the stuff ready to go through the sanding machine. The bed plate, containing the lower feed rolls, can be raised and lowered, for various thicknesses of stuff, by means of inclined sides, which gives it a solid base to rest upon, and at the same time insures accuracy of adjustment A scale is arranged in view of the operator, indicating the point at which the machine is set, and any change in thickness can be effected without stopping or moving from his working position.

The feed rolls are five and a half inches in diameter,



SURFACE PLANING MACHINE OF CONNELL & DENGLER, ROCHESTER, N. Y.

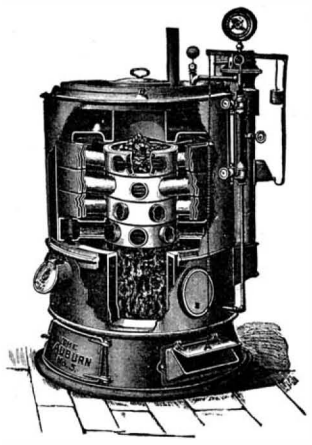
all geared and driven, and planing any desired thickness up to six inches.

The feed pressure is by weight and lever, the weights resting on stops, excepting while a board is feeding through, and the feed works are controlled by a tightener. The cylinder is forged steel, belted at both ends, and has heavy journals running in babbitt lined boxes of great length, insuring solidity and steady motion. The countershaft has twelve-inch tight and loose pulleys, six inches face, and should make 1,000 turns per minute. The weight of the machine is 4,000 pounds.

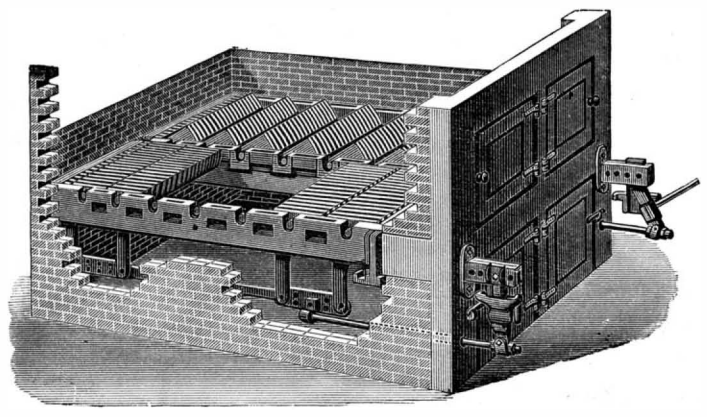
THE "AUBURN" BOILER FOR STEAM HEATING AND THE WOODCOCK PATENT SHAKING GRATE.

A boiler for steam and hot water heating which gives a great amount of effective fire surface, which requires but little attention in operation, and is not liable to get out of order, is shown herewith, and is manufactured by Messrs. Woodcock & Co., of Auburn, N. Y. Above the fire pot is a middle section of simple but novel construction, consisting of inside and outside hollow rings connected by hollow arms, and coming one above another, so that the inner rings form a fuel magazine entirely surrounded by water. The boiler is made entirely of cast iron, and is so constructed and put together as not to be injuriously affected by sudden or severe variations of temperature.

The same firm also manufacture a shaking grate—



"AUBURN" BOILER.



THE WOODCOCK PATENT SHAKING GRATE.

the Woodcock patent—which is made of a number of interlocking segments, as shown in the illustration. Each of these segments has bearings at both ends, and by means of downwardly projecting arms attached to a horizontal shaking bar they may be tripped up at the same angle simultaneously. There is a self-locking arrangement to keep the grates level, preventing their points from being burned. The shaking apparatus can be applied either on the inside or outside of the boiler front, the latter way preventing any dust arising and stopping the necessity of opening the doors in order to shake the fire. The grates keep a uniform distance apart in shaking, and cannot pass each other, except in order to dump the fire, thus preventing coal from dropping through, no matter how inexperienced the fireman may be.

Furnaces provided with these grates afford the largest amount of air space possible, thus giving the greatest draught and the most perfect combustion, supplying the largest percentage of steam with the least consumption of coal. They are adapted to burn coal of any size.

Design in Architecture.

What are the means by which a satisfactory architectural design may be obtained? The best general answer that can be given to this question is, perhaps, that which was given by the painter Opie to a young artist from the country, who, struck with the brilliancy of Opie's coloring, timidly ventured to inquire with what he mixed his colors. To this the gruff old painter briefly replied—*Brains!* In that one word is the whole theory of architecture. If a man will only think of what he is doing, and think of that only, I defy him to produce a bad design. A vulgar man may impress something of his own vulgarity upon it; a weak man something of his feebleness; but if the position of the art is up to the mark of the age, these will not be perceptible to the general eye. An earnest, purpose-like design, pretending to be nothing but what it is—going straight to its object, and giving evidence of careful study and thought—must always be pleasing not only to its contemporaries, but through all ages, even if neither ornamented nor ornamental, while no extravagance lavished on a falsehood can remain tolerable beyond the fleeting fashion that gave rise to it. To descend a little more to particulars, the principles of design in architecture may be classed under four distinct heads, thus: Convenience in arrangement; economy in construction; ornamental arrangement; ornamental construction. The first two belong, properly speaking, to the builder, or to the engineering part of the profession, and only the last two, strictly speaking, to architecture; but unless he gets them done for him, which sometimes, though rarely, may be an expedient arrangement, no architect must neglect the former two. Indeed, the foundation of all good architecture is that the building shall be so arranged as to meet the purposes for which it is intended in the best possible manner. This alone will not suffice to make a building beautiful, but it will go as far toward it as almost any other quality, and nothing that can be added will redeem the want of it.—*J. Fergusson.*

Ebonizing.

One of the English furniture gazettes gives the following account of the French process of ebonizing: One of the most ingenious as well as serviceable methods practiced by French artisans in wood is that by which is produced a complete resemblance in the color, beauty, and density of ebony by the skillful use of charcoal upon the surface. None but carefully selected woods of close and compact grain are employed for this purpose, and these are covered in the first place with a coat of camphor dissolved in water, and almost immediately after with another coat composed chiefly of sulphate of iron and nut gall. The two combinations in blending penetrate the wood and give it an indelible tinge, and at the same time render it impervious to the attacks of insects. On these two coats becoming sufficiently dry, the surface of the wood is rubbed at first with a very hard brush of couch grass and then with charcoal of substances as light and friable as possible, the fact being that if a single hard grain remains in the charcoal it will scratch the surface, which should be perfectly smooth The flat parts are rubbed with natural stick charcoal, the indented portions and crevices with charcoal powder, and, alternately with the application of charcoal, the article operated upon is rubbed with a flannel soaked in linseed oil and turpentine. These pouncings, repeated several times, cause the charcoal powder and the oil to penetrate the wood, insuring a beautiful color and a perfect polish.

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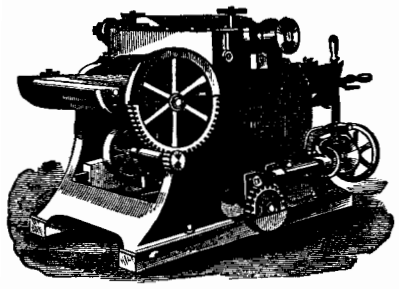

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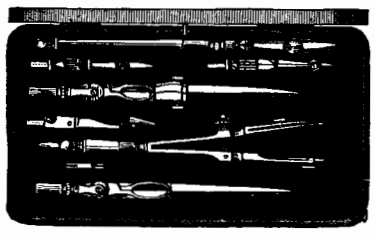

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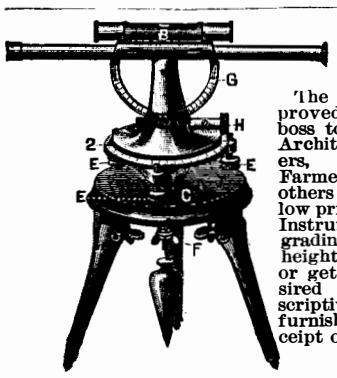

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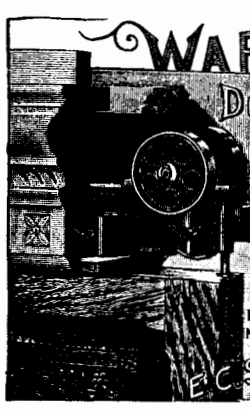

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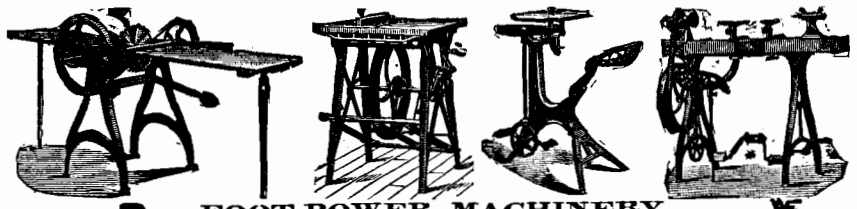

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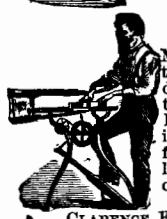

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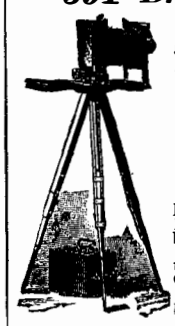

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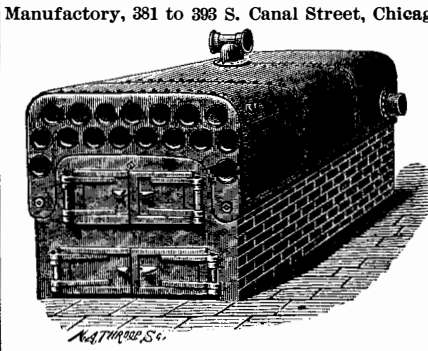

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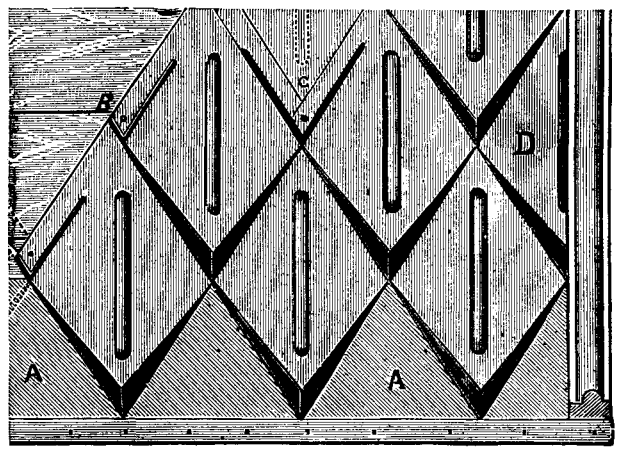

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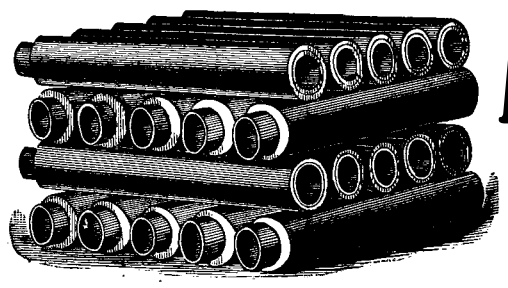

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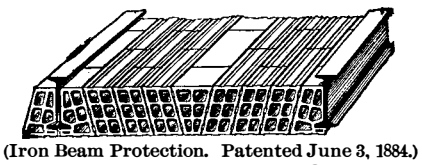

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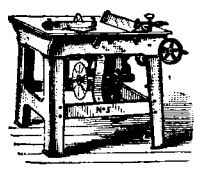

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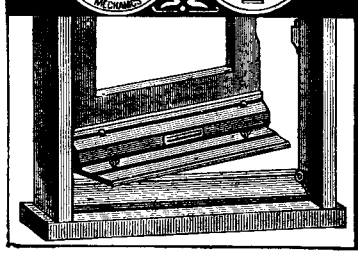

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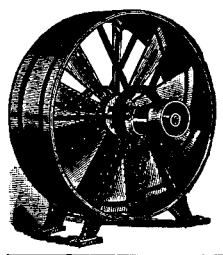

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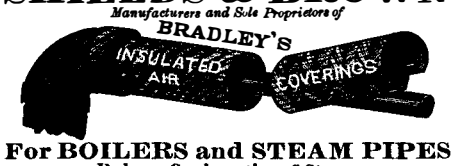

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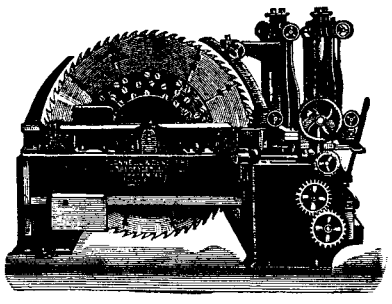

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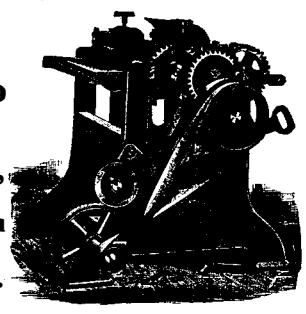

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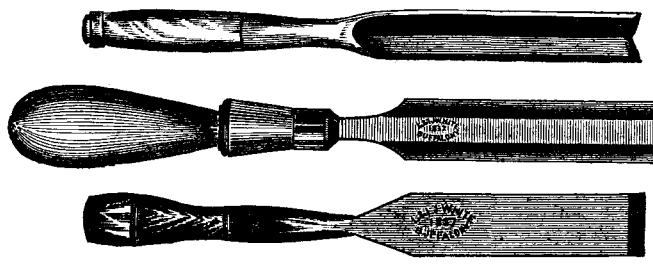

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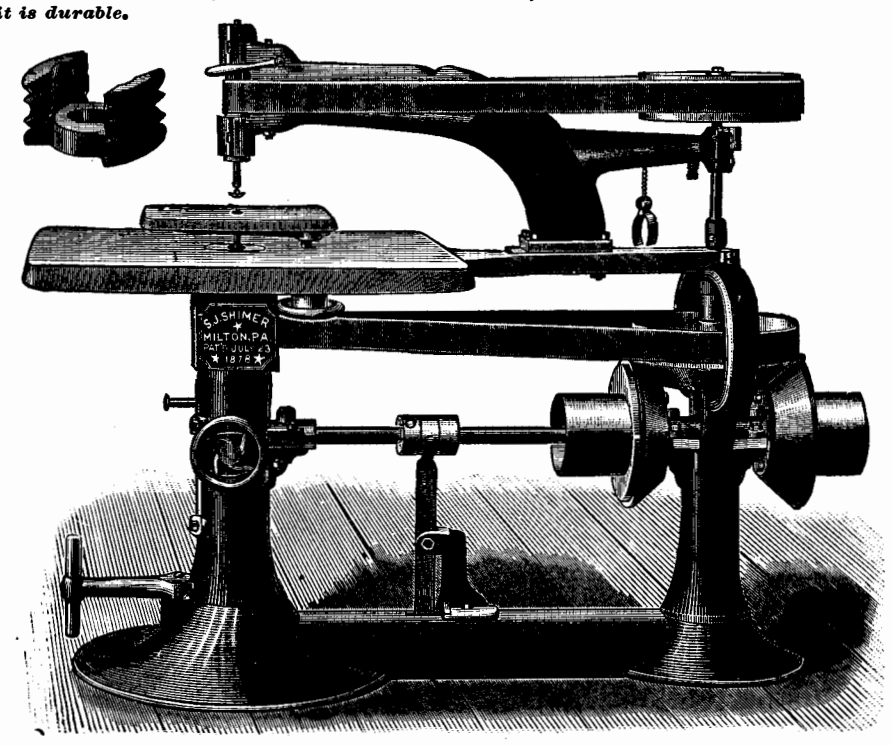

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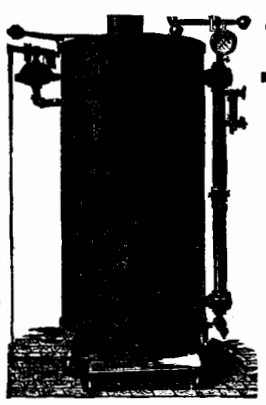

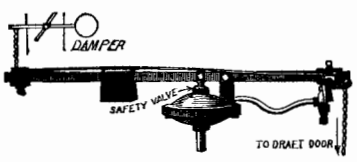

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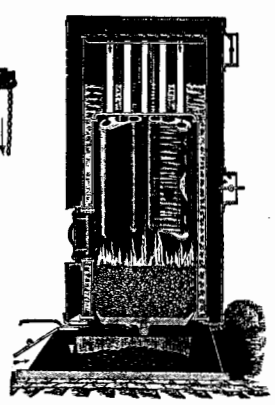

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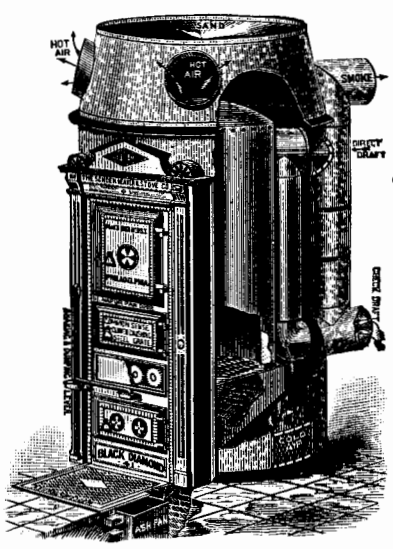

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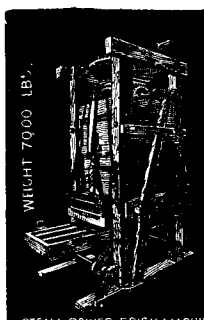

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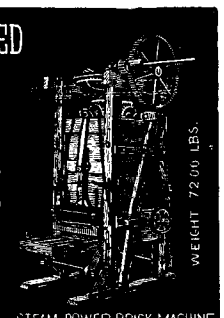

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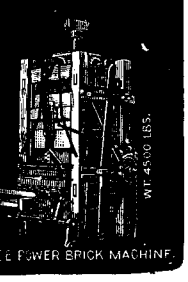

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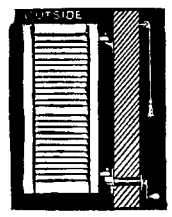

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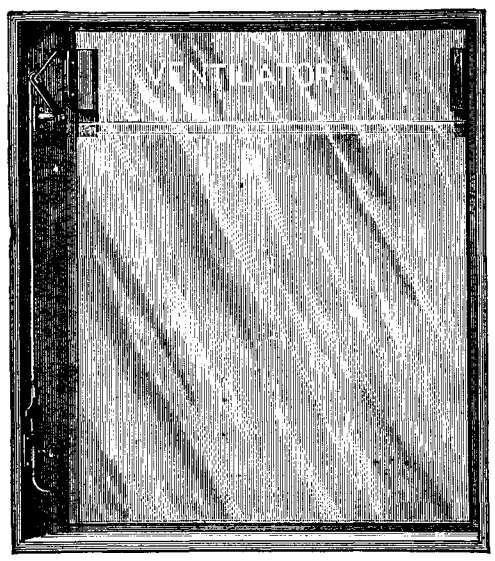

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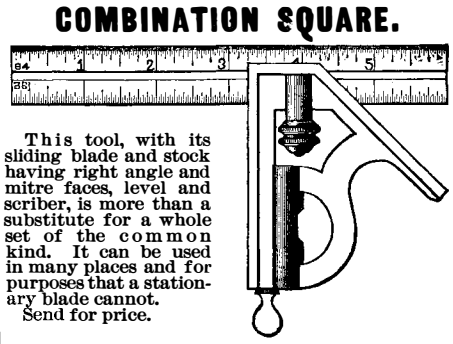

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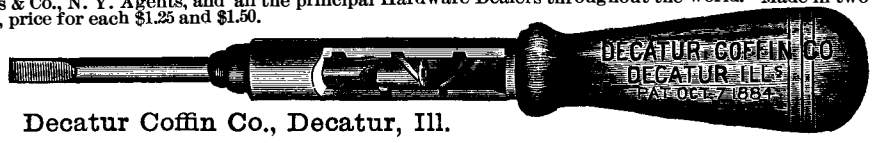

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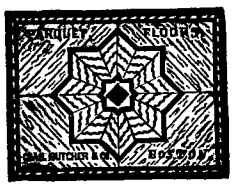

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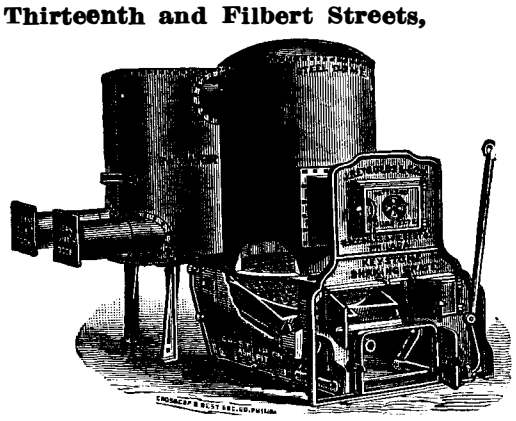

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References to former articles or answers should give date of paper and page or number of question.

Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all, either by letter or in this department, each must take his turn.

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(1) W. H. writes: Will you tell me the reason that an ax at one corner, and sometimes both, cracks in tempering it, and how to prevent? Also a good receipt for small springs, such as main spring to gun locks, and other small springs? A. To prevent the cracking of an ax in hardening, have the iron poll split to receive the steel bit, not the bit to receive the poll. Heat the iron as well as the steel, and plunge into clear cold water until chilled. Use the best of cast steel for gun lock main springs. Forge to size. Do not use a file on the springs. Heat over a charcoal fire, harden in water, and draw the doubled over portion to a blue.

(2) A. L.—For aquarium cement use 1 gill plaster Paris, 1 gill litharge, 1 gill fine white sand, one-third gill resin finely powdered. Mix thoroughly dry. Take what may be required for immediate use, and make a putty with boiled linseed oil and a little drier. Not too soft. Apply at once, as it sets quickly.

(3) O. H. T. asks (1) how to prepare green paint which will stand the heat of steam and not scale off and change color, for painting a steam engine. A. Use a chrome green ground in japan, and put on in several thin coats, and then coat it over with a good body wearing varnish. 2. Please give the dimensions for making a water tank which will hold four barrels of water. A. Make the tank to hold 16⅛ cubic feet, or, if round, 2½ feet diameter, 4 feet 2 inches high, or 3 feet diameter, 2 feet 10 inches high. If square, 2½ feet square by 2 feet 8 inches high.

(4) V. B. asks: What is used in graining machines to stain poplar lumber in imitation of Spanish cedar? A. Just exactly the composition of the stain used we cannot say, but quite likely a solution such as can be made by boiling ½ pound madder and 2 ounces logwood chips in a gallon of water and brush well over while hot; when dry go over the whole with pearlash solution, 2 drs. to the quart. If not exactly the shade, it can be modified by altering the proportions of the ingredients.

(5) W. S. writes: 1. In cutting rafters, what is termed third pitch? I claim that the rafters raised one-third of the width of the building is third pitch; others say it is not. Who is right? A. One-third pitch is a rise equal to one-third the horizontal line from end to peak plumb line, or the width of the building for a single roof, or one-sixth the width of the building for a double roof. 2. If I take 8 inches on the blade of my square and 5 feet 4 inches on the tongue, will it give the bevels for a third pitch? A. Your figures in second query are not correct; 8 inches by 24 inches will be correct. 3. In drawing water from a well, over a single wheel, does a 10 inch wheel draw any harder than one 20 inches? A. A 10 inch wheel will draw no harder than a 20 inch if the axle is proportionate and in good order. 4. Is there any part or place on a locomotive drive wheel that is at rest while the locomotive is running? If so, what part? A. The part of a wheel that touches the rail is theoretically at rest with reference to the rail.

(6) F. E. writes: 1. I find the statement made that whitewashing cast iron will prevent or rather diminish radiation. What then becomes of the heat which was radiated before the surface was white coated? Is it carried through the flue into the outer air, or is it still given off into the room? A. Carried through flues and other outlets. 2. Will it be advisable and economical to whitewash a school room stove? A. No; do not whitewash.

(7) J. B. asks if there is an artificial process of petrifying wood, and explain the process. A. Wood cannot be petrified artificially in the same manner as is done in the natural way, as that is by substitution of silex in place of the wood. Saturation of wood by soluble silica or water glass will make it hard, or it may be covered with a thin coat of mineral matter as is done in some mineral springs. The real petrifactions are the work of ages.

(8) C. A. M. asks: How are the figures and lines made on steel tapes? A. The lines and figures are printed upon the steel ribbons with asphalt varnish instead of ink. The tapes are then put in a bath of acid and etched to the required depth. For the bath use to one gill of acetic acid or good strong vinegar, 20 drops nitric acid. Time, five to ten minutes for light work.

(9) F. S. asks (1) whether there is any way of inlaying bronze or brass letters in stone except by heating process. Can it be done in a similar way to filling teeth in dentistry? A. Letters and devices cut in gems are filled with gold foil by pressure with small tools. Letters are cast and inserted in artificial stone by making the stone and inserting letters (name and address) before it sets, then finishing off the surface. Letters cut in dovetail in stone may be filled with amalgam of copper filings and mercury, which after setting may be finished with the surface of the stone. Metals may be also deposited in such cuttings by the electrotype process. 2. Is there any way of filling seams in hard wood by using fine sawdust and glue? If so, how should it be prepared to make it waterproof, as it is for a hard wood floor? A. You may fill seams in floor with sawdust and shellac varnish that will be waterproof.

(10) P. S. asks how to hang a grindstone on its axle to keep it from wabbling from side to side? A. It requires a pretty fair mechanic to hang a grindstone to run true and stay true. It is supposed that you have no flanges upon the axle. The hole should be at least three-eighths or one-half inch larger than the axle, and both axle and hole square; then make double wedges for each of the four sides of the square, all alike and thin enough, so that one wedge from each side will reach clear through the hole. Drive the wedges from each side. If the hole through the stone is true, the wedges will tighten the stone true; if the hole is not at right angles to the plane of the stone, it must be made so, or the wedge corresponding must be altered in the taper to meet the irregularity in the hole.

(11) P. S. M. asks: Are not V-cone pulleys and round belts as powerful as flat belts on light machinery, and would they not be better for foot lathes? A. V-cone belts—jointed belts built up in this shape—are used to some extent in places where a large amount of power has to be transmitted, and there is not room for a large flat belt, but these belts are not considered as efficient as flat belts. In light machines, such as sewing machines and those of similar requirements for power, round belts are used on a pulley with channeled face, with perhaps as good or better effect than the same weight and strength of leather would give if flat, but the object is rather to serve convenience in construction than gain power.

(*Continued on page* x.)

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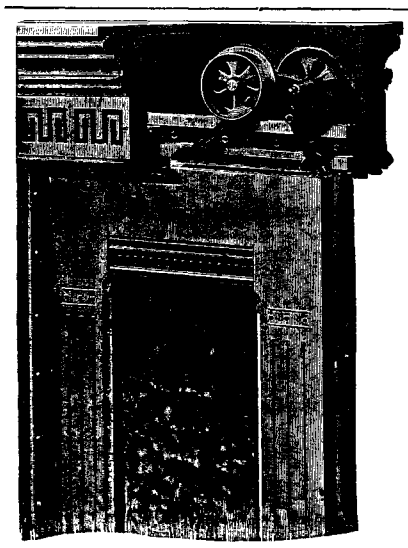

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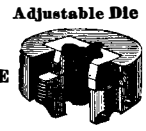

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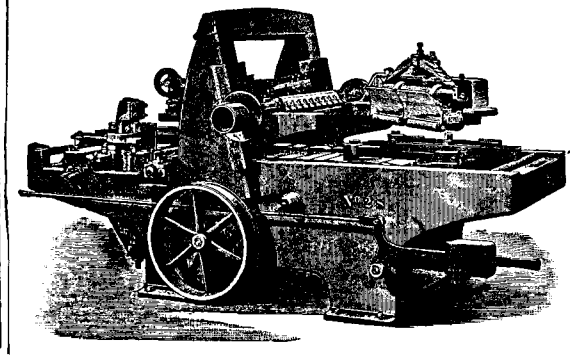

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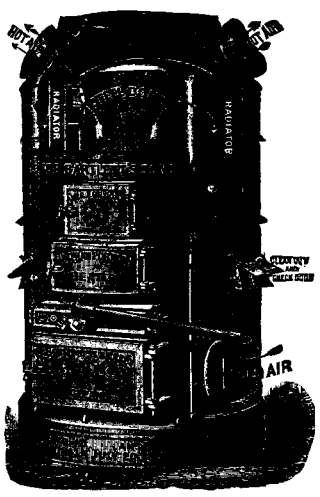

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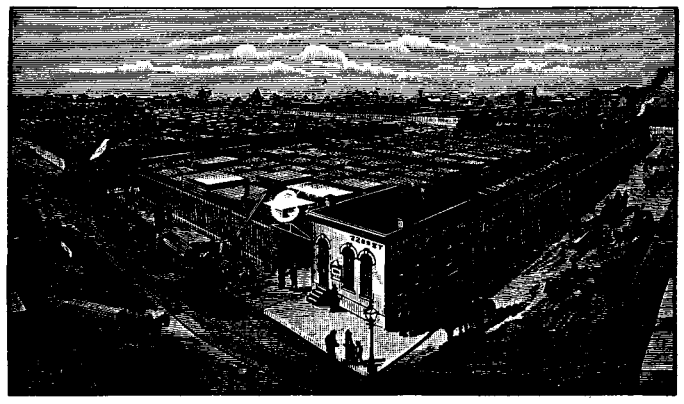

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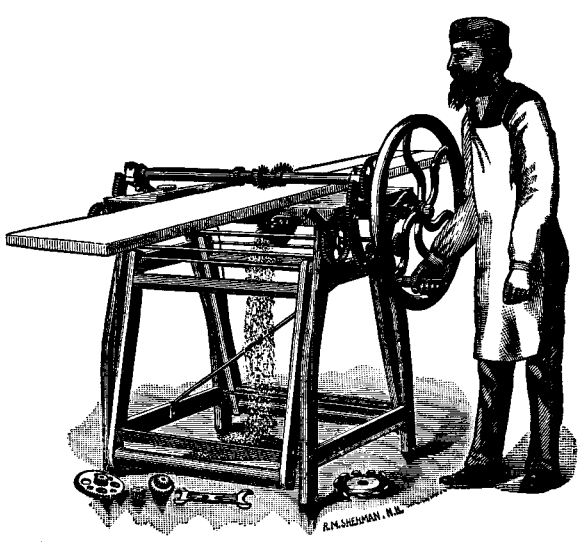

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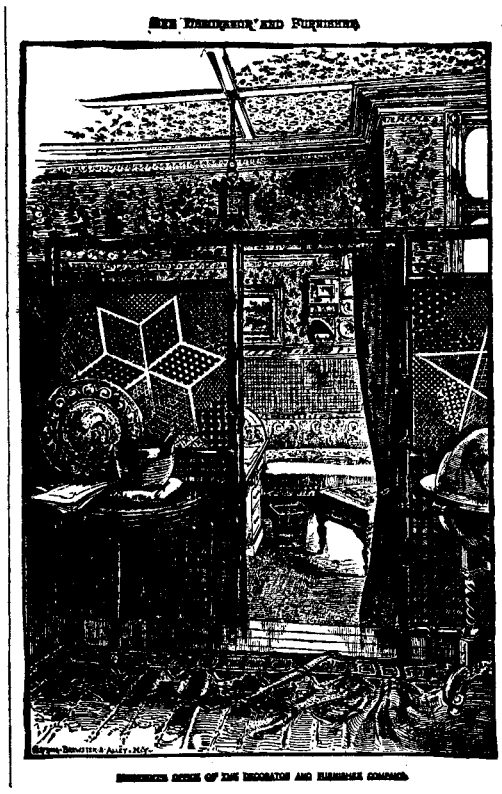

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Notes and Queries.

(*Continued from page* vi.)

(12) J. F. M. asks why a steam pump working with forty or fifty pounds of steam will not pump water against sixty or higher pressure. A. It will pump against 60 or 100 pounds pressure if properly proportioned.

(13) J. J. W. asks: What height and width inside should a brick chimney be made to give sufficient draught to burn tan bark after being bleached and not dried? Length of boiler being 14 feet over all, tubes 12 feet long, 36 in number. 2¼ inches diameter. Furnace being double, *i. e.*, double the size of an ordinary one. Have you any idea as to what number of bricks it would require to build same? A. About 60 feet high, or perhaps more, according to location for draught, and about 2 feet square inside at bottom. Wet tan burning requires large furnace or oven capacity, and exceptionally good draught. Such chimney will probably take about 30,000 bricks.

(14) D. J. R. asks: How will it answer to put a circulating boiler for bath tub into the cellar, running the pipes to a hot water back in the room above? Will there be danger of an explosion, or will the hot water circulate downward to the boiler from the range, and the cold water rise from the boiler to the range? A. Your plan will not work. There will be no circulation. Put the boiler in the same floor with the range, and draw from the top into the bath. Make the cold water connection into the bottom of the boiler, and have the pipe open to the reservoir or water supply, so as not to produce undue pressure from overheating when the hot water is not required for use. Care should also be observed in making the connections between the water back and the boiler so as to insure circulation.

(15) J. P. asks (1) how to take the rust off a bicycle, the rust having been on over a year. I have tried oil and sand, also oil and emery paper. A. Rub with kerosene oil or spirits of turpentine. 2. Also is there any solution to make steel shine just as if it was nickel plated? A. Nothing except polishing. 3. Also of a solution, when you dip nickel or silver pieces into it, it will gold plate them, without a battery? A. Wash thoroughly a quarter of an ounce of gold chloride; then add it to a solution of 2 ounces of potassium cyanide in one pint of distilled water; shake well, and let stand until the chloride is dissolved. Add 1 pound prepared Spanish whiting. Expose to the air till dry, and then put away in a tight vessel for use. When applied, it is mixed into a paste with water, and rubbed on the surface of the article with a piece of chamois skin or cotton flannel. The surface of the article should be thoroughly cleansed before the plating powder is applied.

(16) C A. B. writes: I have been trying for some time to get a steam radiator bronzing that will not tarnish or burn off after it has been on a week, as most of the articles used now do. What is the best liquid to mix the bronze with to produce that result? A. Use a dry bronze powder, and then cover with a coat of transparent colorless varnish. This will be found more satisfactory than any mixture.

(17) E. T. T asks: What is the geometric center of a triangle? A. The geometrical center of a triangle is the assumed center of gravity for its surface, and may be found by bisecting the sides and drawing a line from the points of bisection to their opposite angles. The point of meeting of these lines is the geometric center.

(18) S. H. B. asks for information upon the subject of slate pencil manufacturing from soapstone, the machinery used and the process employed. A. Soapstone pencils are mostly made in New Hampshire near the quarries. The soapstone is sawed in blocks the length of the pencil, then into slabs of the proper thickness, then run through a set of thick saws that cut half way through the slab and round one side, when the slab is turned over and run through on the other side. Or in better machines there are two sets of saws, above and below, so that the slabs are pushed through, one following another, and are delivered finished except pointing. The pointing is done with a machine or a quick running grindstone.

(19) W. E. L. asks: 1. Is there any machinery in successful operation for manufacturing lumber, furniture, etc., from sawdust? A. Sawdust and shellac pressed in moulds have been used for ornaments for furniture and fancy articles, and there is a so-called terra cotta lumber made of sawdust and clay, then burned in an oven. This is as near making lumber out of sawdust as we have yet come. 2. A New England paper recently told of a Western mill that was running the largest circular saw in the world, 60 feet diameter, 700 revolutions, and 12 inches feed. What are the true figures? A. The big saw you speak of was reported as 6 feet in diameter, and we believe a few such are in use in Wisconsin and Minnesota, although 60 and 66 inches have until very lately been the largest sizes.

(20) B. S. H. asks: 1. Is there any ink which is black at the time of writing and which will gradually disappear? If so, how made, and how may it be made to appear again? A. Boil nut galls in aqua vitæ; put some Roman vitriol and sal ammoniac to it, and when cold dissolve a little gum arabic, and it will, when written with, vanish in twenty-four hours. We do not think that it can be made to reappear. 2. Is there any simple method of making the carbonate of sodium from the chloride? A. Sodium chloride is a natural product, and is the basis for the manufacture of sodium carbonate, and therefore there is no simple method for the process asked for. The addition of carbonate of silver would probably bring about the desired result. 3. How may stove polish be taken off nickel plate so as to leave the surface bright? A. Remove the stove polish with warm soap suds. 4. How is the appearance of lightning produced in a theater? A. Lightning may be produced in theaters by means of lycopodium. A quantity of it is thrown from a bellows across some suitable flame.

(21) A. R. S. asks for a receipt for making a covering or paint for a wooden aquarium, so the water will not penetrate it. A. Use a lining of melted asphaltum. A good asphaltum varnish would likewise be suitable. SCIENTIFIC AMERICAN SUPPLEMENT, No. 158, gives receipts for cements for aquariums.

(22) T. G. C. asks if slight scratches can be removed from sheet glass by any chemical. A. Ammonium hydroxide (hartshorn) will probably take the scratches off.

(23) G. W. asks for recipe for staining new mahogany a deep rich red without hiding the grain; also the best polishing material—and how to apply it—after the furniture is so stained. If a filler should be used, please give recipe. A. The following is used when furniture is repaired, and the old wood cannot be matched, so that the work presents a patched appearance. The pieces are washed with soap lees, or dissolve quicklime in water and use in the same manner; but be careful not to let either be too strong, or it will make the wood too dark; it is best therefore to use it rather weak at first, and, if not dark enough, repeat the process till the wood is sufficiently darkened.

(24) J. G. H. asks: What is the best and most durable preparation to paint smoke stacks and other surfaces subjected to heat? A. Coal tar makes a good paint for smoke stacks. If it is thin enough to add a little finely ground plumbago, it will keep its color better for it. A paint made with boiled oil, lamp black, and plumbago is also good, and will keep its color fairly on heated iron work.

(25) J. N. W. asks: 1. At what speed should small circular saws, two inches in diameter, be run for cutting brass and iron? A. For brass, fifty or sixty revolutions; for iron, forty, to be varied according to the size of the article cut. 2. How can I harden these saws without warping? A. Heat the saw to a good red and then place it between two masses of cold iron—the top of a cold anvil and a planed cast iron bench block are good. Unless the saw is over one-eighth of an inch thick, it will be hardened and be straight. If thicker, plunge it into water. In either case brighten it and draw to a low straw. While warm, these saws may be straightened, if warped, by judicious blows of the hammer on an anvil. 3. At what speed should iron be run in the lathe? A. Good results come from a speed of eighteen feet per minute when the iron is clean, the lathe solid, and the tool properly ground and adjusted.

(26) J. M. K.—You can straighten band saws in the following manner: Put the saw on to the machine and under tension, just as it is to be used. Use a steel straight edge 10 or 12 inches in length to find the lumps or twists, which mark with chalk so as to know where to hammer. Now hold the oval face of a millwright's or carpenter's hard wood mallet opposite the chalk marks and against the saw, and with a light oval-faced hand hammer knock out the lumps. Commence carefully, do not strike too hard. Examine your saw often with your straight edge to see how you get along, and you will soon be able to take out twists readily and get your saw perfectly true. J.E.E.

(27) C. N. asks for a formula for a walnut stain on poplar wood that will not raise the grain. A. Take 1 quart water, 1½ ounces washing soda, 2½ ounces Vandyke brown, ¼ ounce potassium bichromate. Boil for ten minutes and apply with a brush either in hot or cold state; or try this: Spirits of turpentine 1 gallon, pulverized asphaltum 2 pounds; dissolve in an iron kettle on a stove, stirring continually. Can be used over a red stain to imitate rosewood. To make a perfect black add a little lamp black. The addition of a little varnish with the turpentine improves it.

(28) E. A. H.—One of the simplest and best methods of rendering the basement walls of a building damp proof is to construct on the outside an area wall, so that the earth does not rest directly against the main wall of the house, but only against the outside wall or casing of the area. To form such an area, build a wall half or one brick thick parallel to and some 2 or 3 inches from the main wall, and form at the bottom a channel or gutter connected with the drains, so that any moisture or water finding its way in through the outer casing may be conducted away and will not therefore penetrate into the building. Thoroughly ventilate the areas by means of air bricks or other suitable connections with the outer air, and connect with one another by making through connections underneath the floor joists. Be very careful that the main wall is laid on a good and efficient damp course. The top of the space between the area and main walls may be covered in all around the building with bricks—ornamented or otherwise, as preferred—on a line just above the ground. Another plan of effecting the same object is to dispense with the area wall, and in building the brick work to cover the whole of the work on the outside with a thick layer of bituminous asphalt. The plaster on the inside is in this case often rendered in nearly neat Portland cement.

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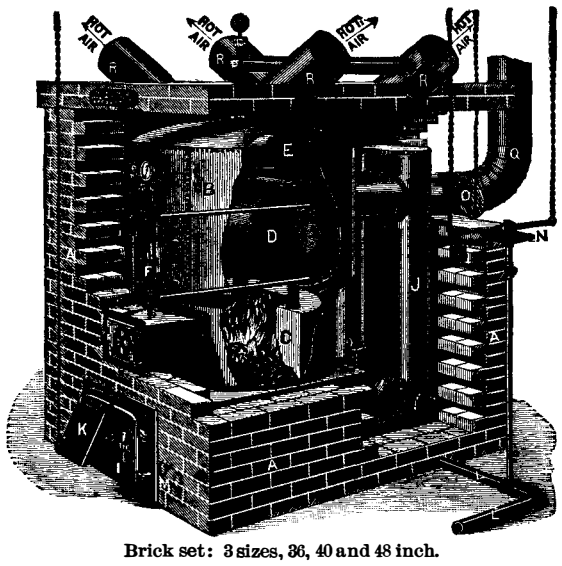

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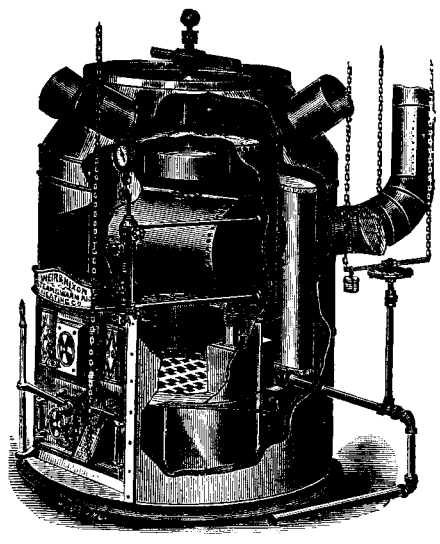

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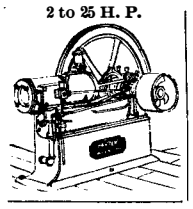

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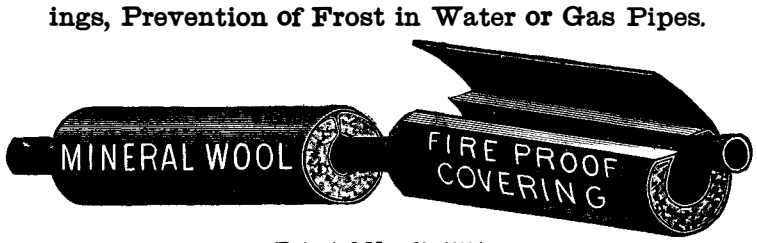

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