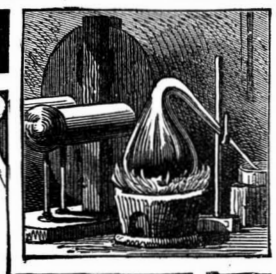

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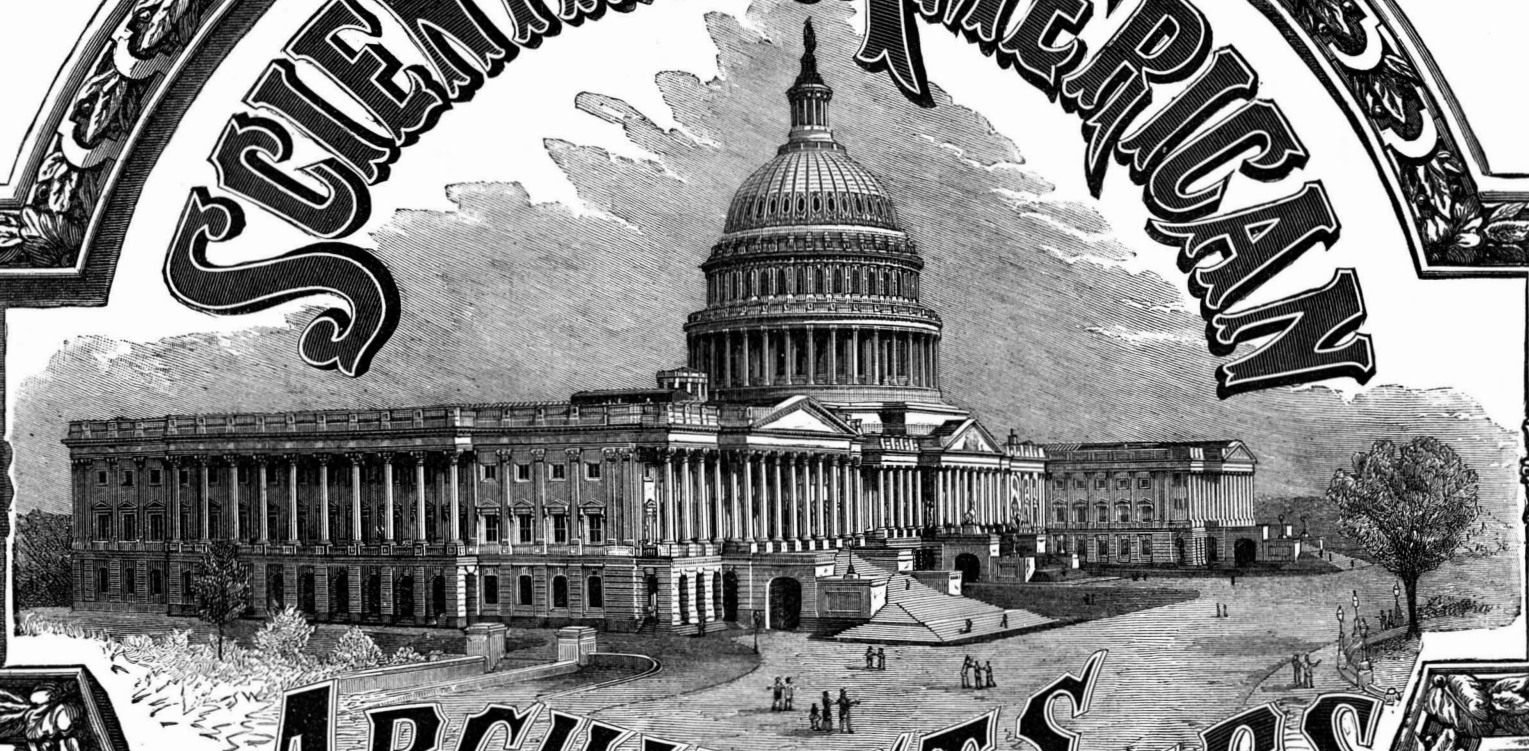

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Vol. III.

JANUARY—JUNE,
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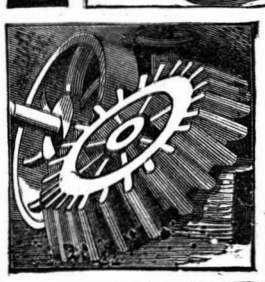

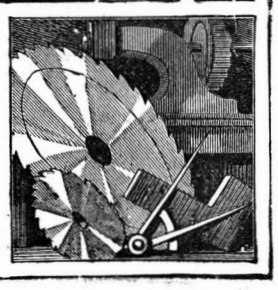

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SCIENTIFIC AMERICAN

ARCHITECTS AND BUILDERS EDITION.

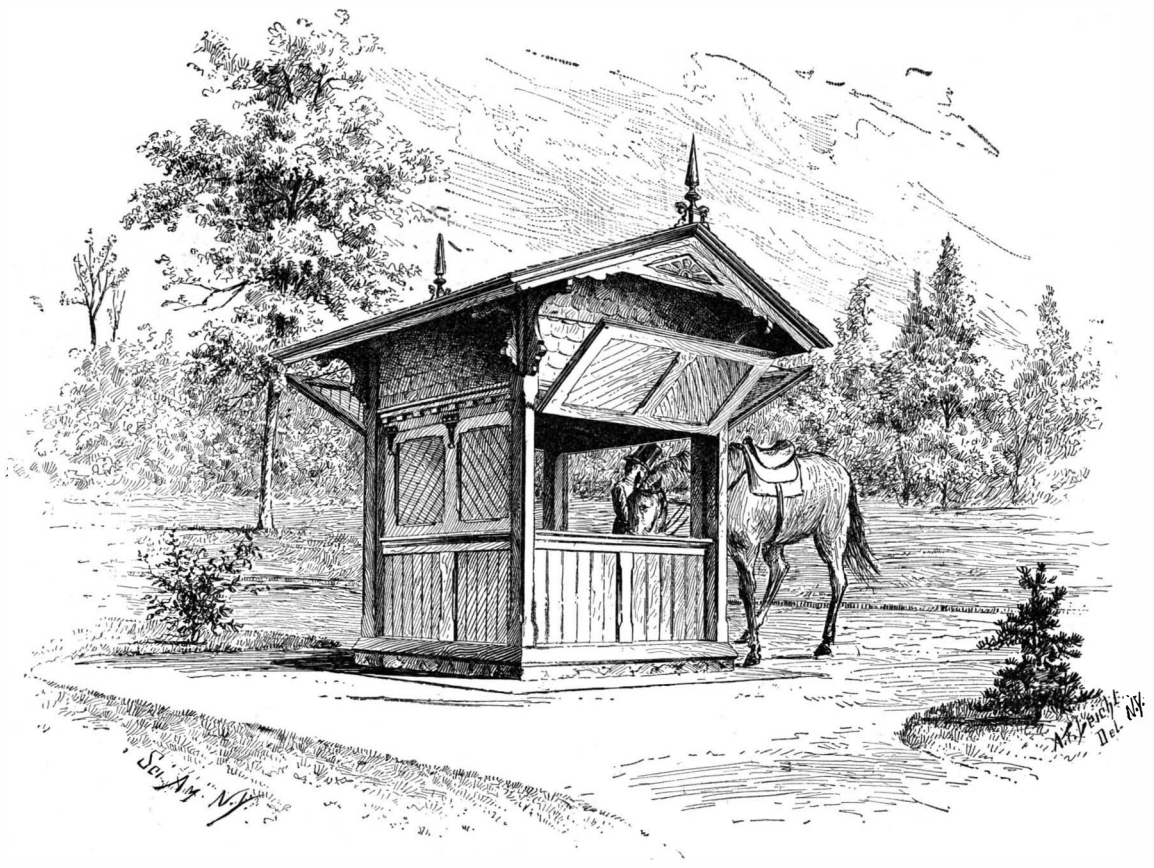
Entered at the Post Office of New York as Second Class Matter.

Vol. III. Subscription, $1.50 a Year. NEW YORK, JANUARY, 1887. Single Copies, 15 Cents. No. 1.

A DRINKING FOUNTAIN.

Designed for J. B. Dutcher, Esq., Pawling, N. Y., by B. J. Schweitzer, architect, Lawrence Building, 84 West Broadway, New York.

The structure is so arranged and fitted up with doors that, by the exercise of a little care, the tank and pipes can be kept from freezing in the coldest weather. The doors, opening upward and operated by weights and pulleys, act as an awning and shade, thus aiding and keeping the water cool in warm weather. This makes it a suitable, profitable, and attractive invention for parties who keep cattle and horses. The tank and all pipe fittings were put in by Mr. A. J. Corcoran, of 76 John St., New York, and are connected with his improved windmills and system of waterworks.



DESIGN FOR A DRINKING FOUNTAIN.

Drawings by Mail.

One of the matters which we hope will engage the attention of the Convention of the American Institute of Architects is the provision of better and cheaper facilities for the conveyance of drawings by mail. At present, by a ruling of the Postmaster-General, drawings and tracings must pay letter postage; and where drawings are sent in pasteboard cylinders, or on wooden rolls, as is absolutely necessary to preserve them from the rough handling of the letter carriers in cities, the cost of forwarding them by mail, although only one-half of what it was in 1885, is still very considerable, especially as compared with that of sending parcels of merchandise or printed matter; and architects are in consequence usually obliged to intrust their plans to the express companies, which, in country towns, are apt to be slow and uncertain in delivery. Even where an architect, for the sake of having his drawings transmitted through the most direct and recognized channel, goes to the expense of sending them by mail, he is, under the present system, by no means sure that they will arrive safely, and he has no redress against the Government in case of their loss or destruction. Most of us have had repeated experience of the loss of plans in the mails, and we remember one occurrence, more annoying, if possible, than the total loss of such property, where a city letter carrier, to save himself the trouble of taking upstairs a valuable plan, which, unfortunately, had not been rolled on a cylinder, deliberately crumpled it up and pounded it until he could force it through a half inch slit into a little letter-box in the hallway of the building where he was to deliver it, and there it was discovered, some weeks later, after a great deal of time had been spent in trying to find what had become of it. Our post office system is none too good, in any case, but we rarely hear of losses of merchants' samples, or other things of the kind, which pay for transportation only a small fraction of the tax levied on architects' drawings; and so long as architects pay exorbitant rates for such service, they are certainly entitled to demand that it should be done with decent care and dispatch. The fact is that in the whole matter of transmission of parcels our post office is at least twenty years behind that of any other civilized country.. In England, France, or Germany it is now as common to take a box or parcel to the post office for forwarding as it is with us to mail a letter. Anything, not dangerous to other property carried with it, is accepted, prepaid by stamps at what seems to us an absurdly low rate, and sent by the next mail, and delivered to the consignee. There is a limit to the size of the parcels received, but in England anything can be sent, we believe, which does not exceed seventy pounds in weight, or which does not measure, by adding the length to the girth, more than six feet. As these limitations admit a trunk of tolerable size, nearly all the transportation for private individuals which with us is done by the express companies, inconveniently and expensively, is there carried on by mail, and the service is so efficient and profitable, even at the low rates charged, that the various European countries are at this moment actively engaged in arranging for the extension of the "parcel post" to include service from one country to another. Here, as each nation has its own custom house regulations, it is necessary to provide for examination at the frontier and for the collection of the duties, but this has been successfully arranged, and the international parcel post is already in operation between England and Belgium, and will, according to the official announcement made last summer, be very soon extended to Germany and Holland, if it has not been already established. Between England and her colonies packages of merchandise have been transmitted by mail for some months, at rates which must make Americans who do not own stock in express companies rather envious. The last parcel which came to us across the ocean was a box, about fourteen inches cube, containing some books, and the bill for transportation from Liverpool was about five dollars. The same parcel, if we understood correctly the tariff of rates of the colonial parcel post, which we saw in various places in England, would be carried from any post office in England to any post office in New Zealand, and delivered to the consignee, for thirty cents. Now, New Zealand is exactly on the opposite side of the earth from London, and the distance, by the shortest mail route, is about fourteen thousand miles; and if the English mail steamers are glad to carry such a box fourteen thousand miles for thirty cents, it would seem as if a charge of five dollars for conveying a similar box, in the same steamer, less than one-fourth of the distance, must allow, to say the least, a considerable margin of profit. In a less degree the same discrepancy in cost between having a thing done on a great scale for the public benefit and on a small scale for private profit is to be observed in inland transportation, and it is quite time that the people in this country, out of whose pockets comes the difference, should have the benefit of such economies as are now in operation elsewhere. Although architects do not have to pay out a very large portion of their substance for the carriage of their plans, their express and postage bills generally amount to a very respectable sum by the end of each year; and as they have the advantage of being able to speak their minds through the deliberations of a highly respected organization, representing all portions of the country, whatever they might say on the subject would be sure to command attention.—*Amer. Architect.*

Asphaltum Pavement.

The best pavement in Philadelphia is the asphaltum pavement around the City Hall. It was laid in September, 1884, cost no more than Belgian blocks, and is as perfect as when put down. It is as noiseless as a macadamized road, smoother than the smoothest floor, and affords an excellent surface for horses' feet. It is easy to clean, handsome, impenetrable to water, and resists the torrid zone of August and the lowest winter temperature perfectly. It requires hardly any repairs, and does away with the necessity for "crossing stones," as it is itself equal to any sidewalk. It is vastly better than a cobblestone pavement, which allows mud to ooze up with every rain, grass to grow in all the crevices, and requires constant repairs on account of settling. It surpasses Belgian blocks, for they are noisy, hard upon vehicles and horses in winter and summer and are not easy for foot travel. None of the other alleged improved pavements, like the wooden pavements of Chicago, the hard firebrick pavements of Steubenville, or the "composition" pavements in vogue in some of the smaller New England cities, possesses the excellent properties of this asphaltum pavement about the City Hall, and it was not laid under the most favorable conditions. As it has answered so well where it is, it should be tried on other streets. Let it be further tested at points of heavy travel in the business portions of the city. While it would not be advisable to take the results up to this time, satisfactory as they are, as conclusive, they certainly warrant the expenditure of money in thoroughly determining upon the value of a street pavement that seems the best now in use in Philadelphia.—*Philadelphia Daily News.*

Gluing.

Experienced woodworkers have always contended that a glue joint, properly done, is stronger than the wood itself. And yet joints often give way at the surface where the glue is used, which is accounted for by bad material. A similar reason is frequently the true cause, which few artisans wish to acknowledge. It is merely that skill is lacking. In gluing wood, it is asserted by competent authority that bad work is produced by applying glue to both surfaces. A good job is secured by applying the glue hot, but not extremely so, to one surface, which should be cold, while the other surface should be heated at the stove, but should have no glue upon it. By this method the glue will permeate the wood, and bind the surfaces together firmer than nature binds the fibers. It is said by good cabinetmakers that if these precautions are taken, less difficulty will be found with glues which, skillfully handled, usually will do the work required of them.

AMERICAN PAINT.—There are now sold in the United States about $250,000,000 worth of paints every year, and raw materials to the amount of half this sum are consumed in making them. Putty is made by all the big paint factories. It is made out of whiting and the skin of linseed oil. It is put up by the thousands of tons in kegs and skins, and costs about a cent and a half a pound to make it.

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THE

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MUNN & CO., Publishers,
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CONTENTS

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

(Illustrated articles are marked with an asterisk.)

Back Numbers.

At present we are able to supply to new subscribers the back numbers of this journal from its beginning in November, 1885. Each number is accompanied by a sheet of colored plates and a sheet of details.

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.

The twentieth annual convention of the American Institute of Architects was opened on Dec. 1, in this city, by the president, Thomas U. Walter, of Philadelphia. He defined architecture as a science in which the good, the true, and the beautiful predominated in all its relations, and regarded the philosophy of taste as indispensable to a successful practice of the profession. Social and fraternal relations were to be promoted, on the ground that knowledge of each other would engender respect and create a truer feeling for art.

He believed that the ennobling and elevating character of an architect's profession should carry him above all petty rivalries and animosities. Confessedly not doing so, the results must be ascribed to the inherent weakness of all human endeavors.

The evidences of progress in the growth of taste and the improvement observable in the general character of buildings erected during the current year, or which are in process of erection, were briefly noted.

Great changes have taken place in the ornamental character of brick and stone work, chiefly the former, and these changes had imparted to modest as well as pretentious buildings, an unmistakable element of taste and refinement. The widespread satisfaction at this state of things is an omen of promise.

The home building instinct of the American people, which fortunately is not a race impulse, has spread its protecting and ennobling influence over the land, and is animated with that insatiable vigor which marks this nation as exceptional.

Wherever terra cotta decorations in brickwork have been tastefully and harmoniously applied, they have imparted an artistic effect. Like many other meritorious accessories, however, its usefulness has been impaired by its abuse.

The popular idea that comfort, convenience, good taste in design, and carefully studied construction are synonymous with costliness is due solely and wholly to an insufficient knowledge of the subject. The tendency of the day is to cheapen construction by every legitimate appliance and device. The apparent cost of a patented invention is more to be found in the name than in the reality. The desire to obtain a ten thousand dollar house for eight thousand dollars is a proverbial weakness of the human race, but the difficulty is to secure from the individual the admission that he himself shares this weakness. The distress that this want of frankness causes is too well known to be discussed.

The fact remains evident that many a plain and unpretentious house shares equally with its palatial namesake the every comfort and refinement of a home.

The growth of taste is admitted. The Queen Anne prettiness is acknowledged to be pretty, but it lacks character and a reason for being what it is, and it is passing away like a fashionable folly. The unrivaled richness of the French Renaissance is confessedly too ornate for our simpler tastes. It smacks of the wanton luxury of French courts, and it has about as much sincerity as an appanage of the court of Louis XIV. Its use is now confined to interiors, where it may in all candor remain, a true expression of the artistic thought of a by-gone day of splendor and excess.

We would catch the spirit, the immortal grace, of every style and period, but we shall accomplish more by endeavoring to utter the principles of their being than by trying to adapt their mere outline of forms and pomp of circumstances to our widely different and variable conditions.

It is observed with pleasure by all true art lovers that the effete forms and constructions of by-gone ages are passing away. The traditions of the past remain with us to guide us in our endeavors.

Because of the conditions which gave it birth and ally it more closely to our time than to that of any other epoch, the resources of mediæval art are being studied with an eagerness and a scientific spirit belonging to the art itself that are commendable wherever the name of art is revered.

The great distances which separate the art centers of the country are gradually being drawn together by means of auxiliary architectural societies, sketching clubs, and annual exhibitions.

The United States now contains thirteen distinct architectural associations, connected in one way or another with the parent organization.

The improvement in the advancement of architectural art and the sciences related to it is due largely to the united work of these organizations.

The Institute is steadily growing in numbers and influence, and constant applications are received from men of prominence in the profession to join its ranks. It now consists of 191 professional members, of which 97 are fellows and 94 associates.

The objects of the association are to unite in fellowship the architects of this continent, and to combine their efforts so as to promote the artistic, scientific, and practical efficiency of the profession.

The questions naturally arise, How are they promoting the efficiency of the profession? and In what manner are they administering to the public good?

It is the policy of the Institute to establish chapters, or auxiliary organizations, in all of the leading cities, or wherever the number of members will warrant their establishment. In Philadelphia for instance, social meetings are held monthly at the residence of some member, ideas are exchanged on all cognate topics, and the good of the profession is practically and artistically promoted.

One of the most powerful influences for the public good is manifested through the work of the committee on education. The first college in the country to establish a course of study in architecture was the Institute of Technology, at Boston, followed by Cornell University, at Ithaca, N. Y., and the School of Mines of this city. Western colleges are instituting similar courses, and the means for acquiring a good foundation for an architectural career are on a substantial basis.

In this connection it is well to mention the work which the people through their own agent, the Bureau of Education, at Washington, are doing for themselves. A series of pamphlets, called "Circulars of Information," are published for distribution among teachers, physicians, engineers, architects, and to all who are interested in the cause of education. Their matter relates largely to the art and science of school building, planning, hygiene, and management. They are written by specialists eminent in their field, and indeed some of these men, in the unassuming pamphlets, have recorded the highly valuable work of a life-long research on these lines of study.

The vast improvement everywhere noticeable in the character of our school buildings must be attributed, to some extent, to the information contained in these circulars.

(To be continued.)

HOW NOT TO DO IT

Seems to be the aim of many architects and builders of the present day. Formerly, houses were built in a thorough manner, with heavy timbers, closely fitted together with mortise and tenon and strongly braced, so that when completed the building was substantial and durable. How different in these respects are the houses which are now being constructed all about us! A partial description of one now being built near the writer's residence will suffice for an illustration. It was begun under contract to be finished and ready for occupancy November 10. Its cost to be $3.500. The foundation wall, instead of resting upon a bed of concrete twelve inches thick, below the level of the cellar bottom, is placed at once upon the ground laid up in a hurried manner without cement, and without any filling up of the interstices between the stones with mortar. Upon this poorly constructed foundation are placed 2×10 timbers for the sills, laid down on the flat, the ends of which are notched out to the thickness of one inch, and then nailed together. Upon this flimsy base the uprights are placed, none of them being larger than 2×4, except the corners, which are 3×6. The horizontal pieces are two, 2×4, nailed together, and this, too, over windows and doors, where considerable weight will have to be sustained. This same lightness of material is seen throughout the entire frame and rafters. These are fastened together with the least possible number of nails. In this way several thousand feet of timber and many days' labor are saved to the contractor. This frail frame is, of course, much strengthened by the sheathing boards which follow, but even these are often put on *horizontally*, instead of *diagonally*, as the latter method takes more time and material. The floor beams are bridged in the flimsiest manner, the contractor relying for the bracing upon the flooring boards laid upon them. The same principle of "how not to do it" thoroughly is carried through the entire structure as to the mason work, the plumbing and the tin work—especially in the last two—so that the house, when done and ready for occupancy, will be after all a mere shell, to shake in every wind, to leak in every rain storm, and to freeze its unfortunate occupant in all cold weather. It will doubtless, to the casual observer and, perhaps, to the coming tenant, look well, inviting, and to all appearances as good as any other better built house. One year's occupancy, however, will dispel all delusions, and show to the owner that it is but a sham, and he will be appalled at the prospect before him of necessary repairs. His investment will be found unprofitable, and perhaps his tenant leave the premises in disgust at country built houses in general. The pertinent question now is, How does this state of things come about? It happens in this wise: The owner desires to invest a certain amount of money, and tells his architect that this is his limit, and that it must not be exceeded, and yet for this sum he must have a house with an attractive exterior and a given number of rooms of goodly size. The architect endeavors to comply, and, so that his task may not be impossible, he draws the specifications so that a contractor may be found who will undertake the construction of the building for the price named by the owner. He, in his turn, to get out whole under existing diffi-

culties with skilled labor, the high wages, and short hours, studies most diligently *how not* to put in anything, either of time or material, that can be omitted. A watchful contractor has always the advantage over the owner, who probably is trustful and possibly often absent. Thus it will be seen that owner, architect, and contractor are each and all responsible for the effort of "how not to do it" as it ought to be done. The first, in not recognizing the principle that a good article cannot be had without corresponding cost; the second, for complying with the unreasonable demand made upon him, and which he knows will result in the end with only dissatisfaction to all concerned; and the last, for willingly undertaking a work of such importance to health and moneyed interest as the building of a house, when he knows he must scimp everywhere, to the verge of dishonesty, in order to save himself from loss. The *result* is that everywhere about us are seen these flimsy, poorly constructed houses, alike detrimental to the profit of the owners' investments and the comfort of the occupants. A well constructed house, even if it does cost more at the first, proves always the better investment, for the extra cost is more than saved in the absence of future repairs, to which, in a house badly built, there is no end.

AN EIGHTEEN HUNDRED DOLLAR COTTAGE.

The following relates to the cottage illustrated in our colored plate given in our last (December) number:

The design is an excellent example of the possibilities developed by the prevailing demand for cheap and, at the same time, convenient and attractive cottages. This building can be erected and fully finished complete at a total cost of $1,800, and the accommodations will be found to compare favorably with many houses of a much greater cost. The rooms are all of ample size and of convenient access and communication. Ample provision is made for closet accommodations, etc., and a cellar extends under the entire building.

The construction may be briefly summed up as follows:

The cellar and foundation walls are to be built up with good building stone, laid in lime and cement mortar. The frame is to be constructed with good hemlock timber, of the following dimensions, viz.: Sills, posts, plates, and girts, 4 in. x 6 in. First and second tiers of floor joists, 2 in. x 10 in., 16 in. on centers; attic joists, 2 in. x 8 in., 16 in. on centers. Door and window studs, 3 in. x 4 in.; partition studs and nailing joists, 2 in. x 4 in. and 3 in. x 4 in., 16 in. on centers. Rafters, 2 in. x 6 in., 2 ft. on centers.

The frame is to be sheathed with millworked hemlock boards, which are to be covered with best sheathing felt, and the exterior finished with shingles and siding, as shown. The roofs are to be sheathed with shingling strips, and covered with best No. 1 pine sawed shingles.

The interior finish is to be neat and simple. The floors are of millworked white pine of medium width. The walls are hard finished. The doors, hardware, etc., are first-class throughout.

The alternative exterior, given in elevation on the supplementary sheet given in December, can be carried out for about $1,200.

Horace G. Knapp & Co., architects, of 176 Broadway, New York city, are the authors of the design.

ST. JAMES' RECTORY, FORDHAM, N. Y.

About two years ago, the rectory attached to St. James' Church at Fordham, N. Y., was erected for the Rev. C. J. Holt, from the designs of the eminent architect, Edward A. Sargent, Esq., of No. 55 Broadway, N. Y. city. We give with this number a colored plate and a sheet of very useful details of this handsome residence.

Examined either from the standpoint of an architectural production or from that of the more practical view of the occupier, the design cannot be considered to be otherwise than a very satisfactory one. The artistic treatment of the details and the happy choice in colors make the whole effect very pleasing.

Stone of a light brown tint has been used for the lower portions of the walls, and in the positions marked in black upon the plan in colored plate. The chimneys are built of pressed brick, and the upper portion of the building is shingles and clapboards. The roof is shingled, and terra cotta panels are used in places.

In the plan of the house we have a somewhat unusual arrangement, in the manner of placing the kitchen and servants' apartments. By building them at an angle, they are kept distinct from the remainder of the house, entirely doing away with the noise and smell inseparable from the use of a kitchen. At the same time, the close proximity of the dining room renders the arrangement a good one for serving. On the ground this manner of planning appears by no means awkward, but rather tends to increase the apparent size of the house.

There is a fine hall and open staircase, finished in polished oak, and a large oriel window on the second floor, forming a balcony and being richly ornamented with cathedral glass. The details of this window are shown in our supplementary sheet.

A very pleasing feature in the house is the number of comfortable corners provided. Thus, in the dining room we have a corner seven feet by nine feet, inclosing the fireplace and forming a very cozy position. In the library is another snug corner in the bay. Stained glass is used for the transom lights in many of the rooms, with excellent effect.

In the parlor, library, dining room, and hall are open fireplaces with tile hearths, tiled mantels, and bright brass borders, fenders, and dogs. Over-mantels of special design are provided, that in the parlor being constructed of cherry and those in the other rooms of polished oak. Each is fitted with beveled edge mirrors and stained glass ornamental work.

The hall and dining room are finished with ceilings of hardwood, paneled and ribbed, and the floor of the latter is laid diagonally in narrow widths around the border. The ceilings of the other rooms are plastered and have deep cornices. The doors, bases, and trim generally are of pine, stained a light color, and varnished in the main rooms and oiled in the upper floors.

Electric bells hot and cold water, and gas are laid throughout the house. The kitchen is fitted with Barstow's "Improved" range.

The cost of the house in its present condition was about $11,000.

A DWELLING OF MODERATE COST AT RUTHERFORD, N. J.

The perspective drawing and plans shown on the colored plate presented with our present issue, and the accompanying sheet of details of construction form, with the specification below, a complete set as prepared by Mr. B. J. Schweitzer, architect, of No. 84 West Broadway, New York city, for the erection of a two story dwelling at Rutherford, N. J., for Mr. A. F. Garnier.

The design has been carefully considered with the view of providing a comfortable and convenient house at a moderate cost. The whole arrangement is a successful one in the cozy and snug appearance it presents and the attractive and appropriate elevation provided.

While keeping the cost strictly within moderate limits, the architect has employed only the best materials and construction, as will be apparent on reference to the specification.

The sheathing is of dressed hemlock boards, and is put on diagonally, and the roof is covered in with Bangor slates of a dark color, producing a very good effect.

Mr. Schweitzer has had a very extended experience in designing all descriptions of houses. In Rutherford, N. J., alone he is responsible for over a hundred buildings, while at Passaic and various other places on the Erie he is well represented by his characteristic work. His fifteen years' labor in New York and its vicinity has made him well known as a careful architect of originality and assiduity.

SPECIFICATION.

EXCAVATIONS.

Cellar.—To be under the whole house, 3 ft. 6 in. deep.

Cesspool.—To be 7 ft. in diameter and 8 ft. deep, built where directed.

Cistern.—To be 8 ft. in diameter and 10 ft. deep, built where directed.

Trenches.—For pipes to be at least 2 ft. 6 in. below the surface.

Piers.—All outside piers to be at least 2 ft. 6 in. below the surface. All inside piers 6 to 8 in. below the cellar bottom.

Privy Vault.—To be 4 ft. 6 in. long, 4 ft. 6 in. wide, and 4 ft. deep, built where directed.

Grading.—Clean up the entire premises of all rubbish, and grade off earth around the house as directed.

MASON'S WORK.

Cellar Walls.—Up to the surface level, to be 18 in. thick, of Belleville quarry stone, laid in good lime and cement mortar. All to be bonded and pointed complete. Above the ground build a hard brick wall, 8 in. thick, laid flush with the inside of stone wall, in good lime and cement mortar. Point up complete.

Piers.—Build all piers of good, hard brick, laid in lime and cement mortar, and point up complete.

Chimneys.—Build chimneys as shown on plans, of good, hard bricks laid in lime and cement mortar; strike all joints on the inside and outside. Provide each room with a stovepipe hole, collar, and thimble, and cap them with a bluestone 1½ in. thick. Build the fireplace in kitchen for range, and furnish and set a bluestone hearth rubbed smooth, also a rubbed bluestone lintel, all complete. The jambs in the kitchen to be nicely pointed and laid up in select Hackensack brick.

Outside Cellar entrance to have bluestone copings and steps.

Cistern.—To be bricked up with good, hard brick, laid in cement mortar. An arch is to be sprung over the top, with a manhole and bluestone cover.

The inside is to be thoroughly cemented, and warranted water tight. The same is to have an overflow pit, and is to be connected with pipes from all leaders.

Cesspool.—To be stoned up dry in usual manner.

Privy Vault is to be stoned up dry in usual manner.

LATHING AND PLASTERING.

All walls and ceilings on first and second floors are to be lathed with spruce lath, and plastered two best coats of tempered mortar, and then hard finished hard and white.

CARPENTER'S WORK.

Timber.—All timber is to be of best quality hemlock. Corner posts, plates, and interties to be mortised and tenoned together, all 4" x 6".

All angles are to be braced with long braces.

First and second floor beams, 2" x 9", attic floor beams 2" x 8", all placed 16 inches from centers, and bridge all in a thorough manner, as directed.

Double all header and stringer beams.

All wall strips 2" x 4"; all openings to be studded with 3" x 4".

Rafters 2" x 8", placed 20" from centers.

Sheathing.—Cover the entire frames with dressed hemlock boards, put on diagonally, and put on resin sized sheathing paper over the hemlock boards.

Siding.—Cover the entire house, from sill to plate, as per drawing, with No. 1 narrow lap siding.

Shingles.—Cover the gables and lean-to over the piazza with regular sawed round and square butt shingles of California redwood, laid 6 inches to the weather.

Trim Corner Boards, Window Casings, and Water Table, 1¼" best white pine. Main cornice all as per detail, of best white pine; also piazza trim, cornice, columns, and rails of best white pine.

Roofs.—All main roofs are to be covered with best Bangor slate in best manner. The ridges are to be coped with galvanized iron and made perfectly water tight.

Bay window and porch on rear are to be tinned with best I. C. tin.

All gutters are to be tinned with best I. C. tin, to conduct all water through 3" leaders.

Windows.—All sashes to be 1½" thick, glazed with double thick French sheet glass. The upper sashes are to have marginal lights filled with cathedral glass.

Furnish all with the "Ives" sash fastener, complete, and hang all sashes on cord weights and pulleys.

Blinds.—All windows to have outside blinds, hung in pairs, on New York wrought iron hinges, and all to be furnished with proper fastenings.

Doors.—Cellar doors to be of heavy spruce dressed, hung on hook hinges and furnished with lock. Front doors 1¾ in. thick, moulded as per drawing, hung on 4 in. by 4 in. hinges and furnished with 4¾ in. "Niles" patent lock and bronze furniture, all complete. Vestibule door to be glazed in upper part and to have marginal lights filled with cathedral glass; furnished same as front doors. All doors, except closet doors, 1½ in., four paneled, white pine, hung on 3½ x 3½ in. regular loose pin butts, and furnished with the "Niles" patent mortise locks, brass bolts and strikes. All closet doors 1¼ in. thick, hung on 3½ x 3½ regular loose pin butts, and furnished with "Niles" patent locks. All inside doors, except sliding doors, are to have jet knobs and electro-bronze roses, No. 47 E; sliding doors are to be hung on Prescott's brace hangers, and furnished with flush locks.

Floors.—All on inside are to be covered with ⅞ in. x 4½ in. merchantable white pine flooring. Piazza floors 1¼ in. white pine, laid with white lead in grooves. Piazza is to be ceiled in good and workmanlike manner.

INSIDE TRIM.

All window casings and door trim, 5 in. Queen Anne, with turned corner blocks; all good white pine. All windows to have aprons and stools. Base on first floor 1 in. x 9 in., on second floor 6 in., all good white pine.

Shelve all closets, and furnish all on second floor with hooks.

Stairs.—Newel on first floor, 7 in., turned cherry. Rail, 3½ x 4 in., double Queen Anne; balusters, 1¾ in., turned cherry; risers, ⅞ in.; treads, 1¼ in.; strings, 1¼ in.; all white pine. Attic stairs inclosed, built in a strong and substantial manner.

Cellar stairs built of dressed plank.

Sink.—Put in the kitchen an 18 x 30 in. sink, with drip board, all complete. Connect it with a 1½ in. lead trap, back vented, and run waste to 2 inch cast water pipe, with fresh air vent and trap, before leaving the cellar.

Pump.—Furnish and set a No. 70 Douglas No. 2 pump, connect with 1¼ in suction to cistern, all complete.

Range and mantels will be furnished by the owner and set by the contractor

Outhouse.—Build in usual manner.

PAINTING.

All metal to be painted two coats of metallic paint in linseed oil. All woodwork on outside painted two coats of white lead in linseed oil. Stain the inside and varnish two best coats of No. 2 varnish.

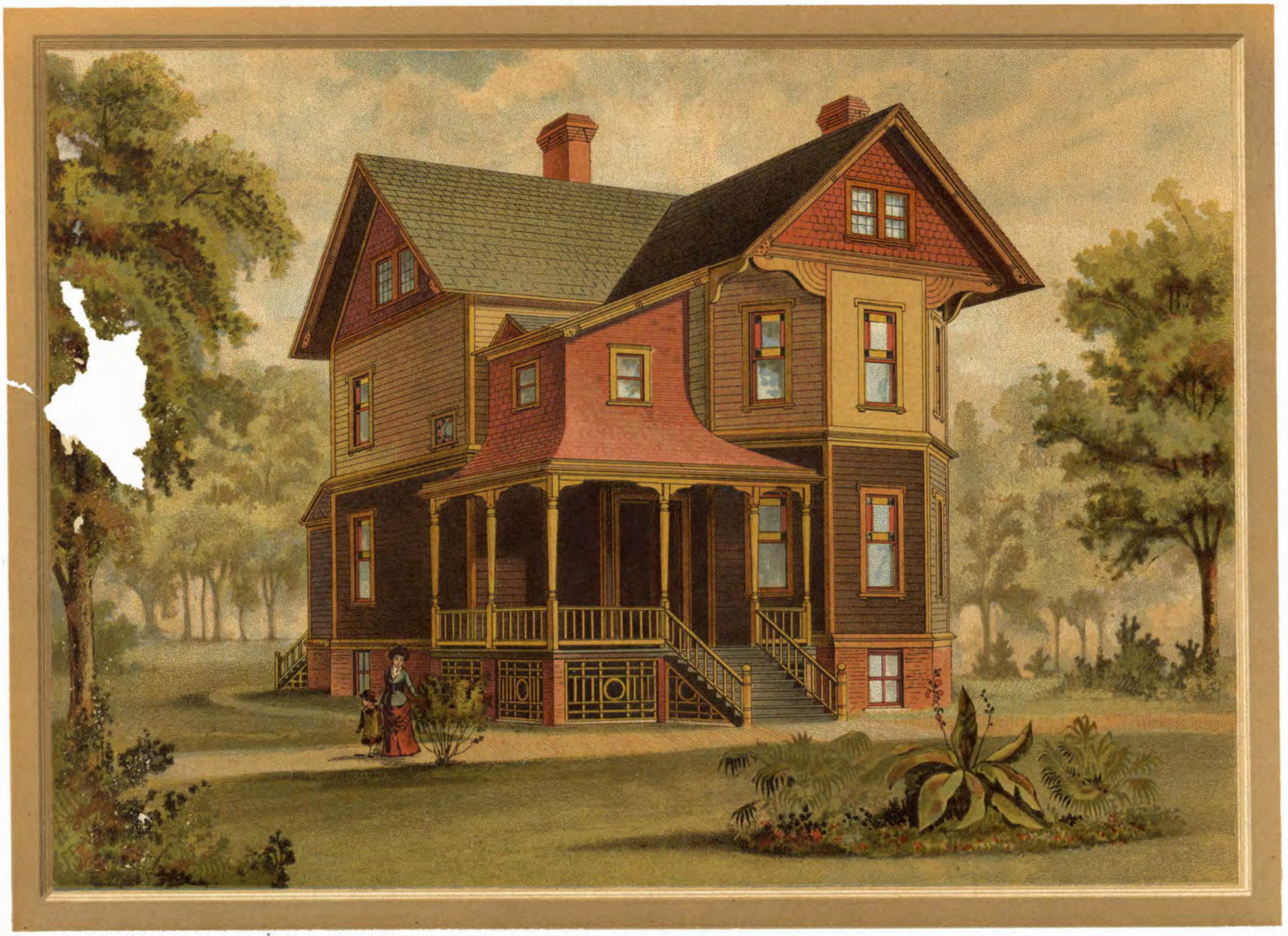
Finally, do all that is necessary to finish the entire house in a faithful and workmanlike manner, ready for immediate occupation.

ST. JAMES' RECTORY, FORDHAM, N.Y.

EDWARD A. SARGENT ARCHITECT, NEW YORK.

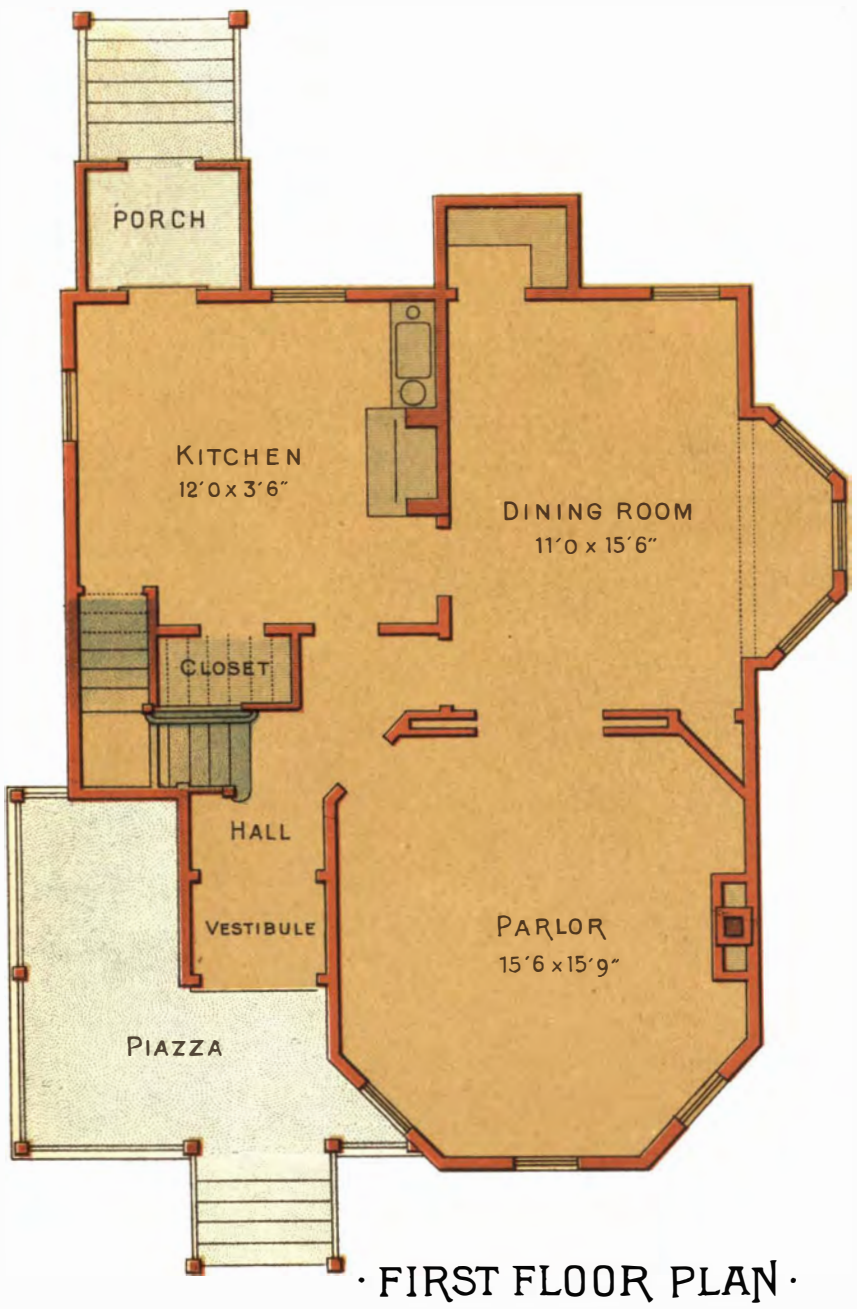
·GROUND FLOOR PLAN·

·SECOND FLOOR PLAN·

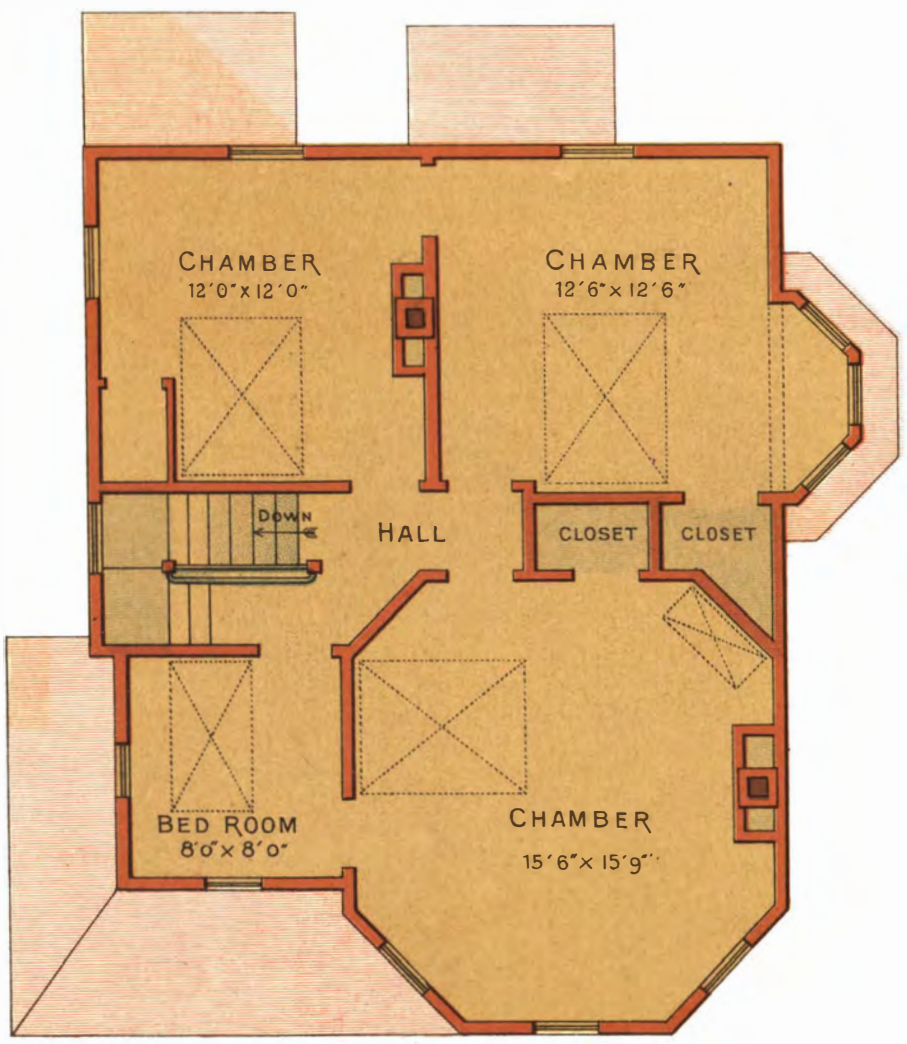


A COUNTRY DWELLING OF MODERATE COST.

B. J. SCHWEITZER, ARCHITECT, NEW YORK



· FIRST FLOOR PLAN ·



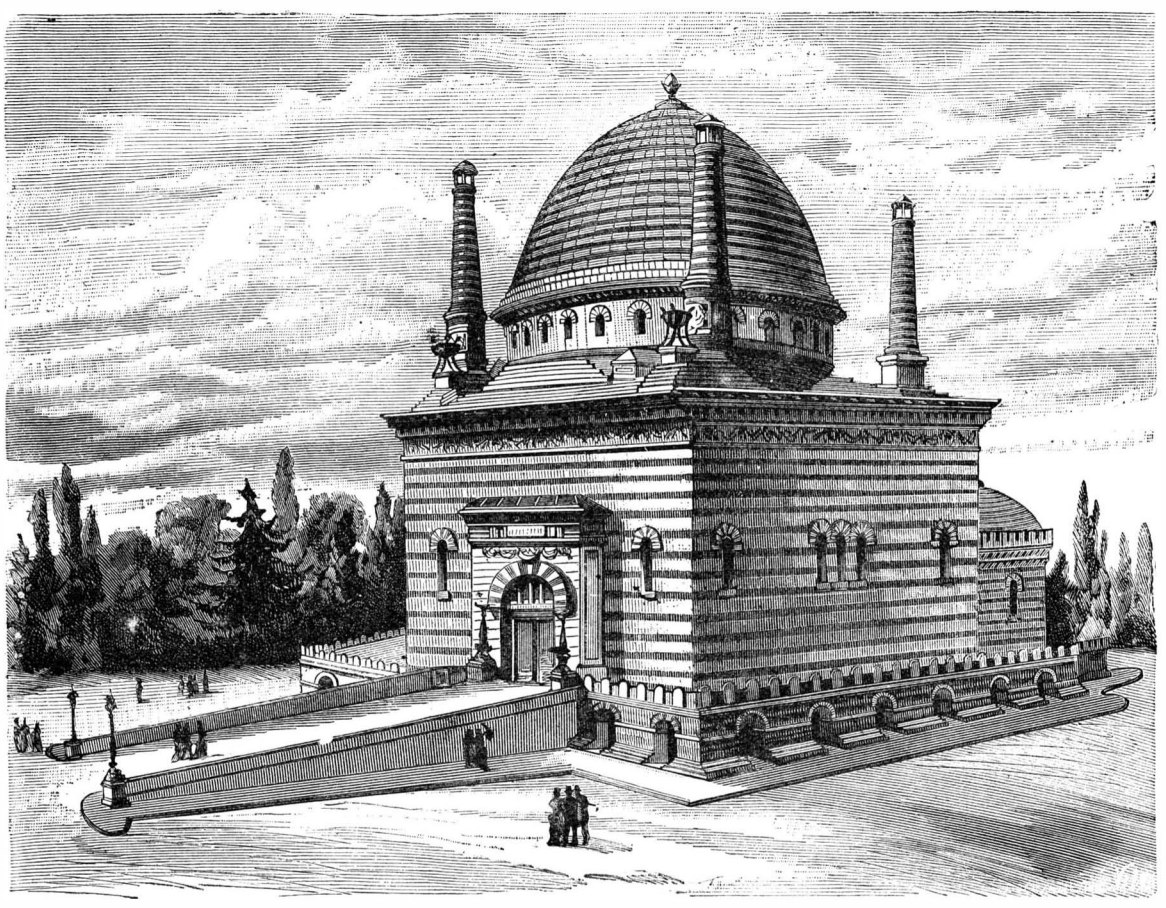
· SECOND FLOOR PLAN ·

NEW CREMATORY IN PARIS.

The municipal council of Paris has, by a majority of votes, granted a permit for the construction of a crematory edifice in the famous cemetery of Pere la Chaise, and the plans of M. Formigé, the architect, have been adopted.

Our engraving shows an elevation of the edifice, which is located near the circular roadway of the cemetery, at one side of the street of Pyrenees. The exterior of the building presents the appearance of a Byzantine temple, having correct and severe lines. The rear portion of the structure contains the furnaces for cremation, constructed and arranged in the most superior manner. The work is to be finished in June, 1887. This is to be an experimental edifice, privileged for two years, and will not be made permanent if, during this period, the Parisian public should become opposed to the burning of dead bodies.

The Catholic population do not favor cremation, however great its hygienic advantages may be, and although, as a Milan paper says, it brings the consolation of knowing that purifying flames convert to ashes the remains of the dead.



THE PERE LA CHAISE CREMATORY, PARIS.

Decorative Painting.*

Messrs. Winsor & Newton, of Rathbone Place, W., have brought out another handbook of their useful series on art, upon "Decorative Painting," the author of which is Mr. Owen W Davis, architect, and a former contributor to this journal on subjects of the kind. The work treats principally of the decorative painting of rooms, and describes various artistic materials used for decoration. As a guide to the amateur and student, Mr. Davis' little manual will be of service, if only in checking extremes or a taste for bizarre productions met with in this field of art. The several apartments of a dwelling house are taken in order. For the hall, the green and russet variety of hues are recommended for a country house. Pompeian red or brown tints, with a self-color stencil for about two-thirds of the height from the skirting, not too declicate, finished above with distemper of rich cream color, is the treatment for the walls. The cornice may be in a stronger tone, picked out by color; the same breadth of coloring should be carried up the staircase, though the decoration may be more pronounced. The author does not advocate the customary dado decoration following the hand-rail rake of stairs, for the reason—and it is a good one—that it reduces the apparent width and disturbs the perspective of the walls. The "endeavor should be to make the ascent appear as easy and inviting as possible." This he proposes by carrying the horizontal lines through, and by introducing vertical forms or gradual, step-like decoration. The lower flight has the blocking courses carried through horizontally, with a star stenciled in alternate blocks. A decorative string terminates this blockwork on a level with the first floor landing, with a diaper filling above. A small vestibule or lobby opening on to a lobby may be treated in a rich decorative manner, and a Pompeian decoration is shown as suitable. For the stair soffit, a plain border with a simple diaper is effeetive, though folial designs in panels can be arranged to have a pleasing character. Designs for morning room, dining room, drawing room, boudoir, and library decoration are suggested, with scales of coloring appropriate thereto. Speaking of the dining room, the author says it should neither be somber nor dull, but massive and dignified. If there are oil pictures, the dominant color of walls should be subservient to them, and used as their background. The tones advised are purpled red, chocolate, leather color, and dead leaf greens stenciled with a brocade pattern in self-tint. Stamped leather paper is highly recommended for this room, which can be hand-painted. Lincrusta-Walton makes a good dado, and the quieter it is the better, though a wood paneled dado two-thirds of height of wall is to be preferred. Referring to the tone of color of the drawing room, the author justly points out the value of attending to the aspect—a cold one demanding a warmer color than an aspect to the south or west. It is observed also that the hangings should determine the tone to be used as wall papers; and painting can be more readily obtained and made to harmonize with the curtains. A series of panels above the dado having the prevailing dado color, filled with designs of natural foliage on a plain or gold ground, with festoonings above this in the filling below the frieze, is suggested; the prevailing hues of the walls to be a gray green, and the ground of frieze a vellum tint with ornaments in the neutral green, and wall ground color aided by positive color and gilding. A suggestion is given for a painted ceiling in the Italian style. For bedrooms quiet and tranquillizing effects are necessary, and the Adam and Louis Seize styles are appropriate for wall and ceiling decoration, the woodwork in all cases giving the key to the cornices and ceiling; shades of green being useful. The scales of general tones given show the tints desirable in each case for framing, for wall filling, the mouldings, and ornament. The scales also suggests tints for the dado color, filling, frieze, and ceiling. The remarks on color are generally sensible, and the list of tints and pigments will be found of service. The observations on architectural features and on setting out the ornament are also useful, and Mr. Davis' book will be found a safe and artistic guide.—*Building News.*

* The Rudiments of Decorative Painting, etc. By Owen W. Davis, Architect. London: Winsor & Newton.

A Note on Watering Potted Plants.

In the operation of watering potted plants, persons not practically familiar with plant culture are apt to make serious mistakes. Cultivators find by experience that an excess of water at the roots is very injurious to almost all plants, and hence it is usual to direct that great caution be used in the application of water, especially in winter. The result is that frequently the opposite extreme is fallen into, to the great injury of the plants. From the moment that the soil becomes so far dried that the fibers of the roots cannot absorb moisture from it, the supply of the plant's food is cut off, and it begins to suffer. Some plants can bear this loss of water with more impunity than others; some again, and the heath family among the rest, are in this way soon destroyed. The object in watering should be to prevent this stage of dryness being reached, at least during the time a plant is growing, and at all times in the case of those of very rigid structure; at the same time, that excess which would sodden the soil and gorge the plants is also avoided. Within these limits the most inexperienced persons may follow sound directions for the application of water with safety. But whenever water is given to pot plants, enough should be employed to wet the soil thoroughly, and the difference between plants that require less or more water should be made by watering more or less frequently, and not by giving greater or less quantities at one time.—*Farmer's (Irish) Gazette.*

To Imitate Ground Glass.

Put a piece of putty in muslin, twist the fabric tight, and tie it into the shape of a pad. Well clean the glass first, and then apply the putty by dabbing it equally all over the glass. The putty will exude sufficiently through the muslin to render the glass opaque. Let it dry hard and then varnish. If a pattern is required, cut it out on paper as a stencil plate, and fix it on the glass before applying the putty, then proceed as above and remove the stencil when the dabbing is completed. If there should be any objection to the appearance of clear spaces, cover them with slightly opaque varnish.

Composition for Making Artificial Marble.

In compounding this composition, which is the invention of Mr. Carl Straub, of Syracuse, N. Y., glue and water are mixed together under a moderate heat, so as to produce a thick fluid, to which is added a quantity of boiled linseed oil. After the oil has been thoroughly intermixed with the gluey fluid, either muriatic or sulphuric acid is added. This mixture is stirred for a short time, having been kept heated up to this point, and is then stirred till cool. After cooling it is allowed to stand for three days, during which time it is occasionally stirred. This solution may be kept almost any length of time; and when it is desired to form any quantity of artificial marble, one part of the solution is mixed with twenty parts of water in which the mixture readily dissolves. Plaster of Paris is then sprinkled into the diluted solution, which is stirred while the plaster is being added. Enough plaster is added to form a dough as thick as moulding clay, and which should be thoroughly kneaded. After the dough is formed, it may be pressed into any shape or form desired, and may be colored by any of the well-known pigments.

This marble is particularly well adapted for ornamental work, as it is easily and quickly manipulated, and is capable of receiving a high polish. The dough, of course, can be pressed into ornamental shapes and forms as well as into plain, flat tablets.

Stained Glass Substitutes.

During the past few years the use of stained or "cathedral" glass, formed of small panes held in lead work, has considerably increased. The effect is excellent where a good design is chosen. The colored tints help to make a room cheerful, while, in both rooms or windows having a disagreeable outlook, in churches and in vestibule doors and transom lights, it is very effective. There is only one objection to the use of cathedral glass. It is very expensive, and especially where anything like an elaborate design is chosen.

Mr. W. C. Young, of 731 Arch Street, Philadelphia, Pa., is now manufacturing, under his patents, a substitute composed of thin, tough sheets of linen, treated in such a way as to make an excellent imitation. The material is colored and is semi-transparent, and, being applied to the surface of the glass, it gives the effect of the opaque leads and richly colored stained glass in a very striking manner. It is quite durable, is easily applied, and may be had in a great variety of designs, of all sizes. Mr. Young publishes a fully illustrated and colored catalogue, and will send it free of cost on application.

Invisible Nails.

For attaching mouldings and other light lumber, a new kind of nail has been contrived, which leaves no nail holes. It is made with a point at each end, and with an outwardly projecting head or shoulder, midway between the points. The nail is first driven into the wood by means of a punch, which straddles the protruding point and bears on the head. When enough have been driven in, the moulding is placed over the nails and driven down.

Health in Schools.

In a voluminous report of Medical Inspector Taylor, presented to the board of health, the sanitary condition of the public schools of Philadelphia seems to show the presence of elements decidedly prejudicial to health. The chief fault appears to be in the dangerous proximity to the buildings of wells which are in a very foul condition. Nothing is more probably responsible for fevers and diphtheria than are these odor-giving and miasma-breeding pools, and the danger from them is heightened when so many children are gathered together in places which at best afford scanty air and poor ventilation.

A CITY RESIDENCE.

We give from the *Building Budget* a sketch of the residence of Mr. C. Thompson, from a pencil drawing by the architects, Messrs. Treat & Foltz, of Chicago. This is a substantial and attractive design.

Specifications for Plumbing, Gas, and Natural Gas Fitting.

BY L. O. DANSE, C.E., ARCHITECT, PITTSBURG, PA.

The following specifications are those prepared by me for two brick dwellings for Mrs. Bailey, to be erected on Murtland Avenue, East End, Pittsburg. For houses built to rent, I think the plumbing is extra good—better, in fact, than many persons put into their own houses; yet, had the houses been for personal occupation of owners, I should have insisted on using brass pipe for hot water instead of galvanized iron. The use of a terra cotta chimney top to hide vent pipes is original.

GENERAL CONDITIONS.

Contractor to supply all materials and labor requisite for the full and perfect completion of the entire work; to give it his personal supervision, keeping a competent foreman constantly on the ground, and to guarantee the work for one year from date of acceptance of same, making good any defects which may arise during that time from improper work or bad material. It is understood that this guarantee does not extend to such defects as may arise from causes beyon control of contractor during duration of said guarantee. He shall not retain on the work any man found incompetent or improper by the architect; and shall do his work in such a manner and at such times as not to retard the other mechanics on the buildings.

PLUMBING.

Tap main on Penn Avenue and lay in trench, four feet six inches below surface, a two inch cast iron service pipe, weighing not less than sixty-seven and one-half pounds per length of seven feet, with carefully calked joints containing two and one-half pounds of lead each, with service cock and box at curb and at point where each branch leaves main line. Length of main supply pipe to be seven hundred and thirty feet.

Branch for each house to be one inch galvanized iron pipe with galvanized malleable fittings. To have stop and waste at point where it enters cellar, and run along partition wall of cellar at a uniform grade of one inch to one foot to point directly opposite the waterback connection in kitchen, where it shall have a one inch by three-fourth inch by one inch T, then rising to point four inches below ceiling of laundry, crossing to rise along flue and connect with waterback. Must be supported at least once in every length of the horizontal parts by wrought iron pipe hooks, firmly driven into walls and so arranged as not to interfere with expansion and contraction.

Run three-fourth inch XX strong lead pipe from T on service pipe, connecting to same with lever handle stop and waste, rough, along wall to supply wash trays, each of which shall have five-eighth inch compression wash-tray cocks.

Hot water supply to laundry to be three-fourth inch galvanized, with malleable galvanized fittings, and to come down from boiler along inner face of chimney jamb, then across ceiling at uniform grade of one-half inch per foot, down beside cold water riser and parallel to branch from same to tray. To have stop in kitchen.

Set thirty gallon Scarfe's patent dome head kitchen boiler on wall plate and supported by three-eighth inch iron rod with nut below plate and attached to joist above by screw eye of same size iron.

Set fifteen inch by twenty-three inch cast iron sink with hot and cold supply through three-eighth inch XX strong lead pipe, with five-eighth inch Dougherty self-closing bibbs; supply pipes to be carried on chimney jamb, and not on outside wall.

Supply to bath room through three-fourth inch XX strong lead pipes, carried along chimney breast and stair partition at a uniform grade of one-half inch per foot, with branch riser to W. B. of five-eighth inch XX strong lead pipe. Branch riser to W. C. tank to be one-half inch XX strong lead pipe, and supply to B. T. to be three-fourth inch XX strong.

Furnish and set six-foot (16 oz.) planished copper bath tub, with nickel plated double bath cock for three-fourth inch supply pipe, rubber plug, and chain, and four pound lead safe under all, with one-half inch drip pipe carried down to laundry and left exposed there.

Furnish and set Paragon "B" solid square top porcelain bowl and trap combined back outlet, washout W. C. with enameled double tank and seat action, cherry seat finished in light varnish without stain, with one and three-fourth inch heavy lead flushing pipe, as made by Standard Manufacturing Company.

Furnish and set style "A" 20 inch by 20 inch marble corner slab, with 13 in. porcelain basin, five-eighth inch self-closing Dougherty nickel plated basin cock and "Star" rubber plug, with chain and nickel plated chainstay.

Furnish and set wash pave in north wall of each building, with terra cotta drip stone and gutter tile, to discharge into branch of sewer. Supply to be through three-fourth inch galvanized pipe, and to draw from opening toward service pipe.

Trap each wash tray, sink, wash stand, and bath tub separately with one and one-fourth inch Sanitas trap to one and one-half inch (5 pound) lead waste pipes, calked into porcelain lined Y branches on soil pipe by means of brass ferrules wiped to pipe.

Soil pipe to be three inch porcelain lined "Standard" from outside of cellar wall, where it is to be carefully cemented into sewer, to be hereafter specified; to have three inch enameled running trap immediately inside wall, and three inch by three inch enameled T vent to it. Run three inch enameled vent pipe from T up and through wall below surface, cementing same into three inch glazed earthenware pipe, laid with cemented joints, and bring to surface 18 feet from building with a cast iron grating at top.

Waste from wash trays to enter enameled T next to one for vent pipe.

Carry soil pipe along partition wall to within six inches of door opening, then rise and carry along the ceiling to foot of recess for riser. Provide one double Y branch, enameled, below ceiling of first story for waste from B. T. and W. B., and separate Y branch, enameled, for W. C. in thickness of floor, running soil pipe full size to top of chimney crock provided on ridge for that purpose. One-eighth bend will be required to turn pipe between rafters and another to turn up again at ridge.

Run two inch wrought iron vent pipe from bowl of W. C. parallel with soil pipe to roof. Make both tight to roof with sheet lead.

All joints of soil pipe to be made with melted lead, well calked, and hemp. No rags, paper, shavings, or putty to be used. Each section of vertical pipe to be supported by ears or bands, and all horizontal sections to be supported by wrought iron hooks and to have a uniform grade one-half inch per foot, with no pockets for retention of water.

Put up Standard "Acme" hopper water closet, number 311, as shown, in cellar, with round self-raising seat, enameled hopper on enameled one-half S trap, with one-half inch XX strong supply pipe, branching through partition wall from W. T. branch, and having stop and waste at lowest point so as to drain entire branch to main supply pipe. Trap of hopper to be calked into three inch enameled pipe reaching through wall and cemented into branch of glazed sewer. Tap trap for two inch gas pipe vent to run through wall and up same to roof.

All lead pipes used in this work to be supported by tacks soldered to pipes and screwed to boards to be provided by carpenter for that purpose. Tacks to be four feet apart on horizontal parts and six feet apart on vertical parts. Where the word horizontal is used, a grade of one-half inch to the foot is meant, unless otherwise specifically stated. All pipes to be kept in full view none being placed behind plaster or wainscot.

All connection between lead and galvanized pipe must be made by means of brass ferrules wiped to lead pipe and screwed into galvanized pipe.

Connection to soil pipe must be made with Raymond's combination ferrules.

When work is completed, the peppermint test must be satisfactorily made in the presence of the architect before same is accepted.

SEWER.

Lay six inch vitrified sewer pipe on grade of not less than one-half inch to the foot from well to Y where branches run to each building. Lay five inch branch to each building, with four inch branches to surface at each conductor shown on plans and at wash pave. Fit in separate four inch Y and branch, to each soil pipe. Cement all joints perfectly tight.

GAS FITTING.

A one and one-half inch wrought iron service pipe 730 feet long must be laid from main on Penn Avenue, with stop and Rickett's patent ventilated service box at curb, and additional stop and box for each house in same ditch with water.

All piping must conform to the rules of the company furnishing the gas.

No joist shall be cut more than eighteen inches from its bearings.

Ceiling lights to come fair in center of rooms. Brackets in halls five feet seven inches from floor, and in rooms five feet ten inches. All nipples to project one and one-fourth inch beyond finished surface of plaster and be capped until such time as fixtures are put on. Put meter on shelf in cellar, immediately under vestibule.

Run all pipes in such a manner as to all drain to a common point; having no pockets for accumulation of water, etc.

NATURAL GAS.

Service pipe two inches diameter, of wrought iron, with stop to each house and Rickett's patent ventilating service boxes, to be laid from Penn Avenue in same ditch with water service.

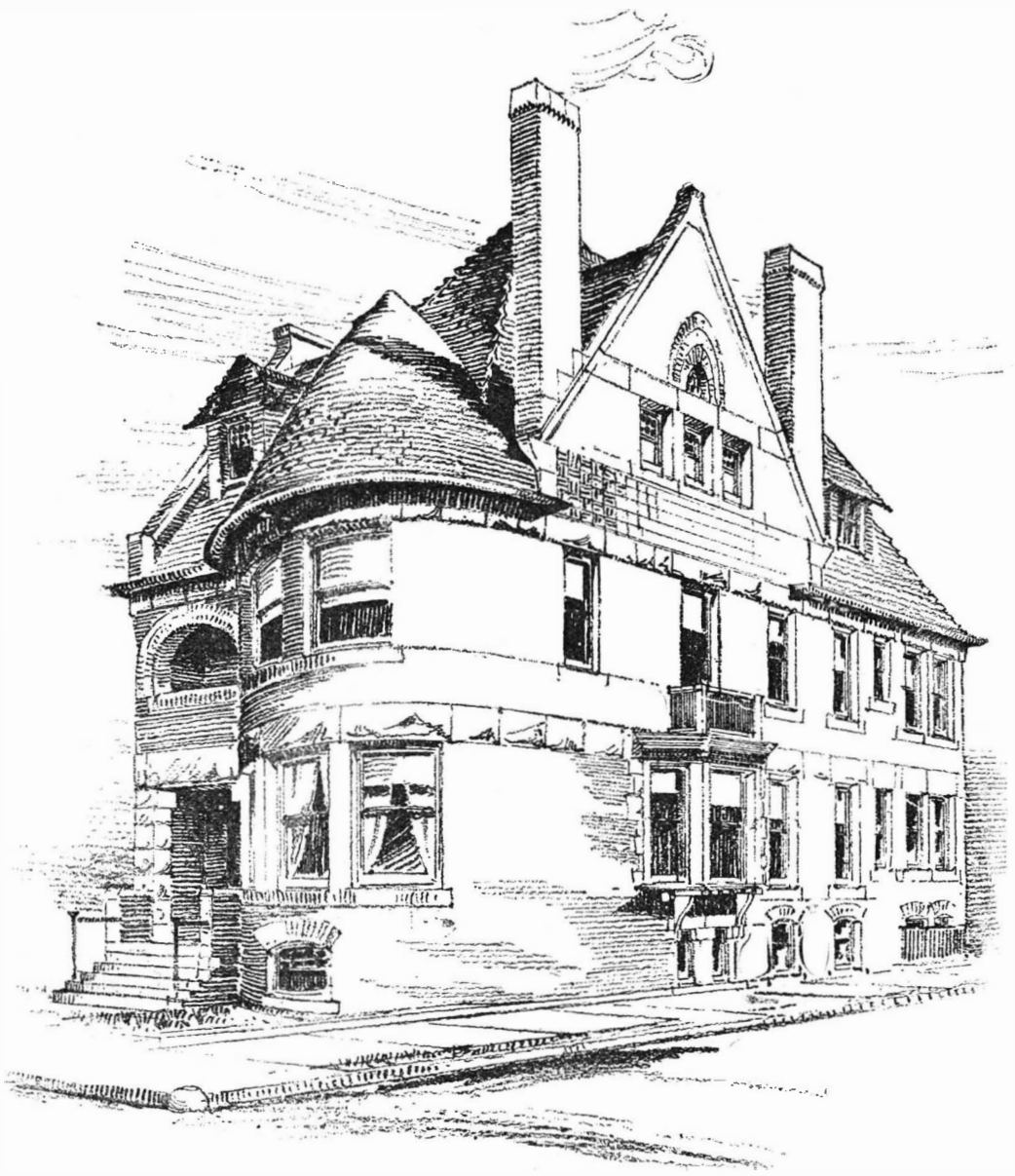
Regulator to be placed in areas as shown on front of houses.

Run one and one-half inch pipe from main service pipe to regulator, and one and one-half inch pipe from regulator through cellars, with one inch laterals to all flues colored blue on plans, and three-fourth inch risers in said flue. Take three-fourth inch branch from laterals through hearth to each fireplace in first story; and three-fourth inch branch for laundry stove down through flue to level of burner in stove.

Branches to fireplaces to come through walls of flues, stone hearths, and all visible pipes except those in cellar, laundry, and kitchen, shall be nickel plated and polished.

Nickel-plated screw valves with self-packing stems, of approved pattern, are the only form of stops permitted in this work.

Provide "Standard" burner for each fireplace, range, and laundry stove.



A CITY RESIDENCE.—TREAT & FOLTZ, ARCHITECTS, CHICAGO.

All fittings to be malleable iron, galvanized, except those in finished rooms, which must be brass, polished and nickel-plated. All work to conform to regulations of fire marshal and board of underwriters.

A DWELLING AT SPRINGFIELD, MASS.

This cottage was recently erected in Springfield, Mass., and represents a house of modern design, conveniently arranged, and of moderate cost ($3 500), using best materials.

The hall is ample, with parlor, library, and dining room connected by sliding doors, with fireplaces in the adjacent corners of each room.

There are five chambers, with bath room and closets, on second floor, with two bed rooms and ample room for storage on attic floor.

The foundation is of brick, 13 in. thick up to grade line, and 9 in. thick above to sill. The cellar is 7 ft. high, with cement concrete for cellar bottom. Brownstone is used for window sills and hatchway steps.

The frame of the building is of spruce, covered with matched spruce boards laid diagonally (on this building they were laid to the northwest, as the prevailing winds are in that direction), overlaid with paper. The outside finish is of pine, with pine clapboards and bands of cut shingles. The roofs are of narrow matched pine boards overlaid with tarred paper, and covered with Chapman slate, 6×12, with lower edges cut.

The inside finish to be of ash, except kitchen, which will be of pine, grained in cherry. The doors are made of pine, with panels of ash to correspond with the inside finish of adjoining rooms. The upper floors of kitchen to be of black birch; remainder of house, pine floors.

Geo. H. Blanden,
Architect.
Springfield, Mass.

A DWELLING AT SPRINGFIELD, MASS.

Petroleum V. Nasby on Socialism.

I hate a capitalist, no matter how he becum one. I hate the meenspirited, grovelin retch wich will work ten or more hours a day, deprivin hisself uv beer, and terbacker, and cards, and bilyards, and hos racin, and sich, savin peny by peny til he hez ground enough out of the world to hev a shop uv his own, and to employ other men to slave fur him, and thus go on akumulatin til he owns things. Such men are monopolists, and the enemies of labor, and grinders.

I hold that the possession of a ten dolar bil makes a monopolist, and al sich shood be crushed. Ez hevin a ten dolar bil makes a man a monopolist, his monopolism increases jist in proporshen to the ten dolar bils he hez. The owner of a factory is a enemy to the human race, and ez for the man who bilds a ralerode, he

> "Is a monster uv such hidgus meen,
> That to be hated needs but to be seen."

My hatred of railroad managers is intens. It commenst with the first time I wuz drop off the hind platform uv a trane for not payin fare, and hez increst with every repetishun uv the ofense, which generally happens every time I want to go anywhere. I lothe the ralerode monopolist.

A grindin monopolist is any man wich has anything. Whenever a man hez saved anything, he becomes a capitalist, and ez capitalists are dangerous to labor, he should be made to divide it up, so ez to be on a ekality with them wich never saved nothing.

The mechanic or workingman wich saves so ez to own a house or a farm becomes a capitalist, and consekently a grindin monopolist, and ez accumolashens are dangerous to labor, wat he hez shud be confiskated and divided up among us wich hezn't anything. Property is a crime.

I ain't jist shoor that I hev got the socialistic doctrine down fine enuff, but I think these definishuns will do, espeshly when you howl em under a red flag to luvers uv humanity wich is chuck full of stale beer.

Brickmaking Under New Conditions.

A few years ago the making of bricks was deemed to be all but impracticable at any site which did not itself contain the raw materials required for the manufacture. Now, however, Taylor & Neate, Medway Works, Rochester, have introduced slurry pumps, by the use of which the brick manufacturer is enabled to prepare his earth upon the site whence he draws his supply, and convey it thence in a liquid state through iron mains to the brickfield, where it is intended to be converted into bricks. In this way Smeed, Dean & Co., Sittingbourne, have lately obtained an enormous supply of fresh brick earth from a property about a quarter of a mile east of Tonge Church, and nearly two miles distant from their present brickfields. The most important feature of the undertaking is the set of pumps for pumping the washed brick earth through a cast iron pipe main to the brickfields, which are the largest and strongest pumps that have ever been made in the district for brickfield purposes.

House to House Inspection.

The Illinois State board of health has received the report of the house to house inspection made by the board of health of the city of Springfield. This is by far the most complete and thorough inspection that has been made by any town or city in the State, and reflects great credit upon the city and the superintendent, Dr. B. Barret Griffith. There were found to be in the city 4,738 houses; the sites of 4,094 were good, 437 fair, and 207 bad; only 453 are sewered. Of these, 7,329 are built of wood, 1,009 of brick, and 19 of other materials. The basements or cellars of 2,188 were dry and 724 damp, while the ventilation of 2,329 was good, 271 fair, and 252 bad, and the general condition of 2,359 was good, 248 fair, and 194 bad. There were found 1,747 cesspools, sinks, and drains in good condition, 150 fair, and 90 bad, 1,505 of these connecting with sewers; 3,075 privies were found in good condition, 434 fair, and 582 bad, 96 of them having connection with sewers. Out of 466 water closets, 427 were found in good condition, 20 fair, and 19 bad; 444 have connections with sewers. The yards of 3,879 were in good condition, 316 fair, and 261 bad.

Of the hydrants, 475 were found in good condition, 337 fair, and 1 bad; 3,085 cisterns were in good condition, 39 fair, and 48 bad, while 3,577 wells were in good condition, 225 fair, and 115 bad. Of these latter, the water in a number was examined and found to be unfit for use, and they were accordingly condemned, owing to their contamination from surface drainage and privies. This was one of the most important facts elicited in the investigation, and shows the great necessity of preserving wells from pollution, especially where the general water supply is not what it should be, owing to local causes.

During the time of inspection there were found 152 cases of sickness, showing the general health of the city to have been very good. Some of these cases were attributable directly to the water supply.

The vaccinal status was found to be as follows:

Adults vaccinated	15,637
Adults not vaccinated	1,353
Adults revaccinated	9,184
Children vaccinated	6,866
Children not vaccinated	3,041

There were found 3,716 nuisances and defective conditions affecting life. Nearly all have been abated or removed. Maps of the water supply and sewerage accompany the report. All this has been accomplished at the trifling cost of $947.50.

The Tehuantepec Ship Railway.

E. L. Corthell, chief engineer of the Tehuantepec Ship Railway, delivered, on December 20, before the New York Academy of Sciences, in the Hall of Columbia College Law School, an address on the Isthmian Railway. Mr. Corthell having gone through an exhaustive account of the historical precedents of ship transportation in the past 2,400 years and having by statistics shown that the proposed Tehuantepec route was the most feasible for the purpose, gave an account of the mechanical devices and plans, their cost and advantages. He brought numerous statistics to bear to show the economy of the scheme on account of the traffic which, because of the abolition of an ocean voyage of 11,000 miles, would pass over it.

This traffic he estimated at almost 6,000,000 tons. He then descanted on the general benefit to mankind resulting from its enabling civilization to advance with more rapid strides. He expressed confidence in its ultimate success, and declared that Suez furnished a precedent as to the country into whose hands this grand achievement will eventually fall, should the United States take no decided national interest in it.

"This work when finished," he concluded, "will be the realization of the ardent wish of statesmen and philanthropists everywhere, the dream of kings and conquerors during the last 350 years, and a fitting supplement to the grand achievements which have marked the progress of the nineteenth century."

A COTTAGE AT HALIFAX, N. S.

We give a sketch of a suburban cottage designed by C. H. McClare, architect, Cambridge, Mass., for a gentleman at Halifax, N. S. The building is of wood, the outer walls and roof to be covered with sawn shingles, stained a warm color before laying, the roof to be darker than the walls, and the finish and copings a lighter color.

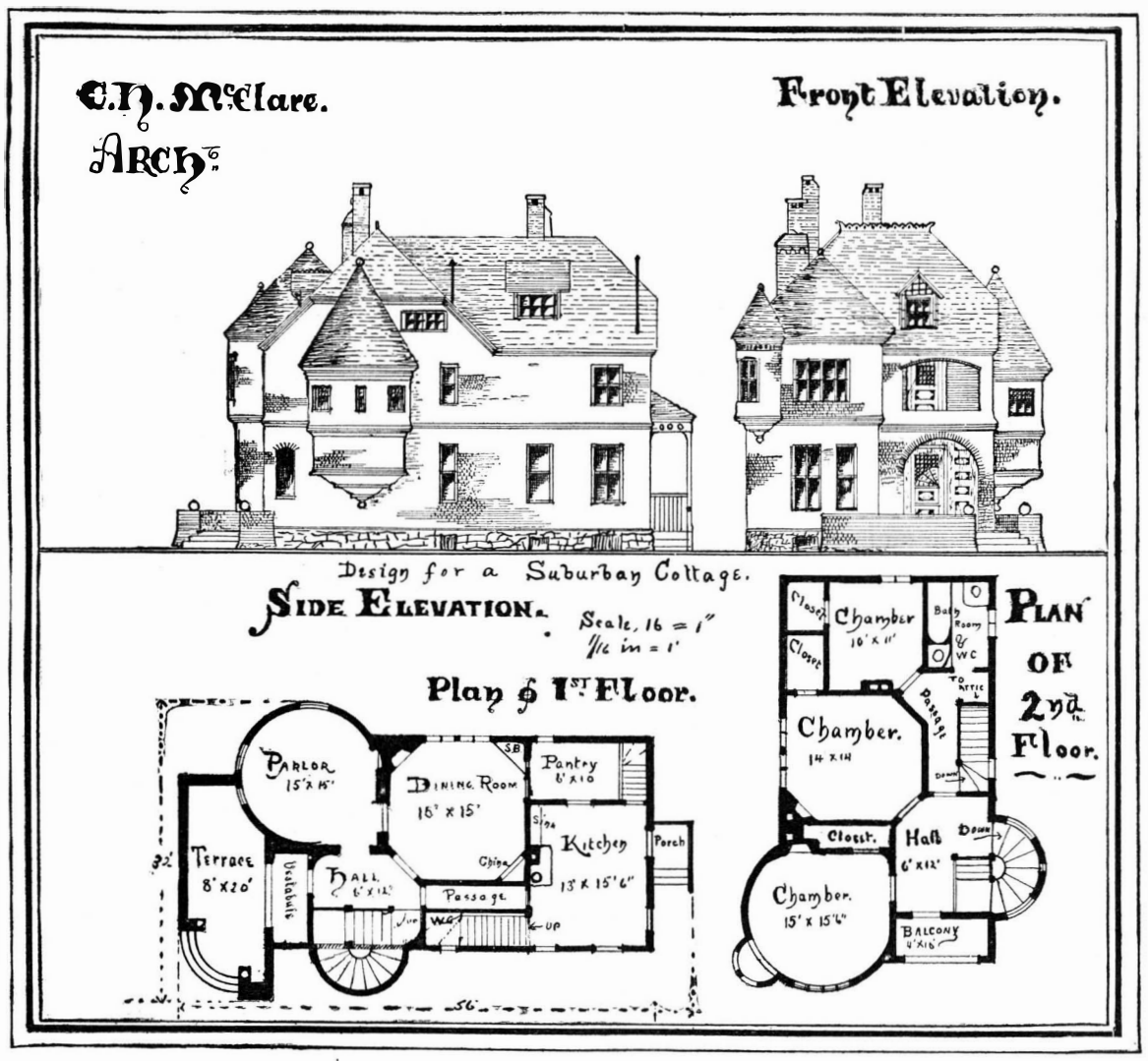
The rooms all of good size and convenient, as the plans show, with three on each floor, with closets, halls, etc.

The first story will be 9 ft. 3 in. between floor and ceiling, the second floor will be 8 ft. 3 in., and the attic will be 7 ft. 6 in., and will be finished in pine, painted. It will contain two bed rooms and a store or lumber room, with closets. The second story will be finished in whitewood, stained cherry, and have open grates for soft coal; the bath room and water closet is on this floor. The parlor will be finished in cherry, including mantel for open fireplace. The dining room and hall is to be finished in English oak, which includes a large mantel and sideboard in the dining room.

The vestibule to be finished in oak, paneled as shown in the sketch.

The kitchen and pantry to be finished in pine, natural or an oil finish. A set range, with hot water tank, is in the kitchen, also stairs to cellar and next floor. The cellar to be concreted and contain a furnace and laundry.

The cost to complete it is estimated at three thousand dollars in that locality.



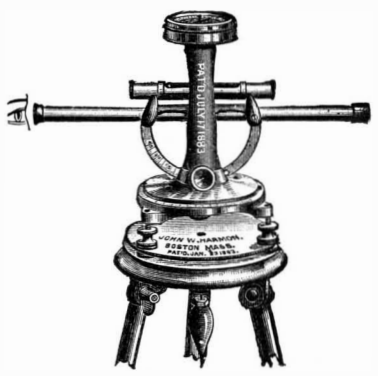
A COTTAGE AT HALIFAX, N. S.

Concrete Floor.

If the wet state of the concrete floor does not arise from land springs or some other source beneath, then it can only be from condensation. The impervious character of good concrete and Portland cement, and the comparative coldness of the surface, are sure to cause—if there is no artificial heat in the room—that appearance of an irruption of water which many persons cannot believe arises simply from the condensation of moisture with which the atmosphere is heavily charged in damp and changeable weather. The only remedy is to cover the floor with a carpet, matting or some material of a higher temperature than the floor; but of course this does not dispel the watery particles held in suspension. Obviously, such a floor is not healthy, for it does not hold or retain moisture but for a short time. This applies to concrete walls as well as floors, and is direct evidence that the atmosphere is at the time too damp for the room to be occupied without some form of artificial heat being introduced to make the air drier, and a single lamp will often effect this and prevent all appearance of moisture. I have known a doctor report a concrete cottage as being unfit for habitation, as moisture runs down the walls; but a candle burning through the night having to all appearance prevented it, he acknowledged he was mistaken.—*Thomas Potter, Building News.*

A NEW LEVELING INSTRUMENT.

The advantages of an accurate and easily adjustable leveling instrument in setting out buildings on the ground is well understood by builders and contractors. The time saved is considerable, and the exactness which is so necessary in this description of work is, to a great extent, insured. The instruments hitherto manufactured have been, as a rule, so expensive as to preclude their general use, excepting in the more extensive works.



HARMON'S NEW LEVELING INSTRUMENT.

Mr. John W. Harmon, of 65 Haverhill Street, Boston, Mass., is the manufacturer of an improved level of considerable completeness and utility. Its general form is shown in the engraving. The simplicity of construction enables the manufacturer to sell at a very moderate price, while the whole arrangement of parts is specially designed to insure accuracy and speedy adjustment.

The special points of construction are protected by patents, and consist of the central stand, provided with a circular gauged flange and a centralizing pointer, with the adjustable screws.

The instruments are supplied either with or without the magnetic compass, and may be used either as a level or theodolite for the various purposes of architects, builders, contractors, engineers, and others. It is claimed that they will do all that is required of the more expensive instruments, excepting where the distances are of very long range.

IN the manufacture of a pair of ordinary window sashes, it is necessary to make twenty four mortises; and in a common door or pair of blinds, from twelve to sixteen mortises.

Air in Greenhouses.

The circulation of air is one of the most important provisions in all kinds of horticultural buildings. Nothing but that will fairly exclude damp, or in any damp weather counteract its effects. It is not enough to open every front window. It would be far better to open only one and let down a top light a little. In all cases there should be an outlet as well as an inlet, and for want of this many houses do not answer well for plants. A circulation of air causes a more rapid evaporation, and it is a common thing among good gardeners to open a lower window even in wet, cloudy weather. Let down one of the top lights a little, and light a fire. By this a free circulation is created and the house dried, although it were in the midst of rains and cloudy weather. It is too common a thing to see the top lights let down to give air to a house, and no other part opened. This is all wrong; for there should be a draught. On the other hand, we see all the front windows and no top lights down. Many persons build pits three or four feet high at the back and half the height in front, and no air but what can be obtained at the top. We would always provide air holes at the bottom, as without such there can be no draught, no free circulation. When pits are built without this provision, the best mode of giving air is to pull up one light to let in air at the foot of it, and push down the next to open at top, and so on alternately through the whole range of lights, however long the pit may be. It is the same in giving air to a hotbed, only that when the air is rarefied, as it is inside, tilting the light a little lets out the steam, and the cool air will get in somewhere; but sometimes when a frame is made too close and the glass is puttied at the joints, things fog off in spite of tilting, because there is no circulation.

Advantages of Low Ceilings.

Rooms with low ceilings, or with ceilings even with the window top, says the *Popular Science Monthly*, are more readily and completely ventilated than those with high ceilings. The leakage of air which is always going on keeps all parts of the air in motion in such rooms; whereas, if the ceiling is higher, only the lower part of the air is moved, and an inverted lake of foul and hot air is left floating in the space above the window tops. To have the currents of fresh air circulating only in the lower parts of the room, while the upper portion of the air is left unaffected, is really the worst way of ventilating; for the stagnant atmospheric lake under the ceiling—although motionless—keeps actively at work under the law of diffusion of gases, fouling the fresh currents circulating beneath it. With low ceiling and high windows no such accumulation of air is possible, for the whole height of the room is swept by the current, as the dust of the floor is swept with a broom. Low ceilings have also the advantage of enabling the room to be warmed with less expenditure of heat and less cost of fuel. The above does not agree with the generally accepted idea of the height of rooms in dwellings but the authority is good, and well worthy of consideration by persons about to build.

Distempering Ceilings.

Give the ceilings a coat composed of soft soap, lime, putty, and size. The quantities to be used of each ingredient entirely depend on the finish of the ceiling; some are much more absorbent than others. The soft soap prevents the dry plaster absorbing the color too quickly, so that a clean, even surface may be obtained with the finishing coat. If the workman is not a practiced hand, he may be successful in laying an even coat of distemper; and even if he should succeed, if his ceiling is gray finished, the sand will probably spoil the distemper.

FURNITURE POLISH.—Equal parts sweet oil and vinegar and a pint of gum arabic, well powdered; shake the bottle and apply with a rag. It will make the furniture look as good as new.

A $2,200 RESIDENCE AT DETROIT, MICH.

We give a sketch of a frame house now being built on Perry St., Detroit, Mich., for Mr. M. McNamara, from plans made by A. C. Varney, architect, Detroit. The cost will be about $2,200. The house consists, on first floor, of hall, parlor, back parlor, dining room and kitchen, and one large chamber; and, on second floor, four neat chambers and bath room. It has a good cellar under the dining room. The remainder of house rests on brick piers. It is finished inside with pine and hard oil finish.

Removal of Snow from Streets.

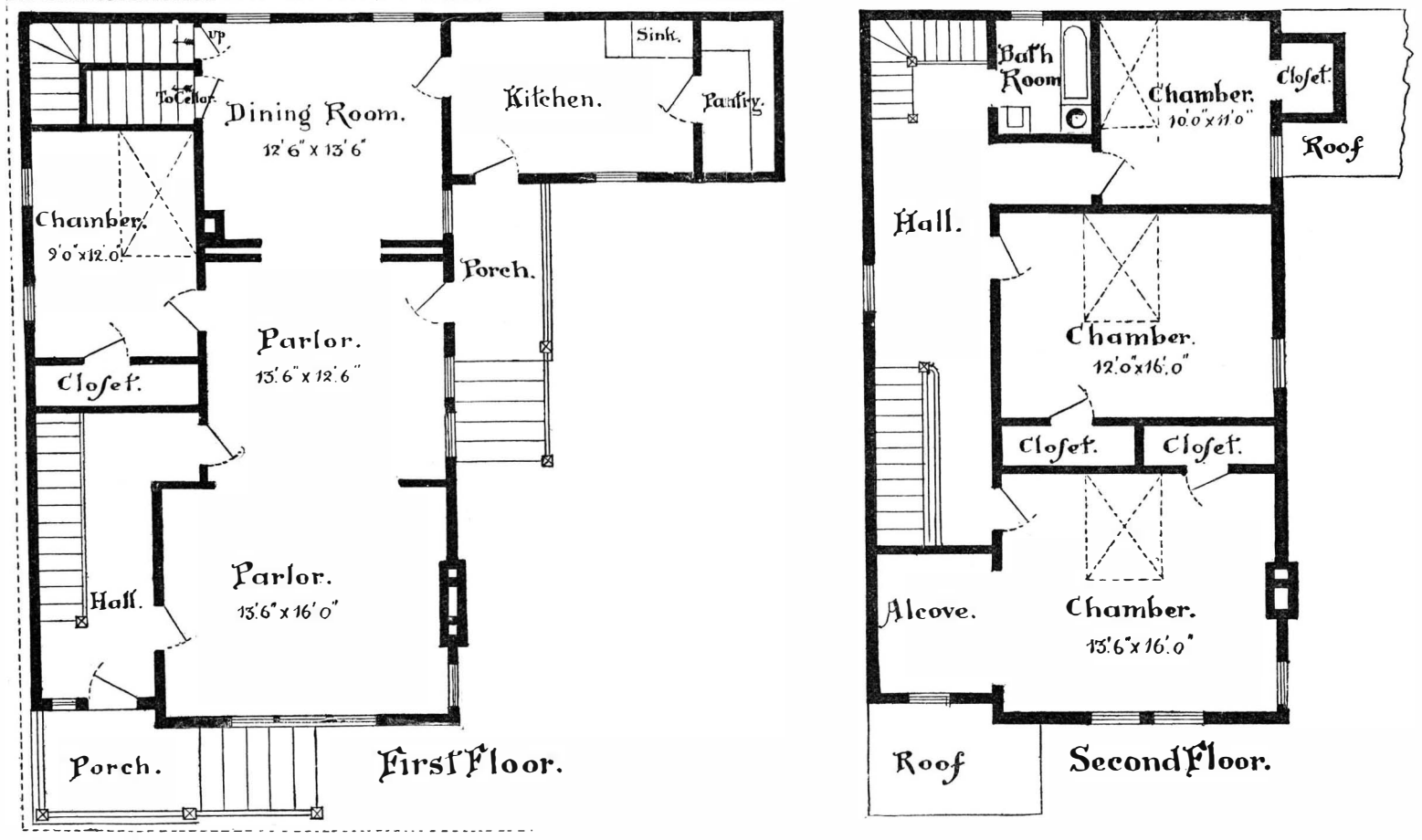
The difficulty of cleaning the streets not only is perennial, but it is one that becomes more disagreeable, and yet more imperative, with the increase of traffic and the growth of population. The streets of New York are frequently choked by the throngs of vehicles even in the best of weather, and of course a heavy fall of snow makes matters worse. In addition to the trouble thus caused, the accumulations of snow are sources of annoyance to pedestrians, and the filth collected in the slushy mass is a serious danger to health.

The expense of carting away the snow has been variously estimated to range from seventy-five cents to one dollar per cartload; but even at fifty cents per cartload it is manifest that to properly clear the streets would cost enormously. Take, for example, one street block 200 feet long and say 50 feet wide, having a surface area of 10,000 square feet. A moderate snowfall of three inches of snow will give 2,500 cubic feet on that one block of street. Assuming that in loading this is packed down to nearly half—say 1,350 cubic feet—there would be 50 cubic yards of snow to be carted; and allowing two cubic yards as the outside limit of each load, there would be 25 cartloads to be taken from each block, at a minimum cost of $12.50, or $250 per mile, for every snow storm.

The use of steam has often been suggested, and we have described in our columns various forms of steam apparatus, but they have generally failed to give satisfaction, in part because they are not sufficiently expeditious, and in part because they were too expensive. In New York, Lockport, and other cities where steam distributing companies have laid mains, attempts have been made to melt off the snow by turning upon it live steam. This plan melts the snow very fast, but in nearly every experiment there has been an enormous loss of free steam in proportion to the work done.

Recently, Mr. Charles E. Emery, C.E., Chief Engineer of the N. Y. Steam Company, has employed a novel apparatus with such success that it bids fair to solve the problem. While it is probable that it can be operated more expeditiously and economically by using steam taken from underground supply pipes, its use is not limited to this supply. Any locomotive or movable boiler could be employed. All that is needed is to keep the steam in contact with the snow without letting a great portion of it escape before touching the snow. For this purpose a broad, light, rough, and strong sled, with openwork runners, is fitted with a short pipe passing through the top of the sled, having a hose coupling at its upper end. A tarpaulin, or canvas spread, about 25 feet square, made steam tight, extends from the sled as a center, and the hose coupling passes through it. The tarpaulin is piled on the sled until it is drawn to the place for beginning work; the tarpaulin is then spread out upon the snow to its fullest spread, the edges are tucked into the snow, connection is made by hose from a boiler or steam pipe to the sled, and the steam is turned on, a pressure of 40 pounds being sufficient. The steam cannot escape into the air, but is held right down to the work required of it; and in a very few minutes the deepest snowbank or the iciest packed roadbed yields to the heat and runs off as water. By repeating this operation a street can be cleaned in a very moderate length of time and at small expense. The three inches of snow on 10,000 square feet of street on a block, if removed by carts, would be, say, $12.50. The melting process would require that the tarpaulin should be shifted sixteen times to cover the street 200 feet long and 50 feet wide. Making the excessive allowance of 15 minutes for each shifting of the tarpaulin, the street would be melted off in four hours. The cost would depend upon the amount of steam used. That is a difficult matter to calculate, for it would vary according to the temperature of the air and of the snow. The N. Y. Steam Co. charges $1 for 2,000 pounds of steam, which would melt from six to seven tons of snow, and on that basis the steam would cost from three to four dollars per block, and the labor of attendants, etc., probably as much more, say $8 per block, or $160 per mile.

To carry out such an undertaking, even where there are steam mains already laid, would call for a considerable outlay. Steam plugs, like fire hydrants, would be needed on every corner, and each melting would require about 100 to 125 feet of steam hose, capable of sustaining a pressure of certainly over 40 pounds to the square inch, and preferably 80. It is probable that a private company could be organized to do this work. The plan has been successfully operated, and it seems to present a practicable and economical escape from the present disagreeable and dangerous condition of our streets during the winter months.



A $2,200 RESIDENCE AT DETROIT, MICH.

How to Grow Large Potatoes.

A superb lot of potatoes which was lately exhibited at a French exposition, and considered worth a gold medal, attracted a great deal of attention. The cultivator gave the following as his method of increasing the size of the tuber: When the young stems have attained about four inches in height, all of them excepting two of the central ones are cut away, and these two only allowed to grow. By means of this simple precaution the tubers become much larger than they are in ordinary cultivation.—*Vick's Magazine for December.*

THE GRECIAN ARCHITECTURAL STYLE.*

BY PROF. N. CLIFFORD RICKER.

1. *Building Materials.*—Stone was most commonly employed in Grecian buildings, since it was found everywhere, and it was almost invariably carefully cut and laid dry, without mortar, but with very fine and close joints, sometimes hardly visible. But these joints were good for but a few inches from the exterior, the internal surface of the stone being roughly undercut to save time, though this sometimes caused the joints to flush. The masonry is sometimes very strongly bonded by interlocking the stones, greatly increasing, the cost, though the bonding is frequently neglected, and metallic cramps were used in the more important buildings.

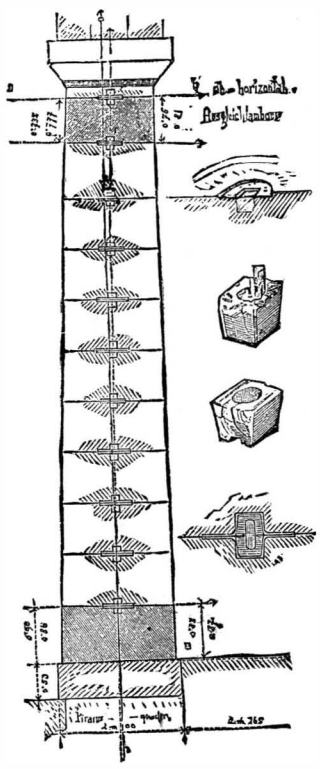


Fig. 1.

Marble was always preferred, when its cost could be met, especially for temples, the favorite variety being the Pentelican, which was quarried near Athens. The Parthenon at Athens was entirely constructed of this marble, which contains a small quantity of iron, causing the surface to take a rich golden tint by exposure.

Limestone was used as a substitute for marble and for ordinary purposes, and as it does not take a good polish, its surface was usually coated with a fine white stucco, very smoothly polished, to give the appearance of marble. This coating was very durable, as it is still found in a good state of preservation, but was rarely of uniform thickness, the surface of the stone being cut with less care than if visible.

Trachyte of a very dark color was used for the Temple at Assos, in Asia Minor, otherwise notable for its unique sculptured architrave.

Pavements, foundations, walls, columns, and cornices, with the occasional exception of the corona, together with the ceilings of the porticoes, were always constructed of stone.

Terra cotta was sometimes employed for decorative purposes, such as the corona or crown moulding of the cornice, a gable rosette, antefixæ, etc., as well as for the tiles of the roof, which were rarely of marble. This material was frequently moulded and also decorated by geometrical or other forms, painted in red and black.

Bricks appear to have never been used by the Greeks.

Wood seems to have always been far from abundant in Greece, and was only used for rafters, and for paneled ceilings having spans too great for construction in stone. Paneled construction appears to have been common in ceilings, the panels being either of wood or terra cotta, decorated by sculptured mouldings, gilding, and painting. In some very ancient temples, rough trunks of trees were employed as columns.

Iron and bronze cramps, set with lead, were used for more strongly binding together the stones in the walls of the most important buildings, as in the Parthenon. Bronze furniture seems to have been common in the temples.

Gold and silver were only used for decorative purposes, though golden shields were sometimes suspended on the architrave of a temple as a votive offering.

Metals were still much too rare and costly to be employed, excepting for decorative or for the most essential constructive purposes.

2. *Method of Construction.*—The general system which forms the basis of Grecian architecture is that of post-and-lintel construction, similar to that of the Egyptian temple, but substituting the gable for the flat roof, on account of the greater rainfall. The site of the building was cleared off, leveled, and a solid platform of stone then constructed, slightly larger than the intended structure, with a series of steps extending entirely around it. This was usually covered by large and carefully joined slabs of stone, which formed the floor. On these, the outlines of the plan were marked, and the walls and columns then erected.

The columns were built of drums or short cylinders, closely jointed by grinding with sand, and the external surface was usually cut after being set up, though the upper and lower drums were first finished, to serve as guides for the remainder. These columns supported the architraves, usually composed of three slabs set edgewise, and the cornice, as well as the ends of the rafters (Fig. 1).

The roof was formed of wooden rafters, which supported the edges of the covering tiles, usually of two forms, with ornamental decorations at the ridge and eaves.

Greek construction was excellent, so far as it was intended to be visible; but when concealed, the workmen were often careless, and many faults were permitted which would not be allowed in a modern building under the superintendence of a careful architect. Mortar and concrete were not used.

The Greeks were probably acquainted with the arch, and perhaps also with the vault and dome, but never employed them, preferring the post-and-lintel system, leaving the arched system to be developed by the Romans.

3. *Curvature of Horizontal Lines.*—By some writers, Penrose and Pennethorne, for example, it is asserted that the top of the stylobate and the lower edge of the architrave, as well as the horizontal lines of the cornices, were all slightly higher at the middle than at the ends of the building, thus making these lines curves of very slight curvature, instead of being straight. The reason assigned for this was that the apparent dimensions of the building would thereby be somewhat increased, especially if the observer were placed opposite the center of one side, and that this would also correct any tendency of a straight line to appear depressed at its center. It is evident that this would materially increase the cost of the building and the care and labor required in its erection. The triglyphs and metopes would not be truly rectangular, but slightly trapezoidal.

It is found that the centers of the sides of the stylobate of the temple of Theseus at Athens are now from one and five-eighths to two inches higher than the angles, these sides being 104 and 45 feet long. But the angles of this stylobate are not all in a common plane, and there are also many other slight inaccuracies in construction, so that after a careful examination and measurement of the building in 1879, Professor Durm decided that there was no ground for the curvilinear theory, and that the differences observed were due to carelessness in the erection of the building, to unequal settlements, or to injuries during the centuries which have elapsed since its completion.

4. *Polychromy.*—Previous to the publication of Hittorf's work, in 1851, it had been assumed that Grecian temples, being either constructed of white marble or coated with white stucco, were not externally decorated by color. But a close examination of the examples still remaining showed that a large part of the exterior was actually painted with bright and full colors. Also, that some portions of the statues and reliefs were colored, though it appears probable that these were only partially colored, the drapery and the background being painted to accent the outlines of the figures and afford a stronger contrast.

Full and pure colors were employed by the Greeks, such as blue, red, green, yellow and gold, with brown and black for pottery, and pink, light green, and violet for the draperies of statues. These were sometimes opaque, sometimes applied as transparent glasses, and were frequently encaustic, or prepared with wax as a vehicle.

The walls of the cell of the temple, the columns, the architrave and cornice, were either unpainted or were of a clear orange yellow tint. The abacus of the capital was red, decorated by a gilt band of fret ornament. The echinus was dark green, its leaves outlined with red and gold, with deep red annulets. The under surface of the architrave was ornamented by guilloches; its outer surface by inscriptions in gold and metallic shields or scroll ornaments. The guttæ were gilded. The triglyphs were blue with gilt ornaments, and the ground of the metopes was a deep brown, while the reliefs were sometimes fully and sometimes partially painted in their natural colors. The bed mouldings were gold or green and red. The ground of the lower surface of the geison was vermilion, with mutules of blue and gold ornaments. The vertical surface of the geison was ornamented by leaf

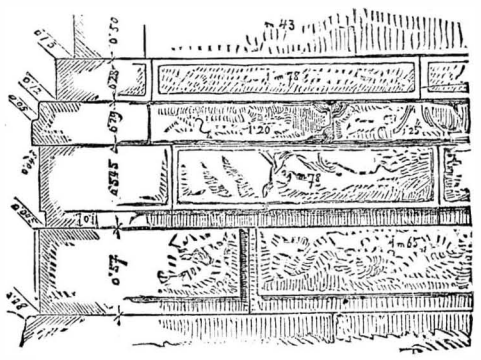


Fig. 2.

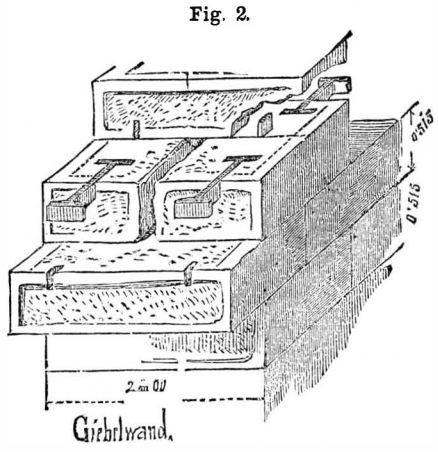


Fig. 3.

ornaments in green and red, and a gilt honeysuckle ornament decorated the corona. The ground of the tympanum was brown, with statues sometimes of the natural colors. This applies to the Doric order.

The exteriors of Ionic and Corinthian buildings were similarly decorated, excepting that a large proportion of the decorations were sculptured instead of being merely painted. Volutes were red, with yellow hollows and gilded eyes. The ground of the inner frieze was usually blue, with reliefs in natural colors, like those of the exterior.

Hittorf published a colored restoration of a Grecian temple, and an imperfect attempt was made to employ this arrangement of colors in the entrance hall of the United States Patent Office, but the colors and their arrangement are not approved by modern artists and connoisseurs, and it has seldom been employed. Either our preference for mixed, broken, and more quiet coloring is erroneous, the result of inferior taste, or the Greeks never succeeded in the use of color so well as in that of form. It is possible that Grecian temples were not painted when originally built; that this was done under the Roman Empire, or later.

5. *Walls.*—These were always built of large blocks of stone with dressed beds and joints, the face being sometimes left rough in terrace walls (Fig. 2), sometimes having draughted margins, but always smoothly cut in important buildings. Great care was taken to obtain fine and close joints, mortar never being used, nor was the interior of the wall ever composed of a concrete of stone spalls and mortar, as in modern building. Cyclopean masonry was rarely used, and notched stones are not common, the rectangular ashlar being most frequently employed. The wall was two-faced, the courses of the sides not always corresponding, and often merely resting against each other or connected by metallic cramps, though through bond stones are sometimes found (Fig. 3). No separate and proper foundation was provided, but the wall stood on the stone pavement of the building. The thickness of the walls of Doric buildings was about one-tenth their height, and usually diminished from bottom to top, the external surface therefore being slightly inclined inward. This batter amounts to $4\frac{5}{8}$ inches for a height of thirty feet in the walls of the Parthenon. This was probably done to better accord with the columns, which were always considerably diminished. their axes also being sometimes inclined inward. Walls of buildings in which the Ionic order was used were never battered,

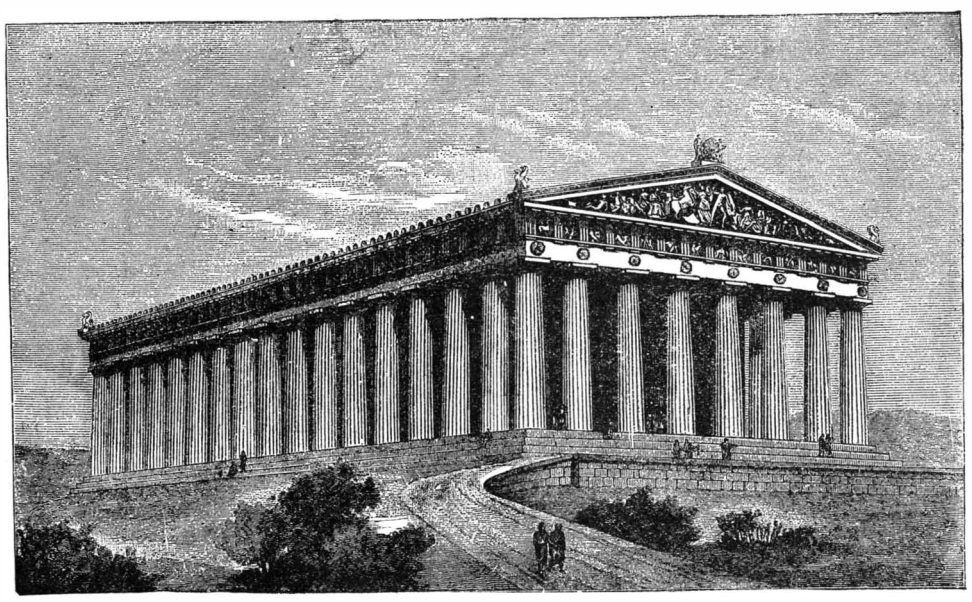


Fig. 4.—THE PARTHENON.

* The figures are taken from Durm's "Griechische Baustyle;" Lubke's "History of Architecture," Vol. I., sixth edition; and Mauch's "Architektonische Ordnungen."—*Building.*

and were thinner, their thickness being about one-twelfth their height.

6. *Roofs.*—The roofs of Grecian buildings were never flat, nor were they ever ornamented by proper windows, forming a prominent architectural feature of the building, though simple openings for the admission of light probably frequently existed in some form. They were decorated by acroteria, placed at the apex and ends of each pediment (Fig. 4).

The term pediment is applied to the horizontal and the two inclined cornices at the end of a Grecian building, together with the triangular wall surface included between them, which is called the tympanum.

The principal forms of Grecian roofs were the following:

A. The gable or pediment roof, always used for temples, and composed of two plane surfaces. This was constructed of wooden rafters, spaced to support the edges of tiles of terra cotta or, rarely, of marble. No trusses were used. The tiles were of several kinds, but generally consisted of broad tiles with their edges turned up, which were covered by overlapping narrow tiles. Ornamental palm leaf forms, called antefixæ, were added to these covering tiles at the eaves and the ridge of the roof. There was no gutter to receive the water, which dripped from the edge of the roof (Fig. 5).

B. The pyramidal terraced roof, as in the tomb of Mausolus, constructed of stone steps, with a quadriga at top.

C. The conical roof was employed for circular buildings, which are very rare in Greece, and was constructed like the gable roof, though trapezoidal tiles were required.

D. The conical stone roof of the Monument of Lysicrates was unique, consisting of a single large slab of stone, hollowed out beneath the upper surface, being decorated by scale-like forms, perhaps suggested by pine cones. A central ornament supported a bronze tripod.

7. *Mouldings.*—These afford some of the most striking and valuable characteristics of the style, since the Greeks appear to have first appreciated the beauty and effect of mouldings, singly and in combination with other architectural details.

The *profile* of a moulding is the outline of its cross section. A moulding may be generated by moving its profile in either of two ways:

1st. Along a straight line, producing *rectilinear* mouldings.

2d. Along a circle, or by rotation about an axis, producing *annular* mouldings, used only for capitals and bases of columns.

Grecian mouldings possess some very distinctive characteristics, thus serving to readily distinguish the style from all others:

A. Some unique forms of mouldings are employed, as the hawksbill, etc.

B. Profiles of mouldings are rarely circular arcs, but are usually portions of ellipses, hyperbolas, parabolas, etc. (Such profiles are employed in no other style, excepting imitative Grecian.)

C. The outlines of the ornaments painted or sculptured on the surface of the moulding are generally similar to the profile of the same moulding. It is usually the case that only the surfaces of alternate mouldings are thus decorated, the others being left plain, with the exception of the astragal, which is almost always ornamented.

D. The mouldings of the caps and bases of antæ or pilasters are almost invariably very different from those of circular columns, in profile, arrangement, and decoration. (In Roman and later styles these are generally similar.)

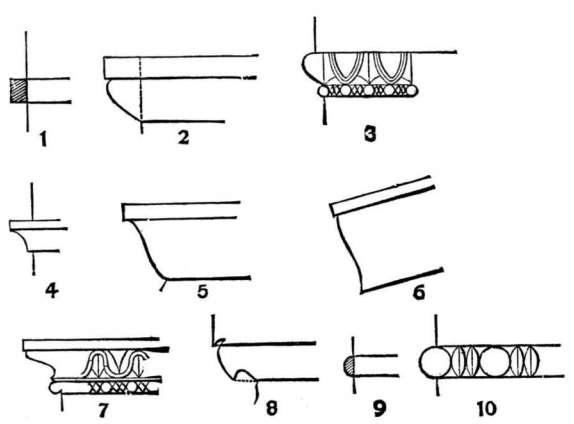


Fig. 6.

In early Grecian buildings, the decorations were merely painted on the surface of the moulding; in later, especially in connection with the Ionic or Corinthian orders, they were usually sculptured in low relief.

More complex profiles were probably preferred to circles for Grecian mouldings, because the gradation of the shading and shadows would be more delicate and beautiful, thus harmonizing better with the architecture. This became evident when executed in white marble, though this refinement would be useless if a dark stone were employed. The cost was thereby considerably increased.

The principal forms of mouldings were the following:

A. *Rectilinear* (Fig. 6).

1. *Fillet.*—Profile rectangular. Also a flat surface used for separating two curved surfaces or to terminate a moulding.

2. *Ovolo.*—Profile convex, usually a little more than half an ellipse, parabola or hyperbola, whose axis is horizontal. Most curved at top and separated from the fillet by a deep quirk. Sometimes used as a corona, more frequently as one of a group of mouldings.

3. *Egg and Dart.*—Simply a sculptured ovolo. Rare in the Doric order, but very common in the Ionic.

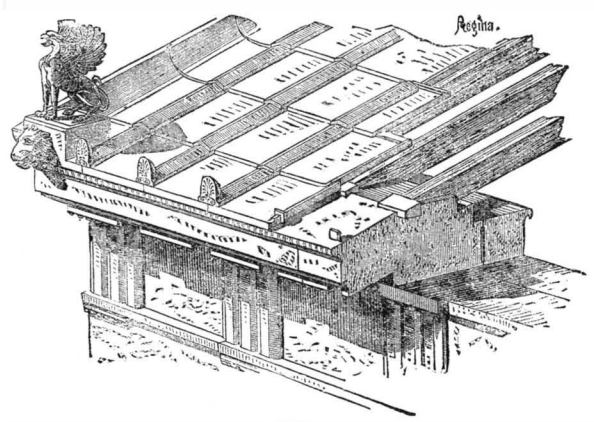


Fig. 5.

Frequently used in combination with the beaded astragal.

4. *Cavetto.*—Profile similar to that of the ovolo, but concave instead of convex. Rare, used as a corona or to form a group.

5. *Cyma Recta.*—Composed of a cavetto and ovolo tangent to each other, the former always being uppermost. Chiefly employed as a corona, for which purpose it is still used, this special section of moulding now being generally termed "crown mould."

6. *Cyma Reversa.*—Composed of an ovolo and cavetto, the ovolo being uppermost, making the profile the reverse of that of the cyma recta. Sometimes used as a corona, but more frequently as a bed moulding, etc.

7. *Lesbian Cyma.*—Composed of a cyma reversa above a beaded astragal, both always being sculptured. Or it might be considered as being an egg and dart moulding and beaded astragal, the lower portion of the first being concave instead of convex. Very frequently used as a bed moulding, also to separate the frieze and architrave of the Ionic and Corinthian orders.

8. *Hawksbill.*—Probably composed of intersecting ovolo and cavetto, usually with a necking and one or more fillets beneath it when used in the capitals of antæ. Common in capitals of antæ, also sometimes found in cornices, forming a drip moulding,

9. *Astragal.*—Profile usually semicircular if small, or semi-elliptical if large. Not common as a plain moulding.

10. *Beaded Astragal.*—Profile like that of the astragal, excepting that it sometimes forms three-fourths of a circle; decorated by being cut into alternating oblong beads and pairs of disks, connected by a kind of stem. This moulding was a favorite, and was much used in composing groups of mouldings, etc.

B. *Annular Mouldings.*—(Fig 7.) Only employed for the caps and bases of circular columns.

1. *Fillet.*—Profile like that of straight moulding and used for the same purposes. The name is also applied to the narrow strips of the original surface of a column, left between the flutes of the Ionic and Corinthian orders.

2. *Incision.*—Merely an angular notch separating the capital and shaft of a Doric column. Two or three incisions are usually grouped together.

3. *Annulets.*—Annular mouldings of peculiar profile, a group of 3, 4, or 5 being placed between the echinus and necking of the Doric capital.

4. *Echinus.*—Profile like that of the ovolo; usually decorated by painted leaves with their points downward, or by sculptured ornaments similar to those of the egg and dart moulding. This is the principal moulding of the Doric capital, just beneath the abacus.

5. *Cavetto.*—Similar to the straight cavetto.

6. *Scotia.*—Profile concave, but comprising a larger portion of the curve than the cavetto; employed only on the base of a column, usually between two toruses.

7. *Torus.*—Profile convex, usually semi-elliptical; decorated either by shallow horizontal flutes or by sculptured interwoven bands. The lowest moulding of the base.

8. *Apophyge.*—A concave surface of quadrant profile, which is used to connect the capital or base of a column with its shaft.

9. *Beaded Astragal.*—Like the straight moulding, and generally placed between the necking and shaft of Ionic and Corinthian columns.

10. *Astragal.*—Profile semicircular, surface plain; sometimes found in the Ionic base.

8. *Columns and Antæ.*—Grecian columns are always circular, and are also free, *i. e.*, are very seldom attached to a wall; antæ are pilasters of rectangular section, which frequently terminate the side walls of temples.

The antæ were built of courses corresponding to those of the adjacent walls, but the columns were composed of cylindrical drums of stone, so cut as to bear only on their outer edges. A square hole was sunk at the center of each end of a drum, which was filled with a tightly driven block of wood. A round wooden pin in the middle of this block then connected two drums and also formed a center, around which the upper drum could be rotated while grinding the joints with sand. Only the capital and lower drum were cut before setting up the column, the others being rough. The outline of the shaft could then be made curved or straight as desired, by using a wooden template, the flutes laid out and worked with much greater ease and certainty than if the column had been completely finished before setting. (See Fig. 1.)

Diminution of Columns.—All Greek columns were diminished, *i. e.*, were smaller just below the capital than at the lower end of the shaft. This diminution was greatest in the early Doric buildings, but was gradually lessened as the ratio of height to diameter was increased. It varies from one-third to two-fifteenths of the lower diameter of the shaft, being in the best examples about five-twenty-fourths for the Doric and one-sixth for the Ionic and Corinthian orders.

Doric antæ were necessarily diminished, since the walls were battering, but they were plain and not fluted.

Entasis of Shaft.—The vertical outline of the shaft of a Grecian column was rarely straight, but was usually slightly curved and convex. This is the *entasis*, which was usually quite small, though materially affecting the appearance of the column. The shafts of the external columns of the Parthenon are 27½ feet high, and their curvature is such that their middle diameter is ⅝ inch more than if the outlines were straight, about $\frac{1}{120}$ part of the lower diameter of the shaft, making an entasis of only $\frac{5}{16}$ inch. The probable object of this entasis was to prevent the outline of the column from appearing concave. The curve of the entasis may have been circular, though it appears more probable that it was a portion of some higher curve, since the mode of working equally permitted the use of any plane curve.

Proportions of Columns.—The ratio between height and lower diameter of shaft was least in early Doric columns, but was gradually increased. It was at first 4, then 6 in Doric columns of the best period, from 9 to 10 for Ionic, and from 8·8 to 10·7 for Corinthian columns. These ratios are all smaller than those employed in modern architecture.

Inclination of Columns.—Their axes were rarely exactly vertical, but were slightly inclined toward the building, to increase its apparent strength; the angle columns were inclined more, because on two sides. To further increase this effect of stability, the angle columns were usually a little larger than the intermediate columns.

Intercolumniations or Spacing of Columns.—The angle column and triglyph of a Doric building were both set close to the corner; the centers of all other

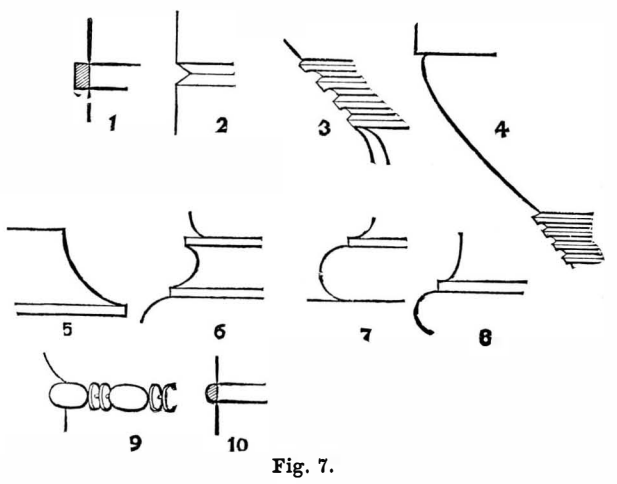


Fig. 7.

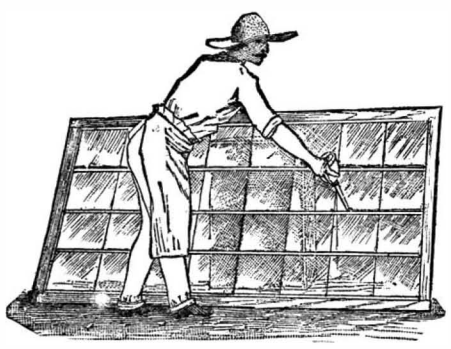
columns were set under the centers of each alternate triglyph, or rarely under each third triglyph. This made the intercolumniation next the angle less than the others, thus further increasing the apparent stability of the corner. But the position of each column was rigidly fixed, once the diameter of the shaft and number of columns had been decided. The distance between centers of columns was generally 2·6 diameters. (See Fig. 2.)

Since the frieze of the Ionic or Corinthian order was not divided into triglyphs and metopes, these columns could be set as desired, through necessarily equidistant. Distances between centers vary from 2½ to 4 diameters,

A NEW METHOD OF GLAZING SASH.

BY PETER HENDERSON.

It is well known that all glass now (both in portable sashes and in fixed greenhouses) is simply embedded in putty, and kept in place by glaziers' points, no putty being now used on top, as was formerly done. It has been found that when the glass lies on the sash bar thus embedded, the putty soon rots or wears out, and water gets in, and not only loosens the glass, but rots the bar as well. A most simple plan to obviate this is to pour along the junction of the bar with the glass a thin line of white lead in oil, over which is shaken dry white sand. This hardens, and makes a cement that effectually checks all leakage. It is quickly done. Our engraving shows how the portable sash is held, and the application made from the oil can containing the thin white lead. I have seen glass, so cemented, that has stood for ten years,



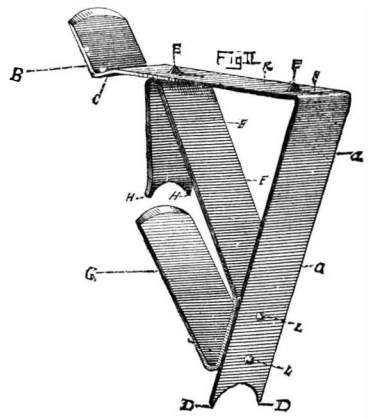
IMPROVED METHOD OF GLAZING.

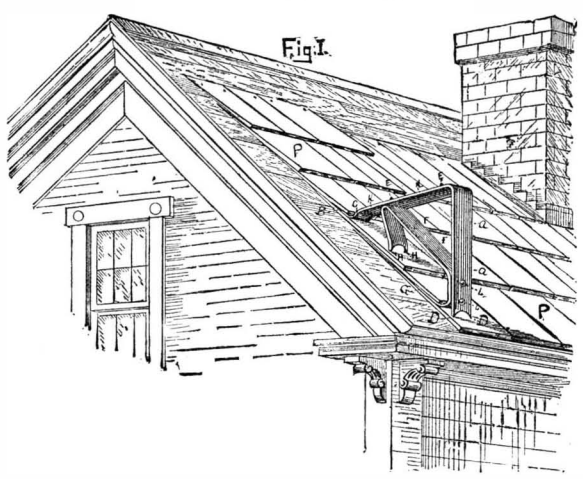
still in perfect order, and it looked as if it would stand for ten years more without further repair. This plan, which is but little known as yet, is of the greatest importance; had I known of it thirty years ago, I would have saved many thousands of dollars in repairing, besides having the plants under this water-tight glazing in better condition.—*American Agriculturist.*

NEW ROOFING OR STAGING BRACKET.

BY HENRY E. TOLMAN, SHELBURNE, MASS.

To use this invention, the bracket is grasped so that the projection, B, is pointed toward the ridgepole of the roof. The projections, B and G, are then forced or pushed under the shingles until the shoulder, C, rests against the base of the shingle under which the projection, B, is placed. This brings the spurs, H H and D D, so that the same rest upon the roof, and thus, after two or more are placed in their proper position,





NEW ROOFING OR STAGING BRACKET.

my brackets are ready to support the boards or staging, as shown.

Adamant—A New Invention.

Prof. Carl Straub, of Syracuse, N. Y., has invented a new cement or artificial stone, for which he has obtained a patent. By years of patient study and experiment, he has produced a material which is believed to be of value, especially to the building trade. His production, with various changes, can be used for wall plaster, for tiles and flooring, plastic work, artificial marble, and granite. He has given the name of "Adamant" to the wall plaster, and "Chromoleth" to the finishing material, either white or colored. It is prepared ready for use by simply mixing with water and applied in the usual manner.

It is a chemical composition, and in a few hours after being applied it is said to become hard as marble, and capable of resisting intact all the ordinary casualties that prove so destructive to common plaster.

Among many other advantages, the inventor says adamant saves time and labor; it can be applied as well in winter as in summer; it avoids saturating the timbers with water, and the consequent warping and shrinking; it saves waiting weeks for the rooms to dry out, and they can be safely occupied next day after finishing.

It adheres equally well to lath, brick, or iron, and will last as long as the building.

Carpenters need not move out while the plastering goes on, but can work right along on the same floor with the plasterers.

Adamant will not crack or shrink; rats will not gnaw through it, nor will it harbor vermin, noxious gases, or germs of disease, like common plaster, because it is smooth, dense, and hard, instead of porous. It places much less weight on the building than plaster, and instead of being a dead weight, it contributes strength. It can be treated with any desired finish.

The Bee's Sting a Useful Tool.

A new champion has arisen to defend the honey bee from the obloquy under which it has always rested. Mr. Wm. F. Clarke, of Canada, claims to have discovered, from repeated observations, that the most important function of the bee's sting is not stinging. In a recent article he says:

My observations and reflections have convinced me that the most important office of the bee sting is that which is performed in doing the artistic cell work, capping the comb, and infusing the formic acid by means of which honey receives its keeping qualities. As I said at Detroit, the sting is really a skillfully contrived little trowel, with which the bee finishes off and caps the cells when they are filled brimful of honey. This explains why honey extracted before it is capped over does not keep well. The formic acid has not been injected into it. This is done in the very act of putting the last touches on the cell work. As the little pliant trowel is worked to and fro with such dexterity, the darts, of which there are two, pierce the plastic cell surface and leave the nectar beneath its tiny drops of the fluid which makes it keep well. This is the "art preservative" of honey. A most wonderful provision of nature, truly! Herein we see that the sting and the poison bag, with which so many of us would like to dispense, are essential to the storage of our coveted product, and that without them the beautiful comb honey of commerce would be a thing unknown.

If these things are so, how mistaken those people are who suppose that a bee is, like the Prince of Evil, always going about prowling in search of a victim. The fact is that the bee attends to his own business very diligently, and has no time to waste in unnecessary quarrels. A bee is like a farmer working with a fork in his hay field. He is fully occupied, and very busy. If molested or meddled with, he will be very apt to defend himself with the implement he is working with. This is what the bee does; and man, by means of his knowledge of the nature and habits of this wondrous little insect, is enabled, in most cases, to ward off or evade attack. It is proof of their natural quietness, industry, and peaceableness that so many thousands of them will go through a summer of ceaseless activity close to your dwelling house, and perhaps not half a dozen stings be inflicted during a whole season.

Paris Cement.

A new cement, called "cement de Paris," has been introduced in France, the inventor and manufacturer of which is M. Vallin, the director of a French cement works, the Gypserie de la Gare. The new material is stated to be at least equal, if not superior, in quality to the English article, while it can be sold at the rate of 2s. 6d. to 5s. per cwt. This material is said to possess durability and the cold appearance of marble, and a wall rendered, floated, and set with it becomes impermeable to moisture. It can also be polished, and made to present an elegant appearance. In the usual method of manufacturing cement, it is generally found very difficult to obtain a thorough burning of every piece of clay or stone; sometimes the surface of it is burnt too much and the center too little or not at all. The result is that, after the clay or stone is crushed, it contains a considerable quantity of unburnt grains, which play the role of an inert material, and which people pay for as cement. In order to avoid this unequal burning, M. Vallin, instead of crushing the material after, does so before placing it in the kiln. A crushing mill breaks it into small pieces, which are automatically conveyed to a vertical cylinder mill, whence they issue ground to powder. This is in turn again automatically placed on sieves, which shift it into pans or kilns heated by gas. A series of inclined plates, having a gyratory motion, agitate the powder in each of the pans, and thus render every particle of it amenable to the action of heat. Finally, a mechanical arrangement conveys it to sacks, which a man fills as the powder arrives. The whole operation is thus continuous and automatic, which of itself is a great advantage. But still more important and appreciable is the fact that all the particles of the cement are thoroughly burnt. M. Vallin estimates that his method enables him to effect a saving of about 30 per cent over those ordinarily adopted. Besides the homogeneity of the particles, the other advantages claimed for this cement are its great whiteness of color, durability, and freedom from liability to unequal shrinkage, which causes fire cracks.

COMBINED HAMMER AND PLANER.

BY CHARLES F. BRENT AND ALFRED LANG, OF MOUNT VERNON, O.

In fitting up siding, cornice, and casings, and for various other work, our improvement is of advantage,

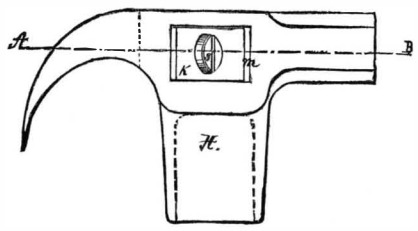
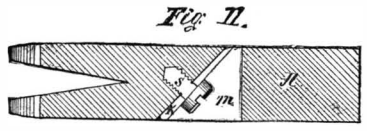


Fig. II.



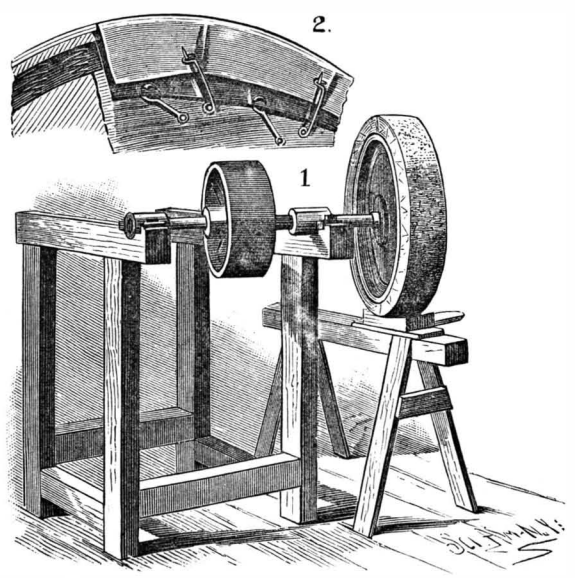
COMBINED HAMMER AND PLANER.

for in case a board after being sawed does not fit, it may be planed, and thus made to fit, by our combined hammer and plane, thus avoiding the trouble of carrying a plane specially for that purpose.

The hammer, H, is provided with an opening, *m*, which extends from side to side, and the rear wall of this opening is inclined and forms a bed for the bit, K, which is secured thereto by the set screw, S. The front wall is straight or at right angles to the sides or longitudinal center of the hammer. A throat is thus formed through the body of the hammer from side to side, which is contracted at one end and widened at the other end. The edge of the bit projects through the contracted end of the throat, and the butt or heel is located within the widened end.

SANDPAPERING AND POLISHING MACHINE.

The accompanying engraving illustrates a sandpapering and polishing machine, which is the invention of Mr. T. B. Marshall, of Sidney, Ohio. With this machine either a flat, oval, or concave surface can be sandpapered and polished with the grain of the wood. To the peripheral face of the wheel, which is of any suitable size, say 24 inches, are secured springs shaped as shown in Fig. 2, and placed as close together as possible. A band of felt is placed about the springs and held in position by a strip of sacking or canvas, the edges of which are corded. This strip is held in place



MARSHALL'S SANDPAPERING AND POLISHING MACHINE.

and prevented from creeping by hooks secured to the side of the wheel by nails. The sandpaper is applied so as to rest smoothly upon the peripheral surface of the wheel, the edges being bent over and crimped and secured to the sacking by safety pins. The wheel is mounted upon a shaft driven in any convenient way. The work to be smoothed and polished is pressed against the surface of the rapidly revolving wheel. This machine has been practically tested, and has given most satisfactory results.

AN attempt to smoke out a 'coon resulted in the burning of a thousand acres of timber land in New Hampshire.

DESIGN FOR A TOMB.

This design is presented in the hope that it may contain useful suggestions for those of our readers who have occasion for work of this nature. The illustration is from *Architektonische Rundschau.*

Home Furnishing.

A writer for the Household Department of the *Cosmopolitan* thus pleasantly chats about home furnishing and decoration:

There is an individuality that attaches itself to every home. Fashion and custom, it is true, assert themselves in the furnishing, but the touch that makes one home different from another is that of the woman who reigns there. The love of order or of comfort is quite as apparent on entering some houses as in others, the eye for color that has placed a drapery of olive here or a scarf of garnet there, so that our homes may well be said to be the expressions of our feelings. And in this age of beautiful colors, of fabrics within the reach of all, there seems to be no excuse for unattractive surroundings.

In furnishing a house, be it large or small, it is well that the hall, which affords the first glimpse we have of the interior, should have an air of welcome. This can easily be maintained if the hall has breadth, and need not be entirely lost sight of in the narrower halls. The coloring in halls should be rich, and the light subdued. If gas is used, let the globes of the fixtures be of deep coloring—the olives, deep red, and orange. These all make good tints, and combinations of them are delightful. In broad halls with high ceilings, tapestry hangings and heavy pieces of metal work are beautifully decorative and in good keeping if the house is large. If the hall has unusual breadth, an open fireplace is desirable, especially in the country house, as there the hall may have a domestic air.

If the hall is very narrow, and the stairs near the front door, it will prove to be an obstinate affair. Portieres can be hung under the casings of the doors; and if it has a vestibule entrance, and the inner doors have glass panels, shirrs of soft China or India silk, figured or plain, will help to furnish. If there are double doors and only one is to be open at a time, there may be space in the corner for a small stand and a large vase or bowl of flowers. In such a hall the hat rack should not be the prominent feature. A small one is much more attractive.

The expanse of a long drawing room may be relieved by a cozy grouping of chairs and tables in the front, and perhaps a desk and piano, and thus leave the lower end for the more secluded *tete-a-tete.* If the piano is an upright, it will break the length of the room by being drawn out at a slight angle from the wall, and a scarf in light material thrown over it, not festooned. Square parlors are much more homelike, and better suited to people of moderate means. The light being usually stronger, the effect of color is more apparent. A room finished in cherry, or with wood painted dark red, may be papered with olive slightly blended with light blue, and a deep cream ceiling. One painted in dark green may have the same shade in paper, with a frieze of salmon, and a garnet ceiling. The same colors may predominate in the rugs. Madras curtains are in good taste in small parlors, with or without heavier ones.

The tone of the dining room should be warm and genial; that which comes through the rose stained upper sashes of windows, or chandeliers, or by means of candles with small red shades, is soft and pleasing. Where there is no stained glass, a very good effect is gained by a sort of patchwork, contrived with the decorated pieces of crinkled Japanese material that are found in almost all the fancy stores nowadays. They are about five by seven inches in size, brilliant in coloring, and, when put together with satin ribbons two inches wide, of any color desired (deep red or purple perhaps), and tacked securely to the casing of the window, the result is marvelously pretty.

The dining room, of all rooms in the house, should be comfortable. An Oriental couch, without ends, and with big pillows at the back, may afford an after dinner rest, and easy chairs on each side of the open fireplace give an opportunity for a half hour with the morning paper, or a snug corner to plan the day's work. It is unfortunate to load the room with decorative china and tiers of plaques, and a great display of silver is vulgar.

The beautiful colors that are brought out in the heavy materials are repeated in goods of lighter weight. Silesias and sateens come in every possible shade and color, and the heavier sateens, such as upholsterers use to line heavy draperies, make in themselves attractive hangings. These can be trimmed with the small tassel fringe. This cannot always be purchased in the shade desired, but any woman with deft fingers can make it at odd moments, by forming tassels about one and one-half inches long of crewels, and crocheting a tiny border to hold them together, which can be sewed to the edge of the curtain.

A TOMB IN BOLOGNA.—DESIGNED BY EISENLOHR & WEIGLE ARCH. STUTTGART.

How to Darken Oak.

A correspondent in the *English Mechanic* gives the following process of treatment, which he considers the best, after trying the various other processes used by builders and cabinet makers to darken woods: "Oak is fumigated by liquid ammonia, strength 88°, which may be bought at any wholesale chemist's at 5s. a gallon. The wood should be placed in a dark and airtight room (in a big packing case, if you like), and half a pint or so of ammonia poured into a soup plate, and placed upon the *ground* in the center of the compartment. This done, shut the entrance, and secure cracks, if any, by pasted slips of paper. Remember that the ammonia does not touch the oak, but the gas that comes from it acts in a wondrous manner upon the tannic acid in that wood, and browns it so deeply that a shaving or two may actually be taken off without removing the color. The depth of the shade will entirely depend upon the quantity of ammonia used and the time the wood is exposed. Try an odd bit first experimentally, and then use your own judgment."

Brick Pavements.

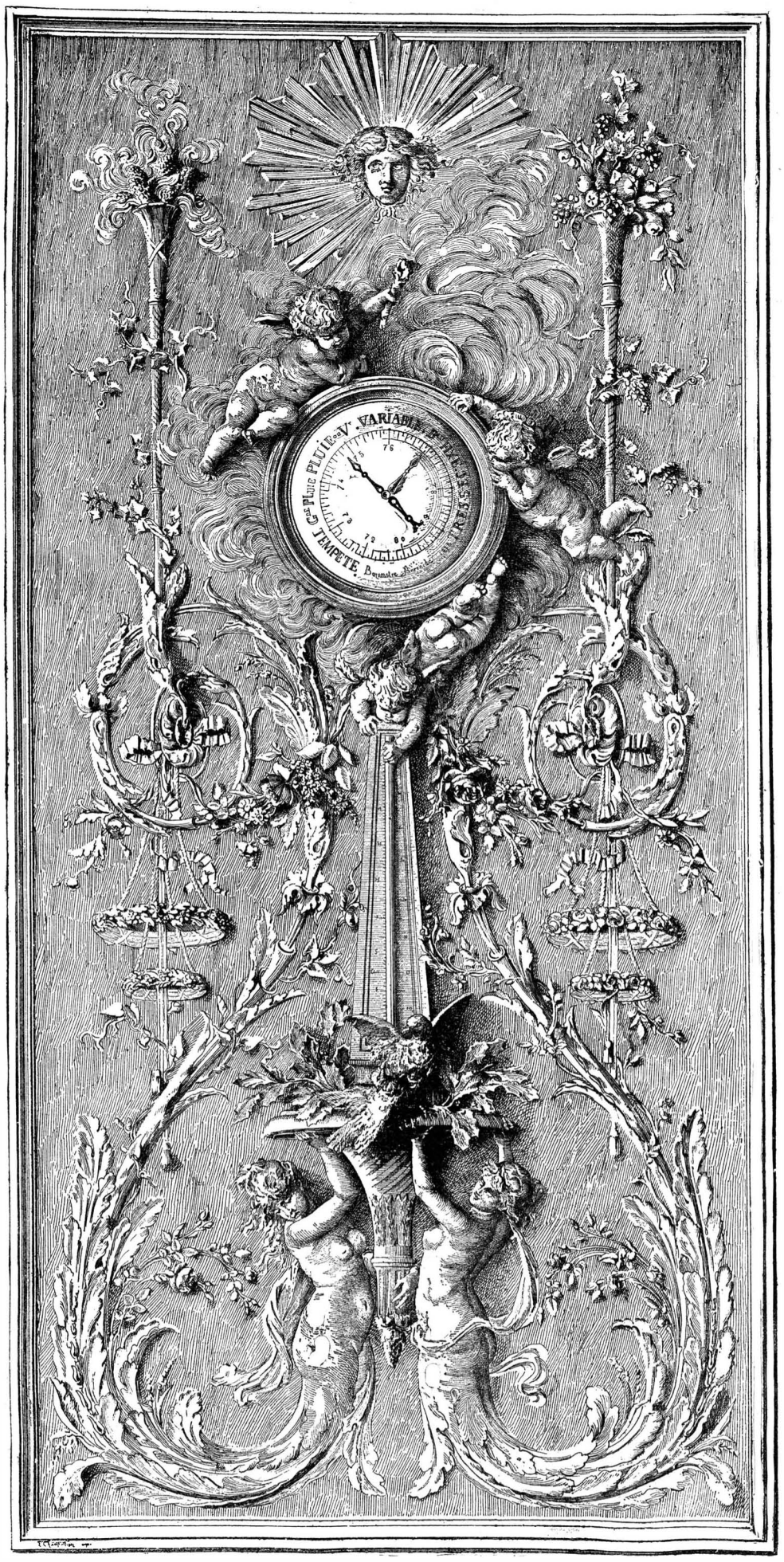
Within the past few years, several towns in the Western States have been experimenting with street pavements of brick. Many miles of brick pavement, it is needless to say, exist in Holland, and, if we are not mistaken, there are remains of brick in the streets of Nantucket, but elsewhere in the United States this material has been rarely, if ever before, used for the purpose. According to the *Engineering News*, Bloomington deserves the credit of being the first modern town in this country to introduce brick paving on an extensive scale. The town is situated in a clay region, and bricks are cheap there, as well as good, and by careful selection of material it has been found possible to produce bricks so tough and hard that in Bloomington, where seven miles of streets are now laid with them, they have been found, after ten years' experience, durable, as well as cheap and convenient. In Amsterdam, where, although canals intersect the city in all directions, a good deal of traffic is carried on by means of horses and wagons, the pavements of small, whitish bricks show little sign of wear, and, partly on account of their porosity, and partly from the numerous joints which exist between them, they are in wet weather much drier and pleasanter to walk over than stone, or even asphalt. In the Illinois town, the street is prepared for paving by forming the natural surface into the proper profile; on this is then laid four inches of coarse sand or cinders, evenly spread, cinders being preferred on account of the better drainage which they afford, and the whole is covered with bricks laid flat, with joints as close as possible, and accurately formed to the desired profile. Fine sand is then spread over the surface, and worked well into the joints with a broom, and, after laying an inch more of sand over it, the top course, consisting of bricks on edge, is set, as closely as possible, and the joints of this also well filled with sand. The multiplicity of joints makes the pavement easy and safe for horses to travel over, and the whole cost is only from one dollar and forty cents to one dollar and eighty cents per square yard.

How to Measure Bridge Deflection.

A novel method of measuring the deflection of railway bridges has been tried in Russia. An iron pipe, 1½ in. in diameter, was carried along the outside of one girder. From this pipe, at each abutment at the pier, and at five intermediate points on each span, vertical pipes of the same diameter branched out. Inside, and near the top of each vertical pipe, was fixed a graduated ¾ in. glass tube, the iron pipe being cut away on both sides. The zero divisions on the tubes were all the same distance above the flange of the girder. Before the bridge was loaded, the apparatus was filled with water, the tops of the upright pipes covered over, and the water was then drawn off until it stood at zero in each gauge. On the bridge being loaded, the deflection could be read with ease.

CARVED DESIGN IN BOXWOOD.

Our engraving shows an etching recently given in the London *Architect,* representing a barometer and thermometer holder. It is one of Champollion's works. Those who are looking for graceful ornamental lines may find something useful in this design.



BAROMETER AND THERMOMETER IN CARVED BOXWOOD.

A Lumber Roller.

Some genius about a planing mill has invented a device for unloading the wagons on which the lumber is hauled for dressing, which is so simple and practical that it is a wonder, as it usually is in such cases, that it was not thought of before. The platform on which the lumber is ordinarily piled as it comes into the mill is raised to just about the height of a wagon, so that, as the load is backed up, the rear end projects over it. A slight depression in the roadway, just in front of the platform, permits the wagon to drop a few inches, and allows the weight of the load to rest upon the edge of the platform. Close to this edge, a live roll is placed, which is given a positive motion by a link belt connection, and behind it are put ordinary dead rolls at suitable distances. The operation of the device will be apparent without further explanation. As soon as the load of lumber rests upon the live roll, it begins moving into the mill, seemingly of its own accord; and sooner than a half dozen boards could be removed from the load by hand, the entire jag is quietly rolled into the mill without handling. It is best to place rollers on the wagon also, in order to make the load move easily and promptly as soon as it rests upon the live roll. To a planing mill operator doing a large business, and who is compelled to employ a number of men and teams to handle the lumber that comes in to be dressed, the value of this little device will be perceived at a glance. The saving in time makes it possible to do the same amount of work with a less number of teams, and with a notable economy of labor for the teamster. It has been applied to the new mill of the Ludington, Wells & Van Schaick Company, at Menominee, Mich., where an ordinary six inch wrought iron pipe, polished, is used for the live roll, being connected with the line shaft with suitable belts and pulleys to secure the proper speed. The beauty of the arrangement is that it is not patented, and may be used by any one. It is said to have been invented by a man at Eau Claire, who certainly deserves the thanks of the planing mill fraternity for his ingenuity.—*Timberman.*

Cleaning Waste Pipes.

A correspondent of the *Am. Artisan* says: The annoyance arising from the stoppage of waste pipes in country houses, although very great, is but a small matter compared with the dangers which may follow obstructed pipes. The "sewer gas" about which so much has been written, and which is so justly dreaded, is not, as many suppose, the exclusive product of the sewer. Indeed, the foulest, most dangerous and deadly gases are not found in sewers themselves, but in the unventilated waste pipes and those which are in process of being clogged by the foul matter passing through them. Any obstructions in the soil or waste pipes are therefore doubly dangerous, because it may produce an inflow of foul gas into the pipe, even though the entrance to the sewer itself has been entirely cut off.

The question is how to get rid of the accumulations in pipes partly stopped or already closed. Digging up and cleaning out is a costly remedy, often ineffectual by reason of careless workmen. The second is the plumber's force pump, which is usually only a temporary relief.

In pipes leading from the house to the cesspool there is a constant accumulation of grease. This enters as a liquid and hardens as the water cools, and is deposited on the bottom and sides of the pipes. As these accumulations increase, the waterway is gradually contracted till the pipe is closed. When the pipe is entirely stopped, or allows the water to fall away by drops only, proceed thus: Empty the pipe down to the trap, as far as practicable, by "mopping up" with a cloth. If water flows very slowly, begin when the pipe at last emptied itself. Fill the pipe up with potash, crowding in with a stick. Then pour water upon it in a small stream, stopping as soon as the pipe appears to be filled. As the potash dissolves and disappears, add more water. At night a little heap of potash may be placed over the hole and water enough poured on, so that a supply of strong lye will flow into the pipe during the night. Pipes that have been stopped for months may be cleaned out by this method, though it may call for three or four pounds of potash. The crudest kind, however, appears to act as well as the best. If the pipe is partially obstructed, a lump of crude potash should be placed where water will drip slowly upon it and so reach the pipe. It is also well to fill the upper part of the pipe with the potash, as before, and allow hot water to trickle upon it. Soda and potash are both used for the purpose of removing greasy obstructions, and the usual method of application is to form a strong lye and pour it into the pipe.

It is better to put the potash into the pipe, because the water it contains, instead of diluting, helps to form the lye. As water comes in contact with the potash it becomes hot, thus aiding in dissolving the grease. Potash, in combination with grease, forms a "soft" or liquid soap, which easily flows away, while the soda makes a hard soap, which, if not dissolved in water, would in itself obstruct the pipe. When a pipe is fairly cleaned out, the potash should be used from time to time, in order to dissolve the greasy deposits as they form, and carry them forward to the cesspool or sewer. The potash is very valuable for this purpose, because, in addition to its grease-dissolving powers, it is exceedingly destructive to all animal and most vegetable matter.

The most dangerous and deadly gases appear to come from urinals and wash basin pipes, these in many cases seeming to be more foul than those from water closets. The decay of the soap and animal matter washed from the skin appears to be the source of the gases. The potash will be effective in keeping the pipes clear, and in this way may lessen the dangers.

Measurement of Brickwork and Masonry.

Brickwork is measured by either one of four methods, viz.: By the number of bricks it contains; by the number of cubic feet; by the perch of 25 cubic feet; or by the reduced rod, consisting of 272 superficial feet and a width of a brick and a half. The first method is most generally employed, and the cubic foot and perch in a few localities. The reduced rod is the method used principally in England.

To ascertain the number of bricks contained in a wall: First find the superficial area, then multiply by 7½ (the number of bricks in one foot of brickwork 4 inches thick), and then multiply by the number of half bricks in the thickness of the wall. Example: How many bricks does a wall 12 ft. × 20 ft. and two bricks thick contain? Answer, 7,200, viz.: 12 × 20 = 240 × 7½ = 1,800 × 4 = 7,200.

Ashlar masonry, or that which is dressed either on face, bed, or side joints, is measured by the cubic foot; rubble masonry sometimes in the same way, but usually by the perch of 25 cubic feet.

Washboards.

A reporter on the Cleveland, O., *Leader* had a talk with the traveling agent of one of the largest washboard factories in the United States the other day. Said he: "Millions of washboards are made and sold in the United States every year, and at least 7,200,000 are sold yearly between the Alleghenies and Missouri River. There are two factories in Cleveland which turn out 200 dozen washboards a day, one in Toledo which turns out over a million a year. There are at least twenty different varieties of washboards, and the best washboards are made in the West. The Eastern factories make their washboards of pine. The best wood for washboards is the cottonwood or the sycamore. Pine is too soft, and white pine is too expensive. The best washboards are made with dovetailed heads with wire nails driven across the grain of the wood. You can buy the poorer class as low as 80 cents a dozen at wholesale, and the better boards cost as high as $2.15 a dozen. Double washboards are those that have zinc ridges on both sides. The prices of these run from $1.60 to $3 per dozen. At retail washboards cost 25, 30, 35, 40, and 50 cents apiece. The first washboards were made of wood entirely, and our washerwomen used to pound the dirt out of the clothes with a stick by laying them on a board. The first washboards made of zinc were put upon the market about twenty-five years ago, and the style first invented is found the best to-day."

CARVED OAK ROOM.

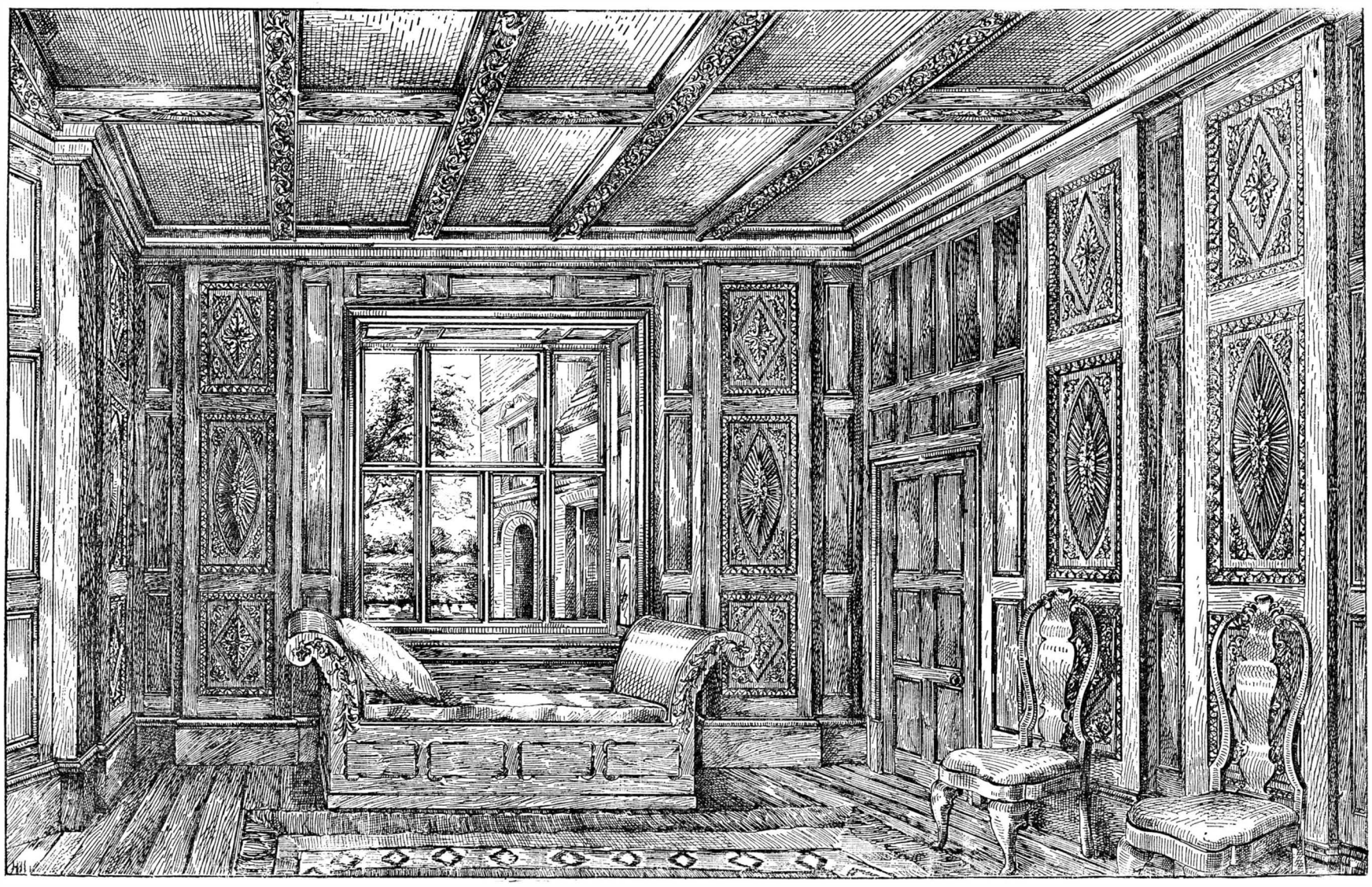
The room we illustrate this month has been erected and arranged for Lady Howard de Walden, Datchet, near Windsor. Our engraving is from the *Building News*. The tall carved panels have been adapted to their present purpose (having been previously at an old castle in South Germany) with great taste and skill. Nearly the whole of the oak in the room is old. The ceiling is constructed with massive beams and cross beams, richly carved with the conventional foliage of the period; while the panels thus formed are filled in with a dark painted canvas with good effect. The cornice has been made a satisfactory means of ventilation. It is one of the finest paneled rooms we have seen.

Trade Surveys.

The latest summary of building trade statistics in seven of the larger cities exhibits a rather surprising activity and a very gratifying outlook for the coming six months. The greatest general activity in building is exhibited throughout the West and Northwest. In the city of Chicago the value of permits for the first nine months of this year was $15,953,950 against $13,770,130 for 1885. The value of permits for week ending Nov. 6, against the previous week's, is nearly double. The building statistics of St. Louis exhibit a smaller increase, but at the same time a very gratifying one. In Kansas City, Omaha, Duluth, St. Paul, and Minneapolis, the increase in permits and in their value certainly points to an active winter and a more active spring. Building material of all kinds is very firm in prices, and in numerous cases contracts have already been entered into for building supplies for the spring. There is also an encouraging degree of building activity in a number of manufacturing and business enterprises between the Lakes and the Ohio Valley. Reports from Springfield, Joliet, Indianapolis, Columbus, Cincinnati, Toledo, Cleveland, and from the manufacturing strip along Eastern Ohio, as well as from Wheeling, Pittsburg, and from Central Pennsylvania, all justify the general and safe conclusion that an extraordinary amount of preparation is being made for building for the coming season. A great deal of the activity will be in manufacturing. There is an urgent demand for more capacity in iron and steel making, in glass making wagon and carriage making, tool and implement manufacturing, and, in fact, in all the industries connected directly or indirectly with iron and steel using. The building trade conditions farther east are sufficiently familiar. The local building authority in New York city furnishes statistics showing that 3,704 buildings have been planned in that city between January and October, costing $53,119,068, against 2,874 buildings last year, costing under $40,000,000. The total number of conveyances is put at 11,242, against 9,195 for same time last year. The corresponding amounts of money are $201,826,369 and $149,511,513. The number of mortgages recorded in New York city is stated by the same authority to be 10,150, as against 8,433 for same time last year, representing in round numbers $117,000,000 and $86,000,000 respectively. The building statistics of Philadelphia exhibit a similarly active condition in house building, manufacturing, and shop building, and in real estate transfers. Real estate throughout Pennsylvania has been in active demand, and authorities there state that the sale of lots for building purposes to people able and intending to build has been far in excess this year of any previous year. The same activity is found to exist in Western Pennsylvania. A great deal of manufacturing capacity is seeking sites there, attracted by the economical advantages of natural gas. A vast amount of house building is projected by local capitalists for the coming year. Rolling mill capacity is being increased. New mills and furnaces are either projected or under way. The entire natural gas region will, it is evident, become the greatest manufacturing center upon this continent. Through Ohio, especially within reach of the natural gas region, there is a great deal of new building projected. The Ohio Valley is maintaining its prestige as a manufacturing region, but the greater part of the new enterprises are small concerns, involving an expenditure of $5,000 to $100,000. It is probable that there will be no serious advance in iron and steel or in their products. While trouble is probable in the building trade, it is scarcely possible in the iron trade. The two classes of mill labor are controlled by yearly contracts, one of which expires in January and one in June. All kinds of iron and steel are high and firm in prices, but prices are not likely to be jeopardized by any speculative influences.

The distribution of all kinds of lumber has been remarkable. Mills in the Northwest are, in numerous cases, operated day and night to accumulate stocks sufficient to meet the requirements which the developments of the past two months have shown to be necessary. Freights have been advanced both by lake, rail, and coastwise. Dealers have advanced quotations correspondingly, and buyers are still making haste to cover winter requirements. No scarcity is probable. Saw mill capacity in the Northwest and South has been largely increased, and presumably, therefore, the future supplies will be greater. Lumber manufacturers have been hopeful all along that the cut, now nearly over, would not crowd the market. It is only the extraordinary demand which keeps prices at anything like remunerative limits. The industrial situation generally is strong. Fuel is in active demand, shop capacity is oversold, capitalists feel more inclined to extend their investments in industrial directions, and in view of the general activity and strengthening of prices, the wonderful expansion going on North and South will meet the extremest requirements of the country. Foreign iron and steel markets are improving, and large orders are now in hand for rails, blooms, billets, crude iron, and other products. The American rail makers have sold one-third of their producing capacity of next year, and the car and bridge builders are hurrying in orders. Both at home and abroad the industrial revival is significant. The activity abroad means higher prices here next year.

The labor question continues to occasion distrust. Employing interests desire a settlement of wages during the winter, yet they do not feel inclined to ask their employes to meet them for that purpose. Organization among employers is growing in many industries. The compacts made have been maintained and are restoring confidence. The unfortunate eight-hour strike at Chicago revives distrust as to the probable future course of the Knights of Labor, but employers generally have faith that, so far as that organization is concerned, there will be no official recognition or aid given to a general movement to that end.—*Amer. Architect.*



CARVED OAK ROOM.

Tile Roofs.

The greater comfort experienced in living in buildings roofed with tiles instead of slates is universally acknowledged, for slate, being, like metal, a great conductor of heat, renders the rooms hot in the summer and cold in the winter. Slates are apt, in cold weather, with certain atmospheric conditions, to cause condensation on their inner surfaces, and the moisture collects, runs down, and, lodging on the framework of the roof, causes decay of the lathing and timbers. Tiles are not liable to these objections. Tiles for fire proof coverings are easy to use, and inexpensive. They can be laid on hoop or iron wire rods, instead of pantile laths, and when so done are practically indestructible. Slate, under the action of fire (and particularly if water be thrown on it when hot), cracks and flies in all directions, and the draught occasioned through the apertures thus caused increases flame. Tiles, even when red hot, will still preserve the roof entire.

Tiles have another superiority over slate—they are far more picturesque; and when a roof is treated with ornamental and parti-colored tiles, as in Austria and Bavaria and parts of Holland, the effect produced is excellent, and it would be well to be in more general use, though within the last few years they have been far more commonly introduced.—*Brick, Tile and Metal Worker.*

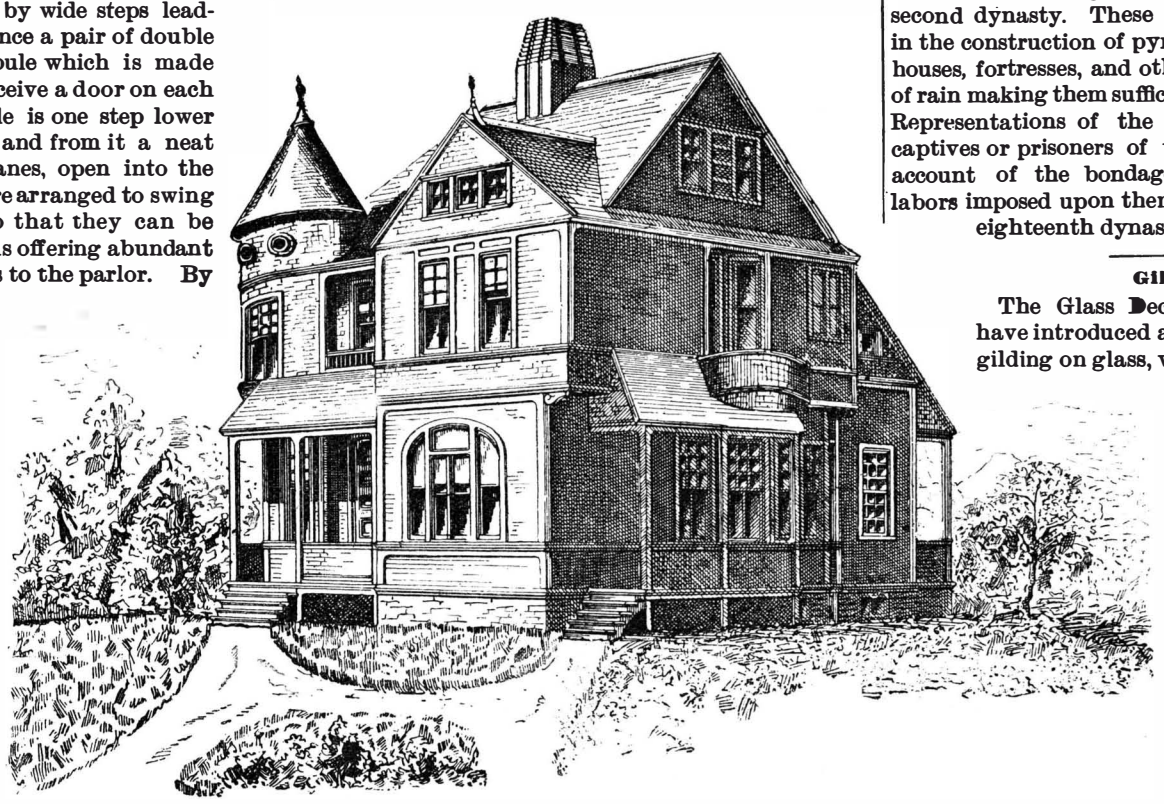
BAKERS AND BAD TEETH.—Dr. Hesse, of Leipsic, says that bakers suffer especially from dental caries. This is due, he thinks, to flour dust, which gets into the teeth and produces an acid fermentation.

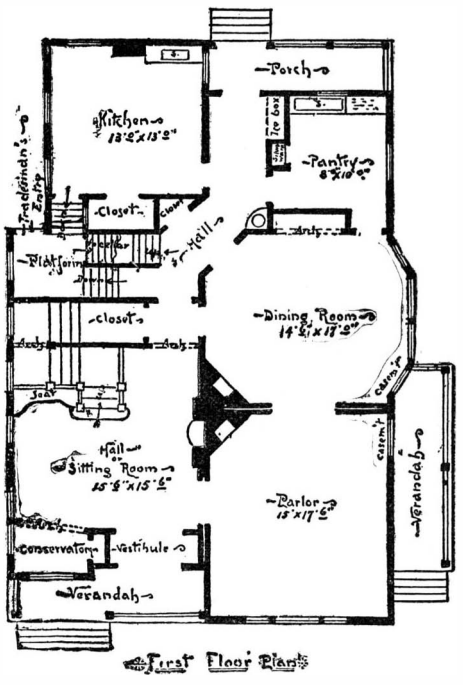
Ten Mile Cannon.

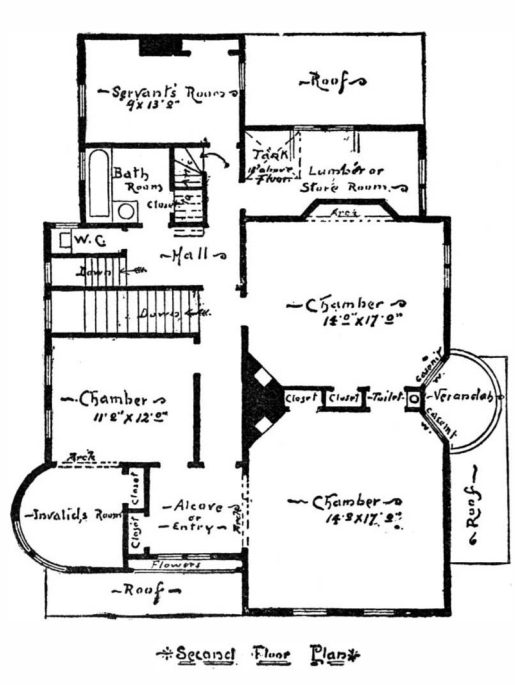
The two largest breech loaders ever made, and, at the same time, the largest naval guns, are those for the English war ship Benbow. Each weighs 247,795 lb., or rather over 110 tons, and will probably carry ten miles. The shell weighs 1,800 lb., and the powder charge, not yet quite decided upon, will be about 800 lb. The "proof" carriage, for guns from 43 to 110 tons, has two four-wheel bogies like those of a locomotive, and four other wheels, braked, between them. The recoil is taken up by a hydraulic cylinder, and there is a loading derrick above the breech. Ships armed with these guns might form a position two miles out from the Coney Island shore, and throw shells into the heart of the city of Brooklyn.

A RESIDENCE OF MODERATE COST.

The illustration herewith presented is that of a frame residence of moderate cost, embracing all modern improvements, and suitable for city or country. The exterior dimensions of the building are 32 feet wide by 48 feet long.







A RESIDENCE OF MODERATE COST.

The height of the first floor is 3 feet above the level of the ground, and is reached by wide steps leading to the front veranda, whence a pair of double storm doors open into a vestibule which is made of the proper dimensions to receive a door on each side. The floor of the vestibule is one step lower than that of the main floor, and from it a neat pair of doors, with glass panes, open into the front hall. The latter doors are arranged to swing either inward or outward, so that they can be opened into the vestibule, thus offering abundant space around the sliding doors to the parlor. By the adoption of this plan, the parlor, dining room, and hall can easily be thrown together on occasions of home entertainments. The hall is square in form, being 15 feet 6 inches, and possesses many useful and attractive features.

The parlor is 15 feet wide and 17 feet 6 inches deep. It is lighted by a triple window on the front, and also by a French window on the side, which opens off on the veranda. Sliding doors connect it with the dining room, which is of the octagonal form, having a mullion window in the center, and one in each angle. One of these is a French window, opening to the veranda, thus virtually obtaining an entrance to these rooms on this side. A door leading into the rear hall, and a fireplace in the other, occupy the remaining two angles. By arranging the fireplaces as shown, it will be observed that those of the parlor, hall, and dining room, are all attached to one another, thus obviating much expense otherwise to be incurred. A door leading into the front hall, and a position for the sideboard, are as shown. The recess for the latter is capped over by an arch, so that curtains can conceal the sideboard if it is desired. Immediately adjoining is a door leading into the pantry, which is 8×10, with access to the rear end, lighted by windows on each side. Here is found a soapstone sink and dripboard, for the washing of fine dishes, and ample shelving for the same and for holding victuals; also a secret closet to hold a small safe for the concealment of all valuable silverware.

On ascending the front stairs, we land in a corridor three feet and six inches wide, from which each of the principal bed rooms is entered. The first door before you, on landing, enters into a chamber 14×17 feet, located directly over the dining room, and lighted by a neat mullion window, and also by a French window placed in the angle. The latter opens off on a small balcony, formed on top of the roof of side veranda This room is provided with a fireplace and closet, and has the use of a toilet stand arranged in the entry as shown, and through this room the front room can be reached.

The family bed room is entered from the hall through the entry, or alcove, and is lighted by three large windows; it has a closet, toilet and fireplace arrangement, and is accessible from the side balcony. The alcove, or entry, is separated from the main room by a large archway, is provided with a closet, and lighted by a mullion window, outside of which is a flower balcony.

It also connects with an adjoining chamber, which is 11×12 feet, and which is accessible from the hall, and is lighted by two windows. Opening from this is a comfortable room, unique in design, with windows so placed as to afford a wide view. This room is intended to serve as the sick (?) room, when one is necessary; and that connecting with it, as the attendant's. In the latter, all work occasioned by an invalid is performed, and the arrangement is such that by drawing a curtain across the opening, it shuts off much annoyance, which otherwise the patient would be forced to endure. When not used for this purpose, it is well adapted for a nursery, as it connects with the family apartments.

A cellar is excavated under the rear part of the house, as shown, with windows for light and admission of coal. In the rear end, under kitchen, is the laundry, which has a large sink. Adjoining this is an apartment shelved for fruits, jellies, etc., with a window to light it.

The first story will be 11 feet 6 inches, second, 10 feet. We herewith attach a preliminary estimate of the probable cost of such a structure as represented, basing our figures on St. Louis market prices:

ESTIMATE OF COST OF BUILDING AS ILLUSTRATED.

Excavations	$50.00
Rubble masonry	280.00
Brick work	250.00
Lumber	950.00
Mill work	500.00
Tin and copper work	115.00
Plastering	400.00
Painting	225.00
Plumbing	175.00
Stairs	175.00
Mantels and grates	150.00
Hardware	125.00
Labor	600.00
Total	$3,995.00

—St. Louis Architect and Builder.

Egyptian Bricks.

Bricks—*tebi* made in a mould, or sun-dried clay mixed with straw, pounded pottery, and other materials—were extensively used for construction in ancient Egypt. At the earliest period the use of baked bricks was unknown, but some objects of this class occur at the time of the twelfth and following dynasties, of baked red terra-cotta of conical or square shape, the use of which is not decidedly known. The bricks of unbaked clay vary in dimensions from 1 foot 8 inches to 1 foot 3 inches long, and are in thickness from 8⅛ to 4½ inches, and weigh about 16 lb. The largest are those of the earliest dynasties before the sixth, and they become of smaller dimensions under the eighteenth and following dynasties. At the earlier period, rude marks, spirals, curves, or devices, made by pressing the finger or fingers of the hand into the moist clay, were impressed on the bricks; but at the time of the eighteenth dynasty, stamps were introduced of an oval or square shape, having in relief the prænomen or name of the monarch, or the name or titles of the persons for whose buildings or constructions they were made. The stamps on the bricks commence under the eighteenth and continue to the twenty-second dynasty. These bricks were extensively used in the construction of pyramids, palaces, walls, private houses, fortresses, and other constructions, the absence of rain making them sufficient to withstand the climate. Representations of the making of them by foreign captives or prisoners of war, corresponding with the account of the bondage of the Israelites and the labors imposed upon them, are seen in the tombs of the eighteenth dynasty.—*S. Birch.*

Gilding on Glass.

The Glass Decoration Company, London, have introduced a newly discovered process of gilding on glass, which consists of the deposit of a solution of chloride of gold on the surface of glass, and is similar to the silver process now in use. Considerable decorative effect is obtained by enriching the ground, or surface, by means of eating out devices, such as borderings, the gold thus producing a nice crystalline effect. The glass, in short, may be treated in various ways, by brilliant cutting, drilling so as to form the design or lettering, and then be subjected to the process. The glass name panels, in which the ground is crystallized and the lettering plain gold, show the many different purposes for which the new process is adapted. The names so treated appear very distinct, and can be read at considerable distances, and this application of it will be found of value in the fitting up of saloons, buffets, bars, and church decoration. A drawing room decorated with the gilded glass is to be mentioned. The chimneypiece and overmantel had panels of the decoration introduced with painted floral and other devices in the centers of each, producing a very rich, if not gorgeous, effect. The door, panels, and window linings were also embellished by gilded glass; the former were relieved by medallions of hand-painted floral subjects. We also noticed wall brackets and panels similarly treated. For sideboards and cabinets this kind of glass decoration is well suited, as it can be enriched by hand-painted designs.

Royal Society Medals.

The president and council of the Royal Society have awarded the Copley Medal to Herr F. E. Neumann, of Koenigsberg, foreign member, for his researches in theoretical optics and electro-dynamics, and the Davy Medal to M. J. C. G. G. De Marignac, of Geneva, foreign member, for his researches on atomic weights. Professor Samuel P. Langley, of Allegheny, Pa., has been awarded the Rumford Medal for his researches on the spectrum by means of the bolometer. Mr. Francis Galton, F.R.S., and Professor Guthrie Tait have been nominated for the Royal Medals, the former eminent for his statistical inquiries into biological phenomena, and the latter for his various mathematical and physical researches.

FIRST CONGREGATIONAL CHURCH, MINNEAPOLIS.

Location, cor. 5th St. and 8th Av., S. E.; cost, $60,000. Material, Bayfield brownstone. Architect, W. H. Hayes, Minneapolis. Our engraving is from the *N. W. Architect and Improvement Record.*

Architectural Charges for Professional Practice.

The usual and proper charges of architects for professional work, such as drawing up designs and superintending the erection of buildings, is given in the following schedule, which is issued under the authority of the American Institute of Architects from its New York chapter.

Designing and Supervision.

For full professional services, including the supervision of the buildings during erection, five per cent on the cost of the work. In case of the abandonment of the work, the charge for partial service is as follows:

Preliminary studies	1 per cent.
Preliminary studies, general drawings and specifications	2½ "
Preliminary studies, general drawings, specifications and details	3½ "

For works that cost less than $10,000, or for monumental and decorative work and designs for furniture, a special rate in excess of the above.

For alterations and additions—an additional charge to be made for surveys and measurements.

An additional charge to be made for alterations and additions in contracts or plans, which will be valued in proportion to the additional time and services employed.

Necessary traveling expenses to be paid by the client.

Time spent by the architect in visiting for professional consultation and in the accompanying travel, whether by day or night, will be charged for, whether or not any commission, either for office work or supervising work, is given.

The architect's payments are successively due as his work is completed, in the order of the above classifications.

Until an actual estimate is received, the charges are based upon the proposed cost of the works, and the payments are received as installments of the entire fee, which is based upon the actual cost.

The architect bases his professional charge upon the entire cost to the owner of the building, when completed, including all the fixtures necessary to render it fit for occupation, and is entitled to additional compensation for furniture or other articles designed or purchased by the architect.

If any material or work used in the construction of the building be already upon the ground, or come into possession of the owner without expense to him, the value of said material or work is to be added to the sum actually expended upon the building before the architect's commission is computed.

Supervision of Works.

The supervision or superintendence of an architect (as distinguished from the continuous personal superintendence which may be secured by the employment of a clerk of the works) means such inspection by the architect, or his deputy, of a building or other work in process of erection, completion, or alteration as he finds necessary to ascertain whether it is being executed in conformity with his designs and specifications or directions, and to enable him to decide when the successive installments or payments provided for in the contract or agreement are due and payable. He is to determine in constructive emergencies, to order necessary changes, and to define the true intent and meaning of the drawings and specifications, and he has authority to stop the progress of the work, and order its removal when not in accordance with them.

Clerk of the Works.

On buildings where it is deemed necessary to employ a clerk of the works, the remuneration of said clerk is to be paid by the owner, or owners, in addition to any commissions or fees due to the architect. The selection or dismissal of the clerk of the works is to be subject to the approval of the architect.

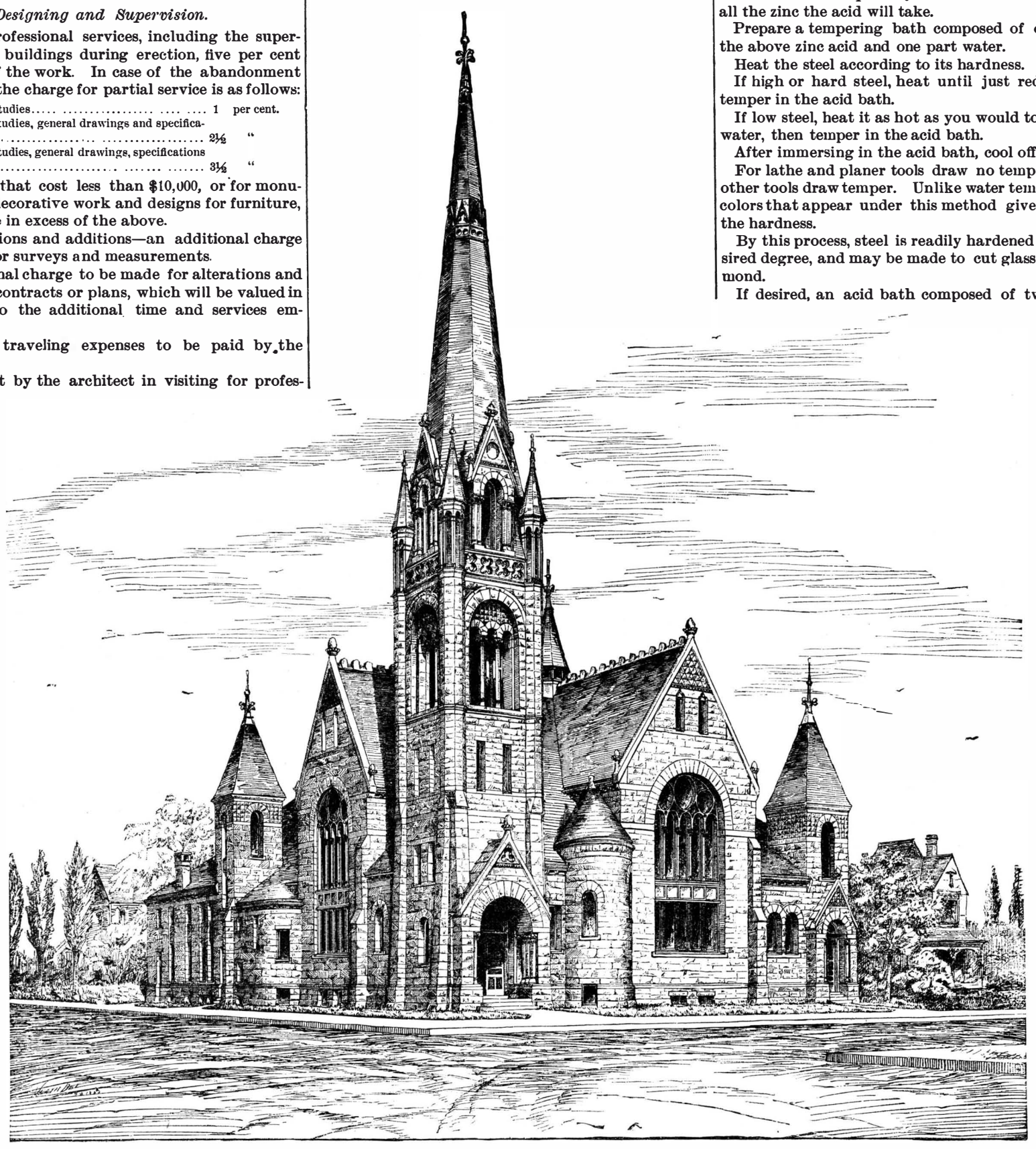
Extra Services.

Consultation fees for professional advice are to be paid in proportion to the importance of the questions involved, at the discretion of the architect.

None of the charges above enumerated cover professional or legal services connected with negotiations for site, disputed party walls, rights of light, measurement of work, or services incidental to arrangements consequent upon the failure of contractors during the performance of the work. When such services become necessary, they shall be charged for according to the time and trouble involved.

Drawings and Specifications.

Drawings and specifications as instruments of service are the property of the architect.



FIRST CONGREGATIONAL CHURCH, MINNEAPOLIS.—W. H. HAYES, ARCHITECT.

A Convenient and Certain Mode for Tempering Steel.

Mr. James A. Peck, of Brewsters, N. Y., mechanical engineer of the N. Y. Condensed Milk Co., gives us the following method discovered by him, and which he uses with great success for tempering all kinds of tools, knives, razors, steel dies, and other implements.

Take a suitable quantity of muriatic acid, dissolve all the zinc the acid will take.

Prepare a tempering bath composed of one part of the above zinc acid and one part water.

Heat the steel according to its hardness.

If high or hard steel, heat until just red and then temper in the acid bath.

If low steel, heat it as hot as you would to temper in water, then temper in the acid bath.

After immersing in the acid bath, cool off in water.

For lathe and planer tools draw no temper; but for other tools draw temper. Unlike water tempering, the colors that appear under this method give no clew to the hardness.

By this process, steel is readily hardened to any desired degree, and may be made to cut glass like a diamond.

If desired, an acid bath composed of two parts of muriatic acid and one part water may be used. Mr. Peck, however, prefers the zinc acid, as being more dense.

A prominent advantage of this method of tempering is the certainty and excellence of its results. It never fails to yield the temper required. It can be relied upon for every description of steel or tool.

A New India Rubber.

According to the *Bulletin de la Societe de Chimique de Paris*, a plant, the *Sonchus oleraceus*, which grows wild in France in dry places, along roads, and among rubbish, has been found to contain India rubber. This is extracted by treating the plant with sulphuret of carbon, and boiling the residuum with alcohol. The mass is then heated with alcoholic potash, and washed several times with warm diluted alcohol. This removes all greasy and waxy matter, as well as chlorophyl. The residue is elastic, and presents all the characteristics of India rubber. It dissolves entirely in sulphuret of carbon and in chloroform, and partly in ether.

A HALL SCREEN.

We give a sketch of the hall screen in the residence of Marmaduke Tilden, Esq., by William H. Beers, architect, New York.

Weathering Stone.

In ordinary conversation, stone is very generally taken as an admitted type of extreme hardness and the utmost durability. It is this opinion which finds vent in the ordinary phrase of comparison that a certain thing is "as hard as a stone."

But this popular view of the qualities of stone is a singularly erroneous one.

True, there are stones which are hard; but then, again, there are stones which are very soft.

It is also, doubtless, true that there are stones which are very durable; but it is no less an incontestable fact that there are stones which are very perishable.

The hardness and durability of a given stone depend upon several causes. Among these may be specified its chemical composition, its structure, and whether it has been brought to its present state mainly by igneous or by hydrous agencies.

The question of the relative hardness of building stones only affects the architect or builder as regards the greater or less quantity of labor required to work them or to bring them to certain forms.

The much more important question of durability not only affects the architect and builder, but the patrons who employ them; and, yet more, the whole of posterity, whose pride and rejoicing in a noble edifice, or whose regret and vexation over a crumbling ruin, will depend in an immense degree on the judicious selection of the material employed in building it.

In certain favored regions the air is so pure and dry that the architect has no cause for anxiety about the matter. He literally has no need to "take thought for the morrow," as far as his building is concerned, let him employ whatsoever materials he will in erecting it.

In the splendid atmosphere of the valley of the Nile, not only will any description of stone remain unchanged and uninjured through centuries, but even the vividly tinted painting with which the ancient Egyptians covered the walls of palace, of temple, of tomb, has come down to us for thousands of years untarnished and uninjured.

The climate of Greece is similarly propitious to the builder.

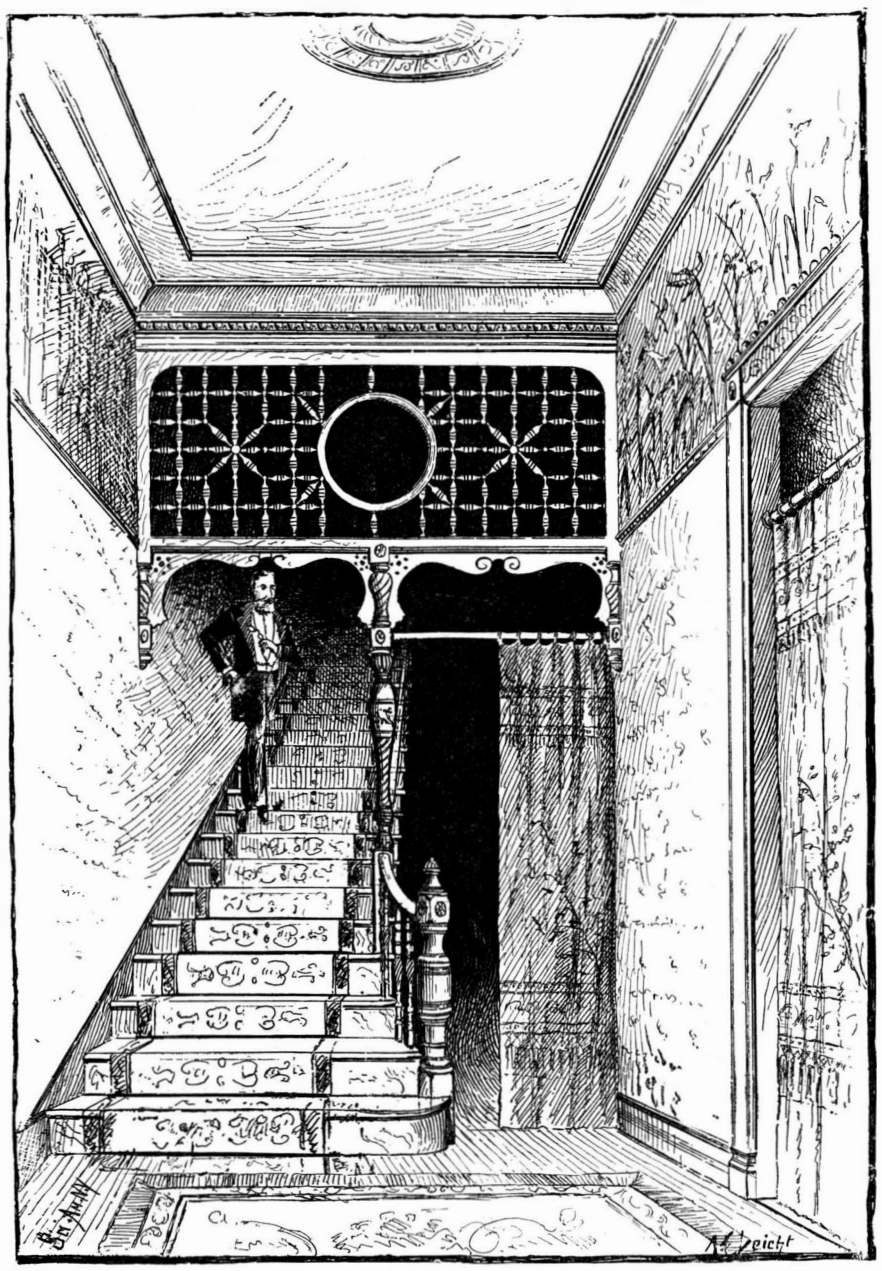
About 2,300 years ago (B.C. 440), Iktinas erected on the Acropolis of Athens that magnificent temple of the Virgin Goddess Athene which we term the Parthenon, and Pheidias, the greatest of the sculptors of Hellas, enriched it with those immortal works of his chisel which are forever famous. Both temples and statues were formed of pure white marble from the famous quarries of Pentelicus. The hand of time was powerless to deface or injure the imperishable stone, although the cannon of the Venetian and the gunpowder of the Moslem brought the splendid fane to ruin, a ruin afterward assisted by the pillage of more civilized men. (For although we, as a nation, have benefited by the pillage, still truth must be spoken.) But no detail either of the ruin which towers above Athens or of the scattered fragments which enrich the courts of our national museum has lost one iota of its freshness, sharpness, and delicacy from the touch of Time's "effacing finger." This is a point which every one may verify for himself or herself.

This Pentelic marble, thus found so enduring, is, of course, a limestone. Let us now see how a limestone fares in the corroding air of our "misty isle." It is, of course, true that we have no native limestone equal to Pentelic marble, either in hardness or closeness of texture; but if we had, they could not withstand a climate before which even granite succumbs.

"Limestones and dolomites," says Mr. E. Hull, F.R.S., "are especially subject to disintegration from the influence of rain charged with acid, and this country presents numerous unhappy examples of its effects. Of these, perhaps, the cases of St. Mary Redcliffe Church, in Bristol, the new Houses of Parliament, and Henry VII.'s Chapel in Westminster Abbey are the most instructive examples—the first built of oolitic limestone, the second of dolomite, and the third of Caen stone, a white limestone of Normandy, of Jurassic age. Even the portions of this exquisitely beautiful structure restored with Bath oolite about a quarter of a century ago have given way before the influence of an atmosphere charged with smoke and dripping with moisture most of the time.

"For such climates, therefore, limestones, especially soft, granular, and porous kinds, should as far as possible be avoided, and even sandstones which contain a notable percentage of calcareous matter in the form of cement. The best kinds of building stones for smoky and wet climates are siliceous sandstones, formed of grains of quartz cemented together by a siliceous or feldspathic paste. In Great Britain such rocks are largely distributed among the lower carboniferous formation of Scotland, the North of England, and Wales, the materials of which they are composed being derived from the disintegrated gneissose and granitic rocks which formed the land of the period. Such rocks are almost indestructible, and have been used with good results in some of the large manufacturing and smoky towns and cities of those districts where they occur. Being destitute of carbonate of lime or magnesia, they are not exposed to the corroding action of the acids which pervade the air."

While perfectly agreeing with the views of Mr. Hull, as expressed in the foregoing extract, we do not consider it at all likely that architects and builders will readily relinquish their *penchant* for the limestones—a predilection which their easy workability and good appearance render not at all unreasonable.



DESIGN FOR A HALL SCREEN.

The "weathering" of stone, as the influence of climate upon it is called, is a matter much studied by modern builders, and justly so, because the selection of the best possible material for any edifice is clearly a matter of paramount importance.

Many building stones of the class to which we have referred consist chiefly of carbonate of lime and carbonate of magnesia in about equal proportions. It is the sulphuric acid found in the rain water which descends on urban districts which so seriously affects stones of this description. Much, however, depends upon the *structure* of the stone itself. If this be crystalline, the stone, despite its chemical composition, may be good and durable; if, on the contrary, it be "amorphous"—that is, not having any determinate form of its constituent atoms—it very readily suffers. But in a large city, where the atmosphere is inevitably largely impregnated with acid vapors, even the crystalline limestone cannot but suffer.

The action of the acid on a magnesian limestone, such as that of which we are speaking, is that the sulphuric acid displaces the carbonic acid of the carbonate of lime, and forms with the magnesia a sulphate which is soluble in water, whence results the mischief.

In illustration of this fact, we may remark that it has lately been proved that in the atmosphere of a large town, with abundant coal smoke and rain, inscriptions in marble become illegible in half a century.

It is thus apparent that a certain stone may appear hard and durable enough in a pure country atmosphere which would yet be of no value in a large city. The carbonic, sulphuric, nitric, and hydrochloric acids of the latter *locale* all conspire to rot the stone.

The architect or architectural student, therefore, desirous of estimating the value of any particular stone for city use has many things to take into account in making his appraisement. In the first place, he has to discover the chemical constitution of his specimen, which has to be accomplished in the ordinary way of chemical analysis. Then, seeing how important is the part played by the structure, he has to decide by ocular inspection, aided, if necessary, by the microscope, whether the rock be crystalline or amorphous, bearing in mind that in the latter case the risk of its succumbing to the deleterious atmospheric influences of a town are considerably increased.

Various plans have been tried to discover the resisting power of stone in this regard, none of which, however, can be pronounced very successful.

Solutions of very weak hydrochloric or sulphuric acid have been made, in which pieces of the stone under examination have been placed and left for several days. It is said that the action of these acids on the stone shows roughly whether it is capable of being durable or not in the atmosphere of a large town.

The purity of a limestone may be roughly estimated by chipping a piece off a block, and putting it into weak hydrochloric acid. If much impurity is present, it will be shown by an insoluble residue which will remain behind. The acid may attack some of the impurities, but the proportion of non-calcareous matter so attacked is usually extremely small.

Mr. C. H. Smith proposed a test in which several damp pieces of the stone might be placed in a glass about one-third full of water. After a lapse of about half an hour they should be agitated, and if the water then has a milky appearance it shows that the stone is not thoroughly crystalline, but contains some earthy matter. If the water is very milky, it shows that the stone is not very durable.

These considerations will, we think, prove that the proverb "Hard as stone" is deceptive, at any rate in an architectural sense.—*Builders' Reporter.*

The Coloring of Metals.

According to the *Illustrirte Zeitung fur Blechindustrie*, a grayish black coloring on copper may be obtained by placing the object for treatment, after being well cleansed, in a weak solution of liver of sulphur. When a caustic effect has, after a short time, been produced, the object is rinsed, slightly heated, and brushed with a stiff brush. This coating is said to be very durable.

A blackish brown bronzing can be applied to vases, figures, busts, etc., cast from zinc, by the application of a solution of sulphate of copper. If the projecting portions are then well rubbed with a woolen rag, they assume a coppery red brilliancy, which increases the resemblance to genuine bronze. A solution of verdigris in vinegar also produces an effective bronzing.

Brass may be colored black by repeatedly coating the cleansed metal with a moderately warm solution of nitrate of copper. Heating over a charcoal fire follows. Finally, the tone is heightened by rubbing with olive oil.

HOW TO MAKE PAPER ROSES.

Of all artificial flowers, the easiest made, the cheapest, and I may add, in my opinion, much the prettiest, are paper flowers. I append a few plain directions with regard to making them, which, if followed out carefully, will give excellent results. To make a rose like Fig. 8, first get a piece of tissue paper and cut it square—3½ to 7 inches square, according to the size of flower you wish to produce—bring the opposite corners of the paper together (Fig. 1), folding it into a triangular shape; redouble it twice again in the same way and double it in the shape of Fig. 2 ; cut the top round (see Fig. 3), then cut it in the center a little more than half way down, as you can see in Fig. 4 ; open it out and make a hole in the center (Fig. 5). To make a complete rose, you must have eight pieces of paper like Fig. 5. Take a piece of cloth or wool and wind it around a thin piece of wire for the stem, and cover it with a piece of green or yellow paper (Fig. 6), and put the wire through the hole in the center of Fig. 5 ; then, after you have placed the stem through the center of Fig. 5, you must proceed to turn the petals or parts down, first taking one of the parts or petals, and then the one right opposite, and so on until you have turned them all down. Press the edges lightly, then take a pin and lift them one by one, until you have lifted every one of them up. Take a piece of sealing or bees wax, and place it around the stem just under the pieces, so as to stop them from falling off, and take a piece of paper and paste it neatly over the wax, and cover the stem with a piece of green paper. To make the rose like Fig. 10, provide a long, narrow piece of paper, and fold it so as to form nine equal parts (Fig. 9) ; cut them about half way down at the beginning of each part, and curl the upper corners by taking a pair of scissors and drawing the paper between your thumb and the blade of the

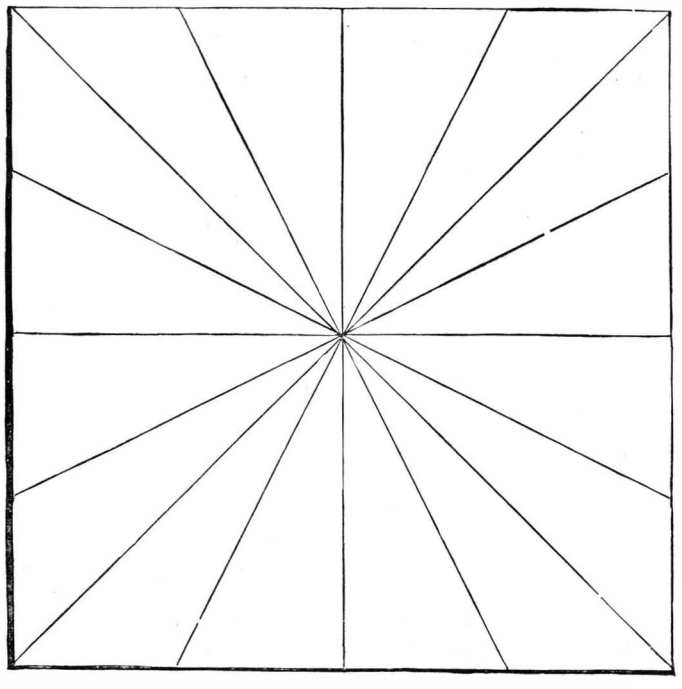


Fig. 1

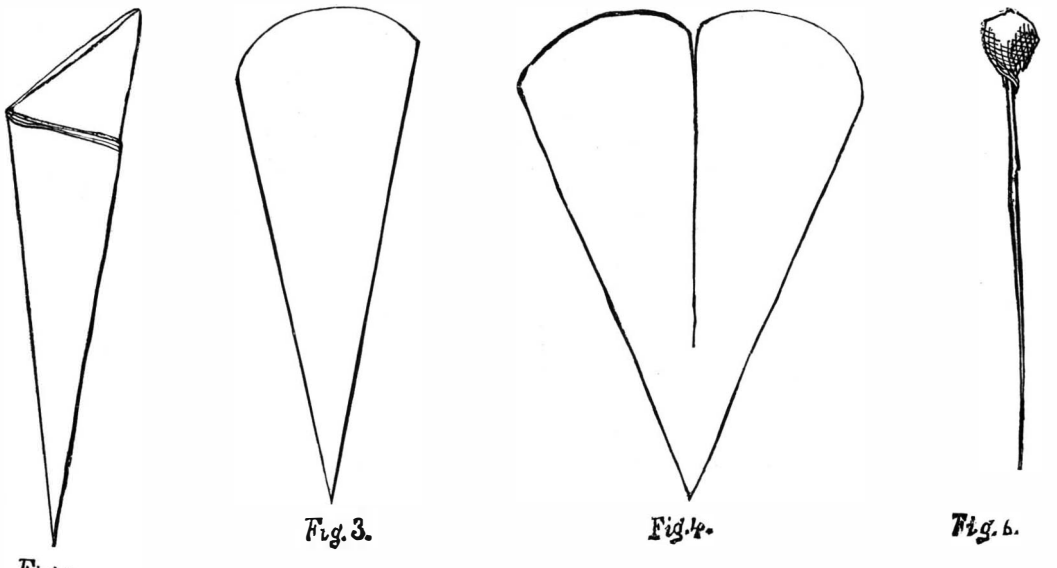


Fig. 2. Fig. 3. Fig. 4. Fig. 6.

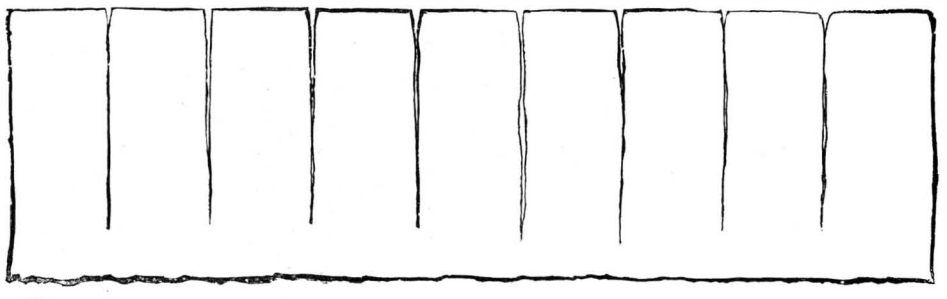


Fig. 9.

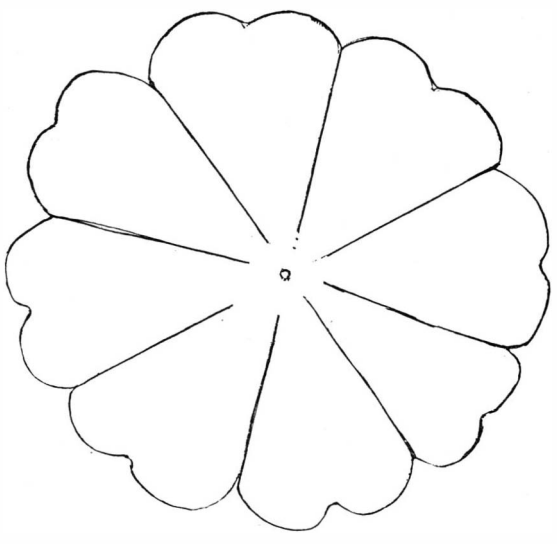
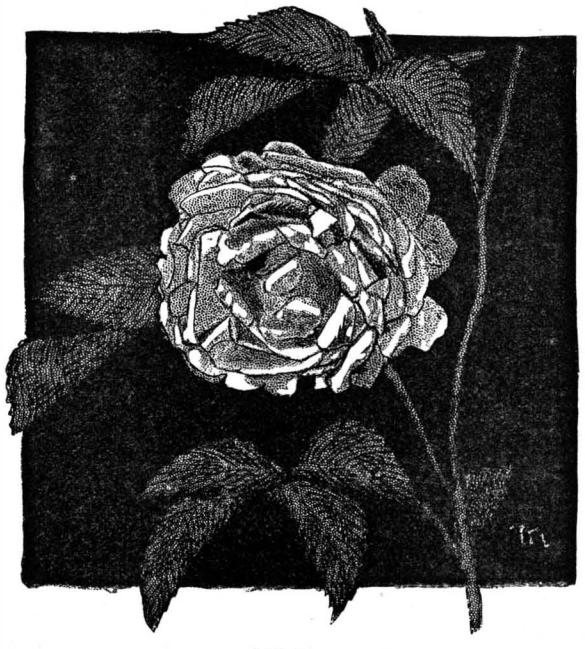


Fig. 5.



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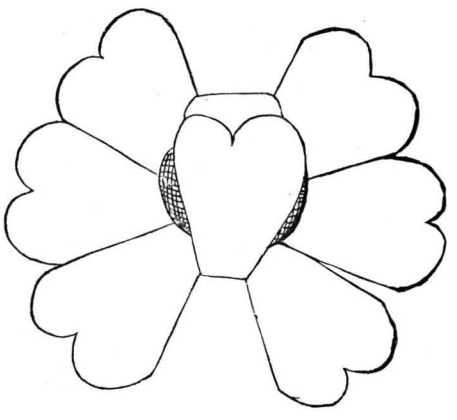


Fig. 7.

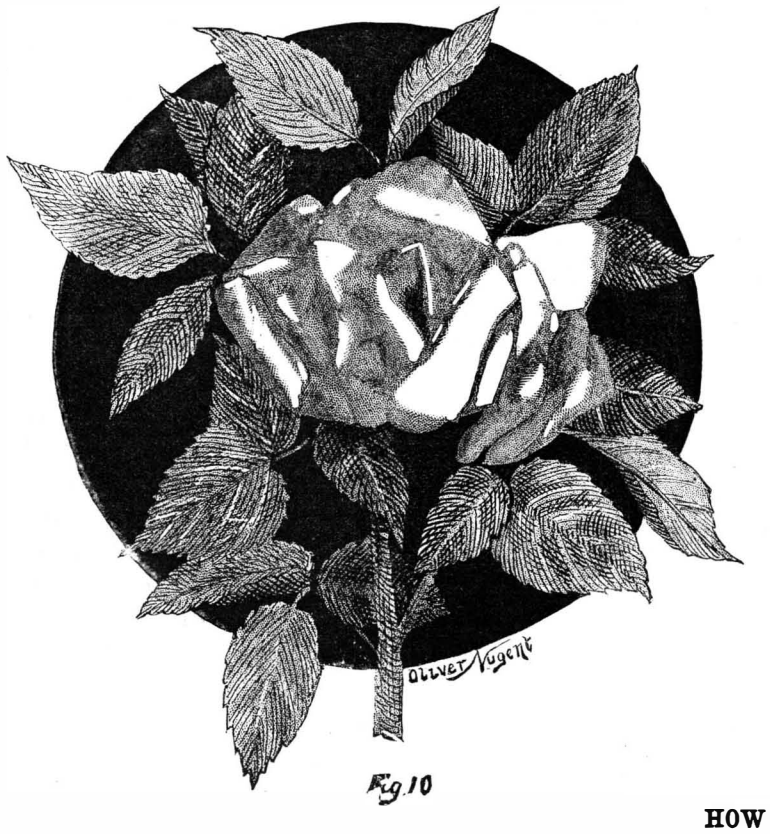
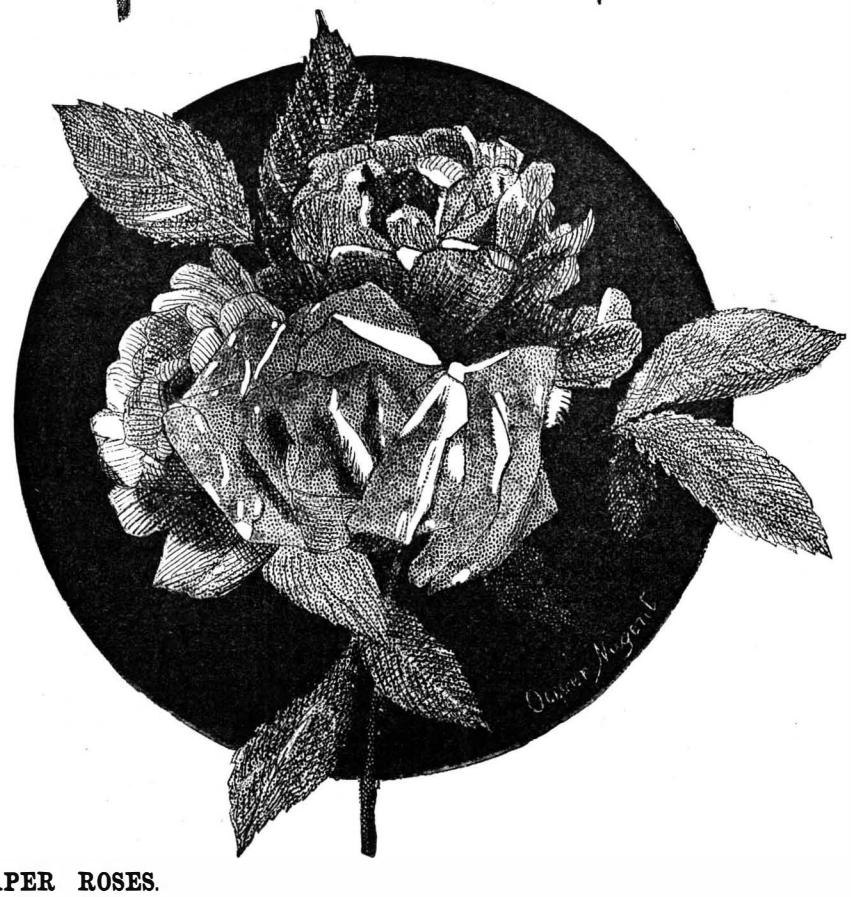


Fig. 10



HOW TO MAKE PAPER ROSES.

scissors. After you have done this, proceed to fold it. In folding it, you first wrap it twice around your first finger, then place your second finger close to your first, and wrap it around both fingers three times. Placing your third finger close to your second finger, you wrap the remainder of the paper around all three fingers, then twist it at the lower end and fasten a stem to it by twisting a fine wire around it, or by a small piece of beeswax, and then place the leaves on the stems as follows: To make the leaves, get a piece of green paper and cut it out in the shape of a rose leaf, or, if you have a book with illustrations of rose leaves in it, you can just place the tissue paper over the illustration and trace it with a pen or lead pencil. Cut it out and leave a narrow strip at the lower end of the leaf, so as to fasten it to the stem; get a piece of thin wire, the same as you did for the rose. For the stem, first fasten the leaves to it by twisting the narrow slip at the lower end of the leaf around it, and so on until you have fixed all the leaves in their proper places; then take another thin slip of tissue paper and twist it around the stem, commencing at the upper end, and when you have covered it all over, take a little paste or mucilage and fasten the lower end securely to the wire. A very nice parlor ornament can be made by taking a fan and fixing a bunch of these flowers to it. These flowers look much more natural than the wax flowers, and are more decorative for ornaments.

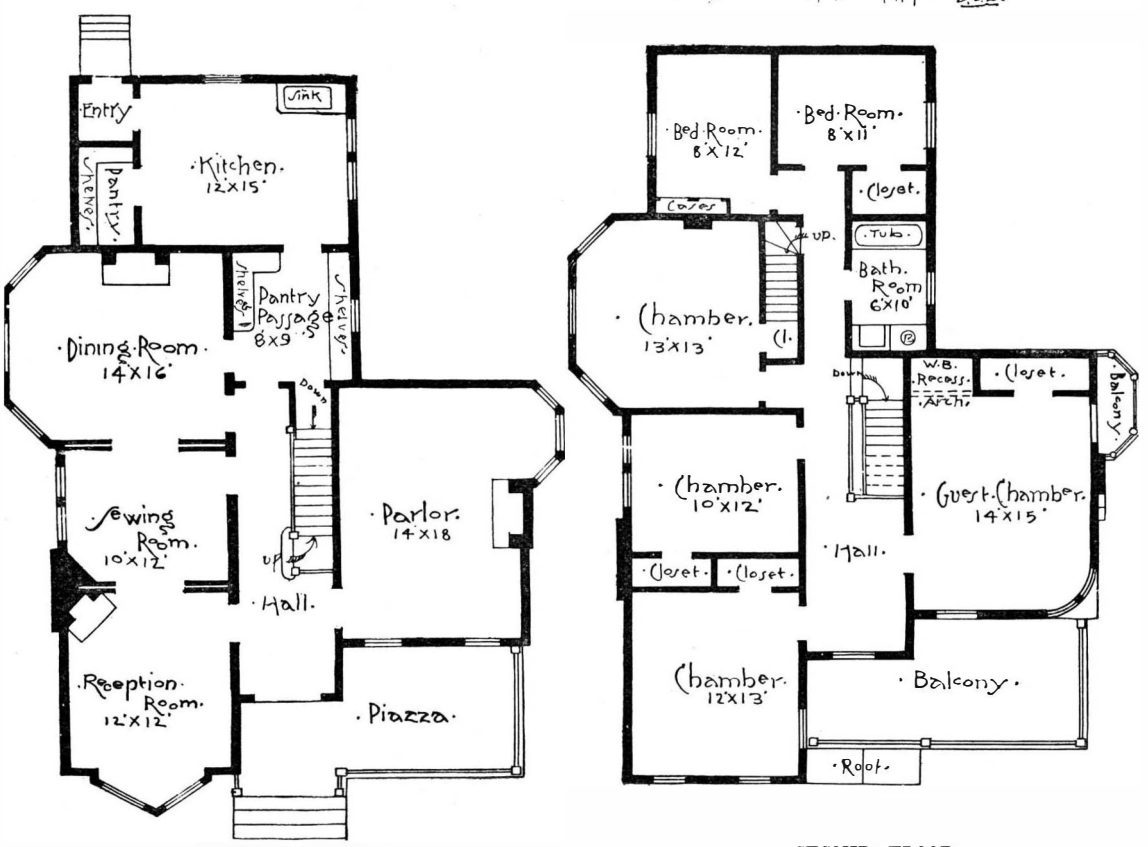
OLIVER NUGENT.

TWO DWELLINGS OF MODERATE COST.

The cost of a house greatly depends upon the interior finish, so that mere size or contents of a certain number of rooms indicates little as to the cost. For instance, the house shown in the upper drawing, though the cost as erected was $3,500, might probably be built for $3,000 if a simple finish were adopted, and twice that sum could be spent without difficulty if more elaborate details of interior finish and decoration were used. The size of the house is quite moderate, but is what is, perhaps, more in demand than any other.

The materials used in construction were of first class quality, and, perhaps, rather better than is usually found in houses of the size. A cellar is provided, and hard wood trim is employed in the parlor and staircase—a material item of expense which could be easily lessened in adopting the design. The exterior of the house is shingled on roof and second floor, and is clapboarded below.

Our lower engraving shows a comfortable looking little residence, which has been built at Little Falls, N. Y., from the designs of Mr. A. W. Fuller, architect, of Albany, N. Y. It cost $4,500, and is a very satisfactory design, with a certain freshness in treatment that is quite pleasing. The first story is clapboarded, and the second story and roof are shingled. There is one finished room in the attic, and a dry cellar below. The trim is pine, with hard wood in the principal rooms, and a careful system of heating and ventilation has been effected throughout the building.

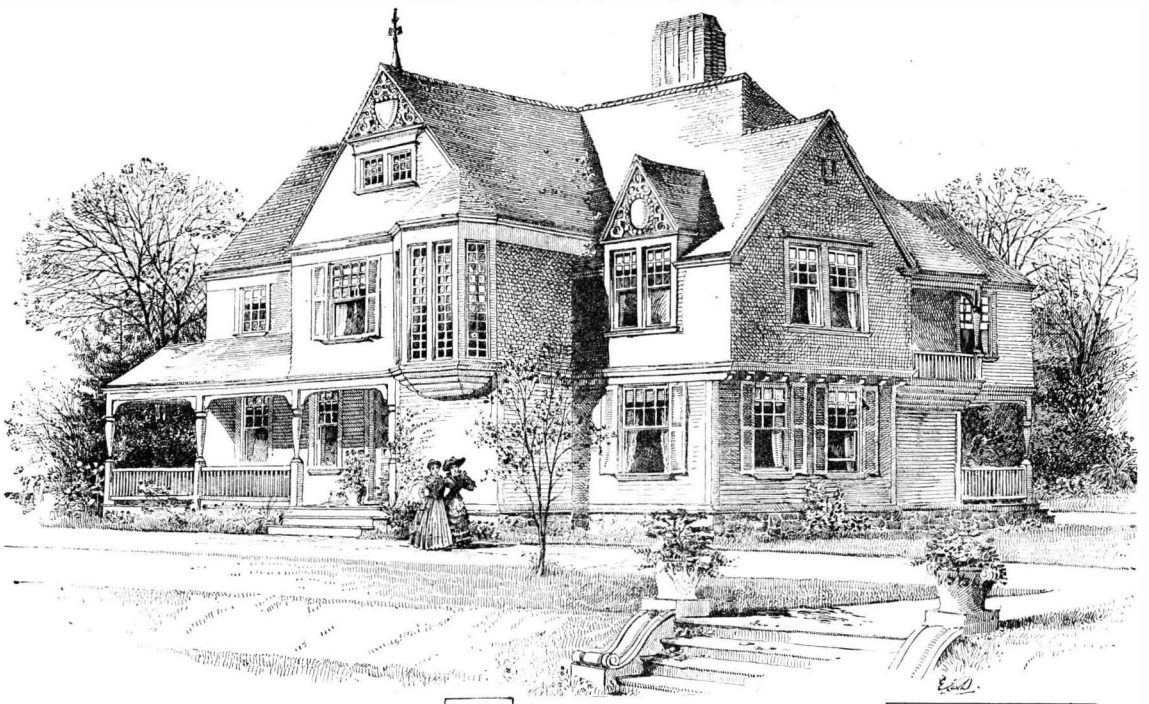


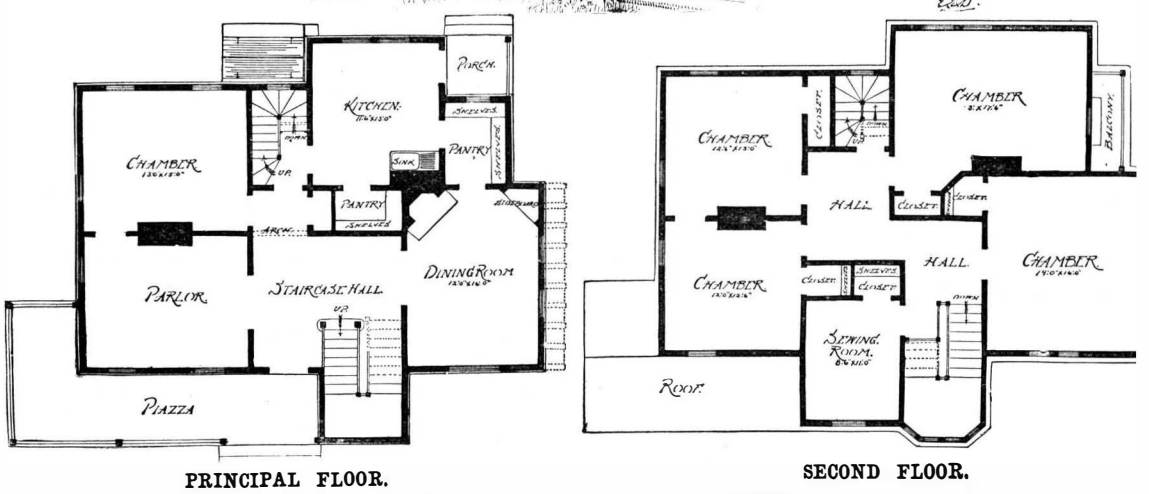
PRINCIPAL FLOOR. SECOND FLOOR.

A DWELLING COSTING $3,500.

The comfort and utility of a house depend so much upon the arrangement and relative position of the rooms that the success of a design in execution may almost be said to depend upon the manner in which the planning is executed. Unfortunately, this fact is often overlooked, and essential details of the plan are sacrificed for features of the elevation. It is quite common, for instance, to find the kitchen planned in such a manner as to place it in an out of the way position, entailing considerable labor to the servants in going backward and forward, or else it is placed in such a way that the smell of cooking and the noise from the kitchen can be known in anything but a pleasant manner all over the house.

Mr. Fuller has in this design skillfully avoided both errors. He gives a really artistic elevation, with an excellent plan, in which the kitchen is placed in a position convenient for access to the dining room and other parts of the house, and, at the same time, sufficiently isolated to completely prevent any annoyance. The two staircases form another convenience in the same direction. Altogether, the design is a good one.





PRINCIPAL FLOOR. SECOND FLOOR.

A DWELLING COSTING $4,500.

Hemlock Lumber.—Southern Furniture Factories.

According to the *Northwestern Lumberman*, hemlock is gradually gaining ground. Every winter, it says, more hemlock is banked, and every year objections to it are possibly a little less pronounced. It would show excellent sense if the people in the West would do away with their prejudice against a wood in favor of which so much can be said. Some day they will certainly be forced to use it extensively. White pine will not last always, and when it shall have largely disappeared, hemlock will, in a measure, take its place. People will use it for dimension, barn and fence boards, and it would not be surprising if for the cheaper class of finishing.—It is to be noticed that in the floating news about Southern industries, frequent mention is made of the starting of furniture factories. As the South grows in population and wealth under the stimulus of revived ambition to rival the North in material prosperity, there will be a rapid increase in the demand for furniture. Fortunately for this industry, there is almost an endless amount of furniture wood in the South, with which to stock factories located in that section much cheaper than Northern manufacturers can procure it. It would not be a matter of surprise to see, within a few years, such a growth of the furniture business in the South as shall become a serious competition with Northern manufacture.

Coverings for Hot Air and Other Pipes.

The manner in which the heat from house furnaces is wasted by radiation from the unprotected pipes in the cellar is within the experience of most persons who have used them. Many a good heater has been condemned and removed for insufficient heating, when the fault has been with the pipes, which, being, perhaps, long and exposed, wasted the heat to a considerable extent. Even in the case of heaters which answer their purpose in giving off sufficient heat to warm the house, there is often a loss of quite a high percentage of the total consumption of fuel from the unprotected pipes.

To prevent such waste of heat, it is only necessary to cover the pipes with an insulating material which will prevent radiation. The same protection may be given to hot pipes where they are located in close proximity to woodwork or other material liable to char or take fire. Mortars, felts, and various other materials have been used as protectors, with more or less success, but the organic matter which they contain has the effect of causing a gradual decomposition, and, moreover, conducts the heat to some extent, and is liable to the ravages of vermin.

Mineral wool is, perhaps, the best material that can be used for the purpose, as it resists the action of fire and water, is practically indestructible, and forms a most effective material for the prevention of the radiation of heat. Messrs. James F. Wood & Co., of Front Street, Wilmington, Del., and 133 North Second Street, Philadelphia, Pa., are the patentees and manufacturers of pipe coverings of this material, having a metal exterior, and being applied to the pipes without the use of paste or cement of any kind. Beyond their great utility as protectors, they have the advantage of being neat and regular in appearance and cleanly in application, while their high qualities of insulating heat render them of especial value in cases where it is required to convey the heat to a great distance, and where it would be almost entirely lost with unprotected pipes

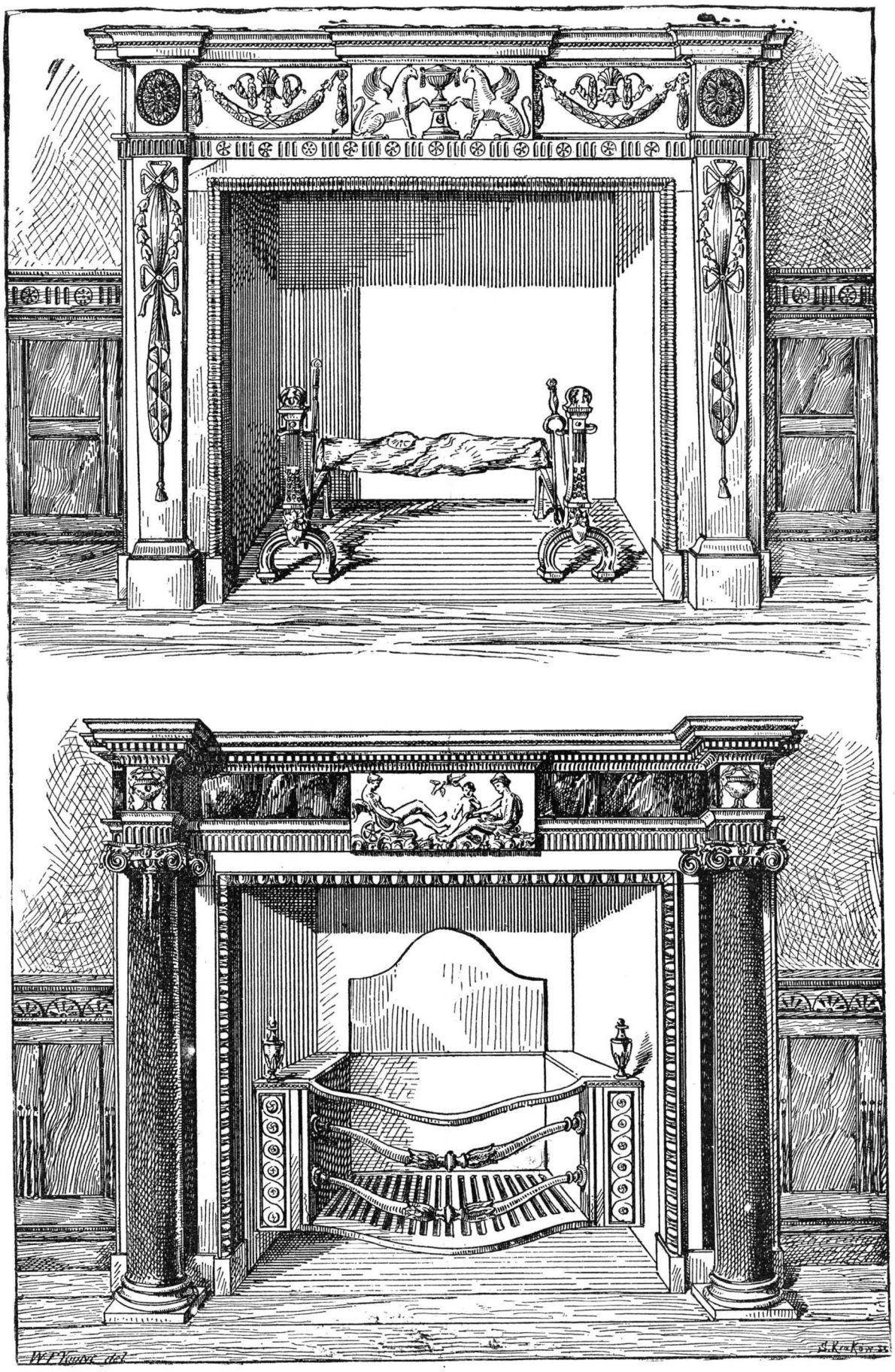
Water pipes located in exposed positions, where they are likely to burst from the water freezing, may be effectually protected by a covering of a good non-conductor of heat, and there are few better protectors for the purpose than those made specially of mineral wool by Messrs. James F. Wood & Co.

Rosewood Stain.

Take half a pound of logwood, boil it with three pints of water till it is of a very dark red, to which add about half an ounce of salt of tartar. When boiling hot, stain your wood with two or three coats, taking care that it is nearly dry between each; then with a stiff, flat brush, such as is used for graining, make streaks with a very deep black stain, which, if carefully executed, will be very near the appearance of dark rosewood. The following is another method: Stain your wood all over with a black stain, and, when dry, with a brush as above dipped in the bright liquid, form real veins in imitation of the grain of rosewood, which will produce, when well managed, a beautiful effect. A handy brush for the purpose of graining may be made by taking a flat brush, such as is used for varnishing, and cutting the sharp points off the hairs, and making the edge irregular. By cutting out a few hairs here and there, the grain may be imitated with great accuracy.

MANTELPIECES FROM OLD DUBLIN.

Our illustration is of two fine old mantelpieces from Dublin. They were made just prior to 1733, for the town house of Viscount Richard Molesworth in that city. They are both classic in design, worked in statuary marble, and are in excellent preservation. The mantel at the top of page is entirely in statuary, and has two pilasters at the sides, carved with wreaths of laurel leaves and drapery; the frieze has also carved swags of laurel, while on the projecting center are winged griffins guarding an urn. The bottom mantel is rather of a richer description, having two Ionic columns of Siena marble, and carved capitals. The frieze is also of Siena excepting the projecting center, which is of statuary, and is beautifully carved with figures representing Mars, Venus, and Cupid. The frieze has imitation dentils of Siena and statuary alternately. These mantelpieces have been carefully restored by Mr. Boucneau, of 48 Warren Street, Fitzroy Square, where they can be seen. As will be noticed, they are both in good taste and of noble proportions.—*Building News.*



TWO MANTELPIECES.

Wood oil is now being made in Sweden on a very large scale. It is abstracted from the refuse of timber cuttings and from stumps and roots in forest clearings. It cannot be burned in ordinary lamps, on account of the large amount of carbon it contains; but in lamps of special construction it is said to give an excellent light, and to be the cheapest of all illuminants.

The Greatest of Great Walls.

Says a correspondent of the *Milling World*, who has recently been traveling in China: Of course we had to go to the great wall of China. This country abounds in great walls. Her mural defenses were most extensive—walled country, walled cities, walled villages, walled palaces and temples—wall after wall and wall within wall. But the greatest of all is the great wall of China, which crests the mountain range and crosses the gorge from here some forty miles away. Squeezing through the last deep gorge and a deep rift in the solid rock cut out by ages of rolling wheels and tramping feet, we reach the great, frowning, double bastioned gate of stone and hard burned brick—one archway tumbled in. This was the object of our mission, the great wall of China, built two hundred and thirteen years before our era; built of great slabs of well hewn stone, laid in regular courses some twenty feet high and then topped out with large, hard burned bricks, filled in with earth and closely paved on the top with more dark, tawny brick—the ramparts high and thick and castellated for the use of arms. Right and left the great wall sprang far up the mountain side—now straight, now curved, to meet the mountain ridge, turreted each three hundred feet—a frowning mass of masonry. No need to tell you of this wall; the books will tell you how it was built to keep the warlike Tartars out—twenty-five feet high by forty thick, twelve hundred miles long, with room on top for six horses to be driven abreast. Nor need I tell you that for fourteen hundred years it kept those hordes at bay, nor that, in the main, the material used upon it is just as good and firm and strong as when put in place. Twelve hundred miles of this gigantic work built on the rugged, craggy mountain tops, vaulting over gorges, spanning wide streams, netting the river archways with huge hard bars of copper, with double gates, with swinging doors and bars set thick with iron armor—a wonder in the world before which the old time classic seven wonders, all gone now save the great pyramid, were toys. The great pyramid has 85,000,000 cubic feet, the great wall 6,350,000,000 cubic feet. An engineer in Seward's party here some years ago gave it as his opinion that the cost of this wall, figuring labor at the same rate, would more than equal that of all the 100,000 miles of railroad in the United States. The material it contains would build a wall six feet high and two feet thick right straight around the globe. Yet this was done in only twenty years, without a trace of debt or bond. It is the greatest individual labor the world has ever known.

Cross of Wheat and Rye.

A successful attempt at crossing wheat and rye is mentioned in Biedermann's *Centralblatt.* The grain capsules of the wheat were carefully opened, and the stamens removed before they were developed. The pollen from the rye was afterward placed upon the stigmas, and the whole head carefully tied up. The seeds resulting from this process were planted and readily germinated, producing plants that partook of the characters of both parent forms, though with those of the wheat predominating. Some of the ears had long glumes, while others had short ones. The seeds themselves showed a resemblance to rye, but less than to wheat.

A New Cement from Slag.

Selected blast furnace slag is, while it is in the molten condition, run into water, and is thereby reduced to a fine state of subdivision. To this finely divided slag, after it has been carefully ground and screened, a certain proportion of slaked lime, also passed through a fine sieve, is added, and the mixture is thoroughly amalgamated and ground together in an apparatus called by the inventors a "homogenizer"—an appliance consisting of a revolving drum, partly filled with a certain number of metal balls, resembling somewhat in its action the machinery often employed for quartz crushing. Here the lime and the slag particles are acted upon by the continuous blows of the numerous balls, and are crushed to an extremely fine powder. Moreover, their molecules are mechanically brought into the closest possible contact. By this means it is claimed that a "flowery, silky" powder is produced, capable of filling all the interstices in the materials to be aggregated better than the "sharp, sandy, and granular powder" of Portland cement. Indeed, it is asserted that this treatment will improve Portland cement made in the ordinary way. The process of "homogenizing," as compared with simple mixing, effects a vast improvement in the quality of the slag cement, its tensile and compressive strength being thereby almost doubled. This is the entire process of manufacture.

A $1,500 COTTAGE.

BY W. H. HARVEY, ARCHITECT, WORCESTER, MASS.

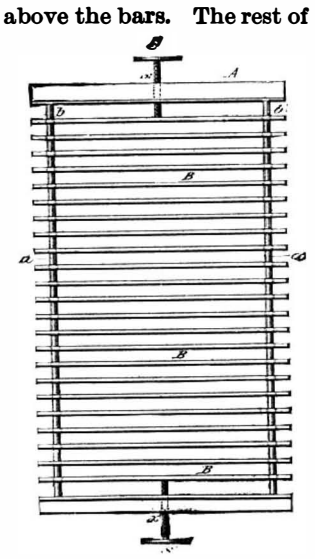
This cottage to cost about $1,500 as estimated by local constructor. The foundation is of stone up to grade line; the walls 20 in. thick, laid dry, and neatly pointed with mortar. The underpinning above grade of good, hard-burned brick, laid in lime and cement mortar, colored red. The chimney of round, hard-burned whole brick, laid in good mortar. The entire first and second stories lathed and plastered one coat, finished with a green skim. The outside finish of best second clear pine. Clapboards of sound spruce, and shingles of clear cedar. The gutters and conductors of cypress. The floors of sound local pine. The inside finish of well seasoned whitewood. Casings for doors and windows 4½ in., reeded with corner blocks. Bare plain beveled 8 in. wide stairs of whitewood; hand-rail of same, placed on iron brackets. All interior doors stock made, 2 ft. 6 in. by 6 ft. 6 in. by 1⅜ in. thick, with beveled rails and stiles and raised panels. All of exterior doors as per detail, with upper panels of stained glass.

All of the exterior to be painted two coats. All of the interior standing finish to be stained and varnished. Floors in kitchen, pantry, bath room, and closets painted. The plumbing comprises bath tub and closet fixtures in bath-room, cast iron sink in kitchen, and the necessary waste pipes and traps, etc., plumbed for cold water. The height of ceilings is: In cellar, 7 ft. 6 in.; first story, 8 ft. 9 in.; second story, 8 ft.; attic 9 ft. to ridge. Attic not finished.

APPARATUS FOR PAINTING SHINGLES.

BY CLIFFORD I. MILLARD, OF BURLINGTON, IOWA.

The shingles to be painted are arranged between the bars, B B, so that their thinner end will reach about one or two inches above the bars. The rest of the shingles



are below the cross bars, B B. When the apparatus is thus filled with shingles, the cross bars, B B, are, by means of screws, S and S', pressed toward the center of the frame, A, until the shingles heretofore arranged between the cross bars are firmly held between the bars. Now the frame is ready to be moved to any suitable place, where the lower ends of the shingles are dipped to any desired depth into a vessel filled with paint or any other suitable material, and after this is done the apparatus, with the shingles, is put aside to dry. This dipping process may be repeated as often as desired. When the shingles are thus painted, the hold of the screws, S and S', upon the cross bars, B B, is relaxed, and the shingles drop from between the bars, and are now ready to be packed.

Errors in Planning Houses.

To the Editor of the Scientific American:

Please allow me space for a few words concerning the mistakes made in planning dwelling houses, in the location of plumbing, such as bath rooms, water closet, etc. I have before me several copies of your ARCHITECTS' AND BUILDERS' EDITION, and find the evil in several of the plans therein published, which give the plumber no chance to make the proper connections with water and waste pipes. Nine-tenths of the architects do not give a thought to plumbing in their plans, but locate it in any out of the way place, which makes it impossible for the plumber to do good work; and if the connections are not first-class, or there is a leak in any joint, the fault is put on the plumber, but not on the architect, to whom it rightly belongs. This necessarily incurs much more pipe and labor than it would if it was over the kitchen, which it should be. My theory is to plan a house so as to have the bath room, if there is one, over the kitchen, near the chimney, so that direct connection could be made with tank from which the hot water is taken, and also to place the sink in the kitchen in such a position as to have waste pipes from bath room and water closet to connect in the cellar. This would give the plumber a chance to get at his work and do a good job, and avoid the necessity of having a plumber running to the house every two or three months, which incurs expense as well as annoyance.

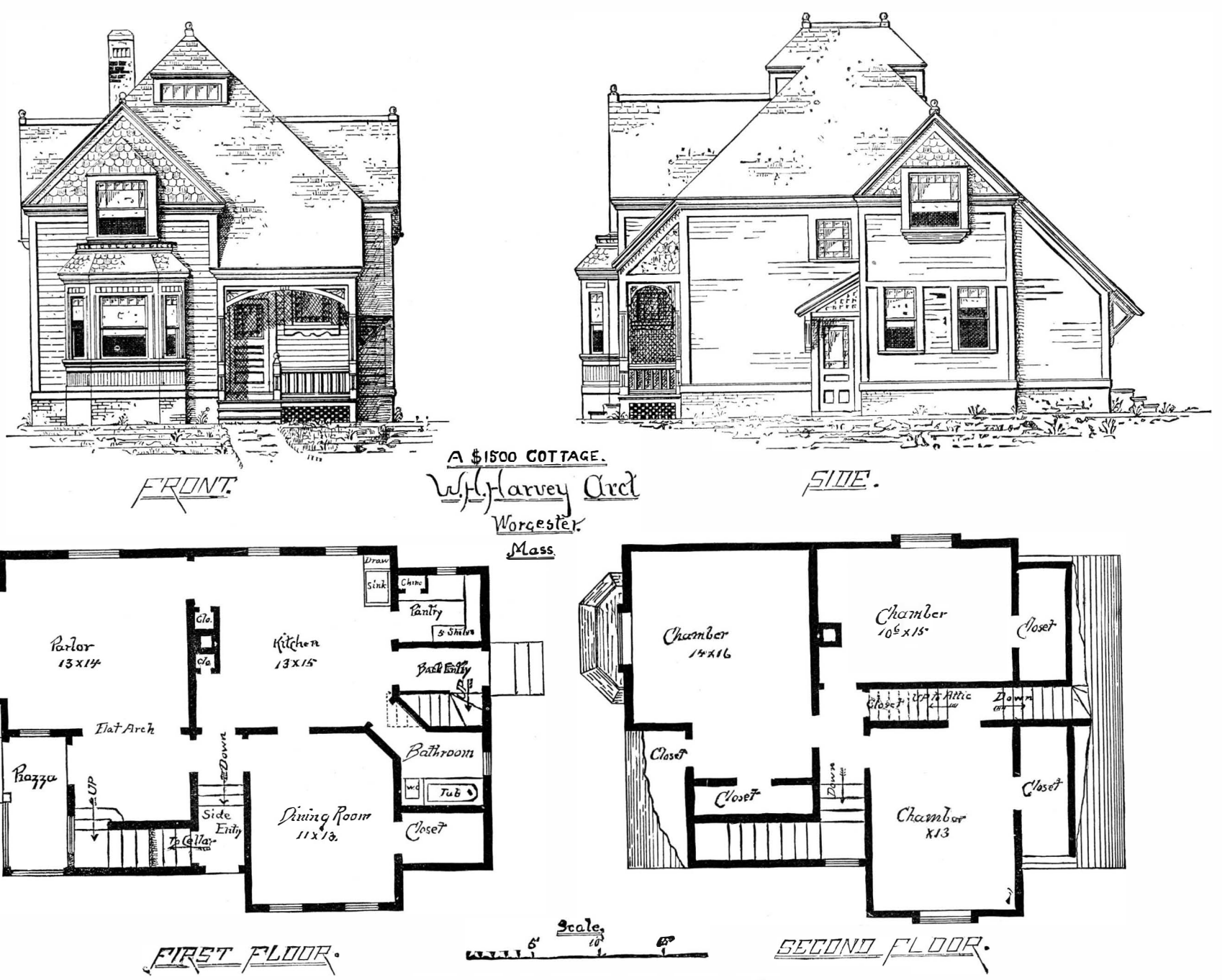
N. H. DECKER.

Newburg, N. Y.

Laundry Hints.

A spoonful of oxgall to a gallon of water will set the colors of almost any goods soaked in it previous to washing. A teacup of lye in a pail of water will improve the color of black goods. Napkins should lie in lye before being washed; it sets the color. A strong tea of common hay will preserve the color of French linen. Vinegar in the rinsing water for the pink or green calicoes will brighten them; soda answers the same end for both purple and blue. To bleach cotton cloth, take one large spoonful of sal soda and one pound of chloride of lime for thirty yards; dissolve in clean soft water; rinse the cloth thoroughly in cold soft water, so that it may not rot. This amount of cloth may be bleached in fourteen or fifteen minutes.

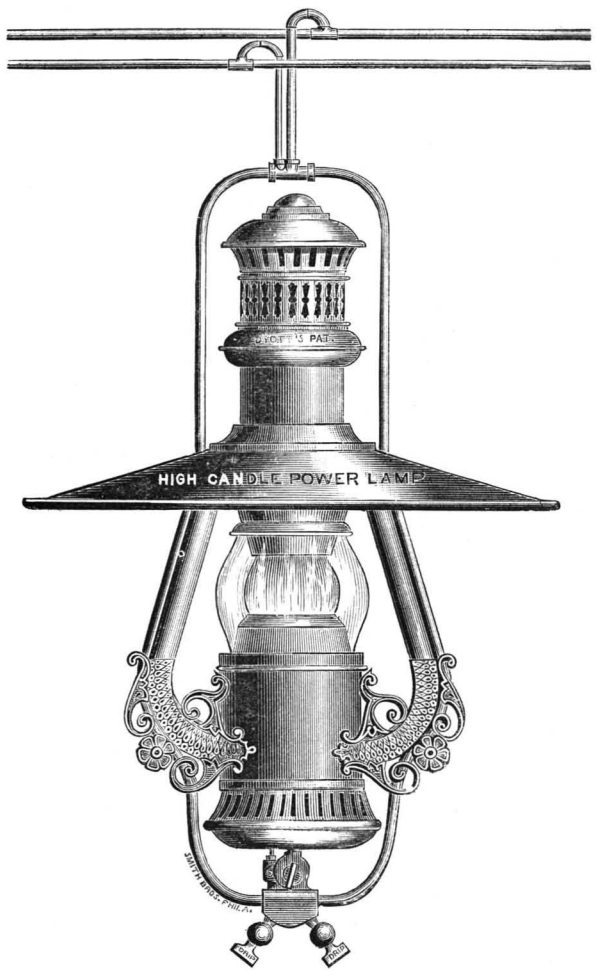
JAMAICA is said to contain about 500 species of ferns, or one-sixth of the ferns of the whole world.



A COTTAGE OF MODERATE COST—$1,500.

GAS LAMPS FOR LIGHTING LARGE SPACES.

The competition between gas and electricity has proved of great advantage to the public, for while in most cases electricity for lighting purposes costs more than gas, the increasing use of electricity has stimulated inventors and manufacturers to the making of many improvements in the appliances for and methods of burning gas, whereby the cost is lowered and greater efficiency is obtained. An example of the means by which gas is thus more efficiently used for the lighting of large spaces is afforded in the illustration herewith of a high candle power lamp, such as made by the Standard Gas Lamp Co., of Philadelphia. By the use of such lamps as these, of 40 candle power and over, the place of the electric arc lamp is supplied, and a light is given which does not cast those heavy shadows which render a gas light so often necessary in addition to electricity. Then, too, the improved burners which are used with these high candle power gas lamps result in a great comparative saving of gas, which is thus more perfectly burned to give the maximum quantity of light possible. In connection with this method of furnishing light, the company use Dyott's patent system of instantaneous lighting and extinguishing gas lights, without electricity, by which one or one hundred burners can be instantly lighted or extinguished by turning one stopcock. This, of itself, renders it possible to readily save a large amount of gas; and where the system is used in railroad depots, where the full light is only required for a short time, on the arrival and departure of trains, the saving thus effected has been enormous. It is this fact, in connection with the economy of burning the gas in these high candle power lamps, which has led the Pennsylvania Railroad Company to adopt the lamps and system of lighting of the Standard Gas Lamp Company in their depots and warehouses.



THE NARROWEST HOUSES IN NEW YORK.

JOHN M. PAGE.

New York has scores of noteworthy buildings laying claim upon public attention because either of their architectural pretensions or their size. It is doubtful, however, if among them all there is any more curious than the one shown in the cut.

It is curious in being the narrowest building in New York. It covers a lot 102 ft. deep and only 5 ft. wide, and comprises two private dwellings. Of even width from front to rear, except for its bay windows, it may be safely pronounced the narrowest building in New York.

As one would naturally suppose, such houses must owe their existence to some extraordinary cause; and the story of the origin of this pair is of interest.

When Lexington Avenue was first projected, it was the intention of the city authorities that it should extend no further north than to the southern side of Hamilton Park. This park was one of the remnants of the old Jones' Wood, and was projected to cover a large square bounded by Third and Fourth Avenues, Sixty-sixth and Sixty-ninth Streets. The abandonment of the idea of devoting this land to the purpose of a public park accounts for its now being the site of such a number of large institution buildings, charitable and educational. After the abandonment of this park, Lexington Avenue was cut through to the end of the island, and many houses and pieces of land were distributed. Among others a certain lot on the northern side of Eighty-second Street, which was almost wholly absorbed, leaving only the strip of 102 ft. by 5 ft., which has since become the site of this uncommon building.

The owner of this strip then tried to buy the adjacent land in Eighty-second Street, a piece 95 ft. by 102 ft. But he and his neighbor could never agree upon the terms. The strip lay idle till the spring of 1882, when the owner of the inside property wished to build. In order that he might have a frontage on the avenue, he began to negotiate for the purchase of the narrow corner strip; but for no consideration would it eccentric owner give it up.

The upshot of these negotiations was that the latter vowed that he would never part with his land, and, moreover, that, worthless as it might appear, he would build on it, and more than one house at that. This presumably absurd threat he carried out to the letter, and with such alacrity that his two houses stood there before his neighbor could enjoy one single day's light through his side windows.

The subjoined plan shows how the lot has been divided crosswise into two equal sections, each 51 ft. by 5 ft. Of course, a really habitable house could not be built within lines so contracted; but from the plan it may also be seen to how great an extent the builder availed himself of the privilege granted by the city of making projections upon the city land, under the name of bay windows. It was solely by making these projections, and thus gaining in places an interior width of 7 ft. 3 in., that anything like a room could be obtained. In this way fully two-thirds of the area of each house is bay window.

The exterior is of red pressed brick of good quality, with white pointings. A white, rough-faced marble is used for the sills and arched lintels of the windows and doors, which are wholly destitute of side trimming. The only windows in the basement, which represents kitchen pantries and coal cellar, are plain round holes two feet in diameter, opening near the ceiling. On the ground and upper floors, the windows are of the most contracted size, and all the same. Those on the ground floor have white wooden shutters, while the others are without any protection but inside blinds.

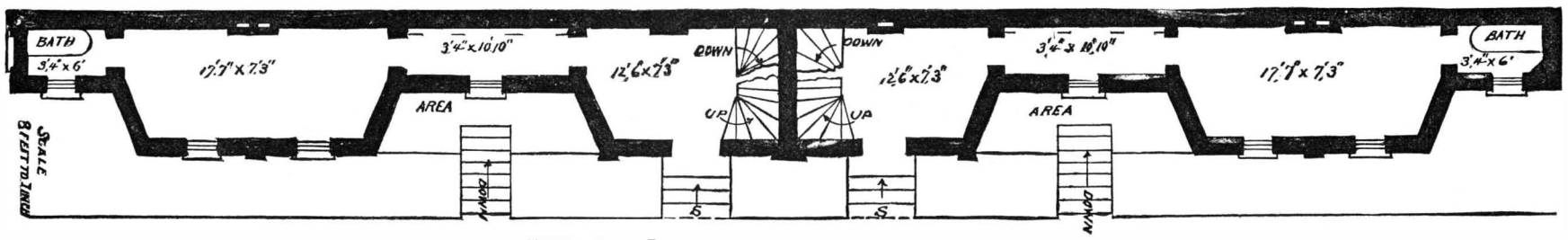
The great disparity between the narrowness of its side and the length of its front, together with the curious combination of building materials, give it an effect which, fortunately, can be seen nowhere else in the city. From the front project three broad bays to a distance of four feet. The middle one of these bays is evenly divided between the two houses, and contains the front doors. It is surmounted by a low gable, about eight feet below whose apex is a large stone forming the cap of a broad pier and bearing the date "1882." This pier and also similar piers in the middle of the side bays are ornamented with a stripe of alternately red and yellow terra cotta tiles. These tiles are the decorative features of the exterior.

The small street door opens into a marble floored hall 12 ft. 6 in. by 7 ft. 3 in. One end of this hall is occupied by the corkscrew stair which winds from ground to roof. Opposite the stair is an arched opening in the brick cross wall (none of the partitions are of wood) into a passageway 3 ft. 4 in. wide, in which for the first time the proper width of the house is encountered.

From the other end of this passage opens the solitary room, a space 17 ft. 7 in. by 7 ft. 3 in., or about the size of the average hall bedroom. From the extreme end of this opens a bathroom 3 ft. 4 in. by 6 ft. The heights of ceilings and interior finish is the same on all the living floors, as is also the plan; so that the uses of the rooms are left wholly to the discretion of the occupants. The basement interior is lined throughout with expensive enameled white brick, making it the best finished floor of the house.

There are no fireplaces on any of the floors, the only means of heating being by having a stove in every room. This difficulty of heating is said to be the only objection to the houses as residences.

In this way was the curious determination spoken of carried out, and better yet: ever since they were built, the wealthy owner has lived in the one on the corner.



THE NARROWEST HOUSE IN NEW YORK.

Anti-Magnetic Shields for Watches.

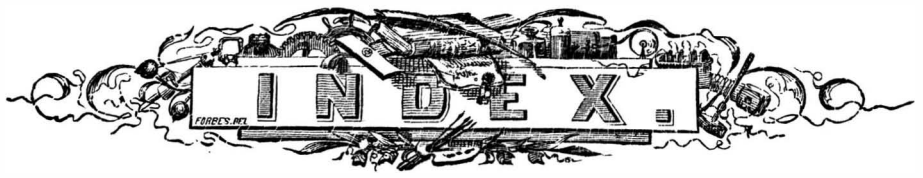
The Giles patent shield for protecting watches from magnetic and electrical influences is made of gold, pure copper, and fine decarbonized steel. The watch movement is surrounded by a compact shield of this combination, so made as not noticeably to increase the size of the case, the principle of the combination and the design in its arrangement being that one of the elements is one of the greatest absorbents of the magnetic current known; another, one of the best conductors; and that the third, offering but little resistance, acts as a diffusing agent, whereby any magnetic influences from currents, or impulses from electrical machines, will be absorbed, conducted, and diffused before reaching the watch movement. Unquestionably, there are times when the magnetism of the earth and atmosphere seriously affect the running of watches. Parts of watches, also, frequently become magnetized from influences which the wearers do not suspect, making this one cause among the most difficult with which watchmakers have to deal. The anti-magnetic shield is intended to prevent all the evils flowing from such influences, and is recommended for this purpose by some of our best electricians, as Prof. Elisha Gray, Prof. Anthony of Cornell, and numerous others. The office of the Anti-Magnetic Shield and Watch Case Company is at No. 18 John Street, New York City, and Giles, Bro., & Co., of Chicago, keep a full assortment of watches provided with this improvement.

Spontaneous Combustion of Wood.

Mr. Braidwood, superintendent of the London fire engine establishment, stated before a committee of the House of Lords that by long exposure to heat not much exceeding that of boiling water, timber is brought into such a condition that something like spontaneous combustion takes place, and that it may take eight years for the heat from pipes charged with or used to convey steam, hot water, or heated air, laid among the joists of a floor, or in the heart of a partition, or elsewhere in a building, incased in timber, to induce the condition necessary to the actual ignition of the timber.

A Large Casting.

One of the largest castings for marine engines ever turned out has just been cast at Messrs. J. Black & Co.'s Portobello Foundry, Monkwearmouth, viz., a bed plate, etc., 21 ft. 6 in. by 16 ft., weighing 25 tons. It was moulded and cast complete in 21 working days, and the metal was poured into the mould from three ladles, containing twelve, ten, and nine tons respectively, in one minute and fifty seconds, without a hitch.



VOLUME III.—JANUARY—JUNE, 1887.

Articles Marked * are Illustrated.

COLORED PLATES.

I. Country dwelling of moderate cost; with plans and details of construction. St. James' Rectory, Fordham, N. Y.; with plans and details of construction. January.
II. Farragut Club House, Chicago; with details of construction. A $1,600 cottage; with plans and details of construction. February.
III. One story dwelling with detached kitchen; with plans and details of construction. A $2,600 cottage; with plans and details of construction. March.
IV. A cottage of moderate cost; with plans and details of construction. Residence of F. W. Coolbaugh, East Orange, N. J.; with plans and details of construction. April.
V. The cottage (as shown in April number) as enlarged; with plans and details of construction. A dwelling at Orange, N. J.; with plans and details of construction. May.
VI. A twelve hundred dollar cottage. A residence costing five thousand dollars; with plans and plate of details. June.

MISCELLANY.

Figures preceded by a *star* (*) refer to illustrated articles.

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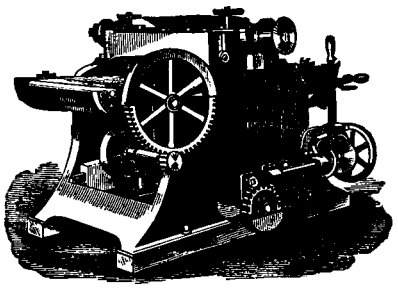

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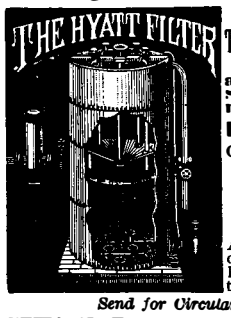

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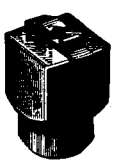

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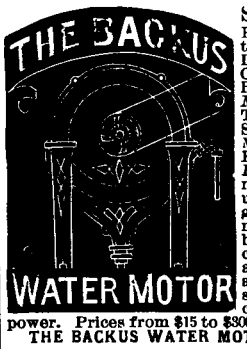

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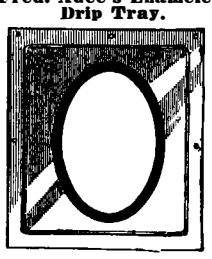

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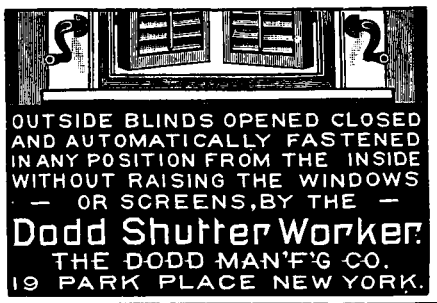

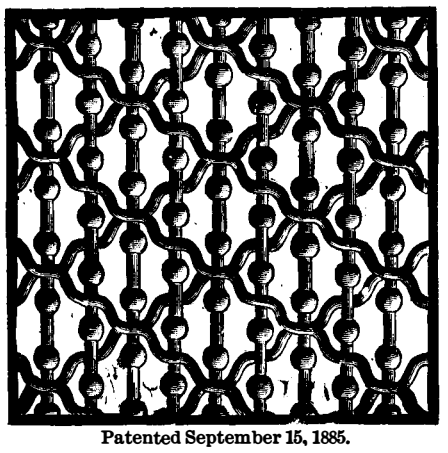

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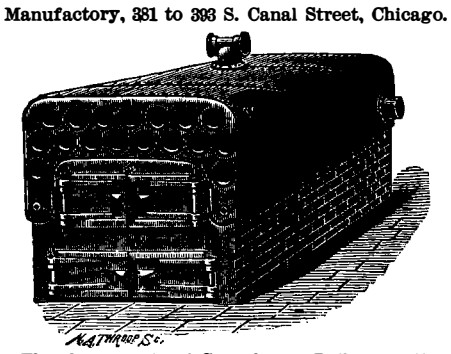

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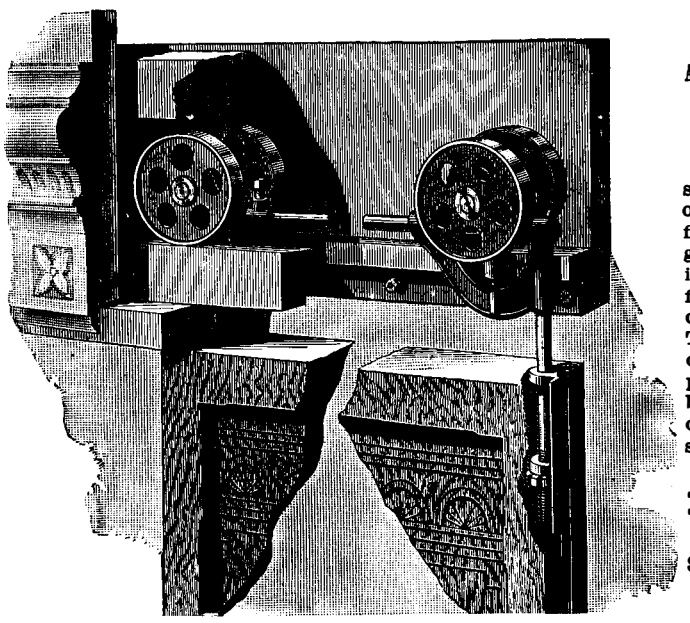

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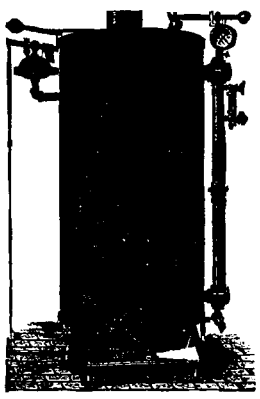

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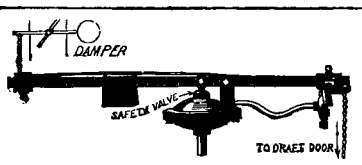

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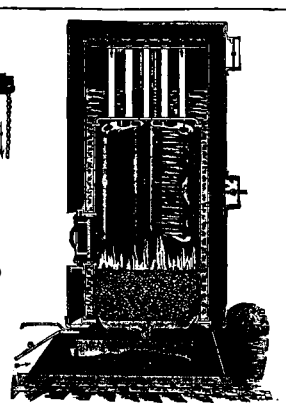

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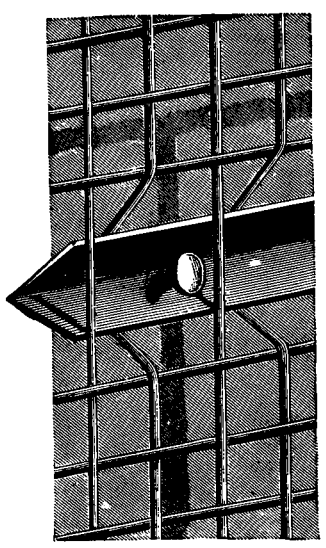

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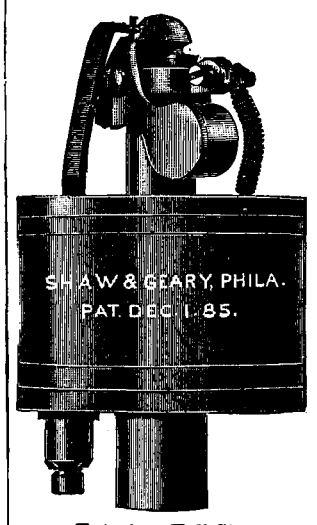

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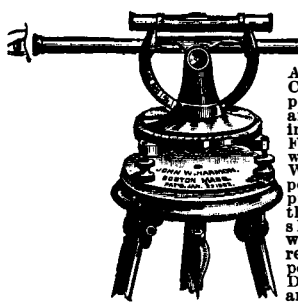

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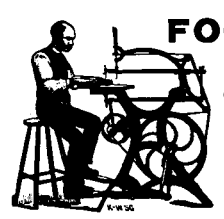

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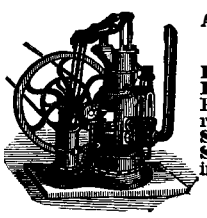

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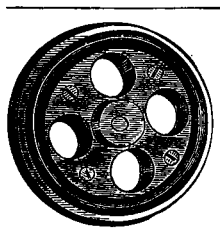

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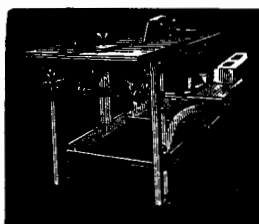

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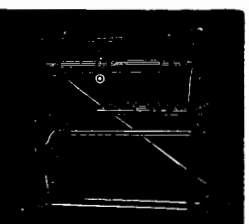

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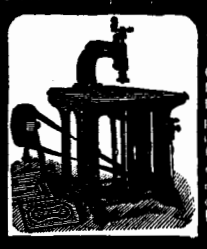

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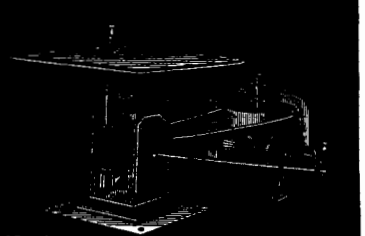

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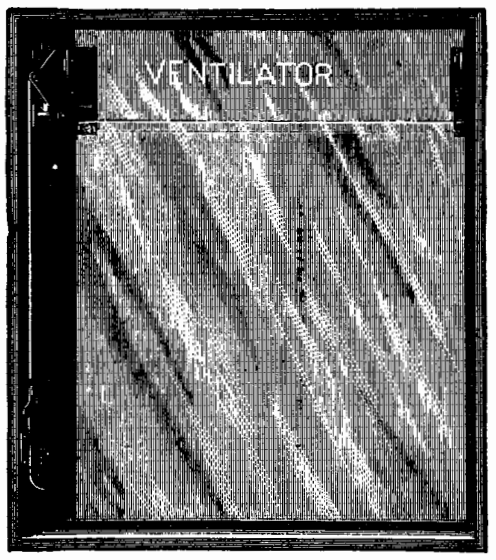

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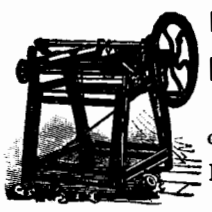

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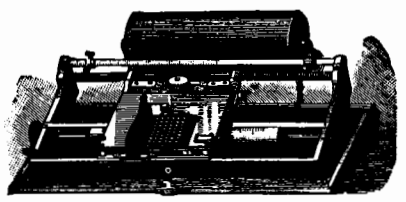

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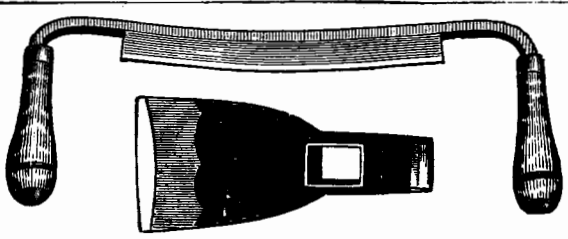

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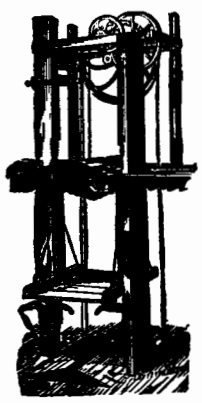

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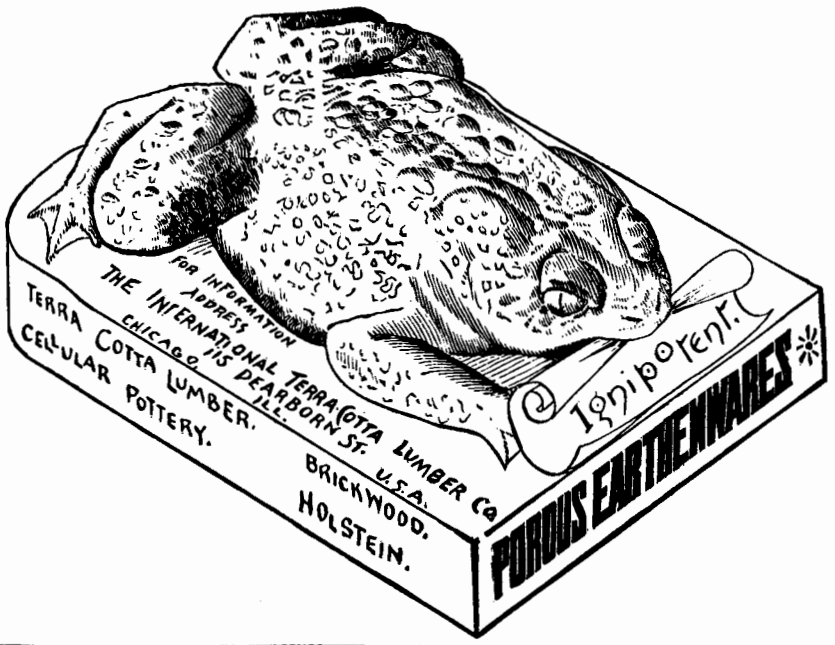

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(1) H. C. W. says: Will you be kind enough to give me a formula for plastering for a dining room? I want a plaster which will finish rather rough and be suitable for decoration in oil colors, and be extra durable. At the same time, if not too much trouble, will you kindly give a formula for a first class rough finish plastering in solid tint—*cafe au lait*, for instance—and say if you think the latter method would be as satisfactory as painting on rough finished walls. The work is to be done in a frame house. A. After the scratch coat, or coat with the hair in, is nearly dry, apply an ordinary second coat, such as is used previous to the hard finish, well gauged up with plaster, according to the hardness of the wall desired. The sand in this coat will give the requisite roughness, or if you desire it still harder, add one-third cement to the mortar. This mortar can be colored *cafe au lait* by adding yellow ocher and burnt umber, previously ground in water and mixed thoroughly with the mortar before the plastering is done. Evenness of tone is obtained by thorough mixing. Try a small quantity and let it set and dry first, in order to determine the tone. The better way, however, is to stain your wall with calcetine, or with any of the prepared calcimines which are sold dry and are ready to mix with hot water. Flatting in turpentine colors makes the best job, as the oil hardens the plaster of Paris in the mortar.

(2) S. D. B.—The safest method of removing varnish from woodwork without injury to the wood is to rub it off with a piece of soft rag soaked in methylated spirits, taking care to rub the way of the grain.

(3) H. L. H. would like the receipt for finishing oak in the antique style. A. Either bichromate of potash dissolved in water or liquid ammonia, applied to the surface of the oak with a brush or rag, will have the effect of darkening it in the same manner as is induced by age.

(4) E. S. asks: Is there any preventive of the disfiguring white incrustation which so often appears on brickwork? We have just erected a handsome brick structure, and already there are some signs of its appearance. Can you recommend any application which, while not injuring appearance of brickwork, would prevent above trouble? A. The incrustation on your brick wall is sulphate of magnesia. Sometimes a cure may be effected by applying, with a sponge, a solution of common muriatic acid, ½ pound in a pail of water; but, if this fail, nothing can be done excepting to brush it off from time to time as it appears. It will eventually exhaust itself.

(5) W. R. X. asks for a solution for waterproofing canvas horse and wagon covers that will be flexible. A. Take boiled oil fifteen pounds, beeswax one pound, ground litharge thirteen pounds; mix and apply with a brush to the article, previously stretched against a wall or a table, washing and drying each article well before applying the composition.

(6) N. S. C. asks how to color water in alcohol so as to obtain the deepest hue (red preferred), suitable for exhibition, in capillary tubes or thin layers. A. Use aniline red, soluble in water.

(7) F. P. L. asks: 1. Of what materials is the composition composed on picture mouldings? In what proportions are they mixed? How are they moulded in shape? How is the white grounding composition mixed and applied? A. Dissolve 1 pound of glue in 1 gallon of water. In another vessel boil together 2 pounds of resin, 1 gill Venice turpentine, and 1 pint linseed oil; mix and boil together until water has disappeared, when add finely powdered whiting until mass is of consistency of putty. This is hard when cold and soft when hot. It can be moulded in plaster of Paris or glue moulds. The white base seems to be mason's hard finish. It would be advisable to drive brads or tacks where the high parts come to be bedded in the composition, and hold it in place.

(8) G. Z. asks (1) how to kill or keep roaches away? A. Use borax or Persian insect powder. These must be renewed frequently, as they deteriorate by exposure to the air, and lose their power. 2. How to remove printer's ink from a tin can? A. Use benzine or caustic soda.

(9) W. W. W. asks if there is any preparation which, applied to windows, will prevent their frosting. A. Covering the glass with a thin coat of glycerine is the simplest method; where there are objections to this, make a double window, with a ventilating chamber between the glass walls.

(10) W. S. H. writes: The architects of this country (Utah) claim that roofs covered with tin sweat, thus causing the tin to rust, and to prevent this they advise a coat of paint to be put on the bottom of tin before laying. Now, I would like to know if the lumber does sweat, as it is a great hindrance to tinners to paint before laying. A. It is not the lumber that sweats, but the condensation of water from the moist air in the room upon the cold roof—exactly the same phenemenon as the sweating of an ice pitcher. Your remedy of painting may save the tin from rusting, but will not entirely stop the condensation and dropping of water. A ceiling is the best. Thick roofing felt tacked to the roof sheathing and fitted snugly between the rafters will make you comfortable.

(11) C. K. asks: Will a kerosene oil heating stove radiate more heat with a heating drum on than without? If there is a certain amount of heat in a gallon of oil, how can it be augmented by a drum? A. When the heat of the flame is communicated to the drum, the radiating surface is increased, and the same amount of fuel is rendered more effective, owing to the superiority of the iron over air as a conductor and radiator of heat.

(12) B. W. B. asks: Which plan is the most efficient for heating workshops—steam pipes around the walls at the floor, or steam pipes overhead just under the ceiling? A. In workshops and factories where the side walls are clear for the reception of pipes, the wall coils near the floor are the most efficient, and generally preferred for equal distribution of heat. There are many workshops and factories in which the wall spaces are occupied with machinery, benches, or goods. In such the hanging system is much in vogue, and is considered very efficient.

(13) "Information."—A structure along or over a marsh is often more correctly styled a causeway than a bridge. The Tay Bridge, Scotland, is 3,600 yards long. A railroad bridge over the Volga is 1¾ miles long. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 256. The Garabit in France is 413 feet high. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 391. The Kinzua viaduct is 301 feet high. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 369. The St. Gothard tunnel 48,840 feet long. The Mt. Cenis tunnel 37,840 feet long.

(14) H. A. W. writes: 1. A house is infested with red ants. How can they be removed? Powdered borax and Cayenne pepper have been used without effect. A. A strong solution of carbolic acid and water poured into holes kills the ants it touches. Lime and chalk are also recommended. 2. What will prevent grass from growing between the bricks in a side yard? A. Use common salt in the crevices.

(15) E. W. asks a receipt to make a cement that will stand considerable heat after it is cooled. A. Mix a handful of quicklime in 4 ounces of linseed oil; boil to a good thickness; then spread on thin plates in the shade, and it will become exceedingly hard, but may be easily dissolved over the fire, and used as ordinary glue.

(16) W. B. asks for receipt for flour paste that will not sour under a reasonable time. A. Mix smoothly flour and water till a thin batter is formed; put in a pinch of pulverized alum, and pour in boiling water until a thick paste is formed. Let it boil a minute or two; add a few drops of carbolic acid or oil of cloves. Put in a wide necked bottle. The oil of cloves acts as a germicide, and prevents the growth of mould.

(17) B. B. asks (1) how to dye or stain white and faded stag horn or buck horn to black. A. 0·14 ounce of silver is dissolved in 2·1 ounces nitric acid (aqua fortis). This solution must be applied several times to the article to be stained, but it is absolutely necessary that one coat should be dry before another is applied. 2. To a dark red color necessary for coloring knife handles? A. Take 17·5 ounces red Brazil wood, and boil for 1 hour in 4·4 milk of lime, and filter through a cloth. The articles to be stained are boiled for an hour in a solution of 1 ounce alum to 17 ounces water. They are then placed in the dye, and allowed to remain until the desired color is produced.

(18) P. H. asks: What is the best method and simplest for putting ebonized finish on small work-table? A. The stain is produced by successive applications of a decoction of logwood, followed by one of copperas; the article is then French-polished and rubbed up with oil and spirit.

(19) B. D. asks how to preserve some mole skins without injuring the fur—an easy method. A. Supposing the skins are dry, they should be softened throughout by soaking in pure water; soft water is best, but any ordinarily pure water may be used, and care must be taken that the skins are thus soaked only a sufficient time to soften them. Then clean off any bits of flesh that may remain on the flesh side, rinse all well, shake off the loose water, and gently stretch out and tack on a board, flesh side up. Then sprinkle with a mixture of powdered alum and salt, about two-thirds alum and one-third salt, enough to just cover every part. As the skin dries it takes up the mixture, but if any be left on the surface the second day, sprinkle on a little more water, otherwise put on more alum and salt, and sprinkle. Two to three days should be sufficient for such small skins, the idea being to give the skin all of the alum and salt it will take up, while in a moist condition. This tawing process makes the hair firm, a gentle rubbing and beating softens the flesh side, and it is preserved from decay, although tawed skins are never calculated to stand much wetting. This process is well adapted for all small skins, although those which are heavier require more time, and the flesh sides are sometimes folded together, and the skins rolled up. When the skins are freshly taken off, no soaking is needed, but more care is then called for in thoroughly washing off and cleaning them, and the first application of salt and alum should be in the proportions of one-half each. It requires the judgment of a tanner to deal with skins in a dry state which may have become partly damaged before drying, and it requires special knowledge also to tell whether a dry skin is so damaged.

(20) L. S. B. desires a receipt for making a good black lacquer. A. Take of burnt umber 8 ounces, true asphaltum 3 or 4 ounces, boiled linseed oil 1 gallon; grind the umber with a little of the oil; add it to the asphaltum, previously dissolved in a small quantity of the oil by heat; mix, add the remainder of the oil, boil, cool, and thin with a sufficient quantity of oil of turpentine.

(21) D. W. McD. asks how to restore rancid butter so that it will taste and smell well. A. Wash well first with some good new milk, and next with cold spring water.

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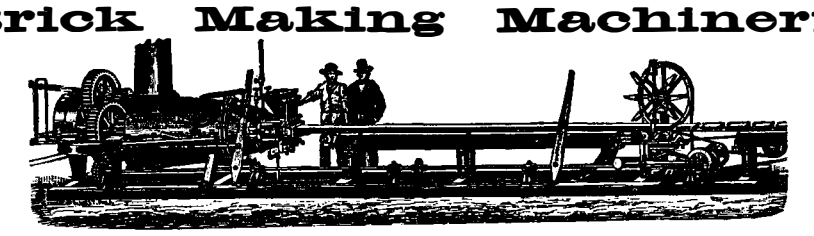

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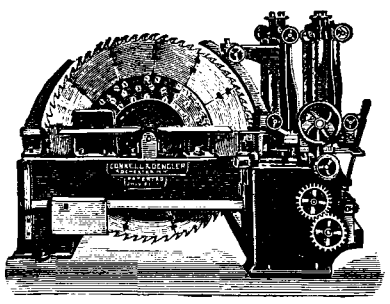

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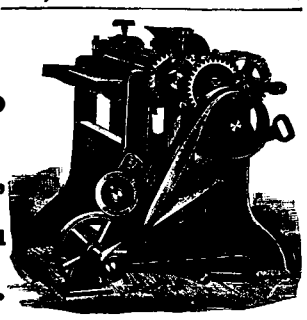

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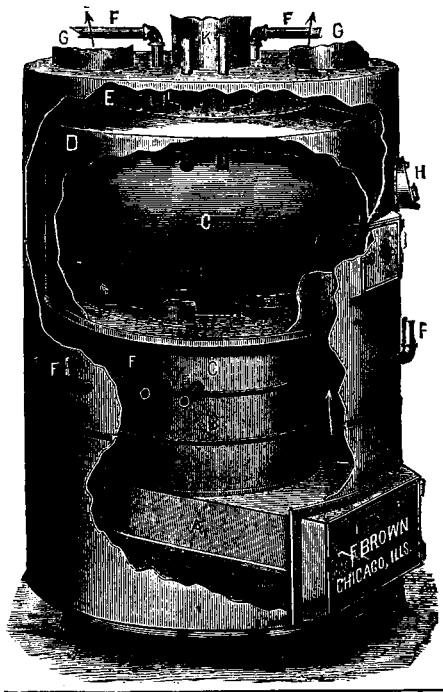

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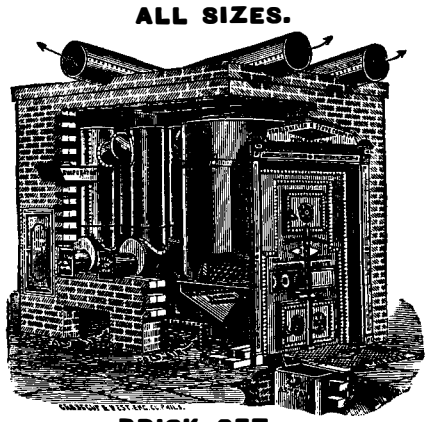

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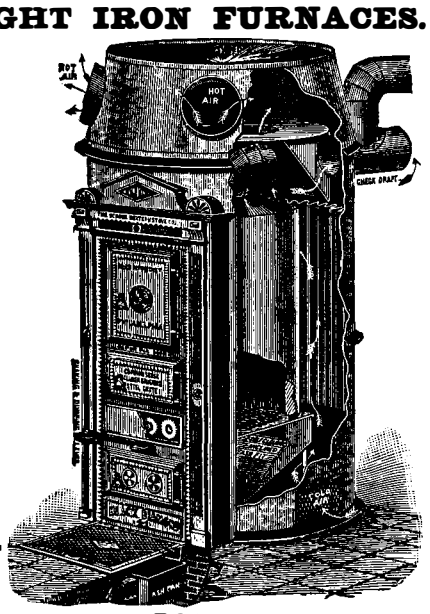

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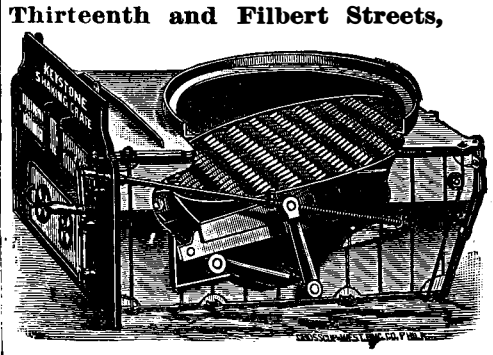

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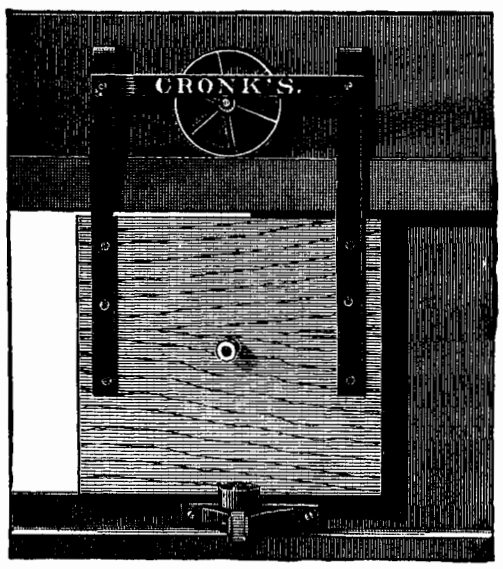

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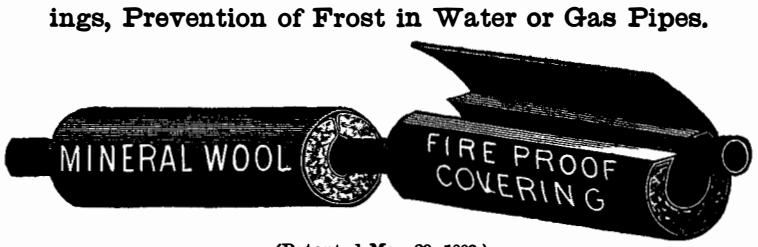

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