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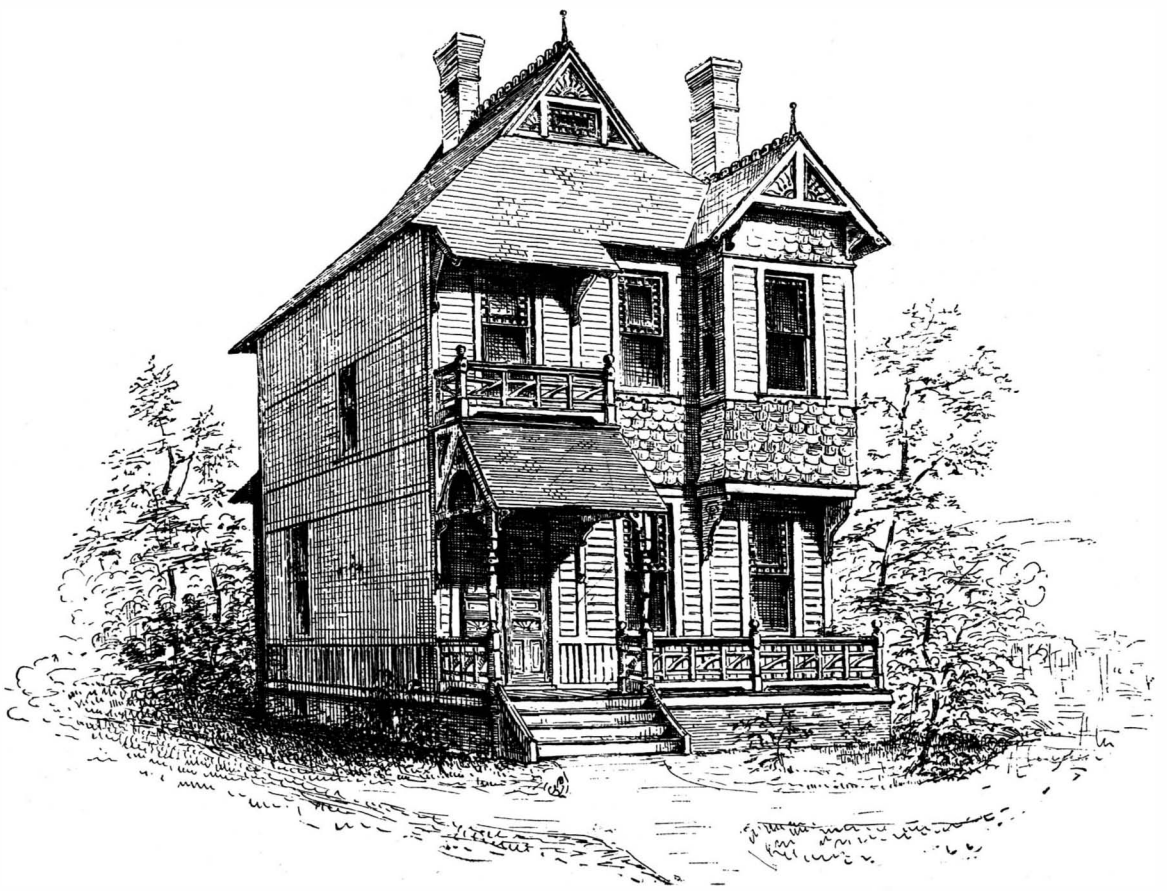

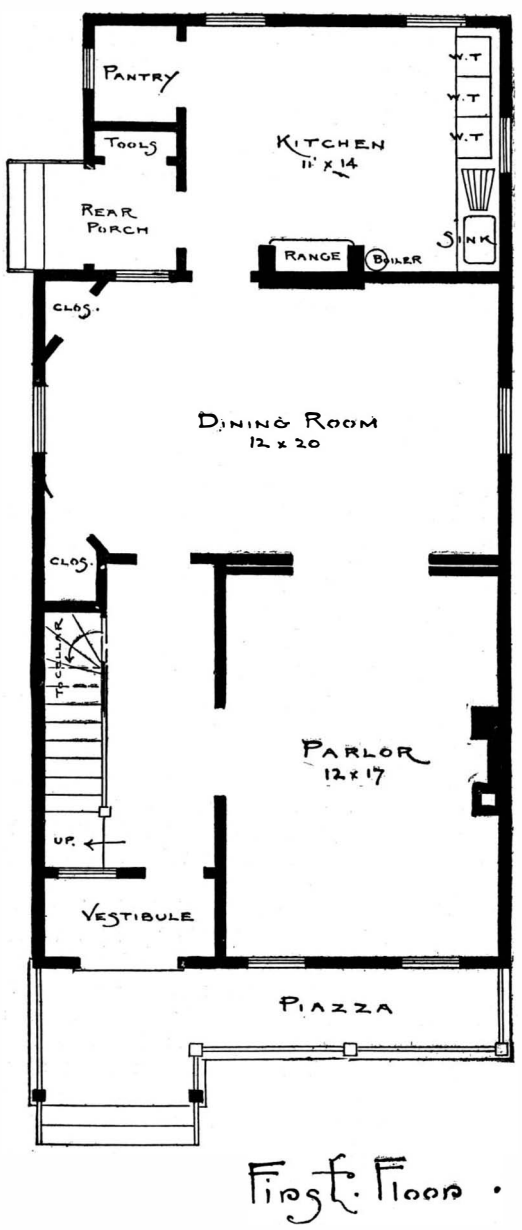

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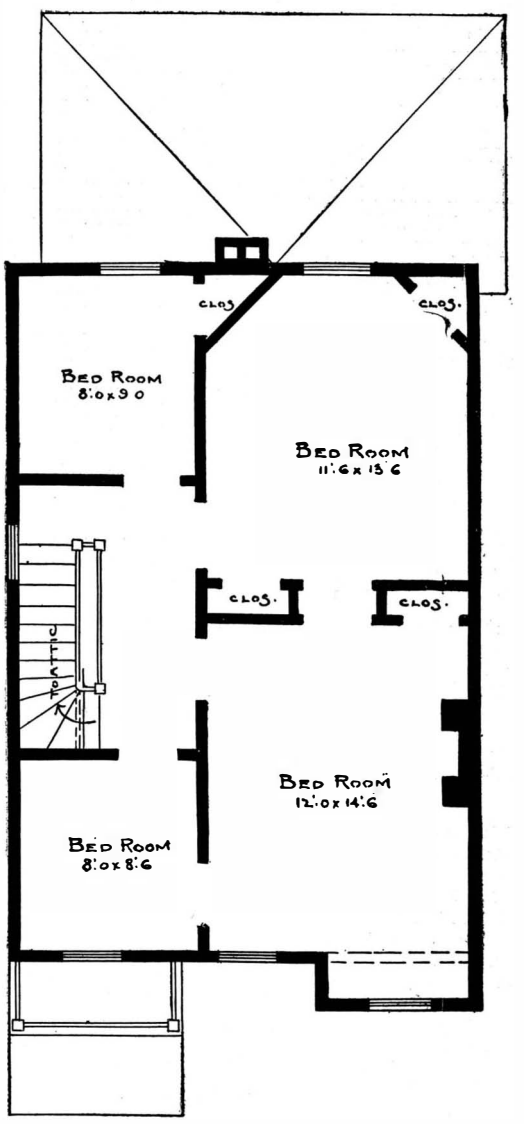

Second. Floor.

A $2 600 COTTAGE AT EAST NEW YORK.—CHAS. E. HEBBERD, ARCHITECT, NEW YORK.—[See page 26.]

Scientific American.

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Of the February number of the ARCHITECTS AND BUILDERS EDITION of SCIENTIFIC AMERICAN.

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THE AMERICAN INSTITUTE OF ARCHITECTS.

A GLANCE AT THE CHARACTER OF THEIR WORK, AND ITS INFLUENCE UPON THE GROWTH OF AMERICAN ART.

BY C. POWELL KARR, C.E., CONSULTING ARCHITECT, NEW YORK.

In this city, through the munificence of Mr. Willard, a trust fund of $80,000 has been bequeathed to the Metropolitan Museum of Art, for the purpose of establishing an architectural collection. The scheme has been approved by prominent museum authorities, archæologists, architects, and many others whose knowledge and experience qualify them to express an opinion.

Even the best of modern museums, though scientifically planned and connectedly arranged as to sculpture, painting, and the industrial arts, fail to give architecture the space and thought it so richly deserves.

In founding this collection he wished to do all in his power to cultivate and encourage a popular taste for it, to help such students as were unable to secure the advantages of travel, and to elevate the standard of American work by presenting choice selections of the masterpieces of all styles.

He desired the collection to tell a clear and graphic story of the progress of the art, from the earliest period to the time of the Renaissance. No important type was to be slighted; neither was the collection to consist merely of fragmentary bits of detail. It should present all the distinctive styles in historical sequence, and in such manner as to show their inter-relationships and transitions. It should comprise carefully made, good sized models of typical buildings, casts of doorways and other minor architectural features, and a complete collection of casts of applied ornament, sculpture, and architectural detail, sets of photographs, and plain or tinted illustrations and engravings. An effort will be made to form a complete collection of scale models. They must be made to order, are expensive, must be accurately detailed, and time will be required to obtain them.

Chances of acquiring valuable collections of originals are rare, but the collections of casts have a completeness and a unity not found possible in museums of originals. It is not expected that the sum already raised will enable the trustees to make a complete selection of such examples as they wish to obtain, but it is such a long stride in advance of anything heretofore done of such a nature, that it is worthy of a wide and general recognition.

To the general public the collections of art objects in our museums are too often regarded as mere repositories of curious things. To attain their greatest usefulness, and tell the story of their creation, they should become more and more illustrative of the principles they were designed to enunciate, by becoming more closely connected with the courses of study in our academies, colleges, and other seats of learning.

The attitude of the general public toward our museums is a reproach to American culture.

In a most interesting manner was told the story of the founding of the American School of Archæology at Athens.

To an architect, Greece is the idyllic land of the past, and her art the perfect expression of the noblest inspirations that ever moved the heart of man. It has been, until lately, the most inaccessible country of civilized Europe. There is no overland route to Athens. Until within a few years, no facilities or opportunities have been afforded for the study of Greek art upon Hellenic soil. Four art schools are now flourishing at Athens, viz., British, German, French, and American.

An effort was made some four or five years ago to establish an American school on Grecian territory, where American students could make a study of history, literature, sculpture, archæology, and architecture.

The director who had charge of the school was at first supported by a yearly contribution of two hundred and fifty dollars from each of the ten leading colleges. This number was augmented to sixteen. An effort, however, has been made to secure $100,000 as a permanent endowment fund. Through the efforts of James Russell Lowell and others, twenty-five thousand of this amount has been subscribed. It is believed that the remainder will be obtained this winter.

The Greek government offered to donate a plot of land to the American school, if the managers of the school would erect a building. The land obtained adjoins the plot of ground given to the British school on the same conditions.

The two schools have similar courses of study. The requirements to enter each are equally severe. The management of the two schools have a good understanding of one another's aims and purposes, and perfect harmony of thought and action prevails. When lists of books, manuscripts, or prints that are wanted are sent on to London for the British school, care is taken that nothing contained in the American school is duplicated, and *vice versa*, so that the meager funds of both institutions shall go as far as possible. The students of either school share alike the advantages of both schools, and, in fact, the arrangement may be said to be on the English university plan, in which the individuality of the schools is kept distinct, yet are so managed that they possess the identity of a common interest. We learn that a fortunate circumstance has happened in connection with the future usefulness of these schools. Mr. Penrose, who is one of the most prominent of British architects, has been sent from London to take charge of the British school. His wisdom and experience will greatly benefit both schools, and will give a new impetus to their work.

In architecture the work of these schools consists in studying, sketching, and measuring the remains of Grecian art wherever it can be found. The explorations now going on at Assos are noted and recorded. Chiefly, the present state of knowledge of Grecian art has been derived from casts and fragments of original pieces, removed from their surroundings to a foreign country, where all the conditions and circumstances are changed. No one, no matter how great his genius, can gather from a fragment under the murky skies of London, for example, that refinement of light and shadow, that mystery of outline, which the Greek artist or sculptor loved to design, and whose effects could be studied only under his own unrivaled sky and atmosphere.

America is not the place to interpret Greek art. In this country traditions have no sacredness, and history is being made, not studied. To the average American, antiquity is a myth, or at the best a creature of the imagination. The student, however, is urged to visit Greece, to let the past perfect art tell its own simple, immortal story; to return, bringing with him something of the spirit which has wrought such masterly work, the admiration and the despair of all the ages.

Among the items of interest discussed in the trustees' report was an account of the preparation of an act to regulate and improve our federal architecture. A committee was appointed to confer with the supervising architect to draft such a bill.

The present unsatisfactory condition of the tariff in connection with the importation of designs, models, casts, photographs, books, etc., was declared to be in abeyance and unsettled.

As we cannot originate the classic designs of the old world, nor manufacture photographs of antique art which we do not and never can possess, it does seem an absurdity to embrace them in our tariff. In such matters protection is exclusion. A better order of things is now upon us. The Fairchild decision in regard to drawing the line between antique and modern art at the beginning of the eighteenth century is a marked step of progress. It is believed, however, that this special decision applied to paintings only; but that it will eventually include works of art of every name or nature, there can be no reasonable doubt.

It has been said of us as a people that we are so determined to have something new at all hazards that the question is not asked, To what epoch does the style belong? but this: Is it new? We take from here and there, and appropriate a noble cornice, adopting some happy Moorish diaper work for the background of a pediment, select a Romanesque archivolt for a Grecian doorway, and in many other ways ransack the storehouses of antiquity to make a heterogeneous mass, and in the virtuous admiration of our own astounding genius, we have learned to call it eclecticism.

This idea of piracy in art matters is not new. When the Romans conquered Greece, they carried away many valuable art treasures, and the artist too; but this action of the Romans has been explained by the admission that they were too practical and busy a people to study art. They saw what they wanted and by the right of might they took it, but must we make the same admission, and be Vandals too?

(To be continued.)

PRESSED WOOD ORNAMENTS.

Will you please answer in your February number of the ARCHITECT AND BUILDER how pressed woodwork ornaments are made, also artificial ornaments?

E. H. SMITH.

Los Angeles, January 12, 1887.

Answer.—Pressed wood ornaments are made in three ways—on end wood, on plastic veneers, and on a composition of veneers and sawdust.

The end wood is turned up to about the general shape desired, and then forced by hydraulic pressure into steel dies.

Plastic veneers are made by laying shavings of the wood to be pressed side by side until the surface wanted is covered, and then gluing to this first layer several other layers running either in the same direction or transversely or at right angles until the requisite thickness is made up. The veneer thus made is kept moist until ready for stamping between a male and female die, the male die being reduced so as to allow the veneer to enter the mould. The first pressure shapes it up, the shape is then covered with another layer and is finished by two or more pressures, the pressure being retained by suitable mechanical appliances until the glue has set. This work is very solid. The third method, for flat work only, is to soften a thin veneer by wet steam,

and to force it into a hot die with sawdust and flour paste, with some suitable contrivance to allow steam to escape from the sawdust and paste. Imitations of very old carving have been very successfully made by branding the wood frequently with a red hot iron matrix. A mould in plaster of the desired shape is given to the iron moulder to reproduce in iron. The iron mould is heated, and pressed against the wood; at each heating and pressure, the charred wood is removed with a wire brush, and in this way the wood is gradually charred and burnt out instead of being cut out.

Artificial wood or sawdust ornaments are generally made of sawdust, glue, and flour paste kneaded into a dough and pressed into hot metallic dies.

USEFUL HINTS RELATING TO HOUSE BUILDING.

In building a house for myself, to cost about $5,000, what are the *special* points which I must watch—points which may be overlooked by the architect or contractor, because, perhaps, not properly in their province, or because the owner should himself know them? I have never yet built a house, and am, in consequence, wholly inexperienced—an easy prey to imposition and mistakes.

The writer having had some experience in building houses as an owner, and paid somewhat dearly for it, proposes in this article, and, perhaps, in others that may follow, to indicate some of the *points* desired.

In the first place, *be most careful in the choice of your lot.* Do not allow the cost per foot to be the most important element in your decision. A *low-priced lot* in the beginning may be the *dearest* in the end, that is, if it is chosen simply because it is low in price. Avail yourself as much as possible of the benefit of others' improvements. If there are desirable residences adjacent to the lot of your choice, the value of yours will be assured at the outset. Remember that you are about to put a certain sum of money into an improvement upon whatever lot you select, and that a *badly located* lot will *decrease* the value of this, while, on the contrary, a *good* lot will enhance the value. Many have suffered disappointment, and actual loss, by an error of judgment in this regard. Your choice will make the difference between a good asset and a poor one.

Having chosen well as to this point, see to it in the second place that the lot *can be easily drained.* To this end, it is not necessary that the ground should be *high*, but rather that it have a slope in *some* direction, otherwise, owing to the *soakage* into the ground of the surface water, which ought to *run* off, your cellar may be damp or even wet at times.

A dry cellar is of the utmost importance, and this is one of the ways to secure it. Another point to be considered in your choice should be *the exposure* it would give your house. By this we mean the way it should front. A wise decision here will conduce greatly to the comfort and health of your family. The writer's experience is that the best frontage or facing for a house is *a little west of south.* This more than any other opens up the rooms to the sun in the winter and to the southwesterly breezes in the summer, thus making the house warm, healthy, and cheerful in the former, and cool and delightful in the latter, as the prevailing winds during the summer are from the southwest. At the same time, they carry away *from* the house the odors and heat of the kitchen; and during the winter the living part of the house is protected from the cold northerly blast.

(To be continued.)

THE FARRAGUT CLUB HOUSE.

Our colored plate this month shows the architecturally attractive building of the Farragut Boat Club of Chicago. This club is, as its name indicates, an athletic organization, but, as may be presumed from the picture of its house, is devoted in no small measure to the amenities of social life. A home so extensive, and even elaborate, would not be required solely for athletic purposes; and still, having gained great prestige and reputation upon the water, this club never loses sight of its "chief object in life," but simply adds to its attractions club features which interest the members during the season when out door sports are out of the question. Organized nearly fifteen years ago, the growth of the club has been slow and legitimate, and the building of the present club house was for the purpose of supplying the actual necessities of the organization, and providing a house which would adequately accommodate the members and befit the honorable rank achieved by the club. The site selected for the house overlooks Lake Michigan from a point near 31st Street, and is in the midst of the best residence district of the city.

The plans were made by Robert Rae, of the firm of Rae & Wheelock, architects, who is also a member of the club. The intention was to provide a house which would combine all the essentials in the way of club rooms, and at the same time furnish an unusual area of balcony and observatory space for the use of members during the summer months, when aquatic sports are in progress on the lake. The site is so commanding that the entire harbor and lake front, and much of the city, can be viewed from the observatory or lantern of the club house. The ground dimensions are 90 by 40 feet, and the building rises to the height of three full stories, and is surmounted by a gabled roof and tower. Opening from the second story there is a loggia of ample dimensions to accommodate nearly one hundred persons, and the front is further broken and ornamented by two or three hooded balconies. The material used is brownstone and pressed brick, while the balcony gables are finished in bronze and slate. The roof is covered with red slate, with copings of galvanized iron. The main entrance is through an archway and loggia paved with Minton tiles, and opens into an entrance hall from which springs a grand stairway in antique oak. An elaborate mantel of the same material occupies one side of this handsome hall, the decorations of which are in Turkey red and bronze. The other apartments on this floor are the grand parlor, library, directors' parlor, card room, billiard room and coat room, all handsomely frescoed, elegantly furnished, and arranged *en suite*, so that they may all be thrown together for reception purposes, or used separately, as occasion may require. The architectural features of this interior include a semicircular niche or "cozy" in the library, an inset "bay" in the parlor, and the novel and elaborate treatment of the entrance hall and grand stairway. This stairway leads to the handsome ball room above. This room, with a twenty foot ceiling, a striking gallery, and a thoroughly equipped stage for amateur theatrical purposes, is frescoed in soft buff tints and bronze, and is one of the most attractive ball rooms in Chicago. Large doors give egress to the main loggia, which in warm weather is thus made pleasantly tributary to the ball room. On the same floor are the ladies' parlor, gymnasium, and superintendent's offices. The floor above is devoted to servants' rooms and to storage.

The spacious basement, eleven feet in the clear, is given up to bowling alleys, pool tables, dressing rooms, baths, steam heating apparatus and other conveniences. The boats of the club are accommodated in a separate house, immediately on the lake shore, and are not carried into the club house, although that building is within a stone's throw of the lake.

The cost of the club house with its furnishings was about $40,000, including the land on which it is built; but owing to the rapid appreciation in the value of the land, and also to the extremely low building contracts that were secured, the property could not now be replaced for anything like the low sum it cost. The present officers of the club, most of whom have been in charge of its business since the inception of this enterprise, are: Lyman B. Glover, President; G. R. Blodgett, Vice-President; Frank M. Staples, Treasurer; S. W. Jackson, Secretary; G. W. McClellan, Captain; W. R. Fowler, Commander; H. C. Avery, Lieutenant; G. B. Jennison, Ensign; and Harrison Kelley, Chairman of the Board of Admission. The membership is about three hundred.

DWELLING AT BABYLON, L. I.

A small house costing only $1,600 is the subject of portion of our colored plate in this issue. It is now in course of erection on ground situated in the town of Babylon, Long Island, New York, the architect being William H. Beers, of the Tribune Building, New York city.

The elevation is of attractive appearance, calculated to prepossess any one in its favor, while the plan, with the somewhat original feature of a room on the upper story, is conducive to comfort and economy of space.

The materials employed in the construction of the building are fully described in the following specifications:

SPECIFICATION

of materials and labor required in the erection and completion of a dwelling house to be built on ground situated in the town of Babylon, Long Island, N. Y., according to plans and specifications, and under the superintendence, of William H. Beers, architect, Tribune Building, New York city.

Drawings, etc.—The contractors will make no alterations from drawings or specifications, but should any error or inconsistency appear in these during the progress of the work, it shall be the duty of the contractors to duly notify the architect, who will make the proper adjustments.

The drawings and specifications are to be used for this building only, and are the property of the architect, and are to be carefully treated and returned to him on completion of the work. The drawings and specifications are to be signed by both owner and contractor, for the purpose of identification.

General Requirements.—The contractor is to furnish all transportation, labor, materials, scaffolding, etc., for performing the work in the best manner. All materials shall be the best of their several kinds, and all work done in a thorough and workmanlike manner, to the true intent and meaning of the following specifications and accompanying drawings, which are intended to include everything requisite and necessary to the proper and entire finishing of the work, notwithstanding every item necessarily involved by the works is not particularly mentioned. All work, when finished, to be delivered up in a perfect and undamaged state.

Any portion of the work done by the contractors of a quality not approved by the architect shall be forthwith removed by and at the expense of the contractor, and replaced by him in a proper and satisfactory manner.

The contractors must do all the necessary cutting and patching, and make good after all mechanics, also clean out building when required by the architect, also cart away all rubbish that may accumulate at any time during the progress of the work and is not required on the premises, but he can put the same in any suitable place, if any such place can be found on the premises.

All masonry as laid to be properly protected from the weather by the mason, and the carpenter must provide suitable protection to all openings to keep out the cold, rain, etc. The carpenter will provide set centers, etc., required by the mason.

Excavations.—Make excavation for cellar the full size of house, as shown on cellar plan, to about the depth of four feet below the line of the present grade, and place the earth in a convenient place for grading.

Grading.—Fill in around and pack the earth against the cellar walls, after the mortar is dry, and grade the excavated earth around to the height of about one foot six inches above the line of old grade, and slope off the ground on all sides of the building as directed.

Footings and Concreting.—Make footings for all walls, piers, posts, chimneys, etc., of concrete, composed of coarse gravel, one part cement and two parts lime, and sharp sand, also concrete the cellar bottom to the depth of four inches, with the upper surface left straight and level.

Brickwork.—Build cellar walls, piers, chimneys, etc., to the heights and thickness as shown on drawings, of good, hard burned brick laid in mortar composed of one part cement, two parts lime, and the necessary quantity of clean, sharp sand, laid true and plumb with flush joints. Build flues in chimney stacks as shown on drawings. Leave all flues clean and smooth, and plaster all chimney stacks on all sides, as they are laid up to the under side of roof. Also build all other brickwork as shown on plans.

LATHING AND PLASTERING.

Lathing.—Lath all walls, partitions, ceilings in first and second stories and ceiling in kitchen with sound lath of full thickness, laid on ¾ of an inch apart and thoroughly nailed, joints broken every eighteen inches. Under no circumstances must lath stop and form a long, straight, vertical joint, nor any lath put on vertically to finish out to corners or angles; nor must there be any lath run through angles and behind studding from one room to another; all to be formed and nailed solid in angles before lathing; should there not be any properly secured, stop and notify carpenter.

Plastering.—All walls, partitions, and ceilings in first and second stories to be finished with best two coat work, to be properly put on, and applied with sufficient force to secure strong clinches; level and float up the brown coat, and make it true at all points. Cover all the brown mortar with a good coat of best white hard finish, composed of finishing lime-putty and plaster of Paris and clean washed white sand; mix in proper proportions, so as to secure a good and workmanlike job; all lathing and plastering to extend clear down to the floor, and all walls to be straight and plumb, and all angles to be sharp and regular; do all the necessary patching after other workmen, and leave everything in a perfect and complete state.

CARPENTER'S WORK.

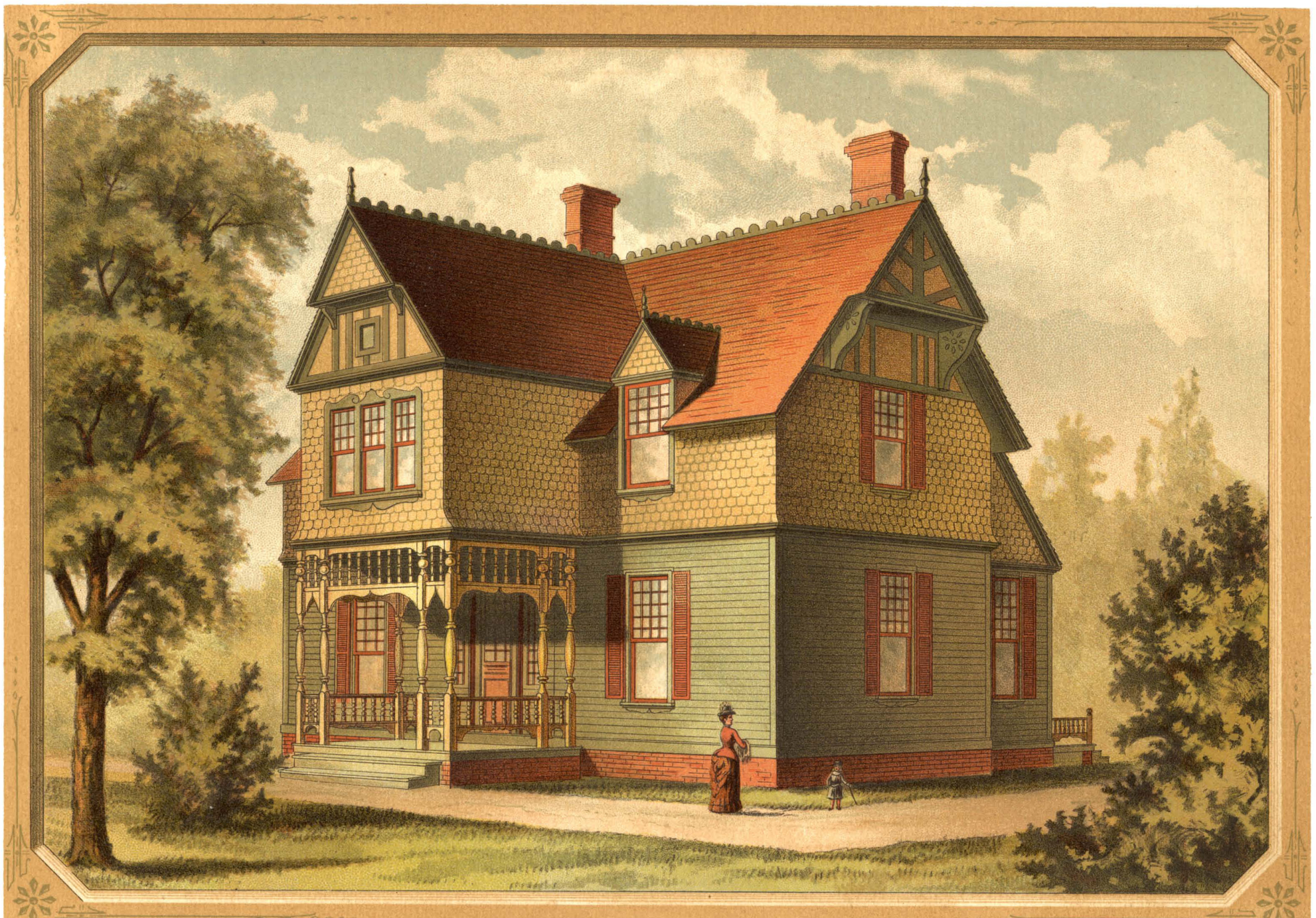
Timber.—The timber used throughout this building to be of good quality, well seasoned, and free from sap, shakes, large or loose knots or other imperfections impairing its durability and strength. All to be of spruce excepting where otherwise mentioned.

Framing.—Size of timbers: girders in cellar, 6 in. x 9 in. of spruce timber; sills, 4 in. x 8 in., halved and spiked at angles; posts, 4 in. x 8 in.; girts, 4 in x 6 in.; plates, 4 in. x 6 in.; braces, 4 in. x 4 in.; floor beams, 2 in x 9 in., placed 16 inches centers; roof rafters, 2 in. x 7 in., placed 20 inches centers; collar beams, 2 in. x 7 in.; studs for filling in outside walls, 2 in x 4 in., of hemlock; partition studs for inside partition, 3 in. x 4 in. and 2 in. x 4 in., as shown, of hemlock; hip and valley rafters, 3 in. x 7 in.; ridge, 2 in. x 9 in.; trimmers and headers, 4 in. x 9 in. Veranda timbers: sills, 4 in. x 6 in.; plate, 3 in. x 4 in.; floor joists, 3 in. x 6 in.; rafters, 3 in. x 6 in., placed over each post and chamfered; purlins, 3 in x 4 in., about 2 ft. 6 in. from centers and chamfered; posts 6 in. square and turned as shown, of white pine; all trimming to veranda to be of white pine.

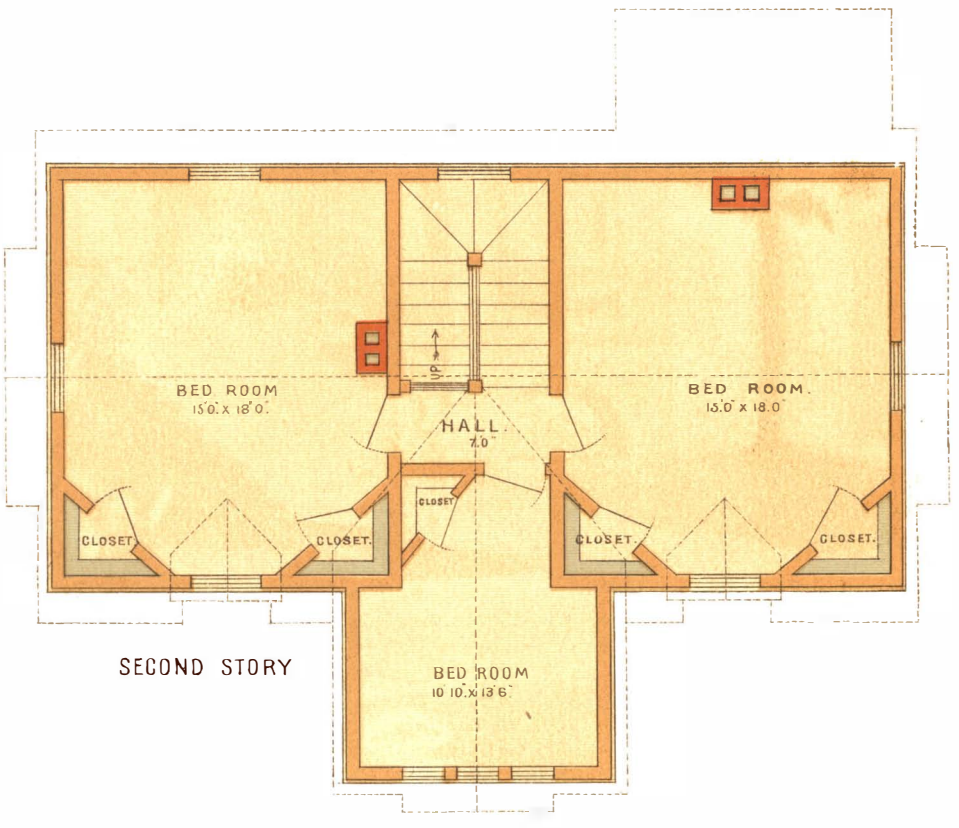
The frame to be thoroughly braced at angles, posts to be mortised into sill, girts well framed into posts and beams notched on to sill and girts, etc., and all framing to be done in a substantial manner and to the satisfaction of the architect.

Cross Bridging.—Bridge each tier of beams with two rows of cross bridging to each tier except attic, which will have one row, with 1 in. x 2 in. stuff.

THE FARRAGUT CLUB HOUSE, CHICAGO. ROB. RAE, JR. Architect.



A SIXTEEN HUNDRED DOLLAR COTTAGE. Wm H. BEERS, Architect.



Headers and Trimmers.—All headers and trimmers to be 4 in. x 9 in. properly framed together, leaving all openings of sufficient size for the finish of stairs, chimneys, etc., and in no case allow the wood to come within 1½ inches around chimneys; care must be taken in framing, so that important timbers will not require cutting for chimneys, heater pipes, plumbing, etc. Cross furring for first story ceiling of 1 in. x 2 in. stuff.

Exterior Work.

Sheathing.—Cover the whole frame and roof with square-edged hemlock sheathing, free from large loose knots, laid with close joints and thoroughly nailed to frame.

Building Paper.—Cover the sheathing of all outside walls and roofs with best sheathing paper, carefully tacked on and lapped three inches, and neatly fitted around all openings, dormers, gables, etc., in roof. Rosin-sized sheathing paper to be used.

Clapboarding.—Put on best quality of clear, dry white pine clapboards, all laid perfectly even gauge of not over 4 inches; cut close joints against all casings, etc., and all well nailed to every stud, with nails set in for puttying.

Corner Boards.—Casings, bands, etc., to be of the width as shown on drawings and about 1¼ in. thick, and all other trimmings to be as shown on drawings. All this work to be of well seasoned white pine free from large loose knots, etc.

Veranda.—All posts to be turned as shown, rail and brackets, cornice, etc., as shown. The veranda roof to be laid with narrow tongue and grooved stuff beaded on one side, laid close and well nailed. All to be of white pine.

Lay the floor with tongue and grooved white pine flooring about 4½ in. wide, blind nailed and laid close. Construct steps as shown, 1¼ in. tread, ⅞ in. rise, to have cove under nosings, etc. Case under veranda floor down to grade level with latticework as shown.

Shingles.—Where shown on elevations, shingle outside walls with good quality of 16 in. sawed white pine shingles, laid to the weather about 5½ in. and applied in the best manner, as shown; cut the butts of shingles octagonal for the second story, as shown on side walls.

Roofing.—Carpenter shall frame and construct according to drawings and sections, etc., all roofs in the most thorough manner, all thoroughly spiked and braced. Do all the necessary framing as required for gables, chimneys, etc., provide and fix the ends of rafters of size as shown, and cut to the forms shown, all to be well nailed to main rafters. Also provide and put in place, as shown on section, a gutter with moulded face, well nailed and supported, of white pine, and pitch the water to points indicated for leaders.

Make all the moulded cornices on gables, etc., as per details furnished, and all other work in gables, etc., as shown on elevations. Make cresting, etc., as shown out of 1¼ in. stuff, and furnish all turned finials as shown.

Shingles to be put on in the best manner, properly laid, joints broken, each shingle to be well nailed, and to stand away from angle of valleys 1½ in. These shingles to be of best quality white pine and laid about 4½ in. to the weather.

Windows and window frames to be as shown on drawings, made in the ordinary manner, with boxes for sash weights, to be of well seasoned white pine, weather lapped meeting rail, and to be double hung with the best hemp sash cord and cast iron weights. Cellar windows and w indows in gables, as shown, to swing and made water tight.

Glass.—All the windows in first and second stories to be glazed as shown, with clear, double thick, American sheet glass. The glass for sashes in roof and cellar to be glazed with single thick sheet glass. Provide and hang to all windows on first and second stories, outside blinds, in two folds with rolling slats, hung with hinges and secured with proper fastenings, primed before coming to the building. Do all other outside woodwork shown on drawings, but not particularly mentioned.

Interior Work.

Flooring.—Lay all flooring in first and second stories with white pine flooring, tongued and grooved, not over 5 in. wide and well nailed to beams and free from large or loose knots, shakes, or other bad imperfections. All flooring to be tongued and grooved, and laid close to the outside wall, closing up all spaces completely. All joints to be leveled off smooth.

Base Boards.—There will be a 9 in. base board on first and upper floors, with moulded top.

Doors and Architraves.—All doors and window openings to have a 4 in. architrave, with turned corner block and base block high enough to receive the full base, all to be thoroughly nailed and put up in the best manner For inside of closets a plain casing to be used. All windows on first and second stories will be finished down to sill with apron piece.

Doors.—There will be a glazed front door, as shown on elevation, 1½ in. thick. All doors on first and second story and attic shall be four panel flush moulded, 1½ in. thick, and of the sizes marked on plans. Closet door to be 1¼ in. thick and moulded on one side.

Closets.—All closets on second story one row of shelves and the necessary number of closet hooks.

Portable Coal Slides.—Construct a portable coal slide to fit cellar window, of ⅞ in. plank, and made so that they can be taken out and in with ease.

Coal Bins, etc.—Construct bins in cellar with hemlock boards as usual.

Main Staircase.—To have 1 in. riser, 1¼ in. tread, tongued and grooved together. Treads to have nosing with cove under, finished work of stairs to be put up after plastering is finished and dry; wall strings to be 1½ in., top edge moulded to correspond with adjoining base. All to be of best white pine.

Newels, Rails, and Balusters.—To be as shown on section, and details to be of selected dry white ash, all to be properly secured. Main newel turned, small newels turned, balusters turned as shown on section and details.

Privy.—Build a privy 5 x 7 feet where directed, with seat, covers, etc., to be of the usual height inside, roof hipped and shingled, window inside about 20 inches square, swinging sash, and glazed with single thick glass, paneled door, with butts, lock and bolt, exterior walls shingled eaves moulded.

Tinning.—Use the best I. C. charcoal tin for all hips, ridges, valleys, gutters, dormers, etc., the side of each sheet painted one coat before laying, and all valleys, hips, gutters, etc., painted three coats before the shingles are put on.

Gutters.—Line the gutter of main roof, and run the tin up under the shingles at least 10 inches; bring the tin over the face of cornice and tack it down and well soldered. Do all necessary tin flashings and top of window caps, etc., and do all other necessary flashing; go over the work, and stop all leaks after other craftsmen, and leave everything tight.

Leaders.—Put up and properly connect with gutter a 4 inch tin leader in front of house from main roof, with the necessary curves, bends, breaks, etc., to convey the water from the gutter. Have suitable shoes at bottom, to throw the water away from the building.

HARDWARE.

Locks.—The main entrance and vestibule doors to have mortise locks with keys, said doors to have imitation bronze fronts, butts, and knobs. All other doors on first and second stories to have mortise locks with white porcelain trimmings and iron loose joint butts. All outside bed-room doors to have mortise bolts on second story. Rim locks to all closet doors. Furnish all the necessary locks, keys, butts, drawer-pulls, etc., of imitation bronze.

Sash Locks, etc.—Furnish to all outside windows on first and second stories improved sash locks of imitation bronze.

Sash Pulleys, Weights, and Sash Line.—To all windows suitable size sash pulleys, best hemp line and weights, etc. Furnish all hinges and fastenings for outside blinds.

Closet Hooks, etc.—Furnish all necessary closet hooks, black japanned.

Furnish all other hardware necessary to make this building complete, of a quality as above specified and carefully put on, so that all doors will lock and be in good order when left.

PAINTING.

Furnish all material and perform all labor for the full completion of all the woodwork. All lead and oil must be of the Atlantic White Lead Co.'s make. All woodwork must be thoroughly cleaned off, sandpapered, cracks and nail holes stopped with putty, knots properly killed, and woodwork free from dirt and dust.

First Story.—All woodwork on first floor to be painted three coats of such colors as directed by the architect.

Second Story.—All woodwork in second story to have three coats in two colors, as directed by the architect.

Newels, Balusters, and Rail to main staircase to be filled with patent wood filler properly applied, rubbed down, and cleaned off, and finished with two coats of hard oil finish.

Outside Work.—Paint all outside woodwork included in this specification, including all roofs, etc., three coats of best white lead and linseed oil paint of such colors as the architect may direct, and all work both inside and out must be to his entire satisfaction. All paint and varnish spots to be cleaned off of walls and floors at completion of the work, and all left in a perfect state.

PLUMBING.

Furnish all materials and perform all labor requisite and necessary for putting up and completing all the plumbing work in a thoroughly workmanlike manner, according to drawings and specifications.

All water pipes must be so put in that they can be readily got at at any time for examination. All lead pipes to be secured with hard metal tacks and screws, and all lead waste connections to iron pipes to be made through brass ferrules. Iron waste pipe to have joints calked with oakum and run with molten lead.

Sink.—Furnish and put up a galvanized iron sink, where shown in kitchen, with cold water supply and brass cocks, and waste through a 2 inch lead pipe with trap and trap screw, and connected with 2 inch iron waste pipe running to cellar. Make all the proper cold water connections.

Pump and Supply Pipe.—Set in kitchen, alongside of sink, a double-acting pump, and make all the necessary connections with 1 inch galvanized iron pipe from well.

$2,600 SUBURBAN COTTAGE.

CHAS. E. HEBBERD, ARCHITECT, 62 BROAD ST., N. Y.

This illustration represents one of five detached cottages erected at East New York. The contract for entire work, including painting and plumbing, was given out at $2,600 each. The building has a frontage of 21 ft. by 30 ft. 6 in. deep, and a one story extension 10 ft. x 18 ft. Height of first story, 10 ft.; second story, 9 ft. 6 in. Attic left unfinished, but with sufficient height and light to admit of finishing two good sized rooms if wanted. Cellar under entire building, 6 ft. 6 in. high. Foundations above ground of brick laid in red mortar; all cellar openings furnished with bluestone sills, outside cellar steps and coping of bluestone, chimneys furnished with bluestone cap with flue openings cut out.

Lathing, plastering throughout in two coats, and hard finished cornice in parlor, dining room, halls, and front bed room. Timber of frame of spruce. Frame covered with mill-worked sheathing, put on diagonally, this covered with heavy rosin-sized sheathing paper, and then inclosed with 6 in. clear beveled clapboards. Shingles with ornamental ends placed where shown. Posts of porch and railing turned. Floors throughout of white pine, 5 inches wide. Inside finish of white pine with moulded pilaster, finish with corner and base blocks.

Doors throughout paneled; 1½ inch room doors, 1¼ inch closet doors. Windows glazed with double thick French sheet glass, with marginal lights of cathedral glass in upper sashes; outside blinds throughout.

Kitchen provided with sink and wash trays. Chair rail on walls of dining room. Picture mouldings throughout. Slate mantels in parlor and dining room.

Tin Roofing Plates.

If the foundation of a building is paramount in construction, as doubtless it is, the roof which is to protect the whole edifice is only second in importance. The qualities of tin as a roofing material rank high, as may be amply proved by the great popularity it has attained during the past few years. Convenient in application, durable, and very economical, it has gained in favor and is now employed to a far greater extent than any other material throughout the country.

Of late, tin roofing has been severely attacked on all sides. With the competition of these days and the consequent reduction in the price of roofing of this description, much of the material has been of far inferior quality to that produced in former years. With the lowering of price, we get a corresponding reduction in the quality of the material, so that at the present time the market is stocked with tin plates, many of them of so inferior a quality as to be wholly unfit for their purpose.

Under these circumstances, it is a pleasure to refer to the plates of Messrs. Merchant & Co., of No. 525 Arch Street, Philadelphia, who have also offices at New York and Chicago. This well-known house issue the first quality of plates in the market, under the name of "The Gilbertson Old Method." They are of far greater weight than usual, averaging 120 pounds for each box of I. C. 14 × 20, and have an extra thick coat of uniformity and quality. To prevent fraud and guarantee that the purchaser shall get what he is paying for, each sheet is stamped with the name and thickness of the metal, and thus the owner and architect have insured the proper performance of the contract by the builder, in this important respect at least.

We have not space here to show the material gain from a pecuniary point of view, effected by the use of a good quality of roofing, but that it is the truest economy in the end there can be no doubt.

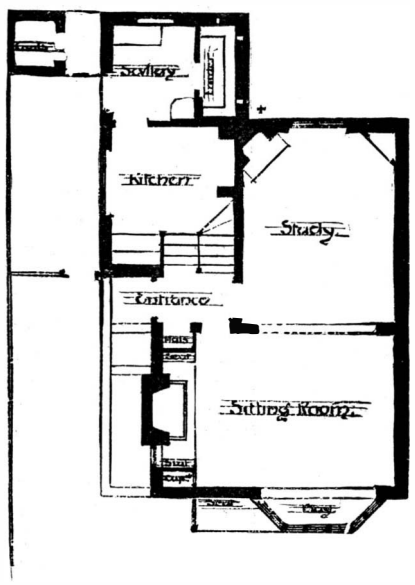
The house of Merchant & Co. has long been identified with the best quality of tin plates, and no better proof could be had of the justice of this than the fact that their goods were chosen, after undergoing the most thorough and severe tests, for the White House at Washington, and this at a price higher than that of their competitors.

We have had enough of bad roofs and more than sufficient of the grumbling of builders, owners, and architects at the poor quality of tin plates. Let them use the goods of Messrs. Merchant & Co., and see that they are properly laid, and there will be no further cause for either the one or the other.

THE Richmond Weather Strip Co., Richmond, Ind., report an unusually good trade for 1886. They have sold over 20,000 of their strips for bottoms of doors, and 200,000 feet of Excelsior rubber stripping for sides of doors and for windows.

AN ENGLISH COTTAGE.

We give from the *Architect* an elevation of "Thought Cot," an English cottage for Mr. W. Norman Marshall, Brentwood, Eng. The building is to occupy a limited piece of ground. We give a small plan of lower floor. The others will be readily understood. The architects, Messrs. H. & E. Marten, have endeavored to utilize to the best advantave a limited frontage. One spacious room is obtained on the ground floor capable of division by sliding partition; also small kitchen, scullery, and



PLAN OF LOWER FLOOR.

larder. Five bed-rooms are obtained on mezzanine, first, and second floors, together with bath-room, water-closet, and box-room. A hall with fireplace, and an additional sitting-room over, are now in course of erection. The materials used are red bricks. The roofs are covered with red tiles, which contrast pleasantly with rather more than the usual amount of white paint. The spaces between framing in gables are filled in with dark rough cast in cement.

Drilling Holes in Plate Glass.

The last volume of the "Transactions of the American Society of Mechanical Engineers," recently issued, contains a discussion on the best method of drilling holes in plate glass, which contains some points of interest to our readers. Mr. Durfee mentioned his successful experience in drilling holes three-sixteenths of an inch in diameter through glass plates about one-eighth of an inch thick, by the use of an ordinary bow drill, with spirits of turpentine as lubricant. The holes were drilled from one side until the drill just punctured the opposite side of the glass; then the glass was turned over and the holes finished by drilling from the opposite side.

Mr. Oberlin Smith recorded fair success with a very hard drill and the same lubricant in drilling holes one-half inch in diameter in plates one-quarter of an inch thick; but instead of turning over the glass, he put a piece of perfectly flat cast iron under the glass, with a little piece of paper between, clamping all firmly together, and permitted the drill to puncture the iron a little.

Mr. Ashworth referred to the remarkable efficacy of the sand blast steam jet in drilling holes through glass, and Mr. Towne stated that that was, undoubtedly, the best method where the work is to be done in large quantities and can be sent out to be done. But for doing the work in small quantities in one's own establishment, he instanced the method employed in the works of the Yale & Towne Manufacturing Company for drilling holes seven-sixteenths of an inch in diameter through glass one-eighth of an inch thick. The best tool for the work was found to be a brass tube five one-hundredths of an inch thick, the cutting agent being emery, No. 5 H, and the lubricant simply water, which they had found as efficient as oil or turpentine, and much less troublesome.

Thus the workman was able to drill thirty to forty holes per hour, the drill being run at 2,000 revolutions per minute, and the drilling of forty holes through the one-eighth inch glass using up about one inch of the tube. Mr. Towne added that it was important to keep the emery well washed and cleaned, that is, with the dust removed from it which results from the abrasion of the glass.

For small holes, Mr. Stetson could conceive of nothing better than the diamond drill.

Drain Pipe Traps.

In the convention of the American Institute of Architects, held in New York city, Dec. 1, 2, and 3, a report was presented by Mr. Glenn Brown, architect, Washington, D. C., on the subject of experiments in "Trap Siphonage."

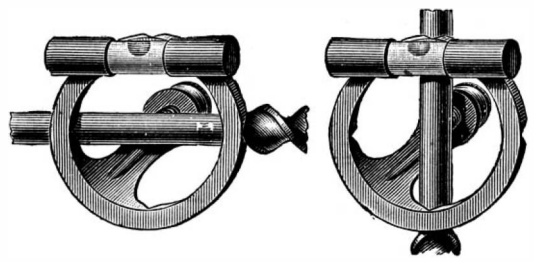
The investigations relating to this subject were carried out at the Museum of Hygiene of the Navy Department, at Washington, D. C.

The experiments have been conducted with the view of obtaining simply facts, without the ulterior object of introducing some patented article, where commercial interests are concerned. There were tests made of existing systems of trap ventilation, and patented traps that claim to need no ventilation. In testing the different forms and manufactures, the fixtures were subjected to a strain equal to what they would receive in actual use, and also strains more severe than ordinary uses, and intended to cover unusual demands. To quote from the report: "The majority of the experiments have been made to test the power of the traps to resist siphonage and back pressure produced by the column of water passing down the vertical pipes. The question of first importance is: *Does ventilation protect the seal of traps in ordinary use?*" Ninety-nine tests of vent pipes and traps are recorded in the report, "in all of which the vent pipes were open and a positive effort was made to break the seal of the traps," except in "the first experiment, when the fresh air inlet at the foot of the soil pipe, and the opening at the roof, were closed, in this way subjecting the traps to the greatest strain which they could possibly have to resist, for either siphonage or back pressure." The deductions arrived at, according to tests, are as follows:

1. The seals of ventilated traps are safe against siphonage and back pressure.
2. The seals of unventilated traps are never safe from siphon action or back pressure, except in deduction four.
3. The vertical vent should be three inches, with a four inch soil pipe.
4. Traps connected on a horizontal pipe and fixtures discharging on the same level into horizontal pipe apparently have no effect on unventilated traps.
5. All varieties of non-mechanical traps are more easily affected by back pressure than by siphonage.
6. The ball traps were not affected by back pressure, but by siphonage.
7. The Sanitas trap withstood siphon action better than any of the patent traps, but was easily affected by back pressure.
8. The sewer air is more liable to enter unawares by back pressure through the seal of the trap, because the seal remains unbroken.
9. Difference in friction of iron and lead pipes made no apparent difference in the effect on the traps.

BIT AND SQUARE LEVEL.

The very trite saying, "*Necessity is the mother of invention*," is verified again in the birth of the little article illustrated in this column. Every mechanic



BIT AND SQUARE LEVEL.

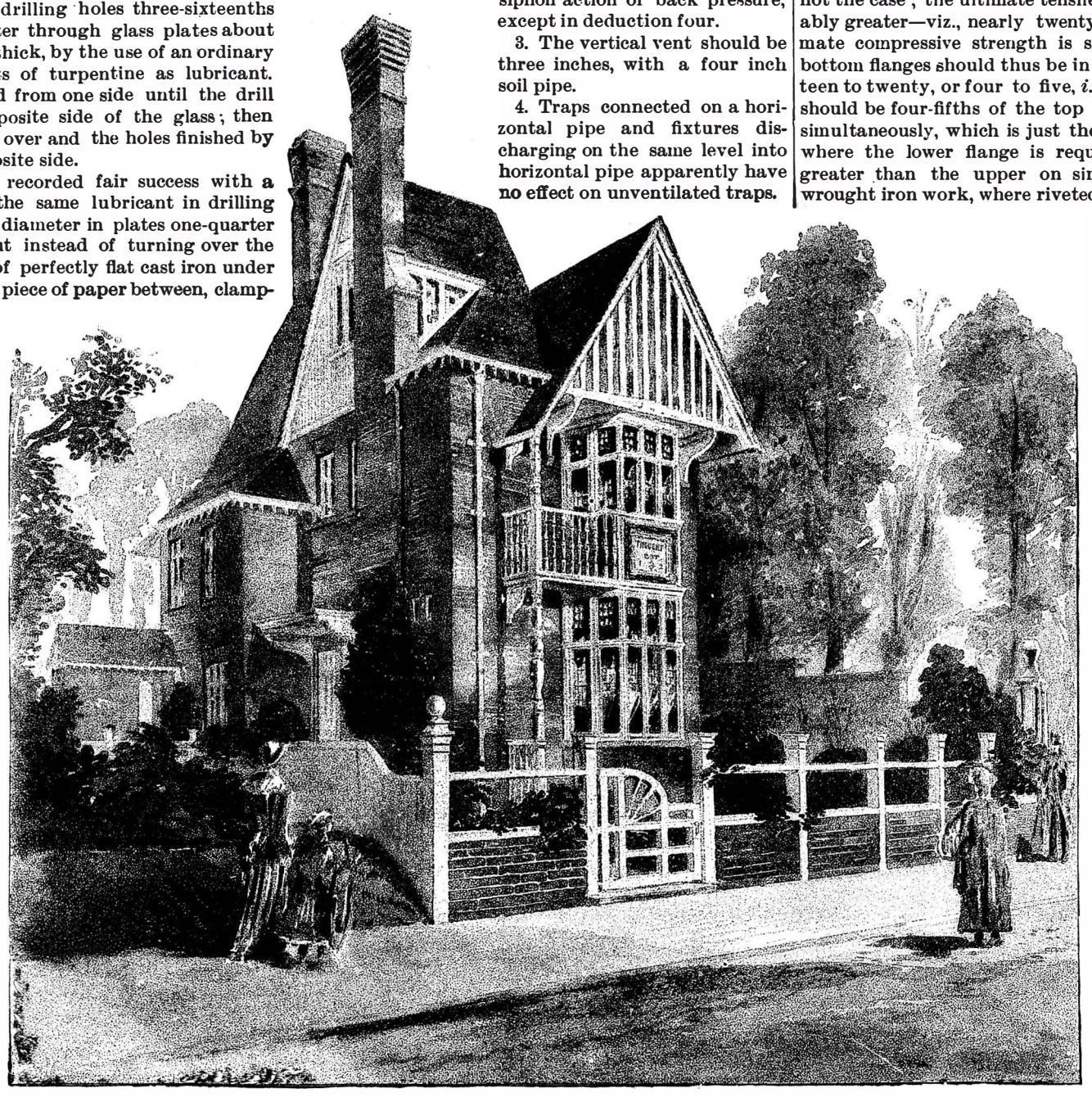
realizes the necessity of boring with precision; but the methods for doing so have not been easy, or always reliable.

The article shown here is made of brass, and has three pairs of V slots, in either of which the shank of a bit will lie; and when secured by the thumbscrew, accurate boring can be done vertically, horizontally, or at an angle of 45°. Another use of this ingenious device can be made by attaching it to one leg of a framing square, thus forming a substitute for a spirit level, while the other leg of the square will indicate an exact plumb line. The Stanley Rule and Level Co., New Britain, Conn., are the manufacturers, and hardware dealers keep them for sale.

Top and Bottom Flanges of Wrought Iron Beams.

It is obvious that if twelve tons per square inch were the ultimate tensile strength of wrought iron, such beams should have the same quantity of material in both their upper and lower flanges. This is, however, not the case; the ultimate tensile strength is considerably greater—viz., nearly twenty tons—while the ultimate compressive strength is sixteen. The top and bottom flanges should thus be in the proportion of sixteen to twenty, or four to five, *i. e.*, the bottom flange should be four-fifths of the top flange for both to fall simultaneously, which is just the reverse of cast iron, where the lower flange is required to be six times greater than the upper on similar grounds. With wrought iron work, where riveted plates are used, the bottom alone is weakened by the rivets passing through the plates, the top remaining uninjured as regards compression, and on this account (neglecting the rivets in the calculation) little difference is practically made in the area of the top and bottom flanges of such girders.—*Edwin Clark, in the Architect.*

AN incidence window for lighting basements, vaults, etc., has been patented by Mr. Isidor Schoenberg, of Baltimore, Md. It is composed of a frame with a parallel series of glass blocks of right-angled triangular shape, with their long sides in the plane of the frame, the blocks projecting upwardly to expose their two sides, so as to give the greatest amount of exposed reflecting surface without shoulders, while the faces of the prism are readily accessible for cleaning.

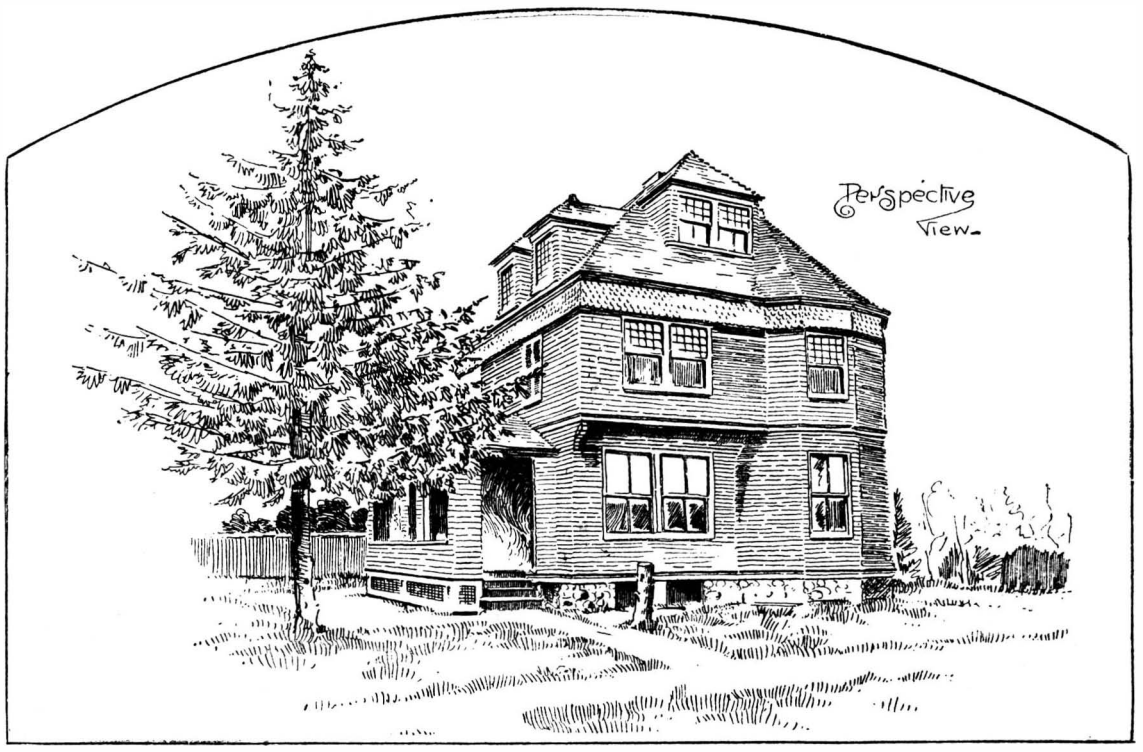


THOUGHT COT, BRENTWOOD, ENGLAND.—H. & E. MARTEN, ARCHITECTS.

DESIGN FOR A $2,000 COTTAGE FOR GEO. GABLE, ESQ.

EDWARD KENT, ARCHITECT, BUFFALO, N. Y.

This house is situated in Lancaster, Erie County, N. Y., and was built complete for the above cost. The original contract price was $1,900, but additional plumbing put in by owner brought the price up to $2,000. —*Building.*



DESIGN FOR A $2,000 COTTAGE FOR GEO. GABLE.—ED. KENT, ARCH., BUFFALO, N. Y.

The Architectural League.

SOME NOTES AND COMMENTS ON ITS SECOND ANNUAL EXHIBITION.

BY OUR SPECIAL CORRESPONDENT.

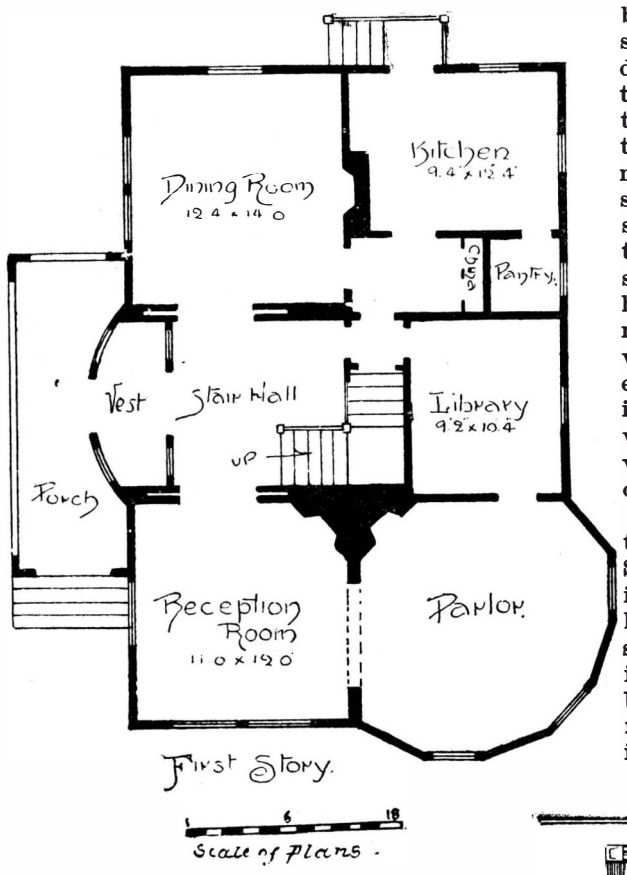
The League is an association of gentlemen who are interested individually and collectively in architecture as an art. Its membership comprises architects, artists, sculptors, painters, engravers, decorators, draughtsmen, and a few art amateurs. Its purpose is for mutual improvement in the technical and æsthetic arts, and it has faith to believe that so long as its membership is confined to persons who have some appreciation for art, it will continue to be successful. Its second annual exhibition was held this year at the American Art Galleries, in conjunction with the Salmagundi Club and the American Black and White Societies. The exhibition was opened on Monday, the 10th of January, and closed Wednesday evening, January 26th. The daily press of the city, in their meager and uninteresting notices, spoke of it in laudatory terms, and concurred in the desirability of such an undertaking. At its first exhibition the drawings were of too technical a character to obtain the attention they were entitled to, and some dissatisfaction was expressed at the result; but this year it was quite evident that better work bad been done by the jury in its selection, although the efforts of its hanging committee were far from successful. The one hundred and eighty-nine drawings exhibited almost as great a variety in subject, style, and execution as the quarters of the world from which they came. While the subjects chosen to represent the League were excellent and interesting of themselves, almost every one, it must be confessed that the juxtaposition of detail sketches from Fontainebleau with Canadian court houses, Nantucket sketches, and cemetery gateway competitions looked rather kaleidoscopic. The suddden jump, for instance, from a New York printing house to a noted French cathedral, and from there to a chapel in Brooklyn, and back again to Europe, without any bridge, to Durham Castle and Cathedral, was, to say the least, rather astonishing. If variety was the Ultima Thule, it was certainly attained. If any connection could have been established by such an allowable architectural feature as a transition of style of some building in America from some building in Europe, the studied contrast would have succeeded in distinguishing the contiguous drawings or designs. If the various sketches from France, such as the Manoir de la Houblonniere, the sketch of Rouen, the very interesting bits of detail from Fontainebleau, the Amiens Cathedral, the quaint sketches in Normandy, the church tower of Darnetal, the Paris street scenes, the Roman monuments at St. Remy, and other sketches from France, had been placed in a group, they would have furnished ample variety and at the same time a sequence of contrast that would have heightened the interest in all of them. The same remarks will apply to the remarkably interesting but widely distributed sketches from Italy. There were enough to have made an effective group from Rome itself. The colored scraps of decoration from the Vatican were rendered in the highest style of artistic color work, and they alone were worthy of an hour's study of anybody's time.

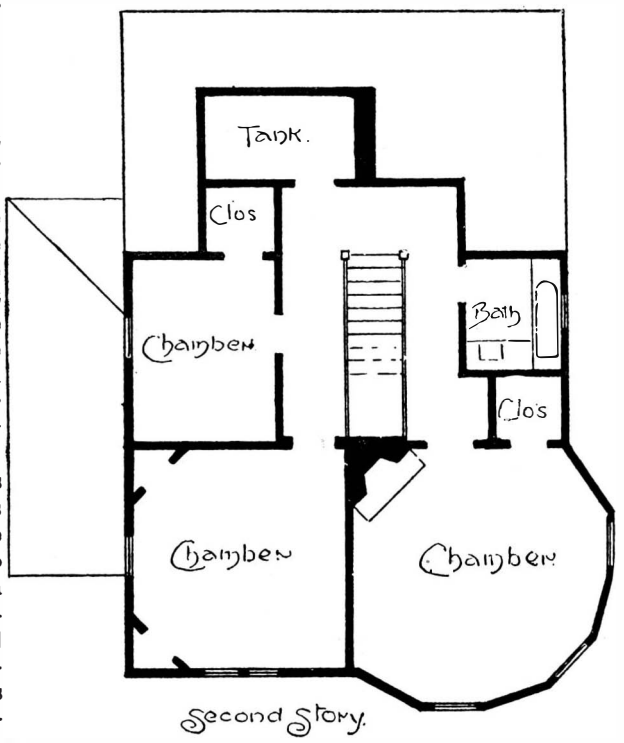
The favorite Venice was well represented, such as the Palazzo Greco, the Grand Canal, St. Mark's Square, and others. Carrying out the thought of some inter-relation, it would have made an effective group to have placed the various designs of school buildings in such proximity as to have invited a comparative examination. The advantages of such an arrangement will be apparent at the mere mention of the designs submitted, viz.: The American School of Classical Studies in Athens, the State Normal School and the Lawrenceville School, both of Massachusetts, and a school and chapel of Chicago, Illinois.

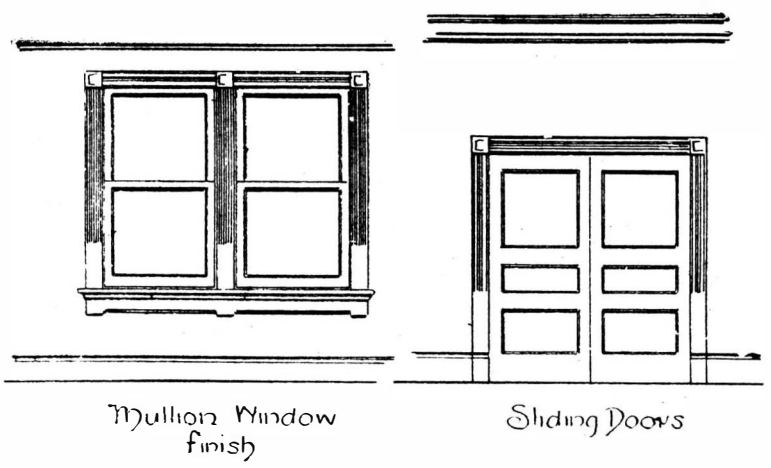
A great many designs of churches were exhibited, but they were so scattered among the foreign sketches and country houses that no one could have brought away an intelligent conception of their number and character. If other buildings of a class, such as club houses, country residences, city warehouses, and others, had been arranged so as to have been studied by comparison and grouping, the profession itself would have been as greatly benefited as its clients. The fertility of resource and ingenuity of conception displayed by these drawings were so great as to avert all danger of monotony or commonplace by the ordinary methods of grouping. The writer is enough of a Philistine to believe that if an exhibition of drawings, paintings, or statuary is gotten up with the purpose of making a showy effect, without attempting to be instructive in any particular, the spectacle ought to be treated as a show, and not as an exhibition hallowed by the name of art.

Some of the most interesting drawings were groups of what were styled alternative studies of country houses. The transitions were readily discernible and pleasing, and the differences sufficiently accentuated, but they would have been more attractive and comprehensive if the architect had furnished drawings of his plans of the interiors that originally accompanied them.

Many of the drawings shown were the originals of illustrations which have appeared from time to time in this and other architectural journals. We looked in vain for any signs of the architectural future; but as this was only the second exhibition of the League, perhaps it was unfair to have looked, but certain tendencies were discovered, and may be pointed out. As an instance of adaptation to the local needs, we noticed the study of a design for a city house, in which a Philadelphia architect had planned a corner house so that its principal rooms were lighted as well as a London drawing-room. It needs no prophet to predict a phenomenal success for the architect who can build a house on a twenty-five foot city lot, in which every room is abundantly lighted. The subject of light led to the discovery of the large number of plans which contained designs of square-headed Tudor-Gothic windows, the upper bars so high up as to make of the topmost sections a set of transoms, grouped together as in the modern English style. While this may look decidedly like a tendency toward such window construction, it might have been







only a series of coincidences, and if it was the former, it is worthy of being recorded.

The general symmetry of the roof lines was quite noticeable, and must be ascribed to a studied effort on the part of our architects to make them so. Taking each design separately, without any reference to the counter-effect of its neighbor upon itself, it gave every true lover of art progress a pleasure to note the symmetrical arrangement of contrasts, not a mere vulgar, wearisome balance of parts, but a recognition of the wider inter-relationships of constructive and decorative features, and in this very recognition we hail the promise of a bright future.

As the late Mr. Ferguson has rightly said, the present unsettled state of architecture is a misfortune to the art. The causes lie deeper than architects can control; they cannot change the spirit of an age, but they can adapt themselves to its greatest needs, and in many ways can indicate by their works what ought to be done.

One of the best means of crystallizing and educating architectural taste is the annual exhibition of designs of current work; and if the best good of the profession is desired, rather than an opportunity for a display of personal vanity, these exhibitions must be conducted upon such a wide and liberal basis as to afford an instructive lesson rather than a passing spectacle to those who take the trouble to attend them. It is our people as a people who need cultivation in the arts, and not the architect, who has spent the most precious years of his youth and his life in acquiring that broad and fundamental culture which the world willingly acknowledges belongs to him because of his profession. Where so much that has been done has been well done, it is rather trying to have to say it might have been done better; but the tendency to exhibit perspective sketches without the keys to them, viz., the plans, elevations, and sections in detail, is a reprehensible one, and should not be countenanced by the League.

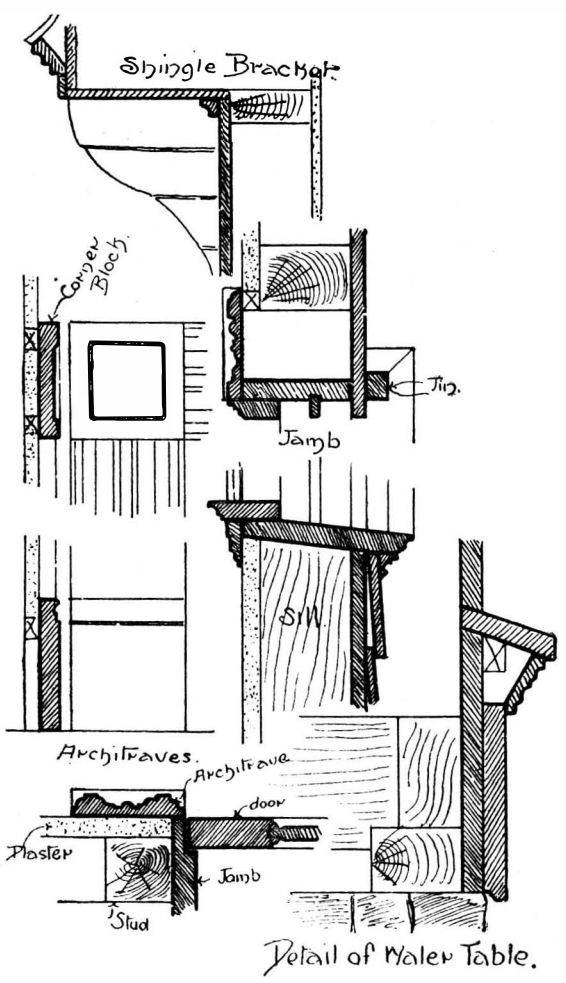
There can be no doubt that every architect desires to see the art of building elevated to a fine art, and to reach that stage it must possess proportion and expression. It may be that some of us who visited the exhibition are deficient naturally in the power of perceiving beauty, or that we lack the truest refinement in form, color, or modulation of light and shadow; but if we have any such perception, be it never so little, it can be cultivated by being appealed to, and until it is brought to some visible state of culture, architects and the people at large may look in vain for the dawn of an American style of architecture.

Notwithstanding our restrictions upon the manner in which so much good material was displayed, it remains for us to say, and with pleasure, that the widespread interest manifested in their work ought to endue the League with new vigor, inspire them with noble purposes, and urge them on enthusiastically to higher and better work.

TURTLE shells may be softened by hot water, and if compressed in this state by screws in iron or brass moulds, may be bent into any shape, the moulds being then plunged into cold water.

An American Coaster.

The loftiest spars at the South Street piers below Wall Street recently were the three masts of the new schooner William W. Converse, fresh from Hanscom's yard at New Haven, where she was launched on Dec. 15. An examination of the Converse shows the wonderful progress made in the construction of coasting vessels in the last few years. Although under the present rules of measurement the Converse registers 708 tons, she will carry 1,200 tons of cargo, quite as much as the square-rigged ships of a few years ago and fully as much as the average bark of the present time. She does this on a draught of 15½ feet of water, and she needs a crew of only nine men, all told, or about one-half the number carried by a bark. She is 180 feet long on deck, 37 feet 8 inches wide, and 18 feet deep. She was modeled by Warren Nettleton, and her owners, among whom is William Converse, president of the Winchester Arms Company, assert that she will not only outcarry, but outsail, the coasting fleet every day in the week. An examination of her lines and a look at the amount of cargo she carries show that there is some foundation for the confidence of her owners. Besides this, she is as handy as a yacht, and, for that matter, quite as handsome.

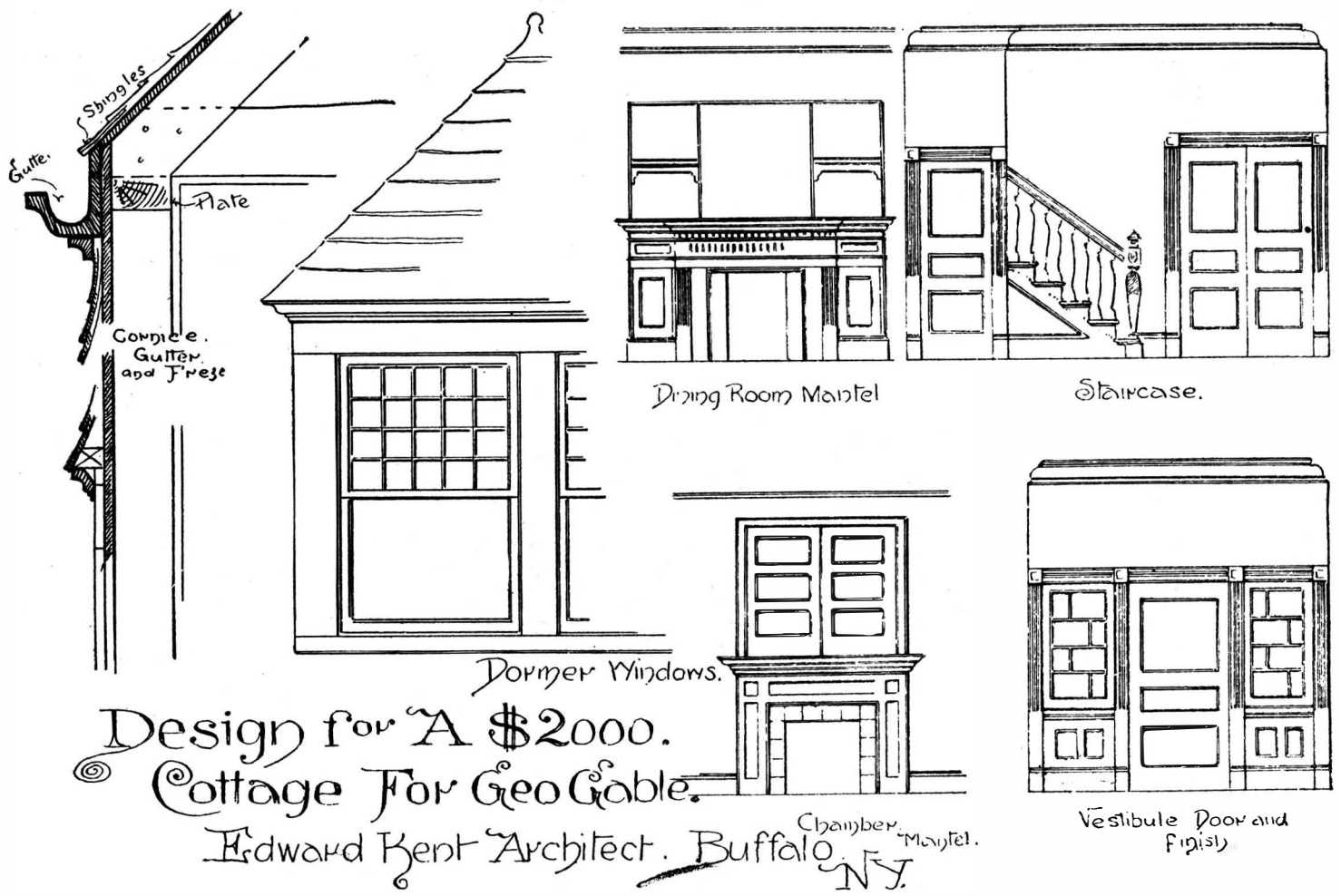


The dimensions of a vessel of this kind are not uninteresting. Her spars are from 91 to 93 feet long. Her topmasts 56 feet. Her spanker boom is 70 feet long, and her jibboom 60. The fore and main booms are 48 feet, and all gaffs 46. It required 5,000 yards of canvas to clothe her. Her frames are white oak and chestnut, and she is ceiled and planked with yellow pine. As a sample of her strength, it may be said that from the bottom of her keel to the top of her keelson the logs are piled up eight feet high. It took ten tons of bolts to hold them together. She is the second vessel fitted with the patent tubular steering wheel, which is a model of strength and beauty.

The Converse is noticeable for her finish as well as her strength. The mouldings and panels of her cabin are in cherry, walnut, and ash, beautifully contrasted. The floors are carpeted with Oriental rugs an inch thick. There is a set of solid silver on the sideboard and no end of rich and beautiful decorations about the bulkheads. The curtains before the berths are of silk, and the furniture of the after cabin is upholstered in silk also. The house forward is divided between the cook and the crew. Although Jack will have no silk curtains before his bunk, he will find a lot of comforts which he seldom finds in coasters, and which he will like much better than silk hangings.

The Converse is commanded by Captain James M. Seaman, a Saville man. In all matters pertaining to the handling of the ship, he is the boss, but it is pretty plain to a visitor that in domestic matters his handsome little daughter Maude, a lassie of eleven years, is the ruler. Captain Seaman formerly commanded the Tingue, a famous schooner, and little Maude sailed more thousands of miles in her than she is years old. Maude helped launch the Converse by breaking the wine bottle over the knightheads in the presence of 5,000 enthusiastic spectators. The state room which this young sailor girl calls her own is as large as the captain's, and quite as handsomely decorated.

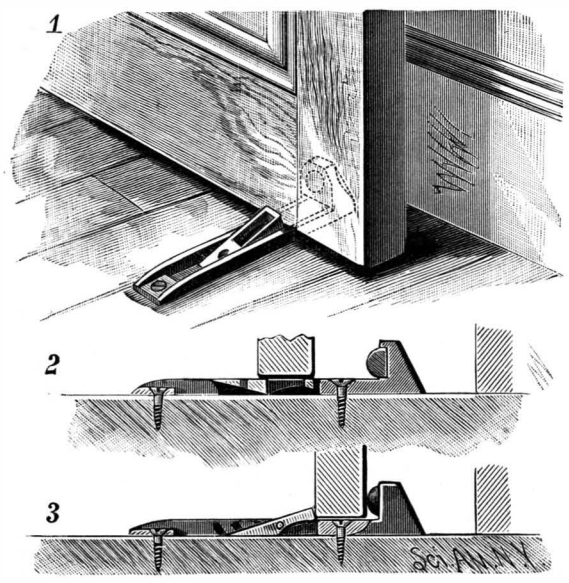
A friend of Captain Seaman told a reporter that the Converse cost $38,000—a figure that compares with the cost of a square-rigged vessel of equal capacity in a way likely to make old-fashioned ship owners open their eyes. The Tingue, which Captain Seaman commanded last, paid twelve per cent net profit while he was in her. The Converse is expected to do rather better, in spite of the hard times. One reason for expecting this good fortune, the captain says, is that he found upward of sixty horseshoes while superintending her construction, and he picked them all up and stowed them away. He never passes a derelict horseshoe. He owns one-eighth of the new vessel.—*N. Y. Sun.*



THE construction of sash windows forms the subject of a patent issued to Messrs. Vaclav Klan and Rudolf Seitz, of Prague, Bohemia, Austria-Hungary. The invention is for windows having an upper and lower outer and an upper and lower inner sash, all the sashes being mounted to slide and to swing on pivots, and counterbalanced by weights in such manner that they can be swung inward on hinges to facilitate cleaning or repairing.

IMPROVED DOOR CHECK.

This simple device is for arresting the motion of a door while being opened and for fastening it in an open position. The base plate is formed with a longitudinal slot extending through the greater portion of its length, and has at one end a right angled arm, formed with a chamber for receiving an elastic buffer. In opposite walls of the slot are formed series of diagonal slots, inclined away from the buffer, and to the slot is fitted a latch having, near its center, trunnions, which may be placed in any pair of diagonal slots, according to the thickness of the door. The



HINKLE & JEFFERY'S IMPROVED DOOR CHECK.

weight of the latch is so distributed that, normally, the end next the door will project above the plate and into the path of the door. The door check is secured to the floor with the buffer at the point where it is desired to arrest the door when opened, and the trunnions of the latch are placed in a pair of the slots, so as to leave a space between the end of the latch and the buffer, about equal to the thickness of the door. When the door is opened, it glides over the latch, as shown in the sectional view, Fig. 2; and when the door has passed the latch, the lighter end of the latter rises in front of the edge of the door, and holds it in an open position, as shown in Figs. 1 and 3. The latch is operated by gravity alone, and the check is not therefore liable to derangement.

This invention has been patented by Messrs. W. A. Hinkle and F. C. Jeffery, of Galveston, Texas.

THE ST. PAUL ICE PALACE.

The general form of the palace resembles somewhat a Latin cross. It will cover about 42,000 square feet, being 217 feet long by 194 feet wide. The grand central tower will be octagonal in shape, 50 feet in diameter and 105 feet high. The building will be a roofless shell, the surrounding walls averaging 23 feet in height. The main entrance will be in the form of a triumphal arch, surmounted by a sitting figure of King Borealis with his attendant bears (rampant) at either hand, all to be carved in ice. This archway will be 16 feet wide and 15 feet high. The wall will be 9 feet thick. The wing forming the foot of the cross, in which will be the main entrance, is circular in form, 95 feet in diameter. Each of the other wings, forming the head and arms of cross, will also terminate in an entrance, but of minor importance. The whole affair will be pleasing in effect and magnificent in proportions.

Our engraving is from the *Northwestern Architect and Improvement Record.*

Plain Wall Paper for the Sick Room.

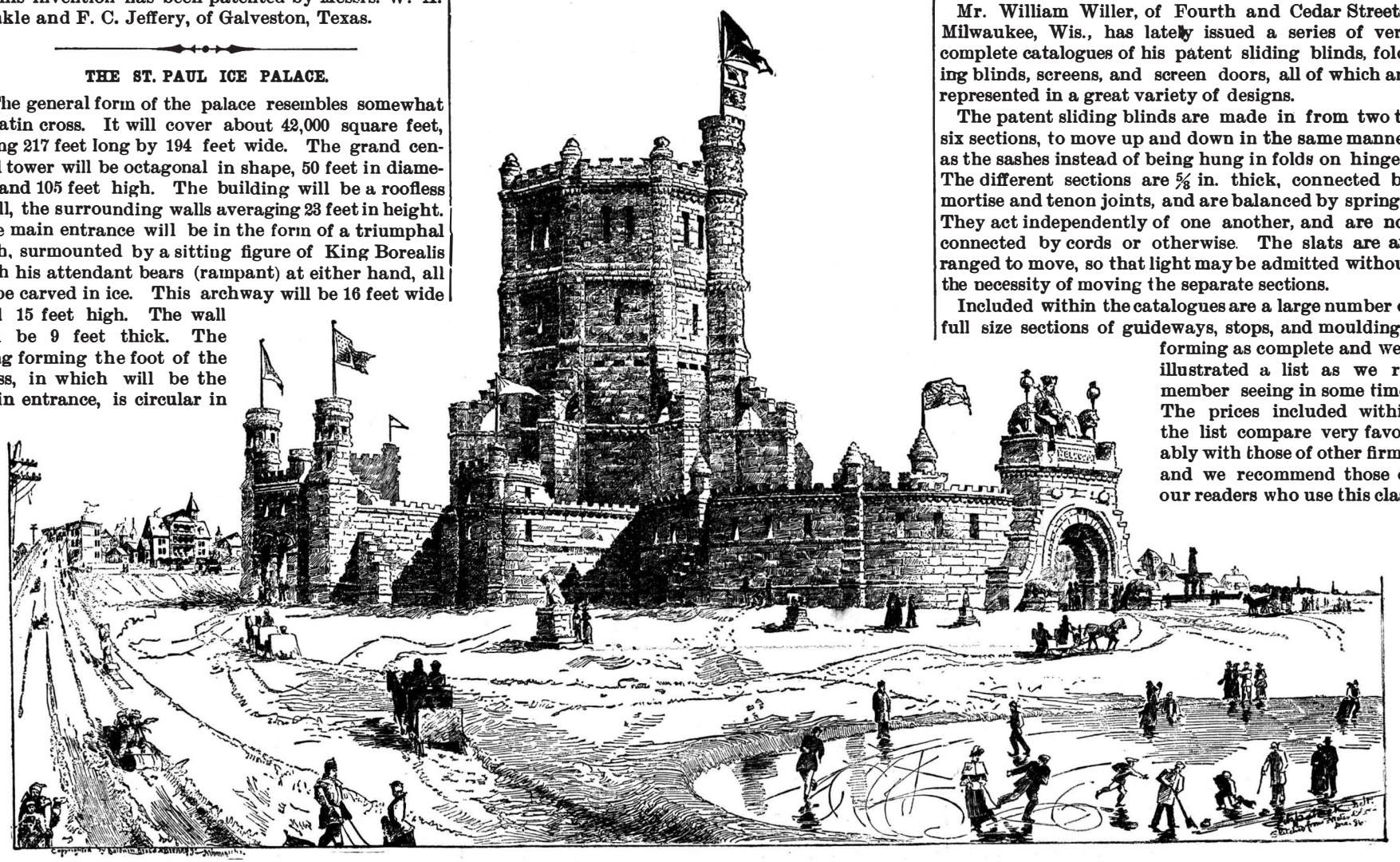
In a recent lecture on nursing, Miss Kelman illustrated the need of having the walls of hospitals of a quiet and unobtrusive color, by telling an anecdote of a patient —an old gentleman—who was heard continually muttering "Fourteen up, thirty-five across." This fact arrested the attention of the doctor and nurses, who examined the room and ultimately found that the pattern of the paper was divided into squares of fourteen up and thirty-five across. When the old gentleman fell asleep he was quietly removed to another room, where, the wall paper being of a neutral tint, he quickly recovered.—*The Hospital.*

Explosion of Wood Dust.

We take from the Ohio *State Journal* the particulars of the recent explosion that occurred at the Columbus Buggy Co.'s works.

The catastrophe occurred in building No. 4, on Front street, being the west portion of the works, and the building just erected as an engine and boiler room on the lower portion, with the Backus dust arrester on the top floor. This is 20 by 40 feet, and was put in at great expense, being used to collect the dust from all parts of that building by means of shafts, the action of its machinery drawing it up to the arrester and shaving vault. From there a great chute extends to the engine room below, divided into two apartments. All is made fire proof. Through this chute the shavings and dust from above are swept at proper times, falling to the engine room, where they are burned. There are two doors, one in each apartment of the chute, opening into the engine room. Into one the shavings fall, and that door can be opened without danger, but the other should never be opened while the dust was being thrown down from the vaults above. An examination shows that disregard of this was the cause of the disaster, and all of the theories previously published are entirely wrong. It appears that at the noon hour, while the machinery was not going, Joseph Brown, colored, went into the arrester as usual to sweep it out and throw the dust down the chute. While he was thus engaged the fireman below, in violation of the rules, is said to have opened the door of the apartment into which the dust was falling. As he did so the dust puffed out in greater quantities, covering him and filling the engine room. The furnace fire is but six feet away, and the dust, which is very combustible, and being so fine as to act almost like powder, made, as it were, a train, which ignited and carried the flames to the chute, thus causing the explosion. As the force of the explosion shot up through the chute and into the arrester, thus extending in all directions, the roof was blown skyward, and the walls of that portion of the building were scattered in fearful destruction. The large quantities of brick, mortar and heavy timbers fell with crushing force upon some of the smaller buildings below, doing considerable damage, and played great havoc with the telephone and telegraph wires and poles. Brown was blown into the air and fell on the roof of another lower building, where he crawled from the debris, badly burned and with considerable skin torn from his hands and neck. He subsequently died.

The damage was confined to the walls of the large building, its roof, and roofs of the lower buildings. Loss, $3,000.



THE ST. PAUL ICE PALACE.

COMFORT AND STYLE TOO.

So long as it is the fashion for ladies to wear bustles of the pronounced amplitude now favored by so many

COMBINED STOOL AND BUSTLE.

of the fair sex, we do not see why the fact may not be taken advantage of to introduce an invention calculated to make it convenient for them frequently to rest from the fatigue of long standing or walking. Such, at least, we presume to be the idea of the inventor of the device shown in the accompanying illustration, for which a patent has recently been issued. The transformation the style has effected in the appearance of a lady properly fitted out in walking costume is something really wonderful, and we are not surprised, therefore, that several other inventors have rushed into the same field, with devices which would not otherwise have been thought of.

Sliding Blinds.

Mr. William Willer, of Fourth and Cedar Streets, Milwaukee, Wis., has lately issued a series of very complete catalogues of his patent sliding blinds, folding blinds, screens, and screen doors, all of which are represented in a great variety of designs.

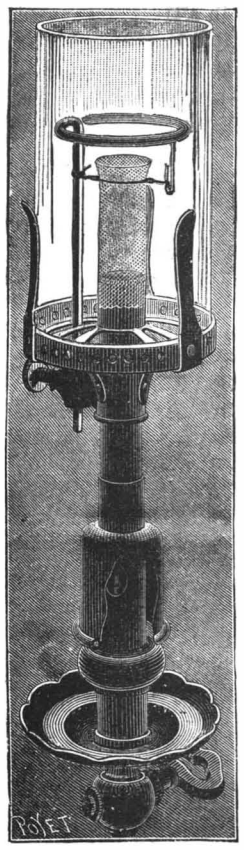
The patent sliding blinds are made in from two to six sections, to move up and down in the same manner as the sashes instead of being hung in folds on hinges. The different sections are ⅝ in. thick, connected by mortise and tenon joints, and are balanced by springs. They act independently of one another, and are not connected by cords or otherwise. The slats are arranged to move, so that light may be admitted without the necessity of moving the separate sections.

Included within the catalogues are a large number of full size sections of guideways, stops, and mouldings, forming as complete and well illustrated a list as we remember seeing in some time. The prices included within the list compare very favorably with those of other firms, and we recommend those of our readers who use this class of goods to send for a copy of the catalogues, which we believe are sent free of charge.

For brassing small articles: To 1 quart water add half an ounce each of sulphate copper and protochloride of tin. Stir the articles in the solution until the desired color is obtained.

INCANDESCENT BURNER OF DR. AUER.

The peculiar feature of the gas lamp of Dr. Auer von Welsbach consists in the incandescence of certain metallic salts placed in the middle of the flame of a Bunsen burner. The principle is not new ; it is the same as that in the Clamond lamp, in which, as may be remembered, the incandescent substance is formed by a little thimble of magnesia threads. On the other hand, the arrangement of the Auer burner is very simple, and appears to possess many advantages. It consists of an ordinary Bunsen burner, the end of which is covered by a hood of cotton or woolen tissue washed in a special preparation. The hood, about 6 or 7 centimeters in height, is slightly flaring and is held by a platinum thread which passes around it and is fixed to two rods of iron connected with a ring above. The longer of the two is held by a thumb screw to the pipe which supports the burner.



NEW INCANDESCENT GAS BURNER.

As soon as the burner is lighted, considerable heat is generated within the hood, which, in a few seconds, becomes aglow with a whitish blue light, remarkable for its steadiness and intensity.

It is not perfectly well known how the hood is made, but here are a few details from the patent of Dr. Auer, which throw some light on the subject: Take a solution of zircon and nitrate or acetate of lanthanum or yttrium, and soak in it the woolen or cotton that is to form the hood. The tissue is then carbonized, and leaves a sort of network, which is applied to the Bunsen. The nets thus procured appear more favorable to the production of light than the massive cylinders of zircon tested in 1868 by Tessie de Mottay on oxyhydrogen burners.

According to the inventor, each hood costs about 1 cent, and will last 1,000 hours, or until the dust of the atmosphere is sufficiently incrusted thereon to diminish the strength of the light. Finally, with equal lighting power, the consumption of gas in the Auer burner will be about one-half less than that of an ordinary burner, which should show an economy of 50 for 100, but these figures ought to be verified. The durability of the hood ought also to be determined by exact tests.—*La Nature.*

JOSEPH ECHTELER'S DESIGN FOR A GRANT MONUMENT.

Fourteen competitive designs for a monument to General Grant, to be erected in New York, have been sent in, and among these the design of a German who has lived in America for two years is especially noteworthy. Thinking that many of our readers may be interested in the design of Joseph Echteler, we give a cut of it, taken from the terra-cotta model.

The monument is to be about 71 or 72 ft. high, the lower part consisting of a mausoleum. It will cost about half a million dollars. The memorial is crowned by an equestrian statue of Grant. This represents the General as commander, riding to battle on a rearing horse, his cloak flying, and his head turned to look back, while he points in the direction of the enemy with a field glass held in his right hand.

At the four corners of the cap or upper part are four female figures representing Peace and Prosperity, Industry and Invention, Commerce and the Marine, Statesmanship and Law. On the front is a battle scene,Grant with outstretched sword riding at the head of a column of infantry, while at the left the cannoneers are busy firing the guns. At the back of this upper part, the North and South are represented as engaged in a mortal hand to hand combat, and in the midst of the confusion of the battle rises the imposing figure of a commanding general of the Southern army.

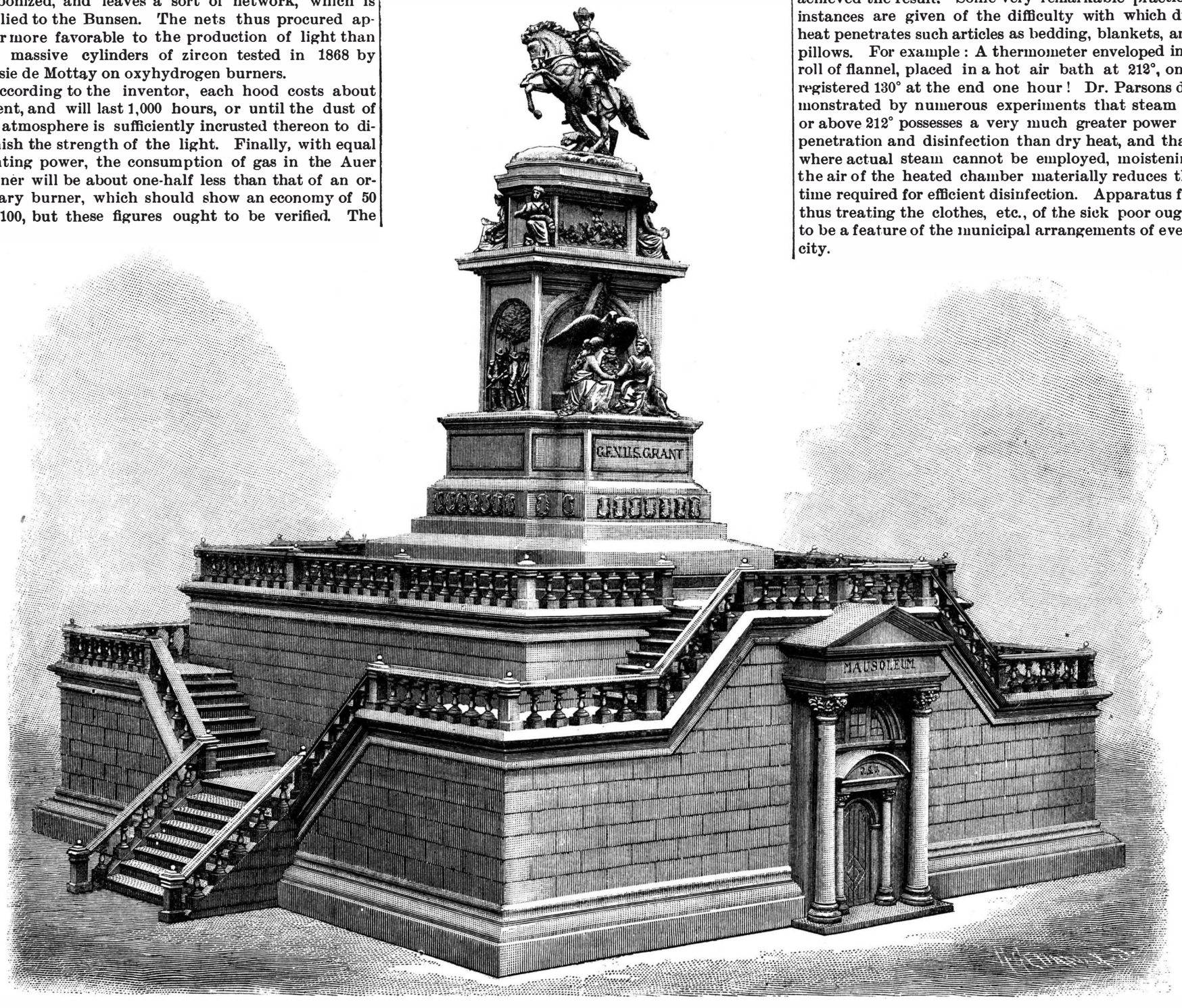
The group in the middle part of the monument is specially well conceived ; two female figures, the North and the South, grasp hands in token of eternal friendship. The North is represented as having beautiful classic features and wearing the Phrygian cap--she is laying the palm branch of peace on the shattered weapons of war ; while the South is characterized by features of the Southern type and light clothing, the figure being partly nude—she is laying a laurel wreath at the feet of an eagle whose outstretched wings spread over the scene. The background of this principal group is filled with an architectural design of arches.

On the opposite side of this part of the monument is the figure of General Grant in uniform and fully equipped for war. He is seated with his left hand on his sword, and about him and on a staircase behind him are grouped the members of a negro family. The negress, on whose wrists the fetters are still visible, raises her hands to Grant, praying him to deliver her from slavery, while the negro tries to express his gratitude by pressing the General's hand, resting his left hand on the forearm of his deliverer. In the foreground a little negro boy is playing with the broken chains. The left face of this portion represents, in high relief, the scene under the memorable tree at Appomattox, where General Lee surrendered his sword to the victor Grant. In high relief, at the right, the artist has shown the steps of the White House at Washington. On the upper step Grant is taking the Presidential oath before Chief Justice Chase, while in the background stand Grant's predecessor, Johnson, and several Senators, as witnesses. The front of the principal part of the monument bears the inscription, "Gen. U. S. Grant." The coats of arms of the different States are arranged on the under socle.

The mausoleum, which is 59 feet in depth, is provided in front and at the back with three terraces. The cap of the monument, the main part of the mausoleum, the portals, and the balustrades are to be made of polished granite, the foundation of rough-hewn stone, and the figures and coats of arms of the best bronze. The completion of the work would require about five years. —*Illustrirte Zeitung.*

Disinfection by Heat.

The disinfection of articles of clothing, and of dwellings, after infectious ailments, is admittedly one of the most important duties which attends the work of preventing disease. A recent report of the medical officer of the local government board, London, presents the entire question of the destruction of germ life in a new aspect, including, as it does, a memoir on disinfection by heat, from the pen of Dr. Parsons. The degree of dry heat necessary to kill the germs of diseases well known to be infectious was first investigated. The bacilli of splenic fever, for example, were killed by exposure for five minutes in a dry heat varying from 212° to 218° F., but their spores did not yield to two hours at 220°. One hour at 245°, and four hours at 220°, achieved the result. Some very remarkable practical instances are given of the difficulty with which dry heat penetrates such articles as bedding, blankets, and pillows. For example : A thermometer enveloped in a roll of flannel, placed in a hot air bath at 212°, only registered 130° at the end one hour ! Dr. Parsons demonstrated by numerous experiments that steam at or above 212° possesses a very much greater power of penetration and disinfection than dry heat, and that, where actual steam cannot be employed, moistening the air of the heated chamber materially reduces the time required for efficient disinfection. Apparatus for thus treating the clothes, etc., of the sick poor ought to be a feature of the municipal arrangements of every city.



ECHTELER'S DESIGN FOR THE GRANT MONUMENT, NEW YORK.

A PRETTY COTTAGE FOR $1,000.

The precise figures of the estimate for this picturesque and tasteful dwelling, as given by the designer, Prof. U. W. Hart, of New Haven, Conn., are $936.32. This must be regarded, of course, as the minimum price; and in carrying out the plans most persons, unless in especially favorable localities, will find it difficult to stop short of $1,200; but we put the figures at $1,000 as the least for which we should wish to undertake its erection for ourselves.

The entrance hall, not being large enough for a reception room, is placed on the side, where its front door and staircase are nearest to the work-room, and to the parlor as well. Under the front stairs are stairs that lead to the spacious cellar, which runs under the whole house. On entering into the kitchen, it will be found that it is both kitchen and pantry, and in the various closets surrounding will be found places for every article used in these two rooms, right where they are needed. Near the portable range is a closet for all the stove and iron mongery of the house. Between the kitchen and dining-room will be found, next the floor, three drawers for table linen, opening into the dining-room; next above is one drawer for spices, etc, opening into the kitchen, and close by the mixing table, which is in front of the window; and over this last drawer are shelves for dishes, opening from both kitchen and dining-room, and inclosed with doors on each side. At the left of the window is another inclosed closet for provisions of all kinds. Between the window and the door opening to the back of the house is a table inclosed below for the flour barrel. In this combined kitchen and pantry, all drawing out of the table and traveling to and from the pantry, bringing and returning the articles three times per day, is avoided

The little parlor of this house is intended to be the family sitting-room, and the kitchen and dining-room are so arranged that the family work can be done in them without observation. The dining-room communicates with both the other rooms in such a way that it will be warmed from them sufficiently for its proper use.

The second floor will be found to be planned with equal care. A small stove in the upper hall will add greatly to the comfort of all the chambers; and the hall, with its closet, will make a very convenient sewing-room. But those who wish can utilize this space for a bath-room. From this hall, stairs ascend over the other stairs, to a commodious store-room in the attic. Each of the three chambers is provided wfth a closet and two windows, thus securing good ventilation.

The height of the ceilings is 8½ feet in the clear in the first, and 8 feet in the second story.

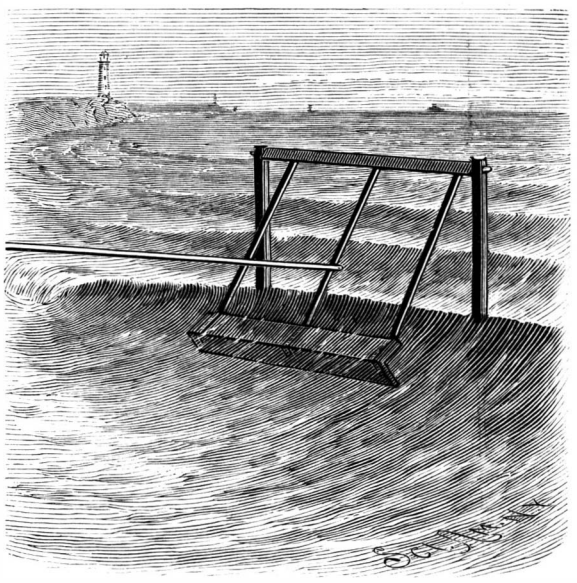
The purpose of this design, to state it briefly, is to make a home of which its occupants may be proud, even though it be situated in the midst of more pretentious and expensive neighbors. —*Amer. Builder.*

STAINED WOODS.

Probably the most artistic and sensible craze that ever reigned among and over architects and their clients was that for the use of woods in their natural finish, but this has had its run. However, it took so deep a hold, perhaps because it was really artistic, the reaction is but slight, and there succeeds a craze for stains which extends to woods hitherto untouched by paint. The principal sufferer will be oak, the most durable and one of the handsomest of American woods. "Antique oak" embodies almost as much toadyism as a coat of arms, and is quite as repugnant to a refined American taste, for its use seeks to convey the idea that its possessors have an unbroken family record reaching so far back that age has stamped its impress upon their furnishings handed down from father to son in good old aristocratic style. Moreover, all such attempts at beautifying nature's most perfect workmanship are unsuccessful. We have become so accustomed to stained cherry, few know that this wood is not red, red as the setting sun, and certainly many architects do not appreciate the elegance of grain and color and marking shown in its natural state. The same is true of many other woods. Shall we not hope that the slight reaction manifest in the stain craze may be short lived, and the return to the beauty of the unadorned may mark an abandonment of all false methods and inaugurate a period of true artistic development among the people and their leaders in art?—*N. W. Architect.*

WAVES UTILIZED TO PUMP WATER.

I send herewith a description of a wave-operated force pump I constructed last summer, to supply my cottage with water, at Thousand Island Park, St. Lawrence River, N. Y. The water was delivered through a three-quarter inch pipe, 200 feet, with 40 feet elevation to tank. The power was obtained from the momentum of the waves, which proved ample.



HOW TO RUN A PUMP BY WAVE FORCE.

The first method by which I endeavored to obtain the power was by a float upon the water, which operated beautifully when detached, but when required to work, very little power was developed. I then hung a shaft, about six feet long, from supports anchored in cribwork, as shown in the sketch, and from the shaft suspended three arms, three feet long. Suspended from the end arms was a plank trough, six inches wide. Practically, the apparatus represented a six foot wheel, like the paddle wheel of a steamer, with barely one bucket, and that having a trough-like section. A cross arm at right angles projected from the central arm, to which was attached the pump. The incoming wave would impart its force or momentum to the swinging pendulum, carrying it much or little, according to the size. It was a surprise to see how small waves could do work; that is, little swells, which would swing the bucket but a few inches, would deliver a corresponding amount of water, frequently in drops rather than in a stream. Another lesson was learned by constructing the bucket eleven inches wide. At first, when a stream came sufficient to fill the bucket, there was not only a large waste of power, but great danger of destruction of the machine. Six inches proved to be the best width. For increase of power, increase in length is preferable. I am well aware that such apparatus might not be as practical as a windmill where heavy seas are liable to occur, as the construction of the piece to stand the shocks would be expensive. In this experiment the cost was not one-quarter that of a windmill, while the apparatus was out of sight. S. B. Palmer.

THE NEW ACADEMY OF ART IN MUNICH.

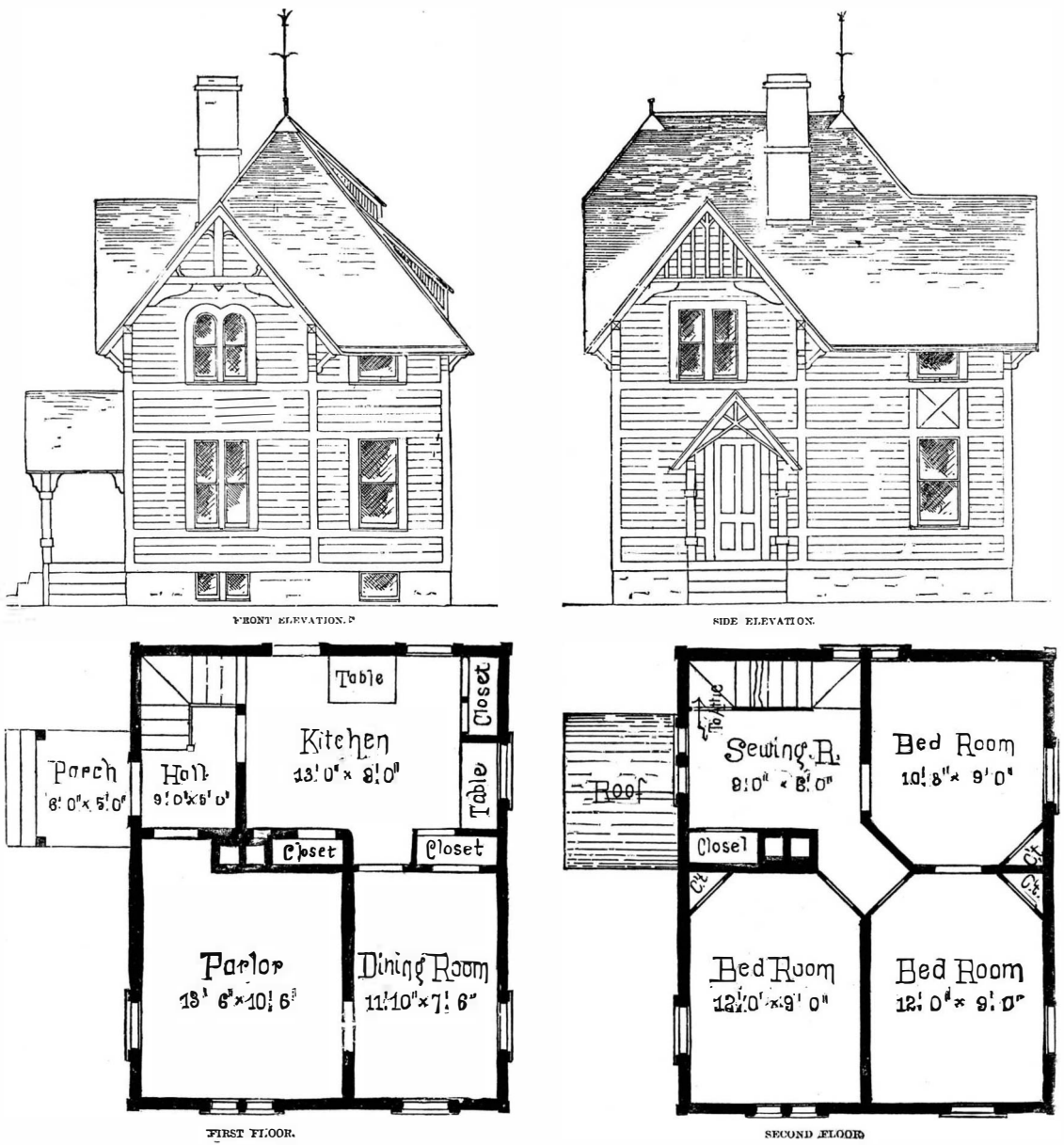
The new Royal Academy of Art in Munich, a splendid monument consecrated to the arts of peace, has lately been completed. In consequence of serious disputes between the Ministry and the Legislature, the money received as indemnity for the French war was withheld for a long time from the object for which it was to be expended; but finally, after a period of ten years had passed, the last scaffolding disappeared, and the newest monumental building of the Bavarian capital appeared in its imposing beauty. It is built in the noble style of the Italian Renaissance. The great architect Gottfried v. Neureuther created for himself a proud monument in this, which will probably be his last great work.

The choice of the site, on the north side of the city, near the triumphal arch, was, at first, considered unfortunate; but as the city has grown rapidly in this direction, all former fears that the Academy would be too remote have been removed.

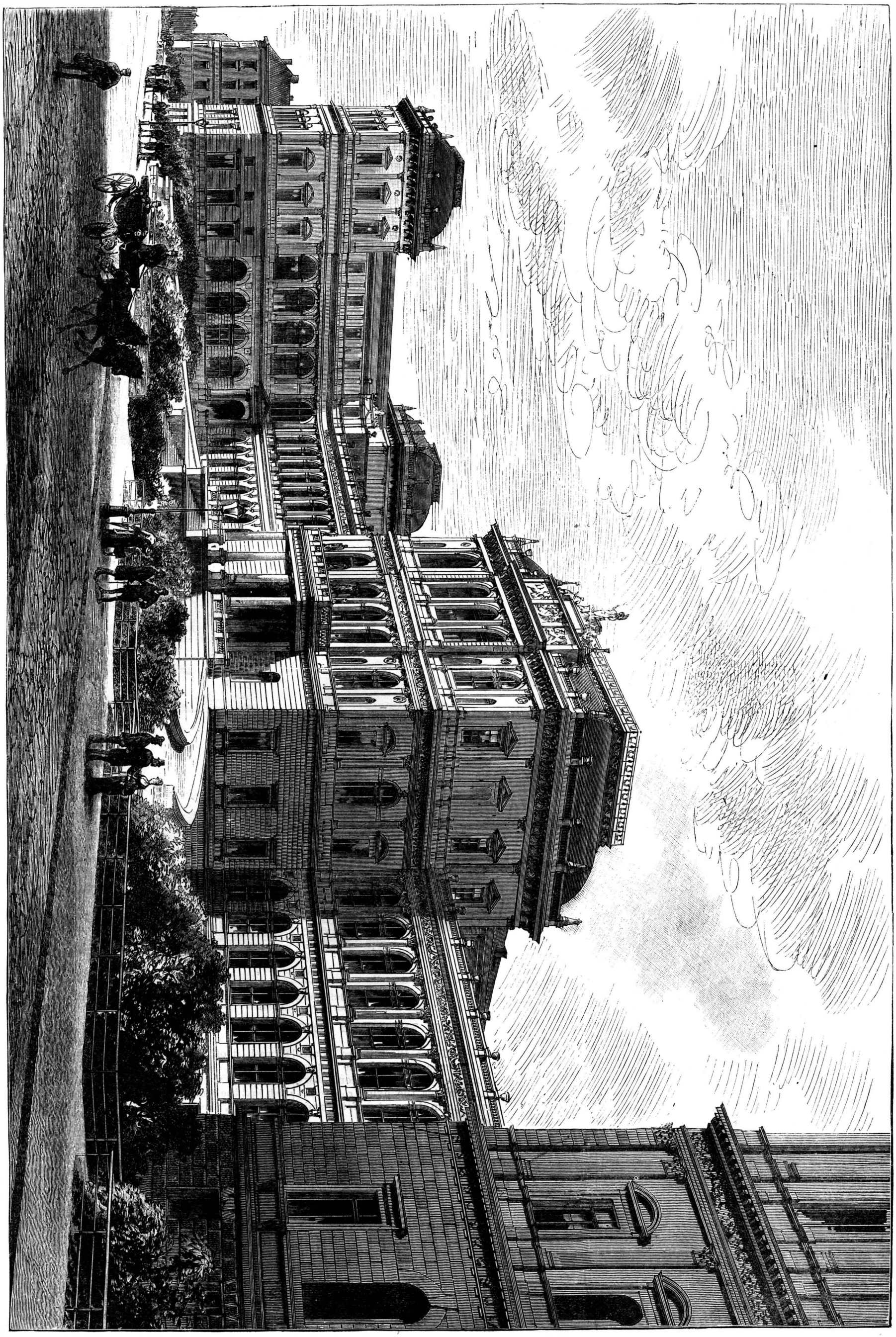
Broad steps, flanked on the right and left by the ramp, lead to the portal of the middle building, which is richly ornamented by plastic groups. (Minerva crowns the building, and on either side of her are the allegorical figures of Poetry and Science.) The imposing staircase forms a worthy entrance to this cradle of Munich art. By the great door of the main building, as well as by the doors of the wings, the lofty first story is reached. This contains all the halls for sculpture, the beautiful antique hall, part of the preparatory school of the Academy, and the archives. An elegant staircase leads to the upper gallery, which sweeps along the entire extent of the building, forming an artistic perspective. Here most of the studios of the professors, the school for copper-plate engraving, the painting and composing classrooms, and the hall of architecture are located. The schools of the different masters, and the nature classrooms, are in the next higher story, in the pavilions, and even in the basement. This high school of art possesses no assembly and exhibition hall, unless we can apply that term to the council chamber of the college, on the first floor.

The erection of this beautiful building is due principally to the energy of Piloty. During almost the entire period of the directorship of the dead master, efforts were being made to obtain this much-wished-for home of art instruction. It is scarcely a year since the celebrated director, with the institution under his care, moved into the new rooms, where his uncompleted work, "The Death of Alexander the Great," was begun. To-day a younger man, with a name long known to artistic circles, F. Aug. v. Kaulbach, conducts the school.

The Munich Academy has a high place to fill; for it must prepare a new ground from which a fresh artistic life must spring. The disciples of art flock to the Munich school from all parts of the world, and carry its fame back with them. The accommodations of this palace of art already seem too limited to receive all the believers, and yet this Bavarian Mecca of artistic youth has only just been completed.—*Illustrirte Zeitung.*



A COTTAGE FOR $1,000.



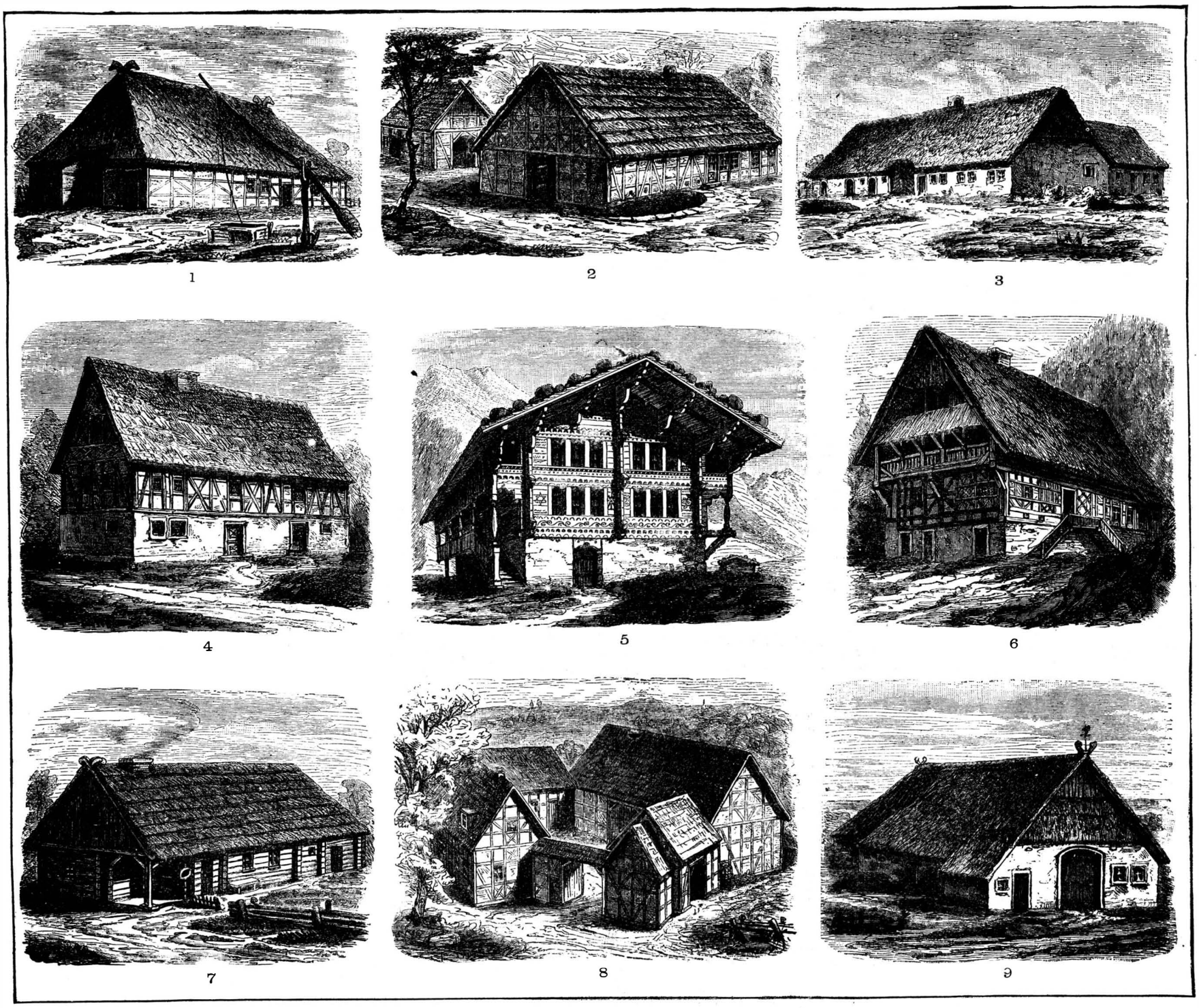
THE NEW ACADEMY OF SCULPTURE AND PLASTIC ART, MUNICH.

ILLUSTRATIONS OF GERMAN COTTAGES.

The house is the embodiment of the sentiment of the people; and while city houses are, to a great extent, affected by the influence of foreign culture, in all countries—and especially in Germany—the national house is that of the present, for it is necessarily influenced by the conditions of the national agriculture and the village life. As the Germans have always, since the time of Tacitus, preferred country life, they take special interest in the architecture of the old German houses.

The dwellings of the old Germans described by Tacitus are easily recognized in the modern structures of North Germany. The German buildings were not separated by a court and garden, as were those of the Romans; the whole establishment was under one roof, and the house was partly dug out of the ground—as is still the case in some villages of Northern Germany—and there were steps leading down into the interior. Such houses (see Figs. 2 and 4) are still to be found in Westphalia, Hanover, Pomerania, Mecklenburg, and Schleswig-Holstein. In the Holstein house, the smoke arisng from the fire has to find its way out through the door, or penetrates the grain which fills the interior of the immense roof.

The Wendish house resembles that of Saxony. It has a smaller hall, in which the hearth is placed, but it is customary to arrange a large living room back of this, which is lighted by side windows at the expense of small rooms. This plan is also followed in the South German peasant houses. The entire establishment is under one roof, but the dwelling is separate from the barn and stable, which have their particular entrances. Any one who travels through the Black Forest will notice the houses with great interest. Sometimes they are sheltered in the valleys, where they seem almost colossal as they spread under their pyramid-like roofs; and again they appear on the slopes of the mountains,



1. Holstein Peasant House. 2. Westphalia and Saxony Peasant House. 3. Schleswig Peasant House. 4. Frank Peasant House. 5. Swiss Peasant House. 6. South Germany (Black Forest) Peasant House. 7. Further Pomerania Peasant House. 8. Thuringia-Frank Peasant House. 9. Wendish Peasant House.

ILLUSTRATIONS OF GERMAN PEASANTRY COTTAGES.

With the migration of the races began the contest between the styles of houses used by the different races. The various types of houses are shown in the accompanying cuts, taken from the latest edition of Meyer's "Conversations Lexikon." The form of house built by the Franks has gradually come to be that most used. In this style of house the interior is divided into different rooms, and the apartments for the people, the cattle, and the provisions are not grouped under one roof around a middle space where all kinds of work are done, as in the houses of other German races, but the various compartments are separated by partition walls, the stable and barn being provided with special entrances.

In the dwellings of Westphalia and Saxony, the housewife, from her central position by the hearth, or from her sleeping place back of the same, can keep her eye on her children and servants, her cattle and horses, watch the cellar, garret, and living room, and still go on with her spinning and cooking. Near the principal house are smaller houses for the field hands, the gardener, or the aged parents. These are built on the same plan as the larger house, but are smaller, to correspond with the lesser needs of the occupants.

half hidden by the trees. These Black Forest houses are three stories high. In the basement, the walls of which are masonry, are the stables; the second story is built of wood, and contains the living rooms and chambers; and above that, in the great roof, the grain is stored.

In several of the Swiss cantons, the same roof covers the dwelling, the stable, and the barn, but in these houses two stories are used for the dwelling. These stories are reached by outside stairs and corridors which are protected by the roof. In the Berne district, the kitchen is in the center, as in the Saxon houses; but in central Switzerland and in the mountainous districts the dwelling, stable, and barn are separate buildings. This use of separate buildings is also found in the Thuringen-Frankish houses, such as we see in Thuringen, Hesse, the Palatinate, and Rhenish Prussia. Here the buildings are arranged around a court which they completely inclose.

In upper Bavaria the stately and solitary buildings look like wooden fortresses, and, in fact, many of the mediæval castles of Southern Germany were built on the same plan as these peasant establishments.—*Illustrirte Zeitung.*

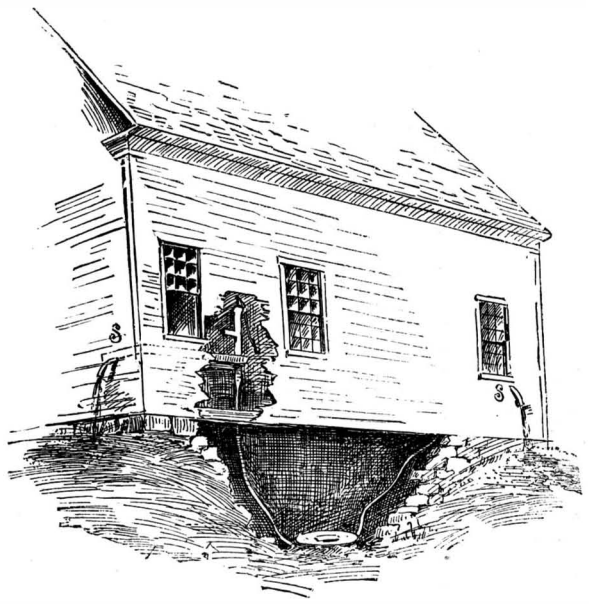
Creeping of Varnish.

We often meet with this trouble, especially in light-colored gears, where oil has been used in the colors, and in almost every case where oil and varnish are combined in the varnish and color. One way to get over the difficulty is to give the job two coats of the true color, and then a light coat of pure varnish without any in; but when you cannot take the time for that, and are compelled to have your varnish and color strong, you can adopt the following two plans, which we have found have answered the purpose. As creeping is caused principally by sweating, which throws off from it instead of attracting to it, we must try and get rid of that false tack, which is nothing but a thin crust of oil held in its place by the other ingredients in the color, just as gold sizing standing over night exposed to sulphur from the stove will have a thin coating of sulphur; and although you might lay the gold on, and to all appearance it would be all right, yet if you attempted to wash it off, you would find the gold would leave solidly.

The oil in the color acts in conjunction with the varnish just the same; the oil, being lighter in body than the varnish, rises to the surface, and, although seemingly hard, has that false gloss and tack which must be taken away before you can proceed. Where you cannot with safety rub it off, without running the risk of marring the looks of the job, take castile soap, and, instead of rubbing it, wash it. It is best, if you can, to take each part separate, except when you are varnishing, which in that case involves the washing of the whole job at once. You should always wipe off with a medium damp chamois skin, one not too dry, so as to retain enough dampness to insure safety. Even after you have gone through the above, if, after all your trouble, you still find places that have probably been missed or slighted in the washing, and detect the creeping, just throw a little pure water into your varnish, stir up thoroughly, and proceed just as you would if you had no trouble. Sometimes the creeping will occur in spots, and can, in striping, be stopped by breathing heavily upon the place, running over it at once with the stripe.—*Carriage Monthly.*

A FEVER HOUSE.

In the annual report of the New Hampshire State board of health for 1886, Dr. A. H. Taft, of Winchester, reports that on May 5, 1885, a lady patient gave birth to a son. Convalescence protracted. Child "brought up" on bottle; deranged condition of bowels from the first. Mother and child in a miserable condition for two months. Upon examination, the sink drains and the well were found to be separated by but about six feet of very porous earth, as may be seen in the illustration. The condition of both patients remained unimproved until the use of the water on the premises was discontinued, and this was brought about only by



A FEVER HOUSE.

calling the attention of the State board of health to the condition of affairs.—*Sanitary News.*

One Reason why Paint Chips off from around the Spokes in the Hubs.

We are often asked by parties who ought to know for themselves, why paint chips off of the hub and along the edges of the spokes. They claim that they have used the best material both in the leads and oils, and yet they have that trouble. We ourselves have often seen jobs that have been out but a short time, and all gone in spots; the trouble has been caused in nearly every case by carelessness: 1st, on the part of the wheelmaker who made them, and 2d, on the part of the painter or apprentice who primed the wheels. The wheelmaker was careless, because he failed to clean all the glue off when he drove the spokes. It does not answer the purpose to claim that he took his sponge and, dipping it into the warm water, washed it off. He did not get it off as thoroughly as he should. In using his sponge once or twice, he will find that he has thoroughly impregnated it with the glue, and instead of removing the glue he has merely spread a thin, almost invisible, skin over the hub. The wheel goes to the paint shop and then falls into hands of an apprentice to prime, and unless there should be an extra large piece adhering to the hub, he fails to see anything wrong, and without further investigation proceeds to cover the skin of glue with his oil priming. The wheel stands around quite a sufficient time to allow the priming to dry before it is ready to be finally painted, although the oil and lead has not been able to penetrate through the glue. He thinks because he can sand it off when he gets it, it is right. The wheel is finished and goes out into the weather. As soon as the dampness from any cause strikes through the paint, it loosens the skin of glue, and away goes the paint, especially if the job sees hard driving.

The remedy for all this is very simple. If the wheelmaker would use two sponges, instead of only one, when he washed the glue off, and have the second sponge used only in fresh water, apart from that which he has in the glue kettle, he would avoid all the trouble. The apprentice, or whoever primes them, should not take it for granted that, because it looks clean, and he cannot see anything out of the way with it, it is all right. That is where he makes his mistake. He should be thoroughly satisfied as to the proper condition of the job before he proceeds any further. In order to be so satisfied, he should carefully sandpaper the wheels all over, and especially between and around the tenons on the hub. He should examine his paper, and if any hard spots appear on the paper, with a smooth, glazed appearance, he may depend upon it that there is glue upon the hub, and should see that it is all removed. When his paper brings the wood away with it in a fine dust, he is then all right, and not before.

In regard to the edges of the spokes, that is principally caused by the party who brings the job up. For instance, if he has been in the habit of cutting his edges through every time he has prepared the job for a coat, and failed to oil the exposed places, the colors that are placed on top at those places have no foundation or anything to hold them, and, consequently, as soon as they are brought into contact with the atmosphere, they are quickly destroyed, the life dried out, and they are dropped off by friction through vibration in driving, or rubbed off through washing. The edges should never be cut through in the first place. There is no necessity for it if ordinary care is exercised, but if they are by any means exposed, they should always be rubbed over with a little pure oil. It is not particular about the oil drying before the next coat is placed on. That would take up too much time. The coat can be put on immediately afterward, without any danger, as it does not require the places to be soaked in the oil, only rubbed. It is never good policy to compel an apprentice to so hurry in priming as to slight the job to get it done. Better use a little extra time and do it right, than to meet with trouble afterward.—*Carriage Monthly.*

The Grindstone Industry.

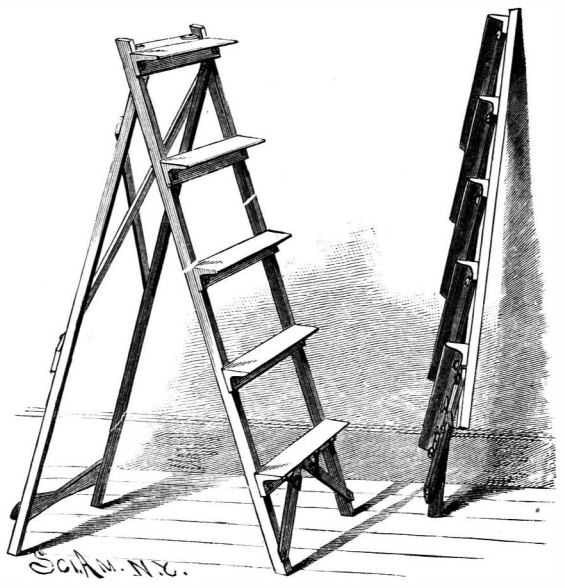
A correspondent of the *Portland Transcript* gives a description of a visit to the Bay of Fundy and along its shores, where the grindstone quarries are located. The superintendent of the quarry says when the tide is out his men go down on the rocky shore and work out near the water. At low tide the men on the shore drill some holes in the ledge, put in powder, and blast out great pieces of rock. When the tide rises again, they float out some big logs and empty barrels over where the loosened rocks are. When the water goes down again, they fasten a big rock to the raft with heavy chains, so when the tide again rises it lifts up the raft and the rock with it. Then they tow it as near the shore as they can. If it is the right kind and size for a millstone, sometimes it is allowed to lie there until the workmen, with stone chisel and hammer, work it into proper shape. At other times, by means of a derrick, it is drawn out on the wharf. Then it is rolled on a track and hauled to the factory.

At the great stone factory the large piece of rock is placed on a carriage, and, with a saw similar to the up-and-down saw in a mill, the rock is sawed into great slabs of the right thickness for the grindstone. The saw does not have teeth, but wears its way through the rock with the aid of sand and water, which are continually poured on. Then the slabs are taken, a hole made in the center, the edges trimmed off with a chisel, and the whole placed on a kind of lathe, turning it until it is true and the edge smooth. A grindstone that "wabbles" is not worth much.

The rock from which grindstones are made is a kind of sandstone, and there is a great difference in the "grit," some being coarse and some fine. Often several different degrees of "grit" are found in the same quarry. There are many quarries along the shores of the Bay of Fundy. The reason stone is taken from under the water, when there are many quarries a little distance from the shore, is because the best stone comes from the bottom of the bay, where it is covered at high tide.

FOLDING STEP LADDER.

The accompanying cut represents a folding step ladder, opened and closed, made of hard wood and ingeniously bolted and braced in such a manner as to form a strong, complete, useful, and handy ladder.



RUSSELL'S FOLDING STEP LADDER.

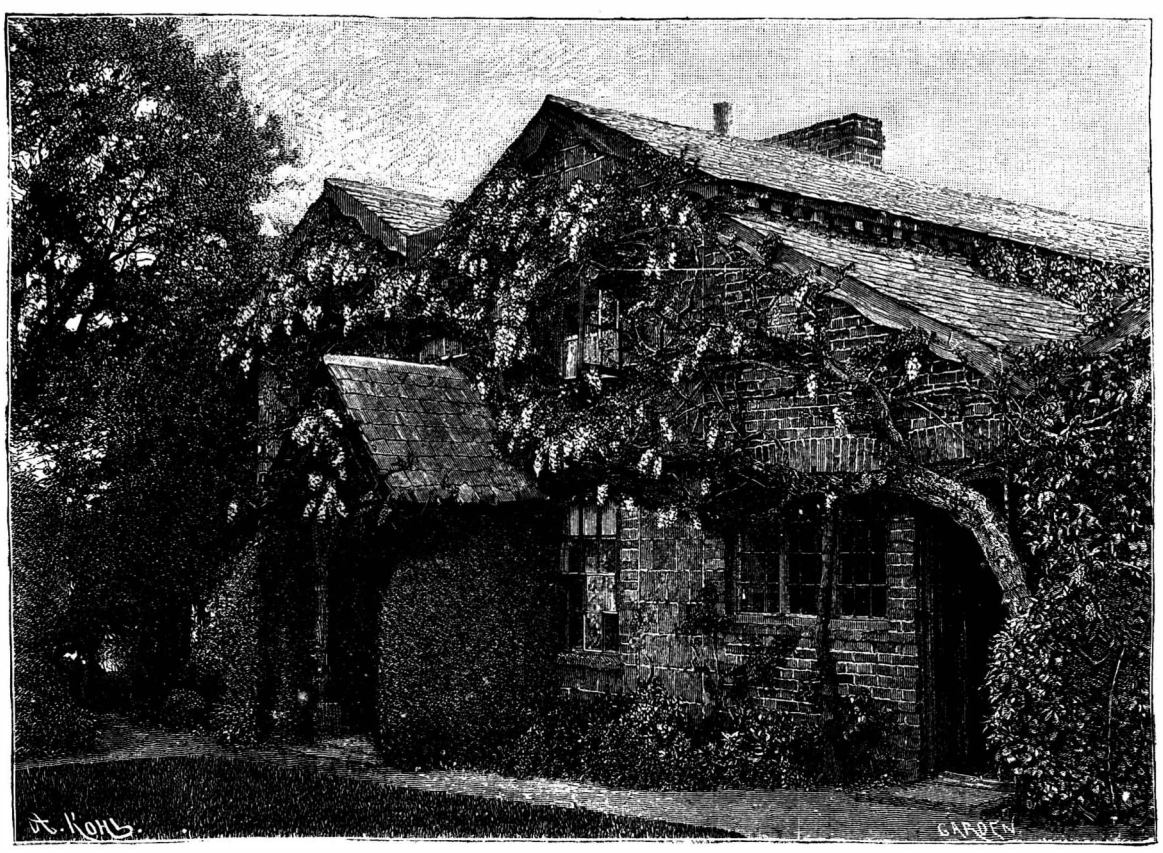
When folded it occupies a space of only four inches, so that it may be put in the pantry or behind any door where it will be out of the way, and yet be within convenient reach, thus saving the trouble of searching the cellar and garret, and perhaps finding the ladder in the yard in a condition unfit to be brought in the house. This compactness is of advantage to dealers, owing to the small amount of space occupied and the low cost of transportation. When used by painters, it can easily be carried under the arm, and for use as an article of household furniture it can be converted into a very neat hall rack.

This invention has been patented by Mr. H. C Russell, of 240 Robert Street, Toronto, Canada.

THE WISTARIA.

(W. SINENSIS.)

How much a simple building may be beautified by a good climber is shown by our engraving of an old wistaria on a modest cottage, the office of Mr. Virgo's nursery. The tree was planted by Mr. Virgo nearly fifty years ago, and, judging from its vigor—for the engraving shows only half its extent—it seems to promise endurance for perhaps another half century. The crop of blossoms was this year not a very full one, as was the case with most of the wistarias in the district. In a year of good bloom the little house looks almost smothered with the pretty lilac bunches.—*The Garden.*



WISTARIA ON MR. VIRGO'S HOUSE, WONERSH, SURREY.

THE recent development of the Mount Lyell gold discovery bids fair to eclipse anything of the kind hitherto found in Tasmania, and even to rival the famed Mount Morgan of Queensland, the value of which is counted in millions. Mount Lyell is about seventeen miles northeast of Macquarie Harbor, on the west coast of Tasmania. Further prospecting has revealed to some extent the extraordinary richness of the deposit. It would appear at first sight to be a dike formation; but its exploration so far indicates that it is of hydrothermal origin, like the celebrated Mount Morgan mine. Several assays have been made, giving magnificent results. Three are known that were respectively at the rate of 164 ounces, 187 ounces, and 348 ounces to the ton.

THREE CITY HOUSES.

The block of city houses illustrated was designed by J. Averit Webster, architect, 110 E. 125th Street, New York city. They have been erected on the north side of 133d Street, between 5th and 6th Avenues, for James O'Kane, Esq. The fronts are rock-faced Connecticut brownstone to the parlor floor, and above Philadelphia pressed brick, with brownstone and terra cotta trimmings. The cornice is entirely of terra cotta.

While the judicious use of terra cotta has given an ornamental impress to the fronts, the most striking and pleasing features are found in the round-arched doorways and windows of the parlor floor, and the triple windows of the second and third floors. The windows with the stone balcony, in the middle house, not only please the eye from without, but make the room they light the pleasantest in the house; a room that will receive the full benefit of the sunshine, even in mid-winter.

Stained glass is employed in the windows of the front sufficient to give a pleasant effect, yet not to that extent that becomes tiresome to the eye. The front doors are of cherry and light oak, with carved panels. Moulded stained glass is substituted for the upper panels of the doors.

The interior is arranged in the following manner: Dining-room, 11x18, in front of basement; kitchen, 13x15, in rear. The remainder of the basement is occupied by stairway, pantry, closets, etc. The parlor floor contains two parlors and staircase hall. A bay window nine feet wide and four feet deep, the full height of the room, opens into and forms a part of the rear parlor. This room is provided with a butler's sink, and communicates with the kitchen by a dumbwaiter.

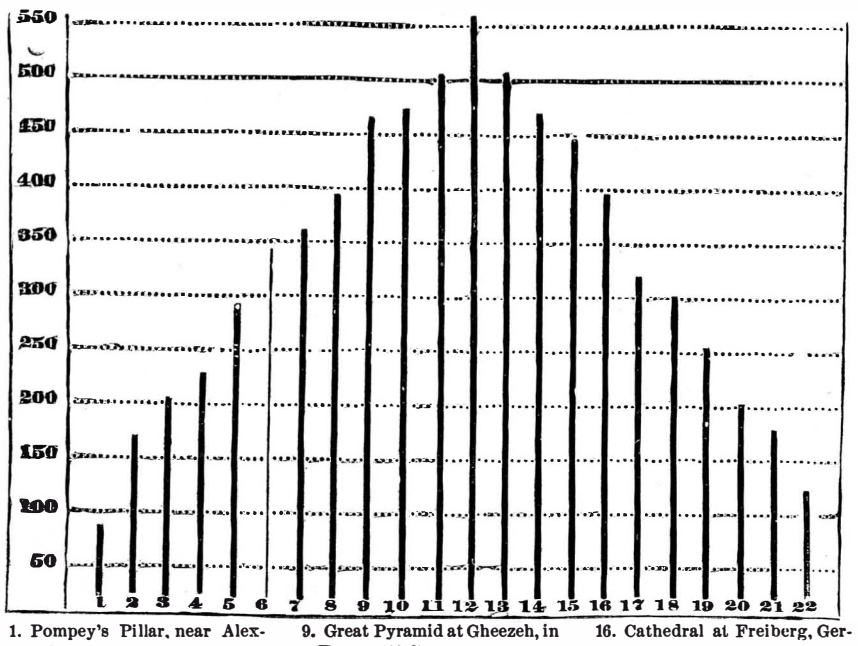
On the second floor are two large rooms (each with a separate dressing-room, provided with marble top washstand and ample wardrobes) and a bath-room. The middle house has three sleeping-rooms on the third floor, and each of the others four.

Dining-room, parlors, and entire second floor are trimmed in hardwood, kitchen in Georgia pine, and third floor in white pine.

The houses are heated throughout with brick-set furnaces, and the principal rooms are also supplied with open grates.

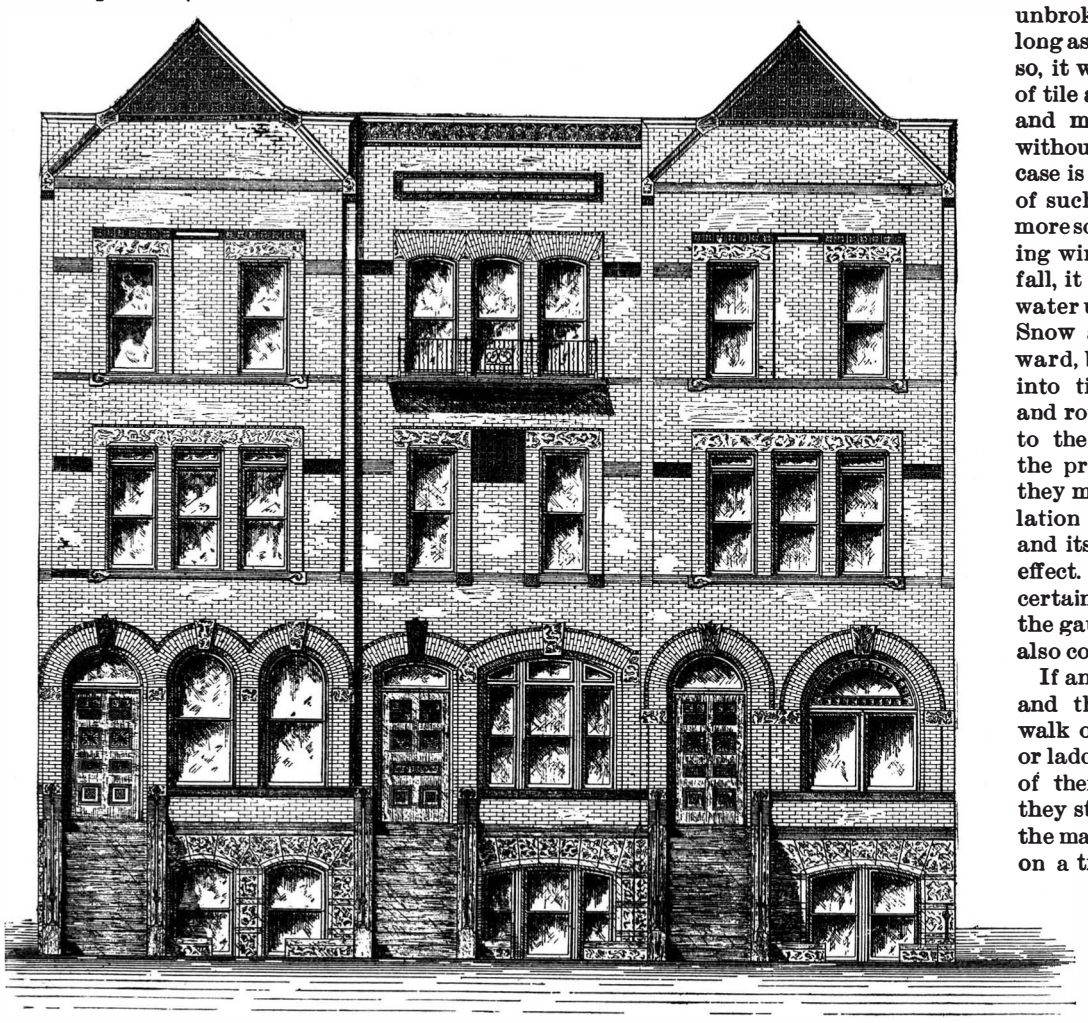
Each house is 16 ft. 8 in. wide by 40 feet deep. The basement is 8 ft. 4 in. high, the parlor floor 11 feet, second floor 10 feet, and third 9 ft. 6 in.

The cost is about $8,000 each house, exclusive of land.



1. Pompey's Pillar, near Alexandria, Egypt, 94 ft.
2. Niagara Falls, New York and Canada, 164 ft.
3. Cathedral (Minster) at York, Eng., 198 ft.
4. Bunker Hill Monument, near Boston, Mass., 221 ft.
5. Capitol at Washington, D. C., 287½ ft.
6. Bartholdi's Statue of Liberty Enlightening the World, 341 ft
7. St. Paul's Cathedral, London, Eng., 360 ft.
8. Cathedral at Antwerp, Belgium, 403 ft.
9. Great Pyramid at Gheezeh, in Egpyt, 460 ft.
10. Notre Dame Cathedral at Rouen, France, 470 ft.
11. Cathedral at Cologne, Germany, 510 ft.
12. Washington Monument, Washington, D. C., 555 ft.
13. Old St. Paul's Church, London, Eng., 508 ft.
14. Cathedral at Strassburg, Germany, 468 ft.
15. St. Peter's Church at Rome, Italy, 448 ft.
16. Cathedral at Freiberg, Germany, 385 ft.
17. Board of Trade Edifice, Chicago, Ill., 320 ft.
18. Big Trees, Calaveras Co., California, 300 to 330 ft.
19. Central Spire of Cathedral, Lichfield, Eng., 250 ft.
20. The Monument, London, Eng., 202 ft.
21. The Albert Memorial Monument, London, Eng., 180 ft.
22. Temple of the Sun, Cuzco, Peru, S. A., 120 ft.

HEIGHTS OF VARIOUS OBJECTS.



A BLOCK OF THREE CITY HOUSES.

Sources of Dampness in Houses.

BY CHARLES F. WINGATE, S.E.

A dry house is, above all things, to be desired. Pure air, pure soil, and pure water are the three requirements for health laid down by Hippocrates, and if these could be provided in modern dwellings, the doctor's visits would be few and far between.

Dampness tends to contaminate the air of houses, the lung food of the occupants, and thus is doubly harmful. A host of diseases, such as consumption, rheumatism, catarrh, and bronchitis, are fostered by dampness of houses. What Frances Power Cobbe aptly terms the "little health of women" is chiefly due to this cause. They spend most of their lives within doors, and to a considerable extent on the lower floors, which are most affected by dampness, and they suffer much in consequence. If our houses could be erected on arches, as suggested by Dr. Richardson, the ills of humanity would be greatly lessened.

When a house is built of stone, the latter should be protected from dampness All stone when new is more or less porous, and until it has become weathered it will absorb a great deal of moisture. An English architect says: "I invariably specify that stonework shall receive, when in a dry state, two coats of a solution, the effect of which is to render the surface of the stone comparatively impermeable, till such a time, at all events, as the stone has had time to weather, and form its own skin and natural protector. In fact, wax and gum are dissolved in a spirit, and the solution is applied with a brush on dry stonework. The spirit volatilizes, and the congealing of the rest forms a skin as thick as the stone is impregnated. Two coats are usually sufficient." Such protection is not so essential in our drier American climate, but in exposed localities, as at sea shores, it may be desirable.

Prof. Reclam, in order to secure healthful houses, recommends: 1. The mortar should not contain much sand, and should be made fresh from day to day. 2. No building with stone and mortar should be carried on in winter. 3. The stones used should never be dipped in water or lavishly soaked, but merely brushed over with a wet brush immediately before laying. 4. Partition walls should be filled up with some thoroughly dry material.

The "saltpetering" of brickwork can generally be prevented by adding linseed or any other oil to the mortar, at the rate of a gallon to the cask of lime If cement is used in the mortar, an additional gallon of oil must be used for each cask of cement. The incrustation, once formed, can be removed by the use of hot water or muriatic acid, but it will reappear by exudation from the interior of the wall, and usually leaves a permanent black or brown stain.

Projecting or "flush" window-sills, though considered æsthetic, absorb the rain through the brick joints, and permit water to drip upon the walls below. They are, therefore, highly objectionable.

An English sanitary authority says that dripping roofs are a very common cause of dampness in the soil in immediate contact with the walls of dwellings. Many a house without a basement floor, and otherwise dry and healthy, is rendered quite unfit for habitation from this cause. It will be frequently observed that the rain falling on the roofs of country mansions is allowed to drip upon and soak into the ground adjacent to their walls, owing to the absence of proper eaves-troughs, downpipes, and water-tight outlets; and if we examine the dwellings in most of our country towns and villages, it will be found that the same condition prevails with them even in a greater degree. It is in the absence of precautionary measures to secure a healthy base to the dwelling that "dry rot," which owes its name rather to the effect produced than to the cause, takes root. This much dreaded enemy is generated in a damp, close, and dark atmosphere; and when once in existence it seems to rise with extraordinary rapidity from its bed, and spread vigorously through timber and walls in all situations, dry or damp, light or dark. One of the requirements of the sanitary code drafted by Mr. Rogers Field, the eminent English engineer, should be adopted by every town. It is as follows: "Every person erecting a new building shall cause all rain water to be so drained or conveyed from the roof of any building as to prevent its dripping on the ground and causing dampness in the walls."

DEFECTIVE ROOFS.

Neglect of roofs is a prime cause of decay in buildings. A writer in the *London Builder* says that "Our roofing, as a rule, is probably in a more primitive condition than any other part of our buildings. If we compare the water-tight and durable protection of the ancient lead roofing to the shelter given by either tiles or slate, we shall see at once how much of the absolute weather-proof efficiency of the building is sacrificed to effect a money saving, which is, of course, a very considerable item. Neither tiles nor slates are laid so as to be absolutely water-tight. They lap over each other, so that in all parts of the roof there is, or ought to be, not less than two thicknesses of slate or an unbroken thickness of tile; and so long as rain falls vertically, or nearly so, it will run from edge to surface of tile after tile, or slate after slate, and make its way to the gutter without entering the roof. But the case is altered if we have anything of such weather as is frequent in more southern latitudes. If a swirling wind accompany a heavy rainfall, it will often carry a stream of water up over a portion of a roof. Snow at times makes its way upward, by the aid of drifting wind, into tiled roofs. Stucco, plaster, and rough cast are highly favorable to the retention of damp and to the progress of decay. Or, again, they may admit of a gentle percolation of water between the wall and its jacket, which has the same effect. The use of bricks made of certain kinds of clay, among which the gault has an evil prominence, is also conducive to damp.

If any repair is required in a roof, and the workmen are allowed to walk over it, unprotected by planks or ladders, the chances are in favor of their making two leaks while they stop one. The mere weight of the man, if allowed to come directly on a tile or slate, will very likely crack it. Again, a nail or peg left out, not to say a pick of a slater's hammer, is quite enough to lead to the sagging of the roof, and to the general increase of damp and advance of decay.

PRECAUTIONS AGAINST DRY ROT.

Besides taking precautions against dampness of foundations and soil, it is important to prevent possible dry rot in the timbers of a house. This may be accomplished by securing a thorough circulation of air around all woodwork, and by coating all the timbers which have to be buried in the earth with coal tar or

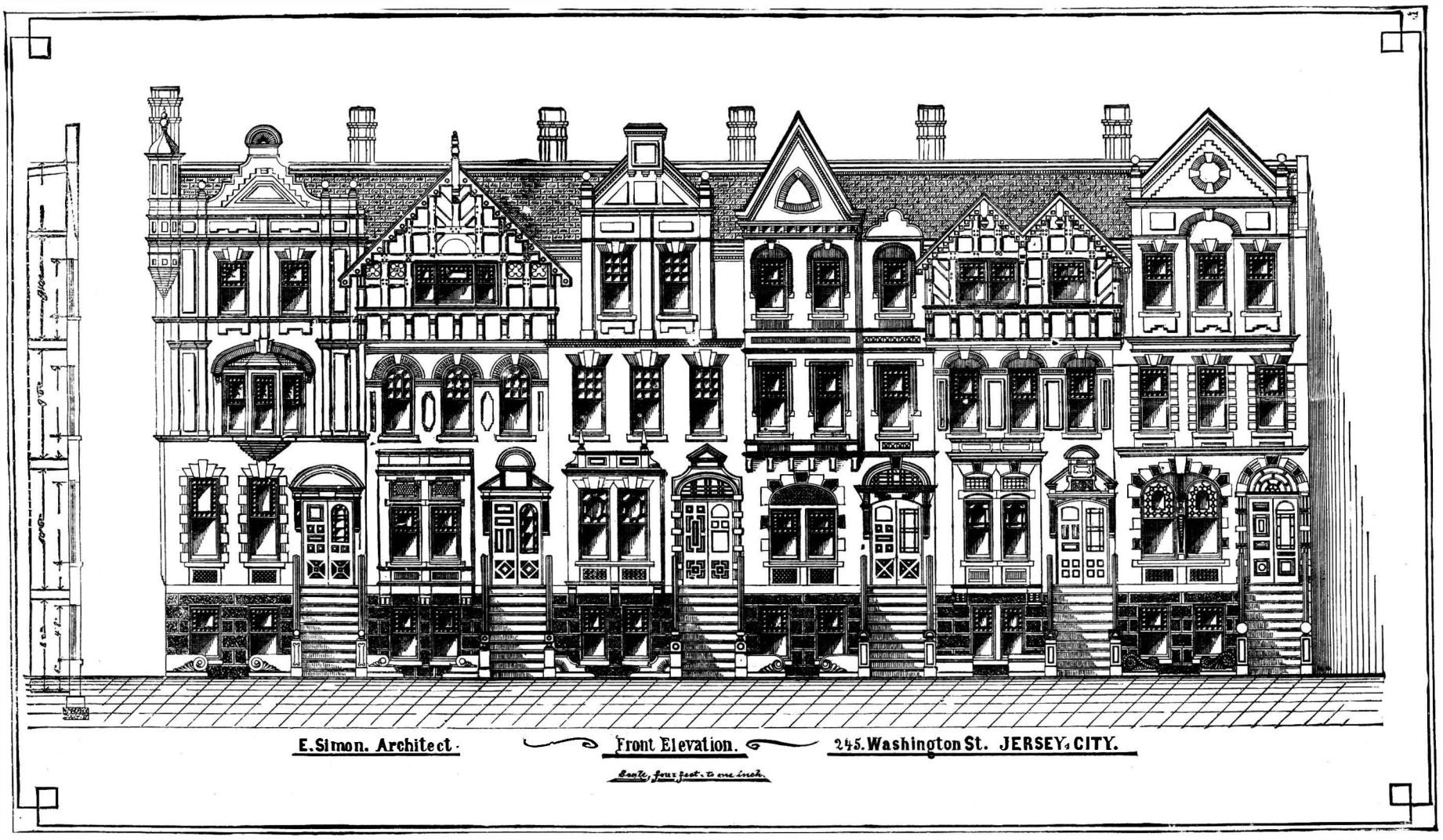
some similar substance. In a paper recently read before the Cryptogamic Society of Scotland, by Mr. Young, an architect of Perth, on "Dry Rot Fungus in Houses," he said: "1. Wood is necessary for the first production of the root of the fungus. 2. The wood after a time becomes exhausted of its nourishment for fungus, and when this is the case the plant attached to it dies. 3. Where other conditions are favorable, free ventilation is not against its growth; on the contrary, a draught aids it by dispersing its spores. 4. Upon good, perfectly dry, healthy wood it will not readily take root; but if it gets good root in dampish wood, its growth will ramify over fresh dry wood, and prey upon and destroy its tissues, thus ruining it for structural purposes. 5. The cure is to eradicate it as far as possible by burning the soil, applying a flame to the walls, removing every particle of wood from its locality, and by substituting stone, iron, or cement."

Dr. Wallace remarks: "It is a mistake to suppose, as many do, that dry rot attacks only the wood in the basement story. It is a common occurrence for the ends of joists built into porous stone to become affected by fungous vegetation; and it is frequently seen in pulling down old tenements that the ends of the joists are quite gone, and that for many years, probably, the joists have been resting only on the plaster cornices of the rooms. The remedy is the use of 'shoes' of glazed fire-clay or other material, which are built into the wall, and into which the ends of the joists are placed. The 'shoes' should be somewhat larger than the joists, which should be kept in position by little wedges of wood, so that air can play freely around the end of the joist. Such protected joists will last for hundreds of years, other circumstances being favorable."

Mineral solutions forced into the fibers of wood arrest the decay of timber by impeding decomposition by wet rot, and also prevent the growth of fungi. A weak solution of corrosive sublimate or of nitric acid has been found of service, after which the timber may be painted with white lead and oil. Timber such as wall plates, ground joists, and sleepers near the ground ought always to be creosoted or coated with a solution of coal tar and fish oil mixed with finely powdered clinkers from a forge. If the timber has not been seasoned, the solutions will not enter, the pores being previously occupied by the fermenting juices, and the process, therefore, will not be effectual. Again, if the joists of ground floors are not ventilated, it is of no use to apply remedial measures after the mischief has been done.

A practical method for ventilating the space under flooring is to construct channels under the floor leading to the kitchen chimney flue. These channels should be of porous materials, and should be six feet apart, and, by being carried to the kitchen chimney, the ground air will be drawn off with the heated air and smoke of the chimney. This was accidentally discovered by Dr. Renk, during his experiments at Munich. Being unable to account for the difference of ground air pressure in various parts of the basement upon which he was operating, he excavated the floor, and found that one of the air flues from the chemical laboratory passed under the basement floor to the foul air extract shaft, drawing with it the ground air in its immediate vicinity, thus relieving the pressure upon a certain area.

This arrangement I have found to work very satisfactorily in my own practice; but it is essential to have openings made at different points to admit fresh air from out doors, so as to cause a circulation, otherwise the flue will not draw. Cellars in most country dwellings are damp, and in many cases even wet. They are closely sealed in winter to exclude the cold, often by banking around the windows with stable manure, and rotting vegetables are stored in them until they become sources of danger. Many a typhoid epidemic has been traced to such places. I recently had the great satisfaction of breaking in the windows of an old farmhouse cellar which had not been opened in fifty years, even if they had ever been opened, and the change within, when the air began to circulate, was marvelous to the owners. Every one ought to remember that the cellars should have openings upon opposite sides in order to ventilate them. As this may not always be practicable, and if nothing better can be thought of, I would say, provide an elbow of sheet iron, cut a hole in the cellar ceiling, and carry the pipe through the side wall of the room above, so as to admit air from out doors, thus creating an inward current toward the opposite side of the cellar.—*Herald of Health.*



A BLOCK OF SIX CITY HOUSES AT JERSEY CITY N. J.

SIX CITY HOUSES.

Our illustration shows the elevations of six houses now in course of erection at the corner of Jersey Ave. and Eighth St., Jersey City, for Delavan De Long, Esq. The basement and stoops are brownstone, trimmings of terra cotta, stone, and galvanized iron. Each house is 16 ft. 8 in. x 36 ft. Kitchen and dining-room in basement. First floor has front and back parlor; second floor has two bed-rooms, bath-room, and closets; third floor has three bed-rooms and store-room, closets, and light shaft to bath-room. All inside finish with whitewood. The houses show a very fine appearance, all corbels and projections having a beautiful effect, each house being of different design. Cost, complete, of each house with all improvements, $5,000.

EDW. SIMON, *Architect.*
245 Washington St., Jersey City.

Culture of Asparagus.

Mr. Joseph Harris argues, in the *American Agriculturist*, that "the plants which contain comparatively little nitrogen require a 'sap of the soil,' rich, rather than poor, in nitrogen. Turnips contain comparatively little phosphates, and yet soluble phosphates are found of special value as a manure for turnips. Wheat and barley contain comparatively little nitrogen, while clover, peas, and beans contain a high proportion of nitrogen; and yet it is a well known fact that to produce a good crop of wheat or barley, the sap of the soil must be richer in nitrogen than for clover, peas, and beans."

Sugar in Mortar.

To the Editor of the Scientific American:

On reading your article in December edition on "Sugar in Mortar," I am reminded of a circumstance I had entirely forgotten.

In 1861 my father was having an old country house remodeled. The outside walls required a removal of the plastering. By some means the plasterer had gotten behind with his work, and the painters were at his heels, so to speak, with the last coat of plaster not yet on. Desiring the plaster to dry very quickly, so as not to delay the painters, he mixed some common treacle in the plaster.

Those witnessing it ridiculed the procedure, but the plasterer averred he had frequently done it. It was painted the same day, and now, after twenty-five years, it adheres to the stone walls as firmly as ever.

J. P. H. SERVER.

Lansdale, Pa., December 24, 1886.

Frozen Boards.

A well informed lumberman vouches for the truth of the statement that frozen lumber occupies a smaller space than the best kiln or air dried; that is, that if two boards of the same size be taken green from the saw, one will contract more under the influence of extreme cold than the other will through any artificial drying. An instance of this character is thus stated: A gentleman, now old, remembers how his father determined to lay a floor; but the proprietor of the old-fashioned saw-mill on which the community depended for their lumber had no dry stock—nothing but green logs, which might be supposed to be frozen under the influence of the below-zero weather then prevailing. He was ordered to saw up those logs. The frozen lumber was taken just as it came from the saw, dressed off by hand, as usual in those days, and laid in the floor. Many years after, the son, who was a builder, put up a house for his own use, and built it as well as he knew how. He paid particular attention to the flooring, and himself superintended the kiln-drying of the strips. But in spite of all his care the floors shrank, and in a few years showed wide spaces between the boards. On the contrary, the floor his father laid of frozen lumber, after forty years of service, showed not a crack—a knife blade could not be inserted between the boards, and it had always retained its perfect surface. The story is an interesting one, as showing that woods have peculiarities which are understood by but few.—*Northwestern Lumberman.*

IT is convenient sometimes to mark our tools. This can easily be done as follows: First clean the place you wish to mark, and then cover it with a thin layer of beeswax, raising the edges so as to form a basin. Mark your name in the wax with a sharp instrument, cutting it through to the steel When this is done, fill the basin with undiluted nitric acid, or aqua fortis, and let it stand a while. The longer it stands, the deeper it will cut. Then wash with water.

DISPENSARY AND RELIEF STATION AT BATTERSEA, LONDON.

This illustration shows the dispensary and relief station in connection with the Wandsworth and Clapham Union at Battersea. Mr. Thomas W. Aldwinckle is the architect.—*Building News.*

What a Western Farmer Saw in the East.

A Western farmer, who lately took a trip East, writes as follows to the *Country Gentleman:*

The first thing to impress me when going from the West to the East is the economy of land in the East. In the West, and even in Illinois, we give everything an abundance of space in which to grow. We often have, for example, the space of a rod between the crop and the fence. If the crop wants to spread itself, we propose to gratify it without straining the fence. The great fertility of our Western land may make this necessary, you know. Our orchard trees are planted wide apart. East they seem to be crowded against the buildings or against the fences. Many more ornamental trees have been planted in Illinois than in New York. Is this because land is so valuable in New York, or because our bare prairies make us love trees the more? But we might well learn of our Eastern brethren in the economy of land.

In one way, however, the Eastern farmers are wasteful of land: they make the fences as crooked as the ways of a politician—to suit some slight conformation of the ground, to avoid passing over a small brook, or what in some cases appeared to me could be only a desire to make the fence as crooked as possible. Now, geometry demonstrates that "a straight line is the shortest distance between two points." It would economize both fence and land to make the fences straight; and the fields would be easier of cultivation. Cross fences, at least, could be straightened. Where the boundaries of farms are crooked lines, why not cut off a rod here and a rod there, and make the boundary line straight? For that matter, while we are speaking of economy in fencing, why not have no fences, as in the West? The old common law was right; a man should fence his own stock in, and not all the world's out; and if this should now prevail, one-fifth of the fencing we now have would answer, and we would not at all be inconvenienced, either.

Shall I offend the pride of my Eastern readers if I say that Illinois has better farm dwellings than New York or Pennsylvania? It is true. Compare the best parts of the States, and we can beat you on houses. But you Easterners beat us on barns; and you beat us further than we beat you on houses. In barns and all outbuildings, you are far ahead of Illinois—of course, further ahead of Nebraska or Kansas. I like to look at the barns in the best part of New York or Pennsylvania, they are so large and substantial and neat. I believe the barns are neater and better kept than the dwellings. Not long since I visited an Illinois farmer who had his own waterworks and gasworks, having water and gas in all parts of his large and very handsome four-story brick and stone dwelling. His barns were large; but they were of boards, had never known paint, and there was litter and manure about them. I could not help but contrast them with the neat Eastern barns, in which I could see the cattle eating. Think of us, or a Nebraskan or a Kansan, putting cattle in a stable in summer! It would pay a Western farmer for the trip to go East and study only barns and stables. He would then realize how much feed he wastes, how much he loses by exposing his animals, and how much manure he might get on his land.

In the West much more farm machinery is used than in the East. It causes a Westerner to laugh to see small grain being cut with a "dropper" or a self-raking reaper; and he cannot refrain from laughing heartily when he sees grain being cut with a cradle. I do not think that one Nebraskan in a thousand would cut grain with a cradle; he would lose the grain first. Nothing short of a self-binder will answer; and then we put on five horses, and cut and bind twenty acres a day. Six years ago I cut 147 acres in one week, and didn't work in the dark or on Sunday either. True, I used ten horses, two sets of five, but that was because the ground was so soft I would mire down if I didn't drive fast, and several times did it anyhow.

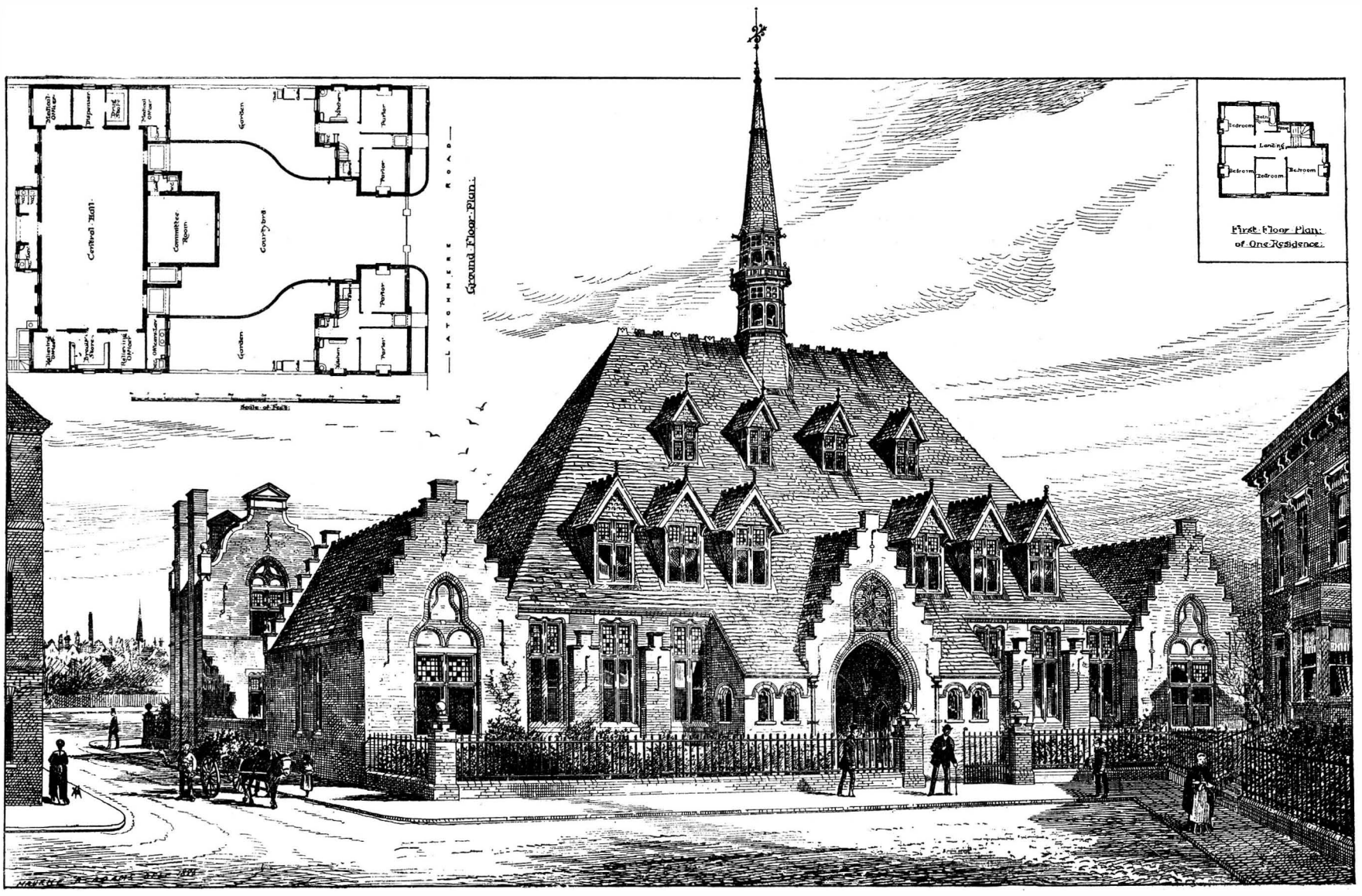
We don't cover corn with a hoe. We plant from twenty to thirty acres a day with a self-dropping two-horse planter. We raise the hay on the wagon with horse power (but pile the hay out of doors, sad to say); ride when we plow or harrow, or plant or sow, or reap or bind; and thrash by steam. In great part this is because of our smooth, level land, free from stones and stumps—but in part because we are more enterprising. (Fact.) The Eastern farmers are more wedded to old ways. They look at a dollar longer before they spend it for some improvement, and likely put it back in their pocket when they have finished looking at it. Take the matter of tile draining, for illustration. When Ohio farmers found that it paid to tile-drain, they put down tile liberally. Now the craze has struck Illinois, and Illinois farmers are planting tile as they would corn.

We have found it cheaper to make the wind pump our water than to do it ourselves; and the wind is doing a big lot of work of that sort. Get across the Missouri River, and a well without a wind pump above it is a curiosity. The wind kicks over the traces sometimes, and distributes houses and cattle around in a very annoying manner; but generally it works well and boards itself. My Eastern readers may claim all the credit for Western enterprise by saying that Westerners are emigrants, or descendants of emigrants, from the East. This is about true. The man that pulls up stakes in the East and goes out to Kansas or Nebraska must have considerable enterprise and go-aheaditiveness. And this does more than crop out in his new home—it expands.

I find that a great many Eastern people fancy that we raise mostly scrub cattle in the West. A trip West would change their notion. One of the surprises to me when I made my Eastern trip was that the cattle in New York were no better than the cattle in Illinois. I expected to find them better. Taken as a whole, New York has better dairy cattle than we, though Illinois has as good dairy cattle as any. In beef cattle we are ahead of the East—further ahead than they are of us in dairy cattle. In the West the cattle are not quite so good as in this middle territory; but there the scarcity of cattle is more apparent than the poor quality. And this is true of all stock. Even the ranchmen are now using full-blood males, some ranch owners buying Hereford, or Short-Horn, or Polled-Angus bulls by the hundred. You care for your farm animals far better East than the Westerners do—better than we do. This is not because of our ignorance or cruelty, but because many in the central part, and nearly all in the West, are paying for their land yet, and good barns and stables will come as soon as we can get to them. But observation, and especially conversation with those farmers who get on the trains, convinces me that raising scrubs can be set down against the East rather than against the middle section, or even the West.

We farmers should travel more. The Westerner can learn much of the Easterner, and the Easterner can learn just as much of the Westerner. The Westerner will be impressed that the *forte* of the Easterner is to save; the Easterner will think that the *forte* of the Westerner is to make. If the enterprise of the one could be combined with the economy of the other, both would be richer. If the Westerner goes East expecting to find every farmer highly intelligent, as I did, he will be fooled. If the Easterner goes West expecting to find every person ignorant, he will be worse fooled. No State in the Union can show more college graduates to the square inch than Kansas. There is more planting in the moon in the East than in the West, and more coins put away in socks; but in the West we are apt to spread our planting over eighty acres of earth when it should be only forty, and to buy land when we have nothing in our socks but holes. JOHN M. STAHL.

Quincy, Ill.



THE BATTERSEA DISPENSARY AND RELIEF STATION.

WIND pressure is generally supposed to increase as the square of the velocity when the opposing surface is at right angles to the direction of the wind, and in such cases Smeaton's rule is to divide the square of the velocity in miles per hour by 200; the quotient is the pressure in pounds per square foot.

Destruction by Nitro-glycerine Explosions.

An "old oil operator" in the Bradford oil region thus rehearses in the New York *Times* some facts as to glycerine explosions which are certainly mysterious, and have been observed many times:

"Attending the frightful deaths that so frequently follow the handling of nitro-glycerine in the oil regions, there is one feature the mysterious nature of which is startling. It has puzzled scientific observation and study, and I do not believe to-day that any satisfactory explanation can be given of it. This singular feature is the almost complete annihilation of matter, especially of the human body, which in a majority of cases results from a fatal explosion of this compound. I have noticed that in many instances. I had a teamster in our employ once named Henry France. Like all men of his kind in the oil country, there was nothing either above, below, or on the earth that he feared. He was in the habit of carting nitro-glycerine to any well where I wanted to use it, and he and his partner Warren Jack actually got so reckless in handling the deadly stuff that no other help I had would remain at work when they knew France and Jack were coming in with a load of glycerine. These two men were so callous to fear that they used to unload the stuff as they would a load of bricks, France standing in the wagon and throwing a can to Jack, who stood some feet away, and Jack catching it and placing it on the ground in time to catch the next one his companion tossed him.

"As it takes a man with a good set of nerves to even ride in a wagon when he knows there is nitro-glycerine under the seat, this manner of handling a compound that the slightest jar frequently explodes will give an idea of the sort of nerves these two men had. One day in 1880 France was coming in with a load of glycerine, and when he was within a quarter of a mile of the well we heard an explosion. No one ever knew how it happened, but it was one of the most complete cases of nitro-glycerine annihilation I ever saw. We found the usual cellar that a few cans of glycerine always digs in the ground when it goes off, and the usual area of timber felled. Over 300 ft. off in the woods, to the right of the road, we picked up a wagon tire. We found the tail of one horse and the hoof of another. In another part of the woods a man's knee was picked up, and that was all we ever found, except Henry France's greasy cap lying by the side of a stump and his silver watch hanging on the limb of a tree.

"George Doran was blown to pieces by a nitro-glycerine explosion at Red Rock a few years ago. He was a man that weighed 200 pounds. All that the most thorough search ever recovered of that 200 pounds of flesh and bone was a part of one of the poor man's feet —less than one pound. Charles Berridge, a well known oil man, was blown up by nitro-glycerine one winter in Allegheny County. The ground was covered with newly fallen snow. On either side was a high and abrupt hill only a few rods apart. Berridge was a very tall man, and his weight was 180 pounds. The remains of the poor fellow were searched for carefully, but less than 15 pounds of them could be found. The most curious part of the case, and one showing how completely annihilation accompanies an explosion of nitro-glycerine, was this: The greatest force of the explosive is always expended upward. However infinitesimal the atoms to which Berridge's body might have been reduced by this explosion, in falling back upon that spotless snow some trace of them must have been seen, but the snow remained as spotless as before. Besides human bodies, the iron frames of wagons, and even the ponderous nitro-glycerine safes, have been removed from human vision by an explosion as effectually as if they had never been formed, and the mystery of their utter annihilation cannot be explained."

The Great Question of the Day.

The late Dr. Samuel D. Gross used the following words in an address delivered at the dedication of the McDowell monument: "Young men of America, listen to the voice of one who has grown old in his profession, and who will probably never address you again, as he utters a parting word of advice. The great question of the day is not this operation or that, not ovariotomy or lithotomy, or hip joint amputation, which have reflected so much glory upon American medicine, but preventive medicine, the hygiene of our persons, our dwellings, our streets—in a word, our surroundings, whatever or wherever they may be, whether in city, town, hamlet, or country; and the establishment of efficient town and State boards of health, through whose agency we shall be more able to prevent the origin and fatal effects of what are known as the zymotic or preventible diseases, which carry so much woe and sorrow into our families, and often sweep like hurricanes over the earth, destroying millions of human lives in an incredibly short time. The day has arrived when the people must be aroused to a deeper and more earnest sense of the people's welfare, and suitable measures adopted for the protection, as well as for the better development, of their physical, moral, and intellectual powers. This is the great problem of the day—the question which you, as representatives of the rising generation of physicians, should urge, in season and out of season, upon the attention of your fellow-citizens; the question which, above and beyond all others, should engage your most serious thoughts and elicit your most earnest co-operation. When this great object shall be attained, when man shall be able to prevent disease, and to reach with little or no suffering his threescore years and ten, so graphically described by the Psalmist, then, and not till then, will the world be a paradise."

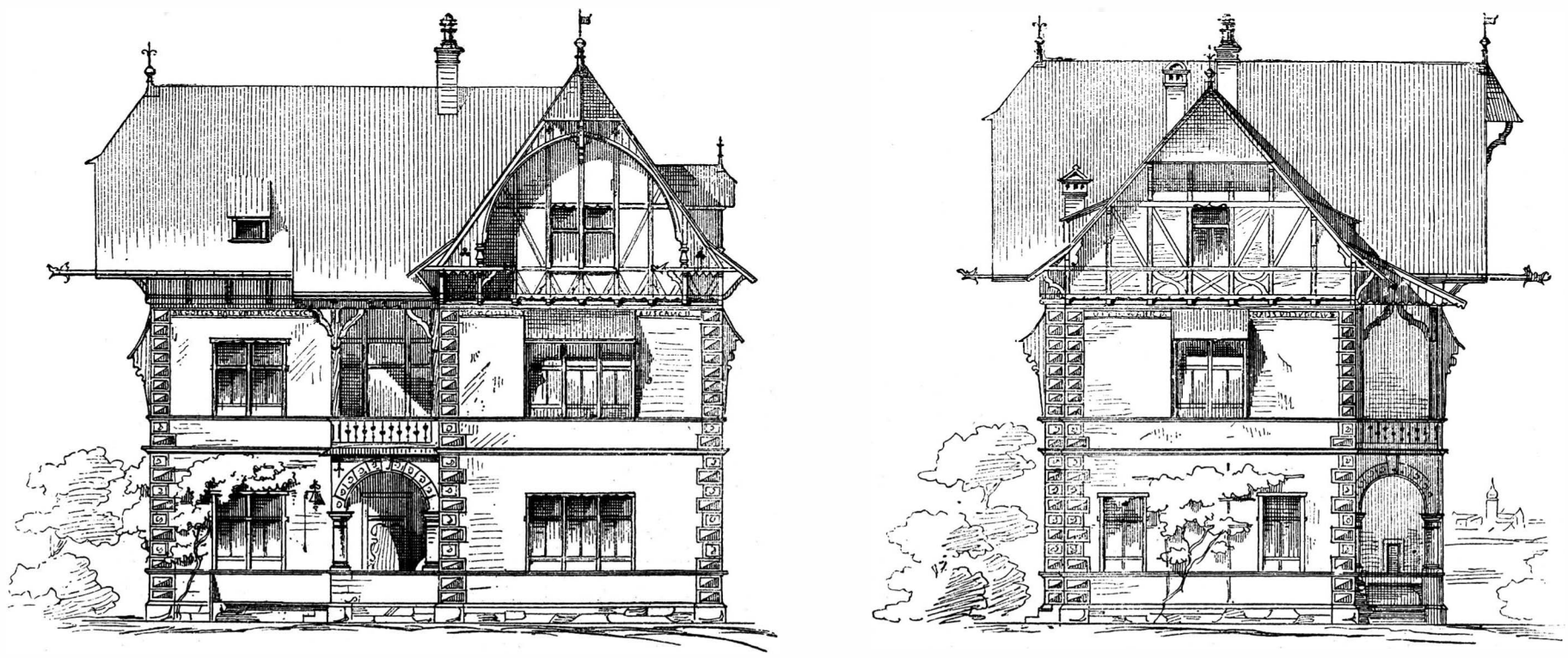
Lightning Melts a Lead Water Pipe.

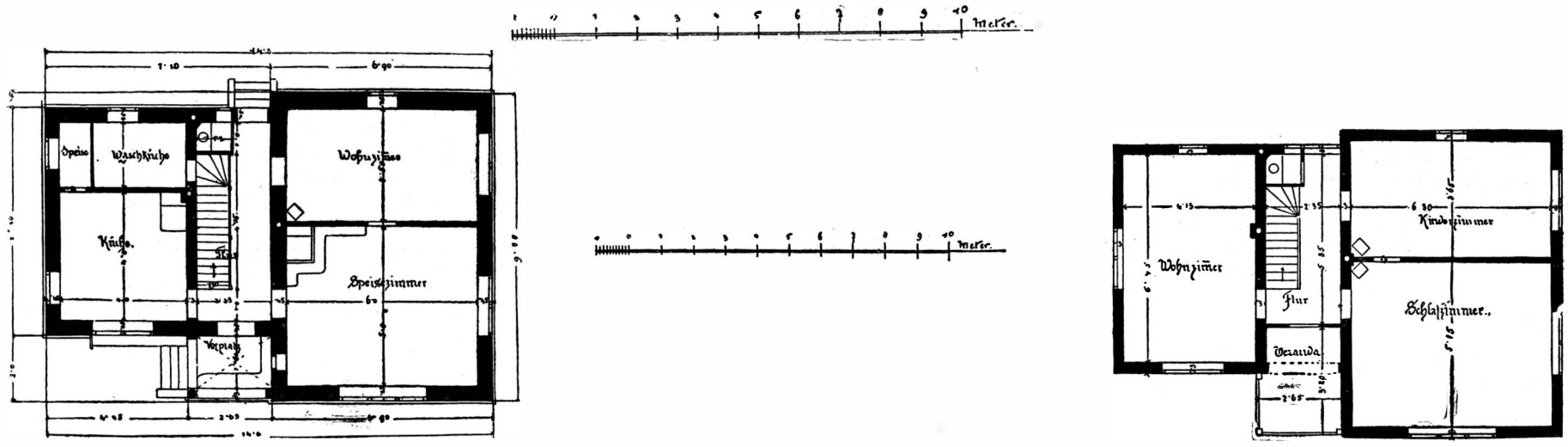
Through the courtesy of Mr. W. F. Stewart, of Hermitage, Pa., we have received an account of the melting by lightning of a lead water pipe on the place of Mr. R. H. Abbey, of Corry, Pa. Water is brought to the buildings from a spring, 80 rods distant, through a lead pipe of half inch bore, at a depth of two feet. Water ceased running about the middle of last May, just after a thunderstorm, and all attempts to force it through failed. In September, Mr. Abbey dug down and found the difficulty to be some 15 rods from the spring, where a section of pipe, 3 or 4 inches long, was found to be melted and fused, so as to be nearly solid. This was cut out and new pipe put in, but still the water failed to run.

Two other melted sections, but not so completely as the first, were found, one about 7 feet above and the other 6 feet below the first. When these had been replaced, a full stream was obtained at the barn. On the west side of the pipe, opposite where it had been melted, the turf had been torn up for a distance of 30 feet or more, and from 1 to 2 feet wide and 6 to 8 inches deep. About 8 feet from the pipe this had forked, one part extending to the middle and the other to the upper fused point. This disturbance had been noticed at the time the water stopped flowing, and "consequently," Mr. Abbey concludes, "when I found the fused pipe, I was satisfied it was the work of lightning."

The New Water Tunnel, Chicago.

The work on the new lake tunnel at Chicago is progressing rapidly. The men work in three shifts, of eight hours each. The first dig the hole about 10 ft. in diameter, through clay, at the rate of about 18 ft. per day, the second trim it up and wall with planks, and the third lay a circular wall of bricks in cement, 12 in. thick. The tunnel is left a shade over 7 ft. in diameter, the whole plastered with cement. This will be completed in about five weeks, and the whole work in about three months.





AN AUSTRIAN COUNTRY HOUSE.—BY L. THEYER, ARCHITECT, BOZEN.

Hints for Builders.

The architects and builders of a thousand years or more seemed to recognize the peculiar construction of the eye and its ability to take in round objects better than square, and, no matter whether they understood this delusion or optical principle or not, it was apparently applied to all their public buildings and rooms of state. Though some of their specimens of architecture baffle the best engineering skill of the present age, these secrets were not buried beneath the ruins of Baalbec, Herculaneum, or Pompeii.

It may be that the massive stones in some of their large temples were put in place by some mechanical contrivances unknown in modern times; or it may be that large hills once occupied their temple sites, and the stones placed one above another, as we build a cellar wall, and when the structure was completed underground, the hill was razed and the edifice appeared in all its architectural beauty and simplicity, appearing, as it were, in a single night, a masterpiece to excite the wonder and admiration of generations countless centuries afterward.

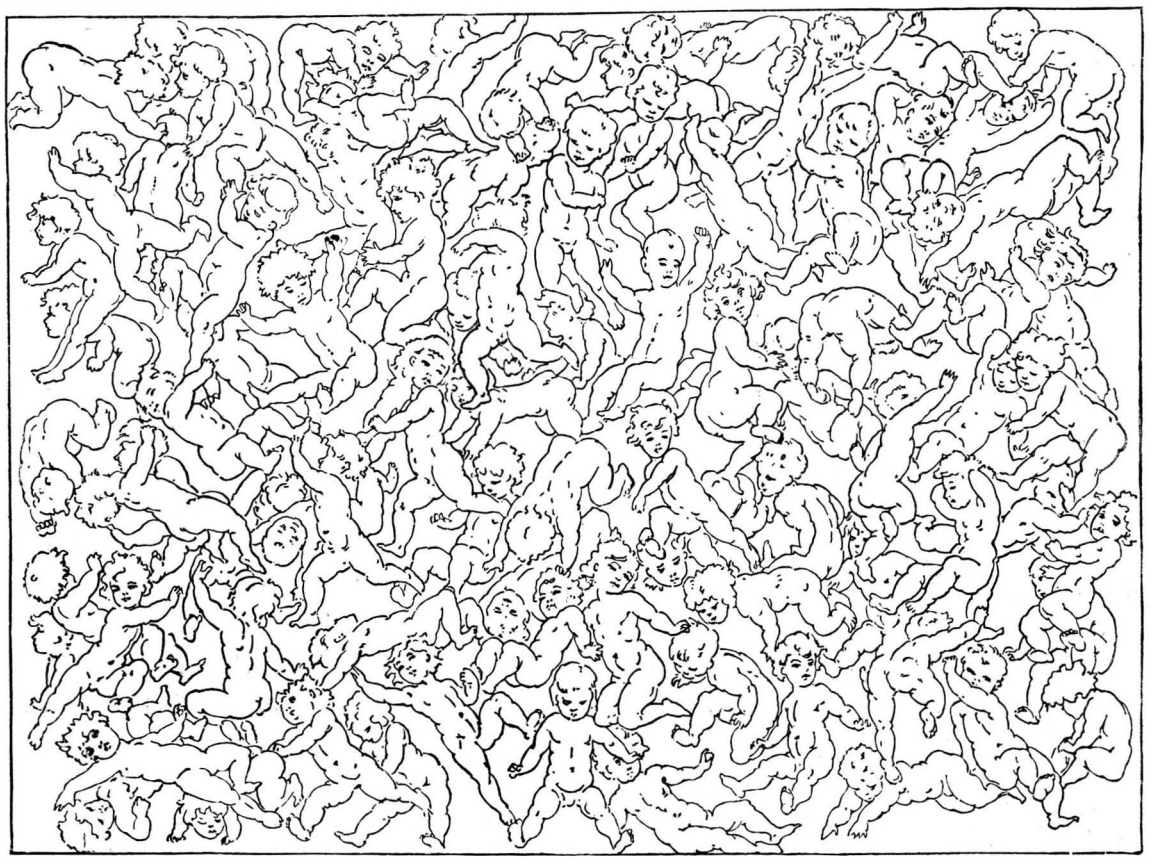
But the external appearances of their structures were by no means the only features that deceived the eye, and were intended to so deceive. The writer has stood in some rooms, in old temples, that the apparent size would stagger belief; and in others very small as measured with the eye would be small and still have so many outside walls, showing them to be very much larger than one would estimate. On the other hand, the large room would not be half so large as it looked to be, and the smaller twice its apparent size. These people disguised distances by curves, domes and alcoves; even a slope of but three inches of the floor toward the center, with a corresponding elevation of the ceiling center, made a difference of as many feet in the apparent height.

These principles are of easy application in modern buildings. To make a room appear higher, the plain surface of the ceiling should be decreased by the mouldings of the cornice, by panels, or, in the absence of these, by bands of color performing the same office. A vertical system of line should be adopted in mural decoration, and the mantel should be lower.

Then, to make a room appear lower, precisely the opposite treatment should be adopted; that is, to increase the plain ceiling, adopt a horizontal system of mural decoration, with a dado and a high mantel. To make a room appear wider may be accomplished by making it appear lower; but where this is undesirable, or where it is insufficient, the effect can be reached by adopting a mural decoration on a graduated scale of form, decreasing upward, so that two or more patterns at the top similar to those at the foot are found to occupy the same space as one at the foot, and this effect can be much increased by a gradation of color upward from dark to light.

To make a room appear narrower is accomplished by making it appear higher; but in case enough deception cannot be produced in this way, the same effect can be obtained by adopting a strongly drawn, large pattern in strong color for mural decoration. To make a room appear longer is accomplished by making it appear lower and narrower, and the effect is increased by decreasing the scale and strength of color of the mural decorations adopted at the ends. To make a room appear shorter is accomplished by making it appear wider and higher, and the same effect can be reached by increasing the scale and strength of color of the mural decorations adopted at the ends.

Any of the foregoing can be modified or increased by treatment of the floor surface, whether by carpets, rugs, painted boards, or the parquet flooring; lines running across a room, or rugs laid down at intervals, having the effect of shortening, and to an extent of heightening and widening a room, consequently lines running in the length increase this dimension, and to an extent reduce the height and width. A floor polished increases the apparent height of an apartment by reflecting all vertical lines and prolonging them.—*J. F. E., St. Louis Miller.*



CURIOUS DESIGN FOR WALL PAPER OR PANEL FOR A NURSERY.

THE CULTURE OF FUCHSIAS.

Lovers of flowers will perhaps be interested in the accompanying engravings, reproduced from photographs representing some fuchsias of unusual forms and dimensions raised by an amateur florist at Evreux. These fuchsias are the ornament of the garden, and are admired by connoisseurs as much for the vigor of their growth as for the abundance and beauty of their flowers. Fig. 1 represents one of these shrubs in its fourth year, and one whose flat, dome-shaped head, two yards in diameter, is large enough to allow several persons to take advantage of its shade. Seated under this plant, one can converse or refresh himself, as is shown by the objects reproduced in the cut, which serve at the same time to well establish the dimensions of this exceptional specimen.

In Fig. 2, three other fuchsias are grouped, the tallest of which is 14 ft. in height. This plant is six years old, and the others four

It is extremely rare to obtain such specimens of a plant which scarcely exceeds three feet in height in ordinary cultivation. The arrangements represented herewith are very pleasing and decorative, and might be oftener adopted by amateurs in horticulture.

The fuchsia is admirably adapted for the decoration of gardens. The elegance of its form, the lovely aspect of its flowers and their duration, and the little care that its culture requires should contribute to recommend it still further to the attention of landscape gardeners. In 1845, Mr. G. Porcher, president of the Orleans Horticultural Society, published a learned monograph upon fuchsias in an interesting volume which was soon out of print. A second edition of the work appeared in 1848, and to this the author added an enumeration of 738 species and varieties of the plant. We should add that since that period the list has considerably increased, thanks to the science of our horticulturists and to the zeal of amateurs, who are much more numerous than is usually thought.—*La Nature.*

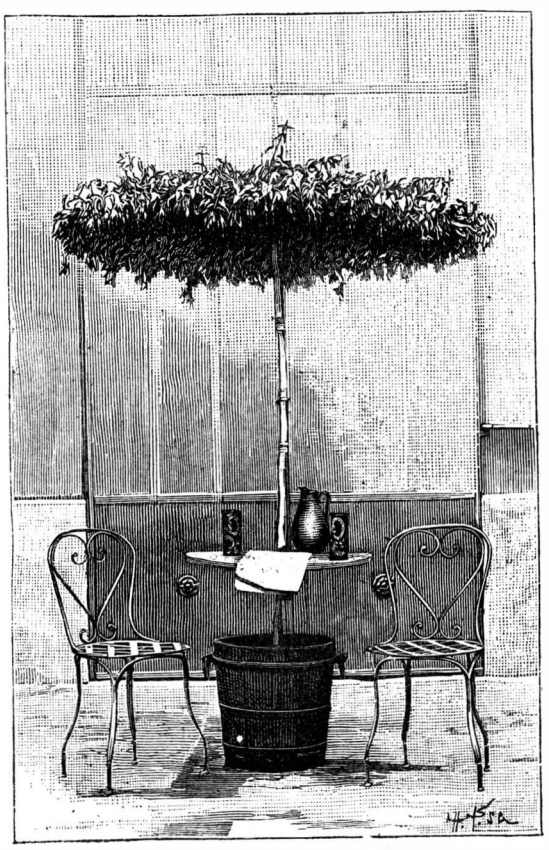


Fig. 1.

SHRUBBY FUCHSIAS.

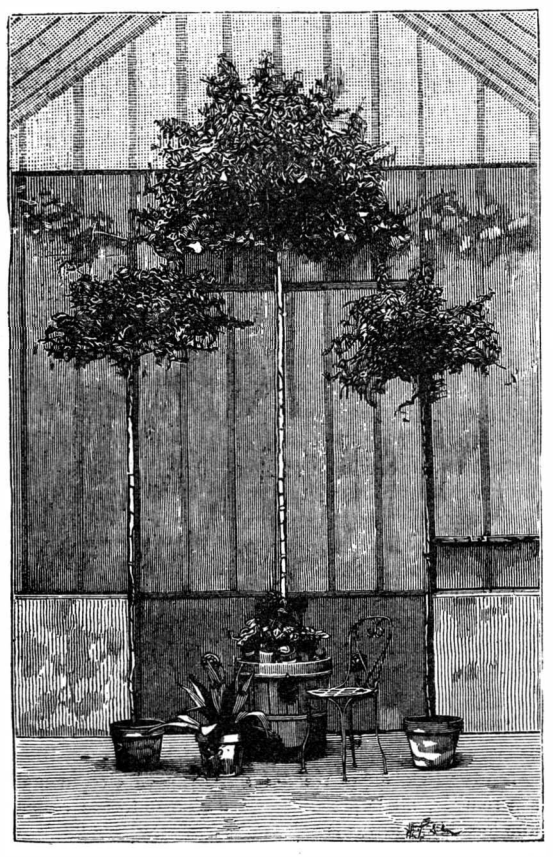


Fig. 2.

Ivy in Hanging Baskets.

Among the very best plants for filling wire baskets that are hung up in corridors, verandas, and other exposed places all the year round are some of the many beautiful varieties of ivy, especially those with very small foliage and graceful trailing shoots. Some years ago I was very much pleased with the excellent effect produced by means of the common English ivy alone, that an amateur friend used to employ in a great variety of ways, for decoration, and especially for filling hanging baskets both indoors and out, the windows being draped with elegant shoots from plants growing in the smallest possible root space. Since that time I have employed ivies for baskets, for brackets, and balconies, and with excellent effect. Any one who has not tried them can have little idea of the variety of form and color to be found among these common hardy plants, and the smaller the root space the better do they display their variegation. The golden blotched variety, that only produces a few golden leaves at wide intervals apart when planted in rich soil, becomes beautifully variegated when starved at the root, and some of the silver variegated sorts are equally interesting. The large leaved kind called Hedera maculata, that in rich soil assumes a dull white variegation, is very much improved by basket culture, and the best of such hardy subjects is that they impart a cheerful look to a dwelling house at a time when other less hardy plants need the shelter of heated glass structures. For lining the base of hanging baskets nothing is equal to the stonecrops. They look fresh and green at all times of the year, except when covered with white or yellow flowers.—*J. G., Hants, in The Garden.*

To copper small pieces of sheet iron: Clean the article thoroughly by treatment in a bath of muriatic acid 1 part, water 4 parts, to remove all scale. Wash in hot water and tumble in sawdust wet with a solution of sulphate of copper in water, to which add as much sulphuric acid as is equal to the weight of the dry sulphate of copper. Use about 2 ounces of each to a gallon of water. You may also copper work that cannot be easily tumbled by dipping in the above solution hot. The work must be clean and free from grease.

INITIAL LETTERS.

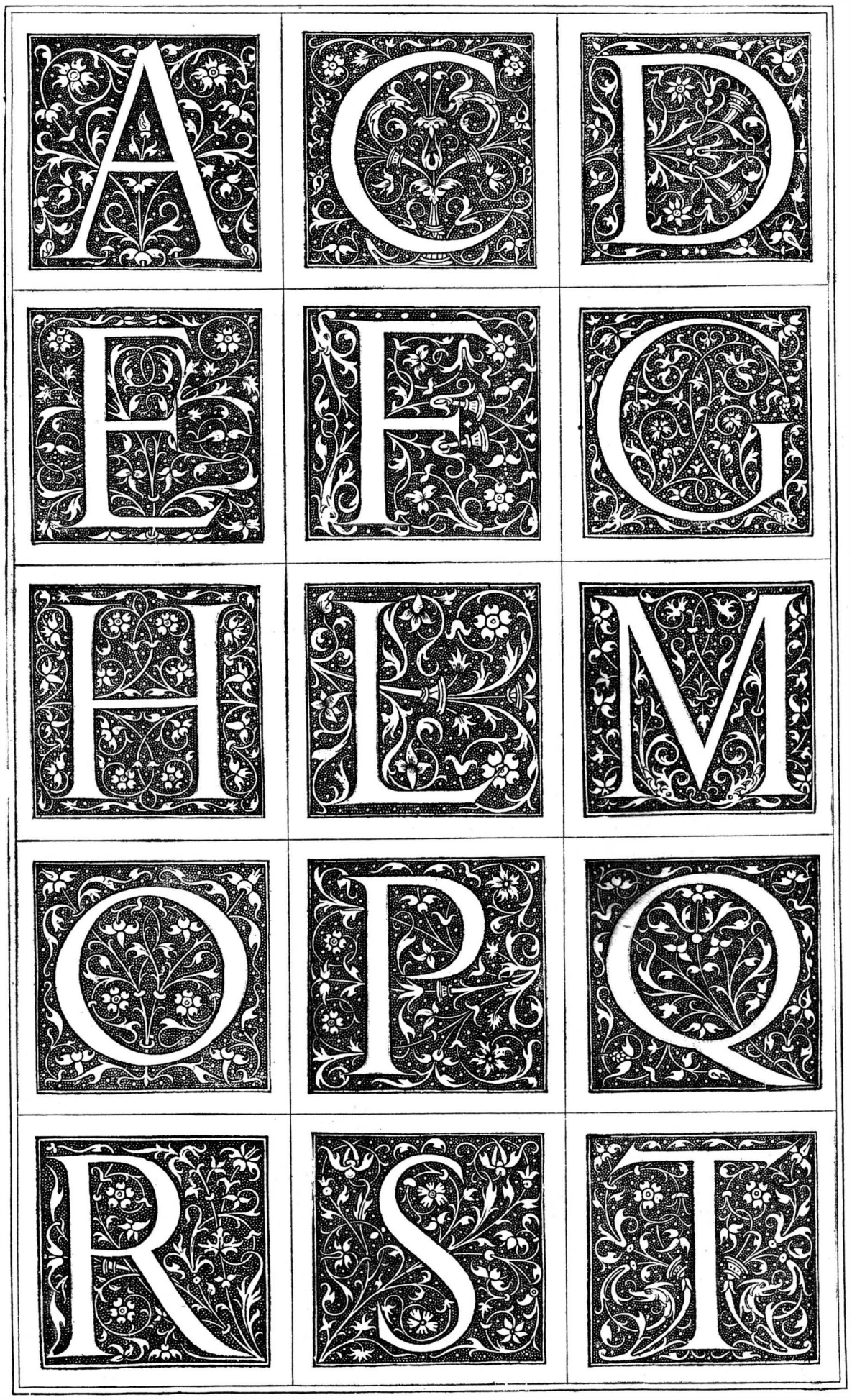
We give engravings of initial letters, the backgrounds of which are full of the most graceful and artistic forms, which we have thought some of our readers might find instructive and useful in various kinds of decorative work. These forms, or parts of them, may be readily enlarged to suit special requirements. The *Building News*, from which our illustrations are taken, gives the following:

Among the various designs for capital letters employed by the printers at the beginning of the 16th century, a very important position must be assigned to those of the French school, which found some of its foremost and best exponents among the members of the famous family of the Estiennes, perhaps better known to modern readers by their Latinized name of Stephanus. The beautiful interlacing designs used by Iodocus Badius doubtless suggested to the unknown artist who worked for R. Stephanus the motive upon which the decoration of the splendid initial letters employed by him is based. The monogram of the author of these designs is frequently found on the printers' devices and upon many of the woodcuts about this period. It consists of what is termed by heralds a "patriarchal cross," and it occurs beneath the center of the G in the letters we have reproduced, this being, we believe, the only one of the capitals thus distinguished.

May we hazard the conjecture that this was the first letter of the name of the author, and that it is to Geoffroy Tory, who was frequently employed by Stephanus, and who is said to have produced the fine folio device of an olive tree, with its broken and displaced branches, used by this printer, that we owe these charming designs? The mark in question bears a cross of the same kind near the roots of the tree, on the left side of the lower margin of the woodcut.

Very soon after the introduction of engraved initials printed with the type, we find such letters placed upon a background of interlaced ornament, which was at first coarse and rude, as in the work of Ratdolt at Venice in 1477, but which gradually became more graceful and refined in the early years of the 16th century, and reached its perfection in the large alphabet, designed probably for the great Bible issued by Stephanus in 1528, fifteen letters of which form the subject of our illustration.

The letters we have selected give all the chief types of the ornament, from the stiff and somewhat heavy curves of the foliage of the L to the evenly distributed and well-balanced tracery of the S. In spite of many diversities of flowers and leafage, there is a strong family resemblance in all this ornament. The frequently repeated dolphin's head from which the principal lines spring in many of the letters, the graceful cornucopia introduced in others, and the five-petaled flower which occurs in most of them, show the same hand throughout. As examples of ornamental treatment, most of these letters furnish quite a study, and will bear looking into most carefully. Among other things we may note the skill with which the masses of light and dark are arranged, all the large surfaces of black in the background being broken up by means of minute dots of white.



FRENCH INITIAL LETTERS, 1532-1544.—BY ROBERT STEPHANUS, OF PARIS.

We may draw attention also the care with which the scale of the foliage is considered, so as not to compete with the white letter, which in each case comes out into chief prominence. Observe, also, the tendency of the stem or mid-rib of the ornament to intersect the chief lines of the letter, and to give an opposite direction to the decorative scheme of the background. This may be specially noticed in the D and in the Q, though it will be more or less apparent in all the letters.

The forms of the letters themselves are extremely graceful, and follow very closely the rules laid down by Serlio in the fifth book of his architecture. There is marvelous variety in the motion or framework of all this decoration, and in the admirable manner in which it is disposed. Each woodcut, in fact, constitutes a little picture, and we scarcely know which to select for special praise. Perhaps the S, which is one of the smallest of the letters, has afforded most scope for skillful treatment of the background, and the artist has here well availed himself of his opportunities. The stem springs from one corner of the square, and crosses the S almost at right angles, the chief tendrils shape themselves lovingly into corresponding curves in the top and bottom of the letter, while one of the main branches balances the terminal flower at the summit of the stem. The lines of the foliage and the seven or eight varieties of leaves and flowers are most harmonious. The initials here illustrated occur in the "Virgil" of 1532, and in the letters of Francis I., dated 1544.

G. R. R.

Chimneys.

For those parts of a chimney which are supported throughout, stone may, under some circumstances, be admissible, but brick is always preferable for the purpose. The abutments of a chimney should be tied into the walls by wrought iron bars of sufficient number and strength, turned up and down at the ends, and built into the jambs for several inches on each side. No part of a flue should be of less thickness than half a brick, or 4½ inches. Where slabs of stone or slate are placed level with a floor before the opening of a chimney, they should invariably be laid in sound mortar, cement, or other incombustible and non-conducting substance, and it should be at a distance of not less than 4½ inches from the joists, flooring, or any other woodwork. A chimney built only up to the roof and stopping at that point is always dangerous. Every chimney in a house should be perfectly distinct and separate from every other chimney, from the hearth to the external opening. Chimneys may safely be built in stacks, but they should on no account have any connection within the stacks. Brickwork around flues should not be less than 4½ inches thick in any part. By the Code Napoleon it was not permitted to build a chimney against the wall of an adjoining house without isolating it by an intermediate wall of sufficient thickness to prevent heat passing to the neighboring premises.—*The Architect.*

Preservation of Wood by Lime.

I have for many years been in the habit of preparing home-grown timber of the inferior sorts of fir—Scotch, spruce, and silver—by steeping it in a tank (that is, a hole dug in clay or peat, which was fairly watertight) in a saturated solution of lime. Its effect on the sapwood is to so harden it and fill the pores that it perfectly resists the attacks of the little wood-boring beetle, and makes it, in fact, equally as durable as the made wood. I have a mill which was lofted with Scotch fir prepared in this way in 1850, and it is in perfect preservation. The timber is packed as closely as it will lie in the tank, water is let in, and unslaked lime is thrown on the top and well stirred about. There is no danger that the solution will not find its way to everything in the tank. I leave the wood in the solution from two to three months, by the end of which time an inch board will be fully permeated by it. Joists and beams would, of course, take a longer time for saturation; but in practice we find that the protection afforded by two to three months' steeping is sufficient if the scantlings are cut to the sizes at which they are to be used.—*Field.*

HALF the time spent in fatiguing tramps after wild berries would supply better ones in a fruit garden. They grow well in the shade of trees or fence, and are easily tended and made productive by a liberal supply of cheap mulch.—*Hugh T. Brooks, in Michigan Horticulturist.*

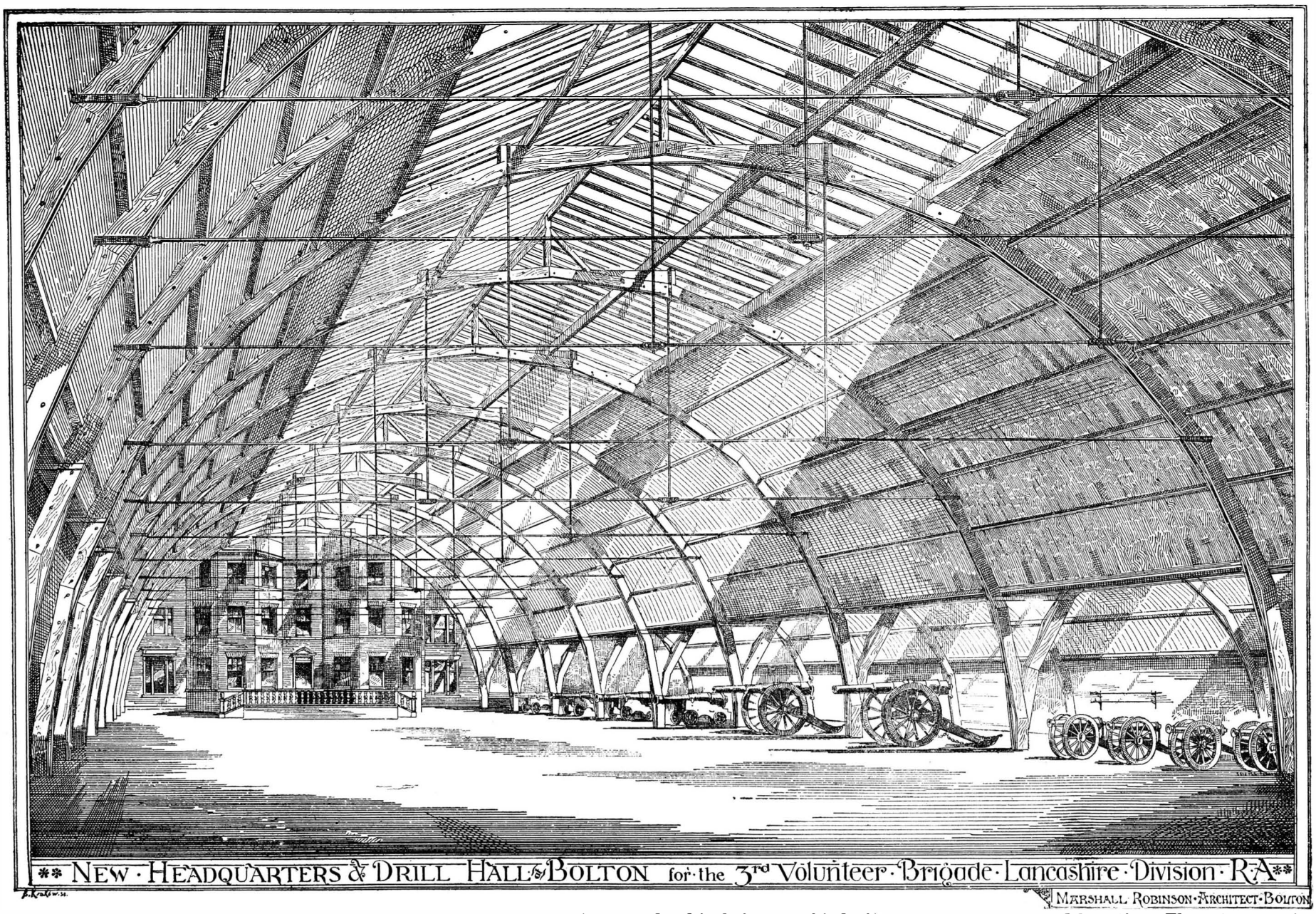
DRILL HALL, BOLTON.

The Bolton Artillery Corps, having for a long time felt the necessity of more capacious premises for drill purposes, have purchased a building in the heart of the town, known as Silverwell House, along with about 2,200 yards of open ground.

The house is exceedingly capacious, and with slight alteration will provide all the accommodation required for a headquarters, including mess and orderly rooms, instructors' quarters, lecture rooms, armory, and clothing stores, canteen, etc. It is proposed to erect upon the ground adjoining the house two large drill sheds, side by side, one 145 ft. by 80 ft. for company drill, and another for gun and gyn drill, 180 ft. by 45 ft.

The general construction of the sheds will consist of semicircular principals, half a diameter high, placed 14 ft. apart, composed of four thicknesses of 11 by 1½ in. planks bolted together, with broken joints. The feet of the principals will be received into cast iron shoes embedded in a foundation of concrete, and kept in position by means of wrought iron tie rods running transversely under ground. Light purlins, 5 ft. apart, will support the roof covering, which consists of slates and boarding. This method of construction gives a permanent building of pleasing form at a very reasonable cost, which, besides doing duty as a drill hall, will be available for mass meetings, bazars, popular concerts, etc. The architect of the structure is Captain M. Robinson, M.S.A., of the corps, and the cost will not exceed £2,000, or $10,000.

The above, from the London *Building News*, is an example of a spacious structure at a moderate cost.



Asphalt Pavement.

After a long discussion of the merits of the various kinds of street pavement, a few months ago St. Paul decided to lay asphalt on two or three of its principal residence streets. The opposition to this material was very strong from leading property holders, who feared the effects of the climate, but in the short time it has been laid many who opposed it now pronounce it superior to any other pavement in use, and it is probable that the city will lay it very extensively next year. Mr. J. N. Granger has been one of the leading advocates of this material, and he has taken pains to obtain all existing information in regard to its use under different conditions of use, climate, etc. The following letter was addressed to Mr. Granger, in reply to queries from him, by a gentleman in Buffalo, who is said to be a leading authority on all kinds of roads and pavements, and whose experience extends over a period of thirty years.

First—"Does the noise of horses' feet upon the asphalt pavement become a nuisance to persons living upon the street?" It does not appear to me that horses traveling over asphalt pavement make any more noise than on stone pavements. The passing of the vehicle attached is noiseless, consequently the two together do not make near the noise on asphalt as over stone pavement. Again, the fact that the demand for this pavement is greatly increasing in this city is proof that the noise of horses' feet is not considered a nuisance.

Second—"Is it necessary to repair a pavement so that it will contain blotches?" The asphalt pavement with us can be replaced so that it is impossible to find the repair except upon the closest inspection. This I have seen in several instances. Ordinarily, in passing over it, the repair would not be seen or ever noticed.

Third—"Cannot we tunnel under the pavement so as to make water and sewer connections, without disturbing the surface, etc.?" Yes; I think you can tunnel under it, and that the concrete will hold up under ordinary traffic. I understand that it has been done successfully here. I would state, however, that as the repairs can be done so perfectly, people prefer to cut it out as a cheaper method. With us all connections for gas, sewer, or water are ordered in before any kind of pavement is laid. Water with us is laid at about four feet below the surface; gas about three feet. The sewerage, of course, depends on the character of the undulations and elevation of the street. In some places it may require more depth than in others; of course, always below frost.

Fourth—"Is it not a fact that when men drive up a street paved with asphalt, they will turn on to a side street paved with the same article in preference to turning on to a street paved with something else?" Traffic with us seeks the asphalt pavement, and drivers with heavy loads go blocks out of their way to strike it. This is notably so in a street newly paved with asphalt, in the heart of the city—Ellicotte Street, over which a large amount of traffic is constantly passing. In the upper part of the city the result is the same; there pleasure driving seeks the asphalt pavement, as well as traffic. In regard to width of street pavements, we have them from twenty-eight to sixty feet wide, usually governed by the width of the street. Linwood Avenue is a ninety-nine foot street, and the pavement thirty-eight feet; Delaware Avenue is one hundred feet wide, and the pavement forty-two feet; West Avenue is sixty-six feet wide, and the pavement thirty feet. Sidewalks upon narrower streets (residence streets) are four feet wide. On Linwood Avenue and other like streets they are six feet. This leaves say twenty-one feet for grass plat, six feet for sidewalk, then seven feet to fence or street line. The houses stand back from twenty to thirty feet, with fences removed, making a wide-looking street. Wherever the asphalt has been laid in this city, it is a fact that property on the street has increased in value much more than the cost of the pavement. It is also considered as having much to do in beautifying the streets on which it has been laid. That this city is very much in favor of asphalt pavement is shown by the fact that this season sixteen miles have been laid within the city limits.

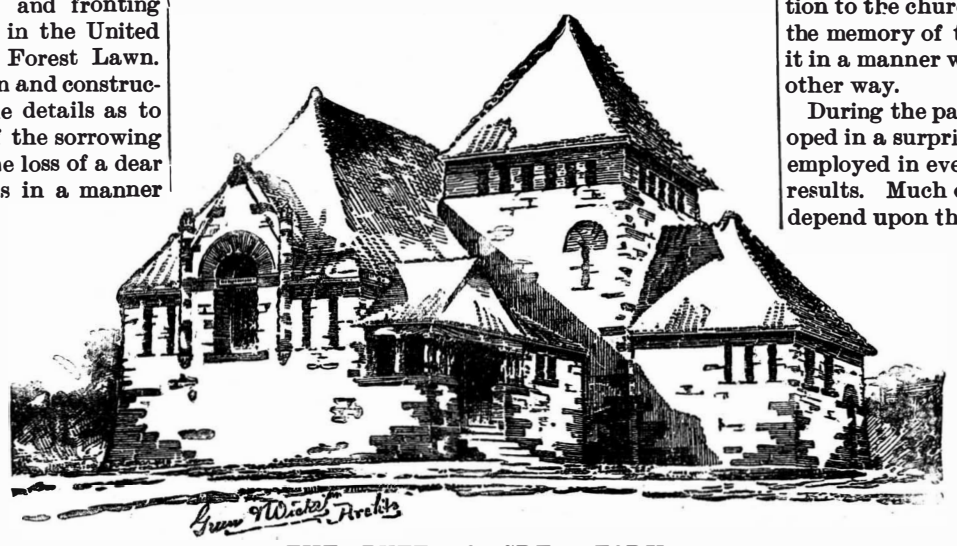
The writer says the asphalt is rapidly taking the place of the Medina stone pavement, which has been in general use there for fifty years and has given satisfaction, and the citizens are almost unanimously in favor of it, and adds:

The oldest asphalt laid here is Franklin Street. This, at the time, was an experiment. It was laid in 1878. Up to this time no repairs have been made or required on it, and, with the exception of surface wear, it is in as good condition as when first laid. When I speak of surface wear, I mean that the center or crown of the street may be worn off, say, from a quarter to half an inch. I will here state that with us all heavy traffic is carted on wagons with the tire four or five inches wide. This is a city ordinance, and all heavy loads are in wagons with that width of tire. This, of course, is for the benefit of all streets.

As to the effect of climatic changes on the asphalt, he says: With us, the climate seems to favor it. How it will stand the extreme heat and cold of St. Paul can, I think, only be determined by experiment, and he refers to the experience of Omaha, which is subject to extremes of heat and cold, as a guide for St. Paul. That this had already been ascertained and proved satisfactory he did not know.

THE BUFFALO CREMATORY.

There has been erected in the city of Buffalo a temple for the incineration of the remains of those whose last wishes in regard to the disposal of their bodies were in favor of cremation, whose æsthetic surroundings please the most difficult taste. The location of the building is in the most beautiful part of the city—about twenty minutes' drive from the city hall, out Buffalo's far-famed Delaware Avenue, and fronting one of the most beautiful cemeteries in the United States (and, therefore, in the world), Forest Lawn. The idea of those interested in its location and construction has been to so arrange all the little details as to render as light as possible the task of the sorrowing one, who is left, not only to mourn the loss of a dear friend, but also to dispose of the remains in a manner least grating to the individual feeling and least harmful to the many.



THE BUFFALO CREMATORY.

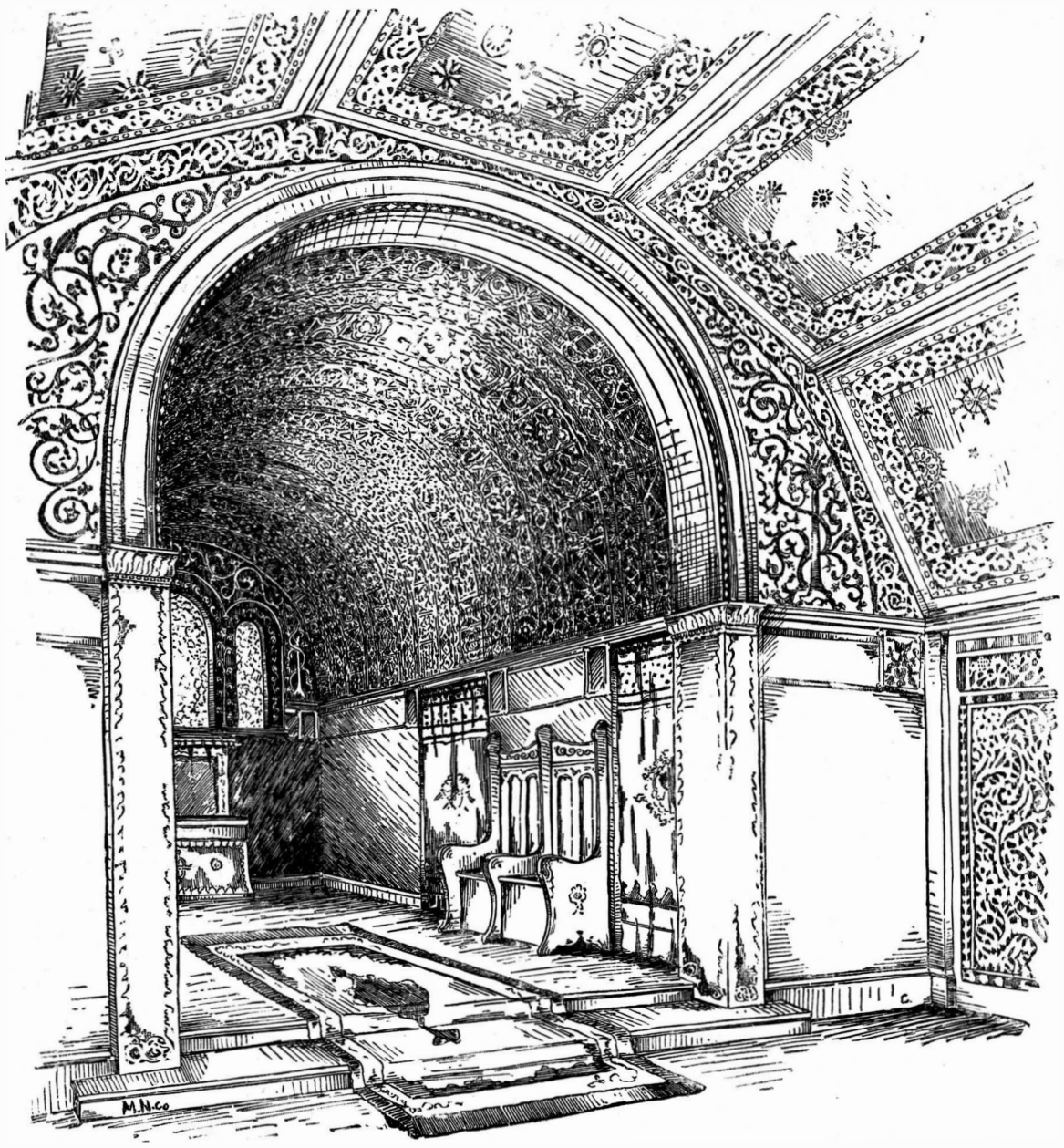
The crematory is built of dark brown sandstone, in a plain, substantial style, reminding one of the small chapels built in the North Country centuries ago, with square tower and steep, slanting roof, covered with ivy and surrounded by sloping lawns. While the hearse conveys the body to the room where the undertaker removes it from the coffin and places it upon a bier, the relatives and friends enter the chapel, while the clergyman passes behind the organ to take his place in the chancel. The bier rolls noiselessly into the chancel, the organist begins a prelude to a chant, the ceremony takes place according to the desires of the survivors. The surroundings present the ordinary aspect of an earth burial ceremony at a church. The body lies on a handsomely draped bier in the chancel. The chancel is beautifully decorated in an early Italian style. There are twenty-one different symbols and devices interwoven in arches of peacock green and blue, while the windows, of rich stained glass, shed a light, dim and religious. The nave, too, is decorated in the same style. All the surroundings combine to show respect for the dead, while respecting the feelings of the living. The service over, the curtains are withdrawn, and the bier glides noiselessly out of sight of the congregation. The crowd disperses, the incineration takes place privately, and the ashes are taken by the undertaker, to be disposed of as the body would have been, or left to form the nucleus of a columbarium.—*Sanitary News.*

Cleaning Cherry or Ash.

As the proper cleaning and finishing of oak or cherry require considerable care and skill, it will be interesting to notice the practical treatment which the woods undergo under the hands of the wood-worker.

Cherry, as in tables, framing, etc., is usually roughed off by the planing machine and worked into its required shape before finishing. When, as in the case of a veneered door, the frame is ready for cleaning off, it is laid on and firmly fastened to the bench by strips cut in between the joggles, then carefully surfaced or leveled over with the fore-plane. This is in itself a delicate operation, as the surfaces of the pieces must be exactly flush under a straight edge—that is to say, across the face stiles must be on the same level as the face of the rails, and the latter on the same level as the mullions; in short, the surfaces must all be in the same plane and the stiles likewise straightened. All lumps must be reduced, and great caution exercised to avoid sprawling corners. Use the plane with the grain, as the contrary works out holes and causes more trouble with the smoother. This done, it is usual to smooth off with a closely set, well-sharpened plane, or, better still, a Bailey iron plane. Some woodworkers object to using the iron plane, as it marks the stuff, and causes much scraping afterward, but it never breaks corners, and will work well against cross-grained stuff like this. Having finished smoothing, proceed to scrape the surface with a scraper which will cut to a shaving. Work carefully with the grain and take out all holes and rough spots, especially near the joints. When scraping across joints, bend the scraper with the hands and avoid tearing up the grain on either side of the joint. Obliterate every imperfection noticeable before applying the sandpaper, which should be No. 1, and used with a broad, flat cork rubber. On no account sandpaper across the joints, as the grit in the sandpaper will score across the sensitive surface, but work close to the endwood joint, and then with the grain of the jointed stile or rail, as the case may be. Of course the result of the operation depends on the operator's skill, but an exceedingly neat job can be done with a little care.

Ash is, perhaps, the most difficult of all the woods to clean, as the grain is of an open and straight nature, varied with a frequently recurring tough cross spot. Like cherry wood, after going through similar treatment, it shows a beautiful surface, which, being filled and varnished or polished, looks rich and glossy, the one dark and warm and the other light and elegant. After sandpapering, rough spots are seen by white blotches, and they can be easily scraped out as before. In these days, when pine is almost obsolete and the hard woods growing in popular favor, it is essential that their treatment be understood.—*Owen B. Maginnis, in Builder and Wood-worker.*



THE CHANCEL IN THE BUFFALO CREMATORY.

Stained Glass.

An enduring art and an old one is that of the execution of stained glass. Originally an art distinctly identified with religion in its application to churches, it is now equally connected with buildings of every kind. Now, as ever, it constitutes the best form for memorials; best because of its great enduring qualities and best by reason of the charm added as a decoration to the church as a structure, serving to keep alive the memory of the dead or the donor associated with it in a manner which could scarcely be obtained in any other way.

During the past ten years or so, the art has developed in a surprising manner, until now the material is employed in every variety of building with excellent results. Much of the good effect in stained glass will depend upon the artistic merit of the design, and, unfortunately, with the greatly increased use of the material, much of it has been manufactured of a very inferior and inartistic order.

At the same time, it is but fair to say that development of the art has been productive of work from some of our best artists which has reached a standard of merit comparing favorably with, if, indeed, it does not equal, that of past ages, as exemplified in the magnificent examples still found in the European churches, many of them in as good a condition as on the day they were executed.

Foremost among the artists whose efforts in this direction have been so successful is Mr. Louis C. Tiffany, now the President and Art Director of the Tiffany Glass Company, of 333 Fourth Avenue, New York City. This company have executed the designs of some of our finest artists, among whom may be mentioned Maitland Armstrong, Robert Blum, E. W. Longfellow, F. D. Millet, Elihu Vedder, and W. H. Low. Its work is represented by memorial windows and less important work in all parts of the country, and among these may be mentioned that in St. Paul's, Milwaukee, Wis., which is a reproduction of Doré's renowned painting, "Christ before the Prætorium." This window contains nearly 200 life size figures, and is all executed in colored glass alone, the only portions painted being the faces, hands, and feet. The innumerable shades and forms, the folds of drapery, and the numberless shadows are obtained by the use of colored glass of different tones, and the whole work is of rare merit.

The company have executed work in many of the public buildings in the country, such as Columbia, Yale, Princeton, and Williams Colleges; the White House at Washington; the Cotton Exchange, the Seventh Regiment Armory in New York, and in a very large number of private residences and smaller buildings.

Convention of the Western Association of Architects.

The third annual convention of this association was held at Chicago, on Nov. 17, 18, and 19 last, and was well attended. President Dankman Adler, in his practical and carefully considered opening address, offered his congratulations upon the great progress made in architecture generally in this country during the past few years. He said that what might be called a new style—an American style—developed by the wants and conditions of civilization in the 19th century, had arisen, and he urged the members to do all in their power in further developing it. Mr. I. Hodgson read a paper treating of the same subject, and among the other practical papers read may be mentioned "Proportions of Joints and Connections in Framed Structures," by S. G. Artingstall, "The Relation of State Medicine to the Profession of Architecture," by Dr. O. C. De Wolf, and "Hospitals for the Insane," by E. H. Ketchem.

Plants for House Decoration.

During winter, and especially at this season, great numbers of plants are required for house decoration, and no one should object to this use of them, seeing how much they beautify the different sites assigned to them. So much are we accustomed to seeing and admiring well-grown plants in front halls, corridors, dining rooms, drawing rooms, and in other positions, that we really think a house desolate without them; and for this reason, as well as on account of the knowledge that plants thus employed are much more appreciated than those always kept where grown, that we never demur at any reasonable request for decorative flowering or fine foliaged plants. Many are under the impression that a few days' sojourn in a house proves most injurious to plants so employed, and sometimes this is the case, the rubbish heap receiving many that have been ruined, either from the effects of gas, neglect, or too long a stay in a darkened corner. Those who grow the plants, or some one equally experienced, ought also to attend to them when in a house. Over-zealous and inexperienced persons are apt to be too free with the watering pot or jug, a daily saturation quickly ruining a plant. Many under-gardeners are also very reckless in this respect, both giving too much and too cold water Some of the most effective decorative plants have to be taken from plant stoves, and, therefore, when in a cooler atmosphere, they ought to receive less water than usual rather than more of it, and it ought always to be slightly warmed. Even cool house plants require less water than usual in much darkened rooms, where they are often placed, and where they suffer when watered daily almost as badly as stove plants. Not a few stands are water tight, and unless a little judgment is exercised, the plants may soon be standing in water. Our plan is to change most of the plants every Saturday morning, those to be introduced being properly moistened at the roots before they are taken into the house. About three times during the ensuing week all are carefully examined, and if approaching dryness a little water is given. No house or window plant ought to stand in tins or saucers partly filled with water, yet such is too often their lot, and this is bound to soon ruin them beyond recovery. Nor, on the other hand, should they suffer from want of water, though they are more likely to recover from this check than they are from being over-watered.

It is really surprising how long some plants, notably the maiden hair fern, will remain healthy either in a window or in a fairly light position, provided no cold draughts of air or water are given them, and they are carefully watered. Several other Adiantums, notably palmatum, gracillimum, assimile, Capillus veneris (of which magnificum is the best form), mundulum, Lawsonianum, formosum, and Williamsi are very serviceable for house decoration, and will keep fresh for a long time. The same may be said of Pteris serrulata and its various crested forms. P. tremula, Asparagus plumosus scandens, and such Palms as Areca Baueri, Chamærops, Kentia australis, Latania, borbonica, Phœnix dactylifera, and Seaforthia elegans are all good for house decoration, and these and other kinds mentioned are available for those who may only possess a greenhouse or cool conservatory in which to grow them when not required in the house. Pans or pots of Selaginellas are very effective in the house; and I know instances where they are kept near a window all the year round and always look fresh. For this purpose I can recommend S. Kraussiana (denticulata) and its golden and silver forms, Wildenovi and stolonifera. I know a case in which a handsome plant of the Filmy Fern (Todea superba) has been grown in a large pan under a bell glass for six years, and it annually improves. It stands under a stained glass window at the end of the principal staircase, and being frequently watered and never allowed to become very dry overhead, it is always attractive in appearance. Begonias of the Rex type are also good house plants, and everybody must know what a good servant Ficus elastica is. Of greenhouse flowering plants, Arum Lilies prove the most difficult to kill, and under fairly good treatment plants in seven inch pots will flower freely in a window. Cyclamen persicum also thrives and blooms well under similar conditions; but Chinese Primulas are apt to lose color, and present a miserable appearance unless much favored. Cinerarias are not easily kept clean. Cypripedium insigne will last on a table, not far from the light, longer than any other flowering plant, provided always it does not suffer from want of water. Epiphyllum truncatum, or Crab Cactus, as cottagers prefer to term it, will, if not over-watered or over-potted at any time, flower beautifully in a window, and the old Cactus speciosissimus is still a favorite for house decoration.—*W. I., in The Garden.*

AUTUMN FLOWERS.—DRAWN BY JULES LAREE, FROM THE PAINTING BY VICTOR LECLAIRE.—*From Le Monde Illustre.*

FLOATING bricks are now manufactured in France, the material of which they are composed being a kind of earth found in Tuscany, consisting of 55 parts of sandy earth, 15 of magnesia, 14 of water, 12 alumina, 3 lime, and 1 iron. It exhales a clay-like odor, and, when sprinkled with water, throws out a light, whitish smoke. It is infusible in the fire, and, though it loses about an eighth part of its weight, its bulk is scarcely diminished. Bricks composed of this substance resist water, unite perfectly with lime, are subject to no alteration from the heat or cold, and the baked differ from the unbaked only in the sonorous quality which they acquire from the fire. Their strength is a little inferior to that of common bricks, but much greater in proportion to their weight.

The Story of a Greek Statue.

Visitors to the Louvre of late may have noticed a remarkable little marble statue labeled "A Young Athenian Girl." The story of its discovery and acquisition, just disclosed by the *Temps*, forms a curious page in the history of antiquities. A peasant of Patissia, while digging in the fields, suddenly came across an old statue. Knowing that the Greek law forbids the exportation of ancient objects of art found in the country, and that foreign amateurs are always ready to pay a high price for them, he at once took it home and hid it under a heap of fagots. He then went to the French ambassador, who was well known for his love of such relics, and offered it to him for 12,000 francs. The ambassador repaired secretly to the peasant's dwelling to examine it, and found it was a *bona fide* gem of the fourth century. He telegraphed the discovery to the French minister of fine arts, who authorized him to conclude the bargain. But there was a serious difficulty to overcome, and that was to get it out of the country without being detected by the customs authorities. After some reflection the ambassador instructed the peasant how to set to work. He was to hide the statue in a cartload of vegetables, drive down to a creek on the seashore, where he would find a boat from the French sloop stationed at the Piræus waiting to receive him. The job was performed successfully. The statue, in the midst of the vegetables, was shipped on the boat, and the 12,000 francs were handed to the peasant by the captain as he left the shore. On the arrival of the statue in Paris it was placed in the Louvre, not far from the famous Venus of Milo, while its discoverer, the poor Greek peasant, is now leading the life of a small gentleman farmer on the proceeds.—*Pall Mall Gazette.*

Steaming vs. Fumigating.

A correspondent of *The Garden* directs the attention of plant growers and orchid growers to the advantages of the practice of boiling tobacco juice in houses for the destruction of insects over the old practice of fumigating. One great advantage is that the steam does not scald nor discolor the most tender foliage nor the most delicate flower; that it can be done without previous preparation, *i. e.*, drying the foliage, etc.; and that the operator can walk about in the house if necessary during the operation.

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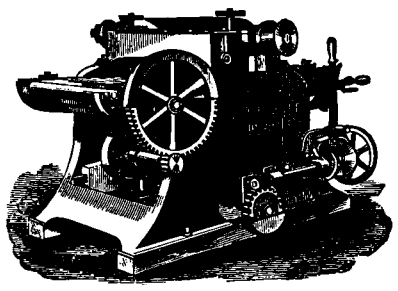

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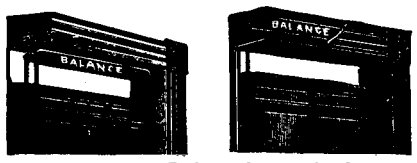

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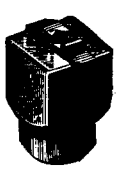

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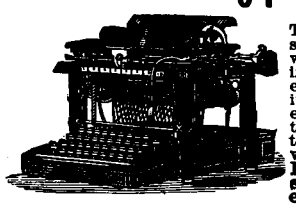

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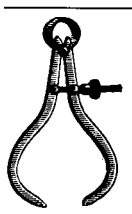

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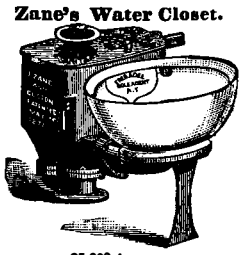

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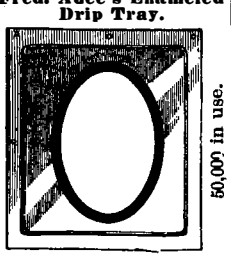

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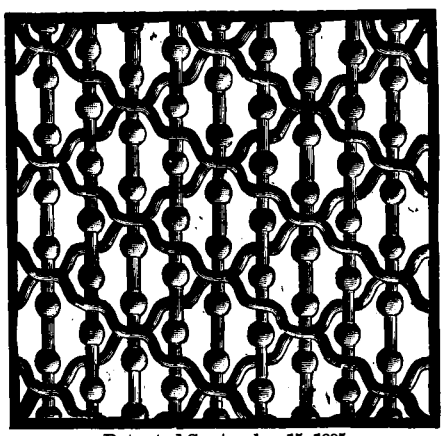

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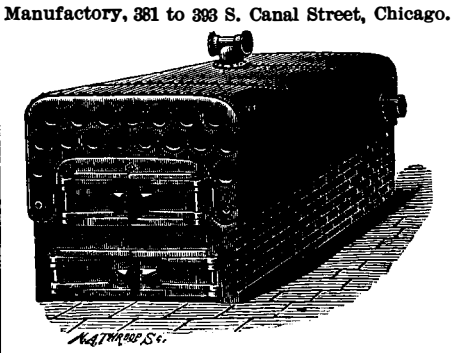

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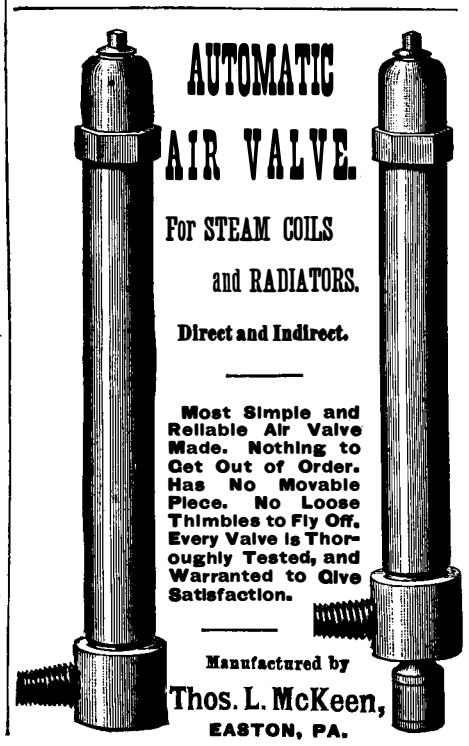

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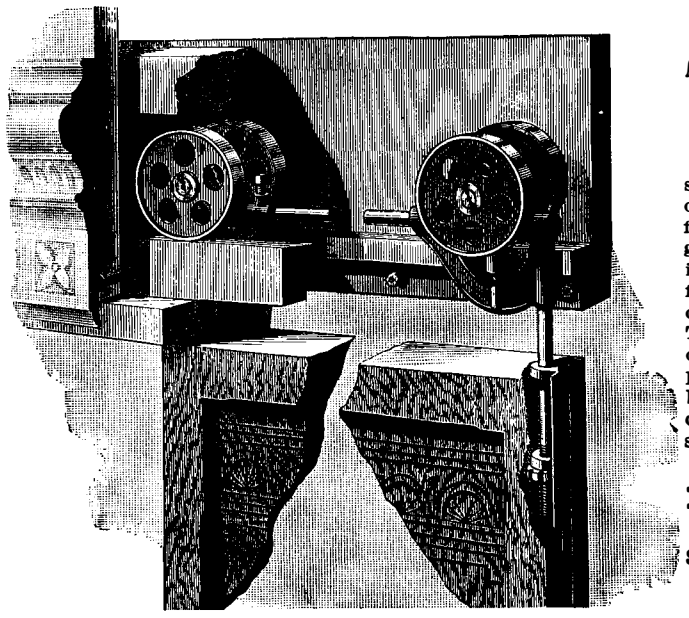

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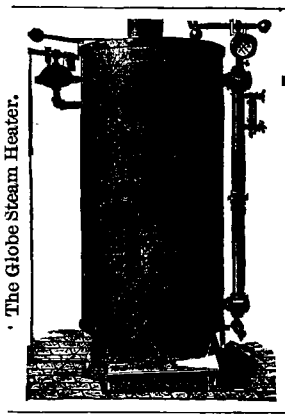

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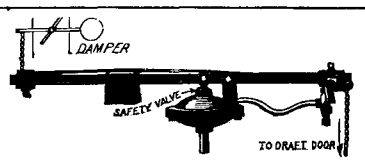

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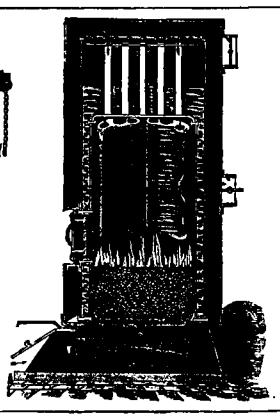

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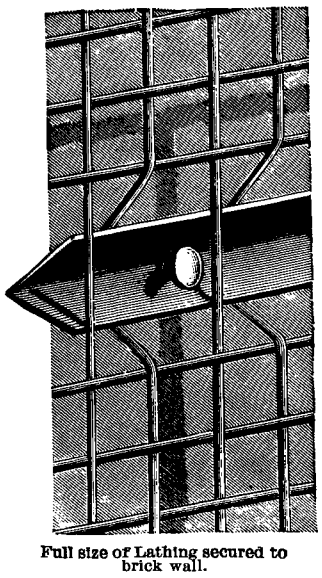

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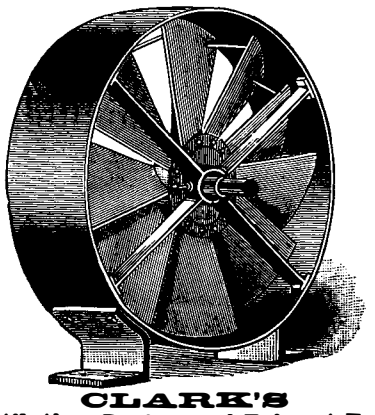

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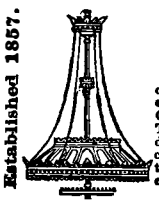

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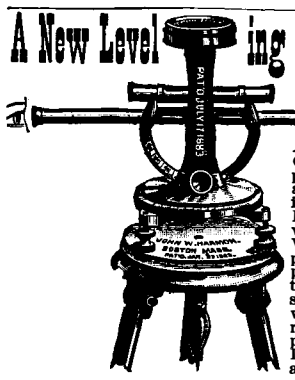

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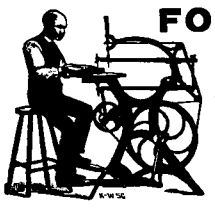

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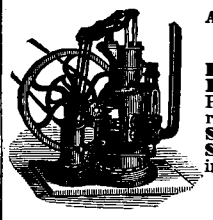

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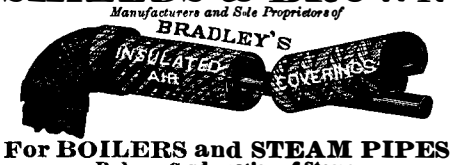

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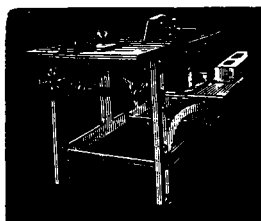

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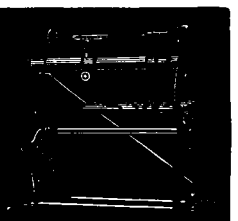

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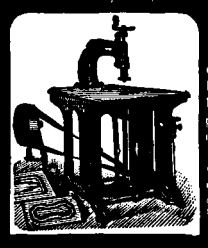

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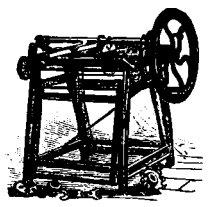

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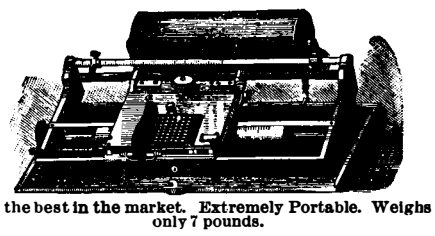

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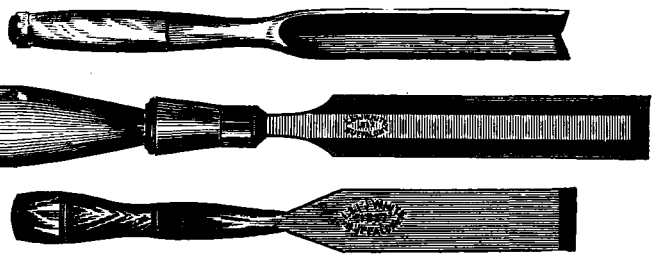

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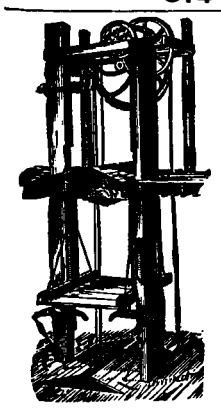

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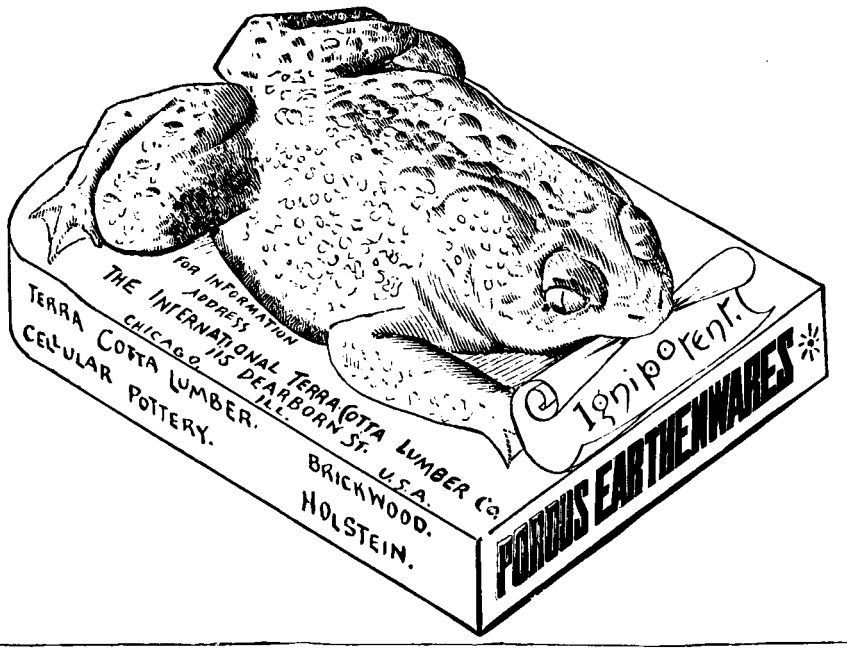

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References to former articles or answers should give date of paper and page or number of question.

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.

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

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Minerals sent for examination should be distinctly marked or labeled.

(1) J. B. McN. asks (1) process of frosting glass for church windows? A. Make a saturated solution of alum and apply over the surface of the glass on the inside. If possible, lay the glass flat so that the solution will not run off, and put it in a position to dry slowly. When dry, varnish with any clear varnish. Another method is to dab the surface of the glass with a ball of putty, and then varnish. 2. The best material to put on the inside of a stove flue, to prevent soot adhering? A. Think you cannot prevent the adhesion of soot to pipe unless you discontinue the use of smoky fuel.

(2) F. M. says: Of iron columns, such as are used for building purposes, which are the strongest, circumference and everything else, except quantity of material being equal, the hollow or the solid? Circumference being the same, does not the hollowing of the column weaken it, and is it not done only to save material and probably reduce the weight? A. Hollow columns are not so strong as solid ones of equal length and diameter. The hollow form is used because it is the most economical, giving the greatest strength with the least amount of metal. For instance, the breaking weight of a cast iron column 8 feet long, 5 inches diameter outside and 4 inches inside, is about 154 tons; but if the same amount of metal were employed in making a solid column, its strength would only be about 83·1 tons.

(3) J. B. asks: What is the formula for preparing asphalt street pavement, and its mode of application? Also, is it durable in a cold climate? A. Formula: Grind to powder bituminous limestone, or dry common limestone, or even broken bricks. Take this powder and mix thoroughly in boiling liquid bitumen, four parts of the former to one of the latter. Mode of application: Spread smoothly this mixture with a hot roller; sprinkle over with sand and let it cool. Durability in cold climate: In cold climate it is not durable, being liable to crack under action of frost. In warm climates it does better. Its failure in most cases is doubtless due to the poor or improper materials used, and imperfect preparation of the mixture.

(4) A. T. G. asks what is the process of fastening rubber rolls on clothes wringer. A. Clean shaft thoroughly between the shoulders or washers, where the rubber goes on. 2. Give the shaft a coat of copal varnish, between the shoulders, and let it dry. 3. Give shaft coat of varnish and wind shaft tightly as possible with five ply jute twine at once, while varnish is green, and let it dry for about six hours. 4. Give shaft over the twine a coat of rubber cement, and let it dry for about six hours. 5. Give shaft over the twine a second coat of rubber cement, and let it dry for about six hours. 6. Remove washer on the short end of shaft, also the cogwheel if the shaft has cogs on both ends. 7. See that the rubber rolls are always longer than the space between the washers where the rubber goes on, as they shrink or take up a little in putting on the shaft. 8. Clean out the hole or inside of roll with benzine, using a small brush or swab. 9. Put the thimble or pointer on the end of shaft that the washer has been removed from, and give shaft over the twine and thimble another coat of cement, and stand same upright in a vise. 10. Give the inside or hole of roll a coat of cement with a small rod or stick. 11. Pull or force the roll on the shaft as quickly as possible with a jerk, then rivet the washer on with a cold chisel. 12. Let roll stand and get dry for two or three days before using same. Cement for use should be so thick that it will run freely; if it gets too thick, thin it with benzine or naphtha.

(5) J. R. S. asks (1) the composition of a cheap paint suitable for rough work. A. Grind powdered charcoal, oxide of iron, or any convenient pigment in linseed oil with sufficient litharge as drier, and thin for use with well boiled linseed oil. You will find it, however, cheaper to purchase a ready made paint from some reputable dealer. 2. A good work on the manufacture of paper from wood. A. See "Technology of Paper Trade," in Scientific American Supplement, Nos. 109, 110, 116, 117, 118, and 123.

(6) S. G. asks: Is there any way to mark white dishes permanently? A. We know of no means except by grinding suitable pigments in proper vehicle, painting the china, and then burning it in.

(7) A. H. W. writes: I want to have twelve triangles made from bar steel, each one to be of a different tone from the other. What sizes should each be, and what sizes of steel should each be made of, to make the best sounds? A. As you cannot depend upon getting steel of small and exact variations in size, your only course is to make a trial of a bar, and make a second trial with a shorter bar for the next note. Then make a trial on the next size steel. Commercial steel varies enough from its normal size to prevent any computation of lengths for chimes or chords or single notes.

(8) W. H. R. asks: 1. How can I construct a simple hygrometer to ascertain the moisture of a room when steam vapor is used? A. You may make a very good hygrometer by hanging a piece of well twisted catgut, that has not been oiled, to a hook with a disk or pointer attached to the lower end just heavy enough to straighten the catgut, using an eye of wire to keep it from swinging. The whole may be fastened to a small strip of wood, to hang upon the wall. The catgut may be a few inches or a foot or two long, according to the amount of twist. The index will swing with the hygrometric changes, and may be adjusted to proportional parts by comparison with a "Mason's hygrometer." Supplements 571, 334, 14, 379, 155. 2. Give me the best recipe you can for a casehardening compound, to be used on open fires. A. Casehardening in the open fire is a very poor and superficial process. We know of nothing better than a mixture of cyanide of potassium and hoof shavings thoroughly pulverized and mixed. 3. What is the best welding compound for working steel? A. There are a great many welding compounds in use, with as many claims to superiority. We have found nothing better than borax with a little sal ammoniac—about 10 per cent—all pulverized together.

(9) M. A. M. writes: I wish to preserve a portion of a polished steel surface and etch or eat away the remainder to a depth sufficient to receive a thick electro plate of silver, so that when plated, and the plating polished, it will be even with the preserved steel surface, so the whole surface will be even, but a portion steel and a portion silver plated. A. This is what is called electro inlaying, and is only successfully practiced by experts in this style of art. The etching process is the same as for engraving steel plates. The protecting material is asphalt varnish, which may be used with pencil brushes for ornamental work or for stopping off any parts not required to be acted upon by the acid. Asphalt, resin, and beeswax about equal parts, varied for hardness to suit the temperature, is suitable to cover the surface, warmed by dabbing with a small pad. This allows of the figure being scratched in with a point. Nitric acid 1 part, water 2 to 4 parts, is generally used for biting in the figures. This, followed by a dilute muriatic acid dip for removing oxide and cleaning the surface, will probably prepare the piece for electro plating. If not, you will have to make a study of chemicals that will clear the surface so as to take the silver; possibly a few trials cyanide of silver or potasso-cyanide may give you success. For electroplating, see details in Supplement, No. 310.

(10) B. F. R. asks: Can you add any harmless substance to milk that would make a copious and permanent foam on being beaten with an egg beater? A. You might take the following, which is used with soda water: To each gallon add from two to four ounces of gum arabic dissolved in its own weight of water; or use the following: Quillaya bark 4 ounces, alcohol 4 ounces, glycerine 4 ounces, and water 8 ounces. Exhaust by percolation to make 1 pint of tincture. Two to five drachms of this tincture to be used to every gallon of fluid.

(11) J. W.—Holes in glass plate or windows may be cut with a diamond by making a disk of wood and using it as a guide to the diamond. It requires a delicate touch to make the first cut so a crack will not start outwardly therefrom; but when properly cut, so that the crack can be seen all around the circle, the glass can be gently tapped with a small piece of wood directly under the cut, when the fracture will run through the glass, and follow the tapping all around the circle. When the separation is complete, the center may be gently pushed out. If it should appear to be interlocked or dovetailed, a few cuts across the center will enable you to take it out in pieces.

(12) A. S. asks what to line a wooden tank with, which will withstand the action of nitric and sulphuric acids. A. Cover the inside with paraffine; go over the inside with a sadiron heated to the temperature used in ironing clothes. Melt the paraffine under the iron so as to drive it into the wood as much as possible, then with a cooler iron melt on a coat thick enough to completely cover the wood.

(13) O. F. B. desires (1) recipe for making stove blacking. A. Take of black lead pulverized 1 pound, turpentine 1 gill, water 1 gill, sugar 1 ounce. 2. A recipe for cleaning isinglass. A. Micas may be cleaned by taking them out and thoroughly washing with vinegar, a little diluted. If the black does not come off at once, let it soak a little.

(14) W. P. J. asks why a loose pulley of certain size, or a wheel such as is used on a band saw machine, shakes when running a certain speed, whereas if the speed is decreased or increased the vibration ceases. A. The cause is the synchronism between the time of revolution of the wheel and the vibration of the band saw. At the speed in which they correspond, the vibration of the band is increased. This phenomenon often takes place with belting, sometimes extending to the floors and the building. We know of a case where at a certain speed of the engine the walls of a building shake.

(15) B. A. H. asks (1) directions for making wax moulds for moulding plaster centers for ceilings. A. Plaster centers are moulded in plaster moulds, oiled with linseed oil. In making an original design, you may use beeswax and whiting melted with a few drops of oil to soften, so that it may be worked. Clay is also used for designing patterns; oil the clay pattern before pouring on the plaster of Paris. 2. What thickness would a cast iron box 6 inches by 6 inches inside have to be made to hold 330° of steam heat? A. 330° heat in steam is equivalent to 90 pounds pressure; your box, if a cube, should have the inside corners rounded, and be about ¾ inch thick for safety.

(16) W. M. S. desires a recipe for a quick drying varnish. A. Use the following: Pulverize 1 ounce sandarac, ¼ ounce mastic, ¼ ounce elemi, dissolving them in ⅓ ounce Venice turpentine, and adding to it a solution of 4 ounces shellac and 3 ounces oil of lavender in 12 ounces alcohol.

(17) N. A. H. asks: Why does placing a vessel of water on a stove in a close room prevent a headache or feeling of closeness in the room? A. Any beneficial effect from placing a vessel of water on a stove is due to the imparting of moisture to the air.

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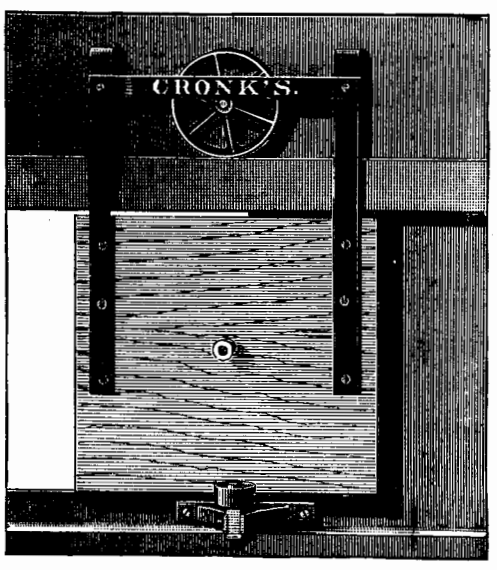

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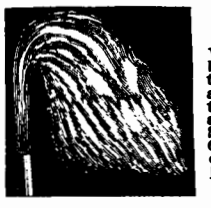

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