Why ask for the moon
When we have the stars?
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**New York: DAVID WILLIAMS, 83 READE STREET.**
A Country Chapel.

Various correspondents have sent in requests from time to time for designs of chapels and churches suitable for erection in rural communities. In response to one of the last of these which we have published, Mr. J. Dimmock, architect of Richmond, Va., sends us some drawings of a chapel designed by him, and recently erected in the suburbs of that city, from which we have prepared the accompanying engravings. The perspective view upon this page has been photo-engraved from a drawing by Mr. Walter H. Hicham, and affords a fair conception of the edifice. The building represented was constructed at a cost somewhat under $2500. The material is yellow pine, with the exception of the foundation walls, which are of brick. The dimensions of the audience-room are 28 x 50 feet, inside measurement; the vestry-room, 14 x 14 feet, and the tower vestibule, 8 x 8 feet. The height of the walls inside is 13 feet; the height from the floor to the apex inside is 21 feet, while the height of the tower outside is 50 feet. The dimensions of the roof timbers are as follows: Rafters, 3 x 9 inches; purlins, 3 x 4 inches; plates, 4 x 8 inches, and joists, 2 1/4 x 10 inches. The latter are lattice-bridged. The wall timbers are 4 x 6 inches. The roof is covered with hard pine shingles, cut so as to show hexagonal shape. The frame is covered with 12-inch boards, put on perpendicularly, with battens over joints. In the finish of the rooms inside they are wainscoted to a height of 4 feet, with room-foucused, grooved and beaded boards, with a cap. Above the wainscoting the walls are plastered roughcast, and blocked off and tinted a neutral tint. The ceilings are formed of the same material as the wainscoting. They are divided into panels by moldings planted on the boards. The glass of the large front window is colored, while that of the other windows is simply obscured. The finish of the inside woodwork is oil and varnish. The outside has been painted, including the roof shingles. The settees used in furnishing this chapel were made of yellow pine, and are the only thing about the building not included in the cost above mentioned. Mr. Dimmock informs us that in the selection of material for the inside work, including ceiling and wainscoting, care was taken to obtain lumber of the most irregular grain. This, being oiled and varnished, presents a most attractive appearance. The chapel in question has recently been occupied, and, we understand, greatly pleases the congregation generally.

Imitating Various Woods.

To imitate rosewood great care should be taken in correctly glazing, blending and blushing. This caution holds good in imitating mahogany and oak. Glazing colors are transparent, thinly mixed. In mahogany glazing add a little asphaltum to the grain color, which is burnt terre de sienne; also add ale to this mixture until it is quite thin; rub it over the wood. Asphaltum for glazing must be dissolved in turpentine, and it is well to add a little boiled oil to check it from drying too soon. To produce a fine rosewood out of ordinary pine make the ground color rose pink. This is mixed with asphaltum; the grains are put in with pencils such as are used by professional grainers; the knots and shadows are wiped out with a bit of rag or sponge in patches to suit the fancy. Blend crosswise in imitating mahogany. Maple wood is very handsome and not difficult to imitate; the grain color is raw sienna and raw umber mixed well together; wipe out the lights with a bit of buckskin, the edge of which gives the curl natural to this kind of wood; varnish, and, when dry, dampen with the grain color, which is made thin by the addition of a little asphaltum; wipe out the large light patches with a sponge, and then blend the light by...
Crossings: When dry use the glaze color for a grain finish. If the bird's-eye effect is desired, take a wet sponge and wipe out specks of light after the grain color is laid on; blend the whole, and dot it with the ends of the fingers, and then lightly burnish, which is the finishing process. Oak for a dining-room is handsomely imitated. Paint with a mixture of chrome yellow and Venetian red; the grain color is raw amber and raw sienna made light and brilliant with whiting mixed with boiled oil. Paint over the wood and comb while damp, first lengthwise, and then run the comb with a starting on the same crosswise. Carefully wipe out the grains of light; hold the cloth over the thumb-nail, changing its position at every touch. After glazing with asphaltum, wipe out large patches of light, and with a soft tool darken other spots. The grain color for imitating walnut is burnt umber; the ground color is made of Venetian red, black and yellow ochre, equal proportions, well mixed. Take a flat brush and a piece of buckskin for wiping out the lights.

Water Supply for Country Dwellings.

BY A COUNTRY PLUMBER.

VIII.

Having located the site for the windmill and run the necessary number of storage cistern or reservoir to use, and found the distance and elevation from the water in the well or spring to the site of the dwelling, the quantity of water needed should be made before determining the size of the pump and of the windmill to erect. The following instructions, although a repetition of some already given, are in order:

1. Ascertain the depth of well or spring below the surface of the ground or platform of well.
2. The least depth of water in it.
3. The height above the platform of the well to where the water is to be discharged, adding the depth of cistern or tank to same.
4. The lateral or side distance (if any) from the source of supply to where the water is to be discharged.
5. The quantity of water wanted, or, at least, the purposes for which it is to be used: also, the quantity afforded by the source of supply.
6. The height at which the mill must be erected to secure a free current of air.
7. In case of a bored or drilled well, find the diameter.

It is important and should be observed that a windmill, deriving its force or power from the wind, should have as great an elevation as possible within reasonable limits, so as to obtain steady motion and full benefit of light winds. A liberal estimate of consumption should be made. Supposing it will be required for all the purposes of the household, kitchen, laundry, baths, closets and also for lawn or fountain, and the family and dwelling are large, the quantity needed to supply all these would be very much greater than inexperienced persons would estimate—possibly even more than afforded by the source of supply. The city plumber, who usually has only to tap the street main to obtain a supply, does not have to deal with this question of quantity, as we most often meet the style of our customer's house and premises, the tastes and number of its inmates, as well as the quantity of water is concerned. Nor will it do to trust entirely to our customer's opinion, especially if he has always resided in the country and is "innocent of city water fixings." Having probably procured the blows; but as we cannot control the winds, which are emblematical of fickleness and uncertainty, to make success much larger cisterns or tanks are required than when using a motor that derives its power from a reliable source or source. A storage cistern or tank capable of holding ten days' supply or consumption will not be too much in most sections of the country. Now, supposing that during three summer months (when winds are usually lightest) we estimate that there will be four hours' wind each day on an average—that cisterns or partial cisterns may last from a week to the daily supply from a spring, possibly at the foot of a steep hill, or pumped it from a deep well by hand, or pulled it up with a windlass or "sweep," or, worse still, have hauled it in a water-cart or barrel from some distant well or spring, the estimate he could be made available whenever the wind blows; but as we cannot control the winds, which are emblematical of fickleness and uncertainty, to make success much larger cisterns or tanks are required than when using a motor that derives its power from a reliable source or source. A storage cistern or tank capable of holding ten days' supply or consumption will not be too much in most sections of the country. Now, supposing that during three summer months (when winds are usually lightest) we estimate that there will be four hours' wind each day on an average—that cisterns or partial cisterns may last from a week to

Demerara Greenheart.—Greenheart is one of the ten woods classed A1 at Lloyd's, and, although a product of the forests of South America, rates at about half the price of teak-wood, the one being purchasable at about 87 cents per cubic foot, and the other at about $1.75. Its specific gravity is 1149, against teak 800, and oak 828. Greenheart has the qualities of being hard, tough, strong and elastic, is very durable and practically indestructible. It is imported in logs from 24 to 50 feet long; and in squares ranging from 12 to 24 inches, and logs are recorded as long as 70 feet, and 24 inches square, so that no objections can be taken to it on the score of size. In color it is not unlike oak, except that it has a greenish tinge. The figure, which is somewhat rare, par excellence of that found in American birch, caused by the fibers in the outer wood, under certain conditions of growth, taking a wave or tortuous course. It has the specialty of being remarkably free from knots, and of being more free from ring and heart shakes than

Ground Plan of St. Andrew's Chapel—

Scale, 1/4 Inch to the Foot.
The elevations receiving the first prize in the part are a misnomer, from the fact that our published. Eight-room, however, is in house. They have been the basis of various prize in our Fifth Competition. These floor plans have been commonly designated in our built according to the plans receiving the first prize. According to the judgment of the designer. The author of this design is Mr. F. J. Grodavent, of Syracuse, an architect with whose designs our readers are not altogether unfamiliar. How well he has succeeded in the problem at present undertakes we leave our readers to judge, remarking only in passing that the elevations have been photo-engraved directly from Mr. Grodavent’s original drawings, and that, therefore, they show his exact intentions without possible modifications incident to the ordinary process of engraving. The use of brick in domestic architecture is increasing yearly by year, a fact which gives great importance to designs making use of this important building material. The extensive introduction of pressed and molded brick makes it possible at present to obtain features of design and ornamentation which formerly were beyond reach. All these points were, no doubt, carefully considered by the various contestants in the competition referred to. In the description accompanying this design the author directs attention to the fact that the gables, dormers and other parts of the roof are so arranged that the water is divided at the front and flows toward the rear. With reference to the exterior walls, the author suggests that the bricks employed be of one color, using such molded forms as he has shown in his detail drawings. On the Use of Building Stones. BY JAMES GOWANS. (Concluded.) 5.—How to Use Stone in the Building of Rubble. Of walls built of rubble there is a great variety. With common rubble masonry, or walls built with stones of irregular shape as they come from the quarries, if well put together, well dressed, well knocked to their bed, and built from front to back, so as to bond and to be the first consideration, has led to much of this kind of work, although I am by no means sure but what there is something else to be blamed, and that is that many of our masons have not been properly trained, owing greatly to their indentures, and not serving their full time of apprenticeship. Masons were better it was now of indenturing apprentices for a term of years—usually five. Three were devoted to the art of hewing, and two to the art of building. When the term expired it was ushers for a term. It was not only bad in itself, but leads to our younger masons being trained to a most objectionable style. Speculation in building, where cost appears built according to the plans receiving the first prize in our Fifth Competition. These floor plans have been commonly designated in our columns as the floor plans for an eight-room house. They have been the basis of various studies of elevations from which we have published. Eight-room, however, is in part a misnomer, from the fact that our contests have permitted additional rooms in basement and attic; accordingly, the common house to the floor plans in question has a rival. The breaking weight of a specimen 7 feet long and 1 inches square is 1332 pounds, against teak 877 pounds, and oak 900 pounds. Its crushing weight on a 4-inch cube is 98.8 tons, against teak 37.8 tons, and oak (green) 53.3 tons. Second Prize Design—Ninth Competition. The subject of our Ninth Competition, as our readers will doubtless recall, was the elevations and details of a house in brick, wood. Where what is called squared rubble is adopted, with ordinary rubble for backing, the practice of running up the outer face shall not be allowed. No worse masonry could be built than this, and it is to be regretted that so much of this kind of work is being done in our city. It is not only bad in itself, but leads to our younger masons being trained to a most objectionable style.

SECOND PRIZE DESIGN, NINTH COMPETITION.—F. J. GRODAVENT, ARCHITECT, SYRACUSE, N. Y.
In specifying rubble work, architects should be careful in making clear the kind of work they require, as many questions have had to be settled in court which might have been avoided if more clearly described, or if, what is better still than any specification, the kind of work was shown to contractors before estimating. There are so many different kinds of rubble, such as common, squared, random, hammer-dressed, nidged and pick-dressed rubble, and rubble where the stones are limited in length, height and breadth of bed, which comes to be a puzzle to the mason if specified for walls such as I have seen built in this city. These should be made perfectly clear by the architect by sample, so as to prevent disputes and show exactly how the stone is to be treated. Another kind of rubble which was much in vogue when the houses in Moray Place, &c., were built, as shown in the back walls of the same, and also in the front of the older houses in George Square and Gilmore Place, was that of coursed rubble. As the term indicates, the stone was taken from the rubble, squared and faced entirely with the cairn hammer I have before alluded to, and it is well to notice from these examples how shapely and well done the work is—some of it brought to a surface by squaring the stone so as to show the natural face, and others by using the paneled hammer for dressing off any inequalities and bringing it more within the term of what we call "nidged" work, only with much less labor than that which is required for this more costly style of masonry.

6.—How to Use Stones in the Superstructure.

There are many ways of building, but whatever kind of work is adopted, whether ordinary rubble stone, cubic stone or ashlar, the great secret is to make every stone do its fair share. The true way of doing this is to build the walls from front to back of stone nearly equal in thickness as possible—that is, of stones of cubic dimensions, or stones of a large area, examples of which we have in the remains of Egyptian and Cyclopean masonry. This is particularly desirable in the space between the foundation courses, and where the face of the wall comes to be seen; good masonry is required for this, although it is often otherwise, owing perhaps to its being buried and out of sight. For the abutments of bridges or piers of viaducts, cubic stone only can be used with safety. Where a great load has to be carried, to build with cubic stone facing and rubble stone backing is a mistake, unless the rubble stone is of large size and carefully bedded. With cubic stone and ordinary rubble you have in the outer face of the wall fewer beds and less mortar than in the backing, so that when the strain comes there is fracture, or a tendency for the wall to yield to the weaker side. Walls, as a rule, are much too thin to allow of the interior of a building being kept at a desirable temperature; thick walls are necessary. I would have all outer walls not less than 2 feet 6 inches, and, as applied to chimney-heads, you will never have a good draft in chimneys that are thin after passing through the roof. Unless they are thick,
Second Floor Plan.—Scale, \( \frac{1}{4} \) Inch to the Foot.

7.—How to Use Stone for Coursed Work.

The variety of this work lies more in the mode of dressing than of building. There are, for instance, hammer-dressed and nided coursed, both done with the hammer, the difference between which has led to many disputes. Specimens of ordinary hammer-dressed coursed may be seen on nided courser have been used, both as dif-

8.—How to Build with Ashlar Facing and Rubble Backing.

For ordinary purposes, where there is no great load to carry, to build a substantial wall the ashlar should be well squared on the beds and joints, and laid in a good swimming bed of lime—not stones with slack beds, which the builder has to pin up to bring to the plumb, but square, well-hewn beds, which will bear equally on the mortar and stones below. The builder has no excuse for not bedding them well, as with the machinery now in use, such as steam cranes and like appliances, he never needs to put his hand to the stone, but can at once have it lifted and rebedded without the slightest ef-

the back walls of the older buildings of the New Town, while in many of the same, where modern additions have been made, the ordinary pick, which belongs to the builder; or it may mean work which can only be done by the point or pick dabber of large-sized rubble—every stone being well knocked to its bed—not simply tapped with the light hammer now in use or the edge of
the trowel, but with the old-fashioned cairn hammer, which every good builder had beside him on the scaffold 50 years ago. I cannot help noticing how different the tools which builders now use are from what they were in the time I have referred to. Then they had a large-sized trowel with which they did not spare the mortar, and the large hammer which was freely used and never failed to bring the stone to its bed. Another tool was the hawk hammer, with one end of which the stone was squared and other inequalities were dressed off. The mash and pincher, first used by the hewers 40 years ago, were handy tools for hammering the checks of rybats and removing the rough along the edges of the stone. Now these, with the closer, are part of the builder's kit, and are used by him for doing that which the older hands accomplished with the hammer—work that was not only cheaply done, but far more tradesmanlike in appearance. Now it is a small trowel and the slightest of hammers, which, if used, scarcely affect the stone at all. In short, the ordinary rubble building of the present day is not such as will maintain the character our Scotch masons had when I first remember.

5.—How to Dress Stone so as to Get the Most Durable Surface.

Of the various kinds of work adopted, and of which we have admirable examples in this city, I am of opinion that polished work is the best, not only for securing durability to the stone, but also for bringing out the beauty of its texture and color. Hammer-dressed, midget, pick-dubbed, broached, and necessary for polishing removes the bruised material, and presents to wasting agents a surface more likely to prevent decay than any other kind of work we know of. I have endeavored to make this paper as practical as possible. Its consideration may be of some value to the architectural student, as it is a matter of regret that a building on which the architect rests his reputation, and to which his genius has been applied, should perish either from faulty stone or bad masonry.

Five hundred years ago, when those beautiful examples of Gothic architecture were erected, with their tracery windows and vaulted roofs, the architect and builder seem to have gone hand in hand, not only in planning, but in building up on true constructive principles edifices which have withstood the ravages of time for so long a period. Before closing, I wish to allude to a custom which prevailed when such buildings as Heriot's Hospital were erected. Then every hewer indented his mark on the face of the stone he had hewn, and it may be of interest to visit this building and observe how carefully this was adhered to. You can by these means nearly ascertain how many hewers were employed on the work, how the structure was built up round and round, and how those most expert in their craft had allotted to them the stones to dress which required the greatest skill. I have seen the same marks on buildings I have examined all over the country. I had a hobby for collecting these some years ago, and visited many of the cathedrals and buildings in England. I made a large collection, but, unfortunately, have lost the record. But it is a custom I should like to see revived, as, in my opinion, it would not deface the stone if done with the deliberate and enduring touch these old masons gave to work to which, no doubt, they attached a high value. Mark masonry, as one of the degrees in Freemasonry, had very likely something to do with the custom, but, although a Freemason myself, my paper precludes me following this phase of the craft further than to mention it as something that is at any rate suggestive.

With these examples before us, the appliances we have, and the teaching which every architectural student or working mason can get, we should be able to cope with those who have preceded us. I believe in the earnestness of the architectural student of the present day, and I am not so sure about the technical teaching or training the apprentice mason seeks after. When I first remember, there were in the city many drawing classes, chiefly attended by young men who were either masons, carpenters, engineers or mechanics of a like kind. There were Ruthven, on the Bridges; Milne, St. James Square; Moffatt, George street; Paterson, Stockbridge and others—all teaching drawing, and making good incomes from the crowded houses that attended them. Now we have such institutions as the School of Arts to take their place; but I question very much if the classes are as well attended as the others were in the time I have referred to. Besides this, there was at every important building a drawing class, usually conducted by the chief foreman or clerk of works, which had the effect of theoretically educating the workman to a proficiency he could not otherwise have attained. In every squad there were numbers of men who were fit, from their intelligence and training, to...
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act as clerk of works or foremen; and, in mentioning the former, I am of opinion that the well-trained mason is better for such a trust than the joiner.

No mason or joiner can be perfect in his trade or have his heart in it without a knowledge of drawing. As to masonry, I know of no trade that affords greater scope to the studious mind. To be proficient, his head and his hands must work together. There is endless variety in the operations he has to perform, and it is far removed from work that is nearly, if not altogether, mechanical. I trust that as education (especially technical) advances, we may have a race of masons who will be something beyond mere machines, and who, by their training, will help in no small degree our architects to carry out buildings whose architecture will be worth copying even by generations to follow us.

Cherry wood, filled and not varnished, has a soft glow not possessed by any other, and has none of those distortions of grain that are so unpleasant in mahogany. The timber is chosen from the wild cherry, which in New England and the North generally does not usually grow to a girth of more than 20 inches, but in some of the Western States and in the South frequently attains a diameter of 24 inches. The domestic fruit cherry gives some good specimens of small timber, but as the tree is rarely sacrificed until it is past bearing and is decayed, this source of supply is precarious.

The Chinese Foot Rule.

A writer in the North China Herald gives some curious information respecting the foot measure in China. At present it varies largely in different parts of the country, and according to different trades; thus the foot of the carpenter’s rule at Ningpo is less than 10, while that of the junk builders at Shanghai is nearly 16 inches. But a medium value of 12 inches is not uncommon. The standard foot of the Imperial Board of Works at Peking is 12½ inches. A copper foot measure, dated A.D. 81 is still preserved, and is 9½ inches in length. The width is 1 inch. The small copper coins, commonly called cash, were made of such a size, sometimes, as just to cover an inch on the foot rule. In the course of two centuries it was found that the foot had increased half an inch, and a difference in the dimensions of musical instruments resulted. Want of harmony was the consequence, and accordingly in A.D. 247 a new measure, exactly 9 inches in length, was made the standard. Among the means employed for comparing the old and new foot are mentioned the gnomon of official sun-dials, and the length of certain jade tubes used according to old regulations as standards. One of these latter was so adjusted that an inch in breadth was equal to the breadth of 10 millet seeds. A hundred millet seeds, or 10 inches, was the foot. The Chinese foot is really based on the human hand, as is the European foot upon the foot. It strikes the Chinese as very incongruous to hear that we measure cloth, woodwork, masonry, &c., by the foot. Of the jade tubes there were 12, forming the basis for measurement of liquids and solids 4000 years ago.

Second Prize Design, Ninth Competition.—Right Side Elevation.—Scale, \( \frac{1}{3} \) Inch to the Foot.

The Chinese Coot Gale.

A writer in the North China Herald gives some curious information respecting the foot measure in China. At present it varies largely in different parts of the country, and according to different trades; thus the foot of the carpenter’s rule at Ningpo is less than 10, while that of the junk builders at Shanghai is nearly 16 inches. But a medium value of 12 inches is not uncommon. The standard foot of the Imperial Board of Works at Peking is 12½ inches. A copper foot measure, dated A.D. 81 is still preserved, and is 9½ inches in length. The width is 1 inch. The small copper coins, commonly called cash, were made of such a size, sometimes, as just to cover an inch on the foot rule. In the course of two centuries it was found that the foot had increased half an inch, and a difference in the dimensions of musical instruments resulted. Want of harmony was the consequence, and accordingly in A.D. 247 a new measure, exactly 9 inches in length, was made the standard. Among the means employed for comparing the old and new foot are mentioned the gnomon of official sun-dials, and the length of certain jade tubes used according to old regulations as standards. One of these latter was so adjusted that an inch in breadth was equal to the breadth of 10 millet seeds. A hundred millet seeds, or 10 inches, was the foot. The Chinese foot is really based on the human hand, as is the European foot upon the foot. It strikes the Chinese as very incongruous to hear that we measure cloth, woodwork, masonry, &c., by the foot. Of the jade tubes there were 12, forming the basis for measurement of liquids and solids 4000 years ago.
Notelities. Improved Combination Sash Machine. Messrs. Greenlee Brothers & Co., of 227 and 231 West Twelfth street, Chicago, Ill., have recently brought out a combination sash machine, the general features of which will be understood by inspection of Fig. 1 of our engravings. This machine is adapted for cutting off to length and traversing the stile for sash. It sizes them for the meeting rail, making either square or dovetail mortises, and cleans out the core of two stiles at once. It tenons, cope and cleans out the relish in the meeting rail of dovetailed or slotted check sash at one operation, and fits the same to the stile by using the table shown in the engraving. It traverses the muntins to a length, cope and fits them to the sticking of the stile either singly or in blocks. It works grooves from 1/2 to 3/4 inch of any depth, and dados at any angle from a square to a miter. The machine is simple in its general construction, and has been so designed as to be durable. It is made entirely of iron and steel, and the boxes are filled with the best of metal. The boxes are also adjustable and self-oiling.

Royle’s Cabinet Saw.

In one of our earlier volumes we illustrated Royle’s cabinet saw as then constructed. The device has been recently improved in various parts, which warrants our directing attention to it at this time. The general appearance of the saw as now manufactured is shown in Fig. 2 of our illustrations. The machine is strongly made and is suitable for saws as large as 16 inches in diameter. It is capable of doing heavy work, and is well adapted to a great variety of uses. As may be seen by the engraving, the table-top is made of a combination of wood and iron. Across the surface of the table, in the central part, and extending from the front to the rear, there is inserted a planed iron plate, 12 1/2 inches wide. In this plate is planed the groove for guiding the cross-cutting slide and the opening for retaining the throat piece which adjoins the saw blade. At right angles with this plate is also inserted a planed strip of iron containing grooves for guiding and adjusting the ripping gauge. By the central iron plate the surface of the table is preserved from wear for a very long period. The parts are so combined and arranged that shrinking and swelling incident to changes in the weather never get the table out of true. From the construction we have described it is evident that should repairs become necessary the wood sections of the top may be readily renewed. The top is attached to the front of the machine by hinges. It may be raised for the purpose of changing the saws, throat pieces and the like. It may also be raised and lowered for sawing purposes by means of the worm and wheel shown on the side of the machine. By a universal adjustment of the hinges the table is made to conform to the wear of the mandrel in its bearings. By this means an accurate alignment with the saw may be secured both horizontally and vertically at all times. The special feature of the machine, and the one which gives it its name, is the manner in which it is fitted up. The reception of small tools is provided at the right, while on the opposite side of the machine, and under the saw, a spacious, closely-fitting sawdust drawer is provided, the whole making a neat and cleanly arrangement. Since sawdust from many varieties of wood is a valuable product, this means of preserving it will be greatly appreciated by users of machinery of this class. Besides these features to which we have already drawn attention, this machine possesses still other merits. The throat piece is of very simple construction, and may, at the will of the sawyer, be renewed in a very few moments. It may be removed when necessary, and is firmly secured to its place while in use. The tongues for guiding the cross-slides and ripping gauge are planed with beveled sides, and are closely fitted to the corresponding grooves in the table. The ripping gauge is provided with an adjustable iron fence, in which is arranged a convenient adjustable device for securing the gauges of various shapes and for special work. Wrenches for adjusting and removing saws, wobblers and groovers are conveniently arranged within the frame of the machine, and

Fig. 1.—Improved Combination Sash Machine, Built by Greenlee Brothers & Co., Chicago.

Fig. 2.—Royle’s Cabinet Saw Table, Built by John Royle & Sons, Paterson, N. J.
so fixed as to prevent liability of being detached from their proper place. The spindle is steel, with V-shaped collars carefully ground to bearings. It is supported in boxes, which are cast with and form part of the frame of the machine. This tool is manufactured by Messrs. John Boyle & Sons, No. 62 Railroad Avenue, Paterson, N. J.

Fig. 3 and 4 show a Universal wood-working machine invented and built by Mr. Henry A. Holt, of Wilson, N. H. The manufacturer directs attention to the fact that this machine includes six different articles in one, making it a double saw bench, a molding machine, a buzz planer, a lathe, a boring machine and an emery grinder. The changes necessary to get the machine to any of the uses above mentioned are produced by the use of two arbors, each of which has a swinging vertical movement, a horizontal movement parallel to the front of the table, and a horizontal movement at right angles to the driving pulley. The arbors are a part of the extension of a revolving arm (all in one piece), the center of which is the center of the arbor and its pulley lengthwise. The revolving of this arm by a worm gear gives the swinging movement to the arbor, and passing through fully one half a circle, as it does, allows the saws or cutters to cut at any angle with the top of the table. A circular index, marked in degrees, is placed around the end of the arm at the front of the machine, and aids in setting it to any angle quickly and accurately. Saws or cutters are used upon either end of both arbors, as shown in the engravings. When used upon the inside end they will cut any angle up to a miter angle, and upon the outside end they will cut at any angle with the top of the table, the arbor even passing beyond a perpendicular and allowing the saws to cut downward at an angle of 15° to more in the opposite direction. The manufacturer claims for this machine the advantage of varying the distances between the cutter heads from a very few inches to nearly the entire width of the machine, and cutting at various angles with the top of the table. It may be changed to a lathe by fastening the dead center with one screw upon the side of the frame. This tool is manufactured by Messrs. John Boyle & Sons, No. 62 Railroad Avenue, Paterson, N. J.

Fig. 4.—Holt’s Universal Wood-Worker in the Form of a Saw Bench.

Fig. 5.—A New Saw Guard.

A New Saw Guard.

Ever since the buzz saw came into use the ingenuity of inventors has been taxed to devise means of protecting those persons who have occasion to use this useful article against the dangers attending its employment. A device now being introduced having these objects in view is shown in Fig. 5 of the engravings, and is made by the National Saw Guard Company, of Indianapolis, Ind. The engraving represents a sectional view through the saw bench, showing the saw mounted on its arbor and the guard in place. The construction of the guard and the general manner in which it is used will be readily understood from the engraving by every experienced sawyer. Among the points of superiority claimed for this device may be mentioned the following: Instead of being attached to the saw-table by bolts and nuts, it is fastened by a wedge attachment. By this means the operator can attach and remove the guard from the table in an instant without disturbing the fastening under the table. A second point is the thumb-sut by which the light of the guard from the table is under the control of the sawyer. A brace holds the guard firmly in place over the saw. A combination fastening is employed which can be readily adjusted to attach guards from 10 to 16 inches in size without removing the fastening from the table or getting it out of line with the saw. The back stop, which is a feature of this saw, effectively prevents splinters and timber from flying back or riding the saw.
manufacturers also direct attention to the fact that this is made with interchangeable parts, thus making the question of repairs a very simple one.

Backus's Portable Cabinets.
A combination bath-tub, wash-basin and closet in the form of a neat piece of cabinet work is being introduced by Mr. Q. S., of Winochkand, Mass. In Fig. 7 we show a form of this portable cabinet, adapted for use where there is a water supply, but no hot water. The cabinet, as represented in the engraving, contains bath-tub, wash-basin and water-closet, also means for heating the water. The base of the cabinet contains the bath-tub. A tank or reservoir for holding water is located at the top in the part covered by the cornice and finish above the doors in the engraving. A boiler of peculiar construction is located in the position shown in the engraving when 6 is to be used, and sliding back under the heater when the bath-tub is to be employed. The same faucets for supplying water answer for both bath-tub and basin. The water-closet is arranged at the end, and has its own proper connection with the reservoir above, as shown in the sectional cut, Fig. 8. In use it turns out as shown in Fig. 7, and when not in use swivels back into the cabinet and is concealed from view by the door shown in the engraving. The general appearance of the cabinet in a room is not unlike that of a wardrobe, and it has the special advantage of being adapted for use in any apartment, thus saving the necessity of fitting up a special bathroom. The boiler is arranged for heating by a kerosene oil stove or gas stove, which is placed under the boiler, and which the manufacturer claims is so arranged that no smell or smoke exists. By closing the doors of the cabinet a hot-air bath can be obtained. The only plumbing required is to attach a pipe to bring water in and conduct it out. Another form of this same cabinet is made, omitting the water-closet attachment, and still a third form, omitting the doors, the back of the latter being supplied by curtains. A fourth form, employing a heater, is made, adapted for use upon a set bath-tub already in place in the house, giving the advantages of having hot water at any time of day or night without heating up the range and house.

New Sixty-inch Surfacing Machine. Fig. 6, shown above, represents a machine designed for the purpose of planing sounding-boards for pianos, also very nice work in piano, organ and other factories where very smooth surfacing in wood-stuff is required. It is probably the widest rotary cylinder planer built. Its width is 60 inches, and it will plane from the thickness of a veneer up to 4 inches. It is of the pony type of surfacing machines, is large, heavy, and altogether a powerful machine. The cylinder is of steel, driven at both ends, and carries four knives. The cylinder bearings are 2 1/2 inches in diameter and 9 inches long. Pressure bars are provided on both sides, each one being within 1/4 inch of the revolving knives, thus making it next to impossible to tear or silver cross-grained or knotty lumber. The pressure bar on the rough lumber side is so arranged that in yielding to the various thicknesses of uneven stuff it will always maintain its close relation to the cutter-head, as it swings on a circular concentric weight. The bar has a pivoted shoe that tips to allow a constant pressure on the board until it has passed from the shoe to the knife. The pressure bar on the finished side is set close to the right-hand end and is partially shown in the engraving. A marble-topped wash-basin sets over the bath-tub and is so adjusted as to be run back and forth, thus bringing it to the position shown in the engraving when 6 is to be used, and sliding back under the heater when the bath-tub is to be employed. The same faucets for supplying water answer for both bath-tub and basin. The water-closet is arranged at the end, and has its own proper connection with the reservoir above, as shown in the sectional cut, Fig. 8. In use it turns out as shown in Fig. 7, and when not in use swivels back into the cabinet and is concealed from view by the door shown in the engraving. The general appearance of the cabinet in a room is not unlike that of a wardrobe, and it has the special advantage of being adapted for use in any apartment, thus saving the necessity of fitting up a special bathroom. The boiler is arranged for heating by a kerosene oil stove or gas stove, which is placed under the boiler, and which the manufacturer claims is so arranged that no smell or smoke exists. By closing the doors of the cabinet a hot-air bath can be obtained. The only plumbing required is to attach a pipe to bring water in and conduct it out. Another form of this same cabinet is made, omitting the water-closet attachment, and still a third form, omitting the doors, the back of the latter being supplied by curtains. A fourth form, employing a heater, is made, adapted for use upon a set bath-tub already in place in the house, giving the advantages of having hot water at any time of day or night without heating up the range and house.

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Novelties.—Fig. 6.—New Sixty-inch Surfacing Machine, Built by J. S. Graham & Co., Rochester, N. Y.

Fig. 7.—Portable Cabinet for Use with Water Supply.
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which the lumber is passed. The bed or platen that carries the under rolls to use it either for parallel or taper work, and have succeeded in the highest degree. A heavy trussed box frame is raised and lowered by the large hand-wheel that is shown on the opposite side. The dimensions are slightly less than these figures, since the inches named represent the size of the sheets from which they are struck. Three sizes are manufactured, which are nominally 7 x 10, 10 x 14 and 14 x 20 inches. The section in the middle of Fig. 12 shows a profile section across the center. The general appearance of a roof laid in the same manner as an ordinary wooden shingle, with the exception that the lap is very much reduced. Referring to Fig. 9, the following shingle would lap down to cover the three horizontal corrugations above the pattern, just reaching on to the stem of the inverted Y which forms the figure. The general appearance of a roof laid introducing a new form of tin roof, or, rather, a new form of metallic shingle, the general application of which will be understood by reference to Figs. 9 to 14, inclusive. We use the term "a new form of tin roof" from the fact that these shingles are made from roofing tin of various qualities, and their price in the market is based upon the current prices of tin plate of the brands from which they are struck. Three sizes are manufactured, which are nominally 7 x 10, 10 x 14 and 14 x 20 inches. The dimensions are slightly less than these figures, since the inches named represent the size of the sheets from which they are struck. Fig. 9 shows the general appearance of one of the shingles, and the irregular line at the bottom a profile section across the center. The section in the middle of Fig. 12 shows a profile of a joint. In applying these sheet-metal shingles, they are laid in almost the same manner as those in use with tin roofs are followed. The expansion and contraction, which cause cracks and leakage in many metal roofs. Each plate is securely fastened to the roof boards in a way to prevent any possibility of being blown off, and each plate through the cupped gutter shown in section in Fig. 12, allows a passage of air, and consequently cools the rooms immediately under the roof. They also direct attention to the fact that each plate is finished, when laid, without being handled with tongs or beaten with a mallet, thus avoiding abrasions of the tin coating. Another advantage is the facility with which these shingles may be taken off, when no longer wanted, and relaid. Instead of drawing the nails, as would at first seem to be the best plan, they are simply driven through by a nail punch, and the shingles lifted out of place. New nail holes in the same positions as the old ones are easily made when the shingles are relaid. The manufacturers also claim that the roof is very ornamental and weighs very much less to the square than slate. They recommend it for use on roofs of one-quarter pitch and steeper. They state that carpenters have no difficulty in applying it when a sheet-metal worker is not at hand. The only tool necessary in laying, outside of what is contained in a carpenter's kit, is that of a pair of tinner's snips or hand shears.

The Challenge Scroll-Saw.

The very general employment of scroll-saws both in amateur work and in practical operations connected with carpentry, pattern making, model making and other depart-
saw, made by the Seneca Manufacturing Company, Seneca Falls, N. Y. In Figs. 15 to 20 inclusive are shown details of construction, from which our readers will be

able to judge of the desirability of this tool for purposes of use or amusement. Among the special merits to which the makers direct attention may be mentioned the following: The saw is provided with a tilting table, held in place by a hollow ball joint through which the saw passes, thus making it possible to change the table to any desired position for the purpose of sawing or planing. The driving-wheel is double-grooved and takes a round belt 3/4 inch in diameter. In place of the table the lathe attachment shown in Fig. 16 can be used. It has a hollow ball similar to that of the table and is attached to the machine in the same general manner. The length of the lathe bed is 18 inches, the distance between centers 11 inches, and the swing 4 inches. The rests are 4 and 8 inches in length; the head has a spindle of steel nicely fitted with a face-plate and spur-center. The Challenge scroll-saw is adapted for cutting wood 1 inch in thickness with a fair degree of rapidity. The distance between the saw and frame is 15 inches. The manufacturers offer this article as a first-class machine, suitable for every description of light scroll sawing in wood, bone, shell or metal.

**Adjustable Miter Planing Machine.**

In Fig. 21 we show an adjustable miter planing machine, made by Theodor Schreppe & Co., 101 Bowery, New York, a working model of which was exhibited at the fair of the American Institute, New York, recently closed. The general features of the device are clearly shown in the engraving. Gauges are provided at each end, which are fastened in place by bolts working through segmental slots, thus permitting ready adjustment. The knives are operated by a rack and pinion movement, shown in the center of the engraving, and as the slide is accurately adjusted, it causes them to work with great exactness. The manufacturers claim for this device that, the machine being entirely constructed of metal, the changes of temperature and atmosphere have no effect upon it. The facility with which it is operated does away with the necessity of the attendance of two men in order to produce good work. The employment of the lever and rack makes it possible for even a boy to use both cutters without changing his position or making unreasonable exertions. From this fact it is apparent that twice as much work can be easily performed by an unskilled mechanic with this machine as could be produced by two skilled men with devices of ordinary construction. The utility of the device in picture-frame factories, cabinet-making establishments and other places where accurately mitered work in molding is required is apparent.

**Soapstone Finish.**

A conspicuous feature in the recent fair of the American Institute, held in this city, was the display made by the American Soapstone Finishing Company, No. 35 Box street, Providence, R. I. This company are manufacturers of a finish for walls made under Arroquer and Barret's patent, to which has been applied the general name of soapstone finish. In appearance walls finished with this material are not unlike a piece of soapstone, although they are somewhat lighter than the general tint of that material. The advantages claimed for the use of this substance over plaster-of-paris or sand finish are that it will not chip or crack, that it is applied with less labor, that there is no loss of material in gauging, and that it is painted or papered at less cost. The material has the further advantage of being a non-absorbent and a non-conductor. Hence, germs of disease and stains do not penetrate it. It can be washed without injury. One of the greatest advantages, it seems to us, is the appearance of the finish. It does away in a very satisfactory manner with the glaring white of ordinary finish, to which there are serious objections, and substitutes a softer tint, much more agreeable to the eye. We are assured by the manufacturers that this finish does not turn yellow by age, but instead improves in color and clearness.

It is likely to be preferred by mechanics from the fact that it is less liable to injury when nailing on the finish of doors and windows than work finished with plaster-of-
work of the external domes of the Church of St. Mark, at Venice, is more than 800 years old, and is still in a good state of preservation. Sound logs are dug out of bogs where they have lain for an indefinite period. But the best seasoned timber will not withstand the effects of exposure to the weather more than 25 years unless the surface is protected by paint or some other coating to keep out the damp, or the wood is treated by some preservative process.

Window Ventilation.

The practice of window ventilation, begun in warm weather, may be carried on with proper care through the remainder of winter. The constantly accumulating impurities derived from breath, from perspiration, from excreta of other kinds, from the sleeping rooms, from the use of gas or lampslight, and too often, even now, from suction of sewage gas from waste-pipes by the heat of house fires, &c., render it as necessary for health as for comfort that there should be free egress, and that they should be substituted by the pure outer air. Fresh air from without may very easily be had without draft, and without risk of cold ever reaching the delicate persons, if a few simple rules be observed. The cold air of winter, of course, enters with greater force and in greater proportional volume than the more equable summer air into a warm

Independent Door-Knob Attachment.

The Clark Manufacturing Company, of Buffalo, N.Y., announces an independent door-knob recently patented, which has the merits of no spindle, no screws in the shank, no washers, quick action and a knob not independent. The accompanying engraving shows the appearance of a knob of this kind fitted up for use upon a first-class door. The shank of this principle is applied to knobs of cheaper construction down to the ordinary mineral knob for use with the cheapest locks. The lock hub is made of the ordinary shape, but is divided in its center. The two parts fit to gather in such a way that each half may be worked independently of the other. This, if we mistake not, is an entirely new departure in lock construction. It adds to the durability of the knobs, and it makes the fact that the spring has only to overcome the friction of the hub of the knob at a time. Adjustment to the thickness of the wall is made by means of a threaded plate screwing on to the end of the shank, as shown in the engraving, and provision is made for variations from the thinnest to the thickest doors commonly used. This adjustment does away with the necessity of rings, washers and pins, and other similar devices frequently used upon door fittings, and leaves the knob firmly fitted and positive in its place. As in the case of many others, is so simple, that aside from the fact that there is no shank running from one knob to the other, at first sight it is not apparent that the thing is anything but an ordinary article. By closer examination, however, its merits appear as we have recited them above. We understand that knobs, escutcheons and handles furnished in a form to be applied to ordinary locks, and that also the Clark Company furnish in them sets, including the lock, ready to be applied to the doors.

Fir trusses of the old part of the roof of the Basilica of St. Paul, at Rome, were framed and put in place and prepared ready for use in red, brown, drab and buff colors.
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The last sum was the limit of cost stipulated, but the first prize schedule fees $2500. It was observed that the greatest part of the buildings can be built within the specified limit, and, as each of the individual items seems reasonable, the conclusion is drawn that none of the sections or parts is omitted. Scanning the estimate again in order to determine what further changes we find that the various amounts that seem at all to fit the case are the opposite items "stairs," "doors" and "handrails" which are independent of the original estimate. The latter being somewhat less than the excess named. Now we know the introduction of "handsome and useful" helpmates, for the use of which the able-bodied workman is best fitted, it is evident that we are compelled to contemplate a house unpainted, or else without doors and frames, or with windows, etc., and if, after all, the house shown is not a $2500 house, but was "railroaded" through the hands of the workmen, it was certainly discovered until too late to make a change.

We conclude in this number the series entitled "A Study in Suburban Architecture," so far as the text is concerned. The crowded condition of our columns compels us to refer to another issue some of the illustrations intended for this. We have no doubt all will enjoy Mrs. Archie's description of her new home. Her husband has known, to allow, proper influence to inspect her private correspondence. The very personal expression of the parts of Mrs. Archie, in describing her new house to her bosom friend, demonstrates that she feels at home with her husband's work, and that, has been so imbued with his methods and ways of thinking that, perhaps, in the event of his illness or other disability, she could continue his professional labors. It is certain that we are disposed to congratulate ourselves upon the pungency of such a delightful and useful helpmate, and to suggest at the same time that it will be just as useful when the house is sold, and the other half of his "den" in the future. This number will reach our readers before the echoes of Christmas chimes and New Year anthems have all died away, and therefore the touch of romance and poetry with which our contributor concludes this study seems likely.

A prominent feature among building specifications for work and other public buildings at the present time is the erection of flats, apartment houses and family hotels. Their most marked difference from common tenements is, perhaps, the fact that, instead of being ailing with his methods and ways of thinking that, perhaps, in the event of his illness or other disability, she could continue his professional labors. It is certain that we are disposed to congratulate ourselves upon the pungency of such a delightful and useful helpmate, and to suggest at the same time that it will be just as useful when the house is sold, and the other half of his "den" in the future. This number will reach our readers before the echoes of Christmas chimes and New Year anthems have all died away, and therefore the touch of romance and poetry with which our contributor concludes this study seems likely.

Among the miscellaneous articles contained in this number is another chapter on the water supply for country dwellings, giving special directions for calculating the capacity for storage cisterns under different conditions. Both articles, as well as others not specially mentioned, are written with a view to practical men, and deservedly command marked attention.

It has been a mystery to some people why the dark wood so highly prized for furniture should be called "rosewood." Its color certainly does not look much like a rose, so we must look for some other reason. An explanation given when the tree is first cut the fresh wood possesses a very strong, dark wood so highly prized for furniture... The varieties are found in South America and in the East Indies and neighboring islands. Sometimes the trees grow so large that planks 4 feet broad and 10 feet in length can be cut from them. These broad planks are principally used for making the tops of pianos. Other parts of the tree are formed in a recess between the main entrance and the right and left front wings of the building. There are eight suites on each of seven floors, one suite on the principal floor of the main building and two suites on the principal floor of the rear building. The living, making in all 59 suites. Each of these, it may be safely estimated, will rent annually for a sum that would build a comfortable house in some of the smaller towns of the country. The latter, however, would not be unattractive, and if the house is more attractive, the separate rooms in the front wing are often used as bedrooms, giving a half-rotary movement to a semi-circular staircase. A knife machine which could cut following the log's diameter, produces interior of the log. A knife machine which could cut following the log's diameter, produces...
arranged circular saw will turn out boards varying the twentieth part of an inch, which would be impermissible, such a lack of uniformity in thin sheets would prove a damaging imperfection. Before being cut, the veneer material must be carefully steamed, the same as in binding. A tight box 12 feet long and 4 feet deep and wide is used, and exhaust steam is utilized. An open grain, will steam sufficiently in six hours, but the close-grained South American woods require 36 hours. Mahogany will steam sufficiently in 24 hours. Mahogany, tulip, and rosewood, being hard to cut, require more and careful steaming and a knife used, and exhaust steam is utilized. An arrangement circular saw will turn out boards varying the twentieth part of an inch, which veneers are to be made.

Construction of a Lathe.—II.

Now, our patterns being at the founder’s, we will take advantage of the opportunity thus afforded to make the standards and bed.

With reference to the choice of wood for the bed, a word or two will not be out of place here. An iron bed suitable for a lathe of the lathe we are describing is very much superior to the average specimens of such wood—so long delayed, and the filing of the iron may, certainly, by a vast expenditure of precious time, be tiled up truly, in which case the cost of the material in the frame is somewhat difficult to estimate, as prices differ in the ordinary run of home work a wooden bed is quite as useful as an iron one, and the making up quickly—first, the two cross-bars into one vertical rail, then the other vertical rail on their opposite ends, and, lastly, the vertical rails into the bottom, wedging up as we go, before the glue has time to set. If, unfortunately, you have not made a good fit of the tenons, it will be well to drive a wooden peg through the joints; but if the parts fit tightly together, pegging is not necessary. When the frames are set, dress off all the joints flush, and try the two together, to be assured that top and bottom edges are in winding with one another—i.e., correspondingly parallel. Plane up two strips, 4 feet by 1 1/2 inches, and screw them under the standards, to maintain them at a fixed distance apart on the floor, Fig. 10, a, a. Then plane over the cheeks for the bed.

Mortises and tenons, then, are marked with a mortise gauge—that is, a gauge having two cutters instead of one only, as in the ordinary marking gauge, the lower cutter of the two, as well as the gauge, being capable of adjustment independently of each other. The amount of separation of the two cutters being adjusted to the required thickness of one tenon, the head of the gauge is set in such a position that, on being slid along the edge of the wood, the tenon is marked at its proper distance from the face. The same gauge is used for the mortise also. Here our tenons will be 1/2 inch thick, and in the center of the stuff. So the cutters will be set to 1/2 inch by the screw at the end of the stem, and the face of the head 1/2 inch away from the nearest cutter. If we do not possess a mortise gauge we must use a marking gauge instead, and take a little more time over the job. In either case, mark the tenons, and cut mortises and tenons to dimensions indicated (Fig. 11).

Fig. 11.—Construction of Standards and Sides.—Scale, 1/4 Inch to the Foot.

Fig. 12.—Wedging Up the Joints.

As accurately as possible—straight—parallel, and with the faces mutually at right angles—to 4 feet by 1 1/2 inches (Figs. 10 and 14, B B). Rebate them back at each end (Fig. 13) and screw them upon standards, just dropping a couple of distance pieces 2 inches thick between, to insure their parallelism. These pieces will not be permanent. A rail is wanted on the back, 4 feet by 2 1/2 inches (Figs. 10 and 14, C) to support the back of the tool board and keep the hinder part of the standards parallel. Then two struts or diagonals (Figs. 13, A) must be fitted. Two pieces, 18 inches by 1 inch, cut to an angle of 45°. Stump tenons (Figs. 13, a, a) will be cut on the ends, and corresponding mortises on the other side of the back rail and in the standards. One end only of each diagonal can be fixed at first. Let that be the end attached to the standard. While both diagonals are thus fixed, bring the back rail down on the free ends, and secure with a wooden peg through the joints; and the mortised joint. The tool board and rack would only be in the way if we made them now and as our hands from the founder. So we shall prefer to leave the remaining odds and ends of woodwork for the present and commence fitting-up.

The cost of the material in the frame is some most difficult to estimate, as it will vary in different sections of the pieces of oak may cost nothing or it may be very expensive, depending upon current market prices, and $25 or $50 will probably be sufficient for this part.

A clock was set going at Brussels which continued to go for nine months and is reported to be still running. An up-draft obtained in a shaft by exposure to the sun was sufficient to keep the fan which caused the escape of the clock until it reaches the top. It then works a brake which stops the fan until the weight has gone down a little, when the fan is free to recommence.
Well, perhaps you are right. The flat roof would have made a bad sky line, and wouldn't have been particularly effective for color. Of course, you like it all, and I'm glad you had your own way about it; but it does cost to have your own way—now, don't it? This last shot was delivered over his shoulder as he drove off. And so at last our house has gradually come to be called finished. The exterior has received its last coat of paint, and shines (a little too much, perhaps) with newness. The entire first story and the trimmings of the house are painted a rich bronze green. The shingles are stained and oiled a warm pumpkin color. The sashes are black, and some of the gables are treated with rough-cast in old-gold color, spattered with pebbles of various sizes and colors picked up on the shore. The roof shingles are stained a dark red.

On this snowy December night a year since we looked among the drawings in our portfolio for suggestions. We now find ourselves comfortably seated before an open fire in the upper hall. We have been talking, Mrs. Archie and I of our neighbor, who for some months has been traveling in Europe, with the avowed determination of returning at last and building a house which shall just "lift the pins." Mrs. Archie has just concluded a letter to her, descriptive of the latest in our little history of house-building, in about the following style:

"Yes, dear Fanny, we are in at last, and it is just too lovely for anything! Of course, you have been well informed all along of the general character and treatment of our rooms, especially the more important ones; but you must know that there are no end of little beauties scattered about our new domain that cannot be half imagined, and which, I must admit, I am somewhat at a loss to describe. The mantel in the first-story hall has a scribe. The open fire, before which I now sit, is framed with a triple row of golden Chelsea tiles on the side, and one row across the top. Above this and immediately under the mantel-shelf is a row of hand-painted tile done somewhat similar arrangement of tile to that I have just now described, and a slight projecting marble shelf above. There is no wooden shelf of any considerable projection, however until a height about even with the

The illustrations in this series of papers are from drawings prepared by Messrs. Gould & Angell, architects, of Providence, R. I.
January, 1884.

Carpentry and Building.

A Study in Suburban Architecture.—Details of Cabinet.—Scale, 1 Inch to the Foot.

Field above the mantel-shelf is framed in with a small band of wood, and the panel thus formed is covered with a rich figured paper. A bevel mirror in the corner of the panel adds greatly to the effect.

The increasing use of corrugated iron for various purposes offers the opportunity for firms making a specialty of the preparation of iron in this shape to do a large business. One of the handsomest exhibits of corrugated iron which we have had the pleasure of examining in a long time was made by the Clarke & Augatting Company at the recent exposition held in that city. We have since received a catalogue and pamphlet issued by this concern, descriptive of the work that it is prepared to produce. It is a handsome oblong book, with a tasteful cover, fine paper and handsome letter-press. A red-line border graces every page. The advantages of corrugated iron are first brought out by this catalogue, illustrating the different classes of work made and the different applications of corrugated iron are referred to. The general quality of the work turned out by them, they make the statement that to build up their business to its present proportions they have been compelled to raise the standard of its manufacture to the highest perfection in quality of both metal and workmanship. This was fully borne out by the goods shown at the recent exposition above referred to, and the statement is made that they are endeavoring to popularize corrugated iron on its merits, by selling it at a genuine cost price, and endeavoring to introduce other kinds of metallic roofing. With reference to the advantages to be derived from the employment of corrugated iron, the statement is made that it will not rattle from expansion and contraction or the effects of the wind; nor is it liable to spring and buckle, causing it to present ugly patches wherever dust and water settle, as is common to plain iron. Among the illustrations simple sheets are shown; also, curved sheets for use between iron beams in fireproof construction, which with this company is ridge-capping not unlike that long made by cornice manufacturers for use in connection with slate roofing. This, by means of special wooden ridge pieces, is made to finish corrugated roofs in a very satisfactory manner. As a whole, it is one of the best expositions of the advantages of corrugated iron which we have ever seen.

Wood-Working Machinery

A catalogue issued by P. Prybil, Nos. 461 to 467 West Fortieth street, New York, contains, among other tools of interest to those who are about to equip shops, the design and description of an adjustable bevel band-saw machine. This is a right-hand machine, designed to avoid the instability of inclined tables supported by segments, pivots, &c. The saw is inclined and the table simultaneously moved so as to correspond with the inclination by turning a single hand-wheel. When turned, the table is inclined and the band-saw may be easily produced by turning the hand-wheel while the work is being fed to the saw. Another notable feature is that the whole form of planer made in two sizes, 26 and 32 inch, is a very powerful machine, geared, with double feed rolls, 4 inches in diameter, and capable of a ¾-inch cut, It is adjustable to different thicknesses of stuff by a single hand-wheel, and also contains designs and descriptions of other saving machines and planers, also jointing machines, shapings and molding machines, carving machines, boring and mortising machines, turning lathes, &c. Useful information with reference to joining bandsaw blades, calculating speeds, determining the driving power of belts, &c., is interspersed among the catalogue matter, thus making the pamphlet useful to all who may possess it.

Field above the mantel-shelf is framed in with a small band of wood, and the panel thus formed is covered with a rich small figured paper. A bevel mirror in the center of the panel adds greatly to the effect.

The Warren Ehrert Roofing Company, Limited, No. 107 South Second street, Philadelphia, have issued a 12-page pamphlet containing a descriptive list of the roofing materials in which the company deals. These embrace various grades of building papers, coal tar and coal-tar products for rendering the paper waterproof.

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time, leaving the hard finish to be put on the following spring. I find by giving plastering a good, strong clinch, using plenty of hair-cement, heavy scoring, letting stand until thoroughly dry, then putting on second coat, letting it get thoroughly dry, then hard finishing, I can always do the best work in the absence of frost, freezing or artificial heat.

Raking and Level Moldings.

From F. H., Albany, N. Y.—Referring to the question of A. M. F., of Tilden, Tex., to miter rake and level moldings of like di-
The sediment left in the first bottle, by adding a sufficient quantity of spirits to make it workable, will do for the first coat or coarser work, when strained through a fine cloth. Next get half pound of finely-ground bronze-green—the shade may be varied by using a little lampblack, red-ocher, or yellow ochre; let the iron be clean and smooth, then take as much varnish as may be required and add the green color in sufficient quantity, slightly warm the article to be bronzed, and with a soft brush lay on it a thin coat. When that is dry, if necessary layer on another coat, and repeat until well covered. Take a small quantity of the gum varnish and the prominent parts with it; before it is dry, slip a little pencil line in a small quantity of gold powder, and then varnish the whole.

Establishing the Angle.—Method Described by J. B. G.

From J. M., Marianna, Ark.—In reply to a question proposed some time since by A. M. F., about mitering raking and level moldings together, I would say that the thing cannot be done where the ends of the rafters are cut plumb unless the mold is worked specially for the purpose. My method of construction in this kind is to cut the rafters square, in which case an ordinary square miter answers the purpose.

Bronzing Castings.—From A. G. W., Buffalo, N. Y.—I desire to obtain, through Carpenter and Building, a recipe for bronzing articles of cast iron.

Answer.—The following has been recommended for the purpose: Dip the articles in a bath composed of hydrochloric acid, 6 pounds; sulphate of iron, half pound; when dry, arsenic, half a pound, until black. Then wash in hot water. Dry in sawdust, polish to suit with plumbago, and brush and hooper. The following is recommended in Sphyn's "Workshop Receipts:" Take 1 pint of methylated finish, add 4 ounces of shelline and 15 ounces of benzoin; put the bottle in a warm place, shaking it occasionally. When the gum is dissolved, let it stand in a cool place two or three days to settle, then gently pour off the clean mixture into another bottle, cork it well, and keep it for linseed work.

Raking and Level Moldings.—Fig. 4.—The Miter Box With Outs as Arranged by J. B. G.

From J. B. G., Louisville, Ky.—In reply to an inquiry of A. M. F., published in the issue of January, 1883, I inclose a sketch of the method I have used in cutting the raking and level moldings of any corresponding dimensions. Instead of cutting molding even on the plumb cut, I substitute the true miter. This answers in all ordinary work whenever it is not convenient to change the mold to suit. My sketch shows a method of getting the cuts for the rake moldings. Referring to Fig. 4, draw the line D D, from which erect A B equal to the pitch of the roof. Draw C B at right angles with A B, making the length of C B suit the inside of the miter box which is to be used for cutting the molding, and from A F parallel to C B, then A F will be the cut across the box. Transfer A F to the miter box, as shown in the accompanying sketch, and let the two ends rest against the line or straight-edge C E. This may be the edge of a board in case a square cut across A F is desired, and the ordinary steel square used for such work is not at hand. With the rule in this position, hold one part, C B, firmly in place, and open the rule to its full length by carrying the arm B B around, as shown by the dotted lines, thus determining the point A. Now, if a straight line be drawn from A, thus established, to the point D, where the foot of the rule first rests, it will be perpendicular or square with C E. The angle A D C will be a right angle. The most satisfactory proof of this proposition to many readers no doubt will be a practical demonstration, and this, I think, is very easily tried. For those who like to see the mathematics of a thing explained, I submit the following: First bisect the angle D B A with the line B F; then the angles A F B and B F D will be equal, and consequently right angles. Bisect the angle C D B in like manner with the line B G; then the angles F B D and B G D are equal, and the angles C B G and G B D are also equal, it follows that the angle G B D added to the angle D B F must equal a right angle. It has now been shown that the angle F B A, B F D, and C B G are all right angles, and it remains to be proved that the angle F D G is also a right angle. The suns of the angles of the two triangles B D G and F B D is equal to 180°; it has been shown that the angles B F D and B G D are respectively right angles; therefore, it follows that the two angles B D F and B D G, or their equivalent F D G, is a right angle.

From W. McC., Erie, Pa.—Will you please explain, through Carpenter and Building, how I can letter polished steel, such as razor blades or knives? I am under the impression that the letters are cut out with an acid, but I am not informed how it is applied, nor what tools are used.

Answer.—The etching of razor and saw blades is done by drawing with a fine hair brush the design or letters in an asphaltum varnish. Cover all the parts with the wax, except the letters, and dip in an acid bath. If the design is very small, a rim of beeswax may be set round it, this saving the use of varnish all over the tool. A few drops of the acid put into the rim thus constructed will cut or bite the figure. Another plan is to cover the whole tool with etching varnish or wax, and scratch the design in the wax and then wash with acid. The acid to be used for this purpose may be composed of the following: To one gill of acetic acid or good strong vinegar take 20 drops of nitric acid, 20 drops sulphuric acid, and, say, 1/2 teaspoonful of salt. The varnish may be applied with a small quantity of gold powder, and then varnish the whole.

Calculating Tanks.—From G. D. C., Philadelphia, Pa.—Will you please give me brief directions for ascertaining the number of gallons in square or cylindrical cisterns of various forms? I want a convenient rule for determining the contents in gallons. At the same time, will you please define the different terms in use in determining the cubic contents, and that product in turn by 7.48, which will give the contents in cubic feet, and again as above by 7.48. In other words, obtain the cubic contents in feet of the required vessel, whatever its shape may be, and multiply by 7.48, which will give the contents in legal United States gallons.

Novel Method of Erecting a Perpendicular.

From C. D. K., Lockport, N. Y.—There is a method of erecting a perpendicular line, using a common pocket rule, a knowledge of which may be of advantage to some reader of the paper. Open the rule as shown in the accompanying sketch, and let the two ends rest against the line or straight-edge C E. This may be the edge of a board in case a square cut across A F is desired, and the ordinary steel square used for such work is not at hand. With the rule in this position, hold one part, C B, firmly in place, and open the rule to its full length by carrying the arm B B around, as shown by the dotted lines, thus determining the point A. Now, if a straight line be drawn from A, thus established, to the point D, where the foot of the rule first rests, it will be perpendicular or square with C E. The angle A D C will be a right angle. The most satisfactory proof of this proposition to many readers no doubt will be a practical demonstration, and this, I think, is very easily tried. For those who like to see the mathematics of a thing explained, I submit the following: First bisect the angle D B A with the line B F; then the angles A F B and B F D will be equal, and consequently right angles. Bisect the angle C D B in like manner with the line B G; then the angles F B D and B G D are equal, and the angles C B G and G B D are also equal, it follows that the angle G B D added to the angle D B F must equal a right angle. It has now been shown that the angle F B A, B F D, and C B G are all right angles, and it remains to be proved that the angle F D G is also a right angle. The suns of the angles of the two triangles B D G and F B D is equal to 180°; it has been shown that the angles B F D and B G D are respectively right angles; therefore, it follows that the two angles B D F and B D G, or their equivalent F D G, is a right angle.

Erecting a Perpendicular With a Pocket Rule.

From J. F. W. Danville, Pa.—I desire to learn, from practical readers of Carpenter and Building, where a carpenter can get steady work the year round. Please explain in what State, and the rate of wages. My specialty is framing barns, houses, grit mills, saw mills and the like.

Note.—We fear that if an answer to this question were published, so many of our
readers would rush to the locality named that the boilers A and B in that vicinity would soon be overstocked, and that, accordingly, the same unsatisfactory state of affairs would exist there that now prevails generally over the country. Notwithstanding all the efforts that are being made by labor reformers and philanthropists generally, employment and the rate of wages are regulated by the old law of supply and demand. When building is brisk, either on account of unusual prosperity in a section of the country or by reason of the peculiar season of the year, wages are good and mechanics generally have already employment. When the reverse of this is the case, circumstances are less promising, and the question of whether one can or can not employ the principles to which I shall direct is likely to receive a satisfactory answer to his inquiry.

The Principles of Octagonal Construc-
tion.

E. F. D., Denver, Col.—In pursuing the columns of Carpenter and Building, especialiy in the back volumes, I have noticed that some of the craft seem to be in need of more light regarding the principles of octagonal construction. A correspondent who writes under the initials of A. E. R., in the issue of December 12, 1883, applies to laboring under a delusion, dispelled, howe-
ver, by the Editor's note. I do not think that my advice is entirely applicable to the solution of the problem in question, for the question was, "I wish to know how much per thousand to allow for fram-
ing, raising and boarding. I want to know the difference in cost between balloon framing and full framing, and what is the cost of running cornices. How should sl Anne roofs be figured? I want similar information with reference to board walls and general finish of good dwelling-houses in detail. If those who answer these questions will name the standard of wages upon which they are based, it will put the matter in shape to be used. If a practical builder will answer these questions in full he will confer a favor upon me as well as on other readers of your paper.

Note.—We have not the least doubt but that a favor would be conferred upon this correspondent and upon numerous other readers of this journal if an adequate and comprehensive answer could be given to the questions proposed, for the subject of estimating has frequently come up for attention in these columns, and we think, long before this we have convinced our readers that in every instance what is desired is a statement as nearly as possible there is no great difference between the two estimates of cost; they may be practically equal in one instance and very different in another. It is possible that A's figures, based upon planing mill prices, are considerably above B's, that the bills of materials for the same size, figures of the respective contractors on the same work may be substantially the same, but still there may be deductions in the cost of materials, and that intelligent discrimination based upon experience, together with a knowledge of the trade, will enable the mechanic to estimate the cost of his work properly.

Principles of Octagonal Construction.

Therefore I come forward, thinking I may offer something of value, simply because others have not done the same at an earlier date. We have no doubt that many are not applying the principles to which I shall direct. The accompanying diagram is calculated to explain itself and elucidates the principles underlying this form of construct-
tion. Referring to the drawing, which represents, we will say, a 24-inch square, B, D and E are diagonal lines, crossing at A, which is the nominal center of the figure. That is, if the length of the diagonal line B, D or E is one-half of the diagonal distance, and apply it to the surface lines B, E, D, C and C, D B, we have the familiar method the spaces D E, E G, E L, D M, D J, C K, C H and B I. This is a practical and a common form, the principles of which are, of course, depending upon the draughtsman. A mathematician, however, would not be quite satisfied with this scheme of length or measurement. To ascertain this fact, we proceed to find the diagonal D, B, which is always (in every case) the square of the angle corresponding to half of the square. By the usual rule, squaring the sides, which, as is shown in the diagram, and by the sum of the squares thus obtained, we have 1152, the square root of which is 33.94, or the length of the diagonal line B, D or E, one-half of this is 16.97. It will be remembered that these figures are inches and decimals of an inch. The figures, though not absolutely accurate, are nearer than measurements can be made with instruments. Referring to the sketch, the line A B, being one-half of the diagonal line and measuring 16.97 inches, is applied to the circumference of the circle E G, &c., as above mentioned, which are all of one length. By subtracting 16.97 inches from 24 inches, we have as the radius of the spaces E F, E M, &c. Eight here I may remark that 0.93 inch would in every case be sufficient, and that 0.93 inch is the gauge at 75°, we would be getting as near to the truth, probably, as a mechanic is likely to make the gauge to. To add to the spaces E M and L D, thus: 0.93 + 0.93 = 1.86, is the sum of the faces of the octagon, we proceed to add the spaces E M and L D, thus: 0.93 + 0.93 = 1.86, is the sum of the faces of the octagon, we proceed to add; this we have convinced readers that, in our opinion at least, no royal road exists to the art of figuring the cost of work. We believe that intelligent discrimination based upon experience, together with a knowledge of the trade, will enable the mechanic to estimate the cost of his work properly.

Price List of Building Costs.

From G. W. F., Sibley, Mass.—Will some of the practical readers of Carpenter and Building give me some ideas about figuring labor and contract work? I want to know how much per thousand to allow for fram-
ing, raising and boarding. I want to know the difference in cost between balloon framing and full framing, and what is the cost of running cornices. How should sl Anne roofs be figured? I want similar information with reference to board walls and general finish of good dwelling-houses in detail. If those who answer these questions will name the standard of wages upon which they are based, it will put the matter in shape to be used. If a practical builder will answer these questions in full he will confer a favor upon me as well as on other readers of your paper.

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A fixed price list of the cost of doing work, including all materials, labor of laying the brick, &c., is helpless as far as estimating is concerned. He proposes to obtain them. The fact that the contract at the same time, or because rid-
ing himself of this detail will enable him to superintend the work more closely and thus save more than their extra cost in some other direction, is no reason why they should be figured at any other price. It is possible that A's figures, based upon planing mill prices, are considerably above B's, that the bills of materials for the same size, figures of the respective contractors on the same work may be substantially the same, but still there may be deductions in the cost of materials, and that intelligent discrimination based upon experience, together with a knowledge of the trade, will enable the mechanic to estimate the cost of his work properly.

After a contract is once obtained the esti-
mat ste is to be again scanned in order to see if by some change in plan of working a saving in cost cannot be made. As it stands it represents the contractor honestly be-
lieves he can do if no better method of operation is discovered. He follows that practice not only in his own shop, and what in all probability they would cost A if furnished in this man-
der others. The man who has near to the truth, probably, as a mechanic is likely to make the gauge to. To add to the spaces E M and L D, thus: 0.93 + 0.93 = 1.86, is the sum of the faces of the octagon, we proceed to add; this we have convinced readers that, in our opinion at least, no royal road exists to the art of figuring the cost of work. We believe that intelligent discrimination based upon experience, together with a knowledge of the trade, will enable the mechanic to estimate the cost of his work properly.
so he proceeds item by item through the entire work, constructing an estimate which is quite as reliable as though made in the regular course of his everyday business. The intelligent advantage which the latter man has over the former is not likely to be over-estimated.

The point to these lengthy remarks about our correspondent's questions, which are only the counterpart of others we are constantly receiving, is—look in some other direction than stereotyped price lists for your basis for estimating. No man can afford to risk his capital by estimating upon contracts by the square. It is obvious that the time and labor required to make a complete estimate of the way it has been calculated, which, to say the least, we consider a difficult matter at the present time. We like to have such questions as these from our readers occasionally, because they give opportunities for referring to the general principles underlying these calculations which are of the greatest importance in the building trades. If any of our readers are disposed to discuss the subject further, we shall welcome their communications.

Framing an Octagon Spire.

From E. W. C., Randolph, Mass.—I have been wishing that some of the practical readers of Carpentry and Building would give their methods of framing spires. My attention has been specially directed to this subject while working on a church edifice recently put up in this place. As likely to be of interest to some of the readers of the paper, I inclose a diagram of an octagon spire, which is original with myself. If it is correct in all particulars, or if better methods can be suggested, I shall be pleased to have it criticized freely by practical readers. The result will be the discussion of a subject which would interest us all, and, I think, to many others in the trade. Referring to Fig. 1, to obtain bevels and length of braces for an octagon spire, or for a spire of any number of sides, A B will be one of the sides. Let A O and B C be the seat line of hip. Let A N be the seat of brace. Now, to find the position of the tie beam on the spire, refer to the plate. The edge of the brace is to be drawn square with E M, which produce until it cuts E C prolonged at O. Draw O L, square with B C, making it equal to the hight of pediment. Join B M. Let O F be the hight of the tie beam. At F, draw square with E M a line, which will be correct for the top. Bevel No. 2 in Y, in Fig. 2. To find the length of brace make A B, Fig. 2, equal to A B, Fig. 1. Next, in Fig. 3, make A P equal to A P, Fig. 2, and make A J equal to A J, Fig. 1.

TABLE FOR ESTIMATING BY THE SQUARE.

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From W. A., Indianapolis, Ind.—I frequently meet in books of receipts the expression "Dragon's Blood" lately employed. I desire to inquire what is the source from which it is obtained?

Answer.—Dragon's Blood is the name applied to resins obtained from several different species of plants. The most important of the resin species is the one known by the name of Dragon's Blood, is afforded by a plant under the botanical name of Columbaria Draca, abounding in Eastern Asia. Other kinds of the same plant occur in India, the Canary Islands, and the West Indies, also in Mexico. In color Dragon's Blood is red, or dark brownish-red, and it is used chiefly for varnishes and tinctures, staining marbles, &c.

Intersection of Pediment Ridge with Main Rafters.

From G. W. W., St. Francisville, Conn.—In the February number of Carpentry and Building for 1883, H. E. G., of Plainfield, N. J., asks how to determine where the ridge of a pediment will strike the rafters of main roof without the necessity of leveling the ridge board. I answer, first, divide the hight of pediment in inches by the rise of main rafters per foot. This gives the length of ridge pole by this rule: Hight of pediment,
To find the seat of ridge board, take a rod the base line of pediment to top of ridge for rafters with steel square, taking 8 inches the half-foot, and we have the length from being the same pitch as main roof makes no locality within a short time past. I have never seen any authority for calling the gutter to which it is applied by that name, nor, on any statute name for the other methods of constructing gutters of this kind besides those shown in the accompanying drawings. In this locality we make the gutters in both of the two ways shown. In Fig. 1 the face of the gutter is vertical and is broken into panels by pieces e. The tin extends up under the shingles and over the cap of the gutter. The second method of construction is shown in Fig. 2. The face of the gutter in this case is at right angles with the roof and has brackets at front.

Designs for Railway Stations.

From Richard J. Evans, Holy Springs, Minn.—The other day, having ever heard or read another name applied to that kind of a gutter, I desire to inquire if there is any statute name for the other methods of constructing gutters of this kind besides those shown in the accompanying drawings. In this locality we make the gutters in both of the two ways shown. In Fig. 1 the face of the gutter is vertical and is broken into panels by pieces e. The tin extends up under the shingles and over the cap of the gutter. The second method of construction is shown in Fig. 2. The face of the gutter in this case is at right angles with the roof and has brackets at front.

Position of Newel.

From J. F., Central Valley, N. Y.—I have a staircase to build, and, accordingly, would like a little advice as to the proper place to set the newel posts. I desire to learn, what will be the proper width of the top and bottom flight under the conditions named. I enclose a sketch of the plan of the staircases from which my wants can be ascertained. The run on top and bottom flight is 11 inches; on the middle flight, 10 1/2 inches, with 4 inches rise. Oak panel work, 4 feet 1 inch high, etc., on the lower floor and the same 5 feet 6 inches high on the top floor. Similar work is to be continued up the stairs. The stairs are to be of oak, with string-cases and cuttings of corner, and an inch diameter. What I would especially like is a sketch, published in Carpentry and Building, showing where the half-turns should be placed on the platform.

Practical Stairbuilding.

From A. L., Putney, Iowa.—As I have more or less work in stairbuilding and handrail making, I desire to ask a question or two of the practical stairbuilders among the members of the Carpentry and Building. I would like to ask F. S. W., of Cleveland, among others, how long it will take to get out the first class 4-inch rail corresponding to Fig. 1 of the illustrations in "Practical Stairbuilding, No. XXIII," published in the issue for December, 1884, the work being done by hand. I find it very convenient in my work to employ a double-bitted spokesman, and have made one for head cutting. The second question is: I am engaged on the ordering of the rail, just as would be done with hollow rounds on straight rails. I like Bailey's circle, but on curves with the twist is not so short. I find building paper both cheap and good for face nails. In getting out wreathings for large cylinders, in order to simplify the work and to save material, I get the face mold out for the quarter-circle, and an inch smaller diameter. The width and bottom of the rail are parallel with the face of the tread. When no mill is convenient for saving out the crooks they may be ripped out with a rip saw.
SECOND PRIZE DESIGN, ELEVENTH COMPETITION.—S. A. BISHOP, ARCHITECT, SMETHPORT, PA.

ARCHITECT, SMETHPORT, PA.
gold leaf, unless there is a great absence of light in the room and the frames are necessary as an important part of the furnishing. The simple plain wood frames, in natural wood colors, with ornaments of oxidized silver or bronze, are generally effective. There should be with them, and coming close up to the picture, mats of gray or blueish or brown rough paper. As to oil paintings, no rule for framing can be given. The tone of the picture must determine the color of the frame; the size and character of the picture must determine its width, and both in color and width there must be a thought of the color scheme upon which the decoration of the room is based.

As to the hanging of pictures, let there be one inflexible rule—to hang them flat. There is something always suggestive of insecurity in seeing a picture tipped forward. The picture cords are better not to show at all; but if they do show, let them not start from each top corner of the picture and meet at a point on the wall just over its center, thus forming a triangle, inharmonious with the lines of the room, but let a separate cord be attached to each top corner and go straight to a hook directly above it. And there should not be too many pictures, nor pictures having purely a family interest. Family portraits, if themselves works of art, are not altogether out of place in a parlor, but photographs had best be kept for the more private rooms. The subjects of pictures should be such as can be quickly understood by anybody. A picture that has to be explained is almost as bad as the picture that has to be apologized for.

Blackboards—Various kinds of so-called "liquid slating" have been sold for converting any smooth board or wall into a blackboard for school or other purposes. The following, we are informed, give very good results. No. 1 is probably the best, but is somewhat expensive: 1. Take alcohol (95 per cent.), 4 pints; shellac, 8 ounces; lampblack, 12 drams; ultramarine blue, 22 drams; powdered rotten-stone, 4 ounces; powdered pumice-stone, 6 ounces. First dissolve the shellac in the alcohol, then add the other ingredients, finely powdered, and shake well. To apply the slating, have the surface of the board smooth and perfectly free from grease. Shake well the bottle containing the preparation, pour out a small quantity only into an old tea-cup, and apply it with a new flat varnish brush as quickly

Eleventh Competition.—Fig. 2.—Side Elevation. Scale, \( \frac{1}{4} \) Inch to the Foot.

Fig. 3.—Section Through Window Frames. Scale, \( \frac{1}{2} \) Inches to the Foot.

Fig. 4.—Section Through Door Frames. Scale, \( \frac{1}{2} \frac{1}{2} \) Inches to the Foot.

Fig. 5.—Soffit of Cornice at Angles of Bay Windows. Scale, \( \frac{1}{4} \) Inch to the Foot.

Fig. 6.—Doors and Trim. Scale, \( \frac{3}{4} \) Inch to the Foot.
as possible. Keep the bottle well corked, and shake it up every time before pouring the liquid. 2. Instead of alcohol, take a solution of borax in water; dissolve the shellac in this and color with lampblack. Two drifts or veins, the other 300 feet, in opposite directions, yield over 400 tons of snow-white sand for the manufacture of the best American plate glass. The vein now being washed in inclined wooden troughs, being forced upward against descending streams of water by means of the Archimedes screw, a principle much in use throughout the building. A continuation of this process results in depriving the now clean sand of most of its moisture. After draining on a sloped floor it is wheeled into several drying machines, some using hot air and others steam as the drying agent. Archimedes screws bring the dried sand to the foot of an elevator, where it is carried up in small triangular buckets to the top, from whence it is poured into wagons, and hauled in six-mule teams to the freight depot, nearly a mile distant. The power by which the machinery is run is furnished by the canal, 1000 feet distant. A large turbine wheel connected with iron-wire ropes running on large wooden wheels in two towers transmits the force necessary to operate one set of crushers, while the engine runs another. Both sets can use canal power when, for any reason, the engine fails to work. The works have doubled their capacity during the past year, and if the Pennsylvania Railroad Company build the line now in prospect, across the river, the output will again be increased.

Plaster Walling as Used in India.

In both Sandoway and Kyoukpyoo, where there is an annual rainfall of over 200 inches, the walls of many of the Government buildings and private houses are made of plaster instead of planking, as is generally the case in Burmah. This plaster walling seems to have great advantages over planking. It is cheaper, cooler, prevents sound passing from one room to another, and is easily and cheaply kept clean by white or color washings; it may also be painted if preferred. Although the plaster walls are double, they do not appear to harbor vermin, insects, &c., as might be expected; and, if the work is done as described, the wooden framing separates the wall into squares of about 3 feet, and it is impossible for rats to work from one square to another. It is necessary to provide some ventilation for the rooms, either by wooden lattice-work at the top of the wall or by any other method. The plaster walls, if properly made, last well, even when exposed to the weather.

For one bay of walling 10 feet square, framing 4 x 4 inches is put up in the ordinary way between the posts. Small green bamboos 1½ or 2 inches in diameter are then cut into such lengths that they may fit tightly when placed horizontally between the vertical pieces of framing. When seven wood can be got cheaply, it would be

Eleventh Competition. — Fig. 7. — Front Elevation. — Scale, 1/4 inch to the Foot.

The sand is now carried by a sheet-iron strainer, from which the coarser particles are returned to the crusher. It is then

Fig. 8. — First Floor.

Floor Plans. — Scale, 1/4 inch to the Foot.

Fig. 9. — Second Floor.
tting the bamboos fitted in nicely; if they are slightly too long they are split in being put in, and if too short it is, of course, difficult to fix them except by wedging. Dry bamboos of as large diameter as can be obtained are then cut into lengths so as to fit vertically between the framing, split open and beaten out flat. These form the groundwork on which the plaster is laid; they are placed vertically on either side of the horizontal bamboos, with the inside of the bamboo outward, and kept in position by narrow strips of bamboo; the latter are placed outside the split bamboos on each side, and are tied together with cane. There is now a double wall of split bamboo, which should be quite firm and rigid. The inside of the bamboo is turned outward, as that forms the best surface for the plaster to be laid on. The projecting pieces of the bamboo joints should be cut off. Long pieces of string are now hung closely together on the bamboo strips, and should not be dressed off. Long pieces of which the tooth rests against it, and being kept in position by a brass plate, with a projecting semicircular plated portion, but only about one-third of the distance. The aperture through which the tooth projects, and about one-third behind it, should be circular.

The Army of Incompetents.—Who does not know them? They are thick, says an exchange, as locusts, apply to you every day for business, abound on every street corner, and pass through life a miserable, shuffling, rejected and seemingly god-forsaken class of men. Never was there an age when the call was louder and more urgent for men competent to do things; and never, we fear, was the supply in its meagerness so disproportionate to the demand. The Army of Incompetents. There is a list of dissipated, vicious, repulsive and utterly incompetent men who present themselves as fit for important service, is discouraging beyond expression to the reflect-

When using a gauge, hold it so that the point of the tooth is at right angles to your work. The first finger is placed upon the top of that portion which guides it, the other three being placed below it, resting on the stem, while the thumb should be above, the inside of it pressing against the lower square part of the stem. If using for marking, set it to the requisite distance; hold it as lightly as possible, and just allow the tooth to mark the surface as slightly as possible. If for cutting, press it downward and forward. In both cases always work from one course to the next below. The workman, in laying the plaster, lifts up the string with his left hand and spreads the plaster on to the split bamboo; then he presses the string into it, and so ties the plaster down. Two coats of plaster are laid, the first having a very rough surface to receive the second. The plaster is mixed as usual for good plastering work, laid on as dry as possible, and well worked by hand; it is then kept damp for three days by being sprinkled with water before the second coat is put on.

Marking and Cutting Gauges.

The gauge, says a writer in an exchange, is a tool frequently used, being required in some shops or other of all cabinet-work. Gauges are of three kinds—cutting, marking and mortising, the names indicating the purposes for which they are used. It is the first and second we have to deal with, the last not presenting any feature of interest to call for notice here. The marking gauge can be dispensed with, as a properly sharpened cutting gauge may be used for the same purpose.

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ing mind of him who would fain extend a helping hand to his fellows. Young middle-aged man, learn to do something! Study a good address, study men and things, and absorb from the abundance about you some knowledge in which you can become proficient. Be clean in speech, in person and in soul; and, inspired by such intentions as these, a thousand profitable avenues of industry stand pleading for your entrance.

Purchasing Machinery.

Mr. J. Richards, in his work on "Wood Working Machinery," gives some very interesting points relative to the subject, and, among other things, states that operators generally understand the subject better than proprietors, and machines are usually bought without knowledge of what is wanted, no matter how well they may understand what is needed for the work. Wood machines are made in America at this time like boots and shoes, or shovels and hatchets. You do not, as in most other countries, prepare a specification of what you want, as to the capacity, belt power, adjustments, and so on, but must take what is made for the general market. That this is not right need not be argued, and that it is as much the fault of the purchaser as it is of the maker is also true. Purchasers are too apt to barter and beat down the price to the lowest point, and then go to another maker to see if he will furnish machines for less, just as though it was a circular saw, a roll of belting or a barrel of oil that was wanted. This not only degrades the business of machine manufacturing, and provokes competition and bad work, but it leads to a state of affairs that allows almost any one to en

found in the wood shop, so that it is unreasonable to expect a machinist, without specifications, to fill an order satisfactorily for a machine which even the operator may not understand. In ordering machines, therefore, take time to investigate their adaptation to what you want to do; if the work is of a regular character, the public reputation of the machine may be trusted; but it is due to the dignity of any shop to at least attempt to improve their manipulation by modifying machines whenever useful improvement suggests itself.

Utilizing Ashes.

A patent has lately been granted for the use of ashes in making mortar. It has been found that the fine portion of domestic ashes is capable of being converted, with a small proportion of lime, into a mortar having, when a month old, a tensile strength of about one hundred pounds per square inch. Ashes and lime, mixed as before, give a tensile strength of about sixty pounds per square inch. Sand-mortar a month old has a tensile strength of about thirty pounds. Ashes and lime, mixed as in the case of sand-mortar, will give a tensile strength of about sixty pounds per square inch. This will be seen that, by utilizing the ashes for mortar, a large part of the expense of removal could be saved, together with the whole cost of procuring sand for that purpose, and, at the same time, a very superior article of mortar be produced. In consequence of the small quantity of lime required (to per cent.), it would be necessary to mix the mortar by machinery at a mill and deliver it ready for use. This practice prevails to a great extent in European cities on account of the superiority of milled over hand-made mortar. Ash-mortar has the additional advantages of resisting the action of water as soon as it has set (in from two to three days), and also the combined action of fire and water, the quantity of lime being so small and the chance so remote that no consequences of the application of heat does not produce free oxide of lime, as in the case of sand-mortar, and consequently does not swell when water is applied to the heated mortar. The ash-mortar forms

Fig. 15.—Section Through Porch Gable.—Scale, \(\frac{3}{4}\) Inch to the Foot.

Fig. 17.—Plan of Stairs.—Scale, \(\frac{3}{4}\) Inch to the Foot.
Bell-Hanging for Inside Rooms.

Our article on "Practical Bell-Hanging," published a short time since, has attracted such wide interest, and has, apparently, been of such service to our readers, that we are induced to continue the subject and to furnish an additional chapter on the art of adjusting bells. At the present time we shall give some general particulars with reference to hanging bells that have communication with chambers, parlors, halls, and the like. In this case, as in the former instance, we shall depend, as usual, upon manufacturers and dealers' catalogues for our illustrations, and shall give such particulars as are, in the estimation of our experienced bell-hangers, of the greatest importance. For much that follows we are indebted to Messrs. J. B. Shannon & Sons, 1009 Market street, Philadelphia, Pa., who, as we have already mentioned, issue catalogues specially devoted to this line of trade.

To hang bells that serve to communicate between rooms in a house, as, for example, from the parlor, dining-room, and library to the various bed-rooms and the kitchen, requires more experience, or, at least, the exercise of more careful judgment, than hanging a bell from the front door, as described in our previous article. Yet the work is done in the same general way and with the same tools. If the building is finished and all the plastering is done, and the painting and decorations are completed, the wires may be run or the outside of the walls, and to make a good job of it they is necessary to keep the cranks and wires as far as possible out of sight. To do this successfully is a test of the knowledge and skill of the bell-hanger. A man of long experience will undoubtedly succeed the best with a job of this kind, but still it is not impossible for a beginner to do the work successfully if he gives careful attention to the principles involved, and discriminates carefully with reference to all the details. The first step is to examine very closely into the construction of the building in order to determine how best to get the wires from the various rooms to some angle or recess, using the smallest number of cranks, thus leading from the principal story of the building most out of sight and in a way least likely to be injured. Cranks when near each other on the same wire strain is and make the bell pull hard, even though the wire has been ever so carefully stretched.

This causes the cranks sometimes to get out of position, so that they are not in the best shape for operation. The point to be considered, therefore, is how to get into the cellar and thence to the kitchen with the least show of wires and fixtures in the principal story.

Sometimes it is best to run up from the principal rooms to the attic, or from the parlor, for example, into a room not much used or especially valued on the second story, the wires going to some room against which the wires can be carried straight down. It is to be observed in all cases that bell hanging must be done at right angles and in straight lines. The less cranks and wire used the better the bells will ring. Every hole to be bored must be straight and large enough for the wire or wires, if there be more than one, so that they shall work freely.

The pull of a chamber bell is frequently placed near the ceiling and has attached to it a cord finished with a tassel, which hangs where it can be easily pulled by a person lying in bed. This arrangement gives comfort and confidence to an invalid, enabling him to summon an attendant whenever required, and saving him their presence when he would be alone. One of the best styles of pull used for the purpose named is shown in Fig. 1, and is commonly known as a purchase lever pull. The wire is attached to the short arm and the cord to the long arm, and as the longer arm is considerably greater in length than the shorter one, a very slight exertion in pulling the cord will ring the bell satisfactorily. A purchase lever pull should be put up near the angle of the building or on the short side of the building, and the wires from other parts of the house attached to it. The pull of a chamber bell is frequently placed near the ceiling and has attached to it a cord finished with a tassel, which hangs where it can be easily pulled by a person lying in bed. This arrangement gives comfort and confidence to an invalid, enabling him to summon an attendant whenever required, and saving him their presence when he would be alone. One of the best styles of pull used for the purpose named is shown in Fig. 1, and is commonly known as a purchase lever pull. The wire is attached to the short arm and the cord to the long arm, and as the longer arm is considerably greater in length than the shorter one, a very slight exertion in pulling the cord will ring the bell satisfactorily. A purchase lever pull should be put up near the angle of the building or on the short side of the building, and the wires from other parts of the house attached to it.

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Construction of a Cheap Lathe.—III.

THE HEADSTOCK CASTINGS.

In these papers we shall not assume the possession of much elementary knowledge of workshop practice on the part of the readers, since such an assumption would not be fair to some of them, at least. Hence, we trust those who have had experience will tolerate remarks upon subjects which are familiar to the most inexperienced of our readers. We will, therefore, give such sketches and descriptive details as will render the whole process clear to every one who is interested in the matter.

Now that we have our castings, let us look them over well to see if there are any 'blow-holes' or 'scabs' about them, particularly in those portions which have to be bored or screwed. If bad, send them back without wasting labor in their fitting. Before marking out the centers, we shall either plane or file the bottom faces, which slide on the bed, as true as we possibly can. Poorly bored centers cannot be procured, and that it is preferred to file everything up rather than put the work out.

Given a small surface-plate, a steel straight-edge, up and down, across and obliquely; check with winding strips as well as straight-edge, trying the surface with steel file, trying the bottom faces, which slide on the bed, as true as we possibly can. Poorly bored centers cannot be procured, and that it is preferred to file everything up rather than put the work out.

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Second Prize Design—Ninth Competition.

In our January issue we presented the perspective view, elevations, floor and roof plans, designed by Mr. F. J. Grodavent, and to which was awarded the second prize in the Ninth Competition. We now lay before our readers a portion of the details forming a part of Mr. Grodavent's effort. The most casual inspection of the diagrams presented herewith will show that the designer has given this subject the most careful attention, and has presented a set of details which would leave very few questions in the mind of any competent builder with respect to the construction and exterior finish of the building represented. Several of the views are very nearly equivalent to elevations upon an enlarged scale. They show such large portions of the building as to answer a very fair purpose where the elevations are not at hand. These details, taken in connection with what was published in our January number, form as complete a set of working drawings as ordinarily falls to the lot of a builder by which to work.

Care of Bearings.

One of the most intricate and difficult things in connection with wood-working machinery running at a high speed is a proper care of the bearings, and even after long experience it is difficult to tell at once or with any certainty the true cause of a hot journal. When a bearing becomes hot the machine stops, and even after long care of the bearings, a high speed is a proper machinery running at any certainty the true cause of a hot journal.

Fig. 1.—Vertical Section, Showing Story Heights.—Scale, \( \frac{1}{4} \) Inch to the Foot.

Second Prize Design, Ninth Competition.

First Prize Design, Ninth Competition.

TRADE PUBLICATIONS.

Low's Art Tiles.

Those who were fortunate enough to procure a copy of the beautiful catalogue issued something over a year since by Messrs. J. G. & J. C. Low, Chelsea, Mass., will be eager to inspect the first supplement, which has recently been issued. The book in question is a quartoto, of the same size as the original, containing 16 II x 13 inches. The cover is of material work and also for various decorative purposes, including their use in stairs and grates, is too well known and appreciated to require mention at this time. The Messrs. Low were the first to make a success of the production of dust tile, and in their manufacture they have combined high artistic experience with the best mechanical facilities, resulting in a line of goods nowhere excelled.

Open Fires.

Messrs. William H. Jackson & Co., Union Square, New York City, have sent us an oblong pamphlet of some 20 pages, devoted to a description of the ventilating grate which they make, and which is known as the "Sanitary" grate, manufactured under G. L. Morrison's patent. The pamphlet is attractive in appearance, having handsome letter-press and engravings of fair quality, all inclosed in a cover which is in imitation of alligator skin. The "Sanitary" grate is presented by elevations, perspective views with sections broken away, showing air chambers and interior construction, and by diagrams indicating the method of setting
the grate under different conditions, together with a diagram showing the theoretical action of the currents of air in a room heated by a grate of this kind. Grates and comparatively few houses of any pretensions to comfort and elegance at the present time are erected in which one or more pieces of apparatus of this general description does not find place. The trade is a growing one, and is being fostered by the careful attention to details manifested by manufacturers. Such diagrams and illustrations, together with the careful presentation of advantages of the grates described, which this pamphlet contains, are of importance to manufacturers in two ways. They show their goods to prospective buyers in an attractive manner, and at the same time educate those who are to use them to a proper appreciation of their merits and to a knowledge of how they should be managed both in their setting and operation in order to attain the best results. The pamphlet before us has been intended not so much for the trade as for the inspection of those contemplating a purchase. It is accordingly of value to householders, architects and all who have anything to do with fitting up dwellings and offices, and also for those in the trade who desire to be posted on what is in the market adapted to meet special conditions. The last page of the pamphlet contains a reprint of the somewhat humorous poem which has been current for a long time, and entitled, "A Hole in the Floor." It sharply contrasts the comforts of the old-time fireplace, and its genial, glowing flame, with the modern practice of gathering around "a hole in the floor," in order to obtain warmth and comfort. Furnaces undoubtedly house heating and ventilating apparatus. The pamphlet is a handsome specimen of typographical art, contains 64 pages, bound in a dark olive-green cover, with bronze side title and fourth page. The preliminary chapter in the book discusses the subject of heating greenhouses and describes apparatus desirable for use for that purpose, entering into such details as the construction open stoves constructed upon principles similar to that incorporated in the "Sanitary" grate are becoming very popular, and have their proper place, and so have fireplaces and open grates, and it is for the intelligent householder to decide between them.

Hitchings & Co.,
233 Mercer street, New York City, send us a copy of their catalogue devoted to green-

Fig. 6.—Elevation of Cresting and Finial.—
Scale, 1/2 Inch to the Foot.

Fig. 7.—Section Through Cresting.—Scale, 1/2 Inch to the Foot.

Fig. 8.—Front of Buttress and Balustrade of Dining-Room Piazza.
are lists of the special goods made by this company, with tables of capacity; also, illustrations consisting of general views and sectional diagrams, and full particulars with regard to their operation. Those of our readers who have given the subject of hot-water heating any attention will find much in this catalogue to interest them. Hot-water heating as practiced in this country is restricted, for the most part, to greenhouses and similar purposes. Accordingly, the most approved apparatus for the purpose is found in catalogues of manufacturers making a specialty of such work. We occasionally receive inquiries as to where hot-water heating apparatus can be obtained, the questions, of course, referring to apparatus for use in heating dwellings. We see no reason why much that is shown in this work could not be adapted to the purpose desired in case such a plan of heating is expedient to employ. In addition to the heating apparatus already referred to, in the latter part of the work improved means for raising and for fastening ventilating sashes on the roofs or sides of greenhouses and grapevines are shown. A domestic water-heater designed for use in first-class dwellings or small hotels as an auxiliary water-heater, and also a stand for the kitchen boiler, is described in the latter part of the work. This apparatus is constructed to be used separately or in connection with a kitchen range. It occupies no additional room and affords a means for effectively and economically heating water for bathing, laundry or other domestic purposes. The pamphlet concludes with a long list of references, including the names of leading floral and nursery establishments throughout the country, also a list of private establishments employing the apparatus described.

Memoranda of Invention.
Mr. George M. Hopkins, of this city, solicitor of American and foreign patents,
recently issued a convenient little publication containing hints on patents, and giving a general idea as to the method to be pursued in making applications. The whole subject, we do not doubt, is shrouded in some mystery to very many, and, in view of this, we think that Mr. Hopkins's little work will meet with a great deal of favor, containing as it does practical illustrations of the method of making memoranda relating to inventions, &c. In general, the value of an accurate record of an invention throughout its entire history is of great value, even after a patent has been granted. It fixes
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CARPENTRY AND BUILDING.

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the date of the invention, shows whether the inventor has exercised due diligence in perfecting it, and is a witness in cases of interference or any other litigation that may arise. Considering these facts, the importance of the matter may be readily estimated. The author has had an experience of some 16 years in the patent business, and may well be regarded as an authority in matters pertaining to the subject.

Wood knots are now in great demand, being used in exceptionally fine veneering, after they have been subjected to a steaming process which softens them and develops their color. Persons who are experts in judging what knots are of value make considerable money by going about looking for them. Some 26,000 pounds of knots were recently sent to New York in one shipment.

A Remarkable Number.

The discussion which has taken place in our columns with respect to the remarkable properties of the figure 9 gives interest to the following communication, published in one of the daily papers:

Attention was drawn to the newspapers, two or three years ago, to some of the singular qualities of the number 14,2,8,5,7. It was then pointed out that this number, when multiplied by any figure up to 6, reproduces its own digits, the results being successively (2) 285,714, (3) 428,571, (4) 571,428, (5) 714,285 and (6) 857,142. When 7 is the multiplier the result is 999,999. This, I think, is as far as the investigation went at the time. It has since occurred to me to experiment further, and I multiplied by all the numbers up to 15, and then by various higher numbers. This led to the following observation: If the digits of any multiple of 142,857 be separated into sets of six, measured from the right hand, and these sets of six be added together, the final result will always reproduce the original digits unless 7 be a factor, in which case the final result will always be the lead. There is probably a number of eight digits which can be arranged at the points of an octagon with similar or more surprising phenomena. Has such a number been discovered? Perhaps some of our mathematicians can pursue the inquiry.
NOVELTIES.

Smokeless Combustion.

The annoyance of smoke from a manufacturing establishment, whether from a coal or wood fire, is something that every one attempting to avoid where possible, and yet which many people put up with because of the difficulty of overcoming it. Many smoke-burning furnaces are before the public, and numerous inventions are chronicled in the daily papers from time to time having for their object a lessening of the annoyance from smoke, as well as economizing fuel. In Figs. 1 and 2 we show a device belonging to prominent wood-working establishments in Philadelphia, notably that of Hall & Garrson, Eleventh street and Washington avenue, and the Franklin Planing Mills, Girard avenue and Vienna street, have furnaces of this kind in use.

Self-Adjusting Wrench.

A new self-adjusting wrench has been brought out by P. Lowenstraufl, of No. 257 Halsey street, Newark, N. J., and is shown in Figs. 3 and 4. The general appearance of the wrench may be gained from Fig. 3, while the arrangement of the working parts is shown in Fig. 4. It will be seen that the handle is pivoted to one of the jaws, and that its end is formed with cogs in such a manner as to engage with corresponding depressions in the sliding jaw. The effect of this is to cause the two jaws to approach each other and grasp the nut or other object to which they may be applied very tightly whenever the handle is moved for the purpose of turning them. The greater the resistance of the nut against turning, the tighter the wrench grasps it. From this it will be seen that the wrench is self-adjusting. The range of the 12-inch size is from 3/4 inch to 1 1/4 inches. Several sizes of the wrench are made, adapting it to use for almost all purposes that may be required.

Routing Machine.

In Fig. 5 we show a straight-line routing machine, manufactured by John Royle & Sons, of 62 Railroad avenue, Paterson, N. J. This machine was exhibited at the fair of the American Institute, last fall, and it not only attracted marked attention upon the part of mechanical visitors generally, but was also awarded the medal of superiority. The purpose of the machine is to deepen with facility the depressed or white portions of woodcuts, electrotypes, stereotypes and the like. It is used for making coarse wood engravings and for the manufacture of blocks for printing fine paper hangings. The same machine is used for making electrotypes, stereotypes and the like. It is employed for the production of fine paper hangings. The machine has, in addition to the general requirements for such work, the special advantage of cutting straight and parallel lines. Accordingly, it is found useful in various shops of cutting and decorating work, as lines can be cut with facility and accuracy by it which otherwise could only be performed in a much more expensive manner. The construction of the machine and the means by which its several motions are obtained are very clearly shown in the engraver.

Fig. 2.—Section Through Front of Furnace.

Fig. 3.—New Self-Adjusting Wrench.

Fig. 4.—The Working Parts of the Wrench Shown in Fig. 3.
work tends to press it firmly to the surface downward movement, which in securing the convenient device for gripping or holding the is used, in which is arranged a very con¬
tact of the work being done. The machine has the advantage of being very steady when in motion. The cutter-bearing arm is sup¬
ported upon friction rollers, and is controlled by both hands. A light handle is properly arranged for each hand, the routing one of which is made extensible. The arrange¬
ment of this handle with a gutter above is such that it may be changed to the most con¬
venient point at the will of the operator, without interfering with his position while routing or with the progress of the work. This enables the operator to rout very closely to the lines and into the most delicate spaces with ease, confidence, precision and rapidity. By changing the gutters metal or wood is passed through the ferrule of the handle and the third of which regulates the tension of the clamp which holds the end of the tip. This clamp consists of a slitted piece metallic in such a form that by driving the middle screw into the wood the two fingers are brought into close relationship, thus holding the tip firmly. In the first figure the rod is shown thrown up into its highest position, in which place the slats are closed and the rod firmly locked. In order to release the tip it is pulled forward from resting against the clamp, and in opening the slats it passes be¬
tween the fingers above referred to. Their friction is such as to hold the rod in any de¬
sired position. Messrs. Butler & Constant, No. 18 Warren street, New York, are the general agents.

The Nickel Barn-Door Hanger.
The common use of the word "nickel," referring to plated work, will lead many of our readers, no doubt, to imagine at the out¬
set that the "Nickel" door hanger must be a hanger carefully finished and plated. However well finished the device may be, the term "nickel" in this case refers to the inventor, Mr. D. Nickel, rather than to the finished goods. The hanger bearing this name, two views of which are afforded in Figs. 8 and 9 of the engravings, the device consists of a metallic tip adjusted on the rod of the slats by a socket, and working in a clamp on the lower cross-piece of the blind, where it is regulated by friction or tension. The nature of these parts will be understood by reference to the engravings. The clamp is attached by three screws, two of which are designed for holding it; and the third of which regulates the tension of the clamp which holds the end of the tip. This clamp consists of a slitted piece metallic in such a form that by driving the middle screw into the wood the two fingers are brought into close relationship, thus holding the tip firmly. In the first figure the rod is shown thrown up into its highest position, in which place the slats are closed and the rod firmly locked. In order to release the tip it is pulled forward from resting against the clamp, and in opening the slats it passes be¬
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The Nickel Barn-Door Hanger.
The common use of the word "nickel," referring to plated work, will lead many of our readers, no doubt, to imagine at the out¬
set that the "Nickel" door hanger must be a hanger carefully finished and plated. However well finished the device may be, the term "nickel" in this case refers to the inventor, Mr. D. Nickel, rather than to the finished goods. The hanger bearing this name, two views of which are afforded in Figs. 8 and 9 of the engravings, the device consists of a metallic tip adjusted on the rod of the slats by a socket, and working in a clamp on the lower cross-piece of the blind, where it is regulated by friction or tension. The nature of these parts will be understood by reference to the engravings. The clamp is attached by three screws, two of which are designed for holding it; and the third of which regulates the tension of the clamp which holds the end of the tip. This clamp consists of a slitted piece metallic in such a form that by driving the middle screw into the wood the two fingers are brought into close relationship, thus holding the tip firmly. In the first figure the rod is shown thrown up into its highest position, in which place the slats are closed and the rod firmly locked. In order to release the tip it is pulled forward from resting against the clamp, and in opening the slats it passes be¬
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the door is being run from side to side, thus indicating the travel of the hanger as the door is being run from side to side, which greatly reduces friction. The makers state that doors weighing 1000 pounds, properly hung with this device, can be started and run with a pressure of from 2 to 3 pounds.

The general style of track employed with this hanger is shown in the perspective view. The design of the hanger is such as to make it cover a considerable space on the surface of the door to which it is to be applied, thus making it possible to bolt or screw it into position without bringing the bolts or screws too close together for strength.

A New Clamp.
Messrs. E. C. Stearns & Co., Syracuse, N. Y., have recently brought out a new iron clamp, the general appearance of which is shown in Fig. 11 of the engravings. This clamp has the special merits of good design, great strength, proper distribution of metal and convenient shape for use to recommend it to the favorable attention of the building trades. It is well made, of good material, and is likely to give satisfaction to all who employ it.

The Bodine Roof.
A form of roof which in one sense might be described as an artificial wood, and which, in fact, a prepared board from pulp, is being introduced by the Bodine Roofing Company, of Mansfield, Ohio. The material put out by this company, when cut with a knife, resembles a close-grained pine shingle in some respects, although it is very evident, by looking at the sides of the material, that it is altogether different in character. The material is a wood-pulp board, manufactured under the patents of the Androscoggin Pulp Company. In its production white silver-leaf poplar, which is non-resinous, and spruce lumber, which is resinous, are combined in such a way as to make a wood board very compact. It is far more compact than the natural wood. The fiber extends in every direction, so that the board neither cracks nor splits. It is also lighter and more pliable than ordinary wood. The wood board manufactured in this manner is then treated at the factories of the company in Mansfield under various patented processes, and is finished by painting on both sides.

The company are now offering this material as the best for roofing, as sent out, in general appearance the roofing, as sent out, somewhat resembles bookbinders' boards. The sheets are 26 1/2 x 38 1/2 inches, so that, allowing 2 1/2 inches for the lap, each sheet will lay 6 square feet. A roof to be covered with this material is first sheeted with surfaced lumber laid close, in the same general manner as would be provided for a tin or slate roof. After the surface has been provided in this manner, the roof is put on in the same general way as shingling or slate would be applied, in courses running across the roof, with the long way of the sheet running up and down the pitch of the roof from cave to cove. The sheets are fastened in place with threepenny common nails, driven through washers. As the roof is laid it is painted, thus insuring a coat of paint where the sheets lap. After it is finished a final coat of paint is applied over the entire surface. In the pamphlet describing this roof, the company have recently issued, certificates are presented from various insurance managers indicating their approval of the Bodine roof on large manufacturing establishments, notably that of the Altman & Taylor Company of Mansfield. While the company do not pretend that this roof is absolutely fire-proof, they do maintain that it will successfully resist burning where sparks are dropped on it. With reference to the cost, the Bodine Roofing Company informs us that this material is cheaper than slate, tin or iron, and costs about the same as the best quality of shingles.

Wilber's Door Hanger.
In Fig. 13 we show a perspective view of a new barn-door hanger introduced to the trade by J. D. Wilber, No. 150 Dearborn street, Chicago. The entire hanging strap and wheels are made of malleable iron. The wheels are straight grooved, fitting the square edge of the track both above and below, thus keeping a door perfectly aligned, and not allowing it to slide in or out until stopped by rubbing against the rail, which is often the case with flat wheels on a wooden track. The track, as will be seen by reference to the engraving, is an ordinary bar of iron, such as may be purchased at any store, fastened to the face of the beam provided for the purpose. The fact that no special track is required, but that material sold in every hardware store can be utilized, is one of the special advantages to which the manufacturer directs attention.

Combined Sidewalk Light and Ventilator.
Messrs. A. W. Herr & Co., of 218 E. Randolph street, Chicago, are introducing some novelties in sidewalk lights, coal-hole covers and sidewalk registers. Fig. 12 of the engravings shows a vault cover 2 feet square, which has the merit of admitting either light or air, as demanded by circumstances. It has two heavy wing ball's-eyes, hinged so that one or both can be opened from below by turning a heavy thumb-screw, thus affording all the ventilation and air through the spaces occupied by the ball's-eyes in the cover. The hinged doors can be readily closed to exclude rain or dust without obstructing the light in either case, thus leaving the sidewalk free from obstruction to the public, and giving the desired light and ventilation at all times. This register or ventilator may also be adapted for use in private dwellings, floors in attics, gables and mansard roofs, may be placed over partitions, and, indeed, in all places where light and ventilation are ne-
the table, as already mentioned. In the use of the
saw, or gaining-head, is brought forward and kept in entire control by means of the handle shown in Fig. 14 of the engravings. This machine is constructed on the principles common to what is known as a railway saw, except that the saw passes over the lumber instead of under. A swing arm, over the table, the belt retaining equal drel will slide lengthways on the projecting arm, over the table, the belt retaining equal tension at all points. The depth being regulated by raising or lowering the arm; the mixture is then stirred and then poured into the vessel of hot varnish. The whole is then stirred so as to be thoroughly mixed, then strained and allowed to cool, when it has the appearance of lead. When required for use, it is thinned with the necessary quantity of varnish and applied with a brush, hot or cold, preferably the former. This lacquer is useful for wood or iron and for walls; it will also render waterproof cloth, paper, &c.

French Polishing.

This is a method of varnishing by rubbing the varnish upon the surface of the wood instead of applying it with brushes. When varnish is applied simply with a brush, a comparatively uneven surfaces results, rendering the only the subsequent processes of rubbing and polishing, but by the method of French polishing a smooth and continuous surface, hard and not easily scratched, is secured. All the polishes are applied very much in the same way, and a general de-

It should never for a moment remain quiet upon the surface, and that its motion should be as even as possible. Neglect of these precautions will produce a rough surface wherever the rubber remains quiet or is improperly removed. The circular rubbing must be continued until the surface appears perfectly smooth and the pores are no longer visible. Be very particular to keep the cloth covering the wad clean and soft. It is desirable to use a clean portion each time it is dipped in the polish. It is quite likely that in about 12 hours after the above operation the surface of the work will be hatterless and the grain plainly visible. In that case, proceed over the work again until the grain is thoroughly filled. French polishing is a process requiring particular care and skill, and considerable experience is necessary to produce good results.

Novelties.—Fig. 14.—Overhung Traversing Gainer and Cut-Off Saw, Built by C. B. Rogers & Co., Norwich, Conn.

A new process for preserving wood, employed in Belgium, consists in exhausting the air from the pores of the wood and filling them with gutta-percha solution. In pouring the solution into the pores, the

A lacquer, said to be of great elasticity, perfectly supple and not liable to peel off, is made in the following manner: About 120 pounds of oil varnish are heated in one vessel, and 33 pounds of quicklime are put into 22 pounds of water in another. As soon as the

sorption will therefore be sufficient. To obtain a good polish with lac varnish on wood, the quantity applied must be very small, and must be rubbed continuously until dry. If the work be porous or coarse-grained, it must be rubbed and also the adjustment for different sizes of saws are made by raising and lowering the table. In place of the saw a gaining or dado head may be used, and thus gains of different widths and depths may be cut, the

line causes an effervescence, 55 pounds of melted india-rubber are added. This mixture is stirred and then poured into the vessel of hot varnish. The whole is then stirred so as to be thoroughly mixed, then strained and allowed to cool, when it has the appearance of lead. When required for use, it is thinned with the necessary quantity of varnish and applied with a brush, hot or cold, preferably the former. This lacquer is useful for wood or iron and for walls; it will also render waterproof cloth, paper, &c.

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depth being regulated by raising or lowering the table, as already mentioned. In the use of this machine the lumber remains stationary; the saw, or gaining-head, is brought forward and kept in entire control by means of the handle shown in the engraving, and which is attached to the gateway. One advantage of this arrangement is that it enables the operator to work with his lines always exposed to sight, instead of having them turned underneath the lumber, as in a railway saw. This is a method of varnishing by rubbing the varnish upon the surface of the wood instead of applying it with brushes. When varnish is applied simply with a brush, a comparatively uneven surfaces results, rendering the only the subsequent processes of rubbing and polishing, but by the method of French polishing a smooth and continuous surface, hard and not easily scratched, is secured. All the polishes are applied very much in the same way, and a general de-

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A Study in Suburban Architecture.

In our January number we presented the conclusion of a series of articles by "An Architect," bearing the above title, and which has been a conspicuous feature of this journal for over a year past. As explained to our readers in a footnote, we were unable to publish in that issue all the details and designs which had been prepared for it. "Mrs. Archie's" letter to a friend referred to several matters which will be better understood by the designs and details of mantels, parts of which we give herewith. Lack of space still delays the publication of the others, and also the kitchen details. We shall lay them before our readers at another time, and have no doubt that they will be quite as valuable, notwithstanding the fact that their publica

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NOTES AND COMMENTS.

Every one who reads the English mechanical and architectural journals, or any of the papers devoted to the lumber trade published in England, or extracts from them which are frequently printed in American papers, often encounters the term "deal." Accordingly, a definition of its exact meaning is of interest. By reference to the dictionary the definition of this word will be found in the following language: "The division of pieces of timber made by sawing; hence, a pine board or plank, particularly a board or plank of fir or pine, above 7 inches in width and exceeding 6 feet in length." In a broad significance this term is sometimes used to indicate wood of pine or fir. The strict definition of the word, as understood by the English timber merchants, says the Journal of Progress, is soft wood timber imported and sawn to a section of 3 x 9 inches or 4 x 8 inches or 4 x 10 inches. In the same way the term "planks" is understood to indicate pieces 3 x 4 inches and 4 x 12 inches. Battens are 2½ x 7 inches or 3 x 7 inches. All of these are respectively of lengths which vary considerably, and none of them have reference to the country or port from which the supply is derived.

One of the art journals raises the question of color as applied to exterior architecture, and asks if it is not time to vary the horrible monotony of brick and stone fronts, of which there seems to be no end, and all of which presents the same stolid, uninteresting face. It goes on to say that there are many rea-

practical solution is altogether a different matter. It is undoubtedly true that the public generally are disposed to beautify their houses by the introduction of color and by other legitimate means. The tendency in this direction is evidenced by the employment of stained-glass windows and of rich upholstery, which is occasionally so displayed about the windows as to make it contribute in some measure to the adornment of the exterior of the house. The public are conservative, however, and until some artist has shown by a practical example, the advisability of such a scheme as our esteemed contemporary suggests, it is probable that very little will be done.

The increasing use of asbestos, both as a non-conductor of heat and as a fire-proofing material, is frequently noted. While asbestos used with a proper spreading medium it becomes a desirable paint or cement for roofs, and when still more carefully prepared it serves an excellent purpose as a preservative of wood, and forms the basis of very desirable paints for both interior and exterior finish. When manufactured in the form of felting it is very useful as a covering for steam, hot-water and hot-air pipes. As a building felt it is no less serviceable in the construction of fire-proof buildings.

One of our exchanges directs attention to the extensive use of this material in fire-proof work. An immense warehouse being erected in Chicago for the National Tubes Works Company has all its floors laid with asbestos building felt prepared by the H. W. Johns Manufacturing Company, of this city. We are also informed that the new depot for the Western Indiana Railway Company in Chicago is lined with the same material. For purposes of this kind asbestos properly prepared is very desirable, and the good results attending its use are likely to bring it into still greater demand. We recently experimented with it upon a small scale for covering the hot-air pipes from a furnace to their entrance into the flues in the walls of a house in order to avoid heating the basement in which the furnace is located. Our investigations have shown that the material is admirably adapted for uses such as we have described, as well as in connection with boilers and steam pipes.

A house built to withstand tornadoes is one of the novelties in architecture which has attracted the attention of various journals during the last few months. According to the Minnesota Tribune, the building in question is being erected by one of the wealthiest men of Osakis, Minn. The peculiarities of this house, it is said, have been inspired by the wife of the owner, who lives in constant dread of storms. All the corners of the building are acute angles, and the sides sink back, giving the plan of the house the contour of a star. From the highest point of the roof the gutters sink suddenly, making great depressions. The theory is that the sharp corners will split the tor-

A Study in Suburban Architecture.—Front Elevation of Mantel in Hall.—Scale, 1/4 Inch to the Foot.
The observatory on Mount Washington, which it would seem, must be sacrificed. It strikes has successfully resisted the wind with a of those who like novelties in decoration and corners and nooks which would please some and is durable in almost every position in Source of supply at the present time is Ala¬
yachts will always find cypress wood very other material. Builders of row-boats and alter¬ningly wet and dry. Cypress seems to on filled land. Wood in this position is quality of polishing up very handsomely. largely employed for shingles, gutters, doors and vats. This is owing to the fact that the dye growing in favor for dyeing and chemical and mills. As a material it seems to be for various purposes, and vats for brewers tions. While a knowledge of all the opera¬tions incident to a manufacturing concern is of undoubtedly advantage to those who
intendents, would be of no force whatever in the general management, and, on the other hand, many excellent men would be entirely lost if called upon to do a simple piece of work at the bench or to manage a gang of workmen. A business must be managed as certainly as the work must be done, and it requires an unusually versatile man who can be one of his own workmen and their manager at the same time. Correspondence and the reception of customers, the overlooking of bills and the supervision of accounts as much demand the care and eye of a master as the direct guid¬ance of the workmen. It is much easier to delegate the latter to a salaried foreman than to attempt to buy the talent for the former, and hence it is that many of the most successful business men, whatever their mechanical qualifications may be, are found directing affairs in the office.

The subject of concrete houses is one of perennial interest. It is continually coming to the fore, and the experience of one section of country or one community seems to be of no particular advantage to any other. While it is undoubtedly true that successful concrete houses can be built, it also remains that this style of building in many sections of the country is not necessarily clean, but, on the other hand, is expensive in compar¬ison with the usual building materials em¬ployed. Concrete work, from a certain standpoint, is as simple as anything to be done in building operations, and yet it re¬quires an intimate knowledge of the proper¬ties of the materials employed to render it entirely successful. Hence it is that many failures occur in work of this kind when attempted by persons without experience in the art. A Western paper recently published an article advocating the construction of houses of concrete. A neighboring journal, published at Winona, Mina., repeats that experiments of the kind referred to were thoroughly tried at that point several years since and the scheme abandoned. Here it then recounts that one of the buildings fell and that the walls of the others have since crum¬bled. It says that some of the cellar walls are impenetrable, and the scheme abandoned. It says that some of the cellar walls

A New Method of Finishing Wood¬work.—Many processes have of late been applied to the finishing of woodwork, such as staining in various colors, fumigating and other methods. A new finish is now culti¬vated in the Continental market, and is known as the Rubenick process. It is used for giving a metallic surface to wood, and consists in first immersing the wood in baths of caustic alkaline lye, in which it is allowed to remain for about 48 hours at a tempera¬ture of 167° to 194° F. From this bath the wood passes to another of hydro-sulphate of caustic potash, which is added, after 24 or 36 hours, a concentrated solution of sulphur. Here it remains for about 48 hours at a tempera¬ture of 95° to 122° F. and, lastly, for 2 or 3 days, a solution of calcium, to which is added, after 24 or 36 hours, a concentrated solution of sulphur. It says that some of the cellar walls

Just what constitutes the successful man¬agement of a business is often a subject for debate among those employed in the me¬chanical departments as well as among those who are engaged in the office, and the two classes of men seldom agree in their conclu¬sions. While a knowledge of all the opera¬tions incident to a manufacturing concern is of undoubtedly advantage to those who
who are engaged in the office, it does not by any means follow that a practical familiarity with the mechanical part of the business is of special importance to the financial and managing men. Many men who are invaluable as mechanics, or asforemen and superin¬

A Study in Suburban Architecture.—Side Elevation.—Scale, 1/4 Inch to the Foot.

corner and nooks which would please some

Cypress timber is somewhat extensively used throughout the Eastern and some of the Middle States for making cisterns, tanks for various purposes, and vats for brewers and mills. As a material it seems to be growing in favor for drying and chemical vats. This is owing to the fact that the dye does not affect it so much as many other woods. In addition to this use it is largely employed for shingles, gutters, doors and door jambs, sash and blinds, and in some instances for flooring. It is also used for outside and inside finish. It has the quality of polishing up very handsomely. From the fact that it is not affected by dry rot, it is invaluable as a foundation for build¬ings on filled land. Wood in this position is alternately wet and dry. Cypress is resistant to this action better than almost any other material. Builders of row-boats and yachts will always find cypress wood very desirable for their purposes. The principal source of supply at the present time is Alaba¬ma and along the Gulf coast. The wood most commonly used is of the yellow variety. The lumber generally runs large and clear, and is durable in almost every position in which it can be used. As its merits become better known, cypress is likely to become a very popular wood in the North.

A New Method of Finishing Wood¬work.—Many processes have of late been applied to the finishing of woodwork, such as staining in various colors, fumigating and other methods. A new finish is now culti¬vated in the Continental market, and is known as the Rubenick process. It is used for giving a metallic surface to wood, and consists in first immersing the wood in baths of caustic alkaline lye, in which it is allowed to remain for two or three days, according to the degree of permeability of the wood, at a tempera¬ture of 167° to 194° F. From this bath the wood passes to another of hydro-sulphate of caustic potash, which is added, after 24 or 36 hours, a concentrated solution of sulphur. Here it remains for about 48 hours at a tempera¬ture of 95° to 122° F. and, lastly, for 2 or 3 days, a solution of calcium, to which is added, after 24 or 36 hours, a concentrated solution of sulphur. It says that some of the cellar walls

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Messrs. F. E. Edbrooke & Co. are the speculators for the brick dwelling and barn that is being erected on Sherman avenue, between Capitol and Olive streets, Denver, Col., for Adeline Ruth. The dwelling is 35 1/2 x 70 feet in size and 2 1/2 stories high. The estimated cost of the former is put at $10,000, and that of the latter at $2500.
CORRESPONDENCE.

Short-Span Railroad Bridges.

From "Engineer."—I think it would be useful to many readers of Carpentry and Building if there should be published in its columns plans and specifications for the construction of a single-track, common-gauge railroad timber bridge of, say, 50-foot span. The bridge should be supported by piled abutments, and should be of strength sufficient to support heavy traffic and great speed. The object of such a publication would be to ascertain the best form for such a bridge, the least amount of material compatible with good construction, and the least expensive plan of construction to give necessary strength and stability. In order to set the ball in motion and to provoke discussion, I send herewith drawings of a bridge erected some time since which is not in all particulars perfect, and which I consider a fair mark for criticism. I invite the most careful attention of the readers of the paper, and hope you will request other plans from such as are able to contribute to this question. The following is the specification to which this bridge was constructed:

"The lumber used shall be sawn from the heart of white oak or yellow pine, and the pieces shall be free of sap, rot, shakes and all other defects. The dimensions given are the finished sizes, and must all be sawn full and the truss timbers large enough to allow for dressing, so that, after being dressed and shapped, the timbers of the chords, truss braces, straining beams and splice blocks shall be the full dimensions figured in the plans. The splice blocks and chords, where put together, shall be neatly cut and planed smoothly, and great care shall be used to make the recesses in the splice blocks and chords fit together closely. The holes for the rods and bolts shall be bored straight and true, barely large enough for a tight fit. The bevel washers shall be closely and evenly fitted. The framing, shaping and fitting of the braces, straining beams, chords and heel blocks shall be neatly and accurately done, so as to give a full bearing to the timbers. The trusses will be framed with a camber in put together. After completion and time for seasoning has passed, the finished trusses shall be given another coat or two coats of pure white lead and linseed oil, so that, when done, the entire surface of dressed timber shall have two coats fully covered and applied. The last coat colored brown and the ironwork varnished black."

The following bill of materials will enable readers to make their own estimate upon this bridge in the light of the following price list: Pine on the spot, sawn to order, $20 per M; iron, 5 cents per pound; piles, 35
February, 1884.

**Bill of Materials.**

- 24 piles, 12" x 12" x 21' 8" length in girds, 4 cast 12" x 12" x 20'.
- 20 cross blocks, 12" x 12" x 3' x 6'.
- 20 beam washers, 12" x 12" x 12' 9".
- 15 chord timbers, 7" x 16" x 26' 8".
- 4 track stringers, 7" x 12" x 26'.
- 2 front stringers, 7" x 11' x 26'.
- 2 cross beams, 8' x 15' x 14'.
- 4 truss stringers, 12" x 15' x 17' 2".
- 10 truss beams, 6" x 14' x 10' 8".
- 6 sway braces, 6" x 8' x 21'.
- 4 end beams, 7" x 10' x 11'.
- 4 sway braces, 6" x 9' x 10' x 22'.

**Iron Bolts, Rods, &c.**

- 4 true rods, best refined iron, 2" diameter, 7' 8" long under head to point, 2 special pattern cast-iron washers, jambs.
- 16 3/4' packing bolts, in chords, 26' long, with 2 face washers, 1 packing washer, 2", and 1 ditto, 3/4".
- 32 3/4" packing nuts, in chords, 18' 15' long, with 6 face washers and 2 3/4" cheek washers.
- 4 1/8" sway-brace tie-rods 11 1/2' long and 2 face washers.
- 8 cast-iron angle blocks for sway braces (special pattern).
- 34 3/4" bolts in cross beams, 32 1/2' long, with 2 washers.
- 72 3/4" spikes in track stringers.

**Bolt Lengths Under Head to Point.**

- 8 3/4" bolts, 49 1/2", with two washers in end track stringers.
- 4 3/4" bolts, 45", with two washers in end bolsters.
- 40 3/4" rag bolts, 23 1/2" long in cross blocks.
- 24 3/4" rag bolts, 23" long in caps.
- 8 3/4" bolts, 49 1/2" long, with two washers in brace blocks.
- 6 3/4" bolts, 21 1/2" long, with one flat and one bevel washer in brace.
- 4 3/4" bolts, in track stringers, 21 1/2" long, two washers.
- 8 3/4" bolts, in chords, braces, beams, 41 1/2" long, one bevel and one flat washer.
- 72 wrought-iron spike bars shapen as shapen.

**Note.** After receiving the above letter, and without waiting to first publish it, we communicated with one or two engineers who have had experience in work of this kind, laying the suggestion of this correspondent before them and requesting contributions on the subject mentioned. From those who have had experience in work of this kind, we have the following, which serves also to get the question proposed for discussion before our readers:

The best way to start the ball rolling will be to find all the fault possible with the designs submitted herewith for criticism, and then follow with improvements upon them. Both of our contributors whose letters appear above invite close and searching criticism.

**Raking and Level Moldings.**

**From S. R. K., Grand Rapids, Mich.—** Referring to the inquiry of A. M. F., of Texas, who asked about joining raking and level moldings, some time since, I would say that he failed to state in what particular he found trouble in making his miter—whether it was because the rake molding was too narrow for the level molding, or whether it was in making the several members of the molding meet properly. He has undoubtedly noticed that the rake frieze is narrower than the rake molding, which is the base of a right-angled triangle; hence the angles are not the same.

The tip of the crown-molding forward is, in common jargon, called the "pitch" of the molding—i.e., when the molding tips forward one-quarter of its width, it is said to be at one-quarter pitch; when it tips one-third of its width, it is said to be at one-third pitch, &c. It must be borne in mind that the pitch of the molding is not the same as the pitch of the roof, for the reason that in the molding it relates to the width of the molding, which is the hypotenuse of a right-angled triangle, while in the roof it relates to the width of the building, which is the base of a right-angled triangle; hence the angles are not the same.

When the pitch of the molding is less than that of the roof, the rake molding will be narrower than that of the roof; when the pitch of the molding is greater than that of the roof, the rake molding will be wider than the level molding. When the rake frieze is narrower than the level frieze, while the rake molding on the same cornice is generally wider than the level molding; and has wondered why it is so. A little knowledge of geometry would easily explain the whole matter. The tip of the top of the crown-molding forward is, in common jargon, called the "pitch" of the molding—i.e., when the molding tips forward one-quarter of its width, it is said to be at one-quarter pitch; when it tips one-third of its width, it is said to be at one-third pitch, &c. It must be borne in mind that the pitch of the molding is not the same as the pitch of the roof, for the reason that in the molding it relates to the width of the molding, which is the hypotenuse of a right-angled triangle, while in the roof it relates to the width of the building, which is the base of a right-angled triangle; hence the angles are not the same.
moldings are made by machinery it is diffi-
cult to make them miter properly unless
they are set to the same pitch as the roof.
This, however, is not always advisable,
as machine-made moldings are made to a
given pitch, and look bad when set to an-
other pitch. To properly miter moldings,
whether made by hand or machinery, it is
necessary to cut the level molding with a
square miter the same as would be done in
putting the same molding around a post or
column, and the rake molding is cut with
the same miter, but on the slant or pitch of
the roof. Did space permit I would give
drawings illustrating each, but must refer
the correspondent to page 292 of the volume
for 1886, and page 96 of the volume for 1881,
where the subject was partly illustrated.

Hip Roofs.—Sketch Accompanying Letter from B. C.
with the principles of this work. My method
transforms a hip roof into a gable roof in its
manner of presentation so that any one
except a common gable rafter can as well
cut a hip rafter with the assurance of getting
it right every time. The accompanying sketc
shows exactly what I mean. First
find the seat of hip rafter; then extend the seat
an equal distance beyond the corner.
Let fall two lines from the end of the seat
drawn. These lines should be square from the seat,
and their object is to reduce the diagram to the form of a gable rafter,
as before mentioned, which I deem desirable in
presenting principles to the young student.
After the drawing has been thus arranged,
it is a simple matter to get the center of
the gable. From it take the rise of the roof
and proceed as with simple rafters. The result
is the length of the hip required.

Hand and Foot Power Machinery.
From W. P. W., Arkansas City, Ark.—
In the June issue of Carpenter and Building for
1884, S. W., of Cleveland, Ohio, gave us
some account of hand and foot power
machinery. Other correspondents in the
volume for 1879 and 1886 treated upon the
same subject. The general effect of these
letters is to recommend the devices described
as working satisfactorily. I desire to say
for the benefit of all who have never tried
the experiment of using machinery of this
kind, never to make an attempt in this direc-
tion. The result will be disappointing,
especially if the makers of foot-power ma-
chinery anticipate easy-working tools.
I speak from experience. I first built a cir-
cular rip saw, which proved to be a failure;
accordingly, I threw it to one side and next
made a wooden turning lathe. This did
not give any better satisfaction than its prede-
cessor, so I threw it to one side also. I
took great pains in the construction of these
machines, so that they should work easily,
but they were positive failures in that sense.
Why were they failures? Simply because a

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is on the side of the rectangles, as my method must be mathematically correct. If the roof was the same pitch throughout, the results would exactly coincide.

**Coloring Cement Sidewalks.**

From H. B. E., Philadelphia.—I would like to learn, through Carpenter and Building, how Portland cement sidewalks are colored. I wish to know specially how to produce a light blue and also a red. Information on this point will greatly oblige.

Answer.—The blue tint that is given to work made of Portland cement by using a small amount of lampblack. The exact quantity has to be determined somewhat by experiment, as different grades of cement require more or less of the coloring matter, as the case may be, to produce the same effect. In this connection it may be mentioned that the cement will look darker from the coloring matter when it is set than when it has been mixed. Red is obtained in a similar manner by the use of oxide of iron.

**Window Frames with Transom.**

From J. I. D., Des Moines, Iowa.—I inclose a drawing illustrating the construction of a window frame with transom, which may be of use to C. P. K., of Bigler, Pa., who have had many such, both in the main part by the end. I have seen people puzzle over the problem till disgusted with the central line of rail is always in the said plane and the plane in the center of plank. Laboring under these restrictions, we have to put up in a general way with the kind of curve the plane will afford; for, if we try to regain the width to its normal course, we should find ourselves short of thickness of stuff. I present a sketch of a development of the elevation of the plan you gave (double size), calling the radius of the angle on the dotted curve, from which it will be seen that the rail gets to have a steeper pitch than that of winders, which is surely against reason. The ease of the tangents, too, are less easy—especially the top one—they should be.

The Tangent System In Handrailing.—Sketch with W. H. C.'s Letter.

We can have the wherewithal to do so, but these new settlers cannot afford such houses. Many good and costly buildings are erected in this country, but with them we have no trouble.

**Arrangement of Rooms.**—Sketch Accompanying Letter from A. J. R.

**Coal Tar on Roofs.**

From J. P. S., Pittsburgh.—I have had experience in this direction, an account of which may be of interest to the reader, in the form of a letter. Some time since I lined the gutters of a house, a portion of the roof of which was tar or gravel, and another portion of which was slate. I used the best I X terne plate in both conductors and gutters, and the same tin in the gutters below both portions of the roof referred to. The gutters and conductors connected with the gravel or tar roof were completely destroyed in 18 months, while the tin used be the slate roof is as good as new to the present day, and from present indications will wear for years. These circumstances show for themselves that tar is very injurious to tin.

The Tangent System In Handrailing,—Sketch from the first, and can therefore refer to anything which has been published in it. I have derived great benefit from it, and expect to be under renewed obligations for every paper sent me. A large number of house plans have been placed before builders to choose from, and it seems as though all might be suited from such a collection as your columns offer to us. Still, in this new country, where most of us are beginners and have never found any one who could. I would like to see how some of your architectural correspondents would divide such a house satisfactorily, and have never found any one who could. It seems as though there should be a level tangent connecting the main part by the end. I have seen people puzzle over the problem till disgusted with the central line of rail is always in the said plane and the plane in the center of plank. Laboring under these restrictions, we have to put up in a general way with the kind of curve the plane will afford; for, if we try to regain the width to its normal course, we should find ourselves short of thickness of stuff. I present a sketch of a development of the elevation of the plan you gave (double size), calling the radius of the angle on the dotted curve, from which it will be seen that the rail gets to have a steeper pitch than that of winders, which is surely against reason. The ease of the tangents, too, are less easy—especially the top one—they should be.

I have for a long time been at war with the inflexibility and limitations of the tangent system of handrailing, because of its inability to meet the requirements of special cases. Another evidence of the lameness of the tangent system to meet special needs is seen in F. S. W.'s answer to S. N. W. in the December number for 1882. In this case, theoretically, there should be a level tangent connecting the main part by the end. I have seen people puzzle over the problem till disgusted with the central line of rail is always in the said plane and the plane in the center of plank. Laboring under these restrictions, we have to put up in a general way with the kind of curve the plane will afford; for, if we try to regain the width to its normal course, we should find ourselves short of thickness of stuff. I present a sketch of a development of the elevation of the plan you gave (double size), calling the radius of the angle on the dotted curve, from which it will be seen that the rail gets to have a steeper pitch than that of winders, which is surely against reason. The ease of the tangents, too, are less easy—especially the top one—they should be.

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a very neat expedient, even if he had to first form a surface of operation as a preliminary to the solution of the problem. His method falls short of what could be done in the premises, not from lack of intelligence, but from the arrangement of his simple tools and false principles of the tangent system.

Now, a word about "systems." All systems having tangents for their bases can be applied to the geometrical methods adopted in solving tangents are concerned; they only differ in the very essence of the art.

Grinding Tools.

From W. A. D., Columbus, Mo.—I desire to ask directions from practical men for grinding tools. Should the stone be revolved against the edge or from it? My present tool is not efficient against the edge, but I would like to hear from good, experienced men on this subject.

Drying Kiln.

From W. G. M., Warrensburgh, Mo.—Will some practical reader of the paper contribute a few facts for the benefit of the men for grinding tools. Should the stone be revolved against the edge or from it? My present tool is not efficient against the edge, but I would like to hear from good, experienced men on this subject.

Wetting Brick.

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Hanging Outside Blinds.

From J. B., Omequa, Neb.—I desire to inquire of those who have experience in the first method of finding the face mold with respect to the general methods of study best adapted to self-taught students. Some chapter heads in this department of the book will serve to indicate its scope. Among these may be mentioned a general introduction, the subject: "Plane Geometry," and "How Shall I Study?" and "How Shall I Study?"

The second division of the work gives a detailed account of the practical use of the curves and instructions. Some chapter headings in this are as follows: "Plane Geometry," and "How Shall I Study?"

The last division in the work suggests a shorter course for those whose opportunities are very limited. It contains a very limited number of statements in the form of questions and answers, describing a detailed course of study enough particular is given under each of the several divisions of the work. It is intended to enable the intelligent student to judge in advance of the results to be accomplished by applying himself to the different branches of the subject. Thus, in plane geometry a careful definition is given at the outset of both theoretical geometry and practical geometry showing at once what the practical results are to be from pursuing the course advised. Special directions are given as to mastering definitions and axioms and as to the precise method of study to be pursued, showing how a proportion and its demonstration is to be made.

The Swedish Methodist Episcopal Church Society, at North Vernon, Ind., have erected a frame church building, at a cost of $3,000.

The plans were prepared by Mr. Stephen C. Earle, of Warrensburgh, Mo.

A Reformed Presbyterian Church building, 35 x 72 feet in plan, is in progress of erection on West Market street, Washington, D.C. It is the architect and Mr. C. Hershiser the contractor. Some chapters in this department of the book will serve to indicate its scope. Among these may be mentioned a general introduction, the subject: "Plane Geometry," and "How Shall I Study?" and "How Shall I Study?"

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Algebra is similarly treated with illustrations that are likely to prove of great interest to the reader. The work is one that is to be recommended to careful reading, and to the part of all who desire to improve their leisure time to the best advantage. It is evident from the first pages that the author has chosen that his idea of what constitutes a good mechanic is a very high one. A pamphlet, expressly prepared. Some of the works to resemble this little work in scope or purpo

The SET of plans for a new City Hall to be erected at Oak Park, Ill., has been laid and about 2,250,000 feet of lumber used. The structure will be 75 x 300 feet in plan, and six stories and basement in height. The cost is placed at $600,000.

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WELLINGTON’S RIDEAU GRATE, MADE BY THE SMITH & ANTHONY STOVE COMPANY,
BOSTON, MASS.
Rideau Grates.

We surrender our first page this month to a very fine representation of Wellington’s Rideau grate, manufactured by the Smith & Anthony Stove Company, 52 and 54 Union street, Boston, Mass. The Rideau stove or grate is of French origin, and is largely used in Parisian houses, where economy of supply and fuel are important considerations. Its construction is based upon principles established elsewhere by Count Rumford and M. Thomond, whose practical researches in this direction have been so applicable to domestic needs. The American designer has improved on the foreign article, and has produced an open stove that is exceedingly ornamental in design, cheerful in effect, and at the same time a satisfactory heater. The term “rideau” means curtain or screen, and its application in this case is perfectly appropriate. The grate is of French origin, and is largely used in Parisian houses, where economy of supply and fuel are important considerations. Its construction is based upon principles established elsewhere by Count Rumford and M. Thomond, whose practical researches in this direction have been so applicable to domestic needs. The American designer has improved on the foreign article, and has produced an open stove that is exceedingly ornamental in design, cheerful in effect, and at the same time a satisfactory heater. The term “rideau” means curtain or screen, and its application in this case is perfectly appropriate.

The Rideau Grate, Showing the Frame Broken Away, Breezng the Balancing Weight.

In both patterns the blower and frame are decorated with rich art castings. It is hardly necessary to point out to our readers that the open fireplace, in addition to its cheerful fulness and beauty, has a sanitary mission. Whether used as an independent heater or simply to supplement the power of the furnance, its ventilating qualities are always in operation. It imparts a movement to the cold stratum of air found in every room, driving it up the chimney and replacing it by an equal quantity of warm air. The frequent renewals of air in this manner relieve the room from air made foul by respiration and other causes.

NOTES AND COMMENTS.

It is only at rare intervals that the pages of mechanical journals are graced by contributions from women, but whenever they do take up the pen there is pretty certain to follow good advice and practical suggestions. Very frequently points are made that the men have entirely overlooked, and occasionally those who are discussing problems of arrangement and decorations, for example, are set right about the superior acumen of some gifted woman, who, perceiving the dulness of the so-called lords of creation, enters the arena and ends the controversy forever by having her say about it. The readers of this journal in the past have had occasion to acknowledge their indebtedness to suggestions from women. A “Woman’s House Plans,” which a gallant architect in the West made still more interesting by furnishing a perspective view of a house constructed to their taste, and a “Letter From a Farmer’s Daughter,” have not been forgotten. Not the least interesting among the practical suggestions that contributed by the sister of a carpenter, in which the question, “Is Carpentry a Desirable Calling?” is discussed. A woman necessarily approaches a topic of contributed from women, but whenever they do take up the pen there is pretty certain to follow good advice and practical suggestions. Very frequently points are made that the men have entirely overlooked, and occasionally those who are discussing problems of arrangement and decorations, for example, are set right about the superior acumen of some gifted woman, who, perceiving the dulness of the so-called lords of creation, enters the arena and ends the controversy forever by having her say about it. The readers of this journal in the past have had occasion to acknowledge their indebtedness to suggestions from women. A “Woman’s House Plans,” which a gallant architect in the West made still more interesting by furnishing a perspective view of a house constructed to their taste, and a “Letter From a Farmer’s Daughter,” have not been forgotten. Not the least interesting among the practical suggestions that contributed by the sister of a carpenter, in which the question, “Is Carpentry a Desirable Calling?” is discussed. A woman necessarily approaches a topic of

The course of lectures under the auspices of the Franklin Institute, Philadelphia, delivered during the past winter, was the most important and interesting to which the mechanical journals are graced by contributions from women. A “Letter From a Farmer’s Daughter,” have not been forgotten. Not the least interesting among the practical suggestions that contributed by the sister of a carpenter, in which the question, “Is Carpentry a Desirable Calling?” is discussed. A woman necessarily approaches a topic of.
cherished institutions. The common-school system has done a good work, and we owe much to it, but the times demand more than an inherent part of the system. Of late it is beginning to be understood that a bright boy can be taught a trade as well as an abstract science, and in a comparatively short time, provided he is properly directed and his ambition and enthusiasm are aroused, hence the propriety of sending boys to school to learn trades, and the expediency of combining in the instruction of our youth what has heretofore been called an education with a proficiency in some calling which will serve as a means of livelihood in after life.

As bearing upon the general question of the feasibility of teaching trades, the following extracts from remarks made some time since by Mr. John Foley, the instructor of the class in blacksmithing of the Massachusetts Institute of Technology, will be interesting: "It appears like throwing away two or three years of one's life to attain a knowledge of any business that can be acquired in the space of 12 or 13 days by a proper course of instruction. The dexterity that comes from practice can be reached as quickly after the 12 days' instruction as after two or more years spent as an apprentice under the adverse circumstances under which the apprentice ordinarily works. The plan in this school (that above mentioned) is to give the student the fundamental principles in such lessons as will teach him most clearly, and at the same time give practice enough in the short time to acquire a knowledge of the different kinds of tools and the various ways of using them." These words have special significance, coming, as they do, from a successful instructor and a mechanic who acquired his trade by serving a seven-year apprenticeship, and should be studied carefully by parents and guardians and others interested in the welfare of youth. That there is much time wasted in the early years of a regular apprenticeship is an undoubted fact.

What little apprentice system this country formerly had broke down and was abandoned before the question of what was to take its place was considered. It failed because it did not meet the requirements of the case. It came to us as a legacy from the older countries, and we used it until it proved to be out of accord with American ideas. It has left behind it in many directions, however, the feeling that nothing but its equivalent can ever teach a boy a trade, and hence we frequently hear arguments for a revival of the apprentice system. More careful investigation has begun to show that the old plan did not teach trades in the best sense of the word, but, instead, simply

parents and guardians and others interested in the welfare of youth. That there is much time wasted in the early years of a regular apprenticeship is an undoubted fact.

Cheap Frame Houses.

We take pleasure in announcing the result of our Thirteenth Competition, which had for its subject a frame house costing about $800. As mentioned in our last issue, the contest in this instance has been very spirited and an unusually large number of studies from competent designers was submitted. The labor imposed upon the Committee of Award has been more difficult in this case, perhaps, than in any other competition which we have conducted. It was not the intent of the original competition to hold designers to the fixed cost of $800, but rather to induce a number of studies of cheap houses the cost of which should be about this figure, and so nearly alike that they would be readily comparable one with another. The opinion of the committee, as expressed in their report, is that all of the better designs submitted would very likely run somewhat above the limit of cost suggested in the advertisement if built in this vicinity. They, however, recognize the fact that there are other sections of country in which it is probable the designs could be built for less than the sum named, and therefore all of the studies submitted have been considered fairly in the contest according to the original terms.
All of the better efforts, so far as can be ascertained by scrutiny of the plans and schedules, and by careful comparisons of the same, were in the same cost. No designs in this contest were thrown out because their cost seemed to be excessive in view of the conditions of the competition. All of this seems to indicate that the competitors have very carefully considered conditions and have worked in all respects as closely as possible in matters of this kind.

By the terms of the competition, the three equal prizes of $50 each were offered to the three best designs received. The successful competitors are: E. E. Benedict, Winstead, Conn.; S. A. Bishop, Smethport, Pa.; and F. J. Grodavent, formerly of Syracuse, N. Y., but now of Leavenworth, Kan. We present the perspectives of the three successful studies herewith, from which our readers will be able to judge of their comparative merits. We also present the elevations and details of Mr. Benedict's design, together with his description. One fact will scarcely escape the attention of our readers when they have had the opportunity of comparing all the studies. In each case, in some respects at least, a better grade of construction has been employed, according to the designers' specifications, than is usual in $500 houses as commonly constructed. The Committee of Award called attention to this fact as indicating in some measure where reductions in cost could be made in constructing these buildings if a minimum of cost is desired. Many of the designs to which the prizes are awarded are also very desirable for publication, and more or less of them will appear in our columns to the future. The continual demand for cheap houses warrants us in believing that the publication of these studies will be quite as valuable to our readers as anything which has appeared in our columns in a long time.

DESCRIPTION OF MR. BENEDICT'S DESIGN.

Our readers will recognize in Mr. Benedict a new contributor, so far as our competitions go, and, from the annexed narrative of the way in which his design was produced, we think they will agree with us that his introduction is likely to be an advantage and pleasure to all concerned. The humor displayed, combined with the practical features strikingly brought out in the account subjoined, we feel certain will interest and amuse all who peruse it:

"I say, Polly, I'm going to build a house next spring."
"Oh, Jack, I wish we could, but I don't see how we can afford to."
"Oh, it's no, is it? Well, I guess we can; any way, we'll see. How much money have we saved up?"
"About $800, I guess."
"Good luck. That will do. You know that little lot, just at the foot of the hill, that I took for pay when my old boss failed? Well, I'll put up a little house on it and speculate in real estate. Here, Chip hand me that piece of board I brought home. That's it. Now, Polly, how much room can you get along without?"
"Hum, let's see. I want a kitchen, pantry, store-room and a living-room downstairs, and we ought to have three bedrooms and—" "Wait a minute, Polly, let me mark out something. There, how's that?"
"That! I don't like it a bit. The stairs shut off all windows on one side and the pantry the other. Besides, I don't like to have the stairs landing in the kitchen, and I want windows on two sides, for the room I have to stay in most of the time must be as pleasant as any in the house. And there's the store-room. Can't you fix it so that you can go through it from the front entrance, 'cause I don't want Chip and his friends running through the living-room. And I wish you could make the store-room large enough to have some shelves in and a place for your tools, and where Chip can keep his playthings, and I want—" "Oh, hold on a minute; I should think, you would get tired. Hand me the smoothing plane, please, and I'll try again. The house faces the southeast. I'll put the pantry, &c., on the side next to the hill, as there isn't much to see that way. * * * There! how's that?"
"That is just what I wanted, and what I was going to tell you when you stopped me."

Cheap Frame Houses.—Front Elevation of Design by Mr. Benedict.—Scale, 1/8 Inch to the Foot.

First Floor Plan.—Scale, 1-16th Inch to the Foot.

Second Floor Plan.—Scale, 1-16th Inch to the Foot.

Side Elevation (Right).—Scale, 1/8 Inch to the Foot.
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better in the living-room, and I'll fill the space in the kitchen with shelves. I guess you'll find them handy, and I can put up a neat shelf with iron brackets in the living-room, and it will look ever so much better than if the chimney stuck out in the room, won't it?

"Lots. The sink will be handy to the pantry; but how are you going to get water?"

"Don't you remember that spring on the side hill? I was looking at it the other day, and I found that it is high enough to force water 'most to the second floor."

That's nice; but what's that place that you've been looking at?"

"That's a 'cubby' to stow away old paper and things in. Anything else you want to do you like the looks of?"

"Well, I guess, Chip, he must have estimated it by the square foot, floor measure. We do that way sometimes. Suppose we try it. Here we have 25 feet 6 inches by 21 feet 10 inches; call it 25% x 22 feet. How much is that?"

"Five hundred and sixty-one feet."

"Now, the house we will build will be worth about $7.25 per square foot; at that rate what will our house cost?"

"Seven hundred and one dollars and twenty-five cents."

"Well, I guess that's about the size of it, but we will estimate it another way and see how we will come out; but remember, the price per foot is above foundation. The cellar will be extra. Now, see how much excavating there is to be done."

"I make 93 cubic yards."

"All right; now for the foundation; that will be, on an average, 15 inches thick and 4 feet high. Get the cubic feet. That's the way the masons do. How much do you make that?"

"Five hundred and seventy cubic feet."

"Well, take the underpinning the same way. That will be 2 feet 6 inches high and 1 foot thick, two-faced wall."

"What is a two-faced wall?"

"It's a wall of flatish stone, pointed both sides."

"All right. How about the openings?"

"Figure it solid; the masons are a hard-hearted set. Got that?"

"Yes, 228 cubic feet."

"Well, take the chimneys next. Figure 35 brick to the foot, and the cost to include lining, &c. I have it, 1050 brick."

"Good! Now for the mason's or plasterer's work."

"How shall I figure that?"

"Figure the plastering by the square yard, and take out half the openings."

"Well, Polly, how do you like the picture? First rate; why didn't you make one like this first. The carpenter could see a great deal better how the house would look."

"That's so; but could you build a dress from a 'picture' of one. Don't you have to use patterns?"

"I put them up because the sink comes under one. It makes a place to catch dirt where a full window comes back of a sink, and as you will want some sort of an opening there in the summer time, at least, I thought it would be better and look better, too, and the one in the pantry for the same reason."

"I guess you're right. Oh, there's one thing I forgot the other day. How are you going to get into the attic?"

"How? I'll have a trap-door, and a light step-ladder to be kept in the attic which you can reach from a chair, for the attic isn't big enough to be of much use, any way. I'll fix it so that you can pull it up and let it down with a small rope."

"That'll do, may be; but, say, don't that long roof cut off some of that small bedroom and make those closets rather low?"

"Yes. But Chip can have that room and he is short enough to fit it, I guess. Any more objections?"

"No; but I can't see much how the house will look by these elevations. Can't you make a picture of it some way?"

"I guess you mean a perspective view. I'll see what I can do."

"There, Polly Ann, there's your picture. See how you like that while I 'fingerprint' the cost."

"I say, pop, I help? I want to learn how."

"All right, Chip, get your slate and pencil."

"I have them; what shall I do first? Isn't there some quick way to find the cost? I saw Mr. Jones the other day when he told Tom Jenkins what he would build him a little house for. He made only a few figures on a board, and I got it after he threw it away, but I couldn't make out much."

"Yes." "Well, elevations are a sort of patterns."

"Now, Chip, how about the plastering?"

"I make it 331 square yards."

Cheap Frame Houses.—Side Elevation (Left).—Scale ⅛ Inch to the Foot.

Cellar Plan.—Scale, 1-16th Inch to the Foot.

$400 don't—H-m-m! Eureka! I have it. I'll cut off the corner in the first story so, and put in windows, and, with brackets under the projections, it will look 'lovely.'

"Here, Polly, here's your elevations; how do you like the looks?"

Rear Elevation.—Scale, ⅛ Inch to the Foot.
"All right; we will have a two-coat job, brown wall, whitewash finish for ceilings." "Now for the carpenter work."

"Take the frame first. We will use hemlock, as that is the cheapest. We will take the sills first; they will be 7 x 6 inches. Now for the outside walls and partitions. Take the distance around the house and multiply by the height of studs, and two-thirds of the product will be the number of feet in the standing timber; where 2 x 4 inch studs and 4 x 6 inch posts are used, which we will do, the partitions are the same. Now for the joist. For the first and second floors, we will have 2 x 8 inches by 16 inches to centers (studs the same). To get the number of feet, get the surface measure of the floors (in board measure), and that will be the number of feet in the joist. The attic joist will be 2 x 6 inches; now take one-half of the floor measure for them—that fills out the joist. Now for the rafters. Get the surface measure of the whole roof (square feet, of course), and where the rafters are 2 x 5 inches to centers (studs the same), take two-fifths of that, and you will have the rafters. How much do you make the whole amount to?"

"It amounts to 4336 feet of timber."

"Well, now take the sheathing; get the square feet of outside walls and take two-thirds the surface of roof, for we will use narrow boards there, and add the floor to attic. Well, how much for boards?"

"Two thousand four hundred and eighteen feet, sir."

"Well, now for shingles. Get the number of square feet covered and multiply that by seven, and that will give you the amount of shingles."

"Well, but my arithmetic says—"

and you may find out how much we may want in the cornice. Here is a detail of cornice at eaves to show how it is put up. Nail on the floor boards and nail the frises to them before shingling. Then we can push the shingles under it to form shingling framed, and then nail through into studs. When we run up the gable we break joints on a second rafter once in a while. The ceiling to front porch will be spruce. Got it? Well, how much for chip?"

"One thousand six hundred and ninetynine square boards."

"For the clapboards take surface measure of walls outside; the openings will make up for the lap. Now, 2 clapboards will do for this job. How many, Chip?"

"Only 1400 feet of those."

"Now we will take the pine lumber."

"Eh! What! Got to study your lesson for to-morrow? We will help you on this first. You want to find out how much stuff it takes to one window and door, then multiply by the number of doors and windows; as to corner boards, cornice, &c., just see how much there is in a foot, then the rest you know how to do. Find out how many feet in length there are, then multiply, and you have the amount. How much do you make?"

"Twelve hundred and fifty feet, sir."

"It will take about 95 feet of matched and beaded pine for the porch 'fence' and cupboards and window locks, and upstairs for down stairs, with locks for front and back doors; Berlin-bronze trimming for black enamel furniture and mortise latchets. For back doors we will use these common thumb latchets, and chip, and I will make a list of what we have done and of the rest."

"How shall I trim the doors? Well, I think we will have common loose-joint chip, and I will make a list of what we have done and of the rest."

"White wood, and stain them; anything else?"

"What's cased flat?"

"It's where the casings are nailed to the studs and the plastering comes even with the face of the casing, just as I have drawn it there."

"Rough boarding with hemlock, about 8 squares per day; clapboarding, I should say about 3 squares per day, though that depends on how much the surface to be covered is broken up. I guess, Chip, if we go on that basis we will put the later down and foot up and see how we stand."

The collar walls will be—

<table>
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<th>Cost</th>
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<tr>
<td>House</td>
<td>$484.42</td>
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<tr>
<td>Total</td>
<td>$700.00</td>
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"Let's see; at $1.25 per square foot the house would be $700.25, and with the collar would bring it up to $820.50, wouldn't it!"

"I'm sure I don't think so."

But, Jack, doesn't it cost more to shingle a gable that way?"

"That depends; you see, when the men are shingling I shall have them, when they pick up a shingle about 4 inches wide, drop it through the roof, and in that way it won't cost so very much."

"What are you going to have the newel and railing made of?"

"White wood, and stain them; anything else?"

"All right, we will put the thing through as soon as we can in the spring."
March, 1884.

NEW PUBLICATIONS.

ALBUM OF MASTERS IN WOOD, STONE, SLATE AND BRICK. Sixty plates of original designs, engraved, folio format. Published by J. O’Kane. Price, $7.50.

This work, which has been very carefully prepared by the lithographic process, contains a number of designs likely to be of service to all who are engaged in building mantels or in designing interior finish. The severest criticism that can be made upon it is the fact that it is the work of one artist rather than a collection of efforts of a number of artists. Many of the designs exhibit strong individual peculiarities of taste and form, and those who is quick to perceive points of this kind there is a general vein of similarity running through all the designs. Notwithstanding this, there is much, as we have already said, that is useful to all who have occasion to employ a work of this kind. The 60 plates contained in this album are divided among wood, stone, slate and brick and many of the designs exhibit rather than a collection of efforts of a number of artists. Monckton’s Practical Geometry. By James H. Monckton. Size, 4½ x 7¼ inches; illustrated by 42 full-page plates. Published by William T. Comstock. Price, $1.

Mr. Monckton is the author of various works on stair-building and other kindred topics, and for several years has been the instructor of the mechanical classes in the General Society of Mechanics’ and Tradesmen’s Free Drawing School of the City of New York. The present work has been designed by the author to be more convenient for use in schools and classes than anything on the subject of practical geometry that has heretofore appeared. The arrangement of the problems is on one page, while the explanatory text is on the page facing, thus rendering reference from one to the other a matter of convenience. The introductory chapters discuss drawing tools, and give the student a fair idea of what he should have in order to be prepared for the prac- Door Jamb and tical work to be done in the course of the work. The first portion of the book contains a number of the articles, owing to the fact that they have been written by persons who are familiar with the trades to which they relate, and not to those who are amateurs. This, add the fact that very many of the workmen-authors are amateurs, particularly those who are artisans, the standpoint the value of the instruction afforded is very high.

The first includes the theory of elasticity in solid bodies, hollow cylinders, thick hollow cylinders, shells, and spheres, and torsion theory of flexure, &c. The theory or technical part is developed in Part 2. The first part of the work is designed for technical students, especially for those whose tastes and circumstances require investigation in connection with the elasticity and resistance of materials. In Part 2 the author says the mathematical results obtained in the first portion are subjected to the tests of experiment. These, of course, are comparisons, but have been taken in all cases, so far as the author knows, from sources the most trustworthy. In every case, so far as we have looked, the author has with the utmost care given credit where credit has been due. In the production of this part of the work the author has evidently reduced to shape a vast amount of experimental material, changing the crude record of tests to a small useful form, and reducing from one unit to another in order to make the work harmonious throughout. Much of the matter, although credited to other authors, is substantially new, having been worked over and put into a shape to be practically useful to the engi- neer without the excessive labor which would be necessary in turning to the original authorities.

Clothes pins are made of white birch and beech. The logs are sawed by three operations into blocks 5 inches long and 3½ inch square. In this shape they are fed out of troughs into automatic lathes, each of which turns out 80 rounded pins per minute. With equal rapidity the knives of a slotting machine, set to work like a circular saw, bite out the sloping slot of each pin.

An engineer of New Orleans suggests the idea of constructing the framework of large exhibition buildings, which must be removed after brief use, of wrought-iron steam engines of moderate size, and streets, built together with standard fittings in such a manner that they can be taken apart without injury and sold for a small loss when the building is no longer needed.

BALUSTRADE AND SEAT ON PORCH.—Scale, 1/2 inch = 1 foot. Building is other illustrated articles in the book. Letters to the editor and replies form a series of very interesting chapters. Taken altogether, the book, which the mechanically inclined amateur will find an interesting companion in his workshop. The results obtained in connection with the elasticity and resistance of materials. In Part 2 the author says the mathematical results obtained in the first portion are subjected to the tests of experiment. These, of course, are comparisons, but have been taken in all cases, so far as the author knows, from sources the most trustworthy. In every case, so far as we have looked, the author has with the utmost care given credit where credit has been due. In the production of this part of the work the author has evidently reduced to shape a vast amount of experimental material, changing the crude record of tests to a small useful form, and reducing from one unit to another in order to make the work harmonious throughout. Much of the matter, although credited to other authors, is substantially new, having been worked over and put into a shape to be practically useful to the engineer without the excessive labor which would be necessary in turning to the original authorities.

Carpentry and Building. Price, $7.50.
The Attwell Sash Lock and Ventilator.

A new sash lock, quite different in its construction from those in general use with

**Novelties.**

Combined Scroll and Resawing Band-Saw Machine.

Frank H. Clement, of Rochester, N. Y., whose wood-working machinery is known to many of our readers, has recently designed and put upon the market a 42-inch band-saw machine, which is described as a combined scroll and resawing machine. It is illustrated in Fig. 1 of the engravings. It is a heavy, carefully designed, powerful machine, with corel frame cast in one piece. The extra-heavy shafts with which it is provided are steel, the bearing long, the pulleys are large and the necessary adjustment gives a capacity for splitting stuff up to and including 20 inches in width. The wheels, which are 42 inches in diameter and 3½ inches face, are made of seasoned-wood rims glued up in segments. They are covered with rubber, ground true and kept perfectly balanced. The main guide has a combination adjustment by which the trade is familiar, is made by the Attwell Manufacturing Company, 162 Main street, Cincinnati, and is now being put on the market. It has apparently novel features and advantages as a window fastening, and is called the “Attwell burglar-proof sash lock and ventilator.” Figs. 2 to 6 will make plain its construction and parts, and the manner of applying it to windows. It is made in two styles, according as it is to be used in windows which are hung with weights or in those with which weights are not used. The latter style, which is illustrated in Fig. 2, may be described as follows: A A, are two locks (one controlling each sash) working in combination and oper-
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these extra strikes are supplied for each window. Fig. 5 gives a sectional view, showing portion of window frame with locks A A inserted in mortises made in pulley stile, immediately to the left of meeting-rails of sash and on the right and left and next to parting bead. The escutcheon B is screwed on over hole which has been bored through the reveal for the admission of key, and the key C is partially inserted. In Fig. 6 is given a section showing a portion of sash, in which are inserted the strike G, and H, when employed, and illustrating their position in relation to the locks. Among the points in this device which commend it for practical use the following advantages are mentioned: The location of the locks in the window is at a point which renders their operation convenient to users, and, being mortised into the frame, they are not easily damaged, are inaccessible to a thief and difficult to force. These are features themselves well worthy of appreciation; but, aside from this, the lock affords additional security. The bolts being spring projected, the sash is automatically locked, and thus the necessity for the care of a thief's body) the result is obtained without any relinquishment of security. Then, too, where windows are without weights, or in case of breaking of sash cords, the operation of this lock serves to hold or control the sash.

**The Smith Band-Saw Setting and Filing Machine.**

Fig. 7 represents a general view of the Smith band-saw setting and filing machine, which embodies some new and interesting features. The machine employs the ordinary three-cornered file, and does away with the necessity of purchasing special files of some particular design. The setting attachment is perhaps the most novel feature. The setting is accomplished by means of hammers on anvils having the desired angle. By this means the teeth will stay at that angle, and do not spring back, as is often the case with teeth set by a cam motion. The amount of set required can be adjusted to the greatest nicety. The machine, constructed to work by hand or power, has been designed with the purpose of imitating, as near as possible, the movements made in filing and setting band saws by hand, but at the same time to overcome the irregularity of the same, as shown by the high and low teeth in a blade after being hand-filed. A three-cornered file from 3 to 6 inches long can be used. Being arranged to work about 60 strokes per minute, it will set and file accurately an ordinary 24-foot band-saw in 20 minutes, while an expert workman would occupy 2½ hours to do the same amount of work. The head carrying the file has a reciprocating movement. In the forward movement the file is held down and the filing of the teeth takes place; in the return movement the file is lifted from the blade, and at the same time the self-feeding motion pushes forward another tooth in readiness for the return of the file. The feed can be instantaneously adjusted to suit the pitch of any saw, and is arranged to feed one or more teeth at a time. A device for holding the saw while being set or filed, as shown in the cut, is supplied. This machine lately received the medal of superiority at the American Institute, New York. It is manufactured by Messrs. Detrick & Harvey, Baltimore, Md.

**Wood Mosaic Floors.**

Messrs. W. C. Runyon & Co., of Rochester, N. Y., are introducing what they call wood mosaic floors and borders. The work may be described as lead-joined, end-up wood mosaic. It consists of small blocks of wood set on end and joined by leaden tongues. Each block has a square surface and a groove running around it. These blocks are made of various sizes, from 1 inch up to 1½ inches square, and are from ½ to ¾ inch deep. The blocks are arranged to form the desired design, and are closely held together while molten lead is forced into the grooves, which are thereby instantly filled. The blocks, the formed back of which is held together while molten lead is forced into the grooves, which are thereby instantly filled. The blocks, the formed back of which is held together while molten lead is forced into the grooves, which are thereby instantly filled. The blocks, the formed back of which is
ever, than is used for the lead, and in the laying of the floor a maple strip or tongue is inserted. The tiles, as above described, are in squares from 12 inches upward. When thus made, they are polished, jointed and grooved preparatory to laying. The woods from which these floors are thus made are maple, beech, oak, ash and hickory. The variety is still further increased by the use of ebonized maple. The introduction of these features of the floor, from the fact that the wood is used on and enables the manufacturers to color it through and through, thereby obtaining a better effect than is possible in ordinary parquet floors. This is especially desirable when a parquet floor is laid over a sub-floor which does not differ from that prepared for other floors. After leveling up the rough floor with the jack-plane, it is simply a matter of arranging the tile above described so as to make the desired pattern and inserting the tongues in the grooves. Very little attachment to the lower floor is required. The Tongues in the grooves. Very little attachment to the lower floor is required.

The projections on the chank, one of which is indicated by A, prevent the knob from turning on the shank. The simplicity of this arrangement, and the evident durability of the parts, warrant the anticipation that trimmings made upon this principle will become popular.

Nail-Holding Hammer.

The Hartford Hammer Company, Hartford, Conn., are introducing a novelty in the way of hammers which will be understood by reference to Fig. 9 of the engravings. This improvement consists in a tapering slot projecting on the side of the hammer, by which a nail may be held in place so as to be stuck in position without the use of the fingers of the left hand holding it while it is being driven. After the nail has been stuck in this manner where it is wanted the hammer is withdrawn, freeing the tool for driving it home in the usual manner. The utility of a device of this kind in nailing siding and various other work where one hand is required to hold the piece in proper position will be appreciated by practical men everywhere. In order to introduce those goods to the trade, we understand that the manufacturers are packing them in such shape as to send them by mail. From personal inspection and trial of one of these improved hammers, we think we are safe in recommending them to any trade who enjoy devices for facilitating work of this general character. The hammer is made of hardened cast steel and is finely finished.

An Improved Board-Saw.

The accompanying cut, Fig. 10, represents an improved form of board-saw made by Goodell & Waters, of Philadelphia, which is especially adapted for pattern-making and cabinet work. It dispenses with the ordinary heavy iron base, and consequently with a large proportion of the weight and room occupied, and can also be used on this account much cheaper than the ordinary form without its efficiency being in any way impaired. Besides this reduction in the cost of the machine, the decreased weight also insures a greater economy in transportation and in setting up, the total weight of the machine complete being about 650 pounds. This saw can be attached to any size of column, and will run with all the steadiness and accuracy of a heavier machine. The wheels, which embody quite a number of improvements, have hubs some 3 inches in length, with annular projections extending parallel to the axis on the periphery of the hub, through which a number of holes are drilled. The spokes, which are of 1-inch round iron, and threaded on each end, are screwed in these holes, as may be seen by reference to the cut. The wheel truck is made of six thin strips of wood glued together and covered with a leadless rubber band in the ordinary manner, and are trued up on the inside before the spider—i. e., hub and spokes—is put in. The uniform strain, expansion, contraction and sudden stress caused by chips getting between the saw-blade and wheels is allowed for by a combination of weight and spring, which tends to elevate the hub of the upper wheel. The weight maintains a uniform tension, compensating for variations in length arising from temperature, while the spring, which is merely a heavy rubber washer about 31/2 inches in thickness, regulates the tension of the saw in case of any sudden friction or strain. This combination is designed to save the machine from all sudden jerks and the consequent breakage of the saw. The table is so arranged that it can be tilted to any angle within 45°.
Boring Tools.

BY JOSHUA BOSE.

There are two principal methods of producing holes in material—namely, by drilling and by boring. When a hole is cut into solid material it is termed drilling, and when we engrave a hole that is already in existence the operation is termed boring. We find in practice that it is a very difficult matter to produce a round, parallel and straight hole with a drill of any kind; hence, when such holes are required in metal, we resort to a third process, which we term reaming, this being what we may call a corrective process. If we enter minutely into any of these processes, and especially into those of drilling and reaming, we find that they involve a great number of intricate mechanical and chemical points that are of the utmost importance, and that call for more consideration than can be given to them within the limits of a single paper. All that can be done, therefore, is to refer to some of the more prominent ones.

Beginning, then, with the wood-worker, we may classify his boring tools under the headings of awls, gimlets, bits and augers. The awl and gimlet you are all so familiar with that it is unnecessary to describe them. The center-bit, shown in Fig. 1, will serve for boring either across or with the grain, but is most serviceable for boring thin stuff, which it will do without splitting B, as augers having conical screws at their ends are apt—and, in fact, almost sure—to do. Furthermore, it requires too much pressure to force it to its cut when it is applied parallel to the grain of the wood. I must here call your attention to an important element in shaping wood-boring tools—which is, that the action of the cutting edges should be such that the fiber is severed at its ends before it is attempted to dislodge it from the layers from the end of the fiber. It will cut almost as well across the grain, but will not leave the walls of the hole so smooth as the form of auger-bit shown in Fig. 3, which has two wings, A and B, in advance of the cutting edge C, and, therefore, cut the ends of the fibers before the edge C comes into action to dislodge them. The object of the screw screw C is to exert a force tending to pull the auger forward and feed it, but it is found that when boring with the grain the thread of the screw was useless. Hence, in boring it is necessary to force the auger well forward to its cut. The pole-bit, shown in Fig. 4, is intended for end grain only. Its cutting edge extends half way across the end, and as it stands above the level of the hole will pull on the cuttings, which is an advantage when the hole is not bored all the way through the wood. The pole-bit or nose-bit is used for boring wooden pipes or pumps, and is made as large as 3/4 or 4 inches in diameter. It bores both straight and smooth. In Fig. 5 is shown A, the nail-bit for boring across the grain. It has the defect that it leaves a central core in the hole it bores, and will not pull it out. It is invaluable for end grain, as it would wedge itself in the fibers; it is stronger, however, than the gimlet, and is less liable to break and easier to work, especially in hardwood.

At B, in Fig. 5, is shown the spoon-bit, which, as its name indicates, does not extend to the point, extracts its own cuttings. It is more difficult to bore a straight hole endways than across the grain of wood, and this reminds me of a method resorted to by pattern-makers in making their core-boxes. These boxes are often made in halves, and the hole requires to be bored in the joint, so as to sink equally into each half. It often happens that the grain of the wood is not straight, and the auger screw is apt to follow the grain of the wood, and so bore out of line. To prevent this they cut a deep line in both halves of the core-box face, and it is found that the screw point will follow this line; or, in some cases, they saw a fine slot, instead of drawing the line, but in most cases the line is sufficient. To prevent the screw from splitting thin wood when an auger-bit must be used, a hole may first be pierced being nearly, or quite, as large as the head of the screw-press.

The stone-worker’s hole-producing operations are divided into drilling and boring. His tools are chiefly composed of carbide, either by means of hammer blows, the drill being revolving after each blow, so that the cutting process is in reality that of filing. On account of the abrasive action of stone upon steel, its wearers rapidly, and, as a result, the drill must be well spread at the end, so that the body of the drill shall not come against the walls of the hole and prevent the workman from lifting the tool after each blow. Fig. 6 represents a drill for stone, and you will observe that its cutting edge is rounded in its length, so that the bottom of the drilled hole forms a seat that acts as a vise to keep the drill central, and, therefore, maintain the hole as nearly as possible to size, and at the same time straight. In stone-working work, A, the black oxide of boric diamond is used as a revolving cutting tool, being placed at the end and around the edges of solid bars or rods for small holes, and similarly situated on the end of a tube for large ones. The object of employing a tube is to reduce the amount of cutting action by leaving a core that can be removed as the result of the tube as it descends into the stone.

TRADE PUBLICATIONS.

Mechanical Refrigeration.

The processes and apparatus of the La Vergne Refrigerating Machine Company, of this city, are described and illustrated in an interesting manner in a volume recently issued by that company. The matter covers some 24 pages and embraces 26 well-executed plates giving details of the machinery, as well as indicator diagrams and five single and double page illustrations of existing refrigerating plants in different establishments. During the past six years the company have made important improvements in their system of refrigeration, and now claim to have perfected a system of mechanical refrigeration as reliable as natural ice and vastly more economical. In the book here mentioned they present a concise and clear representation of the different processes followed, the difficulties hitherto encountered in making them successful, and the means employed to overcome them. Aside from the fact that the particulars will be found valuable to intending purchasers of refrigerating machinery, they are of no little interest to the general reader, giving, in a general way, the principles involved in cold-producing machines, refrigerating agents employed, the economy of different methods, and a large amount of other equally valuable information. About 20 pages, exclusive of illustrations, are devoted to the description of machinery erected in a number of places, and what we understand, has thus far given the most flattering results. Hints as to the true merit of refrigerating machines and as to estimates for the cost of a plant form the concluding portion, making altogether a most desirable addition to the literature of the subject.

Gas Machines.

The Pennsylvania Globe Gas Light Company, of Philadelphia, successors to the Ekin’s Manufacturing and Gas Company, have sent us an illustrated catalogue of their improved Royal gas machine. The pamphlet gives a full description of the gas machine, including cuts of the air pump and carburetter. The machine is intended to supply gas to all kinds of buildings, both dwelling houses and factories, the material used being gasoline. Ample testimony to the merits of their system is given in the number and character of the references appended to the catalogue.

* From a lecture delivered before the Franklin Institute, December 14, 1883.
Second Prize Design Ninth Competition.

We present herewith the remainder of the details belonging to the study which received the second prize in the Ninth Competition. The perspective view, elevations, floor and roof plans were given in our January issue, and a part of the details in our February issue. The crowded condition of our columns precluded the publication of all these drawings together. In the three numbers referred to, our readers have the complete study, which, as we have before remarked, is of a character to be of the greatest value to those who desire to use the drawings in a practical way in their business.

New Method in Gilding and Bronzing Wood.

The new composition now employed in France for gilding and bronzing wood consists of glue, chalk, linseed oil and paper pulp. The glue is first dissolved and boiled, mass forms a stiff dough which is hard when cold, but softens between the fingers and can be kneaded and pressed into molds. In a few days it gets dry and is then almost as hard as stone. The paper imparts tenacity to it, so that it is less affected by blows than wood is. Separate pieces of this mass unite readily, and it is easily attached to wood. The proportions of the four constituents are not stated, except that the proper proportions are recognizable by the feeling; in summer more glue is added than in winter, as it really decomposes (spoil). Owing to the glue, of course, it will not stand the wet, and could not be employed for articles exposed to the weather. When hard, the surface can be shaved off with iron, then polished with sandpaper, and finally coated with a size called "poliment." This, says Professor Meidinger, is a commercial substance consisting essentially of clay, with the addition of soap and fatty substances. For gilding it is used just as it comes; but for bronzing only blue or gray shades are used, and some dark pigment must be added, either fine black or umber. The dry pigment would make it too dry, and hence it must be softened by mixing it with melted wax and rubbing it up fine on a stone when cold. One-third of this is mixed with the commercial gray or blue poliment. To make it adhere to the ground, liquid glue must be added. Three or four coats are applied until sufficiently covered. For gilding it is painted over with dilute alcohol, and the gold-leaf immediately laid on and pressed down. For bronzing, a brush is wet with dilute spirits and dipped in the bronze powder, then silk tissue paper (such as comes between gold leaf is very excellent) is stirred in and rapidly disintegrated, then linseed oil is added, and finally chalk. While hot, the
being generally employed, because
of its adaptation to the require-
ments of fine cabinet-work, and
properties of quick and hard dry-
ing. Copal, anime and amber var-
nishes are also used, but are slower
drying. Veneered panels are usu-
ally "flowed" or "polished" when
the body work is dead-finished.
The number of coats required de-
dpends somewhat upon the quality
of the filler, but usually three
coats, and sometimes less, are
amply sufficient.

Drying Lumber by Steam.
The Lumber World says: Small
quantities of timber may be quick-
ly and thoroughly seasoned by
steaming. The philosophy of this
process—which, if properly per-
formed, does not injure the
strength or durability of the tim-
ber—is very simple. A very large
percentage of the sap in all kinds
of wood is water. This water,
heated to boiling, expands 1650
times. It follows that if wood be
heated to 212°, the boiling point of
water, the capillary cells can con-
tain only \( \frac{1}{1650} \) as much water as
at ordinary temperature, the ex-
expanded water escaping as steam.
The proportion of moisture left in
the wood is, after steaming, less
than that demanded by its ordi-

Dead-Finish.—This term, says an ex-
change, is applied to the finish produced by
the reduction of any of the rubbing varnishes
with powdered pumice-stone and raw linseed
oil, the surface thus produced being left
in the semi-lustrous state by omitting the
polishing process. It is now more used than
any other for body work, shellac varnish

Ninth Competition.—Fig. 22.—Front Eleva-
tion of North Gable.—Scale, \( \frac{1}{8} \) Inch to
the Foot.

Fig. 23.—Elevation of Gutter and Cornice
on Wing.—Scale, \( \frac{1}{8} \) Inch to the Foot.

Fig. 24.—Elevation of Front Gable.—Scale, \( \frac{1}{8} \) Inch to the Foot.
A Study in Suburban Architecture.—The Kitchen Finish.—Elevation of End of Kitchen, Looking Toward Dining-Room.—Scale, 1/4 Inch to the Foot.

Details of Work About Sink.—Scale, 1 Inch to the Foot.

Details of Wainscoting.—Scale, 1 Inch to the Foot.

DOOR TO CHINA CLOSET

Plan of One End of Kitchen, Showing Dresser and Sink.—Scale, 1/4 Inch to the Foot.

A Study in Suburban Architecture.

KITCHEN FINISH.

We present this month the kitchen finish in connection with the series of articles that have been appearing in our columns for some time past. A well-appointed kitchen is one of the most important features of a house planning, especially if the economical administration of domestic affairs is to be taken into consideration. Arguments for a well-arranged kitchen might also be based upon hygienic considerations. The author conducting an interesting set of experiments as to the influence of sand on the strength of cement mortar. Six different kinds of sand were subjected to test, and the results showed that the strength of mortars similarly made with the same cement depends on the coarseness and size of the grains of sand, and that in sands of equal size of grain that is the best whose grain is the coarsest. In order to determine the influence of the size of the grain, comparisons were made with several specimens of sand of various sized grains, and also with granite chips, the result always being in favor of the latter. It was further found that coarseness of grain is a more important factor in the quality of a sand than the size of grain, and that sand containing uniform sized grains is not always the best. On the whole, however, Mr. Arnold concludes that, although different kinds of sand yield different results with similarly prepared mixtures of mortar, it will not be justifiable in ordinary masonry to alter the prescribed proportion of cement and sand unless the exact quality of the sand employed is known.

The Gimlet.

The genesis and history of that very useful little tool, the gimlet, is thus described by Mr. Cail Smith in the columns of an exchange: "The gimlet is an offspring of the awl, and is of comparatively modern origin.

Actinolite Cement Booting.—Messrs. James Bros. & Co., of Montreal, Canada, are directing attention to what they call actinolite roofing cement. This cement is composed of a very fibrous mineral finely ground without destroying the fiber, mixed with coal tar in proper proportions and spread over two thicknesses of 16-ounce felt well cemented between each ply. The manufacturers state that this roofing can be successfully laid on either flat or steep roofs. They also state that a coating of this cement spread over tin, slate, iron or shingle roofs will make them perfectly water-tight. The cement is guaranteed not to run in summer and not to crack in winter, the fiber in its composition preventing this. In a letter, Messrs. James Bros. & Co. state that actinolite, the mineral from which this cement is made, is found in large quantities in certain portions of Canada. In process of manufacture it is reduced in attrition mills which do not destroy the fiber. Actinolite, a specimen of which we have examined, is of the hornblende family, and very much resembles asbestos, if, in deed, it is not the same. We understand that this roofing material has gained an enviable reputation among Dominion architects and builders. It is claimed to be practicably fire-proof, and a number of prominent buildings in Montreal have been covered with it.

Mr. H. Arnold, of Wilhelmshaven, Germany, has for some time past been conducting an interesting set of experiments as to the influence of sand on the strength of cement mortar. Six different kinds of sand were subjected to test, and the results showed that the strength of mortars similarly made with the same cement depends on the coarseness and size of the grains of sand, and that in sands of equal size of grain that is the best whose grain is the coarsest. In order to determine the influence of the size of the grain, comparisons were made with several specimens of sand of various sized grains, and also with granite chips, the result always being in favor of the latter. It was further found that coarseness of grain is a more important factor in the quality of a sand than the size of grain, and that sand containing uniform sized grains is not always the best. On the whole, however, Mr. Arnold concludes that, although different kinds of sand yield different results with similarly prepared mixtures of mortar, it will not be justifiable in ordinary masonry to alter the prescribed proportion of cement and sand unless the exact quality of the sand employed is known.

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March, 1884.

Carpentry and Building.

Traces of the dual use of the latter as both gimlet and awl are discoverable in Egypt as early as the nineteenth century before Christ, and no development of the gimlet as a separate tool was known, as is also the date of the invention. Pliny ascribes it to Dedalus; but whatever Pliny did not know he deemed it a point of personal and professional honor to make up, and little credit is to be given to this fable. The gimlet of the Greeks had the cross-head or handle of the style now prevalent. It also had possibly a hollow pod, as the earliest specimens found are of that type, but it had no screw point, and demanded a large expenditure of muscle, especially in boring hardwoods, where it was not very effective. Later a gimlet of square section, having sharp corners and tapering to a sharp point, was introduced and gave the hint for a form of auger now in use. In course of time the screw point was added, and the hollow-tool gimlet, with a point of this kind, was the only kind in use for many centuries. In England this was called a wimble. This form is still in use to some extent, and is effective where very shallow holes only are to be bored, but, as it has to be removed whenever the pod becomes full of chips from boring, it causes a waste of time when deeper holes are desired. The twisted or spiral form of gimlet, which is self-discharging, is an American invention, and only of very recent date. It has, however, superseded all other forms, and is now in common use. The field of the gimlet is becoming greatly narrowed, giving ground to the more rapid and convenient brace and bit.

CORRESPONDENCE.

The Principles of Handrailing.

From W. G. P., Toronto, Ont.—Now that the winter months are at hand, I would like to introduce the subject of handrailing again. In the first place, I would like to say a few words on what has already appeared in your columns, headed "Practical Stairbuilding." Unfortunately, I had not seen Carpentry and Building when the subject was first introduced; consequently, can only judge it by what I have seen of it. I object to it, in the first place, because a correct face mold is not produced. I consider a correct face mold absolutely necessary to produce a correctly finished rail. If it is for economy that it is so cut, then I may say that it may be cut smaller still, as the size of stuff required is, both in width and thickness, equal to the diameter of a circle that will contain the finished rail. When I say required, I mean that it is always enough for the square-cut system, where the center line of wreath and the center line of plank are also supposed to coincide. Of course, I am aware it is often more than enough, but when this parallel mold is used to cut out by, I would advise all beginners to use the elliptic mold as well, for by sliding the mold you set both the lines to shape the inside and outside of wreath-piece, and can at the same time get the spring bevels, or, if you got them by construction, it will at once prove their correctness. In the next place, the method of arriving at what is aimed at—viz., tangents on face of plank, bevels and center line of wreath—can be got at more simply and more expeditiously by other means. It is taken for granted that the pitches have been obtained in all cases in the articles on practical stairbuilding in Carpentry and Building, so I will do the same at present, but will say more on it at some future time, as I consider it of the first importance—the getting the heights—that is, the resting points, or, if you will, pitches.

Now, to produce all that is called for in the system laid down, say, for a 12-inch well, take two pieces of board 6 or 7 inches wide, nail them together at right angles, outside to stand on tangents to center line of rail on ground plan; apply your two pitches, then cut off to the marks, turn the sawn end down on to what you are going to cut your face mold out of, and mark down the sides of the template (or tangent box) on your stuff, and you have the two tangent lines on face of plank. Make joints square to them and square from face of plank for your spring bevels. Apply your bevel at right angles to each of the pitches on the tangent box for their respective bevels. For center line of wreath it is customary to bend it in a thin bevel. A correct face mold can also be got from the tangent box. Draw a line on ground plan so that when drawn on face of plank, when in position in the same direction, it will be level. This is what is termed by some the ordinate; it is really the inter-
section of the oblique plane with the horizontal plane, or a line parallel with it. Now, if you wish to strike the mould with tangents, this is the minor axis of the ellipse; if you use ordinates, draw them in the direction of this line and transfer the staff for your face-mold pattern. For the half-width of half of the mould at joints set off the half-width of half of the mould from corner of tangent box each way and draw lines to cut the pitches, and you have the width of mold, or, rather, the half-width of mold at each end. So, by this it will be seen that a center of gravity can be produced from the tangent box, not allowing my glosswork whatever. This is a simple and expeditious way of producing face molds for any kind of mold. In my next I will give you a system, equally as simple, by lines. Incluse diagram shows the plan of center of plane and tangent box, with its elevation and pitches, half-width of mold marked on from corner of box and drawn up to pitches for face-mold pattern. For the half-width of mold at both ends. In Fig. 2 is roughly shown what is produced from tangent box when cut.

Center of Gravity of Plane Solids.

Center of Gravity of Plane Solids.

Center of Gravity of Plane Solids. — From H. L. C. in the December number of last year, on "Center of Gravity of Solids," is an exposition of the subject, but as the immediate subject is square solids and moments and other technical terms is apt to confuse the average reader, I propose to arrive at the same result by a different method, which will clearly illustrate the principles which govern the problem. We will commence with the same figure illustrated in the December number, and as the terms weight and center of gravity, which are used in connection with a plane figure, we will use the term weight hereafter, as it properly belongs to the consideration of the subject.

We will, therefore, assume that each square inch of our figure weighs 1 pounds, so that the total weight thereof will be 35 pounds. Of this, each of the triangles will weigh 95 pounds and the parallelogram 102 pounds. Now, as the center of gravity of any body is situated in that point which if placed directly over a single point of support will naturally balance, or in equilibrium, and as the whole weight of the body is borne by the point of support, we will assume that the whole weight of our body is concentrated at the center of gravity. Now, as the center of gravity of every triangle is one-third of its perpendicular height above its base, and as our triangles are the same height, their respective centers of gravity will come on the line AB at C and D, and as the center of gravity of a parallelogram is at the intersection of its diagonals, we easily find the point E. Now, as the basis of our triangles are the same width, and as the line FG runs perpendicularly through the center of our figure, it follows that the points C and D are equidistant from the line FG, and if we add the distances together and place them at H, the equilibrium of our figure will not be disturbed as far as they are concerned.

We will now turn our figure down edgewise, Fig. 2, and we find that have two weights of 352 pounds each, one 24 inches from the base and one 16 inches from the base. Now, as these two weights represent the whole weight of our figure, any point of support that will keep them in equilibrium must be placed under the center of gravity of the whole figure, and as both the weights are upon the line FG, the point of support must also be placed under that line, and, as the weights are equal, it follows that the point of support must be placed the same distance from each, which will be at I, Fig. 1, and which is the center of gravity of the whole figure, distant 3 inches from the base. We will now pass to the consideration of an irregular trapezoid, ABCD, Fig. 3. We find, upon resolving this figure into a square and two triangles, one of whose angles is a great deal the largest, and the other one is upside down; but by making G F equal to E D we have the triangle G C F equal to E D B. We will now locate the centers of gravity of the two triangles and the square, as follows: 114 pounds at H, 13 pounds at I and 15 pounds at J. Now we find that, the two triangles C G F and E D B being equal, and their centers of gravity being the same distance from the center line Q R, and on opposite sides of it, we may do the same as we did in Fig. 1, and bring the weights J to S and T, on the line P Q. Now, we find that S and T are equidistant from the point H, and as the weights of S and T are equal, their common center of gravity must be at H, in the same place as that of the square O E F P. We can, therefore, divide the two triangles and the square together, 18 + 13 + 14 = 195 pounds, and place the sum at H. It is evident that, if we were not for the triangle C A G, our calculations would be ended, but we must now find what effect it has upon the equilibrium of our figure. Although it is not a right-angled triangle, it has exactly the same area as the triangle C G F, and its center of gravity is on the same line O P, so that we may immediately carry its 18 pounds of weight to S, on the center line Q R, and now turn our figure down edgewise, Fig. 4, and mark the position of the weights H and S. We will then consider that point H as being the center of gravity between H and S to be a lever, and that it is necessary to place a fulcrum under it and at such a position that the weights S and H will counterbalance each other. Now it is evident that, as H is ten times as heavy as S, S must have ten times as much of the lever as H; so we divide the distance H S into ten parts, and as the distance between H and S are 2 inches, 2" × 10 = 20", 1/10 of the lever, and 1/10 × 2" = 2", 2" arm, which brings the center of gravity of the whole figure on the line U V 6 1/2", or in the base line A B. Then we have yet to find the exact point on the line U V of the center of gravity for the whole figure, and to determine the position of the weights H and S. We will then consider that point P as being the center of the whole figure, and for this purpose we make the diagram Fig. 5. In this case we will not divide the large triangle A F C, but carry its whole weight to I, and that of the small triangle to J, on the line at that center and I; but we will have recourse to a different method, which will give us an opportunity to use moments.

Now, the moment of any body is the product of the weight of the body multiplied by the distance of its center of gravity from the fulcrum or axis around which it revolves, or would revolve if it had no other support except at that point. In calculating the moment of a body, its weight is generally expressed in pounds, and its distance from its axis or fulcrum may be indicated in feet or inches; if in the former, the moment will be in foot-pounds; if in the latter, it will be in inch-pounds. As all our measurements are in inches, we will use the latter term. Since we have no axis around which our weights have a tendency to revolve, we must draw
March, 1884.

**Carpentry and Building.**

**Private Telephones.**

From J. L. W., Jackson, Ga.—I am thinking of putting a telephone between my house and shop, a distance of \( \frac{3}{4} \) mile. I desire to make it as inexpensive as possible to be effective. I am aware that *Carpentry and Building* has heretofore published considerable information on this subject, but at the time I was not interested in telephones, and, accordingly, did not improve my facts. I will kindly give at this time such information as I am in need of you will confer a favor.

Anser.—Some two years since the subject of private line telephones working without a battery, commonly called acoustic telephones, was up for consideration in *Carpentry and Building*, and we investigated the subject as carefully as lay in our power. While different telephones were sent us, and we constructed short lines according to the directions and we gave them varying success reached by several of our readers in the use of similar apparatus, and the claims the inventors made long sounded. While some very satisfactory results were obtained, the general verdict was that the instruments not were not adapted for general use. Their working properties, it became clear, depended very largely upon conditions which are somewhat difficult to maintain in private lines. Among these may be mentioned the wire, and freedom from contact with limbs of trees and other similar requirements. We are aware that numerous improvements have been made since that time in telephones of this class, and that some of the instruments which we have inspected at fairs and expositions have seemed to work remarkably well, and possibly genuine. We made our investigations at a later date, we would be in a position to recommend something for private use. As it is, we are not acquainted with any apparatus of this character which is giving universal satisfaction. This is not saying, however, that such apparatus does not exist. Those forms of instruments which we investigated at the time above mentioned, if we mistake not, have entirely disappeared from the market, at least in the hands of those who formerly controlled them. To a certain extent the cheap forms of apparatus of this kind are now sold by "novelty" men, and the fact that the goods are handled in this way does not go far to prove the apparatus of doubtful value. If any of our readers are using acoustic telephones of a satisfactory character, it would be pleasant to hear from them. If this account meets the eyes of any manufacturer who has anything that he desires to say, he will be pleased to examine it with a view of publishing the results of our investigations in this journal. The matter of communication between house and office is of such universal importance that we feel willing to go to considerable trouble to obtain the merits of apparatus that is likely to be satisfactory to a large class among our readers who would use it if—were once brought to their attention.

**Siding Gauge.**

From A. S., Seattle, W. T.—I notice in both the Sept. and Nov. numbers of last year of *Carpentry and Building* inquiries...
about Nestor's patent weather-boarding

Instructions in regard to — the first fact I should seek to

bevels, what

have written in

the simplest

perpendicular-sided box can be marked on

any angle or inclination, all there is to do is to

bevel the edge of your board, and pro-

ceed precisely as if the sides were plum.

If the edges are to be left square, take a

piece of waste and place the edge of the scrap

across the beveled edge, and the check will show

whether it would serve as a lock to hold the sash
down. Of course, it is understood that the

joint that can be marked on the edge of a

long enough to cover with slate or shingles

more difficult to cover with slate or shingles

on the two sides of the stuff. It can be done

inside of five minutes, which would be less

fa or auxiliary rafter, with its foot ex-

the hips about 1 inch above where the

lipping the hip experience. Ten years ago I built two

sides splaying differently, sides of different

bevel, I would say that

to the right side of the meeting rail,

my letter is already too long. I appreciate

his diagram in the February number for

a method of constructing a mansard roof,

I would like to give detailed direc-

tions, with diagram, for making the simplest

they did enough

of mathematical calcula-

the advantages of mathematical calcula-

tions where necessary, and regret that

mathematics are not more studied by the

I object to using tedious and com-

tions, with diagram, for making the simplest

of making the simplest
described by architects whose standing

which, as we have pointed out in other

have written for

a very large hat on a small head; in other words, the foot of the rafter

more stress on it? H. McG. is practical,

than a straight one, and has nothing to

this construction makes a very strong roof,

why, then, have they not laid

knifing Tools.

brick, but I object to using tedious and com-

of making the simplest

the advantage of mathematical calculations

were not more studied by the

I think it would do much good; but I fear

for making the simplest

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CARPENTRY AND BUILDING.

March, 1884.

I put a manhole in each cistern. In the center from the bottom to the top I built a 4-inch brick wall, using good hard-burned brick for the purpose, laid in cement. I used no cement on either side of the wall. In operation the water runs from a tin roof into one side of the cistern and passes through the wall into the other half. In this there is placed a 2-inch lead pipe with a foot valve which connects with a McGowan Victor pump. The pump is attached to a vanless windmill which is erected on the house. I believe I am safe in saying that I have the purest water in the world both winter and summer. The tops of the cisterns are finished with iron covers set in cement. This fall I entered them to clean them out, but found no deposit worth speaking of.

Puzzle in Dovetailing.

From J. J. S., Bellville, Texas.—I inclose a drawing of what I call a double dovetail, or, rather, a dovetail in two ways. The first sketch shows the dovetail in perspective, while the second shows an inside view and also explains the manner in which it is put up. After the pieces forming box have been united it becomes necessary to secure the connections in the proper place, and also to obscure the extended recesses at the ends, as represented in Fig. 1 at C. This done, the connections cannot give way and the joint needs no glue or other similar means to hold it together. This puzzle is original with me, and I have made it during the last 15 years. This is the first time, however, that it has been explained to the public.

Groin Ceiling.

From J. W. D., New York.—I desire to learn, through Carpentry and Building, how to get an angle-rib to stand plumb over the line H K in the accompanying plan, and form the intersection of the two curved ceilings which meet at that point. The trouble in the case is that there are two given ribs. The curve C B of the cross-section is one, I O M of the longitudinal section is the other. The position of the ceiling in question is over the front gallery in a church, and the angle-rib is where the noon ceilings join. There is a very fine line window marked K in the plan. This window is 16 feet wide by 42 feet high. The architect says that the rib can be put up to stand plumb over the line H K in the plan. For my part I fail to find any method that from two given ribs will develop the required shape. I cannot see how I can have a true ceiling and a groin line plumb over the plan line named. If Carpentry and Building can enlighten me upon this subject it would be a favor.

Answer.—In the accompanying engraving we have represented all the more important parts of our correspondent’s sketches, and there is also incorporated in it a diagram showing the method by which the rib in question can be developed. We have omitted some parts contained in his diagrams which may be described in this connection. For example, the radius of the ceiling shown in the cross-section is given as 17 feet 9 inches, and the radius of the ceiling shown in the longitudinal section is given as 28 feet and 3 inches. The problem that is presented to our correspondent’s mind, therefore, is the development of the intersecting rib which shall mark the junction between the ceilings constructed to these two radii. Our correspondent is correct that the ordinary groin line or rib that shall stand plumb over H K cannot be obtained when the curves of both intersecting surfaces are given. The problem is very much like that of mitering raking and level moldings in a cornice. It is necessary to change the profile of one or the other in order to accommodate the given conditions. It is true that a rib plumb over the line H K could be devised which would be so adapted that both surfaces would end against its opposite sides. This would not be good construction, for it would be nothing more or less than forcing a solution of the problem. The only method, therefore, is to elect which one of the two ribs shall be taken as a basis, and then working out the profile of the other from it.

In order to illustrate the rule applicable in such cases, we will assume that the rib C B of the cross-section is to be the basis, and, therefore, that the rib corresponding to it is to be developed for the longitudinal section. The same set of lines and measurements for the most part may be used for developing the rib of the longitudinal section, and also for developing the shape of the groin rib. Divide the profile B C into any convenient number of spaces, as indicated by 1, 2, 3, 4, &c. From the points thus established erect perpendiculars from the base line H K, as shown in the diagram, will be the profile sought.

To obtain the profile of the angle-rib erect perpendiculars from the base line H K, as shown in the diagram below the plan. Continue these lines indefinitely. On the line drawn from the point K of the plan, as shown by K S, set off the vertical heights already obtained on the line A C, as previously explained, and which also correspond to the points in P M, all as indicated by the small figures 1', 2', 3', &c. From these points in S E we projected carry lines at right angles to the left, as indicated, producing them until they intersect lines of corresponding numbers drawn from the base line H K. Then a line traced through these points, as shown by S N M, will be the profile sought.

The principles underlying the determination of the two profiles here shown is equally understood. The height is the same in all cases. Thus, compare A C with P M and S R. The curves spring from a given level on the opposite sides, but the base lines over which they are erected differ in length. It becomes a question, therefore, of distributing a given height through curves of different lengths. Therefore, establishing points in a
normal or given profile and making use of corresponding points in the profiles to be obtained. Perhaps more will be done in this direction in the future, but the method has not yet been fully worked out.

Carpentry and Building.

Mar. 8, 1884.

PALMER & STORKE’S PLANES AND STEEL IRONS.

From W. S. W., Winter, Me.—A carpenter uses the best iron or hard-steel planes, Norman & Storke’s patent, Auburn, N. Y. From using them I find they do not clog as badly as the common plane, and yet I desire to make a firm job of it. Time in the accomplishment of this work is no object. I desire to give their ideas as to the best and most satisfactory method of Ergebnissen der Architektonischen Fakultät of the University of Heidelberg at the last doings of the Architects’ Club, has not as fine a calling as any on the globe, and except in the hardest times, a good carpenter is sure of work. And when one of your correspondents writes that carpentry has no connection with the Clark University, for the industries of which I judge by the demonstrations in your columns, it is a school of carpentry whose efforts are more than equal to those of the America at the present time.

Can you trust a woman for that when she has a man at her elbow intelligent and capable? In the absence of her ideas, I have watched his work sharply, but in seven years I fail to find why the young women who come in contact with him are so captivated in his manner. He is the best and easier to plan and conveniently for rooms (with his sister’s help), and I think that he can present pieces, sides, angles, and furniture for it, studying from Violett-Deuc and Jacquesmart in French, through the editors—who manage to keep a decent coat on, and yet are always able to make a firm job of it. The time in the accomplishment of this work is no object. I desire to give their ideas as to the best and most satisfactory method of

REPORTED ON THE ROADS.

Joining Rails to Newel Posts.

From E. S., East Providence, R. I.—I would like to learn, through the columns of the paper, how to run up a set of shelves, remodel a piece of our correspondent at the outset, is shown by the willingness of all parties to make a full account of their experience in building. They are the best that I have ever seen. I don’t know how to make the bread to my mouth and my children’s; and the double ashes were to go on the house at the beginning of winter, and I was waiting impatiently for the man to do the job. I would rather have my own hands in it than to run up a set of shelves, remodel a piece of

Auburn, N. Y. From using them I think the required profile will be obtained. The intersection, through which, if a line be traced, will be the best that I ever saw. I don’t know how to make the bread to my mouth and my children’s; and the double ashes were to go on the house at the beginning of winter, and I was waiting impatiently for the man to do the job. I would rather have my own hands in it than to run up a set of shelves, remodel a piece of

butchers.
of the skill and genius of the builders of the early years of the Republic. Some of these buildings have such historical associations as make them venerable. Artists have painted them and poets have made their names immortal. They are carefully kept and most jealously guarded. There are others that are scarcely known outside of the communities in which they stand, and, while they may be very dear to those whose earliest memories linger about them, they are in many instances allowed to decay and pass away without any effort to preserve them. Old buildings wherever found are of the greatest interest and value to students, whether considered with respect to their architectural or their constructive features, and those

AN EXAMPLE OF OLD-TIME CARPENTRY

BY A. O. KITTREDGE.

In different places throughout the older portions of the country there are to be found a few buildings which, having escaped the ravages of fire and the destruction of the elements, have come down to us as striking examples
A brief description, with illustrations, on the first page. It is a frame building, and is shown by the sketch in the upper corner acceptable.

some features of interest will no doubt prove penters than one built of more durable ma-

therefore probably of more interest to car-

of an old church building which possesses craftsmen living in older communities. To

to the claims of grace and form. The work was undoubtedly managed throughout by a
too years ago these portions remote from the Hudson River and other natural high-

ways were even further from New York City and other points of supply, so far as trade was concerned, than many parts of the far West at the present time. This building, therefore, of necessity was con-

structed out of native materials wrought by home labor, and it portrays in a remark-

able manner the state of the building art at that time. That the work was thoroughly done is amply evidenced by the stained frame, which is apparently good for another century. Sawmills were not easily accessible, and so we find that the timbers used in this build-

ing, even to the long rafters in the roof, were all hewn to shape. Cut nails and shelf hard-

ware as understood at present were un-

known in those days. Hand-made wrought nails and hinges of domestic manufacture are therefore conspicuous features, while the door latches are of patterns to warrant the lovers of the antique offering a premium for them. All of the hardware is guiltless of screws.

The quaint simplicity of the interior is shown by the first-page engraving. The high pulpit is supported by a pedestal that bears a striking resemblance to a modern goblet. It is reached by a narrow flight of stairs furnished with a handrail, in the construction of which the builders successfully dodged all problems of ramp and twist. The pulpit is crowned by a sounding board sus-

pended by a rod from the ceiling. The

An Example of Old-Time Carpentry.—Sketch Showing a Portion of the Roof Framing.

craftsmen living in older communities. To all such a brief description, with illustrations, of an old church building which possesses some features of interest will no doubt prove acceptable.

The external appearance of the building is shown by the sketch in the upper corner on the first page. It is a frame building, and therefore probably of more interest to carpenters than one built of more durable material. It is modest in appearance and unpretentious in all respects. There are no striking historical memories associated with it, yet it proves well worth a visit, whether the trip is prompted by mere curiosity or is, to the purpose of studying the methods of builders of bygone years. The building is known as the Old Brookfield Church, and is to be found in the little village of Slate Hill, some five miles south of Middletown, Orange County, N. Y. It was built shortly after the close of the Revolutionary War, as may be gained from the tablet which graces its front, a reproduction of which is shown at the bottom of the engraving already referred to. Times were hard in those days and money scarce, and accordingly not a few of the subscriptions toward its cost were made in labor and materials. The building, from this fact, may be taken as representing the skill of the average builders of that period. It is hardly necessary to say that no architect was employed. The building itself affords ample evidence that construc-

tion and design proceeded hand in hand, and

that the latter gave way to the former far

nearly portrayed in all of these structures, and this gives them value even if they possess it from no other source.

No observing mechanic can visit any of the buildings erected in the early years of the country's history without coming away with new ideas and higher conceptions. The con-

spicious honesty of the builders of that period, both in the materials employed and the construction chosen, fills him with ad-
miration, while the patience with which they wrought, laboring, as they were compelled to, with scanty tools and insufficient appli-
cances, commands his highest respect. The uniform excellence of their work compared with what passes current at the present day is refreshing, while the quaintness of the shapes employed and the designs that were common in those days add a charm to the whole that is indescribable. It is not

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April, 1884.

Carpentry and Building.

A page of text discussing the construction of a building, focusing on the design and materials used, such as white oak timbers and shingles. It describes the framing of the building, the use of scribing rules for cutting, and the importance of the building as an example of old-time carpentry.

Old-Time Carpentry.—Detail of Pilaster Back of Pulpit.—Scale, 3 Inches to the Foot.

Section Through Pilaster Back of Pulpit, Half Size.

The interior finish of the building is of pine, and has never been touched by paint or varnish or filling of any kind. It remains to this day just as it left the hands of the mechanics who put it in place. All the work is pinned together, and evidently was constructed of well-seasoned stuff. The

Molding at Line of Floor of Pulpit, Half Size.

it was cheaper at the time the building was erected to allow the surplus timber to remain than to cut it away. It is only upon some such hypothesis as this that we can account for the unusual size of the upper ends of the main posts in the frame. The post shown above the end of the gallery in the first engraving measured outside of the wall 9 x 11 inches in the smaller part, while in the portion shown above the brace it is 28 x 17 inches. The construction of the building is not above criticism in all particulars, as the reader will, no doubt, detect by even casual examination, and faults could be found if we had that object in view. The management of the braces in the corners is an example in point. The foot of the brace coming against the post below its largest part, is to be taken, however, as evidence that the increase in size of the upper part was introduced purely as ornament.

The heavy timbers employed in this building suggest the importance which attached to the "raising." It was a much greater event than any barn raising, both on account of the interest centering in the building itself, and by reason of the actual labor involved, considering dimensions and weights. The record is that people came 20 and even 30 miles either to assist in the work or to be witnesses of what was considered a remarkable undertaking. This, contrasted with present methods of construction, balloon framing, and modern appliances in the way of derricks and hoists, by which labor is reduced to a minimum, serves to show the changes that have taken place since the days referred to.

The interior finish of the building is of pine, and has never been touched by paint or varnish or filling of any kind. It remains to this day just as it left the hands of the mechanics who put it in place. All the work is pinned together, and evidently was constructed of well-seasoned stuff. The

Molding Around Pedestal of Pulpit, Half Size.

or narrow strips so placed as to adapt them to the size of shingles used. The present roof is composed of shingles of ordinary dimensions, laid upon lath, the product of a modern sawmill, and is in all respects very much like roofs of modern buildings. The siding of the building is of cedar, the boards being from 9 to 12 inches wide and 3/4 inch thick. The lower edge of each board has been straightened, and has also been rebated so as to show only 3/4 inch thickness. The lower edge is further finished by beading, a feature which always attracts the eye of carpenters who visit the building. The siding is in a fair state of preservation, and only a portion of it has required relaying in the necessary repairs which have been made.

The framing of this building is something which every builder who visits it finds of great interest. The work was all done by "scribe rule," and every joint is marked. The massive proportions of some of the timbers, particularly of those which carry the largest ends uppermost, suggests that

Molding Around Sounding Boards, Half Size.

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An Old-Time Carpentry.—The Key to the Meeting-House.

imported long before protection to home industries had been inaugurated or even suggested. The small panes and bluish cast which they possess are in keeping with other features. The walls and ceilings are finished in plaster. The lath employed are of elm split to size and carefully nailed in place. The quality of the mortar used would put to shame the shoddy contractors of the present day, while it would be hard to equal even where the very best is sought. The walls are almost as hard as rock, and some clinch pieces wrenched from the ceiling and exposed upon a hard roadway resisted crushing under the wheels of a loaded wagon almost like pieces of stone.

A number of the tools used by the mechanics in the erection of this building have been preserved as relics and are shown to visitors. Among them may be mentioned a handsaw made by Spear, in England, nearly 125 years ago, which is in a good state of preservation, and might be used at this day in competition with modern tools. A compass-saw has also been saved. Two planes—a fore-plane and a smoothing-plane—are likewise in the collection. An auger, a pair of dividers and an adz go to make the groined arch of cathedral roof, and the only thing which undeceives you is, on looking up far above your head, to see rifts of blue sky between the branches. But you are suddenly startled by a long cry of warning, which follows the rhythmic chopping sound of the axe and the swish of the saw. It is the woodman, and his melancholy cry portends the fall of a mighty tree. There is a long and labored groaning sound—it is the tree breaking away from the friendly base which has held it perhaps for ages. Then the tree has snapped in twain. The mighty mass trembles slightly for a moment, then inclines in the direction toward which the practiced woodman has designed it to fail. It topples—it falls. There is an awful crash—the falling tree is striking the branches from a fellow-tree which still stand upright, but not for long. There is a sound like a peal of thunder—the tree has struck the ground. The earth trembles for rods around as if there were an earthquake; there is a cloud of dust, and all is over.

The redwood is a most valuable kind of timber. It is very slow to burn, and if ignited is easily extinguished. It is very heavy and very dense in fiber, yet very easy to work, splitting with the utmost accuracy, and yielding to the saw, chisel, &c., with the utmost ease. When polished it makes a most handsome wood for interior fittings, and many of the finest houses in California are fitted with this wood in its polished state.

The California Redwoods.

of these redwood forests. You stand in the midst of vast trees, so close together that there is a dim, religious light around you like that of a cathedral. This delusion is furthered by the apparent regularity with which many of these trees grow. You can look down a long aisle as if it were a groined arch of cathedral roof, and the only thing which undeceives you is, on looking up far above your head, to see rifts of blue sky between the branches. But you are suddenly startled by a long cry of warning, which follows the rhythmic chopping sound of the axe and the swish of the saw. It is the woodman, and his melancholy cry portends the fall of a mighty tree. There is a long and labored groaning sound—it is the tree breaking away from the friendly base which has held it perhaps for ages. Then the tree has snapped in twain. The mighty mass trembles slightly for a moment, then inclines in the direction toward which the practiced woodman has designed it to fail. It topples—it falls. There is an awful crash—the falling tree is striking the branches from a fellow-tree which still stand upright, but not for long. There is a sound like a peal of thunder—the tree has struck the ground. The earth trembles for rods around as if there were an earthquake; there is a cloud of dust, and all is over.

The redwood is a most valuable kind of timber. It is very slow to burn, and if ignited is easily extinguished. It is very heavy and very dense in fiber, yet very easy to work, splitting with the utmost accuracy, and yielding to the saw, chisel, &c., with the utmost ease. When polished it makes a most handsome wood for interior fittings, and many of the finest houses in California are fitted with this wood in its polished state.

Among the items that contain a germ of truth, but which are so covered up with inaccuracies of statement as to leave the general reader bewildered, we may cite the following, which appears in a recent issue of a Chicago architectural paper: “The metal roofers are taking steps toward improving the quality of the zinc and tin employed in roofing, and making the use of the superior metal uniform.” Comments on this absurd statement are hardly necessary. If we had the writer of it in hand for the purpose of catechising him, we should probably ask what is meant by the “superior metal.” The tree is said to improve the quality of the “zinc and tin employed in roofing,” and this notion is very good. Our readers will notice that nothing is said about improving the quality of roofs by employing a better grade of materials, although it is evident that such was the real intention.
with a common drill held in the slide-rest. Re-bore the headstock with the center of the boss on its foot (Fig. 22 A), central with the axis of the lathe, and drill a 3/8-inch tapping hole to receive the hold-down bolt, and tap accordingly.

Fig. 22.—Longitudinal Section Through Headstock.

Now the mandrel will be bored in the same tool as that which bored the mandrel, in fact—turned to 3/4-inch diameter; hold them with two plates and bolts, Fig. 23, and turn their faces to 1/16 inches over, while thus held in position. Remove from the mandrel, and replace in the headstock, which will have now the sectional appearance presented by Fig. 22.

The back poppet will now be treated in a somewhat similar manner. The bottom will be filed true, and the projecting edges will be parallel and true for easy movement up and down the bed. The centers will be marked by the scribing block set as for the headstock. The centering, fixed by the angle-plate, will next be bored with the same tool as that which we used for the mandrel brasses, to the dimensions, Fig. 24, the sharp angle being the recess for the screw collar being cleaned out with a scraping tool. The boss for the set-screw will be drilled through for a 3/4-inch tapping hole and topped. The boss on the foot will be drilled and screwed to 3/4 inch, as in the headstock.

Fig. 23.—Turning the Faces of the Brasses.

Fig. 24.—Longitudinal Section Through Tailstock.

Our poppets are now ready to receive their mandrels and other fittings, the details of which we shall consider in our next article.
ness of the New York Trade Schools, where instruction is afforded in plumbing, stonecutting, bricklaying, carpentry, plastering and other branches of the mechanical trades. The Industrial Art Schools of New York are also achieving success. The class in carriage drafting and construction has already contributed many valuable men to the equipment of some of the large carriage manufactories of the land, and so highly appreciated are its works that the class is under the special patronage of the National Association of Carriage Builders. Wood-carving, modeling and other branches are being successfully taught in the Hollingsworth Industrial Art School of Philadelphia, while the Massachusetts Institute of Technology, Boston, has been giving instruction in practical blacksmithing, as well as in other trades, for a number of years. We have mentioned only a few of the efforts that are being made toward affording the youth of the land an opportunity to acquire an industrial education. Some of those institutions we have not mentioned are quite as conspicuous as those we have named. Seed has been sown upon good ground, and it promises an abundant crop.

What is known as the Chautauqua system of home study has become very popular in many directions during the past few years. It has remained for the National Association of Carriage Builders, however, to apply it to industrial education. For some years past the carriage builders, through a committee appointed by the National Association, have maintained a class in carriage drafting and construction in connection with a technical school in this city, and its success has been almost phenomenal. At a recent meeting of the association it was determined, in order to enlarge its sphere of usefulness, that the committee in charge of this class should arrange for giving instruction upon what is commonly known as the Chautauqua plan. By this means classes will be organized in various parts of the country, and their instruction will be carried on by correspondence upon a regular system. Lesson papers, with directions and schemes for elementary drawing, are to be sent out, and after these are returned they will be sent back with further instructions from the teachers. One of the gentlemen of the committee is reported as saying: "We are now ready to teach any apprentice or artisan in the land all the mysteries of mechanical drawing relating to the carriage trade." This departure in technical education is a novel one, but the very satisfactory results attendant upon the Chautauqua system in other directions warrant the expectation that it will be entirely successful. We commend it to the attention of all who are interested in the practical education of youth as a principle applicable in various directions.

It has occurred to a gentleman resident in Georgetown, West Indies, that a possibly valuable source of energy is allowed to run to waste in the tropics in the shape of the water which pours off the roofs of the houses whenever there is a shower. The gentleman, in question, in a lecture delivered recently before a local society, said that, "having been frequently struck by the great volume of water discharged from roofs during heavy tropical rains, it occurred to me that the power so wasted might be utilized in some way by converting it into electricity by the following means: The water from each roof might be conducted into one main drain-pipe, in which would work a small turbine wheel driving a dynamo-electric machine, the electricity so developed by every passing shower to be stored in accumulators of the type of Faure's secondary batteries. These, as they became charged in variable time, depending on the rainfall, could be collected and stored at central depots from whence the power could afterward be distributed uniformly, either by electro-dynamic engines or utilized for purposes of electric lighting." The cellars have been the points striven for by this author. The cellar is calculated...
under the dining-room and kitchen only. The chimney has been planned to start 2 feet below the ceiling of the dining-room. The chimney has been submitted with this design, from which it will be seen that sheeting was contemplated in addition to the siding:

Following is the "Bill of Materials" that has been submitted with this design:

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excavation</td>
<td>360 yds.</td>
</tr>
<tr>
<td>Framing Timber</td>
<td>56,000 ft.</td>
</tr>
<tr>
<td>Water Table</td>
<td>800 lb.</td>
</tr>
<tr>
<td>Window Frames and Glass Complete</td>
<td>1100 ft.</td>
</tr>
<tr>
<td>Flooring</td>
<td>1400 ft.</td>
</tr>
<tr>
<td>Inside Painting</td>
<td>325 ft.</td>
</tr>
<tr>
<td>Inside Steps</td>
<td>150 ft.</td>
</tr>
<tr>
<td>Rear Steps</td>
<td>10 ft.</td>
</tr>
</tbody>
</table>
|Inside Doors                      | 3 Inside Doors, 2 ft. 4 in. x 6 ft. 8 in. x 1¼ in. thick, 2 Inside Doors, 2 ft. 8 in. x 6 ft. 8 in. x 1¼ in. thick, 1 Inside Door, 2 ft. 6 in. x 6 ft. 8 in. x 1½ in. thick.
|Rear Doors                        | 1 Rear Door, 2 ft. 8 in. x 7 ft. 6 in. x 1½ in. thick, 2 Rear Doors, 2 ft. 4 in. x 7 ft. 6 in. x 1½ in. thick.
|Yard Doors                        | 3 Yard Doors, 2 ft. 8 in. x 7 ft. 6 in. x 1½ in. thick.
|Inside Windows                    | 5 Inside Windows, 2 ft. 4 in. x 3 ft. 2 in. x 1½ in. thick, 2 Inside Windows, 2 ft. 6 in. x 3 ft. 2 in. x 1½ in. thick, 1 Inside Window, 2 ft. 4 in. x 3 ft. 2 in. x 1½ in. thick.
|Rear Windows                      | 2 Rear Windows, 2 ft. 8 in. x 3 ft. 2 in. x 1½ in. thick, 1 Rear Window, 2 ft. 4 in. x 3 ft. 2 in. x 1½ in. thick.
|Skylights                         | 1 Skylight, 2 ft. 8 in. x 7 ft. 6 in. x 1½ in. thick.
|Inside Doors                      | 3 Inside Doors, 2 ft. 8 in. x 6 ft. 8 in. x 1½ in. thick.
|Rear Doors                        | 1 Rear Door, 2 ft. 8 in. x 7 ft. 6 in. x 1½ in. thick.
|Yard Doors                        | 3 Yard Doors, 2 ft. 8 in. x 7 ft. 6 in. x 1½ in. thick.
|Inside Doors                      | 3 Inside Doors, 2 ft. 8 in. x 7 ft. 6 in. x 1½ in. thick.
|Rear Doors                        | 1 Rear Door, 2 ft. 8 in. x 7 ft. 6 in. x 1½ in. thick.
|Plaster and Lathing               | 15¾ yds. |
|Outside Painting                  | 15¾ yds. |
|Yard Doors                        | 3 Yard Doors, 2 ft. 8 in. x 7 ft. 6 in. x 1½ in. thick.
|Inside Doors                      | 3 Inside Doors, 2 ft. 8 in. x 7 ft. 6 in. x 1½ in. thick.
|Rear Doors                        | 1 Rear Door, 2 ft. 8 in. x 7 ft. 6 in. x 1½ in. thick.
|Plaster and Lathing               | 15¾ yds. |
|Inside Painting                   | 15¾ yds. |
|Yard Doors                        | 3 Yard Doors, 2 ft. 8 in. x 7 ft. 6 in. x 1½ in. thick.
|Inside Doors                      | 3 Inside Doors, 2 ft. 8 in. x 7 ft. 6 in. x 1½ in. thick.
|Rear Doors                        | 1 Rear Door, 2 ft. 8 in. x 7 ft. 6 in. x 1½ in. thick.

William Peoples, of Allegheny City, Pa., writes us that the prospect of a good season's work in the building business around that locality at the present time is considered very favorable.
important a part in church ceremonies as "book and candle." Horace Walpole reckoned among the chief gems of his collection a silver bell, exquisitely wrought with figures of insects, and executed by Cellini. It has been used by the Popes when cursing caterpillars and other noxious insects which infested the fields. Southey has versified the legend of the Inchcape Bell. Off the Cornish coast also, near Boscastle, a whole peal of bells are said to be buried in the sea, and their chime is supposed to be occasionally audible. These bells were being brought to shore by a captain, who, when the pilot expressed his thankfulness at their safe voyage, reported that no thanks were due save to his good vessel. Whereupon the captain straightway sank with vessel, crew and bells, only the pious pilot being rescued from the general wreck. And the bells are said to ring still at times under the water.

Cheap Frame Houses.—Section Through Hall.

—Scale, \( \frac{3}{8} \) Inch to the Foot.

Bells have long been beloved of poets. Four centuries before Schiller wrote his "Song of the Bell," a bell had suggested to a royal minstrel the composition of a poem. In the "King's Quhair," James I, of Scotland, tells us that, in writing it, he followed the fancied advice of the bell he heard "ringing to matins."

"Aye, methought, and the bell,
Told me, man, what thou bestell.
And forth withal my pen in hand I took.
And made a cross, and so began my book."

Every one knows the old French story (familiar in English in many prose and poetical versions) of the unlucky lady who followed the supposed advice of the church bells, "Prends ton violet, prends ton violet," and decided on marrying her footman, afterward to discover that she had made a dire mistake, and that the bells had distinctly cried, "Ne le prends pas, ne le prends pas.

"As the bell tinks, so the fool thinks," runs an old proverb.

A parish in Perthshire formerly boasted an ancient bell of great repute in curing mental disease if placed on the head of the sufferer. It was also believed to have the property of extricating itself from the hands
of thieves. It was lately locked up by the parish authorities to prevent its being used for superstitious purposes. England was formerly called the "ringing island," from the multiplicity of its sets of chimes; but the Continent has now far eclipsed its reputation in this respect. Many descriptions of bells are now obsolete. But the dustman's and the footman's bells are things of the past, and the crier's bell is only heard in remote places. One terrible bell is also silenced—that sound once heard in the London streets two centuries ago, when the conductors of

tall chimneys that rise over the tops of the houses in New York and Brooklyn, pouring out their clouds of smoke, would have seemed miracles to our ancestors a few centuries ago. Even the pipe of a steamer or the chimney of a kerosene lamp they would have thought wonderful. In England, in the time of the Conqueror (1066), the fire was built on a clay floor or in a hole or pit in the largest room of the house. The smoke

Chimneys.

A writer in Harper's Young People gossips pleasantly about chimneys, as follows:

Chimneys seem so natural to us that we forget that there was a time when they were unknown. They were invented about the same time with clocks and watches. No house in ancient Rome or Athens had them. The Greeks and Romans heated their rooms with hot coals in a dish, or by flues underneath the floor. The smoke passed out by the doors and windows. You could always tell when a Roman was about to give a dinner party by the clouds of smoke that came out of the kitchen windows. It must have been very unpleasant for the cooks, who had to do their work in the midst of it. The

Cheap Frame Houses.—Back Stairs.—Scale, 1/2 Inch to the Foot.

Front Stairs.—Scale, 1/2 Inch to the Foot.

Vertical Section
Porch Gable.

Details of Porch.—Scale, 1/2 Inch to the Foot.
passed through an opening in the roof. At night a cover was placed over the coals. Everybody was by law obliged to cover up his fire when the bell rang at a certain hour. In French this was couvrefeu, and hence the word "curfew" bell.

Chimneys began to be used generally in England in the beginning of the reign of Elizabeth. No one knows who invented them, or when they first came into use. We find them first in Italy. In Venice they seem to have been not uncommon as early as 1347. In 1368 they had long been in use at Padua. They were at first built very wide and large, so that they could be easily cleaned. The wide chimney-pieces of some of our older houses are very curious. But as time passed on chimneys were made taller, narrow and often crooked. When they had to be cleaned it was customary to send boys up into them to remove the soot and ashes. It was then that the saddest stories were told of the little sweeps who were forced to climb up the narrow flues, and come down torn, bleeding and covered with soot. These poor creatures, who were often not more than seven or eight years old, were sometimes suffocated in the foul chimneys they attempted to clean. When they reached the top they were expected to look out and give a shout. No boy would ever become a chimney-sweep from choice, and they were often driven to climb the chimneys by the fear of a whipping. The cruelty of master-sweeps was fearful. The little chimney-sweep has passed away. His place is taken by a patent broom and a colored operator. Chimneys are built 200 and 300 feet high. In Birmingham, England, one fell down recently on a large factory, killing and wounding 20 of colored glass, the heads of saints and soldiers, the antique or the modern Japanese designs, are all to be had as brilliant in color as any imitation can be expected to be of the genuine glass. The glass thus prepared costs about one-tenth as much as genuine stained glass, and can, when it requires it, be washed without fear of injuring the surface.
The Wythe Automatic hoist that is being introduced by John Q. Maynard, No. 12 Outlookland street, New York. The first view shows the hoist in use as a dumb-waiter. The second shows the parts of which it is composed, and illustrates how it operates. The small engraving shows a side view. Besides being used in dumb-waiters, the device is equally applicable in the construction of light hand elevators and as a portable hoist. The special advantages claimed for this hoist are rapidity and the fact that it will hold its load at any point without a ratchet, brake or other auxiliary device of uncertain nature.

is that, when the shaft A is revolved by the hand-wheel G, the sleeve and trip-arm G engage with the lugs in the case of the outer eccentric ring H, revolving the same

and carrying therewith the lifting chain-wheel which is attached to it by projecting lugs on the side. The arm G is also provided with a projection which revolves the small eccentric ring K around the hub of the case, and is so arranged that the whole will travel around the common center or axis simultaneously. The circular pressure disk I is prevented from revolving by the guide disk L, which imparts a circular movement to the pressure plate. The load is raised by the chain-wheel, which receives its power from the shaft through the outer eccentric

and trip arm, but when the power ceases the load is prevented from running back by the inner eccentric ring K. For lowering the load the small eccentric is revolved in the opposite direction by pulling on the hand rope, thereby moving the pressure disk in such direction as to open the space for the larger eccentric to move into, which movement will continue as long as the small eccentric is revolved.

**Fig. 1.** Light Hand Elevator, with the Wythe Automatic Safety Hoist.


Our readers will understand the operation of this hoist from the following description of the parts of which it is composed and statement of their functions:

**Fig. 3.** Detail Showing the Parts of the Wythe Safety Hoist.

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**Sawdust Plastering.**

John A. McConnell, of 119 Water street, Pittsburgh, is calling the attention of builders to sawdust house plastering. The distinguishing feature of this invention is the use of sawdust instead of sand with the lime in preparing the mortar for house plastering. Among the advantages claimed for this material in the inventor's circular we notice the following: Sawdust plastering is warmer than sand plastering, for the reason that it is somewhat porous and full of small air spaces. The fire in a room will warm the inner surface of the walls composed of it, while in the case of sand plastering the face of the wall is always cold. Accordingly, it is argued that less heat would be consumed in the room than by the use of common plaster. The fact that the material is porous also makes it a non-conductor of heat and a non-conductor of sound and dampness. The further statement is made that sawdust is lighter than sand, and that it does not run out as readily as sand when made in the plaster, as in the case of sand. A glutinous substance is employed in the manufacture of this material, which gives the particles of sawdust firmly

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**Cheney's Compound Anvil and Vise.**

The Cheney Anvil and Vise Company, 115 Ford street, East Detroit, Mich., are manufaturing a combined anvil and vise with adjustable jaw that has several features to commend it for general use. The face of the anvil is chill-hardened and the jaws are steel-faced, thus adapting it for such rough use as occurs in repair shops, about farms and in various other places where a very fine tool is not required. A horn is presented on the end of the anvil which is used for various

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**Novelties.**

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**Fig. 2.** Side View of Hoist. **Fig. 4.** Swivel Jaw Vise, Made by the Cheney Anvil and Vise Co., Detroit, Mich.
overcoming the echo in churches and halls. These statements are certainly of interest, and if correct, the material will undoubtedly find ready use. We shall be glad to hear from any of our readers who have given it a practical test, in order to learn definitely of its merits.

Slate-Dressing Machine.

We took occasion some months since to describe briefly a manual devoted to the slate-roofing business, issued by Messrs. Auld & Conger, of Cleveland, Ohio, and at that time alluded to the slate-dressing machine which was advertised in the book as being of great interest to roofers generally. We now have the pleasure of submitting an engraving of the machine, from which our readers can gain a better idea of its scope and usefulness. The manufacturers offer it confidently as doing the work of from 5 to 20 men, and of performing it much better than in any other way. The knives are arranged as to be adjustable to any size or shape. The machine cuts and punches at the same operation, countersinks the hole, and cut the most difficult patterns, producing far more work in a day than the most skillful slate cutter by hand. A special feature of this machine is that it brings the different patterns to which slate are cut upon a common basis. For example, in cutting slate by hand those patterns which are the most difficult to cut, such as convex and concave points, necessarily command the highest price. By the use of this machine, on the other hand, one pattern is cut as easily as another, and, therefore, a larger profit is made upon the use of such as command a high price in the market, or else the Slater can give his customers the advantage. The weight of the machine is about 140 pounds; it is made of iron and steel, and is very strong and durable. At the price at which the machine is sold, the statement is made that it will pay for itself in cutting squares of any circular pattern. The machine is patented, and is sold including the right to use in specified territory.

Novelties.—Fig. 5.—Auld & Conger's Slate-Dressing Machine.

The manufacturer, Messrs. W. Tryon & McGuire, of Syracuse, N. Y., are putting upon the market a thimble known as "McGuire's Star Thimble," a general view of which is afford
CARPENTRY AND BUILDING.

Fig. 8 of the illustrations. The peculiar features of this thimble are shown in the engraving, and consist of the means by which the cutter-head can be raised and lowered while the saw is in motion in order to suit the work. This is accomplished by a hand-wheel in front of the machine below the table. The counter and shipper are attached to the frame. The machine is provided with a foot-treadle for actuating the traverse frame. As large as 14-inch saws may be used. The traverse is 24 inches.

Traverse Cut-Off Saw Bench

Fig. 9 of our engravings shows a traverse cut-off saw bench built by Goodell & Waters, 200 Chestnut St., Philadelphia. This machine, although specially designed for a cut-off saw, may be used advantageously for a variety of work, such as slitting, under-gaining, grooving and reluting. The mandrel is extended 3 inches from the solid collar to receive the square and bevel cut-off and slitting guides, expanding head or universal cutter-head. The mandrel is hung in a traverse frame in order to suit the work. This is accomplished by a hand-wheel in front of the machine below the table. The counter and shipper are attached to the frame. The machine is provided with a foot-treadle for actuating the traverse frame. As large as 14-inch saws may be used. The traverse is 24 inches.

The Wiles Spring Hinge

The spring hinge illustrated in Fig. 10 of the engravings does not differ materially at first sight from many other similar articles in the market with which our readers are generally familiar. The manufacturers, however—the Bartlett Hardware Company, of Freeport, Ill.—direct attention to features which indicate that it possesses far more than it would be judged to have on casual examination. They claim for it that it is the only spring hinge ever invented having its spring in the line of the pintle, and so constructed as to close the door until it is opened to a certain point, and when opened past that point to throw it open and hold it there. It is also a loose-pin hinge, permitting the instant removal of the door from the casing without turning a screw. It is also described as a spring hinge whose force is greatest when the door is closed, and whose force decreases gradually as the door is opened until it reaches the dead point, and increases as the door leaves the dead point and until it is wide open, where it holds it securely. The spring acts as a cushion or bumper when the door is fully open, and prevents it from striking the wall, and at the same time renders it impossible to break the hinge itself by any sudden jar as it is thrown back.

The question of the relative durability of roofs frequently arises, and copper is very generally admitted to be the most durable material now in the market for general purposes. Penurious Stephen Girard, of Philadelphia, in his time said that copper was also the cheapest, and it is held by some that the practical test to which it has been subjected on the Girard College buildings fully confirms his founder's judgment.
A STUDY IN SUBURBAN ARCHITECTURE.

We complete the illustrations of "A Study in Suburban Architecture" by presenting the mantel in the second story hall and in the chamber over the library. Our subscribers now have the entire series received, it has proved serviceable to a large number and in the interest of builders and house owners, and we know, from numerous letters we have received, it has proved serviceable to a large number.

NEW PUBLICATIONS.

"ÀMMIN'S CENSUS OF PENNSHIP.

We have received from Prof. Daniel T. Ames, of this city, the well-known author and publisher of works on penmanship, a copy of the new edition of his compendium of practical and ornamental penmanship. The work contains upward of 20 entire alphabets, with numerous designs for engrossed resolutions, testimonials, certificates, title-pages and monograms, together with numerous miscellaneous designs for the use of penmen and artists. The book is a large quarto, and has some 70 full-page plates, besides letter-press, depicting the art of practical writing. In the chapter last referred to, many excellent directions are given, making the book invaluable to those who are interested in penmanship either as teachers or as clerks and accountants. The question of position is carefully considered, and the subject of forming letters is discussed in a way to be of the greatest service to all who desire to acquire a neat, rapid and practical handwriting. While this work is called a new edition, it is in reality a new work, since only 13 out of the 70 plates contained in it are reprints. A feature which distinguishes this work from many others of its kind is that the plates are facsimiles of actual handwriting. They

tion to what may be considered pure and simple penman's work, a number of alphabets are given which are used in lettering architects' and engineers' drawings, also marking alphabets for the use of those who have superscriptions to put upon packages. A very handsome collection of monograms is presented, and a judicious selection of ornamental alphabets and initial letters. The specimens of engrossing which are shown are very fine, and may well serve as models for those who have work of this kind to execute. A very fine portrait of the late President Garfield appears in one specimen, while in the directions given in the early part of the book, with reference to the position of monograms, together with numerous miscellaneous designs for the use of penmen and artists.

A TREATISE ON CRANES. By Henry R. Towne

While ostensibly devoted to the cranes designed and built by the Yale & Towne Manufacturing Company, and including the light hoisting machinery by the same makers, this work really covers so much of the ground relating to cranes and crane work that the restrictive clauses of the title page hardly need to be inserted. Almost every type of light hoisting machinery and crane is illustrated with beautifully-engraved cuts of machines and details. In regard to the latter part of the work, Mr. Towne says that it is in some measure a record of the

COTTAGE CONSTRUCTION FOR VILLAGE AND COUNTRY HOUSES. TOGETHER WITH COMPLETE PLANS AND SPECIFICATIONS. By S. B. Roads. 138 pages, 9½ by 6½ inches; bound in cloth. Published by Orange Judd Co.

The character of this volume can be gained from the title, particularly when its coupling with the statement that most of the plans presented were originally contributed to the American Agriculturist. The author of this volume is well known to purchasers of moderate-priced architectural books by his volume entitled "House Plans for Everybody." The present volume in some respects may be considered supplementary to the former work. The illustrations consist of elevations and plans. The latter contain inside dimensions in lieu of scale. The descriptions of all known types, were subjected to the test of practice, and modifications and improvements introduced as experience was gained. It is in this review of the subject that one finds a vast amount of interesting and valuable matter, and the thanks of engineers are due to Mr. Towne for the frankness with which he has put these considerations of details on record. The engineer will put this work in his library with a feeling that it is a very valuable acquisition.

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While ostensibly devoted to the cranes designed and built by the Yale & Towne Manufacturing Company, and including the light hoisting machinery by the same makers, this work really covers so much of the ground relating to cranes and crane work that the restrictive clauses of the title page hardly need to be inserted. Almost every type of light hoisting machinery and crane is illustrated with beautifully-engraved cuts of machines and details. In regard to the latter part of the work, Mr. Towne says that it is in some measure a record of the

COTTAGE CONSTRUCTION FOR VILLAGE AND COUNTRY HOUSES. TOGETHER WITH COMPLETE PLANS AND SPECIFICATIONS. By S. B. Roads. 138 pages, 9½ by 6½ inches; bound in cloth. Published by Orange Judd Co.

The character of this volume can be gained from the title, particularly when its coupling with the statement that most of the plans presented were originally contributed to the American Agriculturist. The author of this volume is well known to purchasers of moderate-priced architectural books by his volume entitled "House Plans for Everybody." The present volume in some respects may be considered supplementary to the former work. The illustrations consist of elevations and plans. The latter contain inside dimensions in lieu of scale. The descriptions of all known types, were subjected to the test of practice, and modifications and improvements introduced as experience was gained. It is in this review of the subject that one finds a vast amount of interesting and valuable matter, and the thanks of engineers are due to Mr. Towne for the frankness with which he has put these considerations of details on record. The engineer will put this work in his library with a feeling that it is a very valuable acquisition.
the different markets of the country and the constant fluctuations that are taking place, both in price of materials and labor. There is comparatively little about this book that would be interesting to architects and builders. The latter may get a few ideas from it, but they would be in want of better specifications and more complete drawings before they would be in the best shape for executing the work shown. As might be supposed from the source from which the book emanates, being a series of papers published in a journal devoted presumably to agriculture, its character fits it more particularly for the use of farmers and those who consider house plans in an amateurish sort of way. To the general reader who is thinking of building, and desires a book describing arrangements of rooms and the general appearance of houses, it is of value.

A Study in Suburban Architecture.—Front and Side Elevation of Mantel in Chamber Over Library.—Scale, 3/4 inch to the Foot.


This is the third edition of a book which has been very favorably received by the building fraternity, and which has been known to many of our readers for some time past. It has been enlarged, and is now presented in a way to make it even more desirable than the second edition, which we noticed only a few months ago. The first part of the book is devoted to the consideration of mathematical problems and problems of construction, while the latter part considers the subject of Patents on Inventions. By Henry Connett and Anthony C. Fraser. Size, 5 x 7 1/4 inches, 226 pages. Published by Burke, Fraser & Connett. Volume I of the above work, made up of interesting articles on patent law, briefs of the more important decisions, and general information on all matters relating to the protection of inventions, designs and trademarks. Both in appearance and arrangement, the volume is exceedingly attractive, and careful attention bestowed upon its contents will not be regretted.

The Austen expanding water conductor-pipe and conductor fastenings have been before the public so long that there are very few in the roofing trades or in the building business who are not more or less familiar with them. Corrugated conductor-pipe, as this article is very commonly called, is made in two different forms. One of these in its general shape is square and the other round. The latter makes an approximate star in plan on account of the corrugations. A circular which Messrs. Austin, Obdyke & Co., of Philadelphia, are sending to the trade contains on the first page a general view of both styles of pipe attached to a brick wall. In the intervening spaces between the two views various elbows are shown, and also sections of the pipe, with illustrations of the use of the fastenings which are supplied with it. Cuts are presented also giving details of the fastenings themselves. One thing, however, that is evident, is that the expanding pipe is the manner in which it is attached to the walls of the building. The way in which it is managed in this respect goes far toward making it a desirable article for use, and what has proved desirable in this case we believe is equally desirable for use on pipes of whatever form or construction. Instead of the pipe being placed directly against the wall and lugged to it by straps or hooks, it is supported away from the wall, thus making a handsomer and more durable construction in every way. The conductor fastenings used with this pipe consist essentially of three pieces. The fastening proper is attached to the pipe by soldering, while the shank into which it fits is driven into the wall at proper intervals. The two are connected together by means of a pin. This construction permits of the pipe being taken down for repairs, in case such a thing should be necessary; holds the pipe away from the wall, thus preventing discoloration in case of internal pressure. The corrugated pipe is manufactured in lengths of 9 feet, and in different sizes and shapes are provided. These are so calculated as to meet all requirements where bends and curves are necessary in putting up the pipe. The pipe is shipped in open crates, and by nesting sizes the freight is greatly reduced.
CORRESPONDENCE.

Counter in a Hardware Store.
From G. J. E., Porter, Me.—I have a counter to build in a hardware store, and would be glad to see illustrations of work of this kind in 

Carpentry and Building.
I have no doubt that such a publication would be of interest to other readers.

Note.—We published a description of the fittings of a hardware store in our issue for May, 1883, which, perhaps, this correspondent has failed to notice. Also designs for counters and shelving in the number for March, 1883. Still, other designs would be very acceptable, and if any of our readers will undertake to supply them we shall be very glad to make the engravings and publish them at the same for the benefit of the correspondent and all others who may be interested.

Truss Roof for Church.
From W. H. F., Terre Haute, Ind.—In response to the question proposed by W. B. R., in a recent issue of 

Carpentry and Building,
I inclose sketch of truss roof made in the general manner of the former drawing sent by me, to the conditions named by the correspondent. A truss constructed as here shown, using the material specified, will be very handy, and is likely to cost much less than similar constructions in which truss rods and east wall-plates and other features usually found in a regular house trusses are employed. My way of putting up this truss would be to build a scaffold through the center of the building and then put the truss together, piece by piece, blocking up the scaffold for the necessary camber. Block in between all braces and spike ends together thoroughly with 2d. nails. Bolt all braces, and glace in the center where they cross the perpendicular struts, using 1½-inch bolts with 2-inch washer. The rafters, as shown in the sketch, should be about 2 feet between centers. Where the collar beams meet in the center allow them to fall below 1 inch. Size back 1 inch and nail on a strip 1 x 2 inches, passing under the chord and joining two collar-beam pieces. This will prevent plastering from cracking along the chord, and give good clinch to the mortar. I hope this construction will be found useful by W. B. R. and other readers of 

Carpentry and Building.

Tar on Shingles.
From J. A., Nantucket, Mass.—I have had some experience in the use of tar on shingle roofs, which perhaps will be of interest. I occupy a house which was shingled with pine shingles in the fall of 1853, something over 50 years ago. After the shingles were laid, the cost of tar was applied, and in a few years a second coat was given them. The shingles to-face on the east roof are in very good condition, and on the west roof are sufficient for some time to come. If any reader of the paper can tell how to make shingles last better than this I should be glad to hear it.

Note.—Our correspondent does not tell what kind of tar was applied to the shingles in question. From the circumstance he mentions, however, we feel safe in concluding that the tar referred to was not coal tar, which, if we mistake not, is the only material that has been mentioned in this general connection. Records of experience of this

character are of great interest as well as of value to all who are interested in building construction, but to be of the highest service they should be accompanied by the fullest possible particulars. If our correspondent please, we shall be glad to learn from him, in addition to what he has already communicated, the kind of tar employed and the manner of applying it—whether hot or otherwise; also some particulars with reference to the condition of the shingles—whether thoroughly seasoned before use or not. It would also be interesting to know the nature of the wear on these shingles. He mentions that one side of his roof is in better condition than the other, from which we conclude that the latter is approaching the end of its usefulness. Many practical readers will be glad to learn whether the shingles have given out in their exposed surfaces, or whether the decay has been principally in parts covered by lapping.

Tar on Shingles,—Diagram Accompanying Letter from J. A.

Problem in Hand-Railing.
From J. B., Osawka, Neb.—I have been looking over some of the problems on hand-railing, especially the one contained in 

Carpentry and Building for March, 1883. The latter shows an obtuse angle with a portion of a circle with two unequal pitches. The author of the demonstration of this problem has overlooked one point that, it seems to me, would prevent some of your readers from understanding how the bevel is found at A., as shown in the accompanying sketch. I have constructed a new diagram with a different pitch and with some alterations in the method, and submit it herewith. It will be understood, so that no explanation will be necessary. I have shown another system of finding the same bevel as B. Make 1 2 equal to 3 4, and 2 2 equal to 3 5. Produce 4 2 to 6. In practice it is not necessary to use all of the lines—only enough to ascertain how much the tangent of the face mold spreads, or, in other words, is out of square. Always use the minor axis on the rail; then we have three points by which to shape the rail.

Twist in Outside Blinds.
From C. M. R., Wheeling, W. Va.—An outside blind that is in twist or wind the wrong way—that is, one which is inclined to hang out at the top center when closed at the bottom end—is a fruitful cause of profanity among carpenters. In order to do as much good as possible to my brother chips, I will tell them how to obviate this wholly in the construction of the blinds. Where the slats are stationary, all that is necessary to

Problem in Hand-Railing,—Diagram Accompanying Letter from J. B.
tendency of twist in the wrong direction or to cause a twist in the opposite direction, which is no fault.

Bridge Construction.

From Bridge.—As one of the parties who submitted plans for a 50-foot-span railroad bridge illustrated in the February number of Carpentry and Building, it may not be courtesy in me to criticise the plan submitted by "Engineer," but as your specifications call for a free fight, I cannot resist the temptation to observe the established rules governing a free fight—whichever you see a head, hit it—and go in with the understanding that "Engineer," or some other man, may put a head on me.

In the first place, the maxim,—"Never trust a single rod," has, in my experience, saved two or three serious railroad accidents; but in one of them to the engineer of the cars across; with a single rod the engine and train would have gone through the bridge. In "Engineer's" bridge two suspension rods of 1½ inches diameter at each point, instead of one of 2 inches, would weigh but about 60 pounds additional for the bridge, and cost, at 5 cents per pound, but $3 extra, and give a greater value for strength.

I think "Engineer" should have a chance as a premium on that chord splice. Suppose those side-bars are intended to hold the joint as a clamp; this has a section of 32 square inches at the center. Estimating the truss at 350 pounds per foot, and the load at 1,500 pounds, would give in round numbers about 59,000 pounds as the tension at the center of the lower chord, and give about 2,800 pounds as the tension per square inch upon the oak clamp. The shoulders of the hook against the pine have an end area of 64 square inches, which gives a compression in both woods at that point of about 50,000 pounds, which is 35 per cent. of the tension of 89,000 pounds at the center.

The Length or Rafters.

From G. A. S., Adona, Ark,—I find that the quickest way to get the length of rafters is to multiply the length of the building with one-third pitch—is to place the spring of 6 inches for hight and 9 inches as the half width of the rafters, measuring the distance between the two points. This gives the correct length in inches. Calling each inch 1 foot, the length of the rafter from bottom to top beams must be used. For these to support a stick of 60,000 pounds we should have a beam of 1½ inches, allowing the same fiber strain that we have been using as a basis, for a depth of 16 inches a width of chord required is about 925 pounds per square inch. It was explained in the criticism that to support the same means a considerable increase required a width of solid timber of 16 inches. The chord is not strong enough to carry floor beams and load safely; consequently, needle
is found. From the point 9 outward is the bottom cut, and from 6 upward is the top cut. The same principle may be applied to any other pitch of roofs.

**Lines for a Curved Roof.**

From C. E. T., Medford, Mass.—In obtaining the lines for a curved roof I was taught to take the curve from the hanging of a chain. A curve derived in this manner I consider very pretty for the purpose.

**Amateur Striping.**

From C. M. R., Wheeling, W. Va.—Almost every carpenter has wished at one time or another that he could do a little striping on some Christmas toy or gifts for the children, or for some other purposes. Any one who has a drawing pen can do a first-rate job by mixing the paint as thick or a little thicker than india-ink and using it with a pair of calipers or with a straight-edge all round the pattern in the same manner as india-ink is usually applied.

**Planning of Stairway.**

From J. A. C., Taunton, Mass.—In response to the inquiry of J. F., Central Valley, N. Y., maybe obtained of Charles Babson, Phillips plow plane, inquired for in the December number by A. W. E., of Brockton, Mass. I inclose a sketch which shows well enough to make applications of it in my own work, and yet, if possible, I should like to have a method of figuring strains that I could use. I have now a weight of 45,000 pounds on the floor of a warehouse, which is supported through the center by a hemlock beam 8 x 10 inches and 28 feet long. This beam has four supports, one at each end and two between. The weight in this case I believe to be more than the rule given would allow as safe, and yet I am unable to apply the method of calculation so as to satisfy my own mind. I wish I could find out more about figuring the strength of timbers, joists, iron rods, &c.

**Calculating the Strength of Floors.**

From J. A. C., Taunton, Mass.—Answering the inquiry of J. F., of Central Valley, N. Y., maybe obtained of Charles Babson, Phillips plow plane, inquired for in the December number by A. W. E., of Brockton, Mass. I inclose a sketch which shows well enough to make applications of it in my own work, and yet, if possible, I should like to have a method of figuring strains that I could use. I have now a weight of 45,000 pounds on the floor of a warehouse, which is supported through the center by a hemlock beam 8 x 10 inches and 28 feet long. This beam has four supports, one at each end and two between. The weight in this case I believe to be more than the rule given would allow as safe, and yet I am unable to apply the method of calculation so as to satisfy my own mind. I wish I could find out more about figuring the strength of timbers, joists, iron rods, &c.

The same principle may be applied to pattern in the same manner as india-ink is usually applied.

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The rule referred to by A. L. F. is quite applicable to his case, with some slight modification. F. F. states the rule correctly for a load concentric at the center of the beam, but as A. L. F. has to deal with a uniformly distributed load, he will have to double the result to apply it to his case. Of the entire floor load of 45,000 pounds, the hemlock beam 8 x 10 inches x 28 feet, running through the center, supports one-half, or 21,500 pounds. As this stick is supported at equal distances, we suppose—it is divided into three equal lengths of, say, 9 feet each, which in turn have to carry one-third of 21,500 pounds, or, say, 7200 pounds. Multiplying now the square of depth of the beam by the breadth in inches, and dividing by the span in feet, we have

\[
S \times 10 \times 10 = 88.8
\]

and multiplying this by 80, the constant for hemlock, we have 7004 pounds, the load which an 8 x 10 x 9 foot beam can carry at the middle, and, as it will carry double that load if uniformly distributed, the beam is good for 14,000 pounds, or nearly twice as much as required. The constant of 90 for pine and 120 for oak, as well as 80 for hemlock, are rather high, however, and apply only to well-seasoned timber. Taking the constant derived by later experiments made by R. C. Hatfield, of New York, the value of A. L. F.'s girder would be found to be about 11,500 pounds safe load—still largely in excess of his requirements.

**Arrangement of Rooms.**

From H. H. M., Tottenville.—Answering the inquiry of A. J. R., of Bluffton, Minn., who some time since asked for an arrangement of rooms in a frame house of ordinary construction. I inclose a sketch of floor plans, showing how I would divide the house in order to get the most room and in the most convenient form. There are many houses built in this vicinity that have nearly the same features of ground plan. The one that I send has been practically tested, and is not simply a theoretical arrangement. I shall be glad to see the efforts of other correspondents in this same direction.

**Gimlet Quill Bit.**

From J. J. S., Bellville, Tex.—I inclose a sketch of a form of quill bit which, I believe, is not in the market. I devised this form of bit about 12 years since, and at the time attempted to secure it by letters patent, but found that I had been anticipated by a similar bit as far back as 1837. The advantages which this bit possesses over the form commonly used will be seen by an examination of the drawing. It cuts a clean, smooth hole, requires no pressure on the brace to operate it, bores equally well in all kinds of timber and is easily kept in good condition. It will clean the hole of chips when the motion is reversed, which no other
being made winding at the top, and their shed roof. The stairs take very little room, it will, however, inclose a drawing that may make a benefit to him and others. The plan is by A. J. R. dimensions are not the same as those given, it is very convenient for a small house. The J. E. H., From 0. D. H., From Tiffin, Ohio A. W., From foundry, Springfield, Mass. In view of this fact, I take the liberty of suggesting the propriety of continuing information on the subject of stair-building, although in past volumes the subject has been very thoroughly considered. Inasmuch as many of the younger readers have not seen it, it might be well to repeat what has already appeared on this topic.

Repetition of Stair-Building Problems.
From C. D. H., Hamilton, Canada.—I presume that new readers, especially young men, are being constantly added to the subscription list of Carpentry and Building. In view of this, I take the liberty of asking if the short arm of the syphon is shown to be 12 feet long. It is probable that there is sufficient depth to the water in the well to reach some distance up this pipe. As the discharging end of the syphon is 6 inches lower than the bottom of the well, it is probable that there is sufficient water in the well and the discharging orifice. In the sketch accompanying the inquiry from this correspondent the short arm of the syphon is shown to be 12 feet long. It is conveyed through a ¾-inch lead pipe part of the way, and a ¼-inch pipe the remainder of the distance. I desire to know how low the water in the well can get and yet run at the faucet.

Answer.—By the well-known principles covering the action of the syphon, the water should run from the lower end of the pipe, or from the long arm of the syphon, until an equality of level is established between the water in the well and the discharging orifice. In the sketch accompanying the inquiry from this correspondent the short arm of the syphon is shown to be 12 feet long. It is probable that there is sufficient depth to the water in the well to reach some distance up this pipe. As the discharging end of the syphon is 6 inches lower than the bottom of the well, it is probable that the syphon would discharge all the water in the well before it ceased its action, provided the short arm were lengthened to the level. Considerable length of pipe of small diameter is used in this case, and the friction of the water in it might perhaps be sufficient to overcome the action of the syphon in whole or in part before the level to which theoretic ally it should work. Other communications on the subject of syphons which have recently been published will probably be of interest to this correspondent.

A Long-Armed Syphon.
From Foundry, Springfield, Mass. In this vicinity there is a well from which water enlarged. I think it is unnecessary for me to say much about it, as the plan shows for itself. I may say, however, that the studs in the main part are 16 feet long, and that the rear is simply an 8-foot story with a shed roof. The stairs take very little room, being made winding at the top, and their location affords a convenient inside cellar-way. A house built on this plan and appropriately convenient would cost in this section between $600 and $700.

Arrangement of Rooms.—Forwarded by R. J. E.

Convenient House Plan.—Contributed by A. W.
Reviewer to Our Readers.

Hanging Doors.
From E. C. Howes, Galena, Iowa. I would like to ask T. D. G., of Silver City, Iowa, for an explanation of his method of hanging doors, described a short time since in Carpenters' and Builders' Guide. I cannot see the point, and do not understand that the try square, as represented in his sketch, is doing anything which could not as correctly do without such assistance.

Façades.
From R. D. M., Grand Forks, D. T. I would like to learn from practical readers of the paper how the radius line by which the fac-similes of the medals which have been represented in his sketch, is doing anything, and do not understand that the try-square, as indicated in the façades, is doing anything which one could not as correctly do without such assistance.

Splayed Work.
From R. D. M., Grand Forks, D. T. I would like to know how to find.

Fireproof Building Materials.
The Raritan Hollow and Porous Brick Company, with a capital of $115,000, of New York City, have issued a very neat catalogue of the products, consisting of hollow borax for fireproofing and deafening. Hollow barrel-clay bricks and porous terra-cotta bricks and blocks for the fire-proofing of buildings, and terra-cotta brick in their partitions and roofs. This form of construction is given the highest satisfaction, and bids fair to come into even more general use for the future. The Raritan Hollow and Porous Brick Company, in publishing their circular, call attention to the location of their factory which is on the Raritan River, near Perth Amboy, N. J., and in close proximity to the narrow of clay which forms the basis of their manufactured product. The company was first presented, following which are hollow barrels laid in their floors, and the materials, consisting of hollow burnt clay and porous terra-cotta brick in their partitions and roofs.

Splayed Work.
Inquiry by R. D. M. During jaunts of Gothic windows are struck is obtained, so that when the pieces are saved and bent to a flare they will fit the frame. I inclose a rough sketch of what I mean. The dotted lines marked "radius line required" are what I would very much like to know how to find.

Trade Publications.
Conductor-Pipe.
The Soldierless Standing Seam Conductor Company, Limited, of Alleghany City, Pa., send us a copy of its revised price list of the goods it manufactures. The trade generally is so well acquainted with the octagonal pipe which this company makes, and the construction which gives it its distinctive name that it is hardly necessary to enter into a description of this at the time. The pamphlet first presents front sights of the medals which have been issued, and follows with a succinct statement of the advantages claimed for this form of conductor-pipe. The third page contains a general view of the pipe in position, with sections showing construction and the provision made for expansion, and the fasteners by which it is held in place. Following this is a price list and views of sizes suitable for use in different positions. A page in the book is devoted to cast-iron shields, cast-iron sewers, and cast-iron pipe, the dimensions of which are shown, and galvanized wire-conductor strainers are likewise noted. The last page of the pamphlet contains circulars from various architects in Pittsburgh and Alleghany. A special sheet containing directions for putting up this conductor pipe accompanies the circular, and conveys information in such a way as to render it certain that the least adept will be able by its assistance to put up conductor-pipe satisfactorily.

Climax Door Hangers.
We have received from S. H. & E. Y. Moore, 163 and 165 Lake street, Chicago, a descriptive pamphlet of the "Climax" door hangers and other similar goods. This firm are Western agents for some 12 or more well-known Eastern manufacturing companies covering a very large line of goods, and are also manufacturers of the line of Climax door hangers and other similar goods, supplied with Moore's differential pulley blocks and Moore's freight-car door hangers. The pamphlet contains a general view of the hardware catalogue, with engravings showing the general appearance of the goods and various diagrams illustrating the construction of composition pulleys. Several different varieties of goods are shown adapted for different kinds of tracks and cars, with a description following for each position. The distinctive feature of the "Climax" door hanger is the anti-friction construction. The friction is overcome by a series of chilles and a concave or splayed face of the axle of the wheel in such a manner as to render it certain that the least experienced hangers and other similar goods. This firm

Stray Chips.
Misses. Gold & Ansdel architects, have just completed a building known as Blackstone Hall, situated on the corner of 11th street and 4th Avenue, Providence, R. I. The structure is three stories, and 70 feet wide, with a low parapet, and having a trussed roof, with the trusses and trussing done in beautiful tracery. The building is of brick, the red material of which has been recently reached in the litigation concerning hand-saw machines of J. A. Peet & Co., of Chicago. This question has been pending more than eight years, and has finally been decided by the Supreme Court of the United States, but whether in favor of the defendants or the plaintiffs, we have been unable to learn. The decision as published is quite lengthy and explanatory of the opinion of the lower courts. The building will be using the means of protecting wooden beams, girders and columns. A table of weights of the various kinds of materials constructed by this company concludes the work, which will well repay perusal by our readers.

Carpentry and Building
April, 1884.

Carpentry and Building.
Our readers will recall that in previous volumes we have illustrated various pieces of wood-carving executed by the pupils of the School of Design of the University of Cincinnati, under the direction of Mr. Benn Pitman. Conspicuous among these were specimens of the decorations of Mr. Pitman's residence, including the dining-room door and casing, sitting-room mantel and a mahogany bookcase. Each of these illustrated in a striking manner the originality of Mr. Pitman's style and the success with which he has worked out his own conceptions of American decorative art—something that is in no respect a copy of what other nations and races have done, but, instead, a direct outgrowth of a knowledge of American needs and culture. The design of a bracket mantel upon this page is a pleasing addition to the general collection, and, representing as it does still later effort upon the part of the designer and still greater skill in treatment and management, exemplifies very happily the mature fruits of a school in native decoration whose success in its own peculiar field is as pronounced as that of American literature or American illustrated art. Mr. Pitman's definition of his work appears in the following words: "The progress sought has been based on a discriminating knowledge of traditional art expression, on an appreciation of the relative and lasting value of Christian (Gothic) art forms, as compared with pagan (classic) art, on the scrupulous avoidance of meaningless and absurd forms, and, above all, on a reverent love and faithful interpretation of Nature's forms and their adaptation to the needs and necessities of to-day." From the outset Mr. Pitman's efforts have commanded attention. His own enthusiasm has been communicated to his pupils, and the reputation of his school has become world-wide.

Mr. Pitman has proceeded in his efforts upon the principle that all art worthy of the name—that appeals to the eye—must fill the two prime conditions of good construction and good decoration. He believes that while it is man's province to construct, it is equally woman's province to decorate. While men have no time, as a rule, to devote to art study and practice beyond acquiring such proficiency as has a fair commercial value, women have more leisure, and in many cases can pursue the study of art from pure devotion—or, if they undertake it as a means of livelihood, are likely to be more conscientious in their work, and more painstaking in all matters of detail. With these facts in mind it does not seem strange that nine-tenths of the artistically decorated work that has been exhibited by Mr. Pitman's pupils during the past 20 years should have been executed by girls and women. The articles made by Mr. Pitman's students are, as a rule, finished with an amount of taste, care and elaboration that a manufacturer, even if he were able to command the necessary skill, could not afford to expend upon articles made for sale. Accordingly, the work of these art students has a distinctive value of its own.

The constructive features of the accompanying design will be readily understood and need not be described in detail. The length is 4 feet 6 inches and the height 3 feet 6 inches. The decoration at the top, immediately over the small shelf, is ground or sunken. The two panels at the sides of the central bracket show a diapered background. The three panels in the lower part show oak leaves and acorns cut 1 1/2 inches deep, while the decoration on the lower rail represents Alpine bells incised. The monogram in the shield indicates the designer. The upright stiles are 3 1/4 inches wide and 4 inches deep. They are strong both in appearance and in fact, but are not so large as...
to look clumsy. The decorations on the stiles, on the arched cap molding, on the most part conventionalized leaf forms. The shelves and on the brackets are for the whole combines to form a rich article for look well in a small sitting-room. A fitting room than anywhere else. Still, it would mantel is perhaps better adapted to a bed¬
might be simply painting with floral designs.
accompanyment in the way of finish around
fondly hope will yet appear, and which, it is
of architecture, something which students
clearly shown, is an impossibility in the form
in Twenty-third street, between Seventh
This writer approaches his subject in a spirit
furniture and two for tradespeople, one for servants and
takes in such matters as fire-proof roofs,
put on the elevator, which
accommodation in the way of finish around
by 80 feet in depth, and is 12 stories high.
measures 175 feet front on Twenty-
rent, but so far the rents
promises to make New York a city of 20-
enormous height of the prevailing style of
enormous hight of the prevailing style of
in Twenty-third street, and a fine restaurant, 50 feet by 50, so the tenants can take their meals if they want to. Each apartment, no matter how small,
additional characteristic, whether the buildings
and steam heat. In the apart¬
be 15 stories high, and there is talk about another which, it is said, will, throw even this into the shade.
The writer approaches his subject in a spirit of earnest nquiry, and, tracing the general
periods, makes an excellent point at the principle of adaptation through historical
The writer approaches his subject in a spirit of earnest inquir, and, tracing the general
In the present time who are so improvident as
in course of erection near the Park, in
promises to make New York a city of 20-
trading in the great stores on Twenty-third street,
the same exactly as that of heating by steam, only instead of heat the refriger¬
can be maintained. The question of insurance against fire is one which concerns every business man and
The following description of the Chelsea apartment-house, now approaching comple¬tion in Twenty-third street, between Seventh and Eighth avenues, this city, written by the resident correspondent of a Western
It is seldom con¬
rent, and each one is kept cool by a coil which receives a current of freez¬
ed to it beyond the endeavor to sustenance by the community at large, and yet
Every visitor to New York during the last few years has been impressed with the enormous height of the prevailing style of
policies. Inasmuch as this amount is usually
The question of insurance against fire is one which concerns every business man and
The placing of a large, iron or cast-iron boiler, and the efficient means of ensuring its proper
in course of erection near the Park, in
The writer approaches his subject in a spirit of earnest inquir, and, tracing the general
in course of erection near the Park, in
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insurance a premium is paid, the rate to the present time who are so improvident as
as well as the standing of the company issuing the policy. Insurance as this amount is usually
In the present time who are so improvident as
The actual yearly cost to the stockholders will depend a good deal upon how well the stores and
The average cost of apartments is about $750, some costing as low as $500, and
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Zinc Roofs in Europe.

A young German architect who visited this country a short time since, and who gave our building construction very careful examination and study, after his return to Dresden wrote a letter discussing zinc roofs in Europe, commencing particularly with tile and slate. We reproduce the principal parts of the letter in question as likely to be of interest to our readers.

"In a former letter I attempted to make some comparisons between the various materials used for roofs, showing, in some respects, the advantages of zinc in point of quality, price, and durability, and particularly those in which it is very important in regard to cost, and which it always requires much consideration and care in its application."

According to this, the advantages of zinc are too expensive. Great care must be taken to make the surface to be covered as small as possible, and to prevent the roof becoming too porous, so as to avoid a massive sub-structure. Finally, the roof must not require much money or trouble to keep it in repair.

A slate roof should pitch from one-half to one-third the width of the building, and last 25 years. A slate roof from one-third to one-fifth, while, in the case of a zinc roof, one-ninth of the width is sufficient if the roof is carefully laid. Roofs of porticos, balconies, &c., which are nearly flat, cannot be covered with sheet metal or zinc. The less the pitch of the roof, the smaller its surface. Take, for instance, a roof of an ordinary building, 60 feet front and 44 feet deep, including projections, the surface would be, for a tile roof, with a pitch one-half the width, 3760 square feet, while at one-third of the width it would equal 3180 feet. The average would be 3450 square feet. A roof, with a pitch of one-ninth the width, would equal 2830 square feet. The average of this would be 3000 square feet; the width would equal 3180 square feet, and at one-fifth the pitch 2700. In wet weather, for example, a zinc roof gives much less trouble than a slate roof.

Wall Roofs.

The materials used in this country for roofs, when properly selected, are perfectly adapted to the requirements of a comparatively large family, and will present attractive features. The author draws particular attention to the arrangement of entrances both front and rear, and also to their connection with the roof. An abundance of light is supplied to each room, while at the same time the number of windows in the whole building is not large. The plan is such as to adapt the house to the requirements of a comparatively large family. It is also evident that very desirable workmanship and a great saving are secured, and that the whole structure will present attractive features.

For the contest in designs and plans of $1500 houses resulted in many respects very similar to that of the $800 houses, the particulars of which were recently laid before our readers. All the better designs submitted by the most careful calculations run in cost above the specified limit when estimated by prices ruling in the markets of New York and the East generally. If the exact limit of cost had been adhered to in deciding this competition, it would probably have been necessary to return to the authors of the efforts submitted all of those which were at the time available for publication.

Fourteenth Competition. - Perspective View of Design by John L. Wees, Bridgeport, Conn.

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Building Contract.

S sued B for $425.50, the balance due him for building a two-story brick house, and made a counter claim for defective material thrown out, and money expended in repairings. The jury found the plaintiff was entitled to $2555, and the defendant had paid $802.40; the counter claim was $2085, which the defendant did not admit. The defense to the counter claim was a novel one: That the plaintiff had "no excuse for carrying on the work," as the defendant knew. The case—Sherman v. Bates—was carried to the Supreme Court of Indiana, where a judgment was rendered in favor of the plaintiff. Judge Maxwell, in the opinion, said: "A party entering into a contract to construct a house and building for another, and making a counter claim for defective material thrown out, and money expended in repairing, to which the plaintiff took exception, and on which the jury assessed the value of $2555, and the defendant had paid $802.40; the counter claim was $2085, which the defendant did not admit. The defense to the counter claim was a novel one: That the plaintiff had "no excuse for carrying on the work," as the defendant knew."
tractor agreed to erect a building in a certain manner, he must comply with the agreement, and no plea of a lack of skill of himself or any of his workmen or sub-contractors will constitute a defense for a failure to comply with the contract.

Adaptation in Architecture.

Probably there are very few people who have not at some time or other noted the fact that a building which looks well in one manner, and no plea of a lack of skill of himself or any of his workmen or sub-contractors will constitute a defense for a failure to comply with the contract.

Adaptation in Architecture.

Probably there are very few people who have not at some time or other noted the fact that a building which looks well in one locality looks totally different in another. It is not an infrequent occurrence that a man about to erect a residence sees somewhere a neat and tasty design, and, being pleased with its appearance, proceeds to obtain plans which shall embody "not every single feature, you know, but the general expression of the whole." After the building is completed, the result is in nine cases out of ten very disappointing, and the maker of the plans is blamed—blamed justly, too, to a certain extent, inasmuch as he ought in the beginning to have made clear to the intending builder the reasons why it would not be pleasing when done. He should have explained that the site and surroundings required a structure which should be in harmony with them, and that a building designed for another situation would, unless surrounded by precisely the same conditions, be entirely out of place here. Two examples of such mistakes occur to us as we write. In a busy New England city there stands a picturesque wooden dwelling, which, if situated in a suburban neighborhood and surrounded by trees, would, with its quaint balconies, oriel windows and shingled sides, give a most pleasing effect; but, standing as it does in a cramped yard within 50 feet of one of the principal business streets of the town, the impression conveyed is most painful. Again, in a Western city there stands a brick schoolhouse which, if seen only from a distance, would have a charming appearance, but, being within perhaps 100 feet of one of the most frequented avenues, and being wholly lacking in detail, it seems sadly out of place. Ever since mankind first began to learn the art of building, this great principle of adaptation to place has been recognized by the most advanced in the arts of design and construction. Even before men had advanced sufficiently to reason why a building looked well in one place and badly in another, they knew it to be so, and instinct and necessity helped them to avoid mistakes. We are told that "necessity is the mother of invention," and, as each of the ancient nations which made any pretension to architecture was obliged largely to originate its own style, it is more than probable that the necessity was at the bottom of their originality.

One point which forcibly strikes every student is that the system in use in any one of the nations of antiquity was admirably adapted to the conditions of nature and the needs of the people existing therein. Take, under such conditions a pyramidal form was most pleasing. Aside from the mere question of looks, there were other reasons for choosing this form. We find the Egyptian rulers ever striving to make their works as nearly everlasting as possible; and when we remember that it has been truthfully said that the most enduring structure with which man is capable of opposing the elements is a pyramid of earth with sides sloping at a gentle angle, we see at a glance the wisdom of their choice of form. In all probability the immense blocks of stone were substituted for earth in order to offer more effectual resistance to human marauders. Of course, from the very nature of things, it was impossible to compel the Pyramids to do duty as temples; but almost universally through buildings of the latter class, whether erected before or after the construction of the Great Pyramids, do we find adherence to the principles of the former.

Passing along a little further we come to India, where the climate is much the same as in Egypt in many respects, but where the other conditions are very different. It is rather difficult to assign a valid reason for the existence of those vast rock-cut temples, which, hewn as they are from the living rock, have no parallel in the world's history; for example, the structures erected by the Egyptians, which are, perhaps, the most ancient in existence. The habitable portion of the country consisted principally of low, level strips of land adjacent to the Nile, with few hills excepting back among the mountain ranges; and the builders soon learned that
May, 1884.

was mild and delightful, and the builders were not obliged to guard against either the burning sun of Egypt or India, or the snows and chilling winds of the northern countries. The surface of the country was rather broken, and contained many small elevations which they delighted to crown with temples. Their chief building-stone, marble, seemed exactly suited to the climate, and gave an effect of solidity combined with liveliness which could be obtained with no other material by builders among whom the arch and its possibilities were unknown.

The Gothic system, on the other hand, came into existence in a cold northern climate where there was much to contend with in the shape of ice and snow and heavy rains, and was designed to meet the exigencies of such regions. The Gothic builders knew better than to use white marble and smooth-cut surfaces, as did the Greeks. Instead, they made use of a tougher material, with surfaces often left rough where exposed, in order that the elements might leave fewer traces of their destructive work. Their skies were not brilliant enough to permit the shutting out of a large portion of the light, as was customary in more southern countries, and we find all of their cathedrals designed with large and numerous windows in which the direct sunlight was softened—not excluded—but by bits of glass of many colors. On account of the absence of earthquakes and similar disturbances, they were able to rear those lofty arches and slender columns so delicately poised that they seemed liable to fall at any moment, yet so skillfully built that after the lapse of centuries they appear as strong as ever—the admiration and delight of modern artists. Even in China—"the home of the earthquake"—we find a corroborating instance of the excellence of our theory in the pagodas and temples, whose elastic timber frames enable them to remain upright through shocks which would prove certain destruction to structures of stone.

Thus, briefly, we have attempted to show that in each of the ancient nations the prevailing style of building was better suited to the wants of that nation than was any other then in existence. Nowhere do we find traces of any Indian or Egyptian buildings having been introduced into Greece, although we are quite certain that the Greeks were acquainted with Egyptian methods. Nor did any of the tribes of the Northern countries attempt to import Greek or Roman styles, although they frequently wandered as far south as Rome or Athens. No, they knew better than to compel a structure designed for one country to do duty in another where all conditions were totally different, and it was left for more modern builders to undertake, with such results as those for religious purposes and those for defense. Of the former we have already spoken in a general way, and we will turn our attention to the latter.

In the warmer climates works of defense seem to have consisted chiefly of immense walls surrounding the cities, with here and there a citadel or keep; but among the feudal lords of the north other conditions prevailed, and gave rise to the castles scattered all through the northern cities of Europe and America. So far we have been dealing entirely with generalities; now let us see if we cannot gain a little information from particular classes of buildings, and from parts of the same. Nearly all ancient structures of note were divided into two classes—those for religious purposes and those for defense. Of the former we have already spoken in a general way, and we will turn our attention to the latter. In the warmer climates works of defense seem to have consisted chiefly of immense walls surrounding the cities, with here and there a citadel or keep; but among the feudal lords of the north other conditions prevailed, and gave rise to the castles scattered all through Great Britain, Germany and France. Investigation shows that these castles almost invariably crowned some eminence—usually rocky and difficult of access—and that, while almost devoid of outward ornamentation, their outlines took largely of the spirit of their broken and irregular sites, forming a most picturesque aspect. Their builders understood that their work was to be seen principally from a distance, and disposed of their masses in such a way as to obtain the desired result without recourse to detail. Later on, after the dwellers in cities had become wealthy, through success in their business pursuits, they, too, began to turn attention to the building of substantial residences. Do we find many castellated dwellings lining the streets of Germany or England? No, far from it. The designers knew that the city walls would furnish all necessary defense, and that, as the buildings were to stand close upon the street, they must be able to bear close inspection. Hence we find every-
cliffs under the shadows of these same castles, we find those beautiful German cities, along whose every street stood and still stand the dwellings of the merchant princes.

Looking again, we see that work designed for use at an elevation of 40, 50 or 100 feet was never used near the level of the eye, and that anything suitable to be seen closely was not sent up aloft. This is one of the most important laws of design, and should never be lost sight of. There is an ancient legend to the effect that two of Athens' greatest sculptors—Phidias and Polycletus—were once invited to compete for the honor of making the statue of Jove which was to crown the lofty pediment of a magnificent temple just completed. The people were to be the judges. Upon the day appointed, the two statues—veiled—were brought to the public square in front of the temple. When, at the given signal, they were uncovered, that of Polycletus appeared so smoothly rounded and so beautifully lifelike that it was almost impossible to believe it to be the work of mortal hands, while that of Phidias looked rough, angular and crude by comparison. At once the shout went up, "Polycletus, the prize is thine!" But Phidias, standing beside his handiwork, simply said, "Let them be hoisted to their places." The workmen at once complied, when it was seen that the smooth and perfect work of Polycletus had dwindled to insignificance and appeared a shapeless mass against the sky, while the other, toned down by the distance, seemed to show every outline and feature smoothly and perfectly. The people were astonished for a moment, then shouted unanimously, "Phidias, thou hast won!" Whether the legend be true or not, the principle which it embodies is true and as immutable as are the everlasting hills, and the close investigator will find it exemplified in every line of ancient work. Thus we have followed this idea of adaptation and ornament of ancient work.
through a few of its various stages, and have seen what was at first a mere instinct, originating in necessity, grow in length and breadth until it became a law governing not only the general style of a nation, but each individual work and portion of the same.

Fourteenth Competition.—Section Through Cornice.—Scale, 1/4 Inch to the Foot.

Elevation in Hall Opposite Front Door.—Scale, 1/4 Inch to the Foot.

LATTICE WORK

Details of Front Porch.—Scale, 1/4 Inch to the Foot.

One more point and we will close this somewhat rambling paper. It has come to be a standing complaint among our architects and others interested in architecture that as yet no distinctively "American" style has been developed. It seems to us that this same question of adaptation has much to do with the matter, and the grumblers should remember that our country is situated rather peculiarly in some respects. While the territory of each of the older nations lies (with the exception of the colonies) almost wholly within single zones, thereby insuring the same climate throughout, ours extends from a northern latitude in which winter reigns from November until March to the semi-tropical tropical regions of the South, were frost is never known; and any style developed in the North would be as much out of place and as incongruous in the South as would a Gothic temple upon the Acropolis of Athens. Nor would a system originating in the South be any better suited for use in the North. To be sure, there are isolated examples of old Gothic work scattered through the more southern portions of Europe, and comparatively modern imitations of Greek and Roman work can be found in abundance in the northern parts; but, however much intrinsic merit these structures may possess, there is always a sense of their being out of their element. Hence, while we fervently say God speed the day when our architecture shall display something of originality, we think it will be a long time before the cry for "the American style" will be answered; for, as long as natural laws render it impossible for an object to be both black and white or hot and cold at the same moment, just so long will those same laws prevent the invention of any one style which shall be thoroughly adapted to the requirements of regions in which the natural conditions are diametrically opposite.
improvement on the machine built by them & Egan Company, of Cincinnati. It is a recent production of the Cordesman

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One of the features of

over all competitors at the Cincinnati Indus-

Exposition. One of the features of

special importance is the method of raising

and lowering the tables, either separately or

together. This is accomplished by means of

a hand-wheel placed on the operating side of

the machine. By revolving this wheel either

or both tables can be moved up or down, the

element of the table always keeping a proper

distance from the head. The movement is

on a circle around the head. By means of

the hand-wheel shown in front, both tables

are raised or lowered together in a straight

line. In order to have free access to the

head for whetting the knives, changing the

heads or putting on a saw, the tables are

necessary to loosen the small hand- whels

which our practical readers will perceive

may be used either upright or inclined. It

They are introducing a new self-withdrawing

wood-boring machine, a view of which is

presented in Fig. 2 of the engravings. This

machine is warranted by the makers to do

all that other wood-boring machines accom-

plish, and is claimed to have several im-

portant advantages peculiar to itself. An

important feature is that it does not require

a special auger. Any auger of the kind

commonly used by carpenters and car-build-

ers, or in any wood-boring machine, may be

used, and even an ordinary brace-bit may

be employed. It makes no difference

whether the shank is long or short, round or

square. The machine is simple, thor-

oughly constructed, and is not liable to get

out of order. It is simply in its parts and

finished. It is made interchangeable, so

that if any member is broken it can be

readily replaced. It is adjustable so that it

it has an open outlet at the side.

A gauge for marking the depths of the holes

to be bored is placed on one side of the

machine, and in other respects the device

has been well calculated to meet the wants

of builders who employ such tools.

New Rain-Water Cut-off.

It is hardly necessary to argue about the

advantages of rain-water cut-offs at the

present time. Their use is so general and

their utility so manifest that there is but

one side to the question. Still, there is choice

among the different devices for this purpose

which are now before the public, and new

ones are occasionally being added to the list.

Our attention has recently been drawn to an

article of this kind made by W. F. B.

Fischer, Springfield, Ohio, and which is

covered by recent United States and Canada

patents. The special advantages of this

device to which the manufacturer directs

attention are that it can be operated in

freezing weather, and that it can be cleaned

out without taking down to get at the inside.

When the cut-off is open the hand can be

inserted for the purpose of lifting out leaves

and other rubbish that may have ac-

cumulated. The cut-off differs from

many in common use in the fact that

it has an open outlet at the side.

When closed the water has a direct

course through the spout. When

open a side outlet is provided, throwing

the water into a trough or into an open

hopper connected with the drain-pipe, as

circumstances may determine. When closed

the device looks like a part of the conductor.

Fig. 2.—The "Ajax" Wood-Boring Machine.

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the device looks like a part of the conductor.

Fig. 2.—The "Ajax" Wood-Boring Machine.
When open it is a cut-off without extra elbows, and its construction is such that it may be used in any position. If a roof is dusty the water should be cut-off from the cistern until the dirt has been thoroughly blown out. If the cistern is large it is good policy to save water during the cool months and to cut it off during the warm months. A cut-off becomes a necessity to avoid an overflow when the cistern becomes full, and its employment has the advantage at all times of giving perfect control of the cistern.

A New Drive Screw.

Many of the coach or lag screws now in use by railroad companies, telegraph companies and ear builders are made with a point the base of which is of various shapes and angles, the base of the point being equal in diameter to the Shank of the bolt, including the thread. When such screws are driven into the wood they tear and lacerate the fiber to a greater or less extent, according to the shape and size of the point, and when driven into a hole of the size of the Shank at the bottom of the thread there is no guide by which an equal pressure or bearing can be insured all around the hole. The consequence is frequently that a bolt when thus driven will not align properly, and will lose much of its holding power, while in soft, spongy wood it often fails to hold at all, and can be easily withdrawn as a nail. The drive screw represented in the accompanying cut, Fig. 3, is designed to avert these objections, and was patented November 27, 1883, by T. J. Bray. This new drive screw is made with a point the base of which is of the same diameter as the Shank of the bolt, not including the thread, and with a cylindrical part between the base of the point and the commencement of the thread, which acts as a guide or lead upon entering the wood. The thread of this screw is made ratchet commencing at the commencement of the thread, which acts as a guide or lead upon entering the wood.

Novelties.

Drive Screw. Several unusual varieties of design are shown in their catalogue, among which may be mentioned a radiator, for dining-room use, constructed with a closet which serves as a dish-warmer. Another form is to be adapted in front of windows in various forms adapting them to the different positions in which they may be placed.

Steam Radiators.

The Detroit Steam Radiator Company, No. 120 Griswold street, Detroit, Mich., are introducing a new form of cast-iron steam radiators suitable for use in heating public and private buildings, railroad cars, steamboats and the like. The radiators are made in various forms adapting them to the different uses above mentioned and to the different positions in which they may be placed.

Improved Planes.

There are shown, in Figs. 6 and 7, two new planes which have recently been put upon the market by the Stanley Rule and Level Company, New Britain, Conn. Fig. 7 illustrates what is known as Traut’s adjustable beading, rabbet and slitting plane. This tool embraces in a compact and practicable form several distinct articles. There is a beading and center beading plate, a rabbot and filletter, a dado, a plow, a matching plane and a superior slitting plane. The manufacturers assure us that in each of the several forms the plane will do perfect work.
Carpentry and Building.

May, 1884.

Novelties.—Fig. 9.—The Hammer Nail Puller.

can be used to plane close up into corners and other places difficult to reach with ordinary tools. Both of these articles are sold through the regular hardware trade.

The Hammer Nail Puller.
The illustration shown in Fig. 9 represents a combined hammer and nail puller, made under a patent of July 30, 1873, by George B. Curtiss, of Chambers street, New York, by whom it is now for the first time put on the market. The special feature in this tool is the application to a nail hammer of a patent claw adapted to draw nails by driving the claw under the head when flush with or sunk below the surface of the wood. To accomplish this it will be perceived that the points of the claws are near together, so as to admit of driving a short distance into the wood; that they are so formed as to look under the head of the nail, and are made strong to guard against their breaking in use. Special attention also is directed to the fact that to start the nail there is a powerful leverage, the fulcrum being at first very near the end of the claws, but as the nail is lifted, and less power is required, it gradually moves toward the handle face of the hammer. It is claimed that in this way ease and rapidity of working are secured. The manufacturer’s directions for the use of this nail puller are as follows: To draw nails, set the claw close to the head of the nail, with the handle well down, and strike on the face a smart blow with a mallet. Use the claw to pry off the hooves. To draw finishing nails, set the claw across the grain against the side of the nail. Other advantages claimed for this article above other nail pullers are that it is practically noiseless in operation, and as a first-quality cast-steel side-eye nail hammer is guaranteed to be equal to any that have been made.

Nine buildings forming the principal business blocks of Tacoma, W. T., were destroyed by fire on the 13th ult., involving a loss of $175,000. Preparations for rebuilding a number of them are already under way.

The Nickel Spring Hinge.

A new form of spring hinge which the manufacturers, the Ohio Butt Company, No. 51 Dearborn street, Chicago, are now offering, possesses features which are likely to make it popular with builders and all who have occasion to use such an article. The general appearance of the hinge, which is seen in Fig. 10, shows that it is neat and compact. The manufacturers claim for it that it is made out of fewer pieces than other spring hinges, that it has less complicated mechanism, no weak parts to break, and no defective fastenings. Considerable time has been spent in perfecting this hinge, and, in the light of long experience in manufacturing other patterns of spring hinges, great care has been taken to get all the parts properly proportioned, of ample strength, and in all respects well adapted to withstand the strains of everyday use. This hinge holds the door closed or wide open, as may be desired, but its construction is such that it cannot hold the door slightly ajar. The great force of the spring is exerted when the door is tightly closed. A special feature of the hinge is the absence of a pin. The parts are so arranged that the spring moves after the manner of an eccentric as the door is opened. It would seem, from inspection of the article here shown, that the wants of builders in matters of this kind had been very carefully studied, and that they had been met with a considerable degree of success.

The Crown Screen-Door Latch.

Fig. 8 shows in a very complete manner a screen-door latch, called the “Crown,” manufactured by the American Machine Company, corner of Lehigh avenue and America street, Philadelphia. The special features to which the makers direct attention are the simplicity of this device, its practicability and its cheapness. The engraving represents the parts in their relative positions as they would be applied to a door. It will be noticed that the door can be locked from the inside by simply dropping the catch shown above the latch. The need of an effective fastening of this kind adapted for use on screen doors has been felt by all carpenters and builders who have had occasion to put up work of this character. It would be desired, from inspection of the article here shown, that the wants of builders in matters of this kind had been very carefully studied, and that they had been met with a considerable degree of success.

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A new form of spring hinge which the manufacturers, the Ohio Butt Company, No. 51 Dearborn street, Chicago, are now offering, possesses features which are likely to make it popular with builders and all who have occasion to use such an article. The general appearance of the hinge, which is seen in Fig. 10, shows that it is neat and compact. The manufacturers claim for it that it is made out of fewer pieces than other spring hinges, that it has less complicated mechanism, no weak parts to break, and no defective fastenings. Considerable time has been spent in perfecting this hinge, and, in the light of long experience in manufactur-
The Goune Door-Knob.

The Climax Door-Knob Company, of 119 Fort street, Detroit, Mich., are directing the attention of architects and builders to a new construction in door-knobs, the merits of which may be judged from Figs. 11 and 12 of the engravings. One end of the spindle is permanently fastened into one of the knobs by spreading and riveting. This is accomplished by a pin which is inserted between the two thicknesses of Norway iron of which the spindle is composed. The opposite knob is made adjustable to fit different thicknesses of doors, by means of a number of small grooves formed upon the inner surfaces of the two portions of the split spindle, and a brass pin which, as shown in Fig. 12, is driven through them. By this means very slight variations in thickness are fully provided for, and a ready means is afforded of removing the knob from the door should such a course ever be necessary. The pin acts as a key to force the sides of the spindle up tight to the sides of the neck. The engraving also shows a section of the roses which finish the opposite sides of the door around the spindle, and the mode of fastening them in place. The knobs, as shown in the cut, are fastened to the sockets by rivets which are finished with plated heads. A special advantage to which the manufacturers call attention is the rapidity with which these knobs may be applied. The statement is made that these knobs can be applied to doors four to one faster than knobs of other construction. It is obvious from the engravings that the annoyance of rings or washers for the purpose of adjusting the thickness of doors is entirely overcome by this device. These knobs are arranged to be suitable for all kinds of locks, and when once in place are not liable to get out of order, no matter how hard the usage.

Tilting-Top Saw Table.

Messrs. Goodell & Waters, of 3100 Chestnut street, Philadelphia, are introducing a tilting-top saw table of the kind shown in Fig. 13 of the engravings. This machine is designed for a large variety of work, slitting, cutting, grooving, mitering and other similar operations. It possesses many conveniences not found in other machines. The saw mandrel is hung on a casting swung on the counter-shaft. It can be raised and lowered at will by the hand-wheel in front. The table can be tilted to any required angle without interfering with or stopping the saw. The table is iron, planed perfectly smooth, and is fitted with square or bevel gauges. The capacity of the machine is such as to carry an 18-inch saw. The counter-shaft is attached to the main frame and has tight and loose pulleys 10 x 4 inches. The machine is calculated for a speed of 750 revolutions per minute. Referring to the engraving, it will be noticed there is a grading index at the side of the machine. By this the exact angle at which the table is set with the saw is indicated, thus facilitating adjustment without the necessity of testing the angle by a set square or some similar device.
The Stearns Barn-Door Hanger.

Another addition to the large assortment of barn-door hangers now on the market is offered by Messrs. E. C. Stearns & Co., of Syracuse, N. Y. The general appearance of this article may be gathered by inspection of Fig. 14 of our engravings. The manufacturers describe it as the only hanger made having a hardwood bearing wheel turned and finished perfectly. The small roller, shown in the illustration at the back, prevents any side friction. Our readers generally will appreciate the neatness of the design and the care with which the parts needed.

Novelties.—Fig. 14.—The Stearns Barn-Door Hanger, Made by E. C. Stearns, & Co, Syracuse, N. Y.

Some months since we noticed a neat little work that has proved so strong and commendable in every town and city in the land. The sample cards which have been issued to our readers who have already written to us inquiring about such matters. One design and three plans of portable cottages are shown on the circular in question. The plans represent, respectively, a two-room house, a three-room house and a four-room house. The latter is 27 feet 6 inches by 32 feet in size. The front is finished with an extension of the main roof that covers the sides of the house or even his front fence.

The Stearns Barn-Door Hanger.

May, 1884.

TRADE PUBLICATIONS.

Structural Decoration.

Some months since we noticed a neat little pamphlet bearing this title, issued by the H. W. Johns Manufacturing Company, of New York. This little work has proved so acceptable to the builders and house owners whose attention has been called to it as to exhaust several editions. Recently the work has been revised and enlarged, but the special features which we took occasion to strongly commend in our first notice have been retained, although greatly improved, and in their present form are very likely to make this edition even more valuable than its predecessors. The special lines of goods described in this little book are the preferable points for which this company is famous. These, as our readers know, are made of various shades and colors, adapting them to use not only everywher. Particularly attention has been given to the production of those particular shades which are at present so popular, and which are a conspicuous feature of the so-called "modern antique" houses found at all the watering places, and, indeed, in every town and city in the land.

The sample cards which have been issued to show these colors are very attractive, and, in a way, serve a very good purpose; but they fail to show in an effective manner good combinations and pleasing contrasts— as, for example, in body colors and trimmings. This, however, has been accomplished in the present work. The sample pages of colors, of which there are several in each copy, are arranged in a way to practically illustrate harmonies and contrasts, and to show the results of the varnished woods painted as treated on house painting at once effective and cheap. Few people of even moderate means and fine feeling can be, without long process, to select colors for a building which, when applied, will come up to what may be reasonably expected, especially in the case of the style in which buildings are now so commonly painted. The illusory and useful combinations come only by long experience. But by this little book the novice is afforded the help of practical experience and successful business. With its aid, accordingly, there is far less danger of poor selections than by old methods. The plan of those containing colors in the way they would be used in practice has proved so invaluable to the company as to make its landing, as its little catalogue proper commences, and it and succeeding pages contain a large assortment of gates, fencing and railing, embodying the construction peculiar to this company. Among the specialties may be mentioned composite lawn fence, hurdle lawn fence, solid white crockery stationary wash-tubs. The application of the latter are meeting with a large sale.

Iron Railings, Fencing, &c.

We have received from the Composite Iron Works Company, Reading and Philadelphia, an advance copy of their catalogue of patent composite iron railings, gates, &c. The catalogue is one of the best described in this line of goods that it has ever been our pleasure to examine. In size it is approximately 10 x 14 inches, contains some 75 pages, and is printed upon a fine quality of book paper, the illustrations being of unusual excellence and clearness. By referring to some features of its contents, we think we shall be able to give our readers a general idea of its excellence. The inside of the catalogue proper commences, and it and succeeding pages contain a large assortment of gates, fencing and railing, embodying the construction peculiar to this company. Among the specialties may be mentioned composite lawn fence, hurdle lawn fence, solid white iron summer-houses, which in turn serve in this connection as a very pleasing introduction to the lines of goods shown. The second page is devoted to a description of composite chilled ironwork, and is illustrated by a diagram showing the construction employed in railings, gates and other work. Following this is a general view of the establishment of the company at Long Island City, L. L. A second illustration shows an interior view of the foundry, and represents workmen engaged in various kinds of work, from blacksmithing to "pouring off." The scene is animated, and is well calculated to impress the reader with the magnitude of the establishment described. The succeeding pages show still other views in the works of the company, wherein various lines of work are represented, among which may be mentioned catalogue proper comprehens, and it and succeeding pages contain a large assortment of gates, fencing and railing, embodying the construction peculiar to this company. Among the specialties may be mentioned composite lawn fence, hurdle lawn fence, solid white crockery stationary wash-tubs. The application of the latter is meeting with a large sale.

The Air Brush.

The Air Brush Manufacturing Company, of Rockford, Ill., send us their illustrated catalogue and price list describing house air brushes, which is now rapidly winning its way among artists, expediting their work and giving satisfaction to the user. These air brushes have been used with a wonderful degree of satisfaction, so that the air brush, though the latter is in itself a mechanical device, cannot be said to be mechanical, but is rather a mechanical office as brush or pencil, and the more skilled the artist the more satisfactory the work done. And an every art needs the appliance, its application and advantages and the kind of work for which it is adapted, the catalogue in question will be found to give full particulars. Descriptive extracts are furnished from various trade papers.

White Crockery Wash-Tubs.

The Stewart Ceramic Company, of 312 Pearl street, New York, have issued a neat little pamphlet descriptive of the Moravian solid white crockery stationary wash-tubs. These wash-tubs consist of plain white crockery wash-tubs, of the defects of soapstone, slate and cement tubs, and the advantages claimed for solid white crockery tubs. Succeeding pages are devoted to price lists, directions for setting and finishing, together with illustrations showing the appearance of the tubs in position. In addition to wash-tubs, solid white crockery sinks for boiler and kitchen use have been very favorably known to the trade for some time past, and, we learn, are meeting with a large sale.

A prominent insurance expert a short time since, in stating that roofing of roofs from an insurance man's standpoint, asserted that tarred paper should be placed on the rafters and not on the roof, which is the usual procedure. During the process of seasoning it acquires certain properties that render it far more valuable for use than in the condition in which it is first manufactured.
Construction of a Cheap Lathe.—Fig. 25.—

Headstock Mandrel.

being 1½ inches distant from the end. Center-pop each end, and in that end into which the back center will run drill 5/8-inch hole about 1/2 inch or 5/8 inch deep, using a fiddle or archimedean drill for the purpose. This hole insures concentric wear in the mandrel end by acting in the function of a guide to the steel point of the dead center (Fig. 26), which, in the absence of the hole, would grit the mandrel end eccentric (Fig. 27).

Chuck between dead points, using the carrier (Fig. 28), and turn the end which is to receive the rigger to 3/8 inch diameter. Use a tool shaped like Fig. 29, taking a rough cut first, afterward a fine one. Then change ends, putting the part just turned into the carrier, and turn the portion that runs in the carrier, and turn the portion that runs in the slide-rest, and drill a hole with it 1/4 inch or 1/2 inch deep, using a key of 1/8 inch or 1/4 inch wide, or, rather, 1/8 inch less than 1/4 inch in one plate, 3/8 inch more than 1/8 inch in the other, to give the necessary taper for the wedge. These plates will be let into the block of hardwood intended for the rigger. Prepare the stuff to 6 inches diameter by 3 1/2 inches thick in the rough; screw it on the face-plate; bore a 7/8-inch hole through it, using the gouge and the corner of a side-chisel. Turn a recess 2 1/2 inches diameter to a depth equal to the thickness of one of the disks, hammer the disk into place, and screw with 3/4 inch or 1 inch screws. Rough down the wooden block to 2 1/2 inches diameter, take it off the plate, and rechuck by the finished face. Let the second disk into the other side, keeping the keyways in line with one another; remove from face-plate, drive tightly on a mandrel, and turn the two speeds to dimensions, not forgetting the slight rounding (Fig. 34). Cut keyway through the wood from plate to plate, file a key out of 1/2-inch iron or steel rod to dimensions (Fig. 35), and key rigger in position. Place in headstock, of which Fig. 36 now presents a sectional appearance. (To be continued.)

Painting Iron Roofs.

The principles underlying the best practice in painting iron roofs and sheet-metal work in general are generally not unlike those necessary to be observed in painting structural iron work exposed three years, and the results observed were as follows: The coal tar on the scrubbed plates was quite gone; that put on the iron oxide A, another set with iron oxide, B, and the remaining set with red lead. They were then varnished; the fumes of these were considerable, and the woman who did the work was ill the day following. The iron oxide A on the scrubbed plates was inferior to the red lead as a preservative for iron has been generally accepted. Wrought iron requires a hard and elastic paint which will hold itself together even if the scale beneath gives way. The following experiments, made under the auspices of the Dutch State Railroads, may be of service. Iron plates were prepared for painting as follows: Sixteen plates, pickled in acid (hydrochloric), then neutralized with lime (slaked), rinsed in hot water, and while warm rubbed with oil. The same number of plates were cleared of scale, so far as it could be removed by brushing and scraping. Four plates from each set were then painted alike, namely, four plates with cool tar and four plates with iron oxide, A, another set with iron oxide, B, and the remaining set with red lead. They were then exposed to the weather for three years, and the results observed were as follows: The coal tar on the scrubbed plates was quite gone; that put on the iron oxide A, another set with iron oxide, B, and the remaining set with red lead. They were then varnished; the fumes of these were considerable, and the woman who did the work was ill the day following. The iron oxide A on the scrubbed plates was inferior to the red lead as a preservative for iron has been generally accepted. Wrought iron requires a hard and elastic paint which will hold itself together even if the scale beneath gives way. The following experiments, made under the auspices of the Dutch State Railroads, may be of service. Iron plates were prepared for painting as follows: Sixteen plates, pickled in acid (hydrochloric), then neutralized with lime (slaked), rinsed in hot water, and while warm rubbed with oil. The same number of plates were cleared of scale, so far as it could be removed by brushing and scraping. Four plates from each set were then painted alike, namely, four plates with cool tar and four plates with iron oxide, A, another set with iron oxide, B, and the remaining set with red lead.
superior to all others. From these results it is evident that the iron removes all the black oxide, while scrubbing does not. It is also shown that the red lead with oil to form a hard, cold-blasted acid soap, a harder soap than that given by any other combination. The red lead is shown by those experiments to give way under the scaling. It is more adherent to the surface, more elastic and cohesive. On the Cin-cinnati Southern Railroad experience extending over some years has shown that red lead has proved to be most durable paint in the many miles of iron truss and bridge-work. It is found that the iron oxide is washed away by the water and periods of soaking, although a valuable paint if frequently renewed. Red lead, on the other hand, is more resistant than the oxide.

Referring to white lead as a material for painting iron, one authority observes that

'...it is very superior to all others. From these results it is evident that the iron removes all the black oxide, while scrubbing does not. It is also shown that the red lead with oil to form a hard, cold-blasted acid soap, a harder soap than that given by any other combination. The red lead is shown by those experiments to give way under the scaling. It is more adherent to the surface, more elastic and cohesive. On the Cin-cinnati Southern Railroad experience extending over some years has shown that red lead has proved to be most durable paint in the many miles of iron truss and bridge-work. It is found that the iron oxide is washed away by the water and periods of soaking, although a valuable paint if frequently renewed. Red lead, on the other hand, is more resistant than the oxide.'

Table showing the diameter of wind-rotors, revolutions per minute and different lengths of stroke, together with the size pump that is recommended to use with each for various depths of wells.

<table>
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<tr>
<th>Diameter of stroke-inches</th>
<th>Different lengths of stroke-inches</th>
<th>10 feet</th>
<th>20 to 25</th>
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Water Supply for Country Dwellings.

BY A COUNTRY PUMPER.

(Concluded from page 2, January.)

We have now to consider the capacity of different sizes of pumps. The following table shows the quantity of water discharged at various speeds by the single-acting pumps of different diameters.

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<th>Diameter of cylinders</th>
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The above will prove substantially correct, but it should be borne in mind that these are maximum capacities, and that in practice the discharge would be a loss of iron: 5 to 10 per cent. by unavoidable waste and failure of plungers to strike, owing to faulty workmanship, and other causes. It will be observed that a 3-inch single-acting pump working on a 6-inch stroke at each stroke, and at 30 strokes per minute would amount to 260 gallons per hour. The average demand of a farm of 30 acres is actually about 24 revolutions per minute; hence a 3-inch pump on a 5-inch stroke con

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May, 1884.

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5 to 15 per cent. more than their fellows employed in the Central States, but this leading feature of the building business is far from booming at the present time. Only a portion of the older towns are reporting any building at the present time. Only a portion of the older towns are reporting any building.

For the most part it is expected wages will remain at about present quotations during the summer. There is little to be remem-bred, when considering this section of the country, as well as others which are in process of development, for there is almost no change in the rates of wages. Fewer mechanics are demanded in the erection of many of the smaller churches and other public buildings. Of course, there are exceptions to this general rule. The building business is very poor indeed. Salt Lake City is decidedly dull. Wages are merely nominal, and many of the better grade of mechanics have any special cause to rejoice at the present time. Nothing of much importance is doing in New Mexico. Handling skylights through roof only, unless said skylight is of metal. The center row of shutters on the window frames and casings, unless they be sanded. Pure linseed oil has a bright amber color, runs freely, sparkles when flowing and fastens only and without backing of wood; it cannot be without skylight, elevator or hatchway openings, and a charge of 10 cents will be made for the deficiency. If gutters or cornices are wood, a charge of 10 cents will be made for the deficiency.

What Constitutes a First-Class Building.

The New York Board of Fire Underwriters have agreed upon the following as their schedule of a First-Class building, with the charges named for variations therefrom: Standard Building.—1. Walls of brick, of the thickness required by the present building law (Section 6), with projections to receive the beams, and coped. Charge for deficiencies: If for metal, or for iron, or for iron and wood, the walls be of less than the standard thickness, 5 cents per $100 of insurance; if without projections, unless they are of sufficient thickness to admit of 12 inches of brick between the ends of the beams on each story, 25 cents.

2. Roof of iron or copper upon rafters, and without skylights; or of brick or the Mansard roof varying in any particular, to be subject, in addition to the charge for skylights, 10 cents per $100. If over 70 feet in height, the addition to be 100 cents. A Mansard roof is intended to consist of a flat roof with the first half, or half a story added, or with frame structures upon the roof, which cannot be made if there are shutters to side windows, not opening on the front or side, to be subject to an additional charge of 25 cents.

6. Covicides and gutters of brick or of metal, if secured to the building by metal fastenings only and without backing of wood; if gutters or cornices are wood, a charge of 10 cents will be made for the deficiency.

How to Boil Linseed Oil.

The Carriage Monthly gives the following directions for the preparation of linseed oil, which are adapted to the wants of our readers: First be sure that you have the pure linseed oil. There is much sold as such manufactured out of peanuts. The test for the genuine is the following:

After you have taken it from the fire, cover it up and let it stand cool off, say, over a fire in a close closet, for a week, and you will be able to either hard or soft stovex. Avoid the tendency when rubbed on the finger, dries with a gloss even in pruning coats, and is very much given to gumminess, or the sanded. Pure linseed oil has a bright amber color, runs freely, sparkles when flowing from the can, tastes smooth and mild, and has the smell of a fresh poultice. When you are satisfied that you have the genuine article, say, about 3% pound of red lead and the same quantity of sugar of lead; put into 5 gallons of pure linseed oil, stir well, and allow to boil evenly. Do not let your fire get either too hot or too low; keep an even tempera-ture all the time, and you will be able to either hard or soft stovex. Avoid a wood fire, as, after the oil gets boiling in this manner, it is not possible to either harden or soften it.

1. Boil it seven hours half; the red lead and sugar of lead will then be dissolved. This is the English method, used in all the carriage fac-tories in the United Kingdom.
Correspondence.

Lathe Construction.

The publication of the series of articles on lathe construction now running in our columns has called forth some critical remarks and suggestions. As likely to be of interest to our readers, we shall reproduce some of the more salient points of the letters.

A correspondent, over initials "O. J. L.," suggests "that it is the best practice in lathe construction to fit bed inside and between standards, not to have brakes in the chords"—I think would make a better job if there were some 5-foot clamp blocks put in at the join of the strands. As there are so many lives at stake on our railroad bridges, I think we should look sharp for the oak points in them when building.

Arrangement of Rooms.

From W. R., Shenandoah, Pa.—"I would like to learn the opinions of practical men of experience in the trade, as well as that of the Editor of Carpentry and Building, with regard to painting tin roofs on the under side. The style of roof that I have reference to particularly is laid with flat seams, soldered. Can the roof be soldered as strongly and firmly when the sheets are painted as when they are left unpainted? Will the solder run into the seams as well when paint is employed, and make as strong a joint as when the seams are clean of paint? I am referring to the average job of roofing, for example, on a house where there is no special presence of steam, dampness or fumes from chemicals calculated to destroy the roof."

Answer.—So far as our own opinions go, we admit that we have for a long time been skeptical as to the advantage of painting tin roofs upon the under side. Perhaps we should qualify this and say we have been so skeptical as to the utility of this work as commonly performed. Our correspondent hits the nail directly upon the head when he calls attention to the difficulty of soldering seams where the presence of paint is encountered. Owing to this difficulty, it is the best practice to have the specifications under which they are working, or the local customs of their community, by which the work is to be done. The communication with the cellar is intended to be under the chimney stacks.

Painting Tin Roofs.

From W. R., Warren, Ohio.—"I would like to learn the opinions of practical men of experience in the trade, as well as that of the Editor of Carpentry and Building with regard to painting tin roofs on the under side."

Answer.—We of course are of the opinion that there is no necessity for painting tin roofs on the under side. We are of the opinion, however, that it is not necessary to pay the fair cost of the tin material used in the roof, and the labor required to properly paint a tin roof on the under side, but that the cost of the tin itself, together with the labor, should be charged to the job as a matter of fact, rather than as a separate item.

Convenient House Plans.—Arrangement of Rooms by H. H.

May, 1884.

Carpentry and Building. 101

Lathe Construction.—Criticism by T. A. D.

Referring to the foregoing, the author of the series of papers on the lathe writes that the design would answer well for a large, heavy lathe.
than by using an ordinary grade of plate and painting it. This brief expression of our views in the matter will be sufficient to introduce the subject to our readers, and we hope it will call out a practical discussion from those who have experience upon which to base their opinions. Painting tin roofs on the under side is a line of work which many tinners would be glad to be rid of, and if paint has no advantage they will be glad to be convinced of the fact, and not only convinced of it, but have the fact presented in such a manner as to enable them to base their action upon it in dealing with their customers.

An argument of the iron roofing men, who have been in competition with tin roofs since by the term of "the tin plate" was introduced in the trade, has been that the tin roof is no better than iron, from the fact that the original question of the quality of tin plate—for example, one of our subscribers mentioned the presence of poor plate, and we venture the opinion, subject to the criticisms of our readers, that with a satisfactory quality of tin plate—for example, King's patent frame erector. By the accompanying sketches I will endeavor to show how the erector is made and how it works. Fig. 1 represents the device in use. It is made of oak scantling 3 x 3 inches, and stands 10 feet high. The base is 7 feet long. The pieces marked G are 1¼ x 2 inches, with a ½-inch rod on top of them for keeping them in place. If indicates rods, of which there are two, ¾ inch in diameter, the use of which is to keep the upright in a vertical position and to counteract the strain from the parts that are being lifted. The erectors are used in pairs. They are set on the sills of the building, one at each end of the part that is to be raised. Pieces of scantling are placed under them, as indicated by I in the sketches. The erectors are fastened as shown at D. Fig. 3 is a detail of the fastening used at the end of the base of the erector just described. This anchor consists of a piece of scantling 3 x 3 inches and 2 feet 2 inches long. Holes are bored through it 16 inches apart. The iron that passes through these holes is provided with eyes on the lower end, through which a 1-inch iron rod is slipped under the sill. The upper ends of the iron are cut with long threads and are provided with nuts. By this construction the anchor is adapted to any sized sill. In the center of Fig. 1 and at the base of Fig. 2 is shown a jack with a windlass, by which the hoisting power is obtained. This is made 2½ feet high, of plank 1½ inches thick by 7 inches wide, for which hard maple is preferred. A board is bolted on each side, and a piece 3 x 3 is placed on each side at the bottom. The jack is fastened to the derrick in the manner detailed in Fig. 4. How these parts are placed can be seen from inspecting Figs. 1 and 2. The wheel on the windlass is notched and has a dog, so that the bent can be stopped with it at any point. Figs. 1 and 2 show the arrangement of the pulleys employed. The piece marked K in Fig. 2 is 3 inches thick, and is bolted in place to keep the two uprights of the erector together. E represents the pulley and P the chain used for fastening the pulley to the bent. The block L and staple M are put in place to afford convenient means for getting to the top of the erector in case it should be necessary to reach the pulley for any purpose. In putting on the ropes the last one is put through a hole at the top of the derrick, marked N in Fig. 2, and is then brought down and tied to the sill as shown by D. The ropes used are ¾ inch thick. The windlass, being loose, can be fastened on the foundations anywhere with a scantling and chain. Fig. 5 shows the...
plate attachment, which is fastened at the top of the main posts. It consists of a grip made of a piece of timber 3 x 8 inches, 3½ feet long, marked P in the drawing. The T-piece is made of 2 x 4 inch stuff, 6 feet high, the cross-piece being of 3 x 3, 2½ feet long. There is a mortise in each end of the latter, in which are placed pulleys. The T has a slot in the bottom of it, which sets on an iron pin 1 inch thick that is fastened in the grip block, as shown in Fig. 5. An iron staple, marked Q in the drawing, is placed at the top of the grip for holding the T in place. A key is used instead of this staple to hold the T in place until the plate is up. The hooks marked R hold the grip in its place. These are so constructed as to fit any size post. The iron staple and the grip strips marked S in Fig. 6 are made of 1½ x ½ inch material, and are provided with several holes, so as to fit any size post. The bolt that passes through the end of them is 1½ inches long and ½ inch thick. One of these grips is used at each end of the plate. Fig. 6 shows the side view of the plate attachment, as shown in Fig. 5, but with the plate hoisted in position, the wedge removed and things in position to lower the plate to its place. Fig. 7 is another view of the same parts, but turned in the opposite direction, and still further illustrating the construction. For convenient moving of heavy timbers, spools are used. These are rollers 20 inches long, fastened to a plank 2 x 12 inches and 3½ inches long, with blocks bolted on each end which have holes bored in them, in which the rollers turn. The rollers are made 3 inches in diameter. I have now described all there is about this device, naming the several parts, except the ropes for raising the girts and pulling the bents together after they are up. I will try to point out the advantages resulting from the use of this machine. It will at once be noticed that the workmen do not run risks from getting under anything. The construction is such that the foot of the post, being raised, is firmly held in place, as shown in Fig. 1. If the ropes are liable to break, they will break before the bent starts, from the fact that the heaviest strain comes on the ropes in starting. I am safe in asserting that four to six men with this device can put together and raise a good-sized barn in a single day. The parts of which this erector is composed are such that one man can load and unload them from a wagon, and they are only a light load for a single horse. I have with this device raised barns with posts 22 feet high, 10 x 10 size, the beam 18 feet from the foot of the post and 11 x 11 inches in size, 40 feet long, with post and girts all of oak. I have raised plates 10 x 10 inches, 34 feet long, and others 8 x 10 inches, 54 feet long, both being of rock elm.

Hopper Bevels.

The communication from "H. L.," of Sharon, Mass., on the subject of hopper bevels, published in our issue for March, in which allusion was made to articles by our correspondent, "H. Mcl.," has produced a characteristic response from that individual. Like some former efforts of his, it is a trifle rough in some of its expressions—that is, the writer has been in so much haste to get his ideas in shape, and so much in earnest in discussing a subject on which he has profound convictions, that manifestly he has not taken the time to sandpaper and varnish his work. Some of the peculiarities of expression and diction found below seem to be

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Frame Erector.—Fig. 3.—Detail of Fastening Connecting Windlass with the Derrick.

Fig. 4.—Detail of Fastening Connecting Windlass with the Derrick.

Fig. 5.—The Plate Attachment, in Process of Raising the Plate.

Fig. 6.—The Parts as Used when Lowering the Plate.

Fig. 7.—Side View of the Plate Attachment.
as easy as lying about laying 4000 or 5000 shingles in 3½ hours, so that the one has no need to be ambitious, if they can see that it makes the slightest possible difference to you whether that "top bevel" is straight or crooked. I think, on the contrary, that, regardless of whether the thing pitched outside of, or inside, or is pitched 19 ways. The same principle applies whether it is through your hair, whether the pitch is a piece of stuff, or whether the piece of stuff itself. If you get the simple geometrical principle of "top bevel," you see that all the "top bevels" are the same, even without that "waste piece of stuff," and I don't strike the boss "silly" with what I know, and the quantity of printed matter it requires to publish what I don't know about "hopper bevels." Till the "boss" comes, A. Jow.

Copper for Valleys.

From J. B. T., Saxton, Pa.—I desire to learn, through Carpentry and Building if sheet copper will be needed for valley for a house covered with tin. The seams of the tin are continually breaking, causing leaks throughout the valley. How do you know of copper valves in use?

Answer.—From the wording of our correspon- dents, it would appear that he speaks of a gutter rather than of that part of a roof usually called a valley. Copper is very ex- tended for such purposes. We are not sure as to the nature of the current by which the nature should not be laid in the same man- ner as tin plate is ordinarily laid for the same purpose. The use of copper gutters in connection with a tin roof is rather common than otherwise, and is likely to give poor satisfaction. The utility of using copper gutters in connection with a tin roof is rather common than otherwise.

Carpentry and Building, July 25th.

Marble Stains.

From U. E. Andrew, Mass.—I desire to learn, through Carpentry and Building what will take strawberry and lemonade stains out of black marble. The stains become very dark. The difficulty occurs in a hall floor of white marble diamonds bordered with black marble in the same shape.

Mortar.

From A. T. G., Washington, D. C.—I de- sire to inquire why contractors and archi- tects object so strongly to the mortar which is the mortar used by bricklayers shall be fresh. In England it is thought that the older the mortar is the better it is for brickwork, and contractors demand of the mason that the mortar shall have laid two years under water. It is never used in England that the plans cannot be changed to the mason's right. Houses recently built in this country are crumbling, while there are buildings old enough even for a mason's time. Our bricks are as good and are claimed to be better. I would like to see this question discussed by practical men.

A Desirable Sample-Room.

The C. J. J. Moyer's Sons Company, 25 Market street, Chicago, have recently ar- ranged a sample-room of doors, door trim- mings, inside finish, window frames and other parts of house trimmings and finish in both soft and hard woods, which we especially recommend to architects and builders. It is well known by the building fraternity at large that very few of those who have thus far, as though their money has either the knowledge or the knowledge of their money has either the knowledge or the experience necessary to enable them to judge properly so far as the carrying out of work from a more technical description or by a reasonable man's usual requirements.

It is to meet a reasonable expectation of people in every direction, as well as to display their various styles and patterns to the best advantage, the new show-room has been arranged. It is intended to be a place to which archi- tects and builders will bring their clients in order to enable them to indicate their preferences among the patterns displayed, or by comparisons to form an intelligent idea of what that has been designed for them, in the work contemplated. Two rows of frames extend down the center of the room, upon which doors of various styles are hung and the opposite sides of which are finished in different ways. hardwoods, both domestic and imported, variously finished, are in- cluded in materials out of which the different forms of trimmings are constructed. This arrangement of samples a very large and complete assortment of patterns and styles of finish can be shown. We understand the combination of two samples, so that articles of appropriate hardware in place upon the doors, this arrangement of a sample-room, and if carried out as at present contemplated, with frequent and periodical changes of material, will prove an improvement. An adjoining room contains samples of mantels very tastefully arranged. Each group of mantels is arranged so that the entire display is one well worth visiting by any one contemplating building, whether an expert or not.

STRAW CHIPS.

Among the fine structures recently completed at Grand Rapids, Mich., is the new build- ing of the Pennsyl- vania Chocolat. The edifice occu- pies a plot of ground 60 x 60 feet in size on Foun- tain street. The building is of dark red brick, with polished tracings, the wall up to the water- table being rock-faced. The roof is of slate. The style of masonry and construction is one of Philadelphia resid¬ ences. Mr. R. B. Gilbert, of New York City, fur- nished the plans and supervised the erection. The brick, stone and wood work was done under con- tracts with Downey, H. D. Davidson and C. C. Miller. The cost of the structure was about $22,000.

The spacious apartment hotel to be erected on Grand avenue, near the corner of Market street, Chicago, is 64 feet in length, with a height of 40 feet, seven stories in height. The entire addition is fire- proof, and the elevated stairs will be fitted with automatic closing doors.

The flat man has created a revolution in the turn-of-the-century, weather-stripping is used, the masons have a whole range of weather-stripping at their disposal, and in some cases it is the only choice of the builder. The Dreadnought, recently completed, has not been furnished with anything but upright pianos in New York because no one has room in a flat for any- thing else.

If we may judge from the present indications and the general feeling that prevails among constructors and builders, there is likely to be considerable activity in the building trade during the summer months. At present blocks upon blocks of private buildings are going up in this city and its environs. The number of plans filed during the month of March largely exceeded the number of plans filed during the month of February. The work to be done is considerable, however, and the plan of laying off buildings in courses of construction or lately completed is somewhat modified for the present. The operations in Brooklyn are strictly con- fined to the dozen or two stories in height. While the number of plans for new buildings filed during the month of March largely exceeded the number of plans filed during the month of February, the aggregate cost is much less.

The largest building business for business purposes ever constructed in this city, and a remarkable history of progress of erection. It has a frontage of 77 feet, a height of 30 feet, and a depth of 200 feet. Local pressed brick, with molded shapes for orna- ments, will be used to line the interior, and will be of tonti charcoal, with iron paint. Mr. B. M. Camp is the architect and Messrs. Hunt, Fawcett, the contractors, the combined cost of which is $100,000.

Work in a new church in course of erection for the First Congregational Church of St. Louis. The church is 115 feet wide; the nave is 160 feet long; the walls are 30 feet high. The operations in Brooklyn are materially suspended. The building will be of stone, faced with brick, and will be of four stories in height, 118 feet deep, and is expected to cost about $100,000. The stones were made by Hard & Rok, of New York.

The cities of Georgia seem to be very lively. In Atlanta there are. 2,000;000 new words of buildings in the city. The number of new words of buildings in the city are so great that the number of words can be given by the number of words of residences erected since last summer, and about 150,000 words of building in course of erection. In Savannah $1,000,000 has been expended for building in the past year for improvements.

The lackawanna County Court house, at Scranton, Pa., was formally opened on March 22d. The stone used for the building was laid in the summer of 1882. The cost was $20,000. The court room is, as rapidly as the weather will permit. The building will be of stone, faced with brick, and will be of four stories in height, 11 feet deep, and is expected to cost about $100,000. The stones were made by Hard & Rok, of New York.

The directors of the Cudeman & Egan Company, of Cincinnati, manufacturers of wood-work, are making preparations to move to the Common Pleas of Hamilton County, Ohio, for a large building. The business was not large enough in the present structure, designed by R. L. Perry, of Cincinnati.

The directors of the Coated Canvas & Egan Company, of Cleveland, manufacturers of wood- work, are making preparations to move to the Common Pleas of Hamilton County, Ohio, for a large building. The business was not large enough in the present structure, designed by R. L. Perry, of Cincinnati.
Seven-Room House in Brick.

We present this month a perspective view, with the elevations and details, of a seven-room house in brick, from our Twelfth Competition. The design shown received the first prize in that contest. The author is Mr. Alexander Millar, Washington, D. C. The following particulars with reference to this study are gleaned from the author's description, submitted with his drawings. The outside walls are intended to be faced with dark-red brick, selected as to quality and uniformity of color and laid in red mortar. The ornamentation is exclusively of brick in different shapes. No terra-cotta is employed. The bricks used for ornaments are so placed as to show to the best possible advantage. A string course extends partly around the house on a line even with the window sills of the second story. The space over the front door, which would otherwise present a bare appearance, is filled in with a panel consisting of large, square ornamental brick for the center, surrounded with square brick placed vertically, horizontally and diagonally. The border of this panel is of molded brick. Very little wood in this building is exposed to the weather. A galvanized-iron cornice might be substituted for the finish of the eaves at a very small cost above that of the wooden one shown in the details. The gables are constructed almost entirely of brick. The coping is wood, covered with tin. Square ornamental brick employed in this design are from patterns manufactured by the Peerless brick Company, of Philadelphia, and the numbers shown in the details are from their catalogue.

Iron Shutters.

Cornice manufacturers and others are frequently called upon to build iron shutters, and almost every shop has its own peculiar patterns or its own method of construction applicable to articles of this kind. The use of iron shutters is very general, especially in large cities and upon manufacturing establishments. They are to a certain extent generally tolerated, but strongly recommended, by the insurance companies, and yet there are objections to them which are so weighty that a careful consideration of the subject would seem to warrant a substitution of some other material or the abolition of shutters altogether. One of the daily papers, in discussing this question a short time since, asserted that experience has proven iron shutters to be among the worst obstacles that firemen have to contend with in striving to enter burning buildings. The time taken to batter them open is for the advantage of the flames, and when the firemen get enough of the shutters open to permit water to be thrown into the building, they find that a fire that was of little account when first discovered has acquired almost irresistible energy.
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many reasons may be given for believing a building to be better protected with iron shutters than without any shutters at all. Some of the objections raised apply particularly to shutters made of a single thickness of iron, which are likely to warp whenever subjected to a considerable degree of heat. It is hardly necessary for us to argue in this connection against shutters constructed in this manner, or in favor of those made of two thicknesses of iron, preferably corrugated, with an air chamber between them. Our readers will know that a shutter embodying this principle, properly made, is not likely to give trouble on account of warping. The fact that shutters are locked from the inside in such a way as to make it difficult for firemen to enter the building in order to fight the flames is certainly wrong, and the intelligent care of property should suggest some plan by which the shutters could be opened from the outside in case of necessity. The fact that sparks are sometimes drawn into buildings through crevices in the shutters, it seems to us, argues more than would at first be supposed. The true province of the shutters is to protect the building from fire, yet their presence induces carelessness upon the part of employees and others in caring for the building in other respects. Sparks would hardly be drawn through the crevices of iron shutters if the windows inside the shutters were properly closed. It would seem that if proper precautions were taken to keep windows shut, thus closing the building as carefully as though no shutters were in use, and relying upon the latter simply as a fire protection, it would overcome this class of objections to which the paper above mentioned alludes.

The Frieze and the Dado.

Of still more importance than the floor, says a writer in the Independent, is the decoration of the wall of our parlor. A few years ago it was genteel—yes, that is exactly the word—to have the parlor walls frescoed. Frescoing was dear in every sense. It was costly to the purse and dear to the heart of the purse-proud. And after the walls were frescoed they were generally rather uglier than when they were plain white. Sometimes the frescoing was intended to deceive the eye; then it was wicked as well as in bad taste. Cornices were painted with clever imitations of shadows on plaster, and people exclaimed, How wonderful! One could hardly tell it.” The good imitation of a bad and false molding was applauded. The thing was bad enough to demoralize a family. And then came a reign of tawdry and imitative and costly papers. All this has passed. We know better now. We are a people getting to despise imitations. We will be genuine, if we have bare and gray walls, or such paper only as our manufacturers have employed the best artists and have given prizes for good designs. They have taken hints from Morris and his followers in London, and Louis Tiffany and other decorative artists in this country. There was a time when, if one wanted a good paper for his wall, he must pay the enormous prices asked by William Morris & Co., of London. Now he can find quite as good designs as Morris ever made by looking over the stock of any first-class American manufacturer, and can buy the American papers at not more than one-third the price of the no better papers from England. The walls of our ideal parlor are covered with wraps about our bundles. If there are frescoes, they are to be in simple flat-line decoration—geometrical figures, with no struggle to make them look like any other thing but simple paint. It is quite remarkable how quickly the supply for cheap and truly artistic papers has responded to the demand. The paper
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intended to imitate any material other than wood, because we are most of us creatures without an elaborate pattern in the wall paper, because the effect is admirable. The costly imitations of plain velvet or leather are as bad as a simple, soft parch-ment paper in some deep tone is admirable. It is surprising, indeed, how much may be made out of our plain wrapping papers. They are often of pretty shades of gray or bluish gray, and pictures always look well in Pompeian red and a fold of gray parchment paper is very effective. There may be used to make effective walls. There is no place in the world, however, where this art has been more cherished than at Venice. Here Byzantine and Greek artists revealed to the Venetians all its secrets, and hero was founded the Venetian school of mosaicists, who for centuries have covered the Basilicas of St. Mark with masterpieces of decoration, both within and without the building. But the glory of bringing the mosaic art to its height is due to the Brothers Francesco and Valerio Zuccato, sons of Sebastiano Zuccato, who for centuries have covered the Basilica of St. Mark with masterpieces of decoration, both within and without the building. But the prize was awarded to Francesco Zuc-cato, and his work was presented by the Venetian Doge to the Duke of Savoy. The mosaic executed by Bartolomeo Bonza is still preserved in the treasury of the Basilica.

Mosaics.

By the term mosaic is meant a sort of inlaid or tessellated work, in imitation of painting, formed by small pieces of marble, glass, enamel or precious stones, such as jasper-lustre, malachite, &c., of varying shades and colors, inlaid and fixed on cement. The art of working in mosaic was probably known in very early times, and was extensively practiced in Greece and Rome at the time of the first emperors. Later on mosaics were widely used in the civilized parts of Europe for decorating the walls and vaults of churches, &c., and splendid relics of the mosaics executed in those times are still extant. There is no place in the world, however, where this art has been more cherished than at Venice. Here Byzantine and Greek artists revealed to the Venetians all its secrets, and hero was founded the Venetian school of mosaicists, who for centuries have covered the Basilicas of St. Mark with masterpieces of decoration, both within and without the building. But the glory of bringing the mosaic art to its height is due to the Brothers Francesco and Valerio Zuccato, sons of Sebastiano Zuccato, who for centuries have covered the Basilica of St. Mark with masterpieces of decoration, both within and without the building. But the prize was awarded to Francesco Zuc-cato, and his work was presented by the Venetian Doge to the Duke of Savoy. The mosaic executed by Bartolomeo Bonza is still preserved in the treasury of the Basilica.

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Concrete in Foundations.

Concrete in foundations is one of those essential items connected with the erection of new structures that deserves far more general attention than, as a rule, is accorded it. There have been, and are still, remarks a correspondent of a foreign paper, many contributory causes to account for this. To the engineer it is often times an uncertain factor in his calculations, for the nature of the component parts of concrete has to be governed by the materials most readily procurable within easy distance of the works, and unless the locality is well known to him this is a matter not at all readily ascertainable. This difficulty, however, obviously does not apply to large towns where there is some recognized source for obtaining clean gravel, quarry chippings, broken stones, slags from iron ore, or similar substances. The contractor, from his point of view, looks upon concrete in foundations as an obstacle absorbing so much valuable time, which might be more profitably employed in the laying of bricks and the "tumbling in" of caisson timbers. For the clerk of works concrete certainly possesses but few attractive features. The constituents being specified, with their relative proportions, and an intimation that they are to be well mixed and thrown into the trenches from a height of not less than, say, 6 feet, the masons ordinarily affords him but little diversity of occupation; it needs no working drawings or checking of dimensions, nor does it visibly lent any opportunity for artistic treatment or constructive efforts; it leaves no visible evidence of careful forethought or unremitting care, and the clerk of works therefore mentally agrees with the architect, and for once tacitly is of the same opinion as the contractor, that it is a subject for which the usual half-dozen lines in the specification are as much as it deserves, and one and all pronounce it an unmitigated nuisance, to be got rid of as quickly as possible, and in point of fact practically and mentally buried and forgotten, only, perhaps, to be reminiscences in after years when sandy cracks and settlements disfigure the building, and somebody then suggests that perhaps the concrete was no account. But within the last few years "concrete in foundations" has certainly received more attention, and it is partially recognized that the lack that bears the burden should have its constitution inquired into more fully than has hitherto been the custom, and that the piling and planking always thought necessary when the foundations were at all of a suspicious character, might, in the majority of instances, be dispensed with in favor of concrete.

The causes that have led to this result are not difficult to discover. When concrete was used for one purpose only—viz., foundations—it was certainly received more attention, and it is partially recognized that the lack that bears the burden should have its constitution inquired into more fully than has hitherto been the custom, and that the piling and planking always thought necessary when the foundations were at all of a suspicious character, might, in the majority of instances, be dispensed with in favor of concrete. Materials to spend much of either on work out of sight. But in point of fact, the foundations of any building ought to be of that nature that it would be practicable to remove the whole of the ground on each side to within a few inches of the bottom without any fear of the concrete holding; yet have many architects or clerks of works who could safely say they would be willing to do this with the buildings they have superintended.

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The materials, or bulk of them, employed in making concrete have, for want of a bet-
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ter term, come to be recognized as the "aggregate," and the cementing medium, for like reasons, the "matrix." For the

filling a water-tight measure with aggregate, then adding as much water as the measure will contain without

aggregates, where a choice exists, it should be a material free from anything of a clayey or dirty nature, and the finer or sandy por-
tions of which are composed of the same materials as the bulk, and it is for this rea-
son that hand-broken materials are unsuit-
able when compared with those broken by a machine crusher similar to Blake's. Another reason why machine-crushed materials are superi-
or to hand-broken is that all sizes are thus obtained, ranging from irregular cubes of 3 inches square to coarse sand or grit, and this is of great importance, because it enables the interstices between the larger portions to be filled up by those next in size, and these latter interstices in turn by smaller still, till we go to the sandy grains, which unite with the matrix and make a strong light material, growing the whole together and forming a solid "pulping-stone" unob-
tainable by any other system of manufact-
ure. Now, concrete made with an aggregate almost uniform in size must have its interstices filled up only with the mortar great formed by the matrix and the sandy grains, and therefore creating an irregular texture in the concrete itself, or, as is most likely the case, the interstices are too large to be filled up in this way, and the aggregate is simply held together at its prominent angles, and is thus weak and unreliable, ad-
mitting water like a sieve, having but a limited power of cohesion, and if broken presenting a honeycombed appearance. It is attempted at times to avoid this condition by adding an excess of sand, the result being that the adhesive properties of the matrix are lessened in the same way that weak mortar would be produced.

In some articles that have been written

prove that the most absorbent materials do not always possess the greatest powers of adhesion, and that granite and rag-stone chippings, when obtainable, are pre-
eminently fitted for aggregates. This knowledge has been taken advantage of in the manufac-
ture of concrete pavings, for which purpose both these aggregates are extensively used.

Coming to the cementing medium, the "matrix" or "matrice," we find that prac-
tically there are only two now in use—"lime" and "Portland cement." Roman cement en-
joyed some popularity in its day as a matrix for concrete, in common with its other uses as a mortar for building purposes and a

stucco for the external plastering of walls, but the introduction of "Portland" has

Improved Portland cement out of the market, and it seems likely that the latter will event-
ually become a curiosity. The quick-setting

properties of Roman cement must have been a great drawback to its use in concrete foundations, although of great service in leav-
ing water was prevalent and in tidal work.

Ingenious Wood Carvers.

Over a West Side doorway in New York is the inviting sign, "Artistic Bric-a-brac." In a small square room, up one flight of stairs, were several tables laden with many curious and interesting pro-
ductions of German and Swiss artists. "The Swiss peasants are the greatest wood carvers in the world," the proprietor said. "Carving seems to be as natural to them as eating. They carve out of wood, with great in-
penity, anything from a simple paper-

mechanical occupations, they are not giv-

for anything, being very simple, ignorant
people. But they have a genius for carving, and have a natural skill for copying from nature. Their floral pieces are regarded as masterpieces, and serve as models for young sculptors. It is only necessary to furnish them a photographic design of what is wanted. Most dealers who import Swiss carvings do this, although the Swiss peasant men produce numbers of things themselves without the aid of any suggestions. They carve out of wood almost every kind of fancy article, such as instands, nut-crackers, jewelry cases, eauclio clocks, ladies' work-boxes and a large number of other things too numerous to mention. The tools they use are very simple, the carving being all done by hand. The articles they carve are ingeniously ornamented with leaves and flowers, and some of their designs are extremely odd; they are always artistic. Here is a piece of carving in the shape of a nut-cracker. It is a life-like representation of a bear on its haunches. Of course, it is made for ornament rather than for use, but its artistic merit is worthy of careful study. The Swiss have a knack for turning the most simple article into a real work of art. Take this book rack, for instance. The dealer produced a very simple form of book-holder for the library table, having two slide pieces on a sliding base. See how artistically the side pieces are carved, showing in bold relief a double rose surrounded with a mass of leaves and vines. One advantage the Swiss have is the wood which they use. This is remarkably fine and free from knots, and a tool cuts it as easily across as with the grain. Another kind of wood which is left to individual taste. Some is made for and excel in the molding of groups of an.

A piece of carving usually made by the peasants at their winter season. In the summer they are occupied in tilling the soil and tending their herds of goats on the hillsides, a pursuit which they love so much that no amount of money could entice them from it. Twenty years ago the oil-stone was found on the shores of a lake in Germany, from which it was mined. It is a slate known in science as novaculite—

The Oil Stone.

Twenty years ago the oil-stone was found only on the joiner's bench and possibly on that of the machinist, and its sole use was the sharpening of the edges of tools. To-day its use has extended beyond this province of edging tools to that of grinding, reducing, finishing—in fact, invading the limits of the grindstone, emery, rotten stone, tripoli, and reaching almost to rouge. This stone, which is a slate known in science as novaculite—
The Creosoting of Timber.

As is well known, the preservative properties of creosote are owing to its preventing the absorption of the atmosphere in any form or under any change of temperature. It is

narcocena, a razor—is cut and dressed in hundreds of varying forms for differing purposes. In any hardware or mechanic furnishing store it may be found in all manner of shapes under the name of "slips" adapted for sharpening tools of all forms. In dentists' supply stores it

may be seen in 20 or more cylindrical and circular forms, and so minute as to be used at a rapid rate of revolution even between the teeth of dental-suffering humanity. Some of these cylinders, ovoids, cones and edged wheels are so minute that a pea looks large by their side; yet they are all real grindstones.

In the manufacture and finishing of the metals the oil-stone, or "narcocula," plays an important part. Our recent exacting as to fits and measures can hardly be filled except by the use of this stone, and it is in demand for truing turned surfaces and planed areas of iron and brass, slowly grinding down the tiny action left by the finish file and the corundum wheel. Recently its powder has largely usurped the place in mechanics' valuation of flour of emery or emery of the higher grades. It is found that a finish "for fit" can be readily obtained by its use in much less time than by the scraper, and that it does not leave embedded particles of quartz or corundum to keep up a perpetual wear. This material is not strictly an oil-stone. It can be used with any vehicle—water, benzine, or kerosene oil; it is amenable to all of these. Perhaps its best use is with water, especially when the stone is of the harder sorts, as the Ounschila.

Principal Doors of First Story.—Scale, \( \frac{3}{4} \) Inch to the Foot.

Twelfth Competition.—Details of Piazza.—Scale, \( \frac{3}{4} \) Inch to the Foot.

Section on Line A B, in Front Door.—Scale, 2 Inches to the Foot.
TRADE PUBLICATIONS.

Portable Cabinets.

Mr. Q. S. Backus, of Winchendon, Mass., whose portable cabinets we illustrated and described a short time since, has issued a very handsome catalogue of these specialties. The book is double thickening from the ends, and the illustrations are lithotypes, done by the Lithotype Printing Company, of Gardner, Mass. The lithotype process is well suited for the purpose of representing cabinet work, and all goods of a similar character. The printed illustrations very closely resemble photographs, the process being, in fact, a photo-print process, resulting from having calculated and prepared with direct reference to the needs of an intelligent constituency. The first line of goods described is sash, and instead of allowing the term "8 light windows" or "12 light windows," as the case may be, to designate the goods referred to in price lists, a carefully prepared engraving showing the arrangement of the lights in forming the sash is given in every case. In the accompanying price lists in the first column the size of glass is given, and in the second the thickness of the sash, following which is the price per window without glass and price per window glazed. The last column gives the dimensions of the window, thus affording the builder the information that he needs in managing work of this kind in a very satisfactory shape. The assortment of sash described is unusually large and covers almost everything that comes up in the ordinary range of work. Following this are price lists of doors similarly arranged. Door and window frames for wood and brick buildings are also presented, with horizontal sections, showing the design and arrangement of parts. Blinds are given, also being illustrated. The next division of the book is that of moldings, the designs presented being those of leading styles. The remark is made in the preface that any style of molding shown in the old "Universal," "New Universal," or "Standard Molding" book will be furnished on demand. Stair rails, newels, balusters, stair brackets and balcony balusters are given. A number of designs for counters, also for pews, office rail, and gates and fences, are contained. Screens for doors and windows are presented in the same thorough manner as characterizes the other departments which we have described in detail. Designs for modern inside finish is a conspicuous feature toward the close of the book, and also designs for ornamental glass for vestibule doors, transoms, skylights, &c. This establishment makes a specialty of the universal self-drying window screen, which is adjustable, so as to be adapted to windows of different sizes. This article is carefully illustrated, with full particulars for orders.

Wood-Working Machinery.

Goodell & Waters, of Philadelphia, Pa., have just issued a beautifully illustrated catalogue of wood-working machinery for 1884. The catalogue contains over 100 pages, nearly every page of which is illustrated with one or more cuts representing the different wood-working machines built by this firm. Goodell & Waters classify the machines which they make under four heads, as follows: Planers, car, sash and door, and general machinery. These divisions including shafting and all necessary appliances for the transmission of power. They wish to call particular attention to the long list of planers which they turn out, the list being subdivided into pony and full-feed boring lathes, the Wood worth and the endless-bed planing machines. Besides the machinery included in the above classifications, Goodell & Waters, having the facilities for manufacturing, are prepared to furnish any special tools or a complete plant; also having recently, after much experimenting, succeeded in perfecting a system of gauges and templates, they can furnish at short notice duplicate parts of machines which will fit accurately. Among a number of improvements recently introduced by this firm is their endless-bed planing machine, which has been altered and improved, and is now known as the "Phil." Another machine brought before the public last year is the "Keystone" door, and which is claimed to be the fastest-feeding machine ever turned out, which is excellently gotten up both as regards general arrangement and detail, containing descriptions of many other machines and appliances of improved pattern which will repay careful attention from all users of this class of machinery.

Sash, Doors, Blinds, &c.

We have received from William Willer, manufacturer of sash, doors, blinds, moldings, &c., corner Fourth and Cedar streets, Milwaukee, Wis., his illustrated catalogue and prices current, bearing date April 1. This book in its arrangement differs materially from the stock or universal catalogues which are very commonly employed by establishments in this line of trade. Evidently the engravings and the arrangement of price lists throughout are original and have been calculated and prepared with direct reference to the needs of an intelligent constituency. The first line of goods described is sash, and instead of allowing the term "8 light windows" or "12 light windows," as the case may be, to designate the goods referred to in price lists, a carefully prepared engraving showing the arrangement of the lights in forming the sash is given in every case. The book is double thickening from the ends, and the illustrations are lithotypes, done by the Lithotype Printing Company, of Gardner, Mass. The lithotype process is well suited for the purpose of representing cabinet work, and all goods of a similar character. The printed illustrations very closely resemble photographs, the process being, in fact, a photo-print process, resulting from having calculated and prepared with direct reference to the needs of an intelligent constituency. The first line of goods described is sash, and instead of allowing the term "8 light windows" or "12 light windows," as the case may be, to designate the goods referred to in price lists, a carefully prepared engraving showing the arrangement of the lights in forming the sash is given in every case. The accompanying price lists in the first column the size of glass is given, and in the second the thickness of the sash, following which is the price per window without glass and price per window glazed. The last column gives the dimensions of the window, thus affording the builder the information that he needs in managing work of this kind in a very satisfactory shape. The assortment of sash described is unusually large and covers almost everything that comes up in the ordinary range of work. Following this are price lists of doors similarly arranged. Door and window frames for wood and brick buildings are also presented, with horizontal sections, showing the design and arrangement of parts. Blinds are given, also being illustrated. The next division of the book is that of moldings, the designs presented being those of leading styles. The remark is made in the preface that any style of molding shown in the old "Universal," "New Universal," or "Standard Molding" book will be furnished on demand. Stair rails, newels, balusters, stair brackets and balcony balusters are given. A number of designs for counters, also for pews, office rail, and gates and fences, are contained. Screens for doors and windows are presented in the same thorough manner as characterizes the other departments which we have described in detail. Designs for modern inside finish is a conspicuous feature toward the close of the book, and also designs for ornamental glass for vestibule doors, transoms, skylights, &c. This establishment makes a specialty of the universal self-drying window screen, which is adjustable, so as to be adapted to windows of different sizes. This article is carefully illustrated, with full particulars for orders.

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Axial Flow.
NOTES AND COMMENTS.

One of the most complete buildings in its architectural details is that recently erected by the Mutual Life Insurance Company, in this city,

...and if the scheme should be carried out it might possibly tend to diminish the amount of building that would otherwise be undertaken. The general lumber market will be stifled and rates might reach a point which would deter many from investing who otherwise would put up buildings.

The utility of slow-burning construction is fast becoming appreciated by architects and builders. It is very generally recognized at the present time that it is practically impossible to make a building absolutely fire-proof. The best, it would seem, that can be done in ordinary circumstances, is to so construct it as to make a swift destruction by fire impossible, thus affording every opportunity for fighting the flames when a fire occurs. Ex-Chief Danrell, of Bos-
ton, in a recent inter-
view expressed himself as follows: 'Buildings cannot be made absolutely fire-proof, but they can be made in such a manner that their swift destruction by fire is impossible, and so that a fire will not extend beyond the room in which it originates. Iron, brick and stone as you know, are not in them-

...The water supply is from an artesian well on Nassau street, between Liberty and Cedar streets. The building is eight stories in height, and, standing as it does on rising ground, it becomes the most noticeable of all the great buildings in the down-town sec-

...on the trade and to devise means the adoption of the precautionary meas-
ures I have suggested would be the means of saving an immense amount of life and prop-

...In this period of overproduction it is very gratifying to learn of any line of trade in which there seems to be an opening with a fair prospect of remunerative business. It would seem from an article an article as building brick would afford the fewest opportunities, in the way of openings, for anything that is most anything. Our correspondent at St. Louis, however, has periodically called our attention, during the last few years past, to the difficulty in obtaining building operations in that city are greatly em-
barrassed in progress, as well as limited in amount, from the lack of supplies of brick, but the facilities in operation are altogether in-
adegerate in comparison to the demand. We are informed that during the ten days in April the two machine establish-
ments operating in St. Louis sent out 350,000 to 400,000 bricks daily, and the hand, of the same day, delivered 400,000 brick daily, and yet the city demand could not be supplied. Several brickmen waiting for a supply of brick, the lack of which completely suspended opera-
tions upon them. The supply of clay at St. Louis is said to be so fine that there is a large demand for brick for shipping.

The danger of excessively high buildings in large cities has received considerable at-
tention of late, and has received more or less discussion. Bills have been introduced in the legislatures of several of the States, looking to the regulation of the height and weight of brick buildings may be carried by a vote in the State legislature, or of locations favor-

...has never been very favorably regarded as an ornamental wood. Yellow pine, however, has recently obtained something of a reputation in this direction. This material, hard-finished in oil, in the opinion of many is the rival in beauty of any wood that grows, not ex-
cepting the costliest of the hard species. It is susceptible of receiving and retaining as a degree of polish as any other wood, while impregnated with oil it is almost inde-
structible. In such a condition it is impervious even to water, and the great durability that leaves an ineffaceable stain upon white pine, maple and various other woods.
Glazing Without Putty.—Fig. 1.—General View of the "Pennycook" System.

The question of glazing without putty is attracting marked attention upon the part of English and Continental journals and architects. A number of very elaborate systems have been devised, and some attempts have been made to introduce some of them into the United States. The advertising columns of the foreign architectural and engineering journals show a number of such systems which are candidates for public favor. We show several of them in the accompanying illustrations, in which we think many of our readers will be interested. Fig. 1 is a general view of glass laid according to the "Pennycook" system, while Fig. 2 shows a full-sized section of sash-bar, and indicates the way in which joints, connections and fastenings are made. The bar of the size shown in Fig. 2 the manufacturers offer for use in connection with purlins up to 8 feet apart. The glass, it will be seen, is held in position by the lead flange turned down upon the top, and which clamps it against the upper edge of the bar. The lower edge of this lead clamp or cleat is folded between the sections composing the bar. The method of fastening the bar in place is indicated in Fig. 1. On the upper purlin, B represents a clip fastened in place, and which engages with the base of the bar. The bottom end of the bar is held in place by a shoe which the manufacturers make either of wood or iron, according to circumstances. The advantages to which the manufacturers direct attention are the great light space obtained on account of the small size of the sash bars and the large space between the purlins. They also direct attention to the security from breakage of glass from expansion, contraction and vibration. No screws or other fastenings are necessary to be removed when replacing broken lights. We gain from the manufacturers’ circular that no paint of any kind is considered necessary to make this form of glazing wind and water proof and durable. The name of the company handling this device is known as the Pennycook Patent Glazing and Engineering Company, Limited. Their principal offices are at No. 52 Bendall street, Glasgow, Scotland, with a branch at No. 57 Chancery Lane, W. C., London, England.

The next to which we shall direct attention is illustrated in Figs. 3 and 4 of the engravings, and is known as Mackenzie’s patent. It is controlled by the British Patent Glazing Company, with offices at No. 24 Finsbury Circus, Birmingham, England. This system is said to be applicable both to transoms and windows, such as railway stations, picture galleries, markets, riding schools, arcades, conservatories, &c. Referring to the engraving, A represents the upper pane of glass and B the lower pane. C represents a middle channel arranged to carry condensed moisture from the top to the outside of the under pane. D D are channels to convey any water that may get into the work at the line of the rib. E E are hollow vulcanite tubes, or packing, that serve as a bed for the glass. F represents a movable stop that prevents the upper pane of glass from sliding down. G and G represent locking studs for securing the gutter to the glass. A detail of one of these is given below the larger view. H represents a movable saddle secured to the bar to which the lead flange is attached. The outer capping in this system is made of either zinc or copper. The fastening is very simple. The hole in the saddle for the stud to go through is an elongated slot. The stud is simply pushed through and then turned quarter round, like a button, and the locking is completed. The advantages to which the makers direct attention comprise, among others, the absence of bolts or nuts in securing the capping to the bars. Flanges may be placed across the bars without in the least injuring the zinc or copper or damaging the glazing. The glass is not held in position solely by the capping, and does not depend on such capping to prevent its being blown out by gales of wind. It is secured by the saddles, which, as we have already explained, are fastened to the bars after the glass is fixed in position. Among the important buildings upon which this system of glazing has been used may be mentioned the buildings belonging to the Prince of Wales upon the Sandringham estate.

In Fig. 6 we show a section of what is called Bendle’s "Invincible" glazing, and of which, it is said, over 7,000,000 square feet have been used in Great Britain. The largest single area over which this system has been employed is the building containing the Flushing station, Carlisle, and which contains 350,000 square feet superficial. The system is controlled by William Edgeworth Bendle & Co., No. 3 Westminister Chambers, Factory street, London, S. W. An attempt, we believe, was made some time since to introduce this system into this country, but with what success we are not at present informed. The system is specially designed for roofs where very long pieces of glass are to be employed. By referring to the engraving it will be seen that the glass is clamped in place against the top of the bar by a bolt and washer, the nut of which comes above the capping. The bar is hollow, forming a water channel for whatever water penetrates between the glass or through the capping. Condensation gutters are provided at the sides and at the bottom of the bar, thus rendering this form very desirable in this particular. The makers direct attention to great saving in repairs, strong and durable construction, and a minimum of labor in putting the glass in place.

In Figs. 7 and 8 there is shown what is called the "Simplex" system of glazing. Fig. 4 shows a section of the sash-bar before glazing, while Fig. 8 shows the same after the glass has been applied. The advantages to which the proprietors, Messrs. Grover & Co., of London, direct attention are the fact...
that no iron, zinc or putty is used, and that by its features it is suitable for almost universal application. The lead strips are the special feature of this system, and have been patented. They require no skilled labor to put in place, and, accordingly, the system has come into quite general use wherever it has been introduced. It will be noticed that in this system the gutters for carrying off the water of condensation are in the bar, and not supplied with any special lining. This, of course, is objectionable, comparing wooden bars with those of metal. This system, however, has the advantage of holding the glass above the bar, thus making it possible for the water of condensation to have a gutter instead of trickling down the outside of the bar. An advantage to which the makers direct special attention is that with this system all outside painting is dispensed with.

The Size of Bricks.

The best method of developing the art of building in brick has occupied the attention of architects and engineers in Switzerland for some years, and with this view it has been determined to attempt to fix a certain standard size of brick, and a report was presented to the Swiss Society of Architects and Engineers, in which the recommendations were 9.84 x 4.72 x 2.36 inches. As, however, these dimensions were not agreed to by all sections of the society, a special federal commission was appointed in December, 1882, to inquire into the subject. A report was presented to the General Assembly of Cantonal Delegates at Bern by M. Favod. The author first of all gives a brief account of the bricks that were used in the making of the bricks. He then gives tables of the dimensions of the bricks that were used from remote periods up to the seventeenth century, and of those in use at the present day in Italy, France, England, Belgium, Austria, Germany and Switzerland. From these tables he shows that the standard size should be between the limits 4.45 inches long, 4.33 inches broad and 2.97 or 2.56 or 2.76 inches thick; or, taking a mean, the size should be 9.84 x 4.72 x 2.76 inches. This size is m'd at the present time, as it is also that of 9.84 x 4.72 x 2.76 inches.

The author is greatly in favor of the thicker brick, and a great deal of the paper is taken up with a discussion of the possibility of properly burning it, many of the Swiss brickmakers having stated that they cannot burn bricks having a greater thickness than 2.56 inches. In reference to the bricks by the thousand without reference to size, the smaller they are the better for him. The contractor, too, is apt to prefer small bricks, because with them he uses more mortar, which costs him less; but, on the other hand, he requires more bricks per cubic yard (the number of bricks of different sizes in a cubic meter of work are given), and there is more labor in setting them, so that what he gains in one way he loses in another.

In regard to the quantity of mortar, Dr. Boehme's experiments at Berlin in 1875 proved that no more mortar than was actually necessary to keep the course horizontal and effect the cohesion of the bricks (for which purpose joints of .4 inch thick are ample) should be used, as, whether the mortars becomes more or less hard than the bricks, the result is in either case to reduce the strength of the work. Experiments made with blocks of 20 sound bricks, one set of blocks cemented with various kinds of mortar and cement, were carried out, and as mean results gave as mean results per square inch to cause splitting: For the first set, 1618 pounds per square inch to cause splitting; 1834 pounds for the destruction of the bricks; and per square inch to cause splitting, showing that the dry bricks gave a mean resistance of one third more than those set with mortar before splitting, and one-fifth more before destruction. The author, therefore, concludes that to secure the greatest strength thick bricks with a minimum of mortar should be used. The author suggests that the price of bricks per thousand should vary according to the number required per cubic meter of work, the manufacturer may be paid according to the size of the bricks. Finally, he recommends that the standard brick should have the dimensions 9.84 inches by 4.72 inches by 2.36 inches.
CARPENTRY AND BUILDING.
June, 1884.

NOVELTIES


Messrs. C. B. Rogers & Co., whose manufactory is at Norwich, Conn., and warerooms at 109 Liberty street, New York, are directing attention to what they call their No. 10 Planer, which is illustrated in Fig. 1 of the engravings. This single-surface machine is made from entirely new patterns, and the manufacturers claim for it that it stands today at the head of the list of the small surfacers in the market. It has a capacity of 20 inches in width and 6 inches thickness. It is quickly adjusted, easily operated and does excellent work. The cylinder is made from a solid steel forging and runs in self-oiling boxes. The feed, which is very strong, is supplied with three changes of speed for the various classes of work to be performed. The necessary changes are quickly accomplished by simply shifting the belt on the cone pulleys attached to the feed counters on the machine. The manufacturers call attention to the advantages of quick and easy change of feed on machines of this class in every shop where both hard and soft wood are used, and where the quality of work done is required to be of a high degree of excellence. The cylinder and feed-roll boxes are made fast to the machine, and by means of a hand-wheel at the side of the bed are raised and lowered for different thicknesses of stock. This arrangement gives solid foundations for the working parts of the machine. Two horse-power is required to drive this planer. The weight of the machine is 1300 pounds.

Stearns' Anti-Friction Door-Hanger.

Messrs. E. C. Stearns & Co., of Syracuse, N. Y., are introducing a new door-hanger, which is represented in Fig. 2 of the engravings. It is called Stearns' anti-friction hanger, although the principles involved in its construction are old and well-tried. The former has made too many friends to be dethroned by any rival, however meritorious. They do expect, however, that this hanger will increase their business in these specialties, and that it will fill a peculiar class of wants to which it is particularly adapted. It is offered on its merits to all who desire an anti-friction hanger with no flanged wheels.

Compressed Lead Sash Weights.

J. N. Raymond, of 55 and 57 West Lake street, Chicago, is offering the trade a very desirable article in the way of compressed sash weights. The feature which distinguishes these weights from others of the same general class consists in the manner in which the fastenings are applied, rendering them much more convenient for use than other similar articles. In Fig. 3 the general appearance of two round weights connected together is presented, while in Fig. 4 a longitudinal section through one of the weights is shown, indicating the manner in which the fastenings are applied. Each weight is centered, making it hang perfectly true and plumb, thus obviating all friction and noise. The fastenings are of wrought iron, and the method of con-
They are about double the weight of iron for the same size, or, in other words, only one-half the space is required to be sufficient where lead weights are used. Mr. Raymond invites the trade at large to send for a circular which he has prepared, which contains a table of weights.

The Reno Hand-Screw.
The Reno Bench Vise Company, Detroit, Mich., are the manufacturers of the Reno hand-screw, represented in Fig. 6. As indicated in the cut, this hand-screw with wooden jaws is operated by iron screws working in metal bearings, the screw ends being squared in the wooden handles to prevent turning. It is evident that such a contrivance has its advantages, and among these the manufacturers claim the following: That less material is required for the same strength, making the tool lighter and more convenient to use; that there is no swelling of the screw in damp weather, and no stripping of thread when glue dries on the screw; that, should a jaw become broken by severe usage, any spare part can be transferred to a new jaw, whereas with the old style the tool is useless; that much greater pressure can be obtained with less power with the new screw than can be obtained with the old one, and that these screws will outwear the old style three to one, and can be handled with much less labor.

Double Roller Surfacer.
Fig. 5 represents Gleason’s improved double-surfacer, manufactured by D. & F. Gleason, Philadelphia, Pa., and those that require much attention are so arranged as to be oiled while in motion. That size of the machine admitting lumber 24 inches wide occupies a floor space of about 4 feet square. Different sizes of the machine are constructed which double-surface lumber from 3/4 inch in thickness up to 6 inches.

Reed’s Patent Noiseless Door-Hanger.
Figs. 7 and 8 represent Reed’s patent noiseless door-hanger, made by the Reed Manufacturing Company, Canajoharie, N. Y. Fig. 4 shows it mounted on a steel track, and Fig. 5 indicates the principle used in the construction of the wheel, to which they direct special attention. For the hanger as a whole the manufacturers specify these points of merit, which will enable our readers to understand the manner of its construction: 1. Its simplicity and durability, as the arms are made of steel, with a flange turned up on each side to stiffen them. 2. That they can be used equally well on wood or steel tracks, as well as on many iron tracks made by other manufacturers. 3. That the steel arm gives a finer finish and a lighter article than any cast or even wrought iron one can. 4. That the door cannot be thrown off the track, on account of the manner in which this hanger is constructed. 5. That the track is adjustable to fit doors of different thicknesses, by means of several small holes in the brackets, the rail being fastened to these brackets with bolts. 6. That the hangers, brackets and tracks are made entirely of steel, thus securing great strength. But another special feature of this door-hanger is in the method that is adopted to secure lubrication of the wheel. Fig. 8 shows the wheel as it is made with wooden bushing, the wood having been thoroughly boiled in tallow, thus affording sufficient lubrication. The wheel so constructed revolves on a hollow tube, turned smooth in a lathe, and held firm by the rivet passing through it. As a result of this arrangement the manufacturers describe the hanger as running with exceptional ease, and without the rattle and noise of competing goods.
Combination Clapboard Tool.

Fig. 9, 10 and 11 of our engravings show a combination clapboard tool manufactured by Basset & Washburn, Plainville, Conn. The tool consists essentially of two pieces, one of which is very clearly shown in Fig. 11, this tool is obtained by two spiral grooves cut on the inside of the brass cylinder which forms the shank. A sleeve with corresponding spiral projections fits loosely upon the upper end of the bit and inside of the cylinder. On the lower edge of the sleeve notches are cut, into which fits a pin that extends through the bit near the upper end. Whenever pressure is applied to the bit this pin engages in the notches in the sleeve, so that forcing the bit to the handle causes the bit to be rotated. Accordingly, by placing the end of the bit on the head of a screw and pushing the screw-driver against it the screw will be driven home. The manufacturers claim for this device simplicity of parts and thoroughness of construction. By providing the spiral grooves in the shank of the tool the bit is left of full size, and therefore must be stronger than those of equal diameter which are cut away in order to obtain a construction which will impart a rotary motion under pressure. The sample which we have received, with the bit withdrawn, as shown in the engraving, is a little over 12 inches in length. When the bit is extended to its utmost capacity, it measures a trifle over 19 inches.

Solid Universal Wood-Worker.

For several years past Messrs. Bentel, Margedant & Co., of Hamilton, Ohio, have been building different styles of universal wood-workers adapted to various lines of work. From time to time changes in the patterns and the designs have been made, rendering them still more desirable for the special purposes intended. In Figs. 13 and 14 we show a front and rear view of what they term their Solid Universal Wood-Worker, which has been recently improved by the addition of the vertical side-head, shown in Fig. 13, but more clearly indicated...
in Fig. 14, and other minor features. As will be seen by the engraving, the frame of this machine is a square column with a broad base, which is convenient for setting up. The leveling of the machine is not dependent upon several feet of an unsteady floor, but is at once accomplished by properly placing the foot of the rigid and self-supporting base in place. The upper frame, which carries the tops, is raised and lowered on a planed way on the front of the column by means of a screw, bevel gears and the hand-wheel shown. The front top is raised and lowered by means of the hand-wheel shown at the end in Fig. 15. The back top has no vertical motion independent of the upper frame or saddle. Both tops are adjustable horizontally, and can be moved back from the head for the purpose of inserting low boards, panel iron, &c. A third top, back of the two front tops, when set level with them, forms a very large surface useful for gaining or sawing large work. The fence is ingeniously arranged to be set at an angle for beveling, and is easily moved in or out to suit the work. The adjustable vertical side-head incorporated in this machine is a very useful arrangement for squaring up material, since with it two sides can be planed square and out of wind at one and the same time, thus saving one operation. In addition to this, the side-head can be used for thickening by fastening an adjustable guide to the front tops and running the material between it and the head. The side head can also be used for shaping. With the fence off, a very large ever used in accordance with their circular directions.

**Allen’s Floor Clamp.**

In Fig. 15 we illustrate F. E. Allen’s patent floor clamp, manufactured by Widberby, Bagg & Richardson, 26 Salisbury street, Worcester, Mass. The engraving represents the clamp in use, placed on the floor timber, with the floor boards in front of it, and with the dogs on opposite sides, driven into the timber for the purpose of holding the frame stationarily. By raising the lever the bar A is drawn back, engaging with the teeth of the rack B. By pressing the lever down the rack B is forced out against the floor boards into proper position. The pawl at the end of the frame engages in the teeth of the rack B, holding it in position while the lever is being raised. The rack B is furnished with a slot running lengthwise with a headed screw running into the bar A, so arranged as to prevent the latter from raising too great a distance from the former, and preventing the bar A from going either side of the rack B. In order to remove the clamp, it is neces-

**Fig. 14.—Rear View of the Solid Universal Wood-Worker.**

Table is presented upon which the material may be placed, the same as on a shaper, and for many kinds of work the upright spindle will do as well as any single shaper. The

**Fig. 15.—Allen’s Floor Clamp.**

sary to raise the lever; then by pressing down the pawl is loosened so that it can be raised; then by throwing the lever back, the pressure is removed from the edge of the floor board. The dogs which hold the clamp in position may be loosened by the claw of a hammer. The clamp may be moved from one part of the floor to another, although a better plan would be to use a pair of clamps, keeping one at each end of the floor while it is being laid.

**Japanese Houses.**

The Japanese houses, says the Builder, are generally one-storied, but roomy, and of exceedingly neat appearance inside and outside. They much resemble Swiss chalets, with the roof protruding over a basement veranda from 6 to 8 feet wide. The wooden framework of the main walls is filled with bamboo laths covered with clay, and heavy rafters are put on it for the roof, to give the whole structure the necessary stability. No permanent partitions are found in the interior, and light wooden panels moving in grooves or porcelain casters divide the different compartments. They can be removed and transposed at will to form new partitions. Transparent paper serves for the window panels, and the same material, made of the bark of the mulberry tree and painted over in colors with elaborate patterns, is used for curtains, purlieres and many other items of ornaments.

The floors are covered with mats made of rush, which all over Japan have the same dimensions—6 feet long, 3 feet wide and 2 inches thick. The size of these mats, or "kins," as they are called, regulates all the measurements of a house, and, if a Japanese wants to have one built, he only states to the architect the number of kins it has to contain. These mats always keep scrupulously clean, and never allowed to be trodden upon by the sandals of the natives on the boots of foreigners, but only with stockings or bare feet. Chairs, tables and bedside being almost unknown, the Japanese sit and sleep on this matting, and, except some ornamental cabinets and screens, hardly any other furniture encumbers the room. The reception and business apartments open toward the street, and the back of the house contains the living and sleeping rooms, as well as the kitchen, which are all more or less open to the view of the passers by. All the household utensils are made of lacquered paper mache or bronze, in curious shapes, elaborately ornamented, and with a view to stow them away after use in the smallest possible space, economy of space being a cardinal virtue in the construction and management of Japanese houses. In winter the rooms are warmed by coal-pans, the ink is prepared with a certain proportion of gelatine, the addition of a little bichromate of potassa, followed by exposure to sunlight, has been found laudable in rendering the ink so insoluble in water that it will not run or spread when water colors are used for shading the sides of the lines.

**To Render India-Ink Waterproof.**

As the ink is prepared with a certain proportion of gelatine, the addition of a little bichromate of potassa, followed by exposure to sunlight, has been found laudable in rendering the ink so insoluble in water that it will not run or spread when water colors are used for shading the sides of the lines.

**Figures 14 and 15.**
CORRESPONDENCE.

Estimating by the Square.

From C. L. G. Burlington, Wis.—Reference to the numbers of the paper on the subject of estimating by the square, I inclose some analysis of cost of four squares of outside walls. For convenience in the following, the numbers of the paper are put on double thickness.

**Analysis of Outside Walls.**

- 19 pieces, 2 x 1 inch, 20 feet long = 210 feet of fencing, at $17.50 per M., $3.63.
- 60 feet dressed and matched fencing, at $17.50 per M., $10.
- 430 feet siding, at $17.50 per M., $76.25.
- 11 squares, paper, at 23 cents per square, $2.53.
- Framing, putting in, and pinning in place 54 feet of siding, at $8 per square, $43.20.
- Laying 4 squares of flooring, at $15 per square, $60.
- Laying 4 squares of siding, at $1.25 per square, $5.

**Total.** $98.64

This sum, in turn, divided by 4 gives the price of a single square, $24.66.

The analysis of cost of four squares of roof is as follows:

- 12 outings, 8 x 8 feet long = 96 feet of roofing, at $8 per square, $768.
- 466 feet matched fencing, at $17.50 per M., $81.65.
- 36 squares, at 37.5 cents per square, $13.50.
- 11 bundles 3x3 nails, $63.00.
- 12 bundles 2x2 nails, $84.00.
- Framing and putting in place 106 feet of floor, at $1.50 per foot, $160.
- 4 squares of roof bridging, at $1.00 per square, $4.
- 4 squares of siding, at $1.25 per square, $5.

**Total.** $1,084.

This amount, divided by 4 gives the cost of a single square, $323.

The following is an analysis of cost of four squares of joists, which may be laid on joists 2 x 8 inches, the flooring being selected from No. 1 fencing, and the joists being placed in such a manner as to allow space for doubling where necessary.

**Analysis of Flooring.**

- 17 joints, 2 x 8 inches, 10 feet long = 240 feet of joists, at $11.50 per M., $2,880.
- 464 feet of joists, at $11.50 per M., $8,400.
- 15 1 x 6 inch bridging, at 2 cents per foot, $45.
- 10 bundles 3x3 nails, $63.00.
- 3x3 spikes, $8.
- Laying 10 squares of flooring, at $1.50 per square, $15.
- Laying 400 feet of joists, at $8 per square, $3,200.
- 600 feet of bridging, at 1 cent per foot, $60.

**Total.** $10,933.

Dividing this amount by 4, as in the previous cases, gives $2,733 as the cost of one square of flooring. It may be remarked in this connection that these figures are based upon the use of No. 1 fencing and joists which are the best and most expensive except the one item of painting

### Analysis of Cost of Door.

- Window frame prepared for weights. $3.00.
- 20 feet 2x6 inch molding, at $.50 per foot, $10.00.
- 36 pounds of sash weights, 40 cents.
- 36 nails, costing 6 cents each, $2.16.
- Grounds for plastering anduting, on sashing frame.
- Casing up.
- Nails.
- Putting on lock.

**Total.** $7.96

I should like very much to know how the word " carpentry and building " would give the pronunciation and meaning of all the unusual technical language that it has occasion to use. This might be done by means of foot notes at the bottom of the page or in the back of the whole account of it. For example, on page 258 of last volume, in the middle column and at the thirteenth line from the bottom, the word " scarcements " is used. I would like very much to know how the word is pronounced, and what it means, and also why it is employed in preference to some more common word?

**Answer.**—To carry out our correspondent's suggestions, we very much fear, would be to produce an appearance of pages in Carpentry and Building that are too full of technical terms for the use of our readers, if not ridiculous in the extreme. The fact that dictionaries are comparatively cheap and easily obtained, coupled also with the consideration that no two readers would require the same list of terms defined, would seem to render such a scheme unnecessary. Our correspondent suggests entirely needless.

The word "scarcements" to which the above allusion is made is reprinted from one of the English technical journals, and was a paper read before some of the engineering societies of Great Britain. While in our own articles we aim to make changes in the terms by which technical journals, and was a paper read before some of our readers the necessity of occasionally referring to the latter recently spoke of Mr. Perry's system of stairwork. I have frequently noticed

The latter recently spoke of Mr. Perry's system of stairwork. I have frequently noticed that position until the parts have become set, and then the cut is made directly over it. Let it remain in this position until the parts have become set. If any one has a better method of doing this work I have sometimes taken a flat file, and, after twirling the nail with the end resting on the bearing, have filed the corners so as to leave a V-shaped end, and then fasten the former to the latter by means of glue. I aim to file it at an angle of about 45 degrees. Such treatment of a nail makes a very slight difference in the position of the Earth, but it would make a job better. It would enable them to be stuck to their places much more easily than at present.

**Definitions of Terms.**

From T., Albion, Ohio.—I desire to have explained the meaning of the term "carpentry and building."

**Answer.**—The term "carpentry and building" is derived from a Latin word signifying wall. Its use has commenced in the English language it has had various meanings, different from that of the time it was first used. Its meaning is the word "scarce" meaning something.

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**Carpentry and Building.**

From D. G. Boston, Ohio,—In response to an inquiry in Carpentry and Building from a correspondent at Milan, Ohio, I would say that tools may be used for "carpentry and silver nailing," as it calls it. I find no tool, however, so well adapted to the work as a thin, sharp file. After the joint is squared and the nail is raised and the nail is set below the surface of the chip, fill the set of the chip with putty; then: rub the putty smooth over its surface. The term "carpentry and building" as employed in the trades at the present time means the lining of chimney flues with a coat of mortar, the mortar being applied with the proper being that with which the chimney is built.

**Chip Nailing.**

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**Alton Lime.**

From I. F., Stonington, Ill.—I think a few practical hints on the use of limes and cement would be valuable in articles in your journal. Application of lime in this country is that it must be put in tight bricks for a few months before it is slacked. If used when fresh out of the kiln it is nearly worthless, as it is too fiery.
Moving Buildings.—Method Described by J. F. W.

From J. F. W. Danville, Ill.—Some months since a correspondent asked for information about moving buildings, and as no one else has undertaken to give him the information desired, I will describe the common method in use. I enclose a sketch showing the rollers, track, and other parts; also a building in process of removal. The building, in the first place, is to be carefully raised from the foundation with jack-screws or by other means, until a height sufficient to insert the timbers under the sill, also the rollers and track, has been reached. The track, as it leads away from the foundation, should be well blocked up, and may be a little descending in order to facilitate the moving of the building, and yet it should not be so steep as to cause it to move faster than necessary. All the timbers used about the track should be very strong, in order to insure against breaking. A large building should have three rollers on each side, and also three under the middle. With smaller buildings four rollers—one at each corner—are sufficient. The force required to move a building well may be estimated at two men at each roller employed. I think the sketches I enclose, in connection with this brief description, will afford all the information that the correspondent desired.

Filter.

From G. A. H., Bolivar, Mo.—Will you please inform me, through Carpentry and Building, what materials are used in filters for purifying water?

Answer.—This question as presented is a difficult one to answer satisfactorily. Various materials are used for the purpose, depending very much upon circumstances and the supply that may be at hand. A very satisfactory filtering material, especially for use in connection with cisterns, consists of ordinary building brick. The bricks are laid in cement, and the water, being pumped on one side of them, passes through to the other side, and is delivered pure for domestic purposes. A bed of charcoal and sand is also very frequently employed, but filters of this kind do not get foul and do not give satisfactory results. A cheap filter may be made as follows: Take a common flower-pot as large as possible, plug the hole with a piece of sponge, and then put in a layer of powdered charcoal about an inch thick, then another of sifted sand, and follow by a layer of small stones and gravel about 2 inches thick. A filter of this kind will give satisfactory results when first used, but after considerable water has passed through it, particularly if it be of a character to leave offensive matter, it needs to be renewed. One of the hooks treating upon this subject says that a filter may be made by placing in a tank of impure water a vessel so arranged that a sponge which it contains shall lap over its edge and dip into the water of the tank. The sponge gradually sucks up and purifies the water, and allows it to drip into the smaller vessel or reservoir, from which it may be drawn off by a tube. By placing a few pieces of charcoal in the bottom of the reservoir, filtration of a very perfect kind is affected. A method of making a filter, which, if properly carried out, would probably give excellent results, consists in pulverizing animal charcoal until reduced to an impalpable powder. This is mixed with Norway tar and a compound of other combustible substances. The combined materials are then properly amalgamated with liquid pitch, and the whole kneaded up into a homogeneous plastic mass, which admits of being molded into slabs or blocks of many required dimensions or shape. These blocks having been allowed to dry and harden, are subsequently carbonized by being subjected to a process of incineration by heat. In this manner all the combustible ingredients are burnt out, leaving nothing behind but the animal charcoal in the form of a block of charcoal permeated throughout by innumerable pores. We are in doubt from our correspondent’s question whether he desires to know what materials are commonly employed in the filters sold in the trade, or what he may use in such filters as he may himself construct. Most filter manufacturers have their own peculiar recipes, and to answer our correspondent in this respect would be very difficult. If this precaution is not taken, when the plaster dries the part next to the old mortar will be found soft, and the patch or plug will soon drop out. The same principle may be illustrated as follows: Suppose it is desired to mend a broken plaster cast. By pouring the casting on it, the part will adhere here; otherwise the old part quickly absorbs the moisture from the new, and the chemical process of setting is broken up. The bulk of the new work will bear, but that resting directly against the old will be found soft, and will not adhere. Bricks that are simply dipped or well sprinkled are wet enough. If allowed to lie in water they are liable to slip while being laid.

Repossesé Tools.

From C. E. E., Urbana, Ohio.—Will you please inform me where I can buy tools for doing repoussé work in person?

Answer.—The tools used for repoussé work vary from a tempeeny and nail, a common hammer to very elaborate sets with different forms of figures and shapes of points. Our impression is that the general hardware stores, particularly in towns where attention is given to art matters, are carrying these tools in stock. We know this to be the case in some places. A considerable demand for them is experienced by wholesale dealers in the large cities. If our correspondent desires to send to this city for the tools he can obtain them from Messrs. Willcox & Co., 1768 W. street, or of Montgomery & Co., Fulton street, below Nassau. Both of these firms, if we mistake not, have issued pamphlets giving instructions for the work and describing the tools required.

Why Bricks Are Wet Before Laying.

From A. T. G., Washington.—In answer to an inquiry from W. W. M. of Missouri, who wishes to know why bricks are wet before laying, I would say that dry bricks absorb too quickly the moisture of that portion of the mortar next to them, thus preventing the mortar from setting. Those who wish to mend a break in a plaster wall should first fill the holes of the hole, and then put in the plaster or mortar. Under these circumstances it is likely to work vary from a tempeeny and nail, a common hammer to very elaborate sets with different forms of figures and shapes of points. Our impression is that the general hardware stores, particularly in towns where attention is given to art matters, are carrying these tools in stock. We know this to be the case in some places. A considerable demand for them is experienced by wholesale dealers in the large cities. If our correspondent wishes to know why bricks are wet before laying, I would say that dry bricks absorb too quickly the moisture of that portion of the mortar next to them, thus preventing the mortar from setting. Those who wish to mend a break in a plaster wall should first fill the holes of the hole, and then put in the plaster or mortar. Under these circumstances it is likely to be the case in some places. A considerable demand for them is experienced by wholesale dealers in the large cities. If our correspondent desires to send to this city for the tools he can obtain them from Messrs. Willcox & Co., 1768 W. street, or of Montgomery & Co., Fulton street, below Nassau. Both of these firms, if we mistake not, have issued pamphlets giving instructions for the work and describing the tools required.

End View of Roller.

Top View of Roller and Track.

Tar for Shingles.

From J. A., New York State.—There was published some time since a communication from me on the subject of tar on shingles, in connection with which the Editor suggested a desire for further information. I would say that the tar which was used was common tar, and not coal tar. The tar was applied out, would probably give excellent results. These blocks having been allowed to dry and harden, are subsequently carbonized by being subjected to a process of incineration by heat. In this manner all the combustible ingredients are burnt out, leaving nothing behind but the animal charcoal in the form of a block of charcoal permeated throughout by innumerable pores. We are in doubt from our correspondent’s question whether he desires to know what materials are commonly employed in the filters sold in the trade, or what he may use in such filters as he may himself construct. Most filter manufacturers have their own peculiar recipes, and to answer our correspondent in this respect would be very difficult. If this precaution is not taken, when the plaster dries the part next to the old mortar will be found soft, and the patch or plug will soon drop out. The same principle may be illustrated as follows: Suppose it is desired to mend a broken plaster cast. By pouring the casting on it, the part will adhere here; otherwise the old part quickly absorbs the moisture from the new, and the chemical process of setting is broken up. The bulk of the new work will bear, but that resting directly against the old will be found soft, and will not adhere. Bricks that are simply dipped or well sprinkled are wet enough. If allowed to lie in water they are liable to slip while being laid.

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Carpentry and Building.

June, 1884.

Desks.—From P.—Inclosed I hand you elevations, sections and details of a cabinet desk in one piece, in which readers of Carpenter and Building may be interested. I have endeavored to make the drawing so complete as to explain itself. The top should be covered with the best blue cloth. The coat of a desk of this kind in walnut, oil finish, according to bids recently received, is about $55. The bids ranged from the figure named to $78. The design is one which a carpenter or cabinet maker could readily build for his own use, and it would be serviceable in either library or office.

Setting Fence Posts.

From A. D. R., Silver City, New Mex.—Thinking it will be useful to some readers of Carpenter and Building (whose columns, by the way, are always consulted in our shop), I send you a method of setting fence posts in rock, that I have used. Instead of removing rock, I drill two holes at right angles to my fence 6 or 8 inches apart, and place in the holes a piece of 3/4 round iron 12 or 14 inches long, and lead the fencing into place. I bend the ends of the pieces together at the top, so as to brace my fencing.

Iron Roofing vs. Tin Roofing.

From J. W. V., Williamsport, Pa.—I desire an opinion with regard to iron roofing as compared with tin roofing in point of durability; also the relative advantages of these two materials as a protect in against fire. There is, I believe, a great difference of opinion among roofers in this section of the country as to which is the best of the two for all kinds of roofs. I would like to have the opinion of the readers of Carpenter and Building who have the experience of the data. Besides the last qualities of this kind of roofing, as well as the opinion of the Editor on the same question, I am a tinner and have done considerable roofing, but as yet have not given much attention to iron roofs. I would like to know now the iron roofing as manufactured at present will compare with tin for roofing purposes. Answer.—Manufacturers of iron roofing have no hesitation in claiming for their product durability equal to, if not greater than, that of tin, for roofing purposes. The manu facturers have always kept up their claims upon carefully-selected stock of a heavier gauge than is used in the case of tin plates, thorough painting, less seams, and a construction that makes the workmanship more satisfactory for the purpose than is very commonly encountered with tin roofs. During the time that tin plates have been used under a ban, from the fact that poor quality of iron and insufficient coating have been the rule, there has been but little question that the iron roof of any of the leading kinds now sold in the market was equal in quality, if not superior, to the tin roof of first-class plates. With all respect for iron roofs, however, we are not prepared to admit that an iron roof as commonly laid is superior to a roof laid of the best "MF" tin or of other first-class plates. While the iron roofs have some advantages on their side with reference to gauge of plates and a smaller number of seams, it does not follow by any means that these difficulties cannot be overcome. We believe by the employment of good tin it is possible to make roofs which, on account of the coating, are likely to endure much longer than those of iron could be expected to last. The relative merits of iron-roofing men are to have experience and careful comparisons that it is possible to ascertain which is the best of the competing materials for the purpose named.

Practical Painting.

From E. P. C., St. Paul, Minn.—I will endeavor to answer a question asked in a recent issue by "S. W. F.," of Webster, Mass. The first coat for outside work should be mixed so as to cover and fill the pores of the wood. It should not be too heavy, for it prevents the wood from being apt to peel. This difficulty, however, will be considered further on. The first coat should be allowed to stand three or four weeks, so as to become perfectly hard. Then all the nail holes should be putted. The second coat should be of medium weight, and should be rubbed well. I am in favor of using a little drier in my first coat, and also some in my second, provided the weather is not too hot. The presence of the drier causes a good hard surface with the paint. The drier coat and helps bear out the second, and imparts a much better gloss; at the same time the paint wears better. The idea I prime in the same general manner as suggested above, but use a little larger quantity of drier. This is necessary, for the reason that inside work does not dry as rapidly as outside work, and, accordingly, the surface is not as hard if driers are not used. For my second coat, if wanted to be flat work, I mix with turpentine well stirred. My experience has taught me to use 1 gallon of color to 1 pint of Damar varnish. This will not hurt the flatness of the color, but does prevent its becoming stained easily, and gives a surface that can be wiped off with a
of oil to prevent it from setting too quickly, and also a little turpentine. With reference to the colors for inside work, the ball should be of such a color and tint as to be pleasant and inviting. I suggest graining in oak. The panels might be painted a light steel-gray and the balance a-tint, taking care in the latter not to get the colors too loud. If corner blocks are used in the casings, they in the latter not to get a shade darker than the color used in the latter to start the color. I add the black simply to set the color, but just enough to make it visible—is also desirable for use.

The Remarkable Number. — Diagrams Accompanying Letter from John C. Rankin.

1. Each 6 is to be placed in the order of the columns of Fig. 6. The 142857 is to be used in the order of the columns of Fig. 7. The figures and their arrangement are the same in all the diagrams. Each column in Fig. 2 contains the “remarkable number,” found by beginning with the 1's and reading upward. Each column of Fig. 3 is composed of repetitions of the different figures composing the number. Commencing at the upper left-hand corner of Fig. 4, and following the serpentine trail, we find the number repeated six times. Beginning at the figure 1 in Fig. 5, and following the courses of the arrows, we find the mysterious number in many convolutions. Fig. 6 shows that the amounts of the vertical columns on either side of the central one correspond, and that the sum of either of
said amounts, increased by that of the central one, is one hundred. Also, that the right-hand figure of each horizontal line is the same as the product of the two that follow it below, No 3, 6 or 9 appears in the number, but ar-
anged in this order as we find it, reading 2 7
as 15, 45 and 27, seven multiples of those digits, &c. I leave to abler and more "lesse learned" than myself, it is a true description of its wonders, and especially to tell us "the reason why.

TRADE NOTES.
The Dudley Shetter and Roukel A. A. Company, successors to the Cordesman & Egan Company, has recently completed and described some months since, announces that it is now altered as to make it burglar proof. The building has been made in these goods. The lock has been so altered as to make it burglar proof. The lock has been so
ってくれる。さらに、 Ri， Griff and others，の記事を引用し、特に、この理由を教えて。

NEW PUBLICATIONS.
The Air We Breathe, and Ventilation. By Henry A. Motl, Jr. 82 pages, illustrated, bound. $1.00. Published by John Wiley & Sons, Price, $1.

This little volume, which forms No. 2 of what has been called the Motl series, is likely to be of considerable practical value to the community at large, since it treats in a practical manner such sub-
jects as are indicated by its title. The first di-
agrams, one page, prove that the air in the Eureka stained glass, which is offered
in various grades of materials for ornamental purposes. The company is at present manufacturing its own goods instead of contracting for their supplies, which insures a better quality of
work in all respects.

We have received from the Egan Company, successors to the Cordesman & Egan Company, a completes the plan for the erection of nearly a dozen office buildings ranging in height from

The Builders' and Manufacturers Mutual Benefit Association of America and the Builders' and Manufacturers Mutual Benefit Association of Canada, is incorporated at

building with a frontage of 116 feet on William street, 87 feet on Beaver street, 89 feet on Hanover street, New York. Several improvements have been done in these goods. The lock has been so

The Eureka stained glass, which is offered by C. L. Seib, No. 553 Broadway, may be more accurately described as a cheap substi-
tutive for stained glass, and, as such, is the most appropriate accessories to tasteful houses. How to manage work of this kind, and how to tell the genuine from the counterfeit, are clearly set forth in the various publications issued by James Vick, Rochester, N. Y. "Vick's Floral Guide" and "Vick's Illus-
trated Monthly Magazine," copies of which are at hand, are especially helpful in this direction.

The architecture of stained glass is, of course, a matter of very great importance to the architect, and the work in all respects.

Alongside of each warm-air flue there is a venti-
lating flue of sufficient capacity to take the foul

Mr. James Murphy is the architect of the new

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An English Fireplace.

It is sometimes advantageous to pause in the course of routine work, whatever may be the line of effort, and spend a short interval in studying results at the hands of others who are differently located, but who are working in the same general direction. Accordingly, we present this month a fireplace design which represents current English practice. We believe it will be of interest to our readers as pointing out the direction of taste in work of this kind by English artist and artisans. The design is by Mr. Walter Crane, and the work, which has been done at Cumberland Place, Regent's Park, London, was executed by a well-known contractor. The London Building News, to which we are indebted for the originals from which our engravings were made, presents the following description of the work and decorations of the room of which it forms a part:

The general tint of the coloring as a basis is ivory white, the grounds of the figure panels, the arabesques, the flutes of pilasters and base ornamentations being a subdued yellow of a golden tone. The tile lining of the fireplace and the bordering of the hearth are of the same color, which in a somewhat paler key is repeated in the stencilled patterns of the frieze of the room, and in the panels of the room doors, which are also of ivory white. The walls are tinted a flat pale gray-blue. The figure subjects in the mantelpiece are intended to be suggestive of domestic security and the repose of the hearth, as in the frieze with its two reclining dames with their fans or screens, and the cat and dog as time-honored warders of the fireside. Below are figures emblematic of the feeders and supporters of the fire, one maiden carrying the lighted torch and faggot of wood and the other applying the lonely bellows. These figures are modeled in plaster, and their minute detail is carefully shown by the enlarged drawings which accompany the general elevation in our plate. The architectural details have the merit of novel proportion and treatment, peculiarly arranged, perhaps, but essentially the work of a decorative hand of no mean order, fresh in conception, at any rate, and certainly extremely interesting.

The lumbering industry of the South is at present in the ascendency, caused in part by the rapid destruction of the Northwestern forests and their inevitable early exhaustion. The general development of the South is also to be accredited for some part of the prosperity of this industry at the present time, for it has shown the resources of sections of that country which have been comparatively unknown heretofore. Throughout the Carolinas, Georgia, Florida, Alabama and Mississippi vast forests of yellow pine, cypress, cedar and other useful timber stand ready for the woodman's ax, while the mountain regions of Tennessee, Kentucky, Virginia and West Virginia are covered by a magnificent growth of walnut, chestnut, oak, ash, hickory and poplar, worth untold amounts to the manufacturing industries of the country. A very large capital has been invested during the last few years in the developing of the Southern lumber and timber trade. Mills have been erected, railroads have been constructed and choppers have been set to work. It is a question of but a short time when these vast supplies of valuable materials will be placed in the various markets of the country. The resources of the South are practically inexhaustible, not only in lumber and agricultural products, but also in coal, iron and other minerals and metals. The time is not far distant when the South will...
be better known on account of the development of her native resources than she has ever been known in the past on account of her cotton and other products.

NOTES AND COMMENTS.

The manufacture of marbled iron and slate mantels seems to be an industry that has greatly prospered in some of the Western cities. Cincinnati has long been engaged in it, and some of her firms have achieved a national reputation. Louisville, Ky., has more recently turned attention to it, and in her trade with the Southern States finds a market for a large quantity of goods of this kind. A new enterprise in this line exists at Cleveland and other towns. The art of finishing cast iron and slate to imitate the various stones and marbles of the world has been reduced to an exact science, and many of the goods produced are really handsome. Better judgment is displayed of late in the selection of patterns and designs than formerly, and therefore there is far less offense to refined and artistic tastes now than was the case some years since, which removes one of the reproaches under which the industry has labored. Changes, too, have been made in construction. What are known as combination mantels are now very common. In these the shelf is of slate, marbleized, while the other parts are of cast iron. Combination mantels are also made in the other way. With slate mantels, some of the more intricate ornamental parts, such as small molded brackets, which it would be difficult as well as expensive to cut out of solid slate, are made hollow, of cast-iron, and filled with a cement which hardens. These parts are securely fastened in position, and, after the whole has been finished, scarcely any one but an expert can tell which is iron and which is slate.

For slate mantles the stock is roughed out at the quarries, and then sent to the mantel manufactories for finish. Mantel stock is a staple line of trade, and into it is worked much material that would otherwise be waste. By working to approximate shape at the quarries the freight on what is necessarily lost and destroyed in reducing is saved, and the material is put in much better form for transportation than it would be in large blocks. If we are correctly informed, slate which has been exposed to the action of frost before being split is no longer fit for the manufacture of roofing slate. As every quarry has considerable material spoiled in this way every winter, and as slate which is for other reasons unfit to split into roofing slate is good for mantels, the supply of raw material is large, and therefore prices are kept below what they would otherwise be.

In molding, cutting and polishing the pieces of slate which go to constitute a mantel some establishments employ more machinery than others. Some use scarcely any at all, while others have given very careful attention to labor-saving devices at every stage. The finish applied to iron and slate in mantel construction is substantially the same, and, as before indicated, so far as looks are concerned, comparatively few can distinguish between them.

Builders' cards and advertisements, like announcements in other branches of trade, must, of course, be in keeping with local conditions, and must meet the requirements of the community in which they are circulated. Some of those which reach us from remote districts sometimes have a freshness about them, with references to materials not in common use throughout the country at large, that makes them unusually interesting. An example in point is offered by a card issued by Charles P. Prather, Lake Valley, New Mexico, which has recently come to hand, and which Mr. Prather announces himself as carpenter, contractor and builder, and says he is ready to contract to build adobe and frame buildings from the foundation up, and to plaster, point, ceil and paper the same, as may be required. He is also ready to lay rock foundations. He states, further, that he has an adobe yard from which he can supply adobes to any one wishing them. In view of the peculiar character of the buildings in New Mexico, and the materials which enter into their construction, it would seem that Mr. Prather is an enterprising builder, and that he has put himself in position to supply exactly what is demanded.

A correspondent of one of the daily papers, in commenting on architectural styles and fashions as manifested in the buildings erected in the National capital, says: "A disposition is also shown of late in building houses here to return to simpler forms and to abandon the so-called Queen Anne style of architecture, without in the least sacrificing originality or having recourse, as formerly, to the monotonous rows of brown-stone frets, with their clumsy flights of steps and still clumsier iron rail-
Door Decoration.

The door, which is so frequently a source of anxiety to the ornamental and decorator, might be made the means of greatly enhancing the artistic completeness of a room. Much of the difficulty experienced in its treatment arises from the desire to disguise its functions. For this reason doors having their panels covered—I cannot say decorated—with wall-papers, &c., no matter how beautiful or costly, fail to please, and the palpable effort at disguising not only bad, but reprehensible, and whenever the position or purpose of a door is thus sought to be hidden the result is a failure.

In modern-built houses the architects are devoting more care and thought to the design and proportion, and the cabinet-maker to the construction, than hitherto, and it is now, fortunately, not uncommon to find doors so original, thoughtfully proportioned and broken up into panels that they are in themselves perfect, and, as a piece of decorative work, charming. An attempt to still further decorate such doors as these would be unpardonable and a piece of vanity on the part of the artist; but, on the other hand, there are thousands of houses—many of a superior kind, if we take the rental as a criterion—the rooms of which are positively disfigured by doors out of all proportion to their position, many being too short and wide, too high and narrow, or in an intermediate state which is more aggravating than either, effectually preventing a successful treatment of the room as a whole. Such doors form a stumbling-block and eyesore to the occupant, and is owned and occupied by Senator Miller, of California. It looks as if somebody had started right there on a tour to paint the town red. Imagine the most fiery hue, a bright vermilion, covering the entire house—roof, sills, balcony, portico, everything, with the sun shining upon it for the greater part of the day, relieved by nothing except the shutters, which are of a bright green color—and you have only a faint idea of the sensation which this bit of outdoor decoration produces in the beholder. It looks almost like the palace of the evil one in the fairy tale or in the pantomime. But how appearances deceive. The occupant is one of the most mild-mannered, gentle and retiring of men."

EXAMPLE OF DOOR DECORATION.

The great pine forests of Michigan, Wisconsin and Minnesota are beginning to show the signs of exhaustion. There is a shortage of production this year in these States footing up to about 600,000,000 feet. The average of "first quality" lumber has run down from 12 per cent. 10 years ago to 2 per cent, last year, showing the rapid deterioration of stock which is brought to the mills. The North-
Cheap Frame Houses.

The perspective view of the design submitted by Mr. F. J. Grodavent in our competition of $800 houses was presented on page 47 of our issue for March. We now submit the elevations, plans, details and schedule of quantities.

Mr. Grodavent directs attention to the arrangement of his plan as constituting a house with conveniences for a moderate-sized family. An outside entrance-way is obtained by the addition of a single door. The idea has been to make a convenient home within the limitations of cost, employing what would be ordinarily termed second-class material in its construction. With reference to the cost of this building, Mr. Grodavent calls attention to the fact that a short time since he furnished a plan very similar to the one he has here submitted, for three houses which cost for erection in the neighborhood of Rochester, N. Y., $850 each. Estimated on the same basis, he believes that this building would cost about the same figure, although some modifications of construction would probably bring it down to the limitations named. By an examination of the following bill of quantities submitted by Mr. Grodavent, and comparing the same with the list preceding, so far as relates to similar features, our readers will be able to determine for themselves whether the opportunity exists for cutting off an extra $50:

- 380 yds. Excavation.
- 64 perches Stone Wall.
- 380 yds. Two-coat Plastering.
- 143 ft. Hemlock Roof Boards.
- 143 ft. Hemlock Timbers.
- 5412 ft. Hemlock Timber.
- 3800 ft. 1-inch Flooring.
- 90 ft. Water-Table.
- 56 ft. Corner boards.
- 14 ft. Cornice.
- 8650 Pine Shingles.
- 1360 ft. 1-inch Flooring.
- 96 ft. Water-Table.
- 56 ft. Corner boards.
- 145 ft. Cornice.
- Front Gable Ornament.
- Dormer Finish.
- Outers and Leader.
- Back Stoop, Porch Pillars and Finish. (Timber in Bill).
- 2 Cellar Windows, 2 Lights, 13 x 16 in.
- 6 First-Story Windows, 4 Lights, 13 x 30 in.
- 3 Second-Story Windows, 4 Lights, 13 x 26 in.
- 1 Second-Story Window, 2 Lights, 13 x 26 in. (No Blinds, Weights or Pulleys.)
- Front Door, 2 ft. 10 in. x 7 ft. x 1 3/4 in. thick.
- First-Story Door, 2 ft. 8 in. x 7 ft. x 1 3/4 in. thick.
- Closet Door, 2 ft. 6 in. x 7 ft. x 1 3/4 in. thick.
- 1. First-Story Door, 2 ft. 6 in. x 7 ft. x 1 3/4 in. thick.
- Back Stairs to Cellar.
- Pantry and Closet Shelves, &c.
- Painting, 2 Coats.
Varieties of Roof Coverings.

The question of the material with which a roof shall be covered is of importance alike to the architect who designs the structure, to the builder under whose direction it is erected, and to the owner who pays the cost, whatever it may be. The range of materials from which a choice is to be made, in this country at least, is very wide, and embraces substances of the most diverse qualities—everything, from thin sheet metal on one extreme to heavy plates on the other; from plastic substances to tile and slate, and from primitive materials like thatch, and temporary expedients like the boughs of trees, to canvas, artificial wood and even glass. Considering the country, as a whole, we have almost every variety of climate, and therefore, whatever peculiarities of roofs there may be in other parts of the world that owe their conditions to climatic influences, all are likely to be found useful somewhere or other within our own borders. On the other hand, throughout a considerable portion of the country both extremes of temperature are experienced, and therefore we have need of roofs adapted to shed the heavy snows of winter, and yet composed of such materials as will not suffer from the hot suns of summer. Our buildings, too, are of many different kinds. There is the pioneer's log cabin, and the unpretentious but comfortable and substantial farm-house which follows it a few years later; there is the average village or town house, with the stone building, school-house and church; there are the residences of the wealthy in town and country, and the palaces of trade and commerce which arise in every important city. There are the public buildings of both State and nation, together with factories, mills, depots, sheds and a host of others, the roofing of each of which, considering the nature of the building alone, need not necessarily be like that of any other. In roofing some of these classes of buildings the choice of material is based solely upon grounds of cheapness and availability. In others durability is considered, while in still others durability in connection with fire-proof qualities are to be taken into the account. Sometimes the material of the roof covering is selected with reference to the architectural features of the building of which it becomes a part. Our enumeration of the reasons for the existence of so many roof coverings would be incomplete without some reference to the numerous materials available for roofing purposes which the resources of the country afford, and to the inventive genius of American builders and mechanics in adopting them to use and in producing new combinations. Our resources, among others, include probably the finest shingle timber found anywhere, and of several distinct varieties. We also use lumber for roofs, of which we have an abundance, not only as commonly produced in the saw-mills, but in forms specially worked and variously reinforced, as shown in car roofs. We produce lead, zinc, copper and iron, all of which find use as roof coverings, and the ingenuity of inventors has been taxed to produce new forms and new constructions of some of these to adopt them to varying requirements. We have slate of several different colors within our borders, and of
qualities unsurpassed anywhere. We produce tile to a greater or less extent, while the enterprise of manufacturers has given us numerous forms of felt, asphalt and composition roofs, to say nothing of various specialties and subcontracts. From this brief survey of the field, it will be seen that a faithful inquiry into the merits of each of the principal materials that are available for use as roof coverings, together with considerations of methods of application, and other questions of similar importance, is a task of considerable magnitude, and the work, if well done, would constitute a volume of value to all who have to do with either designing or erecting buildings.

### Paper Hanging

The art of putting on or "hanging" paper, says an exchange, is very simple and is easily learned; but to make tasteful choice of paper for various situations is not so easy; hence the following remarks, which may be of service to the workman or others on whom the selection of paper may devolve:

Walls to a room should be regarded only in the light of a framework to what the room contains, and should be decorated so as to bring into prominence, and not eclipse, the other parts of the chamber. Nothing destroys the effect of a room so much as a handsomely sized and staring wall paper, or a wall so profusely ornamented as to strike upon the eye to the exclusion of the rest of the decorations, thus bringing forward what should be the background into the most conspicuous place. A modern drawing-room is always difficult to decorate artistically, because of the taste of its builders for heavy cornices, prominent mantel-pieces and rooms too lofty for their size; and as all these misnamed "embellishments" are too easily to remove by tenants, the only plan to pursue is to destroy their effect by exercising both taste and ingenuity.

First, with regard to the ceiling, the ornamental plaster boss in its center should be removed and the ceiling tinted a color that harmonizes with the wall paper, as no harmonies can be hoped for when what produces them is surmounted with the glaring white of an ordinary ceiling. The tint used must be one that softens into the wall paper, not one that contrasts; thus, if the tone of the room is that of a soft gray-blue, the ceiling should be a clear flesh-pink; or should a grayish-green picked out with black be the chosen color, then it should be colored a subdued lemon.

Some people cover their ceilings with whole colored paper, and border it with a stenciled pattern representing the thin garlands so familiar upon Queen Anne decorations, but this is a more troublesome plan than the simple coloring, which answers all the purpose. The walls, if they are lofty, require a high dado. These high dados give a look of comfort and "home" that is absent from the modern, high-pitched room papered with one uniform pattern. The dado is divided 3 to 4 feet from the ceiling, and the coloring of the lower portion must always be heavier than that used on the upper, or a top-heavy look will be given to the room. When many pictures are to be hung up, the lower part of the dado should be of a whole color—either a whole colored paper or a painted wall—as pictures are only shown off upon such a background. Where a whole tint is used for the lower part of the dado, the upper portion should be decorated with a frieze paper of a good, bold pattern, but of subdued coloring and of a tint that harmonizes with the lower. Thus, the color used about the frieze should be the same as that on the lower part, but of a lighter shade, intermixed with some other colors that form a harmonious link between the two shades. Cornices must be carefully avoided, but pole pinks, blues and ambers can be blended together above a subdued gray-blue ground. The two portions of the dado should be joined together with a light wooden (black or brown) railing, or with a line of paint. The dado decoration can be altered by placing the pattern paper upon the lower part of the dado, or a wall as bright and require to be.

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*Front Cable, with Sections.—Scale, 1/2 inch to the Foot.*

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*Horizontal Section Inside Door.—Scale, 1/2 inch to the Foot.*
crewels, and instead of the usual looking-glass over the fireplace, have a mirror surrounded with brackets holding china, or have a black, wooden mantel-piece made with squares of looking-glass set in. The background of your room being thus completed in a manner really to be a background, your furniture will look twice as well as if it were stared out of countenance by the walls; and one need hardly add that all your friends will delight in a room that throws up and brings out their dresses and faces, instead of killing them by its glaring tints.

There is no question, says the Crockery and Glass Journal, but that the manufacture of tiles is to become one of the important industries of this country, and, indeed, the number of factories now in operation indicate that the era of tile manufacture has already begun. The Western section of the country has taken the advance step in this matter, and the large works established at Indianapolis, Ind., have a capacity for turning out encaustic tiles that approaches some of the larger factories abroad, and much of the work produced by them finds its way into the leading public buildings that are now being erected in this country, notable among which is the Produce Exchange, in this city. The phenomenal success of the Lows, at Chelsea, in manufacturing a modernized form of the uniformity in the shrinkage, which produces a consequent variation in sizes. As the use of tiles in this country is only in its infancy, there is no reason to doubt but that the industry is in the same condition. The bulk of the tiles used here, however, come from Europe, where their processes are perfected in such a manner that the production is reduced to a minimum of cost. At present tiles are rather an expensive luxury which very few, excepting the moneyed class, can afford to use, but there is a prospect that the competition that is rising here among manufacturers will have a tendency to reduce the prices to such figures that it will be possible for the houses of the masses to receive these durable and fascinating additions. Plain encaustic tiling is at such figures now that it can be laid in large spaces for as low as 45 cents per square foot, and look pretty well at that.

Palissy tile is still fresh in the minds of those having any interest in this branch of potting. Followers are not wanting, but thus far the competition raised has not materially affected the business of the Lows, and, indeed, the nearest approach to their peculiar style has been produced in an out-of-the-way village on the coast of New Jersey. These goods have not yet been placed on the market. The manufacture of tiles is generally conceded to be the most exacting branch of the potter's art. Much time, money and patience have been exhausted in applying steam or other motive power to the manufacture of tiles, but, so far as we have been able to learn, nothing has yet been found to give the same satisfactory result as the quick-acting screw press designed and patented by Pressner in 1840. Hydraulics, although exerting unlimited pressure, has been found inefficient, for the reason that it was not coupled with the judgment of an operative, and it is generally conceded that the simple secret in tile-making is not the direct pressure of the press, but the quick compressing blow given by the return motion of the screw in bringing the die down upon the dust or clay the second or third time. The firing of tiles is deservedly a more exacting part of the business, for the reason that unless there is perfect evenness of heat throughout the kiln there will be a want of

A German correspondent of one of the English architectural papers mentions a new covering material called roofing linen. This material consists of a layer of coarse linen, somewhat less than that of the ordinary felt material that is used for roofing purposes. The cohesion of the three layers of thin roll paper. The thickness is somewhat less than that of the roofing felt, but the paper is twice as strong when in use.
New Metallic Tile.

Another candidate for favor in the way of a metallic roof covering is illustrated in the accompanying engravings. The article shown has recently been patented in the United States and Canada, and is now being manufactured and introduced to the trade by Messrs. West, Peachey & Montross, of Simcoe, Ontario. This tile or shingle, as may be seen by examining the complete view afforded of one of the pieces in Fig. 2, differs from others in the market in the fact that it is square in its general shape. By stamping there is contributed to the constructive features upon which the manufacturers depend for its weather-proof qualities. In laying the tile are applied diagonally, and the roof covered by them presents a very ornamental appearance, as may be gained by inspection of Fig. 7. The square shape of this tile has been chosen primarily for the purpose of cutting stock to a good advantage, and also for constructive reasons which will appear from the description. Another point that should be mentioned in this connection is the fact that the tile in use have a uniform lap on all sides. This is illustrated in Fig. 2. The lower inclined edges of the upper shingle lap over the adjoining ones in the course next below, as indicated by the dotted lines a a a. The two corrugations in the upper inclined edges of the lower course fit closely into the corrugations of the lower inclined edges of the upper course. The point or lip c engages with the shingles on each side below through the opening e. This opening does not go clear through to the sheathing, but is only through the side shingles, as will be seen by examination of Fig. 2, and the roof is protected by the upper corner of the lower shingle, which extends under the space where it occurs. In other words, in the small square indicated by the dotted lines in Fig. 2, where the two side tile join, there are four thicknesses of material in the finished roof. The lip c extends through the side shingles, as well as against the surface of the lower one. By the lapping, all nail holes are likewise effectually covered. The position of the nails is clearly shown in the several shingles displayed in Fig. 2. By the nailing, in combination with the lip c already described, it will be seen, efficaciously fastens each piece of the roof covering is composed at all four corners. Two double ribs form a double obstacle against snow or rain driving between the courses, and the manufacturers state, in addition, that they make it impossible in roofs of one-fourth pitch or over for snow or rain to drift through under any circumstances.

The construction used in this shingle makes a much narrower lap sufficient than would otherwise be required, resulting in economy of material. The manufacturers point out that a given quantity of metal worked in this form will cover effectually a greater area of roof than can be done by any other tile so far introduced, and, therefore, it must be the cheapest to employ. They also call attention to the fact that ample provision is made in the design and construction of this shingle for contraction and expansion. By the peculiar design of the raised portion the shingle is stiffened in all directions, thus preventing warping or buckling. The nail holes are made larger than under their heads all that is required, independent of the rest of the roof. In introducing these goods the manufacturers recommend them for use on all kinds of public and private buildings whose roofs have an inclination of quarter pitch or over. They also offer them as suitable for elevator and the like. No more difficulty is experienced in laying these shingles than with other metallic shingles, and very explicit directions are given for accomplishing this work. The shingles are manufactured out of roofing tin, 1 C and 1 X gauges, out of steel plates tinned, of both 1 C and 1 X gauges, also of sheet iron painted and of galvanized iron.

The fact that these manufacturers are soliciting an American trade on these goods, although their factory is located in the Dominion of Canada, led us to inquire a short time since concerning the difficulties, if any, which American customers would encounter in getting these goods through the Custom House. In reply Messrs. West, Peachey & Montross assure us that United States purchasers can rely on getting these goods promptly. They say they have agents at both Detroit and Buffalo who receive the goods and make entry to pass the customs and forward the goods on to their destination. Their arrangements are such that a very slight delay, a few hours at most, we are assured, will ever occur in getting goods across the line. We understand that a factory in the United States is in contemplation. Messrs. M. L. Samuel Benjamen & Co., metal dealers, are handling these goods in a wholesale way.

Champion Safety Sash Lock.

Two forms of what are called the "True" Champion safety sash lock and fastener combined are shown in Figs. 3 and 4 of the engravings. These goods are manufactured by George Harz, West & Co., 168 Water street, Cleveland, Ohio. The first shows the side lock applied to the face of the sash, while the second shows the form used when it is desirable to mortise in putting the fixtures in place. By examination of the engravings it will be seen that the essential principle of this lock is an eccentric, which when properly turned brings a pressure to bear against the sash. The manufacturers claim for it neatness in appearance, easy adjustability, effectiveness, and that it can be applied without injuring the sash. The construction of the lock shown in Fig. 3 is such that it may be placed on either upper or lower sash, and when used upon the upper sash it can be so arranged that the lower sash may pass over the upper lock. This is accomplished, when the lip is part on the lower sash, by sawing off 2 inches of it just below the upper lock and fastening it in that place again upon the upper sash. For this purpose locks with four keys are employed. The form of mortise lock shown in the second
enlarging is placed in the jamb. If used with the key it is found most convenient to place it to the right, but if used with the attachment it may be placed to the left of the nail. A feature in the construction of these locks is that, wherever it is inconvenient to place all the locks on the same side of the window in a building, they can still be made to look one way by simply reversing the presser and the eccentric.

**New Joint for Felt Roofing.**

The Cincinnati Roofing Company, Cincinnati, Ohio, are introducing two and three ply felt roofs, a special feature of which is the interlocking joint illustrated in Fig. 5 of the engravings. In the preparation of the felt, the layers of which are cemented together, a portion of the edges are left uncemented, and in the process of laying they are opened and slipped together, as shown in the engraving. By this means the upper layer forms a cap over the nail heads and their washers, and in all parts of the building. It is thoroughly cemented in the process of laying, form a joint that is much more desirable than an ordinary interlocking joint. By this means the upper layer forms a cap over the nail heads and their washers, and in the process of laying they are opened and slipped together, as shown in the engraving. It is composed of three pieces of metal, two of which form the lower sides or guides, and a third of which forms the cap or clamp. A file is placed in the gauge, as shown in the engraving, and is held in place by means of the set screw shown at the top. One of the side gauges is adjustable to accommodate the thickness of the saw, and is fastened in position by the lower of the two screws shown in the cut. After the three-cornered file has been fastened in place in this way, it serves as to fit the hand better than the usual shape and to avoid cramping the fingers.

**New Saw Jointer.**

Fig. 6 of the engravings shows a device which is being introduced by B. S. Bozard, No. 354 Fulton street, Brooklyn, for the purpose of utilizing an ordinary three-cornered file in jointing saws. In the use of three-cornered files, it is well known that their corners become worn and useless long before the middle portion has been worn at all. Mr. Bozard's improvement looks to a utilization of this portion of a three-cornered file for the purpose of jointing a saw, instead of using a flat file for that purpose, as is ordi-

**Improvements in Saws.**

The Eclipse Door Hanger Company, Limited, of Brooklyn, N. Y., have recently perfected some improvements in hand-saws, among which may be mentioned the handle shown in Fig. 7. This handle has a reinforcing plate along the lower portion, so fixed in position as to greatly strengthen the handle at the place where it is the weakest. Among the advantages derived from this improvement, to which manufacturers direct attention, may be mentioned that the user of these saws is brought nearer his work and the weight of the saw is brought nearer the wrist of the operator than is usual. By this means the feeling of "heavy at the point" which many saws possess is entirely avoided. The operator also has complete control of the saw. The handle is carried forward on to the blade in a way to stiffen it, while for the purpose of strengthening the handle, since it would be nearly split in two, the nickel-plated reinforcing plate shown in engraving is applied in the weakest part. This serves the useful purpose of stiffening the hilt of the blade and strengthening the handle. In addition to these improvements the saws manufactured by this company have the hard-piece of the handle so shaped

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The stroke of the machine is adjustable to any length of knife up to 32 inches. The great objects to be attained in the use of a machine of this kind are the improvement in the running of planers secured by keeping the knives and cylinders in perfect balance, and to make what has always been a job of no small proportions in most factories simple and quick, and the work more perfect than by the old way. The advantage of making a machine perfectly automatic is to enable the operator to have one set of knives always ground while the planer is in operation. The machine here shown can be set so as to of the machine is slightly concave, thus grind any depth of cut wanted, and will take care of itself when once set. The grinding enabling the operator to set up the knives twice as often as is possible upon the old plan. The frame is cast all in one piece, and has a good floor, bare, which does not take up much room. It is entirely self-contained, the shaft and driving works of the carriage being all on the same frame. The carriage has a steady traverse movement forward and backward. It also has a horizontal motion to and from the grinding-wheel, so as to give great wearing accommodation to the wheel. The horizontal movement is adjustable by the hand-wheel and weighted lever shown in the front of the machine. The movement of the carriage, the makers assert, is very even and perfect, and the reversing apparatus is noiseless and without jar. The traverse motion is very easy and steady. In all its parts, the manufacturers assure us, the machine has been carefully devised and thoroughly constructed. They offer it as being the most perfect automatic grinding machine yet introduced, and claim for it advantages and conveniences possessed by no other machine made.

The Devore Spring Hinge.

The Devore spring hinge, manufactured by the Freeport Spring Hinge Company, which is shown in Fig. 10 of the engravings, is offered by the makers as the most practical low-priced spring hinge in the market. It is composed of very few parts, and in action is strong, quick and positive. The tension is uniform. The spring, on account of the peculiar manner in which it is attached to the flanges of the hinge, and to the false pintel around which it is wound, is double-acting. It serves to hold the door closed until it has been swung through an arc of about 90°. Then it exerts its force in the opposite direction, and holds the door open. The false pintel is in line with the axe of the hinge when the door is shut, as shown in the engraving, but as the door is opened it moves forward, thus changing the direction of the force of the spring. The spring is composed of very few parts, and in action is strong, quick and positive. The tension is uniform. The spring, on account of the peculiar manner in which it is attached to the flanges of the hinge, and to the false pintel around which it is wound, is double-acting. It serves to hold the door closed until it has been swung through an arc of about 90°. Then it exerts its force in the opposite direction, and holds the door open. The false pintel is in line with the axe of the hinge when the door is shut, as shown in the engraving, but as the door is opened it moves forward, thus changing the direction of the force of the spring. The spring is made in two parts, divided in the center and coiled in opposite directions. A larger quantity of wire is got into the coil by this

Automatic Knife-Grinding Machine.

The Egan Company, successors to the Cordesman & Egan Company, Nos. 232 to 250 West Front street, Cincinnati, have brought out an automatic knife-grinding machine, which may be described as self-operating and stopping. The general appearance of the machine is shown in Fig. 9 of the engravings. It is intended for grinding all kinds of planer knives, both long and short.
The makers announce that they are now prepared to ship other sizes, both means, making this spring hinge superior in double action. The new patterns have this year been put on the market, which are intended to take the place of the former styles. The articles represented in the accompanying cuts, Figs. 11, 12, and 13, are designed for fitting windows by avoiding the use of box casings, pockets, and the hanging of the sash without sash weights. They are made either with or without the locking adjustment, and are inserted in the sash channels of the frame, and are not attached to the sash, an arrangement which, it is mentioned, permits the ready removal of the sash for cleaning, &c.

Fig. 11 represents the sash balances without the locking attachment, and Fig. 12 represents it with the locking attachment. They operate on the same general principle as the former styles, but in these newest goods the roller lever, with the axle-holding bearings and roller clamp, are made in one piece, and the pressure-adjusting arrangement is on the lower end (instead of the upper, as in the old style), so that the pressure adjustment of the roller against the sash may be made from underneath the sash when the latter is fully raised. By this arrangement, in case too much or too little pressure be given in the adjustment—which can only be ascertained by raising and lowering the sash—the readjustment is easily effected without removing the sash, for the sashes can always be raised so as to expose the adjusting screw, while in the former style they could not be lowered to it. A further advantage is mentioned, as a result of this arrangement, that the balance is so placed in the frame as to be out of sight when the sashes are closed, while with the old style they were exposed over the top of the lower sash when closed.

The new locking attachment to the balance, represented in Fig. 12, with engaging plate for the sash, permits the self-locking of the sash when closed, or when open for ventilation, within the length of the engaging plate, by means of the tongue of the lock in contact with the plate, so that unlocking being accomplished by pressure on the exposed handle of the lock. The new patent sash lock represented in Fig. 13 is made in several styles, and is intended for use with sashes hung with weights, and is so constructed as to be self-locking when the sashes are closed, and at intermediate points of opening up to 4 inches. The sashes are closed and locked without the use of box casings, pockets, or the hanging of the sash without sash weights. They are made either with or without the locking adjustment, and are inserted in the sash channels of the frame, and are not attached to the sash, an arrangement which, it is mentioned, permits the ready removal of the sash for cleaning, &c.

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The Ellrich Screw-Driver.
The Ellrich Hardware Manufacturing Company, Ellrichville, Conn., for whom the Alcorn & Berkeley Company are special agents, at 77 Chambers street, New York, are making a screw-driver, a portion of which is represented full-size in Fig. 14, which shows its construction. The dotted lines are intended to indicate the shank of the blade as it enters the handle. This is to prevent the blade from turning. In the wood of the handle four holes are bored, giving engagement of the space that receives the shank of the screw-driver to the outside of the wood of the handle. After the steel blade of the screw-driver has been inserted in the handle, as represented in the diagram, the handle is made over the top of the screw-driver, and the complete socket, is cast on the screw-driver, the molten metal flowing into the holes in the wood of the handle and into the interstices, thus securing a very strong and satisfactory fastening for the blade, as well as giving an opportunity for a fine finish. The manufacturers call attention to the fact that the blades are forged under a hammer from James's cast steel, spring tempered, finished in first-class manner, and warranted in every respect.

The New Wentworth Saw Vise.
In our volume for 1856 we described the Wentworth saw vise as then manufactured. It has been recently improved and Fig. 15 of our illustrations shows the form in which it is at present offered to the trade. It will be noticed that it includes a screw clamp for attaching to a work-bench, thus rendering it very convenient for use. It is so arranged that by simply turning a thumb nut it can be tilted to any desired angle. A flexible rubber cushion or muffler between the jaws prevents vibration and renders saw-filing noises. The makers, the Seneca Manufacturing Company, Seneca Falls, N. Y., guarantee it to make no more noise than would be caused by filing on a solid piece of iron. The jaws open and close by turning a cam lever. The parts have been very carefully considered both in point of design and finish. Ample strength is provided and handsome appearance is at the same time secured.

With reference to the durability of lead roofs, one of our subscribers draws attention to a statement that occurs in the letter of a foreign correspondent of one of the daily papers, writing about the Tower of London. The White Tower was built by William the Conqueror. It is a quadrangular structure 116 feet by 76 feet and 22 feet high, and the external walls are 15 feet in thickness. It has a lead roof and was built in the year 1070. Accordingly, according to the writer quoted, it has stood upward of 500 years and is said to be in excellent condition at the present time. This writer's statements, it may be remarked, are not altogether satisfactory. It is possible that the roof is question has been repaired in the time mentioned, if not wholly replaced one or more times. We speak simply from the probabilities of the case, and not from absolute knowledge. The fact that the building was erected 500 years ago and covered with a lead roof is hardly proof that lead roofs last 500 years.
Hanging Bells with Wire in Tubes.

Our articles so far on bell-hanging have anticipated running the wires as required without any protection or guidance. Where houses are belled in the process of construction, it is desirable to run the wires inside the walls, and to do this tin tubes, or some other means of protecting them and of forming proper channels through which they may pass, are required. When the building is about ready for plastering, having the floors laid and the partitions up, the bell-hanger visits the premises with bell-tubing and tools in hand. The materials which he requires for the purpose are illustrated in the accompanying engravings. After receiving his orders from the superintendent or the owner, he selects so as to be convenient for the grate or the hot-air register, the case may be. A desirable hight for a lever-pull above the floor is about 3 feet, measuring to the center of the pull. The place for the pull in the library is sometimes uncertain after all the preparations in the way of tubes have been made. It may be necessary to fit the pull into the side or front of the bookcase. This work, when required, may be done in such a manner as to make the pull look as an appropriate ornament to the bookcase. Engravings of bell levers of the kind used with tubes are presented herewith. For these engravings, as well as others which have appeared in this series of articles, we are indebted to Messrs. H. St. Shannon & Sons, Philadelphia, who make a specialty of bell-hangers' supplies.

In tubed bells the pulls are not of necessity placed near the ceiling, as must be done when the wires run on the outside of the plaster. The latter construction in a bed-room necessitates the use of a cord and tassel. The cord and tassel is made less objectionable by being made ornamental, but still it holds the dust, and moths destroy its beauty, and it soon shows that it has been used. These points suggest what is to be avoided in locating bells before the completion of the building. Bell-levers in bed-rooms are preferably placed so as to be convenient for a person in an ordinary bed to ring a bell in the kitchen and another in the servant's sleeping-room. In locating the pulls they should be placed far enough apart to allow one to come on each side of the bed. Sometimes a cord is attached to the end of each bell-lever and allowed to extend across the bed, so that by pulling the cord both bells will be rung. This is often done in case they follow the carpenter's scaffold while this work is being done. The scaffold boards used by the plasterer are handled a good deal after the plasterers' scaffold while this work is finished, and accordingly the danger of damage to the bell-tubing, if left not over covered, is very great. Nail a plasterer's lash on each side of the tube, which are to be belled in. If the bell-tube is struck and much injured by the plasterer, the bell-hanger should be notified, so that he may repair the tube before it is covered up. If the bell-tube fails to come down after running the wire, an unpatched strip about the tube should be left, so that the necessary work may be done by the plaster afterward supplied. To repair a tube after the plastering is finished is a most unpleasant undertaking. For the bell-hanger it is a time-consuming, troublesome job, the plasterer having an increased amount of patching-up to do. Work of this kind is neither creditable nor profitable to either of them. Care should be taken that the tubes are free from injury for the reasons above mentioned, and for others that will occur to any one who gives the matter any thought at all. When the carpenters are about done in the house, and just before the painting is commenced, or after the painters are at work in the upper stories of the house, in case they follow the carpenters closely, the bell-hanger takes out the round bell-blocks before mentioned, as is convenient to handle, or as much as will reach to the cellar, has been arranged. Make the mouth-piece and tubing fast to the wall by nails, or screws in some manner to the end of the piece so located, the latter, it will be found, being small enough to pass through the opening in the bell, a little care in matters of this kind will save considerable labor. The nearer the tubing is brought to the bell in the tubes, or staples of suitable size may be used for the purpose. Use care to keep the bell-tube in a straight line, so that the better the bells will ring after they are hung. If the tubes are plumb, there will be no rubbing or chafing of the wires in them.

As it is common for plasterers to lash and put one coat of plaster on the inside wooden partitions before they plaster the walls, if the bell-tubing is run on the wall it must be protected from the work of the plasters, and the bell-tube is struck and much injured by the plasterers. When the work is finished is an unpleasant job, the plasterer, the bell-hanger should be notified, so that he may repair the tube before it is covered up. If the bell-tube fails to come down after running the wire, an unpatched strip about the tube should be left, so that the necessary work may be done by the plaster afterward supplied. To repair a tube after the plastering is finished is a most unpleasant undertaking. For the bell-hanger it is a time-consuming, troublesome job, the plasterer having an increased amount of patching-up to do. Work of this kind is neither creditable nor profitable to either of them. Care should be taken that the tubes are free from injury for the reasons above mentioned, and for others that will occur to any one who gives the matter any thought at all. When the carpenters are about done in the house, and just before the painting is commenced, or after the painters are at work in the upper stories of the house, in case they follow the carpenters closely, the bell-hanger takes out the round bell-blocks before mentioned, as is convenient to handle, or as much as will reach to the cellar, has been arranged. Make the mouth-piece and tubing fast to the wall by nails, or screws in some manner to the end of the piece so located, the latter, it will be found, being small enough to pass through the opening in the bell, a little care in matters of this kind will save considerable labor. The nearer the tubing is brought to the bell in the tubes, or staples of suitable size may be used for the purpose. Use care to keep the bell-tube in a straight line, so that the better the bells will ring after they are hung. If the tubes are plumb, there will be no rubbing or chafing of the wires in them.

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Bell-Tube Lever Blocks.

Bell-Tube. Bell-Tube Mouthpiece.

as the case may be, be commenced his work. Bells are a part of the finish and furniture of a house; therefore it is necessary that they should be adjusted to suit the position and size of the furniture. Care must be exercised that the lever-pulls used in hanging the bells are not hidden or made inconvenient, and that they are not located where the book-case or other tall piece of furniture is intended to stand. Some questions, therefore, that must be considered preliminary to putting the noising for the wire are like this: What place is the bell intended to occupy in the chamber? This is necessary, that the pulls may be let down where they may be convenient for use both day and night. In locating the fixtures before the building is completed, the most desirable places for the pulls should be selected. The lever-pull in the parlor should be placed so as to be convenient to the grate or the hot-air register, as is convenient to handle, or as much as will reach to the cellar, has been arranged. Make the mouth-piece and tubing fast to the wall by nails, or screws in some manner to the end of the piece so located, the latter, it will be found, being small enough to pass through the opening in the bell, a little care in matters of this kind will save considerable labor. The nearer the tubing is brought to the bell in the tubes, or staples of suitable size may be used for the purpose. Use care to keep the bell-tube in a straight line, so that the better the bells will ring after they are hung. If the tubes are plumb, there will be no rubbing or chafing of the wires in them.
papers, he adds one wire and makes it fast to the bell it is to ring. It is well to try each bell as it is hung; particularly is this necessary unless the bell-hanger is well assured of his own knowledge and experience, rough riding on them. Indians water the streets by hand, as well as sweep them with little whisk-brooms, the brush tied in the middle without a handle, so that both sides are available. It is a wonder that street-sweepers survive an hour of their back-

Building and Pavements in Mexico.

While there are no 13-story, or even five-story buildings in Mexico, writes a correspondent, stone structures two, three and even four stories high prevail in the central business quarters. Most Americans coming here will be surprised, I fancy, to find that there are streets as handsome, as substantially built and as full of wealth as the average thoroughfares of commerce in large cities at home. Mexico has no mushroom growth. Its universal stone is handsome and its air of solidity is extremely pleasing. Humboldt’s admiration for the breadth of Mexican streets, however, seems odd. Compared with American urban thoroughfares, save those of the older parts of Boston, they are very narrow. A railway track and two carriages will fill the space from curb to curb in more streets than one. The sidewalks are ludicrously narrow. It is sometimes impossible for two persons to walk abreast, and four arm-in-arm would monopolize the breadth of most of them. But the pavement of the driveways is generally clean, and no one hesitates to go in the road if there is no room on the walk.

The central streets are paved with stone blocks, not quite cobble stones, nor yet of comfortable size. They are ill laid, and it is laboring at an old-fashioned hand fire-engine pumping water through a hose upon the thoroughfare. There are modern watering carts in town, but, judging from the appearance of things to-day, they will not be universally employed for an age,
Galvanized-Iron Work.—Fig. 5.—Cornice with Sun Panels in the Frieze.

The cornice of the building, of which a profile is shown on the right, terminates against trusses or stop-blocks, which form the base of pilasters supporting the pediment. The figures “1884” might be changed for letters, thus indicating the name of the block or owner of the building upon which the design is used. By close inspection of the panels above and below the sign-board it will be seen that corrugated iron has been used in them. In part the corrugations run vertically and in others horizontally. The sides of the trusses are also corrugated. There seems to be a growing tendency upon the part of designers to employ corrugations in sheet-metal work. This is highly commendable for broken surfaces, either crimped or corrugated, gave far better results than plain surfaces, and the use of corrugations is in keeping with the nature of the material.

Fig. 2 is a dormer window in what may be termed the modern antique style. It is a typical design and displays very happily the adaptability of galvanized sheet iron for work of this character. Stained glass windows in the upper part are made to harmonize with the general design of the work. In Figs. 3 and 6 show cornices that are also of the same general order of design. In the former a sun panel of a rectangular form is used between the brackets, while in the latter it appears in a semi-circular form below what may be termed suggestions of modillions.

In Figs. 4 and 5 two cornices are presented which are of a character to be found very serviceable upon street fronts of business buildings and as the finish of public buildings. Fig. 4 is so drawn as to show the side of the truss or terminal block. It will be seen that this cornice has comparatively slight projection, and that it is very compact and well-considered in all its details. In

Fig. 5 it will be noticed that the sides of the brackets employ corrugated panels, while the dentil course is also molded or corrugated on the face, so to be in keeping with other parts. Both of these designs employ standard ornaments freely and in a way to indicate an appropriate use for embellishments of this character. Fig. 7 shows a cornice the leading feature of which is a heavy cable molding in the bed course, the alternate strands of which are enriched with leaves. The lower edge of the fascia is enriched with semi-circular drops, in which are sunk half-balls or rosettes. The face of the truss or stop-block is ornamented with a rosette and leaf, and across the lower portion are semicircular drops corresponding to those in the fascia already mentioned. Fig. 8 shows a design for a cornice window, the entire casing of which, including the balustrade, is intended of “Hippocrates,” in the columns of Building. Mr. Gerhard is a very careful writer, and is for the most part safe in his conclusions, and accordingly this volume forms a very desirable addition to the literature of plumbing. The author’s aim throughout has been to give an account of the usual condition in which plumbing work done years ago—and, for that matter, some done quite recently—may be found, and to give suggestions on the proper manner of doing the work. He has chosen the title “Hints,” because he considers that the present volume is much less than an exhaustive treatise on the subject. The book is composed of 12 chapters, the titles of which will afford our readers an idea of its scope. They are: Fresh Air vs. Sewer Gas; Necessity of Ventilation in Rooms; Sewer and Waste Pipe Systems as Usually Found in Dwellings; Traps and Systems of Traps; Details of Traps; Insecurity of Common Water-Seal Traps; Defects in the Plumbing Work of Dwellings; Cellar Drains and Drainage of Cellars; Usual Defects of House-Drains; System of Internal Sewerage as it Should Be
not exhaustively, illustrated, and the work
cannot fail to be of interest and value to all
who have any occasion to consider the
early reading. One of those old volumes
was lately been reissued with a change of
name, and has been modernized by the intro-
duction of some very appropriate
sketches by E. C. Gardner, of Spring-
field, Mass., a well-known architect
and writer on building and architec-
tural topics. The text seems to be
as fresh as though it were written but
yesterday, while the sketches serve
to suit it to the times and give it
a new interest to those who read
the book 20 years ago, while they
said that the aim of the volume was to stimu-
late those who live in the country and who
love the country to a fuller and wider
range of thinking about the
means of making their homes
an enjoyment. He described
the book as a tract for homeli-
ness, and put it forth with the
hope that it might be useful. In
his present preface he thinks
that the simplicity of the vol-
ume and its commonplace sug-
gestions may have good re-
sults. The book contains many
hints and suggestions that are
invaluable to those who live on
farms or in country towns, as
well as for those who live in the
suburbs of some of the cities;
all this is presented in a most
charming style, and every page
is readable from first to last.
The book is comprised in five
general subject of pure air, pure water and
pure soil.
Out of Town Places. With Hints for Their Im-
provement. By Donald G. Mitchell. Size, 5 x 7
inches, 295 pages, with illustrations by E. C.
Gardner. Bound in cloth. Published by Chas.
Scribner's Sons. Price, $1.25.
Many years ago we remember reading
some of the volumes written by "Ike
Marvel," and were greatly delighted with
their freshness and the attractiveness of
their style. Their memory lingers still as
one of the pleasantest connected with our
render it entirely acceptable to those who
examine it now for the first time. The
author in his original preface, dated 1867,
render it entirely acceptable to those who
examine it now for the first time. The
author in his original preface, dated 1867,
A Question of Insurance.

From R. E., Portland, Me.—A question of insurance arises which I would like to see answered through the paper. A house that was built some 18 months ago, and which had been finished inside by painting and papering, was partially destroyed by fire. The roof was burned off before the fire department succeeded in arresting the flames. As a consequence, the rooms were flooded with water and the plaster was wet through, and the paint damaged or ruined by the flames. Although the house was insured, the general agent of the company did not adjust the loss for some two weeks after the fire. During that time the walls and woodwork were still further wet by melted snow and rain. The question arises: Is the insurance company responsible for damage done by fire and water or only by fire?

Answer.—We think that the question that our correspondent raises is probably one of fact, and is to be answered solely by the conditions of the policy which was written on the risk mentioned. By examination of that instrument it will probably be found that the liability in this case, as in others, depends upon the conditions in the policy. In general terms we believe it is the custom of insurance companies to guarantee a loss from fire in the broad sense that it covers also, damages that may be incidental to the process of putting out the fire. In the large cities the insurance companies sometimes maintain what is called the Insurance Patrol. This consists of corps of well-trained men with all necessary appliances for protecting goods that may be in a building at the time of a fire, and which would be damaged by the water if not cared for. The insurance companies find it cheaper to take care of property in this way than to pay what they would otherwise be liable for under their policies. If our correspondent's question with reference to the insurance companies' liability for damage from water refers to the damage done by the rain and melted snow subsequent to the fire and during the period which elapsed between the time of the fire and the date of the adjustment, a point is raised that we are hardly prepared to answer. The liability of a company, in all probability, would depend largely upon circumstances. If the building during this interval was practically in the hands of the insurance company pending an adjustment of the loss, and on this account was out of the control of the owner, so that he was unable to protect his property, it would seem that, in equity at least, the insurance company should make up the additional loss. What the law may be, or what custom may recognize in the district in which our correspondent is located, we cannot say.

We suggest that it would be a very difficult matter to determine what amount of loss was sustained by the damage done by the burning subsequent to the fire on account of water, and what occurred at the time of the fire. Sometimes insurance companies consider it to their advantage to restore a building to its original condition rather than pay the amount of policy, and they frequently reserve the right to do this. If such a clause existed in the policy in question, and if the company had finally decided to rebuild the building, it is very evident that any loss that was sustained subsequent to the fire and before the work of rebuilding was commenced would fall upon the insurance company. No one would ever think of a claim being entered against the owner for it. This view of the case, however, is not necessary for me to cover my head with my work-apron in order to keep off the flies. The covering that nature provided is still there, and is in good order, although the小儿 locks are widening. I pretend not to notice them, for I have not yet been willing to acknowledge the heavy hand of time. The covering that nature provided is still there, and is in good order, although my work-apron in order to keep off the flies. The covering that nature provided is still there, and is in good order, although the child's locks are widening. I pretend not to notice them, for I have not yet been willing to acknowledge the heavy hand of time. The covering that nature provided is still there, and is in good order, although the child's locks are widening. I pretend not to notice them, for I have not yet been willing to acknowledge the heavy hand of time. The covering that nature provided is still there, and is in good order, although the child's locks are widening. I pretend not to notice them, for I have not yet been willing to acknowledge the heavy hand of time. The covering that nature provided is still there, and is in good order, although the child's locks are widening. I pretend not to notice them, for I have not yet been willing to acknowledge the heavy hand of time.
is not what it should be, and it must be admitted that it is not held in as high an estimation as it deserves. Many carpenters are looked down upon and are classed with the greasy mechanics; but those who affect disdain in our presence, when they want a nice piece of work done, are always compelled to come to the carpenter to obtain it. Of all the trades in the world, so far as my experience extends, I prefer the carpenter's trade. It is the one trade in which the educated man can find full scope for his skill and knowledge, and still find full play for his mental powers. After working at the bench all day or at framing a roof, he can take up a book on construction or architecture in the evening, and by studying some knotty point in framing, or some other similar feature, may pass the time agreeably, and while gaining recreation obtain a better idea of the nature of the practical work to which his labor is devoted. By persistently pursuing this plan he is enabled to climb up the ladder and to advance day by day both in his work as a mechanic and also in acquiring a position for himself in the world.

I have a suggestion to make to the carpenter's sister who proved such a welcome visitor to our shop. Why do you not learn architecture? You perhaps think it is no employeur for a woman—that it is an innovation you are not prepared to make. Perhaps you say that women do not employ such means for making a living. In answer to this it may be said that it was a greater innovation when women began to study innovation when women began to study in her studies then, and is now earning a profession in which women may work to do not employ such means for making a living. In answer to this it may be said that it was a greater innovation when women began to study medicine, yet they have acquired a position in the profession which is greatly to their credit, and which has also benefited the community. I think that architecture is a profession in which women may work to advantage, and in which the peculiar order of talent which you seem to possess could be employed to the greatest advantage. In a class in architectural drawing that I attended years ago in Lowell, Mass., there was a woman. She was very successful in her studies then, and is now earning a competence in the practice of her chosen profession. If she should see this letter she would recognize the writer by the initials and would inquire what he has said, I mention the circumstance for the benefit of the carpenter's sister whom she specially addressed, and of all others who may read it, as indicating another channel in which women's work may be utilized to advantage. In conclusion, I desire to say to carpenters' sisters in general that their suggestion that it is barely possible that equal to what might be expected to come of talent which you seem to possess could be obtained in the profession which is greatly to their credit. They are not acting on this correspondent's well-meaning suggestion.

**Operating a Variety Holder.**

From C. M. R., Wheeling, W. Va.—The writer was at one time operating a variety holder. Among other jobs to be performed was the "octagoning" of the shaft of some walnut stair balusters. After several were reduced to splinters in my hands, with great risk to my fingers as well as to my life, I hit upon the idea of turning the bit upside down, or, in other words, so that the bevel of the bit should strike the wing first. This experiment proved an entire success, and I never had balusters break afterward.

**Fire-Proof Paint.**

From E. B. S., Fullerton, Neb.—Some time ago there appeared in *Carpentry and Building* a note in regard to a new fire-proof paint recently tested in England. Can any fire-proof paint be procured in the market? If not, can any fire-proof paint of real merit be obtained, and from whom?

*Answer.*—There is not to be had at present in this market any fire-proof paint which can be recommended except with very well-defined limitations. For exterior weather exposure there is no paint made which can in truth be claimed as showing how I would divide the house under the circumstances named. Referring to other particulars forwarded by your correspondent, I think the building would be improved if the studding was 16 feet long instead of 14. Much better conditions would be afforded by the former size, and the appearance of the building from the outside would be better. The plans speak for themselves, so that it is not necessary for me to enter into particulars.

**Woolen Roadway Bridge.**

From W. P. D., Cleveland, Ohio.—In the February issue of *Carpentry and Building* a correspondent signing himself "Engineer" presented plans for a woolen roadway bridge, 46 feet clear span, upon which he invited criticism. I expected to see some answers to his invitation in the March number, and was disappointed. I hope the readers of the paper do not all approve of "Engineer's" plans. I, for one, do not, for the following reasons: First, there should be counter bracing for the middle panel on each truss, say two pieces, 6 x 6 inches. Second, the end bracings are not secured to the chord timbers in a workmanlike manner. Third, the trusses should be braced vertically by extending the floor-beams at the panel points, say 6 feet beyond the trusses, on both sides of the bridge, and bracing from the end of the floor-beam to the top of the truss, in the same general manner, which I consider a bad feature. More especially is this so in the case in point, where the floor-beams rest upon the chord. The chord acts as a loaded beam between panel points, which throws a strain upon the splice bars, which, from their design, they were not calculated to x-stain. Another feature to which I object is spiking the rails to longitudinal stringers. This, in my estimation, is a very poor plan, as it is seldom calculated to x-stain. Another feature to which I object is spiking the rails to longitudinal stringers. This, in my estimation, is a very poor plan, as it is seldom calculated to x-stain. Another feature to which I object is spiking the rails to longitudinal stringers. This, in my estimation, is a very poor plan, as it is seldom calculated to x-stain.
Every third tie should be bolted to the stringer by 3/8-inch bolts. Every tie should be notched 1 inch over the stringers, and on the ends of the stringers 9-inch rails should be placed made of 6 x 8 inch oak, notched 1 inch over the ties and bolted to every third tie by a 3/8-inch bolt.

The design, as a whole, I consider rather bad, and not nearly so good as the plans submitted by "Bridge." for the same span. This latter design commends itself to me as a good one. His plan for securing the main braces is the same as quarter-sawed, and exhibit various peculiarities, as we have heretofore explained, as quarter-sawed oak, and relates to the particular features of the hip rafter. In practice, I find the length and bevels for any common rafters, and also for the hips, as I have in the sketch; then, with the di-vider or rule I lay off 1' on the hip equal to 1 on the jack, 2' = 2, 3' = 3, &c., in the sketch, Fig. 2, on the same bevel and jointed edge of the pattern into any number of equal parts and draw the lines, as 1, 2, 3, &c., in the sketch, Fig. 2, on the same bevel &c., in the sketch, Fig. 2, on the same bevel jointed edge of the pattern into any number of equal parts and draw the lines, as 1, 2, 3, &c., in the sketch, Fig. 2, on the same bevel

practical exclusion of all others. Our correspondent's question will be satisfac-tory.

Quartered Oak.

From D. M. McC., Florence, Pa.—Will you please explain, through Carpentry and Building, the meaning of the term "quar-tered oak," as sometimes given in price lists of oak, as quarter-sawed, and relates to the manner in which planks are cut from a log. As our readers generally understand, lumber as ordinarily manufactured in cut from the log in regular courses after it has been squared on the carriage of the sawmill. Planks produced in this manner are known as quarter-sawed, and exhibit various pecu-liarities, as we have heretofore explained, in the process of shrinking and warping. Quarter-sawing, on the other hand, antici-pates cutting the plank from the log radially; in other words, in such a manner that the tendency to shrink and warp will leave the board in much better shape than would otherwise be the case. We have before this fully explained the subject of quarter-sawing, and therefore we trust this brief answer to our correspondent's question will be satisfac-

this connection from the fact that it facil-itates comparisons between it and the other plan shown.

Cistern Filter.

From C. P. H., New York.—For the satis-

factory, the shape should be ob-long, although this is not absolutely neces-sary. It is considered the best, however, an account of the filtering surface presented to the water. However it be arranged, it is important that the cistern itself be first constructed and finished before the parts to be next described are attached to. When the cistern is done, build the filter through the center. It consists of a partition wall 5 inches thick, composed of ordinary build-

quiry. The cistern employed should be of the best possible quality; the brick should be carefully laid, with joints broken and placed lengthwise across the line of the partition. An occasional layer of stretchers should be used simply to bind the wall. In laying the lines stretchers of the joints should be carefully broken. After the cistern and the filtering wall are com-

pleted, receive the water in one end and draw from the other. The result will be that the water will filter through the bricks in the partition promptly. It will, of course,
July, 1884.
first received facilitates such cleaning as is
here referred to, and makes it possible to
conduct this work without exhausting the
entire supply of water. If the main walls
of the cistern are built of brick, they should
be laid with cement, and the entire inside
surface, both of sides and bottom, should be
coated with cement; otherwise the filter¬
ing process will go on in all directions, re¬
sulting in a heavy loss of valuable water. I
have had occasion within the past few days
to inquire the cost of building a cistern of
the general kind here described. It is esti¬
mated at $i per hogshead. I know of a cis¬
tern constructed upon this plan that has
been in use for upward of 25 years, with
entire success.
From H. B., Paterson, N. J.—In answer
to a correspondent who inquired about the
construction of a filter in a cistern, I would
say that I have one that is very effective and
satisfactory in its operation. It consists
simply of a brick wall built through the cen¬
ter of the cistern and carried to the full
hight. The brick are laid in cement.
The
water enters the cistern on one side and
seeps through the wall into the other,
thus filtering as it passes through the
brick.

CARPENTRY AND

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BUILDING.

TRADE PUBLICATIONS.
Stephen’* Patent Vises.

A very nei*' pamphlet, including illustra¬
tions and price lists of the Stephen’s patent
toggle joint vises, manufactured by Natban
Stephen, No. 41 Dey street, New York, is at
hand. A general view of one of the vises is
given on the first page of the cover, while
the second page is devoted to apian view,
with parts broken away so as to show the
working elements.
The mechanism of this
vise is such that by turning the handle to a
certain point the sliding bar becomes disen¬
gaged, so that it may be moved in or out, as
may be desired.
When it has been brought
very nearly to the point where it is desired
to remain, by moving the handle in the
opposite direction, the jaws are tightened
upon the work.
The parts of this vise are
made interchangeable, which insures careful
fitting and cheap repairs in case of any being
necessary. Illustrations of a number of dif¬
ferent forms of vises adapted for different
purposes from the heaviest to the lightest
work are shown, and each is accompanied
by a price list.
A number of special attach¬
ments useful in connection with this vise are
also shown, following which are vises
adapted to jewelers’ work, together with
other special tools used by jewelers. Illus¬
trations and price lists of pipe tongs, pipe
cutters, machinists’ drills, cold chisels, ham¬
mers and patent cutting-off tools are also
presented.

cle from The Builder entitled ‘ ‘ Steam Heat¬
ing and Ventilating,” and then is presented
a description of the Victor, with statements
of its advantages and directions for its man¬
agement. We notice the statement that it
has been only a year since the patent of this
apparatus was allowed, and yet in this
time nearly 200 heaters have been intro¬
duced and are now in successful operation
through the States of Massachusetts, Rhode
Island, Vermont, New York, New Jersey,
Pennsylvania, Connecticut, Ohio, Indiana,
Illinois and even Minnesota.
In the latter
State, with the temperature of last winter,
of 36 degrees below zero in some cases, this
form of heating apparatus, it is said, was
entirely satisfactory. A price list, with
dimensions in inches, of Victor heaters,
together with testimonials from those who
have employed them, occupy the latter part
of the pamphlet
Slate

mantels.

We have received from Charles B. Kline,
No. 420 North Third street, Philadelphia, his
revised book of new designs of artistic slate
mantels, low-down grates, open fireplaces,
&c. There seems to be a growing demand
for slate mantels throughout the country at
large, and in Philadelphia in particular. The
statement is made in the preface to this cata¬
logue that in Philadelphia during 1883 more
slate mantels were used than during any
From C. H. B., Faola, Kan.—In the Feb¬
previous year, a fact which is relied upon to
ruary number of Carpentry and Building a
indicate the worth of these goods and the
correspondent inquired the best method of
appreciation of them by the public. In ad¬
constructing a filter in a cistern. I have
dition to designs of mantels, grates and other
had various kinds of filters to buiid, but I
Band-Saw Blades.
goods which this pamphlet contains, a num¬
have never seen more than one that worked
We have received from A. Haiumacher & ber of testimonials from those who have used
in a manner entirely satisfactory.
The
latter I built in this city, and it has been in Co., Nos. 209 Bowery and 3 and 5 Riving- the goods with satisfaction are presented.
use long enough to demonstrate its utility. ton street, New York, a price list ox French Some designs for tiling are also given.
The cistern in which it was placed was 12 band-saw blades, which in its scope and ar¬
feet 8 inches in diameter and r6 feet deep. rangement has features about it that make it
Cablnet-Makers’ Hardware and Tools.
A well, 3 feet in diameter, was built directly of unusual interest to the trade and all who
Messrs. A. Hammacher & Co., of No. 209
in the center of the cistern, and was carried have occasion to employ band-saws. Hereto¬
within 2 feet of the top of the cistern. The fore, as catalogues have been commonly ar¬ Bowery and Nos. 3 and 5 Rivington street,
walls of the cistern were cemented in the ranged, the matter of indicating exactly what New York, have sent us a copy of their
usual manner and were allowed to dry. kind of band-saw blades were wanted, in plac¬ new illustrated catalogue and price list of
After they had become dry the well in the ing an order, has been one of considerable per¬ cabinet-makers’ hardware and tools. The
center was built with soft brick, laid in plexity, and expensive mistakes have accord¬ book is a handsome octavo of no less than 296
cement. Care was taken to fill all the crev¬ ingly grown out of misunderstandings. When pages, handsomely bound in cloth. There are
ices with cement, so that the water would it is considered that a well-assorted stock of several hundred engravings in it represent¬
filter through the soft brick.
The pressure band-saw blades includes from some 300 ing locks, casters, wire brads and nails, fin¬
of water, of course, was equal on all sides ; sizes and kinds, the difficulty of indicating ishing nails, patent brass upholsterers’ tacks,
the log of the pump was inserted in the well from a catalogue that is not thoroughly blind butts, double hinges, screen hinges,
above referred to, and the inlet of the pipe classified just what is required will be at screw eyes and hooks, wardrobe hooks,
from the house threw the water into the once appreciated. Messrs. Hammacher & door catches, sash locks, sash lifts, bolts,
and brackets, door
stops
cistern proper. The water entered the well Co. have adopted the plan of numbering drawer-pulls
simply by filtering through the brick. Man¬ each description of saw which their catalogue and the various fittings used about tables,
aged in this way the water was pure and describes, so that in ordering, instead of bedsteads and other articles of furniture.
saying that there is wanted, for example, a The latter part of the book is devoted
pleasant to drink.
“ French band-saw blade 19^ feet long, No. to tools, and contains illustrations and
20 gauge, yz inch wide, with seven points to price lists of almost everything that a
Old-Time Carpentry.
the inch,” all that is necessary is to say, cabinet-maker or a carpenter would em¬
From A. S. Thomaston, Me.—In the April “ Sen! me No. 40.” The catalogue is very ploy, from a bench to the smallest tool that
number of Carpentry and Building, in the carefully arranged throughout, and opposite would be packed away in his chest. The
article describing an old church, attention is each number are prices of blades made by catalogue has been specially prepared in the
directed to the increase in size of the posts Peugeot, Perm and Mongin. No less than interest of cabinet-makers and upholster¬
toward the top. I think if the work in ques¬ 234 regular sizes and kinds are enumerated, ers, and yet on almost every page goods
tion is examined more closely, there will be while three pages in addition are devoted to are described which are used by carpenters
found what we used to call a “ cock tenon ” memoranda of irregular sizes.
The latter and builders, especially in country towns,
extending into the tie-beam. The increase are designated by quarter and half numbers. where the lines dividing the mechanical
in size, accordingly, is not solely for orna¬ We understand that these irregular blades trades are not so sharply drawn as in the
mental purposes. The post has two tenons are enumerated simply for the purpose of large cities. As a work of reference the
on the top end, one extending into the plate disposing of the present stock on hand, and book is very valuable to all who have occa¬
and one into the tie-beam. I have framed a that hereafter the stock carried will be lim¬ sion to buy any of the numerous articles we
number of barns in that way, and feel ited to the regular sizes and kinds.
Such a have named above. We learn from Messrs.
sure that I cannot be mistaken in this catalogue as this is cannot fail to be of ad¬ Hammacher & Co. that they have a separate
vantage to all who have occasion to use band¬ catalogue devoted to tools, and that they are
respect.
prepared to send any of their books to pro¬
saw machines.
posing purchasers on receipt of application.
REFERRED TO OUR READERS.
We have also received from the same firm a
The Victor Heater.
new edition of their illustrated price list of
The Victor Heating Company, of Norwich, gold and nickel plated drawer pulls, toilet
“In Wind” or “Out ot Wind.”
Conn., have issued a pamphlet descriptive screws, hatpins, escutcheons, candle holders
From S. F. G., Columbia, Pa.—I have a of the Victor heater, which has a boiler and other similar goods. It is a. pamphlet
question that I desire to refer to the practi¬ for low-pressure steam heating especially of some 32 pages, handsomely illustrated
Sev¬ and well printed.
The goods shown are
cal readers of Carpentry and Building. I adapted for warming dwelling-houses.
want to know the correct form of expression eral illustrations of the apparatus appear in such as are very generally required in the
to indicate that a door is not in proper shape. this pamphlet, being elevations and sections fitting up of houses of the better class, both
For example, after a d.or has been hung on both vertical and horizontal. The frontis in the furniture and in the stationary cabinet
a true jamb, suppose that it strikes either at piece is a vertical section through the boiler work.
the top corner or at the bottom, as the case and the surrounding brickwork, and is done
may be, when it is shut. Is this condition of in colors, showing m a very satisfactory
Iron and Slate Mantels.
things properly decribed by the term “in manner the special features involved in this
We have received from Fischer, Leaf &
The first chapter in the pam¬
wind ” or “ out of wind ?” I find that both apparatus.
expressions are in use, and it seems fair to phlet is an article on steam heating, by Prof. Co., Louisville, Ky., a copy of their new
suppose that one is correct and the other in¬ W. P. Trowbridge, being one of two articles catalogue of marbleized iron and slate man¬
correct. If some of the practical readers of which appeared in a recent issue of the tels, grates, ranges, &c. The catalogue is a
the paper will give me information on this North American Review entitled “ Rival Sys¬ handsome quarto, and contains a large num¬
tems of Heating.” Following this is an arti- ber of designs of parlor, sitting-room and
subject I shall be greatly obliged.


Carpentry and Building.

July, 1884.

The American Well Works, Aurora, Ill., will erect a new factory building in the city of Toledo, furnished the plans.

Mr. Jacob Diamond, of Boston, Mass., has recently made some important improvements in the telescopic plumb and levels manufactured by him, and has issued a very complete catalogue which he sends to any address on receipt of 10 cents in stamps.

The Stray Chips.

A brick block, 35 x 67 feet in plan and three stories in height, is being erected at Elkins, Ohio, for the Smith & Anthony Stove Company, at Alberquerque, New Mexico. The materials used are brick, stone and iron. The roof is to be 66 x 90 feet in size, and the cost 750,000. The actual cost has been over 6,000,000.

The St. Louis Custom House and Post Office is substantially completed and furnished, and is already partly occupied. The contractor is Mr. W. C. Halsell, and the materials used are brick, stone and iron. The roof is 180 x 100 feet in size, and the cost is 300,000.

A brick building, 100 x 150 feet in plan and six stories in height, is being erected at Elyria, Ohio, for the Sandusky Iron Works. The cost is 1,000,000.

A fireproof building, 60 x 90 feet in size, and three stories in height, is being erected at the Minnesota Loan and Trust Company. The contract is 150,000.

A new fire-proof building, 75 x 100 feet in plan and four stories in height, is being erected at Tombstone, Arizona. The cost is estimated at 75,000.

A new brick building, 40 x 60 feet in size, and four stories in height, is being erected for the Aurora, Illinois, House Company, at Alberquerque, New Mexico. The structure will have a slate roof, and will cost 6000.

A new fire-proof building, 66 x 80 feet in plan, three stories in height, will be two stories and basement in height, and will cost 6000. Mr. T. D. Gayle, of Council Bluffs, is the builder. The cost is estimated at 75,000.

A new fire-proof building, 40 x 60 feet in size, and four stories in height, is being erected for the Aurora, Illinois, House Company. The structure is of metal and the cornice of galvanized iron. The materials used are brick, stone and iron.

All sustaining columns of iron are incased in porous terra-cotta and finished with Keen's cement. The party walls are of brick, with Connecticut brown-stone trimmings.

The plans have been prepared by Messrs. Howell & Clendenning, Consulting Engineers of New York. The material used will be brick, Eating iron and terra-cotta, and the cost will be about 100,000.

The Delaware and Hudson Canal Company are erecting a new boat house, 60 x 120 feet in size, and four stories in height, at the Landing of the American House, in Utica, N.Y. The materials used will be brick, terra-cotta and iron trimmings. The structure is of the Romanesque style of architecture, and will cost about 100,000.

A new fire-proof building for the Notes and Post Office is being erected at Mocksville, N.C., and will be 120 x 200 feet in plan and five stories in height. The cost is estimated at 60,000.

Mr. John W. Harnack, of Boston, Mass., has recently made some important improvements in the telescopic plumb and levels manufactured by him, and has issued a very complete catalogue which he sends to any address on receipt of 10 cents in stamps.

The Straw Chips.

A block, 35 x 67 feet in plan and three stories in height, is being erected at Elkins, Ohio, for the Smith & Anthony Stove Company, at Alberquerque, New Mexico. The materials used are brick, stone and iron. The roof is 180 x 100 feet in size, and the cost is 300,000.

A new fire-proof building, 60 x 90 feet in plan and four stories in height, is being erected at the Minnesota Loan and Trust Company. The contract is 150,000.

The St. Louis Custom House and Post Office is substantially completed and furnished, and is already partly occupied. The contractor is Mr. W. C. Halsell, and the materials used are brick, stone and iron. The roof is 180 x 100 feet in size, and the cost is 300,000.

A brick building, 100 x 150 feet in plan and six stories in height, is being erected at Elyria, Ohio, for the Sandusky Iron Works. The cost is 1,000,000.

A new fire-proof building, 75 x 100 feet in size, and four stories in height, is being erected at the Minnesota Loan and Trust Company.

The plans have been prepared by Messrs. Howell & Clendenning, Consulting Engineers of New York. The material used will be brick, Eating iron and terra-cotta, and the cost will be about 100,000.

The Delaware and Hudson Canal Company are erecting a new boat house, 60 x 120 feet in size, and four stories in height, at the Landing of the American House, in Utica, N.Y. The materials used will be brick, terra-cotta and iron trimmings. The structure is of the Romanesque style of architecture, and will cost about 100,000.

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The Oldest House in America.

The description of the old church which appeared in our issue for April last called out a number of letters from our readers, several of which mentioned other old buildings that in the estimation of the writers were equally worthy of attention. Manifestly it would be inexpedient to give space to all that could be offered in this way, however valuable their publication might be, and therefore we have found it necessary to decline, with thanks, the suggestions of several subscribers. A correspondent, writing from Medford, Mass., however directed our attention to a house standing in that place which has the proud distinction of being the oldest building in the United States retaining its original form. Following an account of how a plain country church was built according to his orders, and in a style befitting a person of his means, under the immediate supervision of his agent, Nicholas Davidson. Cradock's death occurred in England shortly after the completion of the house, and the building, which bears the Governor's name, although never occupied by him, was disposed of, in connection with a large tract of land, to other parties.

The bricks employed in its construction were burned in the immediate neighborhood, and vary in size—some of them are 8 inches long, while others are 8 1/2; the thickness varies from 2 1/4 to 2 1/2 inches, and the width from 4 to 4 1/2 inches. Modern bricklayers would, no doubt, object to bricks varying in size as these do, but the old-time bricklayers, notwithstanding these disadvantages, put up a building which for stability rivals the best modern structures. The walls of the building are very thick, being from 15 to 18 inches, and the windows and doors were originally closed with heavy iron shutters. It also contained several fire-proof closets, and two of the original port-holes remain, which may be seen in the engraving.

The location was favorable to repelling attack, and these and other circumstances indicate that the building was erected, partly at least, as a defense against the Indians. Hence it has been called the "Fort" and the "Garrison House." Were we so disposed we might describe some of the historical events which have occurred in the immediate neighborhood of this house. We will only mention that it was within hearing of the shots fired at Lexington and Concord, and that it might have been seen by Paul Revere in his famous ride, made immortal by Longfellow. It stands in a locality noted for the stirring interest to the citizens of America. While in general terms the house is in a fair state of preservation considering its great age, it is out of repair in several important particulars, and long neglect has served to obliterate many features which would be of the utmost interest to builders could they be reproduced and examined at the present day. The building measures 43 x 30 feet. Appearances indicate that some of the original sash and glass still remain in the windows, although successive repairs in this and other particulars make some such points doubtful. The hand of time has manifested itself in the sash as much as in any other place, some portions literally falling to pieces, the corners being entirely gone.

Our details show some of the most peculiar features of construction. In one of the engravings will be noticed the construction of the outside casings. The molding marked E is a part of the upper piece or lintel, and joins the vertical portion on the line A B C. The portion E is worked out of the solid, while the vertical molding D is a separate piece planted on. This union is a most peculiar one, whether considered technically or from the standpoint of progress in the arts. Moldings were originally worked out of the solid. Working them in separate pieces and planting them upon another surface was undoubtedly a later idea. To meet a piece of joinery in which one portion of the molding is worked out of the solid and the other is made by planting on is something of a curiosity. Parts of the casings are so weather-beaten that the molding is entirely gone except in the upper corners, whereas it is more protected than in other places.

The floor between the first and second story is laid on what would be considered, from the modern builder's point of view, very heavy beams. Their lower surfaces, forming part of the ceiling of the lower story, are finished, and the corners are chamfered and molded, as shown in one of the engravings. Equal care upon the part of the builder is manifested in
the finish of the under side of the roof timbers seen at A in the sectional view. Whatever may have been the intentions of the builders, this portion of the house shows signs of never having been finished. The main rafters are connected by horizontal timbers, C, which support intermediate rafters, B. At the bottom of each rafter has been placed the piece D, which gives the roof that curve so often noticed in buildings of olden times. The shingles are laid upon shooting boards placed close together, and, although the shingles have been replaced, it is likely that the original shooting boards remain.

The fireplace, with the old-time oven adjacent thereto, is a conspicuous feature of the corner cupboard which is shown to one side of it in the engraving is suggestive. To the observing mechanic who enjoys studying examples of construction, it is, however, still well worth a visit.

Composition of Zylonite.

The following is a description of the composition and use of zylonite, given by the manufacturer.

Paper, camphor and alcohol are chemically treated and then extruded, and from zylonite, in turn, are made almost numberless kinds of goods which have heretofore been produced from shell, horn, bone, paper again resolved into pulp. Then paper is pressed and old, with chloroform. Then, as it is softened, the whole may be removed by benzine.

Finish of the Under Side of Floor Beams.

In some instances it will be necessary to replace the wedges of wood which have here¬tofore been placed the wedge-shaped piece D, which gives the roof that curve so often evident upon inspection of the belt course.

Horizontal Section of Second Story Window Casing.

No effort is being made to preserve this historic landmark. At present it is used as a common tenement house. The ravages of time will not endure many years more. For a century and a half the house stood in an open field and could be approached only by a private road through gates. Its surroundings, however, have undergone great modification in more recent years, caused by street grading and other improvements. Modern buildings have encroached upon its grounds. It stands an "old house," and, though frequently visited by those who feel an interest in it on account of its historical associations, it is greatly neglected, and some is considered as little short of an eyesore. To the observing mechanic who enjoys studying examples of construction, it, however, is still well worth a visit.

Composition of Zylonite.

The following is a description of the composition and use of zylonite, given by the Paper World. The process of manufacture involves the introduction and combination of camphor and alcohol to the pulp, making the preparation insoluble. At this stage the mass parishes of the nature of cellulose, when coloring matter is introduced, and the combined preparation is passed between shored rollers. It is then molded into slabs of some 4 or 5 inches in thickness, about 2 feet in width and 3 or 4 inches in thickness.

After a certain length of time, and when in proper condition, the slabs are placed on the bed of a machine to which they are shaved to any desired thickness. At this stage of the manufacture, the slabs are as clear as crystal, presenting nothing to the eye in looking through them but the shade of color which may have been added at the proper time. These sheets are changed into rolls or rings and made ready for transformation into the various articles of manufacture.

The plans for the Mobile Cotton Exchange have been completed, and the structure promises to be something handsome. The plans show a three-story brick and tiled building of Flemish Renaissance architecture. The first story will have an elevation of 20 feet, and the second and third 14 feet each. The top of the building will be ornamented with gables and towers, and in the principal tower there will be placed a clock. Emblems of the cotton trade will be displayed over the main entrance. The arches over the windows will be ornamented with terra-cotta moldings in high relief, and will add greatly to the appearance of the building. The south tower will have a clock. Emblems of the cotton trade will be displayed over the main entrance. The arches over the windows will be ornamented with terra-cotta moldings in high relief, and will add greatly to the appearance of the building.

Details of manufacture of the paper can be made. It is made expressly to order, and delivered in rolls. The first process of manufacture consists of cutting the paper into slabs of some 4 or 5 feet in length, and 3 or 4 inches in width. For these papers, paper again resolved into pulp. Then paper is pressed and old, with chloroform. Then, as it is softened, the whole may be removed by benzine.

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August, 1884.

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Construction of a Cheap Lathe.—VI.

Mandrel Details.

(Continued from page 87.)

For the poppet mandrel (Fig. 37) get a piece of thick 1/8-inch wrought-iron tubing 6 inches long and not less than 1/2 inch diameter outside—what is known in the trade as "hydraulic iron"—and instruct the smith to weld a short bit of 1/8-inch bar, about 1/2 inch long, into each open end, in which to cut the mortises for the traversing screw and the dead center. In a small mandrel this is a better method than drilling up a solid piece of wrought iron in a lathe, and fitting with the bore of the poppet-head. Remove the poppet center, replace with the cone-plate, and drill at one end, 1/8 inch into the hole for the center; then rechuck, drill, and cut off.
lungs, and is again exhaled or expired through the pores of the earth or water. How much the expired air is changed in going through the pores of the earth or water.

Now, instead of springing the houses out of the ground in such situations by digging air plants.

How much the expired air is changed in going through the pores of the earth or water.

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Most of the failures which originate, or the laws which govern, terrestrial emanations, their existence cannot be questioned. In alluvial soils cellars are damper and more unpleasant than in primal formations, and obtain and retain an air which gives life to molds and various air plants.

Finials and Vanes.

Almost every architect and builder at one time and another experiences the need of good designs of finials for the points of towers, turrets, spires and for terminals of buildings. Weather vanes are also in demand, and a very general want is felt for something different from the stock designs which many in the trade have been so indubitably manufacturing and selling for years past.

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In a recent issue of the Metal Worker there was presented a number of new designs of finials and vanes manufactured by Shriver, Weatherly & Co., of Grand Rapids, Mich. We present a portion of them herewith. They are composed of wrought and cast parts, with sheet-metal for catching upon them, our contemporary says:

Almost every architect and builder at one time and another experiences the need of good designs of finials for the points of towers, turrets, spires and for terminals of buildings. Weather vanes are also in demand, and a very general want is felt for something different from the stock designs which many in the trade have been so indubitably manufacturing and selling for years past.

It is hardly necessary for us to say that the finials and vanes which have been in the market in the hands of the weather-vane and emblematic-sign trade have never been entirely satisfactory for use with galvanized-iron work, because there was seldom any harmony between them and other parts of the finish, and also because they were so constructed as to make it somewhat difficult to unite sheet-metal work with them. Indeed, it has seldom been our opportunity to inspect as fine a set of designs for the purpose as these. The engravings show their characteristic features so clearly that extended description is rendered unnecessary. It may be observed, however, in passing, that the elements of the designs are comparatively few, and that an interchangeability of parts runs through the lot to a considerable extent. As two finials are seldom placed near enough together on buildings to admit of close comparison, this is no objection, while, on the other hand, this feature cheapens manufacture and makes a large assortment possible with comparatively few parts to be carried in stock.

One great mistake which has been made by cornice-workers has been the flimsy character given to the finials which they have employed. Because their business is sheet-metal working it has seemed that they could use nothing but sheet metal, regardless of position or actual requirements. Accordingly, finials have been made very extensively with sheet-iron stems, having no better connection with their parts than soldered joints; with sheet-iron scrolls, also soldered to the stem, and with vanes made, evidently, of sheet iron to which they are attached—allegedly, without a thought that sheet iron is never very stable, and that soldered joints give a delusive appearance of strength. All of our readers know of finials of this kind which have become broken in the storm or else have had their vanes rusted fast in their places. The reasonable disgust of practical builders with work of this kind is also generally known, and galvanized-iron work has been discriminated against in many cases solely on this account. Cut and soldered crestings have been extensively used, and have, likewise, brought reproach upon the industry. The finials and crestings which have been in the market in the hands of the weather-vane and emblematic-sign trade have never been entirely satisfactory for use with galvanized-iron work, because there was seldom any harmony between them and other parts of the finish, and also because they were so constructed as to make it somewhat difficult to unite sheet-metal work with them, as it is almost always necessary to do in making a finish. The recent demand, therefore, has existed for the cornice trade to get up such finials as are perfectly adapted.
to their requirements, and, at the same time, are not open to the objections to which we have alluded. The problem thus presented is being gradually solved, and the general average of work of this kind as now sent out is far superior to that which was formerly in vogue. The finials shown on this and the opposite page, as we have already stated, are among the best we have seen, when viewed from the standpoint of good design, combined with thorough construction and adaptability to use in connection with sheet-metal work.

Making Artificial Ivory.

A French paper gives the following description of a new process for making artificial ivory from the bones of sheep and goats and the waste of white skins, such as kid, deer, &c. The bones are macerated for 10 or 15 hours in a solution of chloride of lime, and after washed in clean water and allowed to dry, then they are put with all the scraps of hide, &c., to which is added 2\% per cent, of alum. The foam is skimmed off as it rises until the thickness is such that it, which is accomplished by keeping it for about three years, however, that the Thompson Brothers, of Leeds, England, perfected their patent gas kiln, which not only does the work in a better manner and in a shorter space of time than the common furnace, but, what is of more importance, insures a greater degree of safety to the glass from breakage. Although largely used in England, and by such prominent art establishments as Tiffany's, Le Farge and J. R. Lamb & Co., in New York, this improved kiln was not introduced in this city until quite recently, when the George H. Gibson Stained Glass Works put one in as an experiment, and with eminently satisfactory results. Its use is not limited to the burning of stained glass, but is equally adapted to any of the purposes for which the ordinary furnace is used.

Cutting off the access of light to buildings through the erection of lofty structures by the owners of adjoining property has given rise to a serious state of affairs in some parts of London, and in populous commercial centers like New York and other large American cities, not only expense and annoyance, but positive unhealthiness, will likely be the result in course of time of making lofty structures shut out sunlight from residences and places of business. In order to obtain with some accuracy the proportion of light lost by a proposed obstruction, the Building News says: "In this city until quite recently, when the George H. Gibson Stained Glass Works put one in as an experiment, and with eminently satisfactory results. Its use is not limited to the burning of stained glass, but is equally adapted to any of the purposes for which the ordinary furnace is used.

ford. The figures given are pounds sterling. They can be converted into United States money by multiplying by 4.9, which is almost equal to 5. It will be seen that the highest bid was something over £32,000, while the lowest bid was something under £23,000. Between these extremes were 16 other proposals, the whole list showing remarkably small variations in the prices. We think that those who believe in making a bid with refusing to take a paper and subject to disqualification; the volatile matter is conditioned for the distillation is not safe to anything. While we have very little confidence in the efficiency of the method above prescribed, we are not prepared to condemn it.

We shall be glad to watch this subject, and lay further particulars before our readers as we may have opportunity.

The article in our last issue entitled "An English Fireplace," and which illustrated a typical piece of English design and construction, has not passed without criticism from our readers. We anticipated this at the time we penned our brief introduction to the extract from the exchange to which we were referred to is as follows:

Atherton & Latta. 5,885
Arnaud & Son. 5,985
Woodward. 6,000
Shurmur. 5,994
Hobbs. 6,230
Holloway (accepted). 5,375
Morter. 5,690
Conder. 5,760
Hearle & Son. 5,950
Martin, Wells & Co. 5,100
Hunt (accepted). 5,250

The following lines on the pleasures of house-building, and the cost thereof are not the less a true picture because they are written in the Lancashire dialect. Their quantity makes them interesting. They are taken from one of a series of poetical sketches, entitled "Nathan Barlow: Sketches in the Retired Life of a Lancashire Batcher":

"If ye'ar an't spalowed a hawp'y more o' brass, I know an' no-turst stuff if it's built, ye'll bain't fatted like a fattened boar can't be killed. An' an honest man's the noblest work o' God -- So th' poet says--but doun't think it's odd. He's gied so many t' the nest, and those be by th' most o' folk are reckon'd soft 't fa' read? Ye've never seen a window but ye'm in fa' to think it's true, As th' actor said, 'at 's honesty's a few.'

They say there's good and bad 'round every line; there happen to be a ye'm thinly there. If God's land any honest builders, though there seems a deal o' deceit in their 'way. It seems to mean they're gitten lost or strayed. For we've never met with a thing yet o' this number. They're their hawp'y built up like th' China ware. They're scribbled with scorchin' crude an' rude o' ran. Ye think in man hoo, for if we see 'em, it's likely th' old man was right. An' a 'jack' th' contrup, an' paid myself, I had a sight like a rotten house live hell. There's howd fasts, nails, and screws, if we've bower and underhanging."
For back and seat, the same as in the com-
parison, small. The arms full 2-inch, for the
stuffed pad will be reduced at the back
1/4 inch under the back feet, inside and
outside. To obtain ample hold for the head,
which has so small a base, and at the same
time not to impair the seat line, cut away
the side rail to receive it to the depth of 3¼
inch, as shown at B. A shows the face
aspect of the head, which has a "lip" cor-
responding with the space in the side rail,
which it should just fill. After gluing the
head in its place it may be doweled from
under the seat with two stout dowels, when
the whole will be thoroughly solid and strong.
The arms will take two good dowels, or, if
prefered, a tenon at the back end. In
reducing the arm at the back end take it all
from the outside, and in fixing the arm let
it rather overhang the head on the outside.
The head and arm must be glued in to-
gether. It will be evident that decoration
in the shape of moldings or carving can be
added to these chairs where price will allow.

TRADE PUBLICATIONS.

Wood-Working Machinery.

A very neat illustrated catalogue of im-
proved patent wood-working machinery has
been recently published by the manufacturer,
Mr. Frank H. Clement, of Rochester, N. Y.
The present edition makes the 13th annual
edition of the catalogue issued by Hitchings

Heating and Ventilating Apparatus
for Greenhouses.

We have received a copy of the new ed-
tion of the catalogue issued by Hitchings
We reviewed a former edition not many
months since. The present book contains
all essential matter that was in the former
one, with additional particulars which are
of interest to all who have anything to do
with greenhouse work or with heating
where a hot-water system is desirable to be
employed. The pamphlet is handsome
illustrated throughout, and contains much
information that is of value to architects and
builders generally.

Pavements of the Day.

The Warren-Scharf Asphalt Paving Com-
pany, whose office is at 114 John street,
New York, have issued a pamphlet bearing the
above title, which describes the pavement
variously known as "Grahamite," "Trini-
dad," "American," and "Barber." This
pavement is the standard pavement in use
in Washington, and is that which is fast becom-
ing popular in the various large cities of the
Union. There are now 54 miles of it in Wash-
ington city alone. The Warren-Scharf
Asphalt Paving Company is a new organiza-
tion in name, dating from about the first of
the present year. Until recently the mem-
ers of this company were associated with
Barber & Co., in the American Asphalt
Paving Company, which is no longer in
active business. From members of the
Asphalt Paving Company two distinct com-
panies have been organized, neither of which
have any essential rights or privileges not
shared by the other. The two companies
lay identically the same kind of pavement
and by the same method. Among the gen-
tlemen composing the Warren-Scharf Asphalt
Paving Company is Mr. Samuel R. Scharf,
who is one of the most experienced and suc-
cessful asphalt pavers in the United States.
He has had long experience in connection
with the pavements laid in Washington,
Buffalo, Boston, Brooklyn and St. Louis.
Mr. C. M. Warren, the president and chem-
ist of the Warren Chemical and Manufactur-
ing Company, and the asphalt used by them will be
refined under his immediate direction. The
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Paving Company is Mr. Samuel R. Scharf,
who is one of the most experienced and suc-
cessful asphalt pavers in the United States.
He has had long experience in connection
with the pavements laid in Washington,
$1500 Frame House.

The result of our Fourteenth Competition, which had for its subject $1500 frame houses, was given on page 87 of the May issue. At that time we presented the perspective views of the three successful designs and also gave the elevations, floor plans, details and bills of materials of one of them. At the present time we lay before our readers the elevations and details, with floor plans and outline of estimate, of another of the successful studies, being that submitted by Charles J. Williams, of Dayton, Ohio. The perspective view of this design will be found on page 86 of the current volume.

Mr. Williams, in working up his design, has presented four elevations, a first-floor plan, second-floor plan, cellar plan, roof plan, and a liberal amount of details.

The building shown is of the kind that is very commonly described as one-and-a-half story. A bay window, semicircular in form, on the left side elevation is a conspicuous feature and is made to serve a useful purpose as a landing in the stairway. By means of this landing there is communication from a single flight of stairs with both the kitchen in the rear and the hall or sitting-room at the front. There are a number of interesting features about this design that will bear study.

In commenting on the drawings submitted the author directed attention to the compact arrangement of rooms, economy of space and ample closet room provided. He also directed attention to the picturesque and economical arrangement of stairs, the cozy bay and porch in front, and the fact that direct access is had with all the rooms from what he has been pleased to call the hall. With reference to the inside finish the author suggests that the hall be done entirely in yellow pine, and that the remainder of the house be done in white pine or poplar.

The following is the bill of materials submitted with this design, together with the prices attached by the author:

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excavation</td>
<td>70 yards</td>
<td>$17.50</td>
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<tr>
<td>Rubble masonry</td>
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<tr>
<td>Brick</td>
<td>6000</td>
<td>$48.00</td>
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<tr>
<td>Gutters and conductors</td>
<td>140</td>
<td>$14.00</td>
</tr>
<tr>
<td>Valleys and flashings</td>
<td>00</td>
<td>$9.00</td>
</tr>
<tr>
<td>Japanned butts</td>
<td>17 pair</td>
<td>$4.50</td>
</tr>
<tr>
<td>Front door lock</td>
<td>1</td>
<td>$2.20</td>
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<tr>
<td>Siding door lock</td>
<td>1</td>
<td>$2.20</td>
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<tr>
<td>Door bolts</td>
<td>12 pair</td>
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</tr>
<tr>
<td>Sash locks</td>
<td>13</td>
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</tr>
<tr>
<td>Cord for sash</td>
<td>312</td>
<td>$3.12</td>
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<tr>
<td>Sash weights</td>
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<td>Stair-rail brackets</td>
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<td>$1.10</td>
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<tr>
<td>Door bell</td>
<td>1</td>
<td>$1.50</td>
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<tr>
<td>Nails</td>
<td>32</td>
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<tr>
<td>Paint (exterior and interior)</td>
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<td>Plastering</td>
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<td>Shingles</td>
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<tr>
<td>Sheeting</td>
<td>1500 feet</td>
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<td>Patent siding</td>
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<tr>
<td>Framing timber</td>
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<tr>
<td>Cornice and trimmings</td>
<td>560 feet</td>
<td>$16.80</td>
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</table>

First Floor Plan.—Scale, 1/8 Inch to the Foot.

Second Floor Plan.—Scale, 1/16 Inch to the Foot.
1500 feet of flooring at $25 per M. $37.50
19 doors, frames and finish at $6. $114.00
15 window frames and finish at $6. $90.00
7 cellar windows at $10. $70.00
3 closets, 2 shelves each, at $2. $6.00
1 front porch, complete. $50.00
1 rear porch, complete. $20.00
1 pantry and china closet. $25.00
3 closets, 2 shelves each, at $3. $9.00
1 stairs to second story, complete. $35.00

Total estimate. $1500.00

Stone-Cutting of the Ancient Greeks.

A rather interesting observation, says the American Architect and Building News, has recently been made upon the methods of stone-cutting employed by the ancient Greeks. Every one knows that the marble blocks of which the Grecian masonry was composed are put together without mortar, and so nicely fitted that in many instances the two adjacent stones have, as it were, grown together by the cohesion of their particles, brought into almost absolute contact, a fracture made by a blow upon one passing directly into the other, just as if the two formed a single block. With regard to the fitting of the drums of columns, Mr. Penrose, the most scientific and practical of all investigators of Greek architecture, believes that the desired effect of close fitting was obtained by inserting a wooden pin as a pivot certain distance back from the face being polished, while the rest of the joint is slightly sunk, in order to allow the polished portions to be brought into perfect contact. As no sign of a pivot can be discovered on the other. This explanation, which is probably the true one, solves the problem completely so far as the drums of columns are concerned, but throws no light upon the fitting of the other stones of the Grecian buildings, such as the blocks of the entablature, which are found to have joints as close as those of the columns, the edges of each block for a of the joint is slightly sunk, in order to allow the polished portions to be brought into perfect contact. As no sign of a pivot can be discovered on the stones, even if it were possible to revolve them in contact with each other, it is plain that a different process must have been used for fitting them, and an inscription discovered a few years ago gives us some idea of what the process may have been.

This inscription, which seems to have been a sort of official document, answering the purpose which would now be fulfilled by a printed specification, describes the construction of a temple, and stipulates particularly that the joints of every block of marble must be polished with a mixture of oil and vermilion. As vermilion, if the word so translated really refers to the pigment now known under that name, has no polishing quality, it has been suggested simply to spread over the joints before trying the stones together. If any inequality existed in the surface of either stone, it would be immediately shown, on separating the stones after a momentary contact, by the transfer of color from one to the other, and the protruberant portion thus detected could then be rubbed down by hand to a uniform plane with the rest of the surface. A powder of red chalk is often used by mar-
ble-cutters for a similar purpose, and it is quite possible that this may have been the only use of the vermilion paint, but there is some difficulty in accounting on this theory for the mixing of oil with the paint, which, if used dry, would be quite as useful for its supposed purpose, and would be much more easily cleaned off the stone. There is no serious improbability in the supposition that the authors of the inscription may have confused the true vermilion with the red oxide of iron, or crocus, which is a very efficient polishing agent, and if mixed with oil, and applied to the surface of a piece of marble, would serve admirably both to show where that surface had been brought to coincide with a test plane and to reduce the inequalities which might, on trial, be found to exist.

NEW PUBLICATIONS.

SHAVING AND SAWDUST. By "Observer," Containing a series of articles, some of which have appeared in the Lumber World and are now reprinted, together with many others which have not been published—all treating of the design, construction, care and operation of wood-working machinery. Size, 6 x 9 inches; 150 pages, bound in cloth, illustrated. Published by G. A. Womborne.

The somewhat facetious title "Shavings and Sawdust" has been applied to a book treating on the designing, construction, care and operation of wood-working machinery. The letters are pleasant talks about every-day mechanical problems which arise in the management of wood-working establishments, and they will bear reading by all who are engaged in such work, whether they agree with the conclusions reached by the author or not. Some of the illustrations are of the nature of tail-pieces to the chapters. Some of them have a mechanical application; others are humorous. It is to be regretted that the volume has not been more thoroughly illustrated from a mechanical standpoint. The first chapter is entitled "A Plan for the Economical Dressing of Lumber," and in the way of illustrations presents the arrangement of machinery in a model wood-working establishment. There is also given a cross-section, showing the location of line shafts under ground below the main floor, and the framing of the roof of the same building.


This book, by a practical painter and one of the best known writers on the subject of painting, is designed for the special use of those who wish to do their own work. It consists of practical lessons in plain painting, varnishing, polishing and staining, with directions for paper-hanging and kalsomining. Instructions are also given for renovating furniture, and a few hints on artistic work for home decoration are presented. It contains a description of the tools and materials used in painting, with directions for mixing paints. A glossary of terms used in painting and a very complete index complete the book.

COTTAGES, OR HINTS ON ECONOMICAL BUILDING: containing 24 plates of medium and low cost houses, contributed by different New York architects, together with descriptive letter-press, giving practical suggestions for cottage building. Compiled and edited by A. W. Brunner, architect; to which is added a chapter on the water supply, drainage, sewerage, heating, ventilation and other sanitary questions relating to country houses, by William Paul Gerhard. Size, 6 x 9 inches. 70 pages, 24 plates, bound in cloth. Published by William T. Comstock. Price $1.

According to the preface, the aim has been simply to offer hints and suggestions to those about to build, and to present a series of designs of low-cost cottages. This has been very happily done. This work, which contains modern designs, will fill a well-defined want, and should have a very large sale. The designs as set forth in the title are by a number of New York architects, and very satisfactorily represent styles which are current in the best work that is now being done, whether cheap or expensive. An important feature is the chapter on sa
tary matters by Mr. Gerhard. In it various questions likely to arise in the selection of a site and the location of a building are carefully discussed, and principles are presented in such a way as to be readily understood and applied by those who have had the smallest experience. The first chapter in the work, entitled "Hints on Economical Building," by Mr. Brunner, is equally valuable, and the few comments that are offered upon the plates are made with specific application.

**Duck Roofing.**

The following particulars with reference to the use of duck roofing have been furnished by Mr. Timothy Merrick, treasurer of the Merrick Thread Company, Holyoke, Mass. Mr. Merrick has given careful attention to the use of duck roofing have been furnished by Mr. Timothy Merrick, treasurer of the Merrick Thread Company, Holyoke, Mass. Mr. Merrick has given careful attention to the use of duck roofing for roofing purposes. The great danger to the cloth from the under side, and in a short time the ruin is complete. To prevent this is the objective point to be considered. It is a well-known fact that warm air will hold more moisture in suspension than cold. It is also well known that the temperature of rooms where work is being done is much warmer than the outer air at most seasons of the year. By keeping these facts in mind it becomes at once apparent that to preserve duck roofing from the liability to mildew, the humid, warm air of the interior must be effectively cut off from contact with the canvas. The method which Mr. Merrick has found advisable for use for this purpose is as follows: For the roofing use planks well seasoned, planed to an even thickness, tongued and grooved and closely bolted. Cover the roof surface thus prepared with one thickness of a heavy, rosin-sized paper. Over this lay a two-ply thickness of tarred roofing paper, with a coat of roofing composition applied hot between the two layers of tarred paper. This forms a complete barrier against moisture from within the building. In making this foundation care must be taken to fasten it sufficiently to keep it in place. This in turn is covered with another layer of paper of the same kind as the first. The roof is then ready for the duck. Any weight may be used. Mr. Merrick has employed upon the buildings of his company material 72 inches wide, equivalent in weight to 13 ounces, 22 inches wide. The canvas was laid lengthwise of the roof. The lengths of the pieces were the full length of the building, with a little to spare. Each breadth was securely nailed on its edge with 3/4-inch copper nails, the breadths lapping each other about 1 inch. Around chimneys and all other places requiring flashings lead or zinc was employed. After the canvas had thus been prepared it was filled with a preservative against damp of any kind. This fills the film of the cloth, and acts as a preservative against damp of any kind. After completing the roof a coat of paint is applied to the outside, and this is to be repeated as often as circumstances seem to indicate is necessary. Seven cents per square foot, or, in other words, $7 per square, is Mr. Merrick's estimate of the cost of a roof laid in the manner above described.

**Self-Acting Time-Check.**

In all manufacturing establishments the question of accurately registering the time at which the employees of the concern enter for work is of considerable importance. According to an English exchange, an ingenious, self-acting apparatus for checking the exact time of arrival or departure of workmen has lately been invented by Mr. Luther Hansen, of the Bowling Dyke Dye House. The invention is worked by clockwork, and is of a character to be applied to any clock having sufficient strength. The only attachment necessary for the purpose is a cam-plate fixed upon the center spindle of the works. As the plate rotates by the movement of the clockwork, the cam comes into contact with one end of a lever, which is thus raised and suddenly dropped at such intervals as the cams allow. To this lever is attached a peg, which, by the above movements, is lifted and dropped into notches in a circular table below. The table, when thus liberated by the lever drawing out the peg, revolves on a center shaft by means of a weighted cord or a spring. This motion of the table removes a box or cell fixed upon it, from under a hopper, and brings round another cell into its place, which stays there until the table is again allowed to carry it away by the lever action. These cells have marked upon them the period of time they occupy the hopper, which period is arranged by the construction of the cam-plate attached to the clockwork. In this manner an accurate account is kept, without any personal attention, of the exact time workmen enter or leave their work, by each putting their representative check through the hopper into the cell. The whole is inclosed in a wooden case, with the clock above, only apertures for the reception of the checks being exposed. The apparatus is such as can be made to meet the requirements of any trade employing any apparatus of hands or checking any number of times day or night.
parts which constitute a standard set, but, if a complete set is not wanted, any part can be had separate, and others added as desired. All the parts are accurately made to gauge and are therefore interchangeable: Main stock, front bar and gauge, dado forms, including cutters, \( \frac{1}{4}, \frac{3}{4}, \frac{1}{4}, \frac{3}{4}, \frac{1}{4}, \frac{3}{8} \); bead forms, including cutters, \( \frac{1}{4}, \frac{3}{4}, \frac{1}{4}, \frac{3}{4}, \frac{1}{8}, \frac{3}{8} \); auxiliary stock, including back bar and one cutter, grooving and filletster attachment, filletster cutter, bead forms, including cutters, \( \frac{1}{4}, \frac{3}{4}, \frac{1}{4}, \frac{3}{4}, \frac{3}{8}, \frac{3}{8} \); center bead forms, including cutters, \( \frac{1}{4}, \frac{3}{4}, \frac{3}{8}, \frac{3}{8} \); hollow and round forms, including cutters, from No. 1 to No. 18. Attention is called by the manufacturer to the fact that the different

Rust Preventive.

The liability of polished goods to rust, even when finished in nickel, has induced many to investigate the subject of rust preventives. A new article of this kind is being put upon the market by J. W. Cheney, No. 85 Brainard street, Detroit, Mich. Some of the advantages claimed for it by the manufacturer are as follows: It leaves polished surfaces perfectly natural, so that it is difficult to detect that an article has been covered with any preparation, save only on very close examination. The substance is impervious to air and moisture, yet when dry is so hard that dust does not stick to it. At the same time it may be brushed the same as if the surface had no preparation upon it. It dries instantly on being applied, so that in such places as polishing rooms or stove establishments it has great advantages over all slow-drying preparations. Its usefulness includes a wide range of applications. It may be applied to mechanics' tools, to forming implements, to stove and stove-pipe, to prevent rust when not in use, and it is said to be especially desirable for manufacturers and exporters for protecting their goods against moisture incident to shipment to foreign countries. It can be rubbed off if desired by the hand, and is suited to use with turpentine or coal oil. A circular which Mr. Cheney has issued contains a number of flattering testimonials, among which we notice the names of Henry Disston & Sons, Philadelphia, and the Detroit Stove Works, Detroit, Mich.

New Self-Feeding Rip Saw.

One of the newest machines turned out by the Egan Company, Nos. 221 to 241 West Front street, Cincinnati, is shown in Fig. 7 of the engravings. It is described as a self-feeding or hand-feeding rip saw, and has been designed for use in factories where a large amount of ripping is to be done in either hard or soft wood. The manufacturers confidently offer this machine as the best of its class now before the public. A considerable number have already been put out, and some very flattering testimonials have been received from well-known experts in the wood-working line. We con-

Novelties.—Fig. 1. General View of Fale’s Variable Plane.

Fig. 2.—Filletster and Grooving Attachment, Having Reversible and Adjustable Wood Fence.

Fig. 3.—Detached Round Form and Cutter.

Fig. 4.—Detached Hollow Form and Cutter.

Novelties.—Fig. 5. Filletster and Grooving Attachment, Having Reversible and Adjustable Wood Fence.
dense the following description from the company's circular: A reliable and powerful feed, much simplified and with much less machinery than usual, is embodied in its construction. There is also a method of changing from a self-feed to a hand-feed and edger instantly by simply loosen-

Novelties.—Fate's Variable Plane.—Fig. 5.—Detached Bead Form and Cutter.

ing one thumb-screw. A method is provided of getting at the saw without disturbing the feed works, simply by swinging the feed-arm out of the way. A method is also provided of feeding the piece so that it is always given a slight lead against the fence, and of tracking the feed-saw in such a manner that the cutting blade always takes out the kerf made by the feeder. The frame of the machine is cast cored style, and, as may be judged by the engraving, is strong and well braced up and stands very substantially on the floor. The feed consists of four speeds, namely, 60, 80, 100 and 120 feet per minute. The arrangement of parts is such that the feed can be quickly changed from one speed to another. The table is hinged at the back end, and when

the feed-arm is swung back can be raised by a screw or clamp and can be lifted clear up, giving free access to the mandrel and feed works. The manufacturers offer this machine as being capable of doing the work of from three to six men and at the same time doing it cleaner, with no jerks or resting marks behind the sash and at one side if desired, so as to do away with the openings which are required in the old rope system. The construction of the balance is such that the same pair of balances can be arranged to several different lengths and weights of sash. Still another advantage which will be appreciated by housewives who are in the habit of removing sashes from the windows in house-cleaning time is that the sashes can be readily detached, since they are fastened to the balance simply by the hook shown in the engraving. Several different sizes are manufactured, adapted to sash weighing from 8 to 22 pounds, and having a length from 32 to 40 inches. Special sizes are made to order. The capacity of these sash balances is capable of being increased or diminished within certain limits. This is done by passing the ribbon once more around the drum to increase its power, or letting it off a round or more to diminish its power. Small adjustments are made by means of the spring brake which is shown above the drum in the engraving. By increasing the tension of this brake, which is readily done by means of a screw, and which can be accomplished after the balance is in place in the window frame, variations of 1 pound or more are readily made.
The Vulcan Shutter Bolt.
Brooke & Co., Boyersford, Pa., have put on the market the shutter bolt represented in Fig. 9. This article is a bolt and bower combined, and is claimed by the manufacturers to be the only positive bower plate, which is so constructed as to hold it securely until the bolt is drawn back. Of this article three sizes are made, 6, 8, and 12 inch, which are finished in Mexican and Brazilian bronze. The points which are made by the manufacturers in this brace is shown in Fig. 11. The feature of special interest in this implement is the countenance which has been admired as ingenious and efficient, by which the power and motion are communicated to the bit. This is done by means of a universal joint, the form of which is represented in Fig. 12. In this cut P is a portion of the arm by which the brace is held in position and on which the pressure is applied. O is connected with the sweep, by the motion of which in the operation of boring it is made to revolve, and through the joint as represented it gives motion to A, a shaft, which, extended, carries the chuck which holds the bit, E being a bush and A revolving inside of it. The jaws are those of the Barker improved brace, which is already known by the trade. This brace is a hand-some tool, in full nickel-plate, with black-walnut head and handle. It is made with 6, 8 and 10 inch sweep. It will be apparent to our readers that this brace possesses many advantages, and among others the manufacturers enumerate the following: That it bores six or eight times as fast as any other brace, and that the movement is round and round; that it bores more easily, as it is easier to turn round and round in continuous motion than back and forth, and as the pressure on the arm of the brace, instead of on the sweep itself, more power is gained, that for heavy work or boring into hardwood, and especially for boring overhead, either in the corner or in the straight, the superiority of the corner brace is apparent in the advantage gained by the pressure on the arm; that it will bore close into a corner, the ratchet brace, owing to its eccentric contrivance by which the power and motion are communicated to the bit, gives motion to A, which in the operation of boring is round and round; that it is almost as secure for the shutter bowed as when shut and locked; that the self-acting or gravity catch fastens it securely against wind and sneak thieves, and that it is exceedingly simple in operation and not liable to get out of order.

A New Gravity Lock.

Fig. 10 of the illustrations represents a gravity lock which has very recently been put on the market by the Amidon Door Knob Company, of Detroit, Mich. The main features of this article on which the manufacturers lay emphasis are its simplicity of construction, its perfect working without the use of a spring, and the convenience by which the latch is locked on the inside. The construction of this lock may easily be apprehended by reference to the illustration. The reversible latch A, through which the weight C, working on an eccentric, the force of the weight being assisted by a loose spring around the pin D, affording, it is claimed, sufficient pressure to throw any knob. A small bolt, E, is worked by thumb-piece on the inside of the door, and when turned up in notch C in weight C effectually locks A and takes the place of an extra bolt which cannot be worked from the outside. The thumb H to lock the bolt B is a weight assisted by a coil spring inserted in the same. The manufacturers mention that the springs in this lock are not essential to the working of any part, and, being loose on the ends, cannot break or get out of place. The lock is made with an ornamental bronze front and striker, and is furnished with steel keys.

The Amidon Corner Brace.

Figs. 11 and 12, represent a brace which has recently been put on the market by Amidon & White of Buffalo, N. Y., for whom W. H. Goldey is agent in this city, at 103 Chambers street. The general form of the novelities.—Fig. 9.—The Vulcan Shutter Bolt, Bowed.

Fig. 11.—Amidon Corner Brace.

Fig. 12.—Joint in Amidon Corner Brace.
The top part of the cut-off is a raised breast with edge turned inward, into which the end of the conductor-pipe is projected. The valve is of one piece of tin, loosely hung, not soldered to the rod which operates it. This rod passes on its under side and is extended outward to the front, forming the lever for operating, as may be seen by the engraving. The rod and by it the valve are held in position by catches on

Novelties.—Fig. 13.—Richmond Rain-Water Cut-Off.

either side. The extreme simplicity of the cut-off secure ease of action, great strength and durability.

New Molder.

Messrs. Jos. O. Colladay & Bro., No. 626 Race street, Philadelphia, have recently brought out a molder built from entirely new patterns, a general view of which is afforded by Fig. 14. The manufacturers describe this machine as designed for general work in sash, door, car, cabinet and agricultural shops. It is very heavy, and is intended for working all kinds of moldings up to 6 and 7 inches wide. It is also adapted for various kinds of door and sash work. The arbors used in this machine are of steel, and carry four slotted cast-steel heads. The machine is furnished with adjustable chip breakers, pressure bars, springs and guides. Two sizes are built, known as 6 and 7 inch machines.

A New Shelf Support.

The Quincy Floor Plate and Staple Manufacturing Company, Quincy, Ill., are now introducing McMaster’s shelf support, a simple article, the use of which is indicated in the name, while its form and construction are represented in Fig. 15. Each of these shelf supports is made of sheet iron, so cut as to give four staples, 3/4 inch long, which are bent over as represented in the cut, and are intended to be driven into the wood forming the side of the cupboard or other closet in which the shelves are to be placed.

Fig. 15.—Shelf Support.

Holes are also punched in the bottom of the support, and in the staple plate, in order to secure stronger fastening where the shelf is a little too short. In favor of the utility of this article, in addition to its trifling cost, its convenience and strength are mentioned. A shelf held up with four of these supports is capable, the manufacturers inform us, of sustaining with security a quarter of a ton.

Permanent Paste.—Dissolve a teaspoonful of alum in a quart of water; when cold, stir in flour to give it the consistency of thick cream, being particular to beat up all the lamps; stir in as much powdered rosin as will lie on a ten-cent piece, and throw in half a dozen cloves, to give it a pleasant odor. Have on the fire a teacup of boiling water; pour the flour mixture into it, stirring well all the time. In a few minutes it will be of the consistency of treacle. Pour it into an earthen or china vessel; let it cool; lay a cover on and put in a cool place. When needed for use take out a portion and soften with warm water.

Fig. 16.—Set for Driving Shelf Support.

An iron paint of a recent German invention is composed of pulverized iron and linseed varnish, and is intended for covering damp walls, outer walls, and, in short, any place or vessel exposed to the action of the open air and to the weather. Should the article to be painted be exposed to frequent changes of temperature, linseed oil varnish and amber varnish are mixed with the paint intended for the first two coats, without the addition of any artificial drying medium. The first coat is applied rather thin, the second a little thicker, and the last in rather a fluid state. The paint is said to be equally adapted as weather-proof coating for wood, stone and iron; nor is it necessary to previously free the latter from rust, grease, &c., a superficial cleaning being sufficient. This paint will prove a valuable auxiliary to manufacturers.
CORRESPONDENCE.

Stairbuilding Articles.

From W. P., Carthage, Ill.—I inclose you herewith a drawing showing one method of obtaining the radius line required by "R. D. N.," in the April number of Carpenter and Building. A B is the distance between opposite center of arch, which I have examined. Accordingly, I think if "W. G. P." will kindly illustrate his tangent box and describe the mode of using it he will do a great kindness to many young joiners that have been doing such work, or trying to do it, in a modest way for about 20 years, and no doubt you will think me very green when I tell you that I never saw an experienced stairbuilder at work in my life. All that I know I have caught up from what I have seen in print; accordingly, I have been very much interested in the different articles that have been published in Carpenter and Building. The communication referred to at the outset in this letter impresses me very favorably. It struck me at first sight as being more nearly of a character I have been wishing to see than anything else that I have examined. Accordingly, I think if "W. G. P." will kindly illustrate his tangent box and describe the mode of using it he will do a great kindness to many young joiners, especially those in the West, where the conditions are such that a few common-sense hints are worth far more than volumes of technicalities.

Radius Line for Splayed Work.

From W. P., Carthage, Ill.—I inclose you herewith a drawing showing one method of obtaining the radius line required by "R. D. N.," in the April number of Carpenter and Building. E A until it intersects with a vertical line from opposite center of arch, which I have examined. Accordingly, I think if "W. G. P." will kindly illustrate his tangent box and describe the mode of using it he will do a great kindness to many young joiners, especially those in the West, where the conditions are such that a few common-sense hints are worth far more than volumes of technicalities.

A Floor Plan.

From A Carpenter's Wife, New York.—After reading the first of "Notes and Comment" in the March number of Carpenter and Building, I could not resist the temptation to send my plan of a dwelling. If it is deemed worthy of place I should be glad to have it published, and hope to have "C. N. C.," of Alpena, Mich., or some other of your many contributors, furnish an elevation or perspective view. We wish to build a house 1½ stories in height, the kitchen and coal-house to be one story.

Note.—We take pleasure in presenting the floor plan contributed by "Carpenter's Wife" herewith, and, although she has not suggested that it was open for criticism, we feel disposed to call attention to certain points in house-building which may be of benefit to this and in others; and in the hands of the owners or prospective occupants of the house are giving attention to features of plan and design. The floor plan submitted is not without its merits in point of arrangement, appointment and convenience. At the same time it is open to several objections which apply not only to it, but to many other houses that are being built in the country every year. If what we say in this case shall induce any one to avoid some of the mistakes which are made in house-building, and enable them to add to the convenience and comfort of their home, our space will have been well employed. An objection that many housekeepers would make to the floor plan referred to, notwithstanding the fact that it is intended only for a modest story and three-quarter house, is that there is but a single stairway, and that it opens directly into the sitting and dining room. This necessitates a passage through this room whenever the upper rooms are to be communicated with, and in many cases, especially in the event of sickness in the house, the necessity of so doing becomes quite embarrassing. It is hardly to be thought of in a case like this of introducing another stairway, but methods of making a single stairway less objectionable than as here drawn. One method that presents itself in this connection is that of closing in the rear porch, making it a vestibule not unlike the one in front, and opening a door through the wall that separates it from the stairway, so as to give another means of access to the chambers. It is true that the present staircases is planned with a step so placed as to make this impossible without modification; but we think that enough space could be obtained at the other end to accomplish this, while the convenience added by this little change would...
be an important consideration. As now drawn the cellar stairs, which are presum¬
ably under the chamber stairs, go down out of the dining-room and sitting-room. By moving a single door they could be made to go out of the kitchen, which would be an advantage, not only in saving steps, but also in the shape of the dining and sitting room. Instead of moving the door, a second door, a fireplace without smoking. A fireplace is intended for a definite purpose; at least it should be, for it may be made the most im¬
portant feature of the house, in its double office of heater and ventilator of the room in which it is situated. Therefore, when an architect so far forgets his calling as to sacrifice the comfort and the healthful¬
ness of a house, in order that he may ex¬
hibit his ability to produce a fancy fire¬
place therein, we think he should turn his attention to the production of pictures only, and not to the planning of fireplaces, whose limitations he does not understand. We write this because we see in almost every architectural journal that we take up, and, worse than that, find in the plans made by architects, for houses in which we are de¬
sired to place our grates, fireplaces low and wide, or fireplaces high and narrow, in which it would be impossible to make a fire that would burn without smoking. There cannot be a great disproportion between the width and height of a fireplace, if it is ex¬
pected to do perfect work.

Problem in Hip Rafters.

From J. N. H., Chattanooga, Tenn.—I have just had to deal with a problem in hip rafters, which gave me a little trouble at

method I employed. The size of building and center post, distance rafter extends over 6 inches and radius of main rafter, for you, of course, have base A B, rise B C and are A C for your main rafter. For the hip rafter, however, may serve same rise E F as for main, with a base, D E, equal to distance from center of building to corner, which can then be calculated. All other information relative to this being made for center post and extension of of rafter over plate. By dividing base A into 4 equal divisions and extending right-angle lines from the points on base until they cut arc of circle A C, and then drawing a base of hip, into the same number of equal parts and drawing lines parallel with base line from points on curve of hip, points are thus estab¬
lished on the curve for making the ordin¬
ating base of rafters into the number of parts you intend employing jack rafters, you de¬
vote the following advantage: Every point established is a point against which a jack rafter will strike, and from point A to the corresponding point on main is the length of said jack rafter. Thus, point a curve of hip is the point of contact for first jack rafter, and a is length of first jack rafter; 6 on curve of hip is point where second jack rafter will rest, and A to point on main curve cut by 6 is length of second jack rafter and thus throughout. By making your drawing to a scale of 2 or 3 inches to the foot you can give the ordinates to the curve on hip by offsets, thus: Give distance D to 1 with its offset; then D to 2 with corres¬
ponding offset, &c. I would like to have this method criticised by persons who have had more experience than I, and also to learn any other plan of obtaining the desired results.

Windmill.

From C. T. H., Waltham, Mass.—Will some of the readers of Carpentry and Building kindly give plans and description for the construction of a windmill for farm use? All other information relative to this apparatus has been published in the paper except the construction of the mill itself. I think it would be of service to the readers generally if this were now taken up and discussed practically.

Note.—We have no objections in referring the suggestion of this correspondent to our readers, and leaving them to judge for themselves how it would suit their purpose. The matter seems best under the circumstances. We remark, however, that windmill construction is much like many other things at the present time—something in which specially equipped establishments with large experience have the advantage. Hence, amateurs, however intelligent they may be, and however apt and ingenious, with windmills, as with most kinds of machinery, we think no one can afford at the present time to build for himself. We think it is cheaper and in every way more satisfactory to buy, thus securing the advantage of the experience which comes from long and successful conduct of business. Pending such discussion as our readers may see fit to give this subject we would suggest to our cor¬
respondent the propriety of writing to some of the following addresses: Andrew J. Cor¬
coran, 76 John street, New York; United States Wind Engine Company, Batavia, Ill.; Lake City Tool Company, Madison, Wis.

Proportions of Fireplaces.

From Edwin A. Jackson & Bro., New York,—In the July number of Carpentry and Building you illustrate "An English Fire¬
place," as designed by Walter Crane. It represents a fireplace perhaps 24 inches wide by 36 inches high at least, such are the relative proportions of width and height. Now, every person familiar with the subject well knows that no fire would burn in such

Railroad Buildings.

From F. A. H., Peterborough, Canada.—I desire to suggest to both the architectural and practical readers of the paper the de¬
sirability of discussing the subject of railway buildings. Personally, if I had more practice in this line of architecture, I would gladly contribute some designs. It seems to me that all must agree that this subject has be¬
come very important in various directions. Yet careful investigation seems to indicate that a large number of these stations have been given the subject careful consideration, nor have architectural works treated upon it as it should be treated. We are therefore greatly surprised that the numerous railway journals have failed to give this subject such atten¬
tion as its importance merits. There is al¬
together too much conventionality in designs of this sort as commonly erected, notwithstanding the constant outcry from the public and continual inconvenience to the public by railway officials who are obliged to occupy them. I think great improvements may be made in this line of building if the subject is carefully discussed. Among the railway buildings that I have specially in mind in making this suggestion may be mentioned passenger stations, freight sheds, engine houses, workshops, signal houses and tank houses. The construction of buildings of this class cannot be said to lie entirely in the domain of the engineer; he may contribute his proper quota in the matter of construction, but the design certainly is the province of the architect. I shall be glad to have the suggestion receive attention in *Carpentry and Building*.

**Barn Framing.**

From J. E. M., Cookport, Pa.—According to a promise made some time since, I send you part of the drawings of the framing of a barn which, if deemed suitable, I should be willing to have the opinion of my brother framers on this work. I would like to know how I could have improved on it, especially in the matter of the truss from the floor in the middle bent. The barn in question was built where timber is plentiful. I would like to hear from some one who has worked where timber is not as plentiful as in this section, and learn from him how it could be built with less material. I do not think any explanation is necessary, as the thin design certainly is the province of the architect. I shall be glad to have the suggestion receive attention in *Carpentry and Building*.

The barn is 56 x 64 feet in extent. I think any explanation is necessary, as the plan, the general scheme of which should be determined the planning of the house. Hence the architectural style of the house in some respects is insuperably connected with the style of architecture in which it is to be erected, or, conversely, the style of architecture would in some respects determine the planning of the house. Hence the impossibility of a house of the kind we have referred to being erected in any of the classic styles or in some of those styles common in modern times which by their nature should be restricted to special uses. We have no doubt that our correspondent hoped in case it were carried out to obtain the recognition of erecting a building which shall be the permanent home of the society. An architectural suggestion and its growth out of conditions peculiar to our own country; and whatever may be the architecture of the future, it will be the direct outgrowth from what has heretofore existed and is at present in existence in this way. Those who desire a comprehensive view of the subject of architecture from the earliest records down to the present time cannot do better than to purchase Gwilt's "Encyclopedia of Architecture." This work, which we have had frequent occasion to refer to in the past, contains a historical account of architecture, a description of the various styles, together with considerations of the mechanical and mathematical principles entering into building construction.

**Styles of Architecture.**

From G. L. M., Kingston, Pa.—While competitions in architectural subjects are popular, would it not be profitable to conduct a series based upon a carefully-selected floor plan, the general schemes of which should be elevations in various distinctive styles of architecture. In other words, let there be selected a set of floor plans of some well-arranged residences as a basis. Then let there be required elevations in the principal styles of architecture, both ancient and modern, each different style forming a separate competition. The object to be gained would be to show the distinctive features of architecture.

**Answer.**—If our correspondent had considered the scope of his question before he presented it we doubt if it would have reached us, at least in its present form. In order to show the absurdity of such an enterprise as he suggests, let us assume for the purpose of the question that the floor plans selected should be that of the eight-room house which has been a conspicuous feature of past competitions in this journal. Given the floor plans in question as a basis, let our readers imagine for a moment what would be produced if we should advertise for elevations of houses constructed to this plan in Babylonian, Persepolitan, Persian, Phenician, Indian, Egyptian, Chinese, Mexican, Arabian, Greekian, Roman, Byzantine and Gothic styles. Perhaps this is taking our correspondent too literally and carrying his suggestion further than he originally intended; but, restricting the suggestion to the smallest scope consistent with the terms of his proposition, it would be still absurd. The planning of a building which, if deemed suitable, I should be willing to have the opinion of my brother framers on this work. I would like to know how I could have improved on it, especially in the matter of the truss from the floor in the middle bent. The barn in question was built where timber is plentiful. I would like to hear from some one who has worked where timber is not as plentiful as in this section, and learn from him how it could be built with less material. I do not think any explanation is necessary, as the plan, the general scheme of which should be determined the planning of the house. Hence the impossibility of a house of the kind we have referred to being erected in any of the classic styles or in some of those styles common in modern times which by their nature should be restricted to special uses. We have no doubt that our correspondent hoped in case it were carried out to obtain the recognition of erecting a building which shall be the permanent home of the society. An architectural suggestion and its growth out of conditions peculiar to our own country; and whatever may be the architecture of the future, it will be the direct outgrowth from what has heretofore existed and is at present in existence in this way. Those who desire a comprehensive view of the subject of architecture from the earliest records down to the present time cannot do better than to purchase Gwilt's "Encyclopedia of Architecture." This work, which we have had frequent occasion to refer to in the past, contains a historical account of architecture, a description of the various styles, together with considerations of the mechanical and mathematical principles entering into building construction.

While we are on the subject of absurdities in architecture we may be excused for referring to a suggestion of the same kind recently made by a Southern architect to the architectural fraternity of the country. The American Institute of Architects have for some time past been considering the expediency of erecting a building which shall be the permanent home of the society. An architect, ambitious alike to hand down his own
name to fame and posterity, and to build a monument to the architecture of the past, presents a design for the proposed building to one of our contemporaries, which in its composition contains a little something of almost every style of architecture which the world has known from the beginning of history to the present time. We must say that he has been the subject of a commendable manner, and that the building, as shown in his drawings, taken as a whole, is not nearly so displeasing to the eye as one would expect under the circumstances. Yet it is an absurdity from the very nature of the case, and its elements remind one of the grotesque constructions frequently indulged in by cartoonists in the comic papers. Those of our readers who have any desire to view the architecture of the past in the light of such an effort as we have described will find many topics for conversation, and perhaps an acceptable addition to their scrap book, in the American Architect and Building News, dated January 19 of the present year.

**Building Terms.**

**Fig. 4**—Left Side Plan Vent.

**Window-sill**—The term means a horizontal piece of timber or stone at the bottom of a framed case; hence the piece closes we will define in the order in which they are used.

**Window stool** is defined by Webster as the flat piece upon which the window shits down and which corresponds to the sill of a door. The term window stool conveys the meaning of a seat, and a window seat; therefore, as the term is commonly employed, means the projection portion at the bottom of a frame which under certain circumstances might serve as a seat. It is placed above the sill, the latter being the projecting member at the bottom of the frame on the outside of the building. We believe this is the sense in which the term is commonly employed. It is committed in the architectural dictionaries to which we have referred.

**Jamb** may be defined as the side of a window, door or chimney or the vertical side of any aperture.

**Knee** or **Knee bend**, as defined by Brande, is a cone bend or slope in a curve or a gradual increase in the number of any piece of ascending or descending workmanship. The term is commonly employed in connection with hand-calling work in stairs. In its literal signification it is a spring or bound; hence any sudden rise interrupting the continuity of a slope line. It is sometimes used in the sense of a flight of steps or a line tangential to the steps.

**Apron** is a piece of timber somewhat in the form of a man's knee when bent. This term is also used in stair-building, and indicates the reverse of ramp. It means the back of the hand-rail, which is of a convex form.

**Soffit**—This term means the under side of the lintel or ceiling of an opening, the lower surface of a vault or arch. It also denotes the under horizontal surface of an architrave between columns and the under surface of the corona of a cornice. A term which in some degree is synonymous with sofit is planseer, also occasionally written plancher, which means the ceiling or the soffit of a cornice.

**Cap** is used with two distinct meanings among builders and mechanics. In one sense it means the measurement around some thing, as the girt of a building or the girt of a molding, the latter term occurs frequently where moldings are formed out of sheet metal; it is also used in the sense of a small horizontal beam or girder. The latter is a term peculiar to the United States. The term is spelled both girt and girth.

**Cap** on used among mechanics conveys several different ideas. As commonly defined in the dictionary it means a platform or flooring laid at the entrance of a canal lock on which the gates are shut. It is also used by metal workers as indicating a peculiar form of flashing—thus a tinner will speak of the flashing and counter-flashing or soffit and counter-soffit. The term is commonly employed. It conveys several different ideas. As commonly defined in the dictionary it means a platform or flooring laid at the entrance of a canal lock on which the gates are shut. It is also used by metal workers as indicating a peculiar form of flashing—thus a tinner will speak of the flashing and counter-flashing or soffit and counter-soffit.

**Flashing** is a peculiar form of flashing thus a tinner will speak of the flashing and counter-flashing. It is sometimes used in the sense of a flight of steps or a line tangential to the steps. It is sometimes used in the sense of a flight of steps or a line tangential to the steps. If time permitted, our correspondent, accompanying his former communication, he will notice that the vertical pieces are standed out below the coping and fasten disabled and enable one to use a tiner to the south on the roof in order to draw it into the houses. I trust this will meet all requirements.

**Cellar Cistern.**

From **E. H. C.**, Thomaston, Conn., we answer the inquiry of "L. L." of Richmond, Va., who desired to know how to construct a cistern in his cellar. I would advise him to build a wooden frame of the inside of the cistern wanted. Place it, say, 6 or 8 inches from the cellar wall, having first dug down into the cellar from the bottom of the cistern. Place a second frame outside of the first, allowing 1 foot of space between the two, according to the height of the cistern to be built. Fill the interior space with cobble stone, and then pour in cement made to the proper consistency to fill in between the stones. After the sides have been formed in this way the inside work may be finished. The bottom is then to be built treated in like manner. The outside woodwork may be removed or left in place as the location and convenience may require. If removed the exterior surface of the cistern can be plastered, thus making a smooth surface.

**Shrinks from Stove Patterns.**

From **F. E. O.**, Rochester, N. Y.—We shall be glad to see published in Architect and Building News, dated January 19 of the present year.

**Answer.**—We do not know of anything that treats upon the subject of "E. C. N.," as we have already given a description of the manner in which I hang the blinds referred to in a former communication. For the sake of a description, I jot the length and width of the frames with the pattern of segment. I then dress the blinds to size, allowing for the sight and the red fastens them. I next step out upon the cistern with the rod and fasten them on the casing hinges. Then I take out my scaffold and then slip the blinds into place and see for any deficiency. The next step is to fasten the covers on the sides. This being done, I proceed to the next window. Inasmuch as two persons work together at the blinds, one goes ahead at the outside, the other following on the inside. If time permitted, our correspondent, accompanying his former communication, he will notice that the vertical pieces are standed out below the coping and fasten disabled and enable one to use a tiner to the south on the roof in order to draw it into the houses. I trust this will meet all requirements.

**Cellar Cistern.**

From **W. H. C.**, Thomaston, Conn.—Answering the inquiry of "E. C. N.," we shall be glad to see published in Architect and Building News, dated January 19 of the present year.

**Answer.**—We find in Wilt's "Encyclopedia of Architecture" the following:

"There can be no doubt whatever that the defect has arisen from bad foundation, and that the failure exhibited is not long from the building was completed, because on one side, at a certain height, the columns are higher than on the other. Both of the old heads please me know me."

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**Attic Plans.**

From **D. G. E.**, St. Louis, Mo.—I think it would be a benefit if the attic plan to the design published in the January number, and also to the description in the number for June of last year, were prepared and published.

**Answer.**—This correspondent, and all others who desire more particulars with...
referred to their readers.

Drawers.

From C. W. F., Cambridge, Ohio.—I desire to learn from some practical reader of carpentry how he would proceed to slant his drawers, what size the shoulders shall be, and whether they should be of wood or metal.

Center of Gravity.

From W. P., Columbus, Ohio.—I would like to ask "If H. L. C.,"of Unfalo, who favored us some time since with a consideration of the subject of the center of gravity of various surfaces, to rise up and explain why he takes the trouble to divide his irregular triangles into concentric circles so as to find the center of gravity, when it can be done much quicker by the same general method by dividing the figure into a number of short ordinates and finding their common center of gravity. This method, by the way, is simply that of Trautwine for finding the common center of gravity of curved surfaces or more bodies. An explanation of it will be found in his "Engineer's Field Book," page 42.

From M., California.—It seems to me that the center of gravity does not stick to the subject first proposed, which was center of surface.

Joining a Wing to an Upright.

From H. B. Y., Chagrin Falls, Ohio.—I desire to inquire of the readers of Carpenter and Building the best method of joining a wing to the main body. May I add that it must be water-proof. I have tried tin flashing, also a gutter, with very indifferent success in both cases.

Workbench.

From W. W. S., Kalamazoo, Mich.—Will some practical reader of Carpenter and Building contribute a plan for the construction of a workbench suitable for patternmakers' use, or for a cabinet-maker? I want a plan of Smith's patent adjustable fastener, which is to be placed in a cellar or basement for heating apparatus is manufactured by the New England Machine Company. A new building is to be erected, which will cost $30,000. The structure will be of brick, three stories in height, has been recently completed at Sioux Falls, Dak. The structure is 70 x 100 feet in plan, and contains 100 sleeping rooms for male inmates. The structure will be fire-proof in every respect, even to the basement and first two stories, which will be entirely impervious to heat or flame, and the upper stories will be faced with the best quality of clinker rock-rising. This form of heating apparatus is manufactured by the New York Central Iron Works of Geneva, N. Y.

MIXES, BUTLER & CONSTANT, with offices at 15 Warren street, New York City, have lately taken the agency for Gorman's foldable, adjustable extension scaffold, which was fully illustrated and described some time since in this journal. Building contractors of the west should see at the company's rooms on Warren street.

The Kansas City Corrugated Iron and Ventilating Company, Kansas City, Mo., have sent us an old pamphlet illustrating their specialties. Corrugated iron as put up by this company is held in place by the use of Smith's patent adjustable fastener, which has the advantage of permitting the sheets to be removed for repairing or other purposes whenever required. Smith's patent ventilators and chimney-caps are also illustrated in the pamphlet a number of designs of galvanized cornices and window-caps are presented.

The Scraper Roofing and Corrugating Company of St. Paul, Minn., have one of the most complete establishments in the Northwest, and probably in the country at large. In addition to their fine wrought-iron work, including Haynes's skylights this company also manufacture corrugated iron and an excellent article in the way of fire-proof shutters. The same is made in the most durable, serviceable material, and can be used in slate, asphalt, and pitch and gravel roofing.

STRAY CHIPS.

A RESIDENCE for the president of the university is in course of construction at Boulder, Col., from plans furnished by W. L. Frelinghuysen, of New York, and the structure will cost, when completed, about $7000. Two story brick, 12 x 24, and the use of the students is also going up—one from plans furnished by J. G. With, of Denver, to cost $4000, and the other from plans by Steiner & Varian, also of Denver, to cost $8000. Mr. Frelinghuysen was superintendent for the improvements for the.

On very corner of Fifteenth and F streets, Wash¬


ginon, D. C., the Washington Light Infantry Corps has lately commenced the erection of a building containing a gymnasium and baths. The total cost of the structure is estimated at $125,000. Messrs. Gray & Page are the architects, and Mr. B. Macaulay the builder.

Mr. G. L. VRWICKEL, of Brockport, Mass., is erecting a building for the use of his firm, which is to contain three stories in height, which will be occupied as a manufact¬

urying offices, and contains over 1500 working tables in all classes in all respects, steam being used for power heating. The front of this building is in charge of Mr. G. L. Ward of that place.

Work has lately commenced on the Colby block, situated at the corner of the 15th and 18th streets, Milwaukee, Wis. The building will have a frontage of 75 feet on the 15th street and 100 feet in street of the Washington Light Infantry Corps is in course of construc¬

tion. A new building is to be erected, which will cost $30,000. The structure will be of brick, four stories in height, and contains 100 sleeping rooms.

Mr. C. L. G. L. CHANCEY has furnished us plans for the hospital building in course of erection, on Baltimore street, between Lloyd and Easter streets, Baltimore. The structure is 15 x 100 feet in length, four stories in height, with a basement.

Mr. C. B. B. H. H. LEIGHTON is erecting a two-story and basement residence, which will cost $15,000. W. G. Copeland is the architect.

A HOTEL BUILDING, known as "The Commercial," is recently completed at Sioux Falls, Dak. The structure is 30 x 100 feet in plan, and contains over 150 rooms in the hotel and apartments. The cost was $8000. W. L. Davenport is the architect.

At Brockton, Cal., Mr. C. Bellin is erecting a two-story and basement residence for Mr. W. G. Copeland the architect.

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ARTISTIC HEATING STOVES.—THE "ART WESTMINSTER."—RATHBONE, SARD & CO., ALBANY, N. Y.
Artistic Heating Stoves.

While the furnishing and decorations of rooms in homes of moderate cost are seldom considered as belonging to the architect's work, he is frequently called upon for assistance specifically included in his contract. It is hardly necessary, however, to bring forward arguments in support of the broad proposition that architects and builders should keep thoroughly informed upon all matters of furnishing, as well as upon those more desirable forms of heating stoves now before the public, although such a topic at first thought may seem somewhat outside of the nominal field of this journal, we shall be laying before our readers information which in many cases can be turned to practical account at once. Until recently it has been the reproach of the stove trade of the country that, no matter how meritorious our stoves have been as heaters, nothing has been available which, by reason of its artistic features, was desirable or of design and construction. The advantages accruing from the pursuit of a liberal policy of this kind must be self-evident to all who give the subject a moment's reflection. Accordingly, in devoting space at this time to a consideration of some of the
even unobjectionable for use in a well-appointed parlor or library. The round or "pump-log" base-burner, loaded with nickel and meretricious ornaments, is an example in point, and illustrates at once both the best and the worst, and also about all that has been available. The production of some stoves which in their designs are not only unobjectionable from a critical point of view, but, in fact, are of real art excellence, and which at the same time are among the best of heaters, becomes a matter of wide interest and importance.

For a number of years past the open fireplace has not only been fashionable in the appointments of all rooms the furnishing of which have had any claim to being in good taste or artistic, but it has been the only form of heating apparatus which could be obtained of a style and character to harmonize with fine furniture, handsome walls and rich carpets and upholstery. The open fireplace, whatever may be urged in its favor from sanitary considerations, has seldom been an economical success as a heater. Housekeepers have always found it a dirty adjunct, damaging by its dust such articles as carpets, furniture and paintings to many times its value in a very short period of time. They have submitted to the infliction because an open fireplace was the proper thing to have, and because no other form of heating apparatus which in itself would constitute part of the furnishing of a room or harmonize with artistic furnishings was available. Steam heat and furnace heat cannot be used with artistic furnishings was available. The production of some stoves which in their designs are not only unobjectionable from a critical point of view, but, in fact, are of real art excellence, and which at the same time are among the best of heaters, becomes a matter of wide interest and importance.

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treat only one of them, the "Art Westminster," which is shown on our first plate, and the "Franklin" stove, which is also shown on our first plate. While the success of the first square stove, in account of its artistic excellence, indicated competition, as has already been mentioned, on this high plane, the popularity of the square stove with the general public favors its future. It must be made without reference to art features. Accordingly, it becomes necessary to remind our readers that all square stoves are by no means art stoves, and that careful discrimination in selection is necessary. The ornaments with reference to the stoves illustrated hereinafter will be of interest. The "Art Westminster," which is shown on our first plate, is made by Rutland, Sard & Co., Albany, N. Y. It may be described as a square, low-heated, narrow, and with a round fire-place. It is well proportioned in its working parts and makes no departure from the shapes and relation of parts which experience has shown to be conducive to the most satisfactory results in operation. In point of utility it leaves nothing to be desired which can reasonably be expected of a magazine stove. As a work of art it is rich without being too ornate. The parts taken together keep its proper place in the design, and there is no slighting of details in one part to enhance the beauty of another part. The ornamentation is honestly carried out in every part. The plates in the back are as carefully and conscientiously enriched with ornamentation as those of the front. The only bright metal about the stove is that of the hinges on the top, the opening and closing of the grate and the draft slide, and the foot-rails, all of which are in brass and are appropriate to the position of the metal. There is no gaudiness of any kind. The beauty of any piece of work is but indifferently conveyed by a photograph of the stove, as well as by the other works, needs to be seen to be fully appreciated.

The "Ideal," which is shown in our second illustration, has been before the public for some time. It has, however, undergone some modifications since it was first introduced, and as put upon the market the present season is superior to the earlier forms. In its general effect it still adheres quite closely to the original idea, which, as we have stated, was successfully revolutionary in character. The "Ideal" is made by the Magee Furnace Company, Boston, Mass., and in general features is of the same character as those of the "Art Westminster." The "Franklin" stove is a thoroughly practical stove as well as a beautiful stove. The design of the "Franklin" has been ever done in cast iron. It is rich without being at any point obtrusive, and its workmanship is of the highest. As a heater its utility has been satisfactorily demonstrated by the practical test of the thousands which have been sold for the past three years. Our third illustration shows a stove of another class, but which also combines artistic features with practical utility. The "Hub Franklin," made by the Smith & Anthony Stove Company, in addition to the Franklin stove we illustrate, makes a square stove of great square art, which is one of its great excellencies. While the success of the first square stove, in account of its artistic excellence, indicated competition, as has already been mentioned, on this high plane, the popularity of the square stove with the general public favors its future. It must be made without reference to art features. Accordingly, it becomes necessary to remind our readers that all square stoves are by no means art stoves, and that careful discrimination in selection is necessary. The ornaments with reference to the stoves illustrated hereinafter will be of interest. The "Hub Franklin," made by the Smith & Anthony Stove Company, in addition to the Franklin stove we illustrate, makes a square stove of great square art, which is one of its great excellencies.
$1500 Frame House.

We submit herewith the third of the three successful plans in our Fourteenth Competition. The present design, the one published in our August issue, and the one shown in our number for May, received equal prizes. The author of the design here shown is Mr. D. S. Hopkins, Grand Rapids, Mich. The floor plan has several features to commend it. The parlor is large and capacious, and the corner bay window gives it an abundance of light. The reception hall is also conveniently arranged both in itself and with reference to the other rooms. The stairs, it will be seen, are so constructed as to make one flight serve the double purpose of front and back stairs. In this particular Mr. Hopkins's floor plan in some respects resembles that of Mr. Williams, which was presented in our August number. The resemblance, however, is only in general features, for the details are sufficiently different to mark the individuality of the two designers. Mr. Hopkins has brought all his chimney flues to the center of the house, so as to make a single stack answer. The following particulars with reference to construction are derived from concise specifications which accompanied the design in the competition:

- The chimney is to be provided with an ash pit base in the cellar, and is to be planned for the use of a furnace, the flue for the latter to extend to the bottom of cellar. The entire finish of first and second floors is to be of lath and plaster, two-coat, hard-finish work. The framing of the building is to be in the balloon style, the sills to be 6 x 8 inches and the joists to be of pine and worked as indicated by the detail drawings. The rail, balusters, &c., of stairs to be of pine, cherry-stained and finished in oil. The principal features in this design to which the architect directs attention embrace, among others, compactness of floor plan and convenience of arrangement.

- The windows are to be hung with weights throughout and glazed with first-quality American glass. The interior trimmings are derived from concise specifications which accompanied the design in the competition.

- The windows are to be hung with weights throughout and glazed with first-quality American glass. The interior trimmings are derived from concise specifications which accompanied the design in the competition.

- Tide of materials furnished by author:
  - 75 yards excavating.
  - 63 perch of stonework laid in wall.
  - 6300 brick laid in chimney and wall.
  - 35 yards cellar bottom cementing.
  - 600 feet common lumber, frame.
  - 3000 feet roofing and sheathing.
  - 10,000 shingles.
  - 2000 feet 4-inch siding.
  - 2000 feet finishing lumber.
  - 16 doors complete.
  - 17 window's complete.
  - 3 cellar windows complete.
  - 2 attic window's complete.
  - Front stairs, open and boxed.
  - Cellar stairs.
  - Mantel and grate.
  - Hardware.
  - Carpenter-work.
  - Tinwork.
  - Painting.
  - Architect's services.

A more detailed estimate of materials can be readily made from the drawings submitted herewith.
### TRADE PUBLICATIONS

**Boston Terra-Cotta Company.**

The Boston Terra-Cotta Company, with offices at 304 Federal street, Boston, have sent us Part 5 of their catalogue. The book is handsomely gotten up, with red edges, bound in cloth, and displays much taste in its compilation. It contains something over 100 pages, with nearly 50 full-page plates, including some that fold. The representations of terra-cotta work are printed in terra-cotta color, thus closely imitating the appearance of the work itself. The designs have been prepared with great care, and the variety shown is much larger than is usually found in works of this kind. In addition to the usual lines of work made in terra-cotta some mantel and fireplace trimmings are shown. Much of the work presented has the merit of being reproduced from designs executed to order, and contains information of the parts in the company's stock. The work forms a very desirable addition to the library of any architect or master builder. Near the close of the book several plates are introduced showing general views of buildings which have been trimmed with terra-cotta manufactured by this firm. Among those may be mentioned the new Cotton Exchange, Memphis, Tenn.; the New York Casino building; the new Pension Bureau, Washington. A price list supplements the designs, and a list of buildings with the names of the architects, on which this company's work has been used is presented, the latter occupying no less than eight pages. The frontispiece contains a front view and section of the special terra-cotta kilns used by this company. The second illustration in the book is a general view of the offices and studios of the company in Boston. The building shown displays in a satisfactory manner the application of terra-cotta to building construction.

### Steam Heaters

We are in receipt of the catalogue of the Pierce Steam Heating Company. The general office and boiler works of this company are at Buffalo, N. Y., while the foundry is at Westfield, Mass. The company are the manufacturers of J. B. Pierce's wrought-iron tubular steam heater and the "Excelsior" direct and indirect radiators. Several cuts are presented; one shows the steam heater with mason-work complete, another the same with direct and indirect radiators. Several cuts are also given. The radiator, both direct and indirect, are clearly presented and price lists are also given. A number of references and testimonials are presented at the end of the book.

#### The Distribution of Steam in Cities.

The experiments connected with the work of supplying steam in cities for manufacturing purposes and for domestic use have been watched with great interest. Almost everyone knows that the work of the New York Steam Company has been attended with success, but very few have an adequate idea of just what has been accomplished. For the purpose of indicating the magnitude of the work, and showing just what has been done, we present on page 172 a map in which the steam mains and buildings using steam from them are indicated.

The New York Steam Company, after two years spent in making plans and trying experiments in expansion joints and in non-conducting materials, began building their first boiler station in the summer of 1881, and commenced laying street mains in September, 1881. The company now have their boiler station (II) on Greenwich street, above Cortlandt, in this city (a building 75 x 100 feet on the ground, with a basement and three stories complete, and the fourth story covered by a temporary roof), containing 31 Babcock & Wilcox 250-horse-power boilers, of which there are on the first floor, 14 on the second floor 12 and on the third fl or 15. The fourth floor contains the coal-bins, the coal being hoisted in cars, upon a platform hoist, and descending in chutes to the floor, alongside each boiler. The building is designed to be six stories or 120 feet in height above the basement, and is to contain 64 boilers of 250 horse-power each, 16 on each of the first three floors, and six on the fourth. The company have prepared a catalogue of the parts of such stations, which are at Buffalo, N. Y., while the foundry is in the city of New York, which contains over 250 miles of paved streets, and the company now own the property for 10 boiler stations, distributed on both sides of the city, from near the foot of Broad street to Fifty-sixth street. The system of mains consists of a steam main of 6 inches to 16 inches diameter, and return-water main of 2 1/2 to 8 inches diameter, the former laid between brick walls and surrounded by 6 inches to 12 inches of mineral wool, and the latter laid in hollow logs, with a space of 3 inches around the pipes also filled with mineral wool.

The pipes are laid with an anchorage every 90 to 100 feet, and a double expansion joint midway between the anchorages, or with an anchorage and single expansion joint every 45 to 50 feet. The expansion joint of the diaphragm style, invented by Mr. Emery

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**Details of Stairs.**

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<tr>
<th>Size</th>
<th>Scale, 1/2 Inch to the Foot</th>
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**Steam mains.**

<table>
<thead>
<tr>
<th>Size</th>
<th>Feet</th>
<th>Return-water mains</th>
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<table>
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<tr>
<th>Size</th>
<th>Feet</th>
<th>Return-water mains</th>
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**Total.**

<table>
<thead>
<tr>
<th>Size</th>
<th>Feet</th>
<th>Return-water mains</th>
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**Or 4.42 miles of steam mains, and 4.14 miles of return mains—in all, 8.56 miles of pipes, exclusive of service-pipes.**

The most distant point to which steam is now deliver-
Steam distribution has been successful in accounting for the success of the company. The system of steam distribution invented by Birdstill Holley, M. E., has been in successful operation in Lockport, N. Y., for heating only, for seven years. The company have 4½ miles of mains, six 75-horse-power boilers, and supply over 200 consumers. During the first four years it was operated without meters at a loss. When meters were adopted three boilers were sufficient to supply the customers who formerly required the steam from six. The capital of the company is $50,000, and they are earning net 20 to 25 per cent, per annum. The largest main is 4 inches in diameter, and the pressure carried is 30 to 35 pounds. In Springfield, Mass., the system has been in use for five winters, for heating only. The company have 2½ miles of mains and eight 75-horse-power boilers. The pressure carried is 20 to 40 pounds. The company have 196 consumers, and, on an investment of $50,000, have earned net 12 to 15 per cent, per annum since the second year. The steam is sold by meter, and readings are taken weekly. In Dubuque, Iowa, the system has been in operation for five winters, with 2½ miles of mains, and seven 50-horse-power boilers. The company are supplying 250 horse-power of steam to 120 consumers, for heating purposes only. The plant was constructed too cheaply, and has not been a financial success. It is now earning a small surplus, and consumers are all delighted with the service. In Denver, Col., the system has been in use during four years, for heating only. The company have nearly 3 miles of 8, 6, 4, and 3 inch mains, and 12 50-horse-power boilers, supplying 190 consumers. Upon an investment of $50,000 the company earned net, during the season of 1882-83, $760, or 5½ per cent, and the net savings for the season of 1883-84 were estimated at $10,000, or 6½ per cent.

In Hartford, Conn., a steam plant has been in operation during four years, for heating only. The company have nearly 2 miles of 6-inch, 4-inch and 3-inch mains and 20 80-horse-power boilers. This company carry 60 pounds pressure, and supply 150 consumers, principally for heating. The plant was poorly constructed upon plans designed to evade the Holley patents, and has not been profitable, but is paying expenses and improving in its results.

In Lynn, Mass., a "duplex system" was put in operation in February, 1881, and was run until July, 1883. This plant had a high-pressure main in which 70 pounds pressure was carried, and a low-pressure main carrying 20 pounds, the former being used for power and the latter for heating. I personally examined this plant in October, 1881, and again in June, 1882, and found it working successfully and giving great satisfaction to its customers for power, the only ones then using the steam. The plant was poorly constructed, the boiler-house was badly located, and the company failed financially.
and in July, 1883, the plant was sold to a company, to be used for the distribution of water-gas. It has been so used during the heating season just ending, with a less favorable result than was reached by the steam. The plant was constructed on the "duplex plan," and during the first season furnished both power and heat, but during the past season it has furnished 500 horse-power of steam to 80 consumers, for heating only. The have been in operation from three to four years, but I have no definite information as to their results.

In Milwaukee, Wis., a plant was constructed and operated during two winters,
ties to the main shaft. The form of these it may be blowing, and at least one of lator causes it to be. favorably influ¬enced by the wind in whatever direction openings which occur behind the shields. the same general finish is continued around the appearance. The upper edges of the shaft are brought together and fastened by rivet¬ting are provided, both of which can be ad¬ justed true parts are well fitted and adjusted true

The Clover Leaf Ventilator.

Among the recent additions to the styles of ventilators before the public is what is known as the “Clover Leaf” ventilator, manufactured by E. Van Noorden & Co., No. 357 Harrison avenue, Boston. Fig. 1 affords a fair idea of the device. It will be seen that it is simple in its parts, and of such a character as to be readily con¬ structed in a substantial manner. The pipe or shaft at its upper extremity is so formed as to present three openings at the sides, and each in turn is faced by a segmental shield that is fastened at its lower extremi¬ ties to the main shaft. The form of these shields is such as to permit a bead being run around their edges, thus greatly stiffen¬ning them, as well as adding to their general appearance. The upper edges of the shaft are brought together and fastened by rivet¬ing with an extra piece of metal, and the

this ventilator is very satisfactory for use in curing smoky chimneys, since by the pecu¬ liar arrangement of parts a downward wind creates an up draft in the flue.

Fig. 3 shows a new saw set just being brought to the attention of the trade by Messrs. E. C. Atkins & Co., of Indianapolis, Ind. It consists of a vertical bar having a lower wedge-shaped end or point that is driven into a log or other suitable support. The upper end of this upright bar forms an anvil to support the saw, and is beveled in a suitable manner to give to the saw teeth the inclination required. At one side of the anvil bar, near the top of it, projects a hori¬ zontal arm, as shown in the cut, the end of which is perforated for the passage of a thumb-screw. A yoke projects obliquely from one side of this arm and carries at its upper end a thumb-screw which projects downward immediately below the screw on the lower arm and acts in connection there¬ with as a guide to regulate the degree of set. The saw is passed between these screws and laid upon the anvil with its teeth projecting over the bevel on the same, in which posi¬ tion it is held at any desired angle by means of the adjustment of the thumb-screws, so that it may be readily passed along while the requisite degree of set is imparted to the teeth by means of a hammer in the usual manner.

Plains and Encaustic Tile.

We have lately been much interested in examining a large line of samples of plain and encaustic tiles manufactured by the Star Encaustic Tile Company, of Pittsburgh. This concern was established about 30 years ago, and after a varied experience, was reorganized under the present name and management in 1882. Since the reorganization, the company has doubled the capacity of their works and are now prepared to turn out about 200,000 square feet of tiles per annum. For the present they are confining their attention to the manufacture of unglazed tiles for floors, &c., in halls, vestibules, churches, depots, banks, &c. These tiles have been extremely well received, and are admirable in design and color, comparing favorably with the best imported tiles of the same class. In fact, nothing better in the way of tiles for floors, hearths, bath-room linings, &c., has ever been made. They are sharp, true, uni¬ form in size, even in color, hard, strong and exceptionally admirable. The company are looking forward with satisfaction to the in¬ trduction of natural gas into their works, as it will give them a fuel for fixing their kilns which will be cheap, perfectly control¬ able, and free from all the objections which have been found by experience in¬ separable from soft coal. The company ex¬ pect ultimately to employ their manufac¬ turer of art tiles, but for the present the de¬ mand for encaustic tiles is sufficient to peducibly employ their manufac¬ turer to bring this branch to the highest perfection before undertaking a different class of work. In this we think they are wise. The mar¬ ket for art tiles is pretty well supplied, but there is a chance for profitable success in

same general finish is continued around the openings which occur behind the shields. The triangular character of the venti¬ lator causes it to be favorably influ¬ enced by the wind in whatever direction it may be blowing, and at least one of to heavy segment bars to prevent warping. We understand from the manufacturer, however, that, when so ordered, an iron table is furnished with a hardwood center-piece. The manufacturer states that all the parts are well fitted and adjusted true and square. The arbor runs in self-oiling boxes, and is nicely fitted with means of taking up end motion.

The Atkins Adjustable Saw Set.

Frank H. Clements, Rochester, N. Y., is introducing a new design for a small cut-off and splitting saw bench, suitable for use in pattern shops, carpenter shops, furniture factories, car works and in all other wood shops where light and accurate work is done. The general appearance of the bench is clearly indicated in Fig. 2 of the engravings. The table rises and falls, in a direct line, 5 inches. It is moved by means of the large hand-wheel and screw shown in the cut. The table also tilts to saw beveling, and swins upon trunnions, thus permitting of the removal of saws and the oiling of bear¬ ings. Iron gauges for cutting off and slit¬ ting are provided, both of which can be ad¬ justed to any angle up to 45°. With this machine ordinarily a hardwood table is furnished, glued up in strips and bolted fast
Improved Cabinet Scraper.

Samuel C. Tatum & Co., Cincinnati, Ohio, are introducing to the trade the cabinet scraper represented in Fig. 4. As will be seen from the illustration, the blade is held in an iron frame provided with convenient handles, the scraper having a clamping device so constructed that the blade is not only held near the top by a cam movement, but is clamped immediately at the cutting edge, so that there is no opportunity for any spring or chatter if the proper feed is used. This is accomplished by a contervice by which the motion of an eccentric clamp not only securely fastens the blade at the point at which it presses upon it, but also at the same time draws together the jaws, which hold the blade, close to the cutting edge. There being no screws to loosen, the adjustment is effected very easily and rapidly. In operation the face shown in the cut is on the side away from the operator, whose thumbs are placed on the fixed framework against which the blade is compressed, and the scraper is pushed from him. To set the blade after inserting it through the bottom, the holder is to be placed on a level board or counter. When pressing the blade against the counter the eccentric clamp will fasten it securely. The manufacturers add that if this does not give sufficient set the blade may be tapped slightly with a hammer until it projects the requisite distance. The width of the cutter is 2½ inches, and the length and the whole tool 11 inches. The manufacturers put this implement on the market with great confidence that it will work right up to an edge, and in other places where an ordinary scraper cannot be made to do satisfactory work.

Adjustable Iron Planes.

By means of Figs. 5 and 6 the general appearance and construction of Steer's adjustable iron planes are shown. The special features embodied in these tools, which are being introduced to the trade by W. A. Ives & Co., New Haven, Conn., whose New York office is at 88 Chambers street, will be noticed in the accompanying illustrations. This ingenius tool, the invention of H. L. Pratt, the president of the company, consists of three parts— the handle, Fig. 8; the bit, Fig. 9, and the points, Fig. 10. The handle Fig. 5.—Steer's Adjustable Iron Planes.

Fig. 6.—Bottom View of Steer's Iron Plane.

Fig. 7.—The New Haven Bit Brace.

Fig. 7.—The New Haven Bit Brace.

Fig. 8 and 9.—Handle and Bit of Pratt's Multiform Screw--driver.

Fig. 10.—Screw-Drive Point.

Carpentry and Building.

Norvelties.—Fig. 4.—New Cabinet Scraper.

Steer's Adjustable Iron Planes.

The method of fastening the cutter in the plane, which does away with the heavy short irons used in some planes, and makes it possible to use a heavier cutting-iron, thereby avoiding chattering and enabling the user to adjust the cutter with facility and exactness. A third improvement consists of the method of adjusting the cap iron, by which the cap can be removed and re-

The bottom of the plane is made in composite form, as shown in Fig. 6. The metal is inlaid with rosewood strips finely dovetailed, and so combined as to prevent the wood from wearing away. This improvement overcomes the very common objection to iron planes, namely, the clinging of the plane to the work when in use. A second improvement is followed: The bottom of the plane is made in composite form, as shown in Fig. 6. The metal is inlaid with rosewood strips finely dovetailed, and so combined as to prevent the wood from wearing away. This improvement overcomes the very common objection to iron planes, namely, the clinging of the plane to the work when in use. A second improvement is

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Carpentry and Building.

Norvelties.—Fig. 4.—New Cabinet Scraper.
flush with the door frame, the casing for the movable part of the bolt projecting somewhat beyond the plane of the door. The striking-plate, which is simply a rectangular piece of metal, is secured to the face of the door by the slotted lines in Fig. 12, the bolt piece, which is pivoted through the center, as shown in the cut. Fastened to the bolt piece is a spiral spring which at every quarter revolution draws it into the slot until it rests in recesses at the back or bottom of the slot, in which position it is impossible to rotate it. In unfastening the bolt, as shown by the slotted lines in Fig. 12, the bolt piece is first pulled directly out for a short distance and given a quarter revolution, when on releasing it the spiral spring draws it into its seat. The bolts are made of bronze and brass iron. H. J. Brainerd, No. 125 Chambers street, New York, is agent in this city.

The Acme Sash Lock and Balance.
A new form of sash lock and balance, made by the Acme Lock Company, Newark, is directed to the length of the escutcheon of the lock a simple auger hole as being such that there is no danger while it is being bored into the wood to compare growth from year to year, the heavens, and when the trees are clothed with living green, so as to cast a dense shadow. To many whom this idea may not be best effected in the summer, when the sun will be at an exact angle of 45°. Measurements of this character could be best effected in the summer, when the sun is powerful, has reached to a good height in the heavens, and when the trees are clothed with living green, so as to cast a dense shadow. To many whom this idea may not have occurred, it might be made annually a matter of interest thus on warm summer days to take the heights of prominent trees, and to compare growth from year to year,
How to Make a Cheap Lathe.—YII.

**MISCELLANEOUS DETAILS.**

We left, it will be remembered, our headstock and poppet screws completely fitted, with the exception of the tightening screws, which are to hold them down upon the bed. The headstock and poppet screws get two pieces of 3/4-inch round iron, 6 inches long, and screw about 1 1/2 inches inward from each end, turning stock and dies (Fig. 48). Screw one end of each tightly into its respective casting, either by holding the 3/4-inch rod in the vise jaws, and twisting the headstock round upon it, or by turning the rod with a pair of small gas tongs. For the rest a piece of 3/4-inch rod having a T-shaped head and a square shoulder forged at its end will be necessary (Fig. 47)

Three tightening nuts will be required, being either large wing nuts, or shaped as figured and made of cast iron (Fig. 48). For the pattern, cut the looped portion out of a bit of hardwood, turn the boss and fit on. Leave the hole to be drilled in preference to coring it out. At the same time make a pattern for the washer (Fig. 49), one casting from each end, as in the headstock (Fig. 50), to receive the dead-centers, and screw them up moderately tight into the countersunk ends of the crank-axle.

For the treadle-bar get a piece of 3/4-inch gas-tubing, 4 feet long, and either skin the lathe or file the ends to a fairly decent surface. Drill a 3/4-inch hole through the bosses of these, grinding both bar and bearing together with a little fine emery and oil at the finish will facilitate the easy motion of the bar. We want to keep the bar in position endways. A couple of collars furnish the readiest method of doing so. Turn two metal rings, 1 inch in the hole, 1 inch long by 3/4 inch thick, or simply two pieces 1 inch long, cut from 1-inch gas-pipe, will answer the purpose sufficiently well. Into each of these collars tap a 1 1/2-inch set-screw, by which to hold them in position on the bar. Drill two holes in each bearing for wood screws, slip the bearings over the ends of the bar, and screw in position on standards, Fig. 57. Now, temporarily slipping one of the end bearings off, take out the bar again, and fit to it the carriers for the treadle board. Cast a 3/4-inch hole through the bosses of these, and they ought to fit just tight over the 3/4-inch gas-tube without much filing. We must cut a keyway in each boss, 3/4 inch wide by 3/4 inch deep, and make keys to correspond; also flats on the treadle-bar. Drill, besides, a couple of holes for wood screw for fixing the treadle-board; then key up, and screw on the treadle, now complete, has the appearance of Fig. 55. Have the connecting-rod forged to dimensions (Fig. 56). Fig. up a chain and wheel if you prefer it; but the rod is easier made, and answers well enough. Loop the rod into a 3/4-inch eye-bolt, let into the treadle-board, having a washer between the nut and the wood (Fig. 60). We may now consider the actual lathe as finished. For driving, get a piece of leather belting at a saddler's, 3/4 inch or 1 inch wide by 8 feet 9 inches long, and fasten at the ends with a common hand-screw, Nos. 1 or 2. In a foot lathe, the removal of the strap from one speed to another is not so often necessary as is one driven by steam-power, because the speed can be regulated within a wide range by the foot of the individual who is treading. Hence, our driving-wheel of one speed only will seldom put us to the inconvenience of having to alter the length of strap. Then, however, the adjustment can be effected in a few seconds by removing the screw from one pair of holes to the other (Fig. 62).

A tool-rack is a convenient accessory to a lathe. Prepare two strips of wood 4 feet long by 1 inch by 3/4 inch, and screw them to the vertical strips 6 inches by 1 inch by 8 feet 9 inches long, at a saddler's, inch or 1 inch wide by 8 feet 9 inches long, and fasten at the ends with a common hand-screw, Nos. 1 or 2. A tool-board also, 4 feet by 9 inches by 3/4 inch, screwed on the top edges of the standards, receives the tools and tools and ends of material which we have in use when working at the lathe. In counting the cost, let it be noted that prices will vary, and the experience of no two persons will be exactly alike. But the figures we state will be found approximately correct. The crank is the most expensive item. A piece of 3/4-inch round bar iron 4 feet long will weigh the most expensive item. A piece of 3/4-inch round bar iron 4 feet long will weigh
16½ pounds, which, at 4 cents per pound, will cost 95 cents. A smith will forge it for, say, 75 cents. Then poppet, mundane screws, bolts, dead-centers for crank, nuts, should not cost more than 15 cents. Another 50 cents will pay for the three cast-iron washers and tightening nuts, and the strap washers and tightening nuts, and the strap should not cost more than $1.25. Another screw, bolts, dead-centers for crank, nuts, washers and tightening nuts, and the strap should not cost more than $1.25. Another screw, bolts, dead-centers for crank, nuts, washers and tightening nuts, and the strap should not cost more than $1.25. Another screw, bolts, dead-centers for crank, nuts, washers and tightening nuts, and the strap should not cost more than $1.25. Another screw, bolts, dead-centers for crank, nuts, washers and tightening nuts, and the strap should not cost more than $1.25. Another screw, bolts, dead-centers for crank, nuts, washers and tightening nuts, and the strap should not cost more than $1.25. Another screw, bolts, dead-centers for crank, nuts, washers and tightening nuts, and the strap should not cost more than $1.25. Another screw, bolts, dead-centers for crank, nuts, washers and tightening nuts, and the strap should not cost more than $1.25.

How to Make a Cheap Lathe.—Fig. 55.—Position of Dead-Centers for Crank Axes in Middle Rails of Standards.

at 6 cents per foot will run to about 60 cents. The bit of timber for tool-board, rack, and lathe, about 25 cents per foot, 30 cents. Total, about $1. This supposes that every little bit of wood and metal has to be bought; but odds and ends of worn-out bars and strips of wood may often be had for the asking, and waste maerial may often be utilized.

NOTES AND COMMENTS.

In the death of Samuel Sloan, of Phila-delphia, which occurred in the latter part of July, at Raleigh, N. C., the architectu-ral profession lost one of its most useful members, and a man who in his day contributed in practically work and as an author more, perhaps, than any other architect of the United States. He was born in Chester County, Pa., in 1815. It commenced the study of architecture at an early age, and soon achieved an em- inence that distinguished him throughout his life. A specialty with him in late years was public buildings, particularly insane asylums, and of the latter he designed no less than 32. He pro-jected and edited one of the first architectural building papers in the United States. It was called the Architectural Review and Builders' Journal, and it commenced in 1858. It was discontinued two years later, partly on account of lack of patronage (for the building public which read at that time was far less in numbers than at present), and partly because the professional work of its editor gave him little time for literary matters. However this work was received at the time it was issued, there is hardly an architectural library in the country at present that does not contain one or both volumes of this pioneer periodical. Mr. Sloan was also the author of a number of books on architecture, most of which have had a considerable sale. Among these may be mentioned the "Model Architect," "Construc-utive Architecture," "City and Suburban Architecture," and "Homestead Architecture." Mr. Sloan continued in active life up to within a short pe- riod of his death. Among recent work may be mentioned the plans for the Western Insane Asylum, at Morgantown, N. C., and the State Exposi-tion Building, Pennsyl- vania. "The American Ar-chitect and Building News," in noticing Mr. Sloan's death, says: "Although belonging, like other archi-tects who began busi- ness 50 years ago, to a school which has ceased to excite commotion in the artistic world, Mr. Sloan was one of the most distin-guished of that school, and his career, in activity and usefulness, was one which the ablest of the younger generation is un-der the country owe something of their knowledge to the excellent books in which he sought to convey to others the results of his experience, and he deserves the credit of having been one of the first persons in this country to perceive the deficiency in technical literature which he afterward en-davored to supply by the publication of his "Architectural Review and Builders' Journal."

Apropos of the description of the Cradock mansion, which appeared in our issue for August, it may be mentioned that one of the daily papers has been searching for the oldest house in America, irre-spective of its present condi-tion. One of its correspond-ents declares that the Fair-hank's house in Deadshorn, Mass., built in 1686, is the oldest in the country. This is contradicted by a cor-respondent writing from Hanson, Mass., who gives the following particulars: "In the year 1682 two men by the name of Barkers started from Plymouth on a prospect-ing tour, and finding in Pembroke, Mass., what they considered a suitable spot, they

The excellent work published by the Cincin-nati School of Design, to which we have directed our readers' attention in the past, is evidence of the advantage of having a com-petent instructor.

At least two articles which appear in this number of Carpentry and Building are some-what outside of the usual lines which are observed in papers relating to house building. We refer to the description of "Steam Heating in Cities," and our first article, on 

Carpentry and Building.
"Artistic Heating Stoves." New methods and new styles are continually superseding old, and every architect and builder who desires to keep abreast of the times finds it necessary to read up in many directions - w4ade of the beaten lines of his profession or trade. Accordingly, in presenting the two articles named we undoubtedly meet a well-defined want. Our article on heating stoves is timely, for it will reach our readers just prior to the time that selections of heating apparatus are very generally made in preparation for a winter season. Advice is very frequently solicited from architects, builders and superintendents about stoves, as well as with reference to grates, mantels, furnaces, plumbing fixtures and other features which are sometimes outside of the original contract. To be able, therefore, to point out the very best from an artistic standpoint is desirable.

At a recent meeting of the Brick Makers' Association, which includes among its members prominent manufacturers whose yards are situated in the region supplying New York City and vicinity, it transpired that in 1883 680,000,000 brick were made. The association estimates the product of the present year as 150,000,000 less. It seems that there is an overproduction of brick, which is said to have a pretty sharp point. It required no little self-command on the part of the man who has been the actual cause of the seams between the stones or the joints, which had been filled with cement, were now open, owing to the action of the weather. To preserve the structure it was necessary that they be refilled with cement. The operations given above form a practical basis for gaining an idea of the amount of building in and about New York City.

Trinity Church is a landmark well-known to every visitor to the metropolis. A new scaffold has been climbing up the sides of old Trinity's steeple for several weeks, and not a man walks down Broadway but sees it and wonders what it means. Occasionally one asks the sexton and goes away satisfied. Others are harder to please, and go into details, manifesting much unlooked-for interest in the old church.

"What's wrong with the steeple?" asked one of these.

"Nothing at all, sir."

"What are you going to do with it?"

"Going to repoint it."

"Yes, sir."

"Well, in the name of heaven, isn't it sharp enough already?" And the questioner stepped back a few paces to satisfy himself by a skyward glance that the steeple did have a pretty sharp point. It required no little self-command on the part of the man to whom these questions were put to restrain his risibles long enough to tell the inquirer that the seams between the stones or the joints, which had been filled with cement, were now open, owing to the action of the weather. To preserve the structure it was necessary that they be refilled with cement. The operation is called "pointing" in the language of the mason. It is likely that the entire church will undergo an overhauling of the same kind.

Mr. J. C. Cady, architect, of this city, is quoted as saying that a great change has taken place in church decoration in New York within 10 years, and that what is true in the city is also true of the country at large, which generally copies what is done here. The hard, stiff lines of 40 years ago have long since passed, and all forms of church decoration are now in demand. Among what some people have styled innovations in church arrangement may be mentioned the so-called private boxes which are now being introduced in Dr. Paxton's church, in West Forty-second street. These, however, are nothing more than old English news, such as may be seen in the illustrations in some of Dickens's novels, and the equivalent of which may be found in many of the old English churches existing in this country. The purpose in view in this case is, in all probability, only that of making the galleries, in which it is quite difficult to induce people to sit, more attractive, and thus increase the available sitting capacity of the church.

Amateur Wood-Carving.

What may be accomplished by an amateur in the art of wood-carving is happily illustrated by the panels shown herewith, which, according to the Decorator and Furnisher, were carved by Mrs. Emma Price Willis, of Galveston. They are her first attempts, and were made without example or assistance in any way whatever. The lady never had instruction either in drawing or the use of tools, but was compelled to rely upon her own good taste and ingenuity in doing the work. The design and execution, our contemporary adds, are exceptionally good, and the marked success of the pieces in an artistic sense should be an encouragement for others to utilize the skill they may possess in the same direction.

It may be generally remarked that wood-carving offers boundless scope for the exercise of taste and display of skill in manipulation. While light and shadow belong to its effects, it has yet the merit of being in no way deceptive. Its relief is real, and not that of the colorist. It allows at once of literalness in treatment of a subject, while its representations. There is a vast difference in the pleasure derived from carving as employed in constructive decoration and forms impressed in plastic material or fashioned by machine work. The laboriously spent upon carving, and the stamp of indi...
viduality expressed in the production, if of any merit, are distinctive elements of value. Nor even if we descend to imitation can the same type or design be exactly reproduced. One cannot but admire the devotion to this art, in the development of its fullest capacities, shown by the artists of olden time. The evidence of sincere love of beauty and efforts, and gives an impulse to popular appreciation of the capabilities of wood-carving. It is noticeable that good artistic carving is being extensively introduced into furniture. The Renaissance style, with its varied types and combinations, aids the movement. Free development as to variety in wood-carving designed to constitute structural adornment must be allowed. Dication on this point is not to be tolerated. Even grotesques has always had its place in the art, though in the newer methods this feature is not so prominent as of old. The greatest triumph in this style, as regards the display of real art in manipulation, was in the medieval period, when mysteries of religion were thus expounded without the

The evidence of sincere love of beauty and aims to elicit powers that might have been otherwise unsuspected. The tools required for the practice of wood-carving have been described and illustrated in former articles upon this subject, but may be briefly referred to again in this connection: They consist of flat and skew chisels, shallow, deep and fluting gouges, one

**AMATEUR WOOD-CARVING.**

**Rosé.**

**Cat's Tail or Bulrush.**

In putting up your screen doors and windows to very particular to have a little hole in one corner so that the flies can go outdoors when they get tired of being inside.
Arrangement of Rooms in a Cheap House. -

From A., Des Moines, Iow— I inclose hereewith a sketch showing the arrangement of rooms for a house built to the general plan, submitted by "A. J. R.," published in the February number of Carpentry and Building for the current year. My object in doing this is to call particular attention to a lack in house plans which prevails almost everywhere in the Western country. I refer to the omission of the hall or entry. On the cold prairies of Minnesota plans similar to the one referred to are very common among farmers. Their houses frequently have three outside doors, and sometimes more, depending somewhat upon the interior divisions. If, on the other hand, the house is divided according to the method shown in the first plan submitted herewith, every main room as well as the stairway may be entered from the hall, thus dispensing with a portion of the outside doors and rendering the building much more comfortable in cold weather. The second plan which I inclose is suitable for use in a still cheaper house. The arrangement is somewhat similar to that shown in the first. Some would prefer the second plan, however, because the two principal rooms communicate. A house built to this plan is the cheaper of the two, because it has less foundation wall, less exterior wall and no more floor and roof. It also has the advantage of using a single chimney. The second plan is better adapted for farmhouses than the first. A house built to it would have the merit of being large and plain. The dotted lines in both diagrams indicate additions that may be made to the buildings at some time after they are built. In the first a porch and a pantry are suggested. In the second there is a front porch and the outline of a kitchen, which may be built in the rear. In the latter case the room that is now marked "kitchen" would serve as a dining-room or general living-room.

From BEATRICE, Middletown, N. Y.—The Editor of Carpentry and Building spreads so many good things before his readers that one feels almost ashamed to ask for more. Contests in houses of five rooms for a common laborer; in houses of seven rooms for a better-waged mechanic, and in houses of eight rooms, with ample attic and basement in addition, costing, perhaps, $10,000 to $15,000, have been given. All of these, however, are either beyond the reach of the average farmer or fail to reach his requirements. The farmer must have more rooms than in the cheaper houses above mentioned, with plainer finish, so as to reduce cost. His house must be built to accommodate his workmen and visiting friends and yet be done without investing more money than he can afford. A house of ten rooms, five on each floor, with perhaps an opportunity for two additional in the attic, about meets the requirements. Such houses are yearly built throughout the country at a cost of $1000 to $1500, and in the main are well constructed. They are, however, so uniform in appearance, and built so plain, that any one with taste must feel that a new departure in this direction is eminently desirable. Now, Mr. Editor, the object of this letter is to suggest a competition in farmhouses in order that such plans and designs may be brought out as will meet the requirements of those in whose interest I write. If you act from these suggestions I feel sure your efforts will be appreciated by many who are desirous of making farm life attractive to their growing families. I suggest, further, that the readers of Carpentry and Building should be allowed to vote on the floor plans, for a compact, convenient, practical plan is wanted, and those who are to occupy the houses, or who are engaged in building them, should by some means be allowed to indicate their preferences. There is wanted something that will make housework easy. Perhaps one should be allowed to have a bath-room and a small conservatory. A farmhouse should face either east or south, so that all the glare obtained from the cheer of sunshine may be utilized.

Note. — This letter, coming as it does from a woman of eminently practical ideas and the daughter of a farmer, suggests questions which it may be profitable for this journal to discuss. It is somewhat difficult for us, however, to know what proportion of our readers are specially interested in farm buildings, and, therefore, we are unable to tell how generally acceptable a competition of this kind would be without asking for an expression of opinion. We are now considering the subjects of our competitions for 1885, and shall be very glad to have suggestions from our readers with reference to them. We accept this letter as one of the kind which we shall be glad to have from many other readers. If a competition in farmhouses seems to be generally desired, we shall take pleasure in offering prices and publishing conditions for its conduct.

Windmills. — From the AMERICAN WELL WORKS, Aurora, Ill. — We notice in the issue of Carpentry and Building for August an inquiry from "C. T. H. of Waldburg, Mass., in relation to windmills. We take this opportunity of directing your correspondent's attention to our establishment, and also of mentioning that our advertisement of windmills appears in another part of this paper. If "C. T. H." will address us we shall be glad to mail our catalogue and to correspond with him in reference to his requirements.

Radius of Splayed Jamb. — From J. V. H. S., New York City. — In answer to the question proposed by "R.D.M." in the April number of Carpentry and Building, which was for some rule for finding the radius of splayed jams, I submit the accompanying diagram and the following explanation: Let the point A be the center from which to strike the opening of the splayed jamb, and let B and C represent the upper and lower limits of the splay. Then through A drawn a perpendicular E F to the point P in the point B, and then from F as center, and F E and F D as radius, describe arcs as shown, and on them set off distances corresponding to the original divisions in the arc of the frame, all as shown by corresponding figures. By this means the length of the piece to form the splayed jamb will be obtained. Connect

Arrangement of Rooms in a Cheap House. — Alternative Plan Suggested by A.
Projection of Cornices.

From J. R. L., Chillicothe, Mo.—Some discussion has arisen with regard to the projection of cornices. I have thought that perhaps it would be interesting to submit a plan for the benefit of those who may not have the work named for reference. Referring to the sketch, E shows the splayed jamb of a Gothic window may be radius, describe the arc K H. Divide the curve G K H thus established into seven equal parts, as marked 10, 20, 30, 40, 50, &c., in the sketch. From the points in the curves thus established drop perpendiculars to the line A C, as indicated by 10 1, 20 2, &c. By this means a scale is constructed that may be used in practical work. B 1 will be the cornice projection for a building to feet high, while B 2 will be the projection for a building 20 feet high, and so on. I think your correspondent, “P. E. C.,” hit the nail squarely on the head when he said that the judgment of the architect is brought largely into play with regard to the matter of cornices projection. J. B.,” of Des Moines, Iowa, gives an arbitrary rule, namely, that the projection must be one-twelfth the height of the building. This reference to the terms “in wind” and “out of wind,” I would say that the door as he describes it is “winding.” When he gets it correct in all particulars it will be “out of wind.” I hope this will clear up your correspondent’s difficulty.

“Something Better or Nothing.”

It has always been the pride of Carpenter and Building that it is has been able to publish diverse criticisms as well as letters which are complimentary to its management and contents. We have never asked our readers to agree with us in all cases, and where they have differed we have taken as much pleasure in presenting their communications for consideration as those which have indorsed our utterances. We have succeeded in making the paper as acceptable as it is only by inviting free expressions of opinion, and then carefully noting the wishes of a majority of our readers. Occasionally we receive letters which, on account of their character, are very hard to publish satisfactorily. To cut them in type, even though we attempt to follow copy verbatim et literatim, deprives them of some of their piquancy and flavor. It destroys their individuality, so to speak. We have recently had one of the kind referred to, which complains of the conduct of the paper. On this account we are anxious to lay it before our readers. The letter is without address, date or name of writer. It destroys their individuality, so to speak. We have recently had one of the kind referred to, which complains of the conduct of the paper. On this account we are anxious to lay it before our readers. The letter is without address, date or name of writer. This alone destroys whatever claim to attention it might otherwise have. Editors have very little respect for anonymous writers, and generally throw into the waste basket letters which, on account of their character, are very hard to publish satisfactorily. To cut them in type, even though we attempt to follow copy verbatim et literatim, deprives them of some of their piquancy and flavor. It destroys their individuality, so to speak.
### Construction of a Mill

From J. F. W. Danville, Pa. — I inclose herewith drawings of a mill built by me some time since, and the publication of which in Carpentry and Building may be of interest to the readers at large. The drawings so thoroughly show the construction that very little description is necessary. I would remark that the cost was about $7000. This was exclusive of the machinery. The following is the bill of lumber used in the mill, which was 90 feet wide and 45 feet long, and which is owned by John A. Cooper:

- 2 oak sills, 6 x 115 inches, 50 feet long.
- 2 oak sills, 6 x 15 inches, 50 feet long.
- 2 oak strakes, 15 x 15 inches, 50 feet long.
- 16 pieces, 15 x 12 inches square, 12 feet long.

The following is the bill of lumber entering into the saw null, which is 17 x 53 feet in plan, covered with a board roof:

- 5 posts, 8 x 8 inches square, 10 feet long.
- 5 plates, 6 x 8 inches square, 53 feet long.
- 4 ties, 9 x 9 inches square, 20 feet long.
- 5 ties, 3 x 3 inches, 17 feet long.
- 2 trusses, 6 x 18 inches, 12 feet long.
- 2 truss rods, 13 x 4 inches diameter.

The following is the bill of lumber used in the engine-room, which measures 15 x 14 feet, and is covered by a slate roof, as is follows:

<table>
<thead>
<tr>
<th>Material</th>
<th>Quantity</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 posts, 9 x 9 inches square, 100 feet long.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 plate, 9 x 9 inches square, 40 feet long.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 plates, 8 x 8 inches square, 50 feet long.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 plates, 9 x 9 inches square, 40 feet long.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 plates, 8 x 8 inches square, 40 feet long.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 plates, 8 x 8 inches square, 20 feet long.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 sets of setting, 3 x 3 inches, 12 feet long.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 doors or collar beams, 8 x 8 inches square, 12 feet long.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 doors or collar beams, 8 x 8 inches square, 10 feet long.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 doors, 8 x 8 inches, 10 feet long.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 posts, 9 x 9 inches square, 40 feet long.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 plates, 9 x 9 inches square, 53 feet long.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 plates, 8 x 8 inches square, 50 feet long.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 posts, 8 x 8 inches, 10 feet long.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000 feet of roof boards.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>21 rafters, 3 x 5 inches, 17 feet long.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1000 feet of siding.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 doors and frames, 3 x 8 feet x 2 inches.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2000 pounds 8d. nails.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1000 pounds 6d. nails.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4000 feet of slate roofing.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9000 feet white pine lumber.</td>
<td></td>
</tr>
</tbody>
</table>

The carpenter work on this job, not including the roofing or the millwrighting, amounted to 525 days.

Note: The above contribution will be found acceptable to many of our readers, and will excite curiosity and surprise in the minds of many who are not specially interested in the kind of construction described.

### Conflicting Terms

From B. B., Mexico, Mo. — I should be greatly obliged if you would inform me how to distinguish between a piazza and a veranda, a porch and a portico.

Answer. — The employment of these terms in modern architecture is in many cases very confusing, and, even among writers of recognized ability and standing, there are occasionally discrepancies which greatly confuse an ordinary reader. Perhaps we cannot better answer our correspondent's inquiry than by presenting herewith the definitions of the terms about which he inquires, as given in some of the standard dictionaries. Newlands, as defined by Webster, is "piazza or covered walk, supported by arches or columns." Upon referring to the architectural and mechanical dictionaries, we find a different meaning. Newlands says: "A piazza is a square, open space, surrounded by buildings or colonnades." This definition is also given by Webster, in another sense, however. Newlands goes on to say that the term is frequently, but improperly, used to signify an arcade or colonnado walk. Nicholson, on the other hand, says that a piazza "is a portico or covered walk, supported by arches or columns, which serves to keep inner rooms cool and dry."

The term "veranda" is defined by Webster as "a kind of open portico formed by extending and sloping the roof beyond the main building." He also defines it as "a little open portico or outer gallery with a sloping roof." Parker does not give the word at all. Gwilt also omits it. We also fail to find it in Nicholson. Newlands describes it as "an Oriental word, denoting a kind of open portico or a sort of a little open gallery in front of a building, with an open roof supported by slender pillars and frequently partly closed in front with latticework." He continues: "In India almost every house is provided with a veranda, which serves to keep inner rooms cool and dry."

"Porch" is defined by Webster as "a kind of vestibule at the entrance of temples, halls, churches or other buildings; hence, a stately or ornamental entrance way." Newlands describes a porch as "an external appendage to a building, forming a covered approach or vestibule to a doorway." He continues: "The porches in some of the older churches are of two stories, having an upper apartment, or a second story, which is sometime applied." Parker's "Concise Glossary" defines a porch as "an external erection materials and labor entering into a grid mill and constructed to meet modern requirements.

### Plan of Mill and Saw Mill

- 200 pounds 8d. nails.
- 1000 pounds 6d. nails.
- 4000 feet of slate roofing.
- 9000 feet white pine lumber.
and follows this definition by a number of illustrations bearing out the idea that a porch is the entrance to a building of more than ordinary size and importance. Nicholson defines porch as "a kind of vestibule supported by columns, much used in the entrances of ancient temples, basilicas, churches, &c." Gwilt says: "A porch is an exterior appendage to a building, forming a covered approach to one of its principal doorways." With reference to the term "portico," Gwilt gives it as synonymous with colonnade, the latter being defined as an arrangement of columns. Nicholson defines portico as "a kind of gallery on the ground, encompassed with arches or supported by columns. The roof is usually vaulted, sometimes flat." This definition is followed by references to the portico of Solomon's Temple, and to the Doric portico at Athens, and the portico of the Ionic temple, also at Athens. Among modern porticos there is mentioned that of Saint Peter, of the Vatican. Newlands defines portico as "an open space before the entrance of a building, furnished with columns." Parker defines portico as "an arrangement of columns in front of a building." From the foregoing it will be noticed that a porch has something of the dignity of the building to which it is applied inseparably connected with it. Portico conveys the sense of sturdiness, whatever may be the material, and even dirty, may well be applied, although there is no excuse for this with a carpenter, as there is with a machinist, for example. The only ground I can stand on is the common one of the dignity of all honest labor. It shall never forget a remark made many years ago by a friend of mine in a very large cabinet-making establishment. His sons have never yet done a day's hard work, of being clerks, a class which I must confess I am not proud of. My friend said: "My sons have never yet done a day's hard work, but the time will come when they will learn that an honest mechanic is better than a skillful quill-driver any day." I then belonged to the same class, but, nevertheless, I agreed with him.

Joseph joined the Stair-Rail. From F. S. W., Cleveland, Ohio.—Some time since I noticed an inquiry as to the best method of joining a stair-rail to newel and turning. All bolts should be put in horizontally. In case of a shallow rail on the rake a very short bolt is required; one 3½ inches long will answer. Such bolts, by the way, are not to be found in this market. If they are made it would be a great convenience to stair-builders to know where to obtain them.

The Carpenter's Sister. From C. M. B., Moorcombe, Liskeard, Cornwall.—The letter from "J R. L." published in the July number, reminds me that in the village where I was brought up two cottages were designed by ladies. The landlord was spending much money, time and thought on the buildings, and his two daughters asked that they might each design a cottage. Permission was granted, and both cottages built to their plans are substantial stone buildings, creditable in all respects to the designers. One, however, was much better than the other, and, encouraged by her first effort, the lady afterward designed the village smithy, with cottage adjoining. The work is one of the prettiest I have ever seen, and is universally admired by strangers. The only objection urged against the work of this lady, referring to her first effort, was that some of the cornices on the house smoked. I have known houses designed by leading architects, however, which were not perfect in this respect. Of my own knowledge, I can say that the elevations and details were just as good as those drawn by professional men in the neighborhood.

From "CARPENTER'S SISTER."—I never had a compliment that pleased me more sincerely than when "J R. L." dusted off his tool chest and invited me to a place in the shop as a sister carpenter. There was no excuse for this with a carpenter, as there is with a machinist, for example. The only ground I can stand on is the common one of the dignity of all honest labor. I shall never forget a remark made many years ago by a friend of mine in a very large cabinet-making establishment. His sons have never done a day's hard work, but the time will come when they will learn that an honest mechanic is better than a skillful quill-driver any day." I then belonged to the same class, but, nevertheless, I agreed with him.

Question of Insurance. The article published in the July issue of Carpentry and Building, on page 140, bearing the above title, has called out the following reply from Mr. C. J. H. Woodbury, of the Boston Manufacturers' Mutual Fire Insurance Company. Mr. Woodbury's remarks will be read with interest. He says:

In the absence of any specific contracts or clauses to the contrary, underwriters are liable within the limits of the policy for the damage by water used in extinguishing a fire, and also for unavoidable damage which ensues in a building exposed to the elements.
by a partial destruction of the roof. How-
ever, an owner is bound to make use of all the available means to save and protect his property, both against fire and subsequent damage from any cause connected with the building. The liability embodied in an insurance policy does not give a new article for an old one, but is limited to the value of the property within the limits of the policy, for the loss sustained. In this instance, after 18 months' service the paint and paper were presumably nearly as new, but if they had been badly used the insurance company could be called upon only to make a settlement, and even then, with paper as they were at the time of the fire. Every insurer ought to make a detailed statement of the losses and contents, with an appraisal of the valuation, as often as once a year. In case of fire he can act with certainty to the expense of these losses. The "Hub Plate," of which is elsewhere illustrated in this issue, is prominent among them. The "Modern Wood," an all-wood stove, is also shown. One of the circulars contains a reprint of an article which recently appeared in the New Yorker, recommendatory of these goods. A round are stove called the "Hub Heater," and a series of stove similar features, are also presented.

The contract for the marble work required in the construction of the Mutual Life Insurance building, New York City, is said to be larger than any that has been let in this country. Over 200,000 square feet of marble, the most of which is polished in the highest style of art, were set in the building in one year. The marble is of Onyx and Onyx mantels were distributed through the several rooms. Messrs. A. U. Fauchere & Co., of No. 433 Seventh avenue, were the contractors. The entire work was completed in less than a year's time. This firm also executed the work for other prominent buildings in this city, among which may be mentioned the Wells building, the Equitable building, the Merchants' Bank building and the Vanderbilt houses.

The Edan Company, of Cincinnati, Ohio, manufacturers of wood-working machinery, some time since received the following which explains itself:

"Office of C. H. Fries & Co.
KANSAS CITY, MO., June 28, 1884.

The Egan Company, Cincinnati, Ohio,—
Clemmelen: I am in receipt of your draft on New York for the amount of your invoice of May 28 for the automatic knife grinder. Although we stipulated as a precaution for 30 days' trial if necessary, it did not take 10 minutes to ascertain that the machine was a good one and thoroughly satisfactory. We are well pleased with the machine, and if our name will assist in recommending the knife grinder to others, we cheerfully offer it very respectfully, etc.,

S. H. Parke & Co.

The Cincinnati Corrugating Company, of Cincinnati, Ohio, have recently extended their business by importing their goods by absorbing the New York Iron Roofing and Paint Works. This consolidation in itself will double the business proportionately. The Cincinnati Corrugating Company in a position to supply iron roofing in the form of flat sheets. Circulars have been issued, one of which is reproduced. The New York Iron Roofing and Paint Works, soliciting with the Cincinnati Corrugating Company the confidence of their business by heretofore been extended to the old firm, and by the Cincinnati Corrugating Company the confidence of their business for present excellent facilities for manufacture.

The National Shutter Metal Roofing Company, whose office is No. 21 Cliff street, are directing the attention of the trade at present to theirs. A new form of roofing has been brought forward for something over three years, and in that time has secured many friends among architects and builders, and among roofing trades. The special point to which the company are directing attention at this time is the exactness with which the standard size pieces fit, and the great uniformity of the finished product. This article can be secured by those who apply first. We understand that the policy of the company is to be so handled by only one party in a place.

An improvement in sheet-metal ceilings made of raised or sunk panels is the subject of a recently granted patent to A. Northrop, of Pittsburgh, Pa. The object of the improvement is to provide means whereby any panel that is let is the panels or portions by condensation is speedily carried off. In each raised panel the inventor makes an opening of central position in the panel, which is closed by an ornamental. With sunken panels the water flows through small side openings into receptacles in the moldings that surround the panels. In these trough moldings the water will run to the point where the next molding adjoins, and at this point a rosette is affixed for the reception of the drippings.

STRAI CHIPS

The Board of Trustees of the University of South Dakota, at a meeting held a short time since, decided to push forward the plans for building for the Presbyteriine College to completion within 18 months. Mr. George D. Pierce, D. T., was appointed supervising architect, and will immediately superintend the work during its construction.

Mr. J. D. Silley, of Middletown, Conn., is at present employing the company in the construction of a new hospital for the insane. The building, which is to cost $60,000, is about to be completed and is with the present buildings in Middletown and vicinity is reported quite brisk at present.

Plans have been prepared and the contract let for three five-story store buildings to be erected on the west side of Fourth avenue, in the old St. Nicholas Hotel, burned last winter. The buildings are to be brick and marble, and will be 100 feet by a depth of 125 feet. They will have hy- dronic heating and will be fire-proof, the floors and ceilings being of brick and iron. The front will have an massive appearance, being constructed of brick and stone, and surmounted by a large cornice. The estimated cost of the new court house is $25,000.

Stevens & Smead, of Galivani, Texas, are erecting a cor- vered hall, 58 by 100 feet in size, and two stories in height.

A new $50,000 building, to be called the Alabama Bank, will be built on the Normal School grounds, at Tuscaloosa, Ala.

Mr. W. C. Rosser, architect, of Grand Rapids, Mich., has recently executed the plans for a large brick building for the red-brick pressed and enamel brick and stone building, to cost about $25,000, for Mis. P. M. Ball, a stock building, to cost about $25,000, for Mr. W. H. Halliday, and a woolen mill, to cost $450, for Dr. P. F. Farmer.

The Houston (Texas) Post, in a recent number, states the city is erecting a building at a cost of $30,000, and the Merchants' Exchange, at San Antonio, Texas, will have one costing $30,000.

Mr. F. O. Weeks, of Akron, Ohio, has recently completed the plans for the splendid building to be erected there, to be of stone, brick and iron, and to cost $20,000. The structure, under the direction of Mr. E. F. P. (as the future church (St. Paul's) and the new $75,000 Central High School building, for the State of New York. The number of the paper is published in the Akron Iron Company, a pressed and enamel brick and stone building.

A report of 120 for the automatic knife grinder, which we have recently received, indicates that the machine is a good one and thoroughly satisfactory. We are well pleased with the machine, and if our name will assist in recommending the knife grinder to others, we cheerfully offer it very respectfully, etc.,

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Seven-Roomed House in Brick.

The subject of the Twelfth Competition in Carpentry and Building was elevations and details of a house in brick, built to the same set of plans that has been used in similar competitions in wooden houses. We published the design receiving the first prize in this competition several months since, and now lay before our readers the third prize design, the author of which is Mr. H. L. Campbell, of 485 Main st., Buffalo, N. Y. We should add at this point that the public endeavor of the designer to make the house as attractive as possible and still keep within the limits of a moderate estimate. The disposition of materials is as follows: The base and water-table of the foundation to be of hammer-dressed limestone or native stone, whichever may be the most conveniently obtained. The courses between base and water-table are to be rough-pointed, of the same material, and laid in regular and equal courses. The brick used in facing the walls above the foundation is to be of dark-red stretcher brick, of even quality and character.

On account of the houses being placed on a corner lot, the author has made the south elevation more elaborate than would be necessary if the same building were erected on an inside lot.

With reference to the woodwork of this building, the author says that it has been designed with a view to being substantial and of a character to resist the weather. His ideas with regard to painting would be to paint the cornices, casings, window frames, porches, &c., a medium olive or seal brown; the beads, chaunfers, rosettes, &c.,

The window sills of first and second story, and the stone window head shown on front elevation, to be of rubbed white sandstone. The brick courses on the line between window sills to be of "Peerless" buff brick laid in white mortar. The courses in a line with the arches from window to be of "Peerless" black brick, as indicated on elevations and details. The black and buff brick are to extend all around the house except on north elevation. All the red brick are to be laid in brown mortar, and the black brick in black mortar. Molded brick have been introduced in various places, and will be seen by examination of details. These have been selected from the catalogue of the Peerless Brick Company, and the designs are specifically referred to by number.

From the particulars submitted by the author, with his drawings, for the consideration of the judges in this competition we glean the following items. It has been the fully selected. The window sills of first and second story, and the stone window head shown on front elevation, to be of rubbed white sandstone. The brick courses on the line between window sills to be of "Peerless" buff brick laid in white mortar. The courses in a line with the arches from window to be of "Peerless" black brick, as indicated on elevations and details. The black and buff brick are to extend all around the house except on north elevation. All the red brick are to be laid in brown mortar, and the black brick in black mortar. Molded brick have been introduced in various places, and will be seen by examination of details. These have been selected from the catalogue of the Peerless Brick Company, and the designs are specifically referred to by number.

The second prize set will be presented to our readers at no distant date. Owing to the very complete manner in which Mr. Campbell has worked up this study in house-building, we find it impossible to present all of the details in this issue. We show here-with the perspective view, elevations, and the principal details relating to the brickwork. In a subsequent issue we will show the details of interior woodwork and exterior finish in wood, including porches.

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Perspective View of House Receiving Third Prize in the Twelfth Competition.

H. L. Campbell, Buffalo, N. Y., Architect.
In the slate district of Pennsylvania a machine has recently been introduced which lends fair to supersede the old method of drilling and blasting. The machine is the invention of John Crump, of Philadelphia, and of Richard Breereton, superintendent of Mr. Crump's quarry. Mr. Crump four years ago proposed to himself the project of devising a machine to cut and finish with true surfaces all kinds of building stone as it lies in the ground, thus saving the enormous waste of blasting processes and the handling of the waste. He engaged Mr. Breereton to assist him, and the result of their labors is this novel "rock quarrier and stone shaper," which they have had patented in all countries under the above name. Its cutting power is shown by the ease with which it goes through the flint in this slate quarry, where, at least, it is capable of doing remark-able work. Whether it can be as successfully employed in cutting and shaping granite and other hard rocks is not decisively proved as yet, though it is designed for such use.

The machine in its essential features is as novel as it is effective. It looks like a very coarse circular saw, but is not driven like a saw, and it makes its cut in an entirely different way. Thus, it runs backward, cutting upward instead of downward, moves very slowly instead of rapidly, and is driven not from its axle, as saws are generally driven, but from its periphery. The cutting disk is substantially like that of a saw, with removable chisel teeth. These have an alternate "set," right and left, and at intervals there is a straight tooth to clear out the sliver that the two sets of teeth might otherwise leave. Near the outer edge of the steel disk there are two rows of oval holes, in which the teeth of two pinion-wheels, one on each side, engage. This is the driving mechanism, and it serves two useful purposes. It applies the power at the most advantageous point, and it steadies the large, thin disk, ½ inch thick, while cutting through very hard rock, or rock containing hard particles of flint. The circular cutter is, in fact, simply journaled on its axle, and is pulled around by its periphery while making an upward cut. The feeding mechanism is worm-screws and cog wheels, so geared with the cutter that they move in unison. The whole machine (including the boiler and the steam engine for driving the cutter) is mounted upon one framework, and all of the mechanism travels together upon pinion-angles, and if the stone is to be finished before its removal files are attached to each side of the saw-plate, slightly wider than the cutter, thus removing the saw-teeth marks. The teeth of the cutter are, as before remarked, replaceable, and

Effect. The intermittent heat from such a source, however, is more tolerable in the dining-room than in the living-room of a dwelling. Before the stairs, the author says he has placed the novel cube with the stairs on account of the construction being the least expensive as it gives the largest amount of room. No effort has been made to obtain an attic story beyond placing a dormer on the side to light the stairs. The attic plan has been drawn to show where the stairs terminate and how the rooms might be located in case it should be desirable to finish them.

A slight variation from the original floor plans has been made in this design, as is shown by the elevations. This has been done, the author explains, in the spirit of economy. In order to roof the kitchen and pantry, and preserve the two windows referred to of sufficient importance to justify the expense required to save them. He therefore has placed them on the sides instead of in the rear, and by roothing the kitchen, as shown in the side elevation, does away with the necessity for a brick wall between pantry and dining room. The roof, he suggests, should be shingled and painted the color of slate. The distribution of color has been shown on the plan in the rear, it would be advisable to roof the kitchen and pantry, and preserve the two windows. The roof, he suggests, should be shingled and painted the color of slate. The intermittent heat from such a source, however, is more tolerable in the dining-room than in the living-room of a dwelling. Before the stairs, the author says he has placed the novel cube with the stairs on account of the construction being the least expensive as it gives the largest amount of room. No effort has been made to obtain an attic story beyond placing a dormer on the side to light the stairs. The attic plan has been drawn to show where the stairs terminate and how the rooms might be located in case it should be desirable to finish them.

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The Building Trade in New York.

The enormous capital that is invested from year to year in the building up of the metropolis may be judged from the following table giving the number of separate plans filed and the estimated aggregate cost for each in the first six months in the past three years:

<table>
<thead>
<tr>
<th>Months</th>
<th>Cost</th>
<th>Months</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>$1,749,885</td>
<td>January</td>
<td>$1,362,681</td>
</tr>
<tr>
<td>February</td>
<td>2,343,650</td>
<td>February</td>
<td>2,741,525</td>
</tr>
<tr>
<td>March</td>
<td>3,605,360</td>
<td>March</td>
<td>5,864,769</td>
</tr>
<tr>
<td>April</td>
<td>6,015,270</td>
<td>April</td>
<td>4,126,322</td>
</tr>
<tr>
<td>May</td>
<td>3,917,350</td>
<td>May</td>
<td>4,897,200</td>
</tr>
<tr>
<td>June</td>
<td>8,616,065</td>
<td>June</td>
<td>4,847,500</td>
</tr>
<tr>
<td>Totals</td>
<td>$29,308,756</td>
<td>Totals</td>
<td>$26,443,245</td>
</tr>
</tbody>
</table>

It will be seen that there has been a steady increase in the number as well as the cost of the buildings. The great jump in operations in June, 1882, was due to the filing of plans for the Navarro flats and the Field buildings, as well as for the blocks built for the Clark estate on the West Side.


In Berlin, in June last, the corner-stone of the Reichstag building was laid by the Kaiser, with the greatest and most imposing ceremony performed by him since the completion of the Cologne Cathedral and the unveiling of the National Monument at Ruhrwinkel. Herr Paul Wallot, who not only designed the plans that received the first prize at public competition, but who has been appointed supervising Government architect during the erection of the building, has furnished the following details concerning the structure:

The building will form a great square, with a frontage of 446 feet on the greater sides, facing west and east respectively, by 312 feet on the shorter fronts. It will inclose 6560 square feet. It will be 43 feet in height from the ground. This edifice will be 85 feet in hight, being flanked by four square towers which rise at each corner to 131 feet. The central part of the western front, with the grand entrance, is designed to be 105 feet high, and will be surmounted by a huge octagon cupola, the apex of which will stand 230 feet above the ground. This cupola will cover the central hall, 69 feet square; which, with two galleries added on either side, 46 feet high, will form a great hall with a total length of 305 feet, to be used as a members' lobby, and for great ceremonies and festivities. The session hall for the Reichstag will cover an area of 6560 square feet. It will be 43 feet in height, and, like the great hall, receives the light from above. Besides the seats and desks for the 399 members, it will contain the places for the members of the Ministry...
and the Federal Council, with galleries for
the court, the diplomatic corps, the press
and the general public. The entire building
will be placed on vaulted cellars, and com¬
pri ses four floors, on which all rooms neces¬
 sary to a great Parliamentary building are
to be distributed in the most practicable
manner, including the offices for the
presidents and secretaries, and those
for the Federal Council, the library
and large reading-room, the archives
and record rooms, the dif¬
ferent offices of
the House, the
stenographic
and pressroom,
the telegraph
and post of¬
 fices, commit¬
tee-rooms, res¬
 taurants, ante¬
 chambers and
parlors, ward¬
robes, toilet¬
rooms, &c. The
internal ar¬
 rangements
will naturally
include the latest scientifi c improvements
in electric lighting, telephonic commu¬
ication between all parts of the build¬
ing, hydraulic lifts, heating and venti¬
lation. It is intended to employ none but
German material exclusively in the erec¬
tion of the entire edifice. The total cost,
great historical ceremony. In the nature
of things this can hardly be expected.

Artisan and Artist.
A recent issue of the Contemporary Re¬
view contained the following: Architect-
and walling there is very much, indeed,
to be done that requires nothing more
than good workmanlike ability. Nearly
all those features of a building, very
numerous and very important, which consist
of straight lines and circular curves, can be
perfectly worked from drawings by any one

with fair mechanical skill. The architect
has only to see that they are well de signed,
and there are plenty of workmen, even
now, who will take care that they are well
executed. But the critical point is passed
when we come to features which a drawing cannot fully explain. The mechanical workman can produce from drawings the largest arch molding, the most complex nave pier, the finest window tracery; and from the same drawing of such things every competent workman will produce, practically, the same result. The reason is that every point about them can be absolutely fixed and settled by lines and figures, and there is, therefore, no opening in them, or only the smallest conceivable opening, for the workman’s art power, even if he has any. But all this is changed at once when we come to details, which a drawing cannot perfectly explain. The mere mechanic is equal to the largest geometrical pattern, but not to the smallest piece of leaf ornament, much less to ornament of a higher class. All sorts of mysterious reasons have been assigned for the difference, because, like Sir Thomas Browne, art theorists “love to lose themselves in an O altitudo,” and because the real explanation is too simple and obvious to leave opportunities for fine writing and declamation. The plain fact, however, is that the mere mechanic can only go with safety as far as he is guided; that he cannot be guided, except by way of partial suggestion, where difficult and complex forms come in, and that, therefore, in the latter case an artist-workman is wanted, who, in his own special department, can guide himself.

**A House of the Stone Age.**

A short time ago there was discovered in a marsh at Schussenried, in Wurtemburg, a well-preserved hut of the age of stone. The flooring and a part of the walls were intact, and, as appeared from a careful measurement, had formed, when complete, a rectangle 10 m. long and 7 m. wide (32 x 23 feet). The hut was divided into two compartments, communicating with each other by a foot ridge made of three girders. The single door, looking toward the south, was 1 m. wide, and opened into a room 6.50 m. long and 4 m. wide. In one corner lay a heap of stones, which apparently formed the fireplace. This room was the kitchen, “the living-room,” and probably a night refuge for the cattle in cold weather. The second room, which had no opening outside, measured 6.50 m. long and 5 m. wide, and was, no doubt, used as the family bed-chamber. The floors of both rooms were formed of round logs and the walls of split logs. This, it is remembered, was a hut of the stone age. It may be safely presumed that the lake dwellings of the bronze age were larger in size and less primitive in their arrangements. At both periods the platform supporting the houses communicated with the shore by means of a bridge (probably removable at pleasure), and with the water by ladders. The ladders, as appears from an example found at Chavannes, were made of a single stang with holes for the staves, which protruded on either side. This hut is the most complete yet discovered of the dwellers of this interesting period.
The Way Houses are Ordered Nowadays.

The Philadelphia Record holds the mirror up to nature, and describes how many of our modern houses are planned and ordered, in the following terms:

When a woman goes to a dry-goods store to order the materials for a dress she has usually something like a definite idea of the kind, color, quality and quantity of the stuff and trimmings needed; but whether a man, or a married couple or a woman give the order for a house, one and all have usually but a very undefined notion of the size or number of the rooms, of the quality and quantity of the materials, or of the kind of “trimmings,” external or internal, that they require. All these things are left to the interpretation of the architect, if he is called upon, but, if not, to that of the builder, who, for the occasion, is compelled to do an architect’s work. Under these circumstances it is no marvel that the plans have to pass through three or four editions, to the great dissatisfaction of both architect and client; for, though it is doubtless the province of the architect to provide for all the needs of the plan and for the details of construction and ornament, it is yet quite impossible that he can make the size and arrangement of the rooms to suit unless the client has definite ideas upon the matter and is capable of explaining them.

Few people have clear conceptions of size. How large a room 16 x 12 feet is they have no idea. When the length and width are measured off for them upon the floor of a large office they think the dimensions awfully small, and make them 20 x 15. This does very well on paper, but when the estimates come in there is wailing and gnashing of teeth, and the design has to be submitted to the process often called “boiling down.” A design for a house is usually made somewhat in this wise: A man suddenly makes up his mind that he will have a house built. He has waited until the last moment for his decision, and rushes to the knight of the T-square with the request that he will at once get out the plans and specifications for a house to cost so many thousand dollars. Perhaps he wants it like so-and-so’s house, and occasionally he has a wish for a bay window in one of the parlors, or for two communicating bedrooms. He sees the drawings in a day or two, and to commence work in two weeks or less. The architect — who is generally, in these progressive and mechanical days, neither an artist in general nor a student of architecture in particular, but simply a man with considerable tact and knowledge of men, and with an extensive acquaintance among moneyed men and speculators on the one hand and among practical builders and artisans on the other — has been through the operation so often that he has become case-hardened, and simply orders one of his assistants, probably the youngest, to make a copy, with variations of a plan that has been used before. This is done, the sketch is submitted, alterations are made and finally all is ready. The
like a hundred others turned out by the same firm as though it were made by a machine. Some architects do better than this—think, plan, design, try to perfect sanitation, construction, ventilation, ornament, &c.; but such architects remain poor. They are voted slow and behind the age, get no work to do, and are usually considered fools for their pains.

The same general truth holds good for houses and architects, medical practice and doctors, Congressmen and government, namely: The general public that needs houses, medicine and government must itself know more about house-building, physiology and social science before it can expect to be served by better architects, better doctors or a better set of law-makers.

Plaster.

A recent issue of the London Builder contains the following particulars about the early use of plaster: The use of plaster, or "plai-


ter," as it was formerly called, is of early date, even in the British Isles, in connection with domestic architecture. Long before lime plas-

ter came into general use, a tenacious clay or sticky and unctuous earth was employed if procurable, and, in its absence, whatever clay or mixture of mud and earth produced the most binding material. The rudest and coarsest forms of daubing or plastering in the British Isles were those structures erected of waffles and daubed over with clay to keep out the cold. This kind of domestic buildings was common in Ireland in the time of Henry II. From necessity, or in conformity to the

in happy harmony. In some districts infested by marauding bands, houses are strongly fortified with high walls containing apertures for firearms, and protected by a moat crossed by a rude drawbridge. With

The New Capitol of Dakota.—An instance of the practical application of science to every-day life is well shown in the building of the Capitol building of Dakota, at Bismarck, by the aid of electric light. This building, says Science, costing $350,000, consists of three stories, basement and subbasement, measuring 155 by 92 feet, and contains over 4,000,000 bricks, with trimmings of Joliet stone, and has been erected in the midst of winter. The corner-stone was laid September 5, 1883; and on the 10th day of January, 1884, a few days more than four months later, a photograph shows the building to lack only the projection of one end and the upper part of the
Improved Drawer Locks.
The D. K. Miller Lock Company, 821 Cherry street, Philadelphia, have placed upon the market some improved drawer locks which possess features that are of special interest to all who have occasion to use goods of this character. The locks contain circular tumblers or disks, and are adapted to the use of a small flat key. They are known under the general name of "Champion" locks, and are the invention of Milton Jackson, the manager of the Miller Lock Company. We have only space in this connection to illustrate one of the new locks, but it is typical of the entire assortment, so far as its leading features are concerned, and therefore will convey a satisfactory idea of the merits of these goods. The inner cylinder of these locks is shaped like a thimble, with the open end toward the key-hole. The cylinder carries a dog that in locking enters the tumblers inside the cylinder, and in unlocking is forced into a recess formed in the outer shell. The extra security afforded by this lock cylinder arises from the difficulty of arranging the disks without the use of the proper key, so that their notches shall be in line under the dog. The arrangement is such that no motion or strain on the bolts or any other part can in any way aid in locating the notches. Should any notch chance to be placed properly, it would be displaced by movements that are necessary to locate the others. In short, the manufacturers claim that the processes by which other locks are readily picked always fail when applied to this lock. A further advantage claimed is the absence of all springs save one. Mechanics well know that in any mechanism springs are frequently the source of trouble; accordingly, the fewer that are employed the more positive will the action of the device be and the more reliable it will be after long periods of service. The "Champion" lock cylinder as above described is readily adapted to a wide range of locks. Although the last patent of this device bears date within the present year, the manufacturers have already in the market quite a list, among which may be mentioned locks for drawers, closets, clocks, for chests and desks, and also locks for post-office boxes, and for safe-deposit boxes. All of these embody the features which we have described. In addition to the particulars already presented, an important advantage which these locks possess is the application of a master-key to an extent far beyond what has been accomplished in other locks. Having a rotary disk or tumbler, the "Champion" lock readily admits of a very wide range of combinations and at the same time of a special combination to fit the master-key. The manufacturers state that one master-key may control an entire set which may be variously used for drawers, closets, desks and a night latch, thus greatly relieving the proprietor of an establishment of a cumbersome pocketful of keys. These advantages are likely to be appreciated by all who have occasion to apply or use locks for the general purposes mentioned above.

Portable Scroll-Sawing Machine.
Fig. 2 of the engravings shows a new portable scroll-sawing machine built by Frank H. Clement, 131 Mill street, Rochester, N. Y. This machine has been built from new designs, and the maker claims that it avoids many of the difficulties experienced in the use of the ordinary suspended or clear-sweep scroll-saw. He states that it is a fact that five-sixths of all the curved sawing that is done comes within the compass of an ordinary band-saw arch. It is for work of this kind that the portable machine here illustrated is specially adapted. The arch is cast on one piece in tubular form, and is sufficiently strong to sustain the saw rigidly against its work and resist the vibration caused by the action of the strain. The table is of kiln-dried hardwood, firmly screwed to a heavy tilting bar, so as to be adjusted for bevelled sawing. The vibrating parts are of steel and wood, and, while strongly built for their purpose, are constructed light and admit of a high speed without special foundations for the machine. The strain is of leaf-spring steel compounded so that the labor is distributed through a large amount of material, while the actual motion required is very slight. The bearings of the arch and its attachments are of steel bronze, made in a form to reduce friction and weight to a minimum. A combined brake and shifter is attached by which the machine may be stopped almost instantly. In all other respects equally careful attention has been given to details and to the requirements of work. The machine is provided with various adjustments adapting it to a wide range of combinations and at the same time meeting the requirements of plumbers, gas-fitters, jewelers, tool-makers and miscellaneous manufacturers in metal. Its general features are so clearly shown in the engraving that its adaptability to various purposes will be readily perceived by all who have need of such an article. The flame can be regulated to any desired size by turning a screw-vice. This enables the operator to keep the heat under perfect control. It is so constructed that it can be used bottom side up or in any other position. The cost of running it at the average price of gasoline, when the flame is used full size, is estimated at 5¢ cent per hour. Inasmuch as a very small quantity of gasoline is used in filling it, and is contained in a receptacle required to be air-tight for the practical operation of the device, it is considered safe. The manufacturers offer it for such work as brazing small articles, tempering tools with a very small fire, thawing out frozen water and steam pipes, and for melting holding-wax used by metal pattern-makers and engravers.

Fig. 2.—New Portable Scroll-Sawing Machine, Built by Frank H. Clement, Rochester, N. Y.
Safety Guard for Molding Machines.

In Figs. 4 and 5 we show a safety guard for variety molding machines that is being offered to the trade by Messrs. Squires & Shriver, 175 George street, Baltimore, Md. This guard is presented, we are assured by the firm above named, not as an experiment, but as a reality. The guard consists of a wrought-iron band with malleable-iron standard and thumb-screw. The parts are arranged that the guard can be conveniently adjusted to any position and applied to any variety of molding machine made. The engravings show the guard in two different positions, and indicate the method of adjustment. The guard is fastened to the table by a standard working through a slot in it. This standard is held in position by a thumb-screw working on the under side. The wrought-iron band is held to the standard, and adjusted to any position required by a thumb-screw working in a slot in the band and also in the standard. By this construction it is evident that this guard can be thrown up for the purpose of setting the cutters or sharpening them, without the necessity of removing the guard from the table.

New Fast-Feed Flooring Machine.

The machine shown in Fig. 6 of the engravings is one recently designed and introduced by the Egan Company, of Cincinnati. On account of the rapidity with which it turns out work, the name "Lightning" has been applied to it. The aim in the construction of this machine has been to make a reliable, convenient and rapidly-working machine, and one that should give a minimum of trouble while turning out a maximum of work. A special feature of this machine is the doing away with all links and levers in the expansion gearing, thus avoiding a very common source of annoyance and expense.

The engraving gives a general idea of the machine, the following particulars will enable it to be fully comprehended.

The capacity of the machine prevents any steam or water packing invented for and peculiar to these engines, in connection with a hoisting engine, in which, as well as economy, are of interest to contractors and builders. One form of these engines, in connection with a hoisting drum, is shown in Fig. 7 of the engravings. Some of the leading features of these engines will be understood from the following partial description:

The New Rotary Hoisting Engine.

Mr. E. W. Bliss, of Brooklyn, N. Y., well known for the excellent quality of the special machinery which he builds, has recently put upon the market some rotary engines adapted to hoisting, pumping, &c., which, on account of their general convenience and utility, as well as economy, are of interest to contractors and builders. One form of these engines, in connection with a hoisting drum, is shown in Fig. 7 of the engravings. Some of the leading features of these engines will be understood from the following partial description:

The inner portions of the cylinder in which the piston-heads revolve are cylindrical and true to a common center, while the intervening part is shaped to give such a reciprocating motion to the piston-valves that an equal transmission of power is maintained at all points of the revolution. The piston is of cast iron, slotted radially through its full length at four equidistant points, enabling the operator to adjust them so as to receive the piston-valve which travels therein. The opposite slots or recesses are connected with each other by means of two holes, into each of which is fitted a cylindrical tube, bored from both ends, leaving an intermediate portion solid. These cylindrical tubes contain springs which bear on the valves, keeping them in contact with the inner periphery of the cylinder, the tubes and springs moving reciprocally with the valves. Each end of the piston is let into and accurately fitted and secured to a cast-iron piston-head, the periphery of each piston-head and the inner periphery of its cast-iron packing-rings forming a ground joint. The arms of the packing-rings are fitted into recesses in the piston-heads, and the ends of the arms are in contact with the periphery of the piston, their inner faces being in line with the sides of the recesses of the piston. The packing-rings and arms are kept in contact with the ends of the cylinder by means of spiral springs inserted between them and the followers screwed to the piston-heads. The four piston-valves which transmit the power of the steam travel in the recesses in the piston, between and in contact with the arms of the packing-rings. They are of crucible steel, and are recessed in such a manner that only the portions which travel between the arms of the packing-rings and the piston are required to form a close connection with the piston are subject to contact.

The shafts are also of crucible steel, each formed with a flange of sufficient diameter to give a broad base, which is fitted into a recess on the outside of the piston-head. The bolts or screws which combine the piston and piston-heads pass through these flanges, thus in effect making of these parts one solid piece, revolving with the packing-rings on a common center. A metallic packing invented for and peculiar to these machines prevents any steam or water which may accumulate between the piston-
Novelties.—Fig. 7.—New Rotary Hoisting Engine, Built by E. W. Bliss, Brooklyn, N. Y.

Lane's Patent Door Hanger.

Lane Brothers, Poughkeepsie, N. Y., have recently brought out the door hanger represented in Fig. 8. of the illustrations, and also a track for the same, each protected by separate patents. As indicated in the cut, it will be seen that this hanger is anti-friction in its movement, having a rolling motion only, the load being carried by the small steel axle of the wheel, this axle resting under the parallel ways of the hanger, while the periphery of the wheel follows the track. The wheel being many times larger than the axle, the door is allowed to open from 5 to 10 feet while the axle traverses the length of the parallel ways. The point is made in favor of this construction that friction is reduced to a minimum and a motion secured very much easier than where the axle runs in a stationary box. The whole hanger is made of wrought iron except the wheel and axle, the latter being made of steel. It will be observed also that the shape of the hanger is such as to insure strength and give a wide bearing on the door. It is mentioned also in its favor that no oil is required and that noiseless motion is always secured. The special features of Lane's patent track are also exhibited in the illustration. It consists of flat wrought iron 1 1/4 x 3/4 inches in size and supported in position by hollow iron brackets, as shown in the cut. These brackets are each fastened to the building by a single screw at distances corresponding to the holes in the track, and when so fastened a common coach screw or carriage bolt is put through the hole in the track, passing also through the bracket into the building, making, it is claimed, a very strong fixture of neat appearance. The lower edge of the track is even with that of the brackets, and the door is hung beneath as near as possible without contact, thus effectually preventing derailment without any additional device. In favor of this track the following points are made: That it requires no heading or roofing, as snow, ice or other matter cannot lodge to prevent working; that there is no liability to decay; that the swell and shrinkage which apply to all wood track ways having iron rail attached, or otherwise, are also avoided; that the cost is less than that of wood track, and the track is superior when completed. The manufacturers call attention also to the fact that it is not necessary to use this track with their hanger, but that the ordinary iron track of either cast or flat wrought iron may be used if desired. The hanger is made in two sizes—No. 1 for doors to slide 5 feet and No. 2 for doors to slide 10 feet.


The Kelly patent adjustable shelving, as shown in Fig. 9, needs very little description and is evidently simple in construction, easily adjusted, and can be attached to any wall or level surface. The manufacturers recommend it for fire-proof buildings, vaults, &c., since when sheet iron is used for shelves the structure is entirely metallic. Another advantage claimed for the use of sheet iron for shelves is in the economy of space, as 3/4 inch is saved by substituting a sheet-iron shelf in place of wood. Its cleanliness is another desirable feature mentioned, as there are no corners to catch and hold the dirt, and each shelf can easily be lifted out and cleaned or painted without the use of a single tool. The uprights, as shown in the cut, are provided with slots into which the bracket fits, the pin shown in the slots holding it in place. The manufacturers call attention to the fact that it is not necessary to use the iron rail of the usual type, but that plain flat iron may be used, and the expense reduced.

Fig. 5.—Lane's Patent Door Hanger.

Fig. 9.—The Kelly Patent Adjustable Shelving.
Novelties.—Fig. 10.—Adjustable Handle Draw Knife, Showing the Knife Closed.

New Adjustable Handle Draw Knife.
The accompanying illustrations, Figs. 10, 11 and 12, represent an adjustable handle draw knife which has just been put on the market by A. J. Wilkinson & Co., 184-188 Washington street, Boston, Mass. The illustrations represent some of the different positions in which the handles can be fastened, Fig. 10 showing the draw knife closed, and Figs. 11 and 12 representing it in other positions which may be convenient to the carpenter or other woodworker in the use of the tool. These cuts indicate clearly the general appearance of this article, and show its construction and method of operation.

The handle, it will be perceived, is pivoted at the end of the blade and is held in the desired position by means of a ratchet and pawl, the latter being carried into the ratchet by a spring. By this arrangement each handle can be fastened in either of four positions—closed down on the blade, as in Fig. 10; at right angles with the blade, as in Fig. 12; and turned back, as in Fig. 11, a position also in which the knife will be found convenient for some kinds of work. The tool is made 6, 7 and 8 inches long.

Acme Sash Lock.

In our description of the “Acme” sash lock and balance shown in Fig. 12 of our last issue we conveyed the idea that the two articles shown in Figs. 13 and 14 were the two parts necessary to be employed upon a single pair of sash. We now call attention to the fact that the two illustrations show two different articles. The sash lock shown in Fig. 13 is applicable to both upper and lower sash, requiring only to be inverted for the upper sash. The device shown in Fig. 14 is a combined sash lock and balance, and is adapted to be used where sash weights are not employed. We take pleasure in making this correction.

A New Syphon-Valve.
Alphense Manor, No. 232 William street, New York City, is introducing a syphon-valve to take the place of a water-closet cistern or spring valve for water-closet wash-outs. The general appearance of the article is shown in Fig. 13 of the engravings. The lever is connected to the pull by means of a chain. As soon as the lever is let go the air rushes into the pipe and forces all the water out of the syphon, which overflows the pan. Another feature to which the maker directs attention is that with this syphon no water or air is drawn from the bowl in case water is being drawn from the supply-pipes on the floor below. Annoyance of this kind is prevented while the pull is held up, since the air-pipes supply air for bowl, supply and syphon. The special advantages of this device claimed by the maker are its cheapness compared with a tank; nothing to get out of order; neat appearance and indefinite durability. A good pan water-
Architectural Ironwork.

The application of cast iron to architectural purposes has had the same vicissitudes as almost every other material that has been adapted to a social use. The facility with which it could be applied to fronts and to the purposes of decoration generally induced its very extensive employment at the outset in forms which experience ultimately indicated were not best adapted to it. A reaction set in, and a period followed in which cast iron was less employed. A revival to a certain extent has taken place since, so that cast iron in its employment about buildings may be considered at the present time to be in its third stage. At present it is being used with far more skill and with a far better knowledge of its real utility than ever before. It is largely combined with brick, so that the objections to it on account of its sudden destruction by fire and of its sudden destruction have been in a large degree removed. It is also very extensively used in the way of trimmings, and in combination with wrought-iron frames. Cast iron is perhaps more extensively employed at the present time than ever before, and in such ways as to be open to few or none of the objections which formerly prevailed against it.

We are indebted to Messrs. J. B. & J. M. Cornell, of the Cornell Iron Works, this city, for the originals from which the accompanying engravings were made, and which illustrate in some degree modern applications of iron to architectural purposes. The designs presented have been adopted somewhat indiscriminately, but they illustrate the manner in which cast iron was less employed. A reaction set in, and a period followed in which cast iron was less employed. A revival to a certain extent has taken place since, so that cast iron in its employment about buildings may be considered at the present time to be in its third stage. At present it is being used with far more skill and with a far better knowledge of its real utility than ever before. It is largely combined with brick, so that the objections to it on account of its sudden destruction by fire and of its sudden destruction have been in a large degree removed. It is also very extensively used in the way of trimmings, and in combination with wrought-iron frames. Cast iron is perhaps more extensively employed at the present time than ever before, and in such ways as to be open to few or none of the objections which formerly prevailed against it.

The engravings shown on the opposite page represent a balcony fire-escape, and indicate a form of construction which in its general features is being very largely employed in this city at the present time. A balcony of ornamental pattern, as in this case, or of the simplest possible construction, to satisfy his own requirements, while the other is a contribution from an architect in answer to a request from one of our readers, published two months since. All of them will bear careful study, and each will, no doubt, prove valuable in many directions.

A somewhat remarkable controversy has been in progress during the past few weeks between the master plumbers and the dealers in plumbers' supplies in New York City and Brooklyn. Perhaps we would be more accurate by giving it a longer period, for the action upon the part of the National Association of Master Plumbers which precipitated the controversy took place several months ago at the convention which was held at Baltimore. The plumbers of New York and Brooklyn had a joint meeting with the manufacturers and dealers in plumbing material during the latter part of August, and at that meeting the plumbers submitted a plan showing the shape and location of the store front in cast iron, with a stairway between communicating with the upper story. Plate-glass windows are used in the store front, not extending the whole height, however, but being divided on a line even with the heads of the doors. The upper story is characterized by abundance of light, and yet the plasterers and columns are not so small as to reduce the strength of the supporting wall. The upper corner may be supposed to be of galvanized sheet iron. It would probably be better made of that material than of cast iron, considering cost and utility. The whole design is of a character to admit of modifications and adaptations to use in various situations. The engravings on the opposite page represent a balcony fire-escape, and indicate a form of construction which in its general features is being very largely employed in this city at the present time. A balcony either of ornamental pattern, as in this case, or of the simplest possible construction, to satisfy his own requirements, while the other is a contribution from an architect in answer to a request from one of our readers, published two months since. All of them will bear careful study, and each will, no doubt, prove valuable in many directions.

NOTES AND COMMENTS.

This issue contains more than the usual allowance of house plans and designs. We present in this issue the plans of seven-roomed brick houses, and also two contributions in our Correspondence Department, illustrating and describing houses of moderate cost. One of these is the record of the experience of a correspondent who has built to the dealers certain propositions which had been adopted unanimously by their local associations and which it was demanded the trade should adhere to. Their demands upon the trade were as follows:

1. That the manufacturers and dealers in materials shall not sell to others than licensed plumbers, who shall exhibit a certificate duly signed by the president and secretary of their respective associations. This certificate guarantees that such plumber is entitled to all privileges, and is to be renewed every three months.

2. That no manufacturer or dealer shall sell plans or specifications for any persons, whether engaged in the plumbing business or not.

3. That no plumber, manufacturer or dealer in patented articles shall sell to others than licensed plumbers, as stipulated in Article 1.

4. That any plumber who waives his discount in favor of his customer shall be dealt with as one not entitled to the regular trade.
October, 1884.

architects and contractors to control the 
buildings and put it beyond the power of
ful it would materially enhance the cost of
menace to the public, since if it were success¬
all this and more was perceived by
reasonable limits and secure satisfactory
stipulated in Article 1.

shall be prohibited from selling plumbing
shall not be accepted from any interested
agents of manufacturers and dealers
4. Agents of manufacturers and dealers
shall be prohibited from selling plumbing
5. That manufacturers and dealers shall
6. That manufacturers and dealers shall

shall be prohibited from selling plumbing
goods to any person other than those stipu
article of the craft.

we further regret the position you have
we must embrace this opportunity of stating
resolutions, merely to show that the demands
resolutions, contained in the first and third
9. That the manufacturers and dealers
8. Agents of manufacturers and dealers

shall not be accepted from any interested
party, whether owner or contractor.

Architectural Ironwork.—Balcony Fire-Escape, Elevation.—Scale,

Architectural Ironwork.—Balcony Fire-Escape, End View.

Architectural Ironwork.—Balcony Fire-Escape, Top View.

Architectural Ironwork.—Balcony Fire-Escape, Elevation.—Scale,

Architectural Ironwork.—Balcony Fire-Escape, End View.

Architectural Ironwork.—Balcony Fire-Escape, Top View.

Architectural Ironwork.—Balcony Fire-Escape, Elevation.—Scale,

Architectural Ironwork.—Balcony Fire-Escape, End View.

Architectural Ironwork.—Balcony Fire-Escape, Top View.

Architectural Ironwork.—Balcony Fire-Escape, Elevation.—Scale,

Architectural Ironwork.—Balcony Fire-Escape, End View.

Architectural Ironwork.—Balcony Fire-Escape, Top View.

Architectural Ironwork.—Balcony Fire-Escape, Elevation.—Scale,

Architectural Ironwork.—Balcony Fire-Escape, End View.

Architectural Ironwork.—Balcony Fire-Escape, Top View.

Architectural Ironwork.—Balcony Fire-Escape, Elevation.—Scale,

Architectural Ironwork.—Balcony Fire-Escape, End View.

Architectural Ironwork.—Balcony Fire-Escape, Top View.

Architectural Ironwork.—Balcony Fire-Escape, Elevation.—Scale,

Architectural Ironwork.—Balcony Fire-Escape, End View.

Architectural Ironwork.—Balcony Fire-Escape, Top View.

Architectural Ironwork.—Balcony Fire-Escape, Elevation.—Scale,

Architectural Ironwork.—Balcony Fire-Escape, End View.

Architectural Ironwork.—Balcony Fire-Escape, Top View.

Architectural Ironwork.—Balcony Fire-Escape, Elevation.—Scale,

Architectural Ironwork.—Balcony Fire-Escape, End View.

Architectural Ironwork.—Balcony Fire-Escape, Top View.

Architectural Ironwork.—Balcony Fire-Escape, Elevation.—Scale,

Architectural Ironwork.—Balcony Fire-Escape, End View.

Architectural Ironwork.—Balcony Fire-Escape, Top View.

Architectural Ironwork.—Balcony Fire-Escape, Elevation.—Scale,

Architectural Ironwork.—Balcony Fire-Escape, End View.

Architectural Ironwork.—Balcony Fire-Escape, Top View.

Architectural Ironwork.—Balcony Fire-Escape, Elevation.—Scale,

Architectural Ironwork.—Balcony Fire-Escape, End View.

Architectural Ironwork.—Balcony Fire-Escape, Top View.

Architectural Ironwork.—Balcony Fire-Escape, Elevation.—Scale,

Architectural Ironwork.—Balcony Fire-Escape, End View.

Architectural Ironwork.—Balcony Fire-Escape, Top View.

Architectural Ironwork.—Balcony Fire-Escape, Elevation.—Scale,

Architectural Ironwork.—Balcony Fire-Escape, End View.

Architectural Ironwork.—Balcony Fire-Escape, Top View.

Architectural Ironwork.—Balcony Fire-Escape, Elevation.—Scale,

Architectural Ironwork.—Balcony Fire-Escape, End View.

Architectural Ironwork.—Balcony Fire-Escape, Top View.
that is directly antagonistic to the freedom of our laws and the spirit of our institutions. We ask this in view of the stand we have been compelled to take, which is, in our opinion, the only one that could be taken by upright and honorable business men."

This very reasonable appeal to architects, we are certain, cannot fail of having an important influence upon the controversy, although it would have been in far better taste if the architects had been asked to protect their clients' interests instead of the interests of manufacturers of plumbing goods. The interests of the building trades in this issue are unquestionably upon the side of the manufacturers and dealers. As would be very natural to suppose, this controversy has called out numerous newspaper criticisms and comments. The daily press, as well as all the trade and technical papers, with the exception of the organs of the plumbers' associations, have been on the side of the public at large, as opposed to the preposterous demands of the plumbers. The Metal Worker, which foresaw this difficulty, good standing. A strict interpretation of this remarkable provision, therefore, would deprive the public at large of the valuable services of the plumbers, because they would not be allowed to sell to any one save plumbers duly licensed. It is hardly to be supposed that householders in order to obtain plumbing fixtures would be willing to qualify and obtain licenses as practical plumbers in addition to paying the high prices that are provided for further along. Should they go to the trouble of becoming plumbers, they would very likely, in protection of their own interests, do their own plumbing. The spectacles of plumbers preying upon each other in the festive manner this resolution provides for is indeed refreshing. On the other hand, the fact that none but plumbers for the future are to be allowed the luxury of plumbing fixtures in their houses is serious in the extreme.

"The fourth article in the remarkable document submitted by the plumbers provides a penalty for any plumber who waives his discount in favor of his customer. The only possible interpretation of this clause is that from the time of the organization of the National Association of Master Plumbers, has been very pronounced in its views, it has analyzed some of the demands made by the plumbers as given above, with the following results: The demands of the local associations of master plumbers upon dealers in plumbing materials, when critically examined, show in themselves that the plumbers have greatly overshot the mark in this matter. The third resolution reads as follows: 'That no plumber, manufacturer or dealer in patented goods shall sell to others than licensed plumbers, as stipulated in Article I.' Article I, here referred to, provides that manufacturers and dealers in materials shall not sell to others than licensed plumbers, who are to exhibit a certificate duly signed by the president and secretary of their respective associations. From this resolution it appears, therefore, that no plumber is allowed to sell his goods to any one except some other plumber, and this plumber in turn must be a licensee of some association and in the plumber is obliged to demand for his goods in all cases the full list price. By the terms of this resolution he is no more allowed to waive a portion of his discount than he is the entire discount. The working of this becomes obvious. On many lines of goods in which plumbers buy, the discount is from 50 to 60 per cent. For example, 50 and 60 per cent is a well-known rate on several lines of brass goods. If a plumber buys goods at 60 per cent discount and sells them at list price, he makes a profit of 100 per cent. Such profits, which the plumber is forced under severe penalties to exact, are enough to justify all the newspaper paragraphs that have ever been flung at him. These have been based upon his supposed habit of exorbitant charges. The public have been taking the humor of the press with many grains of allowance, but with such figures as those before them, backed by the formal action of two local associations of master plumbers, they will have reason to believe that the most exaggerated stories of the past have had a strong foundation in truth."

CORRESPONDENCE.

A House for "Carpenter's Wife."—Having been called gallant by the editor of Carpentry and Building for my contribution in reply to a request for the perspective view of a building to a "Woman's House Plans," some months since, I shall be hardly able to maintain that character unless I do something in response to the request of a "Carpenter's Wife," published in the issue for August. I therefore submit for consideration a perspective view and suggestions as to the modification of the floor plans submitted by the correspondent named. By the plans here shown, it will be noticed that a larger closet, with a window for light and ventilation, is provided in the family room. There is also a larger china closet opening from the dining room. The single stairway is more centrally and more conveniently located. A pantry is also provided, and by means of a slide, which is shown, much, much going down out of the dining-room, as was originally intended. The coal bin should be covered with about 14 feet high and be provided with a trap-door in the top. The top of the bin will thus serve as a good receptacle for boxes, &c. The coal should be put in through a chute from the outside of the building. The floor of the coal bin should be built with an incline, so as to throw the coal to the supply-box, which is arranged something like a slip in the kitchen, with a top to open. By this arrangement there will always be a constant supply of coal convenient to the range. In the plan as I have modified it the chambers are all of good size and well supplied with closets. If desired, by placing a double chimney in the hall partition of the chambers, all the chambers may have access to separate flames in the main chimney, thus giving the opportunity of
thorough warming. The dormer window over the landing lights the stairway and the building and brackets Venetian red, the dark brown. Spots and figures in panels. deepened with orange chrome. The belts panels of brackets, between windows and

to be painted as follows: The body of the upper hall I would recommend this building frieze to be painted with French ocher to harmonize well with the green surround striking or decided, but they will be found The colors selected may appear to be rather brown, the three Projecting bands to be rolls red. The top section of chimney to be red. The roof to be dark slate and the ridge I offer these suggestions as to the painting ness in appearance that will be sure to please. will have a comfortable warmth and cheeri

to the Foot.

Suggested by Mr. C. N. Cornell. —

Note

CHUTE

CARPENTRY AND BUILDING. —

Sscopic view which our correspondent has given shows a design that is in keeping with the general intent of the building. The dormer, which, and the attic chambers or store rooms might be obtained which our corres
dents have been so handsomely presented, and, while there is little to which exception need be taken, there is one feature which is hardly in keeping with others. The rear porch forming the entrance to the dining-room has been supported at its outer end by a bracket of a shape very much reminding one of an inverted harp. Our office boy, when he saw this design, sug
gested that perhaps the author was getting his harp ready to hang on the willow. Such a suggestion, of course, is not to be considered moment, but we do think that the author comes to work out this plan in the way of elevations and details he will probably modify this feature or substitute some other shape for it. The scheme of color which our correspondent suggests is certainly striking, and if carried out literally we think would have a pleasing effect, while at the same time it would produce a house that would command attention upon the part all who saw it. Contrasts and somewhat loud schemes of color are at present very popular in the fashion, and should any of our readers build the house here shown and paint it to the scheme laid out, they will have the satisfaction of knowing that they are on the front ranks of the extremists in house coloring. Our own taste would indicate something less pronounced, yet we agree with our contributor that in summer and winter the scheme as he has described it will have some of the advantages named.

Vermont Houses.

From C. W. P., East Shoreham, Vt.—Although the house plans published from time to time in Carpentry and Building are admirable, no one in this vicinity could be prevailed upon to adopt them entirely. The requirements of houses in this vicinity are almost invariably a large kitchen, two large pantries or storeroom, at least one bedroom (but more often two) of a good size, a diningroom, a living-room, a front hall with stairs, and at least four closets, including china closets in dining-room. There is also required a back stairs out of the kitchen, with stairs to the cellar underneath. There is very seldom a bathroom or a private kitchen. No sleeping-room on the first floor is a fatal defect to plans in this section. People in the neighborhood do not build a house the year after building to no plan at all, resulting in eye

score to the otherwise beautiful landscape. Building to no plan at all, resulting in eye

score to the otherwise beautiful landscape.

First Rank of Extremists.

From L. H., Administrator, a “ Carpenter’s Wife,” and supplementing her ideas by professional plans submitted by a "Carpenter’s Wife," —

See their interests, but will inflict countless inconvenience upon themselves and their children for the sake of saving $25 or $50 architect’s fees. This is not real saving, for the front of the houses of the character which we have described are altered almost as soon as built. Alterations begin at this time and are kept up year after year until little resemblance to the original internal arrangement remains. If people could be made to see that it requires more thought to build a successful house than it does to build a rail fence, failures in house planning would be less frequent and many new houses would be superior to the old ones.

Combined Calipers and Dividers.

From A. G. S., Chatanooga, Tenn.—In the December number of Carpentry and Building attention was directed to a combined caliper and divider. I desire to say that I had this tool described in use eight years ago. By examination of the instrument I see it was patented in 1872, according to it, it would seem that the paper is in error about the tool in question being a “novelty.” As to its value, I think also a mistake has been made. Theoretically the tool is a very fine one, but practically it reminds one of an article dis covered in one of our Western States, which, the geologist decided, looked like coal, felt like coal, and was coal; but, nevertheless, it would not burn. The tool in question looks well in a kit, but for practical work it is not altogether a success. The arc is so near the pivot, and the legs are so long and slender, that it is impossible to strike a large circle with accuracy. The points do not meet by about a 1/2 inch, which renders the tool unfit for general use in scribing base and fitting doors and the like. As Carpentry and Building is published for the good of the trade rather than as an advertising sheet, I presume this correction will be acceptable for publication.

Pitch of Roofs.

From J. H., Armstrong Mills, Ohio.—I desire some information with regard to the pitch of roofs—the pitch is calculated and the definition of the different terms used in this connection—how it is determined. Our correspondent will find in the January number of Carpentry and Building an article published for the good of the trade which may concern him, the pitch of roofs.

transposed caliper and divider. I desire to

For C. M. B., Wheeling, W. Va.—If the readers of Carpentry and Building are not already tired out on the subject of hoper bevels, I will state that I have seen of whom it may concern, that the butt joint

A Mechanical Means of Solving Hopper Bevel Problems.

From J. E., Louisville, Ky.—In “Jumbo’s” specifications, published in the October number of Carpentry and Building for 1882, I find the following: “Construct in the bottom of the cistern a brick filter in the form of a pyramid, say 2 feet high, 2 feet wide at bottom and 4 inches wide at the top.” I desire to inquire about how much water may be expected to pass in a day’s time through a filter constructed to these dimensions, suppos ing the filter to be covered with water.

Brick Filter.

Answer.—The amount of water that would pass through brickwork under the conditions above described would depend in some degree upon the character of the water, the frequency with which the filter was emptied of water, and the height of the water in the well or cistern in which it is placed. If, for example, if the filter was kept partially emptied all the time, and the water stood in the cistern at a considerable height, the pressure of the water itself would cause the filter to be filled more quickly, or, rather, cause the water not to be filtered at all, which would be the case under other circumstances. From our own experience with brick filters we think there would be no difficulty in obtaining daily, from a filter constructed in this manner, the all the water that
would be ordinarily drawn from a cistern for domestic purposes. The supply would probably be in excess of requirements.

**Sawed Rosettes.**

From C. M. Rathbone, Wheeling, W. Va.—I find that a great many useful ornaments may be produced with an ordinary scroll-saw or band-saw by means of a small con- trivance of which I send you a model and drawings herewith. This device may be made to cut any angle. I find it so useful and so convenient in its use hundreds of designs can be manufactured, the ornament being limited only by the taste and skill of the operator. I send with the model a few specimens of work performed by means of this device. The ornament of a different number of sides from 4 or 8 is desirable, the gain and block can be made of a different shape from that shown. It is necessary that the block should have as many sides as the ornament, and that the gain be made to fit the block. From the above it is obvious that many designs of center ornaments, rosettes, &c., hitherto carved by hand can be produced very quickly by means of the device shown. The size of the device is not material. It should, however, be proportioned to the size of the work to be done. For example, for a 3-inch rosette I would make it about 1 foot long by 4 inches high. The gain in the inclined piece I would make about 2½ inches square. Referring to the sketch, the block should fit neatly in the gain in the inclined piece. The gain and block can be square or semicircular. The following directions will indicate how this device is to be used: Cut the face figure of the ornament first, then fasten it to the block by means of wood screws, as shown. Drop the block into the gain in the inclined piece, first laying off the edges as they are to be sawed. It will be noticed that in the accompanying sketches of work done by this device the edges are all simply gauged an equal distance from the back. This, however, can be varied with good effect sometimes.

**Fire-Proof Paint.**

From H. S. Derby, East Saginaw, Mich.—I desire to inquire how a living-room 14 x 16 feet in size can be ventilated with air supplied in the same way, we think the life of people who occupy ordinary dwellings would be far less desirable that it is prepared with boiled linseed oil and the statement that it contains no silicate of soda or alum. The broad assertion is made that powerful chemical agents are used which unite by affinity, and the writer states that they penetrate the surface and make it hard and durable as well as fire-proof. The testimonials to which our correspondent refers are indeed very flattering, but, like many others, when boiled down they contain little that is of tangible value. Several of the writers have witnessed experimental tests of the fire-resistant qualities of this paint, and give their opinions accordingly. The samples which Mr. Derby has sent us are so small as to render it impossible to make any experiments on our own account, and accordingly I send my letter before our readers without expressing an opinion either way as to the quality of the paint in which he deals.

**Tight-Fitting Sash.**

From J. V. Macroth, Iowa.—I submit, for the benefit of the readers of Carpentry and Building, my method for making tight joints in fitting sash to windows. The plan also allows the sash to work freely when re- moved from the lock. The ratchet need not be very closely in the sash channel, it being desirable that they should run easily. The inside stool and the outside headstock are beveled, and the sash are beveled correspondingly. The upper sash, in closing, crowds the parting strip at the upper end and the lower sash crowds it at the lower end. Now, if a check rail be fitted so as to have the sash come just to the parting strip, and it is jointed about ½ inch, hollowing, where the sash lock is drawn up, it makes a tight joint all around, with no annoyance of rattle.

**Radius of Splayed Jams.**

From J. Y. H. S., New York.—The word- ing in explanation of splayed jamb, in the September number, should read thus: "From outside figures to the point 5 draw lines, crossing face of segment jamb. The lines thus drawn will indicate direction of saw cuts."

**Ventilation of Living-Room.**

From W. J. Truex, Minn.—I desire to inquire how a living-room 14 x 16 feet in size can be ventilated with air supplied in the same way, we think the life of people who occupy ordinary dwellings would be far less satisfactory than at present. In the main our correspondent is correct in supposing that ventilation should be provided for the upper sash. Crowds the parting strip at the upper end and the lower sash crowds it at the lower end. Now, if a check rail be fitted so as to have the sash come just to the parting strip, and it is jointed about ½ inch, hollowing, where the sash lock is drawn up, it makes a tight joint all around, with no annoyance of rattle.

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by means of the inside pipe, as mentioned. Its success if arranged this way will depend somewhat upon the height of the chimney and the amount of heat derived from the stove-pipe. With the hope that those of our readers who have experimented practically in this direction will answer this correspondent's questions as he desires, we shall not enter into a discussion of the subject at this time, although upon some future occasion we may give it further attention.

Building Paper.

From H. T., St. Louis, Mo.—Please inform me if paper is used as a building material, and, if so, with what success.

Answer.—We hardly know in what sense our correspondent proposes this question. Paper is so extensively used in building that it would seem that almost every one must have some information as to its employment in buildings. It is possible that this correspondent anticipates the use of paper as a leading building material rather than as an auxiliary. It is not employed in that sense. Paper is used for fastening under floors. It is also used for the purpose of making houses tighter and warmer by being placed underneath the weatherboarding. It has its use also as an inside finish. It is used in different roof constructions, and is occasionally employed as an outside finish. In the latter case, however, we believe it is not an entire success. Paper gas and water pipes are in use to a limited extent, while paper utensils are very common. What is known as straw lumber is in some respects of the same nature as paper, and this material, we understand, has been successfully employed as a finish for both interior and exterior purposes.

Making an "O. G." Hand-Rail.

From F. S. W., Cleveland, Ohio.—A short time since "A. L.," of Ferryville, Iowa, asked how long it would take to make a 4-inch "O. G." rail for the plan of stairs shown in Fig. 1, of the XXIIIrd article on stair-building, published in the December issue for 1882, the work to be done by hand. In reply, I offer it as my opinion that it would not be difficult to complete the work in question in three days. There would be at least two other crooks besides the one shown in the plan, also the straight rail. Much, however, depends on the quality of wood used for the rail. Something also depends upon the skill of the workman.

The Steel Square.

From A. S. Colfax.—I desire to learn, through Carpentry and Building, if there is a publication devoted to the use of the steel square, and, if so, where it can be procured! Note.—We do not know of any paper that is devoted to the use of the steel square, and, if so, where it can be procured! In short, we do not know where else to refer our correspondent for as full an account of the use of this tool as any that can be found. In all the problems of framing which we have discussed we have taken care to point out how the various lines and cuts could be obtained with the square, as well as by other means, and in our back volumes a number of special articles on the use of the steel square will be found. We think that Carpentry and Building comes as near being a periodical devoted to an exemplification of the uses of this tool as any that can be found. In each of these respects of the same nature as paper, as the leading building material rather than as an auxiliary. It is not employed in that sense. Paper is used for fastening under floors. It is also used for the purpose of making houses tighter and warmer by being placed underneath the weatherboarding. It has its use also as an inside finish. It is used in different roof constructions, and is occasionally employed as an outside finish. In the latter case, however, we believe it is not an entire success. Paper gas and water pipes are in use to a limited extent, while paper utensils are very common. What is known as straw lumber is in some respects of the same nature as paper, and this material, we understand, has been successfully employed as a finish for both interior and exterior purposes.

Species Rosettes Produced by Mr. Rathbun's Device.

in a country village. I want something that will look well. I desire to ask whether it will be best to employ an octagonal or square form. I also desire to know whether the same size of windows shall be used in this part as in the other portion of the house, or would it be best to vary the size and style of the sash. Plans and details in an early number of the paper would be a favor.

Answer.—It would be impossible to publish special plans and details in answer to this correspondent's request that would be of any advantage to him. The questions which he raises are essentially questions of taste and preference, and for which no definite rule could be given. It would be particularly to his interest to follow. We have published a great many designs of bay windows in the back numbers of Carpentry and Building, and shall undoubtedly give many more in the future, but all of them have been given as parts of special plans and details in answer to inquiring any works on architecture at hand, and making a design to meet the case by selecting from these such features as seem most appropriate for employment.

Fastening Newels and Hand-Rails.

From M. W., Chattanooga, Tenn.—I desire to say to "E. S.," of East Providence, R. I., who inquired about fastening newels, some time since, to use a ¾-inch rod through cap and newel and through the floor. An extra piece of timber 2 x 4 under the floor should also be used. The rod should be provided with a nut on one or both ends, and by means of it the whole construction be bolted down. By this means a strong job, so far as the newel is concerned, will be obtained. The rail in turn should be bolted to the cap.

Construction of a Bay Window.

From H. A. B., De Forest, Wis.—I would like some information about the construction of a bay window in connection with a house in front. An extra piece of timber 2 x 4 under the floor should also be used. The rod should be provided with a nut on one or both ends, and by means of it the whole construction be bolted down. By this means a strong job, so far as the newel is concerned, will be obtained. The rail in turn should be bolted to the cap.

Construction of Mansard Roofs.

From T. B., Philadelphia.—In a recent issue of Carpentry and Building a design for a mansard roof was presented. I would like to make some objections to it. In the first place it may be remarked that the floor joints cannot be run out to receive the cornice, as shown in the diagram in question, without making the roof look too heavy or squatty. Another objection is that of having the front lines of the roof projecting beyond the face of the house. I have still another objection which is important to me, although it may not be of equal importance to others. I do not like to have the water from the deck-roof run down over the mansard roof. However, some time since, to use a ¾-inch rod through cap and newel and through the floor. An extra piece of timber 2 x 4 under the floor should also be used. The rod should be provided with a nut on one or both ends, and by means of it the whole construction be bolted down. By this means a strong job, so far as the newel is concerned, will be obtained. The rail in turn should be bolted to the cap.
solved. I say this after having tried a great many different ways and styles. I use boards for the slatting pieces or rafters. I find after the sheeting boards are nailed on the roof is very stiff, and this construction avoids extra weight in the roof. A special advantage of the construction is a good gutter and rooms with vertical walls.

Measuring Earth and Stone Work.

From Dexter.—I would like to learn, from the practical readers of Carpenter and Building, the best method of measuring the number of yards of dirt in a cellar and the best plan for getting the number of perches of stone in a given wall.

Note.—We publish this inquiry without being satisfied in our own mind of its exact intent. The usual plan of figuring earth work is in principle the same as that of calculating cubic contents for any purpose whatever. Thus by multiplying the length, breadth, and depth altogether, if these dimensions are in feet, there will be given the cubic contents of the cellar, or whatever the figures represent, in feet. This may be reduced to yards by dividing by 27, the number of cubic feet in a cubic yard. On the other hand, if the dimensions in the first place are in yards and fractions of a yard, the result of the multiplication will be cubic yards.

The same general advice applies to the calculation of masonry. By obtaining the number of cubic feet in a given wall and dividing by the number of feet in a perch, the result in perches will be obtained. If our correspondent refers to the methods for shortening this process, and which, at best, are applicable only in rare cases, our answer as given will not interest him. We shall be glad to hear from our readers who are using such plans will write us for the benefit of this correspondent and others. The whole subject of measurement and calculation is carefully discussed in most engineer's and architect's pocket-books. Our correspondent may find it of advantage to examine "Vedges' Architect's and Builder's Companion," and also "Nystrom's Mechanics." Both of these are books that will hardly come amiss in the library of any architect or builder.

Problem in Hand-Railing.

From W. G. M., Warrensburg, Mo.—According to my understanding of stair-building, a face-molding cannot be drawn without knowing the height or rise of the tread, diameter of cylinder and thickness of fillet, if any. I notice that the first articles of the stair-building series, published some time since in Carpenter and Building, did not take into consideration the rise, the tread, the cylinder and fillet, if any, in drawing the diagrams. Accordingly, I consider the lessons as presented deficient in this particular. The principles are correct. I inclose a drawing of a straight flight of stairs, with cylinder at top and with ⅜-inch fillet long baluster on the return landing. The cylinder is 7 inches in diameter, the rise is 7 inches and the tread 10 inches. The landing riser is placed at the spring of cylinder; accordingly, the crook has two pitches. My purpose in submitting this diagram is to request the author of the series of papers above referred to to draw a face-mold according to his system. If the articles are explained in this particular they will be about right, according to my reasoning.

Answer.—The first of the accompanying illustrations is a duplicate of the drawing inclosed by this correspondent. He does not seem to find fault with the stair-building articles as we have published them, except that some of them were not specifically applied to examples of stair-building. In reply to this we would say that this was done purposefully, so as not to burden the learner's mind with too many things at once. In the case presented, we suggest cutting off ⅜-inch from the long baluster on the landing. It is not necessary to have two pitches in the crook. In the second engraving submitted herewith we show how such a crook may be taken out of the plank. The ground plan is shown in the lower part of the diagram, and shows the method of drawing the face-mold. To the pattern is added some straight wood at the lower end for convenience in holding the piece in the vise. The line B of the pattern is drawn with the pitch-board of the stairs, extending over A B of the ground plan, while e of the pattern corresponds parallel with the face of the plank. The pitch board at the upper end is the angle formed by the rise and rake lines of the pitch-board. The height gained by the raking...
Carpet and Building.

First Floor Plan.—Scale, \( \frac{1}{2} \) Inch to the Foot.

House fronts the west, thus bringing the bay window on the south. The measurements given in the floor plans are inside of finish. The front chimney was located so as to permit the use of a grate in the front room. A door occurred between the bedroom and the lobby leading to kitchen, which we find a great convenience. The house is heated by a furnace, and wood and coal bins are located in the cellar. On the north side and back of the bedroom an open porch or platform is used. We thought to roof it over would make the kitchen too dark. The chambers are plentifully provided with closets, a feature which housekeepers generally will appreciate. In the finish of the outside we are in the matter of the front door from the drawing. Instead of the large glass which the front door shows in the drawing, we used two smaller lights of stained glass. In this case the house were occupied by a family who did not care for a bedroom downstairs, that room would make a convenient dining-room, leaving the present dining-room for a sitting-room. The height of ceilings is to feet, in the first floor, and feet in the second floor. The lower rooms, with the exception of the kitchen, are finished in butternut.

Problem in Board Measure.

From H. J. R., Drayton, N. Y.—I happened a short time since to pick up an old copy of Carpenter and Building, and my attention was drawn to a problem in board measure there presented. The problem was stated in the following terms: Given a board feet long running to a point at one end and inches wide at the other, of even thickness throughout. Required the exact distance of a line parallel to the broad end which shall cut the board so as to leave the same amount of lumber in each end. I have not been able to find any solution of this problem in subsequent issues, and therefore I may not be without interest to call it up at this time. As nearly as I can figure it, the line would come inches from the large end. Is this correct? I know of no rule by which to work out the problem exactly.

Note.—We submit this problem and the answer proposed by our correspondent above for the consideration of our readers. Similar problems have been discussed advantageously to all concerned in the past, and the one which this correspondent brings to notice at this time grew out of another, but similar, one, stated in somewhat different terms, which was discussed in our columns shortly before the date named. We should be glad to have this correspondent indicate the method by which he reached the conclusion above, and this leads us to request those who may write to us on this subject in the future to explain in every case the methods by which their results are reached. There are different methods by which this problem may be solved, and we shall be glad to have as many as possible of them for publication. Here is a nut for our mathematically inclined readers to crack. We prefer the discussion here invited to answering our correspondent’s question direct. It will be of greater interest.

Trade vs. Profession.

From Shirley Darke—I presume many of the readers of Carpenter and Building have noticed what Mrs. Van Ronsselaer has written on the August issue of The Century Magazine on the subject of recent American architecture. On page 512 the statement is made that “it is only recently that such works have been confided to hands more skillful than ordinary builders”—that is, architects. The statement brings to notice at this time the growing out of another, but similar, one, stated in somewhat different terms, which was discussed in our columns shortly before the date named. We should be glad to have this correspondent indicate the method by which he reached the conclusion above, and this leads us to request those who may write to us on this subject in the future to explain in every case the methods by which their results are reached. There are different methods by which this problem may be solved, and we shall be glad to have as many as possible of them for publication. Here is a nut for our mathematically inclined readers to crack. We prefer the discussion here invited to answering our correspondent’s question direct. It will be of greater interest.

In Wind and Out of Wind.

From O. L. C., Newton, Mass.—In answer to the inquiry proposed by "S. F. G." in the July number, I would say that when a door strikes the jamb at all points it is "out of wind" and otherwise it is "in wind" or "winding."

Grinding Tools.

From E. C. N., St. Catharines, Ontario.—In reference to grinding tools, I would say I was always taught to revolve the stone toward the edge of the tool. My experience is that this plan makes a truer and better cutting edge.

From S. G. F., Nantucket, Mass.—An emery-wheel will take the temper from a plain iron, owing to the friction, unless the person grinding the tool is very careful and is accustomed to grinding with an emery-wheel, and accordingly knows how to manage his work. In using a grindstone I am in danger, from you there is less water on the tool than when used in the opposite direction; accordingly, there is danger in this case of the temper being drawn. There is much less danger if the stone is used so that the water runs up on the tool.
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Planning a House.

From J. H. L. Jones, Grov's Po., I enclose a plan of the house for the inspection of readers of Carpenter and Building. I would like to learn through the paper a convenient size adapted to this plan—all constructed under one roof.

We take it from our correspondent's question above that he has devised the arrangement of rooms indicated in the accompanying plan without much regard to dimensions. What he desires now is to see a general arrangement maintained, the rooms properly proportioned, and the whole likely to be of service to the correspondent.

Another question I also desire to propose. Is there any method of darkening the color of mahogany, say, 20 to 50 years old? I have seen some mahogany fungoid, and would like to know if the tone of the wood very much darker than the new surface will be. How can a true mahogany color be given to an old maple? The secretory? The only mahogany stain with which I am acquainted is too red for the purpose.

TRADE PUBLICATIONS.

J. G. & J. F. Lown, of Chelsea, Mass., manufacturers of the famous Chelsea tiles, which have of late taken so prominent a place in store decoration and for other ornamental purposes, send us a very beautiful catalogue, probably the handsomest thing of the kind ever issued. The covers are simply charmingly being an art reproduction of a modeled panel in which every detail of the sketch in clay has been preserved with more photographic fidelity. There are 30 artotyle plates, including the frontispiece, which represents a tile mantel in the store of Wellington & Burridge, of Boston. The other 29 pages of plates are devoted to illustrations in red, black, blue, green and brown of the varied products of the Chelsea Tile Works, including everything from the smallest size of tiles up to the most ambitious pieces ever attempted in dust. It would be impossible to describe these tiles in detail. They relate very largely to marble work and are undoubtedly far superior to anything of their kind ever before produced. Plate 17 show a tile mantel complete from floor to ceiling, and is one of surprising beauty. The book is one over which an appreciative person could spend many pleasant hours, and is altogether a work of art and a most instructive one. It contains full particulars requisite for reading, and the pictures here illustrated and explained, and the reader is made so familiar with them as to be able to use the book with the greatest advantage. It is addressed to the building trade of the Northwest. The book contains 112 pages, exclusive of the plates. The former 29 pages of plates of prominent buildings in the vicinity of Chicago and elsewhere on which work of this firm has been placed, the catalogue is by far the most important addition to the literature of this line of manufacture that has recently appeared. Builders will serve their own interest by obtaining it.

TRADE NOTES.

Messrs. Knesley & Miller, 129 and 131 South Clinton St., Chicago, have recently issued a catalogue of galvanized-iron ornamental iron works and roofing and other specialties, which has recently appeared. The book accordingly becomes of value to all applicants. It contains no less than 168 pages measuring 57,949 tons sawn or worked. The book accordingly becomes of value to all applicants. It contains no less than 168 pages measuring 57,949 tons sawn or worked.
Secretary Sideboard.

The amateur cabinet-makers among our readers, we think, will be pleased with the accompanying design and details of a secretary sideboard in the Queen Anne style. In houses where there is no library, most of the writing is transacted in the dining-room, upon a writing-table inconveniently placed. It frequently happens that when the purse present taste for the display of bric-a-brac is equally considered. Having introduced the design, let us explain how to make it:

Before proceeding even to select the wood, the workman should prepare his full-sized drawings, and fairly consider and understand the job he is about to construct. In some shops this is done by the working foreman, but every competent man should be able to strike out his job from such sketches

front and top pediment, the end scroll brackets, bracket over doors at end, plinth lining and bottom carcass should be out of 1-inch stuff before being worked. The uprights 1 1/4-inch, “to hold” 1 1/2-inch when finished. Partition ends 1/2 inch, and moldings for drawer fronts and doors 1/4 inch, to hold 1/2 inch when worked. The facings for the top uprights will also be out of 1 1/4-inch stuff, to hold 1/2 inch when finished. Fine

of the householder will permit the addition of a writing-table the small dimensions of his dining-room prohibit the introduction of extra furniture. The design herewith is just the article to meet the wants of such a case, for it will be readily seen that it combines more useful attributes than a mere sideboard. The secretary drawer and shelf above add to the uses and conveniences of both a bookcase and an escritoire, while the

as are annexed. It will be seen that there is very little carving about our secretary sideboard, but what there is should be sketched out upon a separate piece of paper, along with the pattern for the turned knobs on the top. The cabinet-maker should now carefully take the measurements from his working drawings and proceed to select the wood. The top, door framing, shelves, drawer-

may be used for drawer bottom and back framing. Now cut up the wood to the desired lengths, care being taken to be exact to the working drawings. In cutting the bottom carcasses and top, the two should be marked out upon the same board and the pattern reversed, so as to save wood. Now prepare the bottom uprights to receive the partition rail under the secretary drawer, which being done, the two ends should be
with \( \frac{1}{2} \) inch hard wood to form uprights, and \( \frac{3}{4} \) inch between uprights in order to leave a slight recess. The cornice, made of three separate lengths, should be glued on to the facings; and the pelmet, made in three pieces, should be screwed into the framing, as shown in the sectional sketch. The side scroll brackets, which will end hanging at the back to screw the top to, as shown in the sectional view. After working the moldings of the top and lining, screw it on and finish.

The drawer is the next thing to be made. First of all, get out the sides, fit them in, and work rabbets to receive the top and bottom. After having fitted these, cut the panels for secretary drawer, as shown in the horizontal section, and fit them. It is presumed that the top part has meanwhile been gradually proceeded with, the frame being of pine, laminated together, and faced with \( \frac{1}{2} \) inch hard wood to form uprights, and \( \frac{3}{4} \) inch between uprights in order to leave a slight recess.

The drawer front also should not be employed. We have purposely omitted such additions in order to make the article strictly economical. The Best Paint for Iron Roofs.

Since iron roofs depend for their durability upon the paint with which they are coated, the question of the best paint for them becomes a matter of great importance. Few experiments have been recorded which have been undertaken with special reference to roofing made of thin plates, but the results of tests made with iron-bridge work and in other similar places show the direction in which the best coating for roofing is to be obtained.

The value of red lead as a preservative for iron has been generally accepted. Wrought iron requires a hard and elastic paint, which will hold itself together even if the scale beneath gives way. The following experiments, made under the auspices of the Dutch State railroads, may be instructive. Iron plates were prepared for painting as follows: Sixteen plates pickled in acid (hydrochloric), then neutralized with lime (slaked), rinsed in hot water, and, while warm, rubbed with oil. The same number of plates were cleared of scale, so far as it could be removed by brushing and scraping. Four plates from each set were then painted alike—namely, four plates with coal tar and four plates with iron oxide A, another set with iron oxide B, and the remaining set with red lead. They were then exposed three years, and the results observed were as follows: The coal tar on the scrubbed plates were quite gone, that put on the pickled plates was inferior to the others. The iron oxide A on the scrubbed plates was inferior to the other two, while on the pickled plate it held well; the oxide B was found superior to that of A, but inferior to red lead, while the plates coated with red lead stood equally well on both prepared plates, and were superior to all others. From these results it is evident that pickling the iron removes all

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The Best Paint for Iron Roofs.
To Clean Marble.

Brush the dust off with a piece of chamois, then apply with a brush a good coat of gum arabic, about the consistency of thick mucilage; expose it to the sun or wind to dry. In a short time it will peel off. If all the gum should not peel off, wash it with clean water and a clean cloth. If the first application does not have the desired effect it should be tried again. Another method is to rub the marble with the following solution: One-quarter of a pound of soft soap, one-quarter of a pound of whiting, and one ounce of soda and a piece of stone-blue the size of a walnut; rub it over the marble with a piece of flannel, and leave it on for 24 hours, then wash it off with clean water, and polish the marble with a piece of flannel or an old piece of felt; or take two parts of common soda, one part of pumice-stone, and one part of finely-powdered chalk, sift it through a fine sieve and mix it with water, then rub it well over the marble, then wash the marble over with soap and water. To take stains out of white marble, take one ounce of ox-gall, one gill of lye, one and one-half tablespoons of turpentine; mix and make into a paste with pipe-clay; put on the paste over the stain and let it remain for several days. To remove oil stains apply common clay saturated with benzine. If the grease has remained in long the polish will be injured, but the stain will be removed. Iron-mold or ink spots may be taken out in the following manner: Take half an ounce of butter of antimony and one ounce of oxalic acid and dissolve them in one pint of rainwater; add enough flour to bring the mixture to a proper consistency. Lay it evenly on the stained part with a brush, and, after it has remained for a few days, wash it off and repeat the process if the stain be not wholly removed.
from colds the winter through. Such families need judicious instruction that respired air contains one of the most virulent poisons known, and that dry and overheated air is deleterious and irritating, leaving the mucous membranes sensitive, to be inflamed by every breath of the natural atmosphere.

The second popular fallacy is that the poison of respired air is carbonic acid. This is an example of superstition, or the "survival" in science of an idea long after it has been proved to be false. It is perpetuated in school text-books and popular treatises innumerable. Indeed, correctness of the poison of respired air is carbonic acid. Hence the solution of this puzzle is that respired air contains a very small proportion of carbonic acid; hence the relative quantity of the power, and carbonic acid should never be allowed to accumulate in occupied rooms to the extent of 0.5% of 1 per cent.

The third popular fallacy is that the most dangerous air accumulates near the floor of the room. This false idea has probably arisen from the fact that carbonic acid is more than half as heavy again as air, and can be poured from one dish to another like water. Although this is true when both gases are at the same temperature, a very little difference of temperature is sufficient to reverse these conditions. Respired air issues from the nostrils at a temperature of nearly 100° F., and is lighter than the outer air at 70° or at 80°. Again, the temperature of the body is nearly 90°, usually much above that of the surrounding air. This is sufficient to create an upward current, rising from the body of every person in the room, just as the heated air rises above a hot stove. If to these influences be added the more

powerful action of a stove, register or other heating apparatus, it will be understood how the impure air rises and accumulates very rapidly near the ceiling. This can be easily proved by experiment, such as placing candles at various heights; the upper one will burn much more dimly than the lower. At the same time the cooler air on the floor moves toward the stove to enter it or to join the current rising from it.

The fourth popular fallacy is that the outlet for impure air is best placed at the top of a room, and the inlet for pure air at the bottom. This may seem a contradiction to the third fallacy, but is not, for several reasons. An opening into a room near the top of the room is an outlet, and as such should be kept at a height where the air is not so contaminated as to absorb carbonic acid. Children cannot climb to the top of a room and get into the attic, and poor persons, such as are injured by carbonic acid, could not, if they did not know how to escape, by being thrown out of the window, or climbing to the attic.

The first paper floor ever laid has recently been completed in the new rink on North Pennsylvania street, in Indianapolis. This floor is made by pasting and pressing straw boards together under a powerful hydraulic press in the same way as the disks of the paper car-wheels are made. When these blocks are perfectly seasoned and dried, they are sawed up into flooring boards, and laid with the edge of the paper forming the surface of the floor. This surface is unsanded until it is as smooth as one vast sheet of ice, and the adhesive quality of the paper prevents any slipping of the roller upon the floor. The floor is without joints, perfectly smooth and comparatively noiseless.

A recent writer, in comparing native cherry with some of the imported fancy woods, remarks that cherry wood filled and not varnished has a soft glow not possessed by any other, and has none of those disfigurations of grain that are so unpleasant in mahogany. The wild cherry of the New England States does not usually obtain a growth of more than 20 inches girt. In some of the Western States, however, and also in the South, it frequently obtains a diameter of 24 inches. The domestic fruit cherry gives a good specimen of timber, but as this tree is rarely sacrificed until it is past bearing and has become decayed, the source of supply is precarious.
Sound-Proof Construction.

The qualities which contribute toward making a fire-proof building, says an English exchange, are usually those which are best to prevent the passage of sound. A hollow floor of wood, for instance, is a very combustible as well as sound-making structure. If we ceil it we make it impervious to both to a certain degree; hence the value of plastering of some thickness if it can be executed without risk of cracking. For lodging-houses the absolute importance of both fire-proof and sound-proof floors and partitions need hardly be asserted, though it is unfortunate to admit that the class of property which is let in this way is the worst built and the most vulnerable, both as to the passage of fire and sound. Fire-proof floors are necessarily very costly unless constructed in the following simple manner—the complete immersion of iron bars of small section in concrete, the bars forming a kind of netting for the latter, which is laid upon a centering of boards at the ceiling level. It is not so generally known that solid wood floors have strong recommendations in their favor; they are comparatively fire-resisting and quite sound-proof. In this form of flooring the joists are placed close together, the floor boards are tongued, and the ceiling filleted, lathed and plastered in the usual manner. Or the joists are in some cases brought into close contact by spikes at intervals or by screw bolts. The spikes or screw bolts are placed about 18 inches apart and fixed alternately. Angular grooves run along the bottom edges of each joist, forming, when they are put together, a series of dovetail grooves, which provide a key to the plaster ceiling. Staircases are made in the same manner; the joists are, of course, cut to the triangular or on the ceiling or walls before they are plastered. Asbestos flooring and felt is manufactured for these purposes. Of still more recent modes of deadening sound we may mention the use of reeds for ceilings instead of laths. The reeds are secured to strong wires in the shape of webbing, which is fixed to the underside of the joints. The reeds are close, or nearly so, just sufficient space between them being allowed to form a key for the plaster. The plaster

Doors in First Story.—Scale, ½ inch to the Foot.

Inside Finish of Windows in Parlor Hall and Dining-Room.

and cold. The felt can be laid between the flooring boards or studs,

Sections Through Windows.—Scale, 1½ inches to the Foot.

Doors in Front Door.—Scale, ½ inch to the Foot.
both admirable layers for floors and parti¬
cinders of heat and cold. We have here
conductors of heat and cold. We have here
touched upon methods and materials which
there are other modes of accomplishing the
serve to arrest the passage of sound; but
substances like slag-wool or sawdust.

New Form of Tin Roofing.
We have already alluded to the importance
of the fact that new forms of tin roofing are
continually being brought to the attention of
builders and roofers, and have remarked that
for the future it will not do to speak of
standing-seam and flat-seam tin roofs as the
only distinctive kinds in the market. There
is at least one other general kind now in
very common use, and of this several differ¬
ent forms are before the public. It may be
described as being composed of plates or
shingles, in contradistinction to those cover¬
ings the parts constituting which are joined
by soldering or double-seaming. The Anglo-
American Roofing Company, whose of¬
ice is at No. 22 Cliff street, New York City, are
now offering a new form of this variety of tin
roofing, which they designate as the "best
tin roofing in the world." It is another
candidate for favor among the so-called
metallic shingles or tile. It possesses cer¬
tain advantages over some of the forms which
have preceded it, and is undoubtedly worthy
of more than passing attention upon the part
of all who are interested in roofing-work.
The essential features of this roof may be
 gained from an inspection of the accompany¬
ing engravings. The first shows a single
section of a Roof Covered with the D. T. Roofing Plate, Made by the Anglo-American
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The essential features of this roof may be
 gained from an inspection of the accompany¬

four of the roof. As each

successing course is laid, the flanges through

lower one, forming a dovetailed joint.

the one below, forming a dovetailed joint.

This would seem that schoolboys
should be able to do better than this
without any special instruction.

D. T. Roofing Plate, 1/2 Full Size.

the author for the most part are given, and
in all instances the attempt is made to indicate
the cost of the structure. Front and side
elevations and floor plans comprise the usual
assortment of drawings present in books from
though a few perspectives are introduced. With
one or two exceptions, no attempt is made
that for the future it will not do to speak of
standing-seam and flat-seam tin roofs as the
only distinctive kinds in the market. There
is at least one other general kind now in
very common use, and of this several differ¬
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Elevation and Section of the D. T. Roofing Plate, 1/2 Full Size.

Elevation and Section of the D. T. Roofing Plate, 1/2 Full Size.

by kalameining. The Anglo-

See the above subject and the rapid development
of graphics, a subject which has characterized it within the last
few years. Lieutenant Pettit’s little work
will prove a most welcome source of infor¬
mation to students and practitioners alike. It
was prepared for the use of the
Department of Drawing of the United States
Military Academy, as a basis for elementary
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Elevation and Section of the D. T. Roofing Plate, 1/2 Full Size.

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We might criticise several of the

designs presented as being in styles that are
long out of date, and which, were any one to
consider them upon the market now, would call upon him the ridicule of his
neighbors. With these defects aside, the
book contains some good plans and eleva¬
tions that will no doubt prove useful.

modern reproduc ing Graphic Processes, By
James S. Pettit. Size, 5 x 8 inches; 122 pages. Published by J. Van Nostrand. Price, 50 cents.

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NOVELTIES.

Rappleye's Saw Jointer.

We show in Fig. 1 a device known as Rappleye's improved saw jointer, which is made by F. A. Rappleye, Farmer Village, N. Y. The jointer is made of gray iron and japanned. Its general arrangement is easily understood from the illustration; it is very simple in construction, there being but four parts in all, including screws. It is claimed to use equally well files of almost any shape—flat, square, triangular, round, half-round,

Novelties.—Fig. 1.—Rappleye's Saw Jointer.

is a steel hinge-pin rigidly inserted in the lower leaf of the butt or hinge, and bearing at its upper end against a block B. C is a steel washer surrounding the pin A and interposed between the hinge and bearing against a shoulder or collar projecting from the hub of the upper leaf of the hinge and bearing against a shoulder or collar projecting from the hub of above it. The weight of the tool attached to the upper leaf is thus borne jointly by the steel block B and washer, C, instead of by the latter only, as in other butts.

A Steel-Bushed Loose-Joint Butt.

The Yale & Towne Manufacturing Company, of Stamford, Conn., and 62 Reade street, New York, have lately put on the market a loose-joint butt of improved construction which they designate as "double steel-bushed," and which we illustrate in Fig. 2. The improvement consists in providing two bearing points in a loose-joint butt (which is as many as fast-joint butts of the usual sizes have), and also

Fig. 2.—Yale & Towne Mfg. Co.'s Double Steel-Bushed Loose-Joint Butt.

a steel hingepin rigidly inserted in the lower leaf of the butt or hinge, and bearing at its upper end against a block B. C is a steel washer surrounding the pin A and interposed between the hinge and bearing against a shoulder or collar projecting from the hub of the upper leaf of the hinge and bearing against a shoulder or collar projecting from the hub of above it. The weight of the tool attached to the upper leaf is thus borne jointly by the steel block B and washer, C, instead of by the latter only, as in other butts.

A larger size is made on substantially the same principle for jointing cross-cut and mill point made in favor is its cheapness. This article is but 3 inches long, it occupies but little room in the tool-chest. Another point made in its favor is its durability equal, if not superior, to that of the best fast-joint butt. The follow¬

Fig. 3.—Front Door Lock With Reversible Swivel-Spindle Hub, Made by the Nashua Lock Co., Nashua, N. H.

Fig. 4.—Detail of Swivel Spindle.

Fig. 5.—Detail of Divided Hub.

ing is a description of its construction: A

only requires that the latch and hub shall be turned over, always keeping the %-inch part on the outside. The %-inch part of the butt being on the inside and adapted to the %-inch part of the spindle enables the jointer to trim the inside of the door with any style of knob that may be desired. Nearly all kinds of knobs carried in stock by the general hardware trade are provided with %-inch holes. The company further direct attention to the fact that their swivel-spindle locks and latches are the only ones in the market which are reversible. Another feature to which they direct special attention is an anti-friction device applied to the latches of these locks, a detail of which is shown in Fig. 6. This de-

vice is also of a character to permit the ready reversing of a lock. It is simple in character and very effective in use. It differs from other anti-friction devices from the fact that it is located inside the case of the lock, and hence does not deface the front of the lock or latch. As indicating in some measure the amount of wear that may be obtained from a latch furnished with this vice, it may be stated that in one case a latch was moved 111,600 times, and yet no wear was noticed. This vice, it is to be noted, protects the parts liable to be affected. There are still other interesting features about this lock which will be appreciated by all careful builders upon examination. We shall not stop to mention them, save only that which relates to rabbeded fronts. The company claim for their locks having rabbeded fronts special advantages over others, in that they can be used for any width of rabbed and any thickness of door, and at the same time are reversible. This is an important departure

Fig. 6.—Divided Hub.

A Steel-Bushed JLoose-Joint Butt.

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Carpentry and Building.
from the old method of constructing goods of this kind, and makes it possible to place those locks upon doors satisfactorily with far less skill than would otherwise be demanded. At the same time it makes it possible for a hardware dealer to maintain his assortment with less stock than would otherwise be required.

A New Scraper.

The cut below illustrates a new Scraper, manufactured by the Eclipse Plane Company, of Coshocton, Ohio. The invention consists in the combination of a metallic plane stock, with the usual handles, with a scraping bit, and is so constructed that the bit can be placed at any desired angle or inclination with the plane throat. The devices for adjusting and securing the bit are very simple, and the various changes in inclination, as well as the removal and replacing bit, can be done readily in a moment. To the inner side of each cheek or side piece, as shown in the illustration, is cut a semicircular shoulder in a radius with the throat from which the circle is struck. These cheeks are connected with a threaded bolt, as shown, by which they may be slightly sprung together and thus clamp together the bracket or sliding segment holding the bit. This segment rests upon the shoulders and is held in place in the semicircle mentioned, in which it travels, by a flange which forms the

From the engraving which appeared on page 93, it will be seen that the blade, which is a new feature in tools of this class, is constructed as to render the bead

Fig. 4.—Anti-Friction Device Applied to Latches of Locks, Made by the Nashua Lock Co.

Duplex Rabbit Plane and Filletster.

The engraving which appeared on page 93, shows the device as it is made this ring serves the double purpose of preventing the bit from coming out and also centering it truly. The thimble is then screwed up by the spanner or key, making the joint complete. The other end of the section is made in the shape of the end of an auger bit, and by a similar operation is attached to the next joint. This process of attaching different sections can be repeated until the desired length is obtained. This holder is made of two sizes, Nos. 1 and 2. Size No. 1 will take an bit from \(\frac{1}{2}\) to \(\frac{3}{4}\) inches, and is made in two sections, each section being 12 inches long. Size No. 2 will take any bit from \(\frac{1}{2}\) to 2 inches and over, and is also made in two sections of 12 inches in length each. The cut of this larger size represents an attachment which, instead of being used with brace, as the smaller size is, is made to receive an auger handle, by which it may be operated.

Fastening for Window Beads.

A novel article of builders' hardware, which will no doubt be greatly appreciated by all who have occasion to use such a device, is shown in Fig. 11 of the engraving. It is a fastening for window beads, so constructed as to render the bead readily detachable for the purpose of removing the sash for cleaning or for any other purpose. The view in the upper portion of the cut shows the parts of which the fastening is composed. For the purpose of putting the fastener in place, holes about \(\frac{1}{4}\) inch in diameter are bored through the bead and a short distance into the frame. Into the holes bored in the frame the screw part f, shown in the cut, is inserted. The outer end of the fastening is placed in the hole in the head, and is secured held there by means of

the engraving which appeared on page 93, shows the device as it is

Fig. 6.—Anti-Friction Device Applied to Latches of Locks, Made by the Nashua Lock Co.

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Duplex Rabbit Plane and Filletster.
November, 1884.

CARPENTRY AND BUILDING.

Elliptograph.

The elliptograph shown in Fig. 12 is known as Abbott’s practical elliptograph, and is made by Stevens & Snow, Boston, Mass. The device consists of a light metallic frame, upon which, by means of cross slots, a second frame is made to move readily. Upon this second frame the holder, which carries the pencil, is made to slide with equal facility at right angles to the former. Between these two frames a disk is placed in which are two slots. Working in these slots are screws, one of which fastens the disk against the lower frame, thus fixing the center about which it revolves. The other controls the pencil carrier. Each of these screws may be set at various points in the slots in which they are placed, thus varying the proportions of the figures produced. The two slots are graduated for the purpose of facilitating adjustment. The pencil is carried in the holder O. The method of using this device will be understood by brief directions. The pencil is allowed to extend through the holder far enough when screwed in the holder O off the bottom of the slot through which it slides, and to allow the weight of the arm to be supported by the end of the pencil on the paper. A planer mark can be made by pressing on the arm with the finger. In adjusting the instrument to produce an ellipse of a certain size the disk G is to be moved on the stud from the center one-half the width of the ellipse. To elongate the ellipse the pencil arm is moved back from the center of the disk one-half of the length required. Ellipses of various sizes may be drawn by this device, and oval figures may also be produced by drawing the large end first in the form of a semicircle, and then setting the pencil arm in the manner above described for the remaining portion. This device is well adapted to the use of draftsmen, engravers, pattern-makers, engineers, marble-workers and others.

The Crescent Wrought-Iron Door Hanger.

E. R. Saxton, of 31 Lloyd street, Buffalo, N. Y., is introducing a wrought-iron door hanger for use on a wood track, which he has named the “Crescent.” This hanger in its general appearance is not very different from many others which are manufactured. It has, however, some advantages peculiar to itself, and of such a construction which have been recently patented. The maker directs attention to the following advantages: The hanger is simple, durable and strong. All the rollers are drilled and heavy wrought iron is used for the strap. A heavy roller with broad treads and flange is used indicating the relation of the parts. With the long cutters inserted the appearance is the same, as shown in the engraving. The adjustable cutter takes its chip a very little higher up in the hole than the cutting edge of the bit proper, as shown in the rear view. The spur on the outer edge of the cutter cuts very nearly as deep as the one on the bit proper. The adjustable cutters are of a shape to be readily sharpened when needed. The cutters, as indicated in the engraving, are graduated so as to facilitate adjustment for holes of specified diameters.

The Hayward Hand Grenade.

A device coming into very general notice for extinguishing fires when in an incipient state, and which is of special interest to carpenters and builders, as well as house-owners generally, is known as the grenade. The special advantages of this grenade, a general view of which is shown in Fig. 15 of the engravings, are that it may be used by those who are not expert in matters of this kind, and even by women and children. The article here illustrated is made by the Hayward Hand Grenade Fire Extinguishing Company, with office at 407 Broadway, New York. It consists essentially of a closed globe about 4 inches in diameter, having a capacity of one pint. It is filled with a fluid of such a chemical composition that, when the grenade is broken and the liquid is allowed to come in contact with indicated the atmospheres, immense volumes of chlorine and carbonic acid gas are generated, which have the effect of immediately extinguishing the flame. The general shape of the grenade is spherical, flattened at the bottom to prevent it from rolling when set down. A number of wedge-shaped scores are formed in the surface, which tend to weaken the glass and cause it to be readily broken. This is an essential feature in an article of this kind. The grenades are filled through a rather long neck which also serves as a handle by which to grasp them for throwing. The opening in the neck is closed with Rosendale cement, which hardens to a stone-like consistency and which effectually prevents any loss of the fluid by evaporation or otherwise. Pendi-
ing their use, the grenades may be kept sus-
pended on hooks or pegs by a wire which
encircles the neck, as shown in the engraving,
or they may be placed, two or more together,
in neat wire racks which the com-
pany provide for the purpose. The grenades
are to be located at points where fires are
most likely to occur and where they can
be conveniently snatched from their position
and broken upon the fire on the shortest
notice. This device is of special interest to
us, many degrees below zero. It is asserted
that the fluid remains uncondensed at a tem-
perature at which mercury freezes.
**Breach Without Burning.**
Brick without burning at the present day
may at first thought seem to be a revival of
processes of manufacture which, however
venerable by reason of years, are scarcely
appropriate to this day of modern improve-
ment; B, the center from which the segment on
outside string at the top is described. The other curves in both
sections for the stairs, with the mode of securing the string to the same..
nothing short of a thorough drenching with
water will subdue a fire at such a stage. The
fluid with which these grenades are filled is
made by the patentees that brick of
an article is where fire has obtained such head-
way as to form a considerable bed of coals.

Self-Supporting Stairs.
In addressing ourselves to the considera-
tion of some of the problems which underlie
the construction of self-supporting stairs, it
is proper to inquire at the outset what is in-
cluded in self-supporting. To this we reply
that stairs are self-
supporting when they
are not what is meant by the word
self-supporting as commonly
used. The term "self-supporting" is gen-
erally employed in those cases where the
form of the stairs is such as to render the construction more
complicated than is ever necessary in
straight flight. If we were going to build stairs of the self-
supporting variety, and we should adopt
a semicircle as the plan, it is very
evident that considerable skill would be
required were we to construct the stairs properly. T's beams
would be entirely at the side, and the
whole width of the stairs must be
supported from the side, since they over-
hang the bearings. The moment we pass
the center or make more than a semicircle,
we begin to counteract the strain on the first
half, and, accordingly, if we should continue
produced which is far
superior in strength
and durability to the
ordinary kiln-burnt
brick, and are said to
equal the best
building stone. The
remarkable statement
is made by the pat-
entees that brick of
this kind can be made
one day and laid in the
walls the next, al-
though they advise
allowing two or three
days to elapse. Any
desirable color can be
imparted to the brick.
Various shapes can be
produced with the greatest facility. We
have inspected two samples made by the
plan here referred to.
One of these, we re-
grett to say, did not show satisfactory results,
being so soft as to become badly broken in
the stairs until they make a complete re-
duction. We should have stairs of a character
more easily supported. Such stairs take the form of a screw, and all parts help to sustain the
weight. Stairs of this kind are the prettiest
desirable for use, they are graceful in ap-
pearance as well, and, accordingly, they are
the most used.
Stairs to an elliptical plan may be con-
structed in the same way, but it is evident
they would require a great deal more labor
to build than those semicircular in plan.
This becomes evident when it is remembered
that stairs of this kind are the prettiest
desirable for use, they are graceful in ap-
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November, 1884.

Carpentry and Building.

In order to discuss the problems pertaining to the construction of self-supporting stairs, we will consider stairs built to a circular plan. First, we will give attention to the methods of building the outside and inside strings. In this respect our remarks will apply in part to elliptical as well as to circular stairs. In the first place, select the plank from \( \frac{1}{2} \) to \( \frac{1}{4} \) inches thick. Let the plank be as straight-grained and free from knots as it can be obtained. Smooth it off and lay off the treads and risers. In doing this do not use a knife, for it is necessary to avoid cutting the fiber of the wood, since that would cause it to kink or break in subsequent operations. Use instead a pencil on the rise, extending the line across the plank, so as to transfer the line to the back of the string, for the purpose of guiding and regulating the dados in the back. At the intersection of rise and tread use a scratch-awl, prick at these points, so that when the string is taken from the drum a straight-edge may be used for marking the tread line with a knife to plane it out to receive the treads. Having laid out the strings (for both of them are obtained in the same way), transfer the rise lines to the back. Tack a strip in such a position as to serve as a guide for constructing the first dado. Judgment must be used with reference to the distance from the face of the string to run a gauge line against which to work the dados. If the distance is made about \( \frac{3}{4} \) inch for the front string, and \( \frac{1}{2} \) inch for the back string, it will be about right. Lay the string upon a bench with the face down and the joint edge to you. Start the dados at the right end and work to the left, using a bit about 1 inch wide, and making the dados about \( \frac{1}{4} \) inch apart on the front string and \( \frac{1}{2} \) inch apart on the back string. Do not cut the string to the length, but dado it about 5 inches past where it is necessary, requiring no bracing to hold it in shape. The intent of the strap is to keep the string firm and in shape.

The next matter to be considered is that of jointing and putting the string together. We will saw it off and joint it square, and in the end of each string we will sink a center groove by means of a plow about \( \frac{1}{2} \) inch down by \( \frac{1}{4} \) inch wide. In this groove we will fit a tongue made from end wood. Glue it fast in one string. To fasten the strings together we will use two rabbet-bolts in each joint. We must glue upon the back of each string a piece of hardwood, 4 inches wide, through which to put our bolts. Keep down near the lower edge with the first bolt, so as to give leverage. This bolt must keep the joint tight at the bottom. The top will be sure to be in place. These directions will better be understood by reference to Fig. 5 of the accompanying cuts.

Another way to build up a string is to place upon the drum a veneer as thick as

![Fig. 4.—Self-Supporting Stairs.](image)

![Fig. 5.—The Method of Joining the Strings by Means of Rabbet Bolts.](image)

![Fig. 6.—Section Through the Steps and Rise, Showing How They Are to Be Secured in Position.](image)

![Fig. 7.—Full Size Section of Nosing and Core.](image)
In such cases as this, where it is best to have to put the steps and risers. Lay down on a size of the stairs. A scale drawing I will frame a carriage to the strings on which stairs of this description to be timbered. We will then frame cross-pieces of the same material, putting the end pieces 6 inches from the back of the string, making the other part of the subject to be considered is how are steamed in this direction to be timbered. We will frame a carriage to the strings on which to put the steps and risers. Lay down on a large drawing board or upon the floor the full size of the stairs. A scale drawing 1½ inches to the foot is more desirable for use, except in such cases as this, where it is best to have a drawing full size. In that case we are sure to get all lengths correctly and to make joints better. Take 2½-inch dry pine about 12 inches wide, or, say, 5 inches wider than the risers, for the stairs. Cut the piece 1½ inches longer than the distance between the strings. The ends of the pieces are to enter each string 3½ inches. These pieces we will make ¾ inch from the back of the string, putting the end pieces 6 inches from the back of the string, making the same width on the front end as the pieces which are framed in the string. The length of these pieces is to be covered by the width of the tread at the point where the piece will be framed. The length is determined by allowing 1 inch on each end of the piece. Each end is to have a dovetail cut upon it running the full width of the piece. This is to be fitted in the groove on the back of the rise running the whole width. This will be better understood by referring to Fig. 7 and Fig. 4 of the engravings. On the narrow end there will be a dovetail cut in the same manner. It is put in from the bottom of the rise at the front. It is not best to put these pieces opposite each other, as it would cut the rise strength. It is necessary to break joints. These pieces should fit snugly, so as to get all the strength of the veneer. Commencing at the bottom, put the end of the rise in the front string, making it fast, then put in another in the same way. Afterward put the crosspieces in place, which must be done from the bottom. Use glue in the grooves. The parts are driven in place, put in some rad. nails, and so continue to work until they are all in place. Slip the back string in, securing the ends of the risers either by screws or nails. At this point we will strengthen them still further by taking some strips ¼ x 2, cut 12 inches long, which we will nail with rod nails upon the face of the risers. This will then be the back end of the finish rise, and will keep the frame from splitting. We will next nail some pieces on the soffit of the stairs, running them lengthwise. Let them be 3½ inches wide; fit them to the framing and securely fasten. This will finish the carriage ready to receive the finish steps and risers. A carriage constructed in this manner will support itself with whatever weight may be put upon it. We will next consider putting on the finish steps. We will make the steps the same width, so as to receive the rise in the groove on the back edge. We will next edge them. We will then finish the panels from j ½-inch stuff and fitting the grain run to the center the same as the sawing up, making the molding for one panel. Then finish the panel from j ½-inch stuff and fitting the grain run to the center the same as the transverse axis. The curve may be drawn by using a mixture of cork, silica and lime. It is guaranteed not to rot. It has the advantage of being easily handled, adopting some design which will be in accordance with sectional work. This will necessarily require great skill to execute, but if properly done it will present a pleasing appearance. The several operations above described will be better understood by reference to the accompanying illustrations, with their explanations.

We have recently had brought under our notice, a foreign exchange, a new material for building purposes in the shape of cork bricks. The material used in these is a mixture of cork, silica and lime. It is intended to be a perfect durable material, guaranteed not to rot. It has the advantage of being easily handled, adopting some design which will be in accordance with sectional work. This will necessarily require great skill to execute, but if properly done it will present a pleasing appearance. The several operations above described will be better understood by reference to the accompanying illustrations, with their explanations.

Fig. 9.—Mold Produced from Lines in Penciling Figure.

Let 1 2 equal E F : 8 equal E H and 1 2 equal E I. Make 2 4 equal B C, and 3 4 equal B D. Let 4 0 equal L K. From 5 through 1 2 give the chord rule. For the bow, square this to the bow, finishing at the top edge on a line with the under side of the finish step. We will then frame cross-pieces of the same material, putting the end pieces 6 inches from the back of the string, making the spaces between them 16 to 18 inches, as the case may be. These pieces must be the same as the tongued and grooved ones.

Fig. 10.

A A, Outside End of Cross-Rail, with Bake of String; B, plumb line ; E, section of rail.

Fig. 11.

Section of Panel Soffit ; J and K, soffit molding ; L L, molding over joint between panels.
A new nailed flooring, the invention of a Mr. Putney, has, according to the London Working Trades Journal, attracted considerable notice. As likely to prove of special interest to American readers, we have had engravings made from the illustrations which appeared in our exchange, and submit them herewith. The flooring is formed by a novel arrangement of the grooves and tongues of the boards. As may be seen by the cuts, the course of the nail is through the tongue, the groove fitting compactly over this, effectually hiding all traces of nail. The joint thus formed, it is claimed, is air-tight, dust-proof, and provides thoroughly against drafts and the penetration of unpleasant odors. With seasoned lumber and with the joints so closed and perfectly free from indentations, as in this case, it is evident that all dust and dirt are impossible. The joint is solid and renders the floor in a large measure self-supporting. This form of flooring is specially intended for the bettor class of work, and is a staff in narrow widths. The flooring is made in two forms. The section shown in Fig. 2 indicates the impressed surface. This is preferable for hardwoods, but the right-angled shoulder shown in Fig. 1 is the form most generally employed throughout the U.S. For the peculiar character of the work shown, the shrinkage and buckling, which are so great a drawback in parquette and other ornamental work of the same kind, are prevented. The same process employed in dovetailing and wainscoting gives an appearance of durability that is very desirable. Another advantage to which our English contemporary makes especial reference is that no nails are used. The work is thus self-supporting, and the thin edges that are likely to be interfered with while the work is being driven together. Should any one be tempted to try such a principle in dovetailing, it would be well for them to cut out a sample joint to make sure how the parts go together, even if you have a specimen of this kind of work from a foreign country. We cannot always judge the character of a piece of work from the description of it.

"The same principle is made use of in Fig. 5, where the corners are left rounded with a full quar¬-}

the latter part of the year, and fill in the corner, and to keep the work from splitting. The trimming for which this principle is so particularly adapted is on some interlocking principle and by undercutting to make room for their connections in those parts that are shut out from view, and by that means giving the appearance of dovetailing, and finished to the mark, if you wish the work to come together without being interfered with after it is driven down. This is a very deceptive in appearance; the end and side are locked together both ways. There is a recessed through the thickness of the side, bevel on the projection of the ends that holds the sides from ever being forced out of position from any strain that may be brought upon it from within the chest. It is also noticed that these dovetail-shaped projections have another bevel in the direction of their thickness, to hold the ends from being drawn off from the sides. Taking these both together, the pieces are completely locked with a smooth, even joint on both inside and out, with no notches or cavities to be filled with inlaid work of any kind. Simple as this may appear in the engraving, we have seen many a workman study on this principle for hours when a chest was to be interlocked in this manner, and then declare that nothing short of a thorough steaming would ever allow the halves to come together. It will be noticed that the width of the projections of the ends, as they appear the sides of the box, are not so thick as the

that by taking the advantage of giving the joints a space where the sides meet, and with the sides thus shown fairly locked, and it is on account of this bevel on each projection of the ends and the corners are left rounded with a full quarter of a circle, and the people across the dovetail edge where the sides meet with the ends, and it is well to bevel them a trifle to give them more of a surface of contact. This work is shown separated in Fig. 4, that it's internal structure may be more readily understood, and the thin edges that are

ends are themselves. It would be impossible to have them show as deep on one side as on the other without leaving a cavity on the inner side to mar the appearance of the joint; to remove an interlocking of this kind the sides must go together in a projection in a direction of a miter, or half way between that of a direct end and side motion. This joint is shown separated in this manner in Fig. 2.

Preceding Cut is Done.

Further.

of the boards. As may be seen by the cuts, the course of the nail is through the tongue, the groove fitting compactly over this, effectually hiding all traces of nail. The joint thus formed, it is claimed, is air-tight, dust-proof, and provides thoroughly against drafts and the penetration of unpleasant odors. With seasoned lumber and with the joints so closed and perfectly free from indentations, as in this case, it is evident that all dust and dirt are impossible. The joint is solid and renders the floor in a large measure self-supporting. This form of flooring is specially intended for the...
Architects and builders generally are very familiar with the use of sheet metal for architectural trimmings of various kinds. Galvanized iron has been in extensive employment for cornices and other similar work for many years past, and occasionally zinc and some other of the sheet metals are employed for the same purpose. In some of the Eastern cities, notably Boston, the use of copper for work of this general character is becoming quite common. Some very fine jobs employing work of this general character are the Vanderbilt houses on Fifth avenue, New York City. Among the more conspicuous work done the last two or three years in New York City are the Vanderbilt houses on Fifth avenue. Our illustrations are of work on two of the houses recently built by members of the Vanderbilt family, and which are located on the corner of Fifty-fourth street.

Our readers frequently inquire for desirable whitewashes, and occasionally some one asks for water-proof whitewashes. A German paper describes a preparation of this kind as follows:

"Mix together the powder from three parts silicious rock (quartz), three parts broken marble and sandstone, also two parts of burned porcelain clay, with two parts freshly-slaked lime, still warm. In this way a wash is made which, when applied to the wall or other surface, let dry one day, and the next day frequently covered with water, makes it water-proof. This wash can be cleaned with water without losing any of its color; on the contrary, each time it can even be brushed, while its porosity makes it look soft. The wash or limewash can be used for ordinary purposes as well as for the finest painting. A so-called fresco surface can be prepared with it in the dry way." This would seem to be an excellent preparation, and useful for many purposes.

Modern Copper-Work.—Main Cresting on South Side.—Scale, 1/2 inch to the Foot.

Note: This work has been thoroughly done and to the entire satisfaction of the architect. In the main, it is of copper and slate work. The construction of this work, which really constitutes the distinguishing difference between it and other designs, may be briefly described. The sides of the scrolls were cut from sheet copper, and the back and faces supplied by bands or strips formed to the required shape. A very free-flowing solder was employed, which, when applied to the outside, flowed between the two parts, and the work was so managed as to cause the solder to form a kind of fillet on the inside, thus giving the joints sufficient strength, without the solder appearing on the exterior. After joining, the work was very carefully dressed up with files and finally bronzed. The Crestings, being hollow, were readily put in place by means of rods securely fastened at intervals along the ridges of the roofs. Over these rods the cresting was set, allowing the rods to run up into the posts. We have examined sections of this work very critically, both in Mr. Borkel's shop and in place on the buildings referred to, and we believe that it ranks among the finest of its kind that has ever been executed. It is of interest to architects, because it shows a plan whereby really desirable work of this character may be obtained when required. That it is not cheap is evident in view of the statement that one of the cresteings here shown cost no less than $30 a running foot when in place on the building.

In our last issue we devoted considerable space to a presentation of the situation in the plumbing trade, showing how the plumbers, on the one hand, had made unreasonable demands upon the dealers in plumbers' supplies, under the guise of trade protection, and how, on the other hand, the dealers and manufacturers had made a dignified and positive reply, refusing to accede to the demands made upon them. In response to the circular addressed to the architects by the dealers, numerous replies have been received showing that a very large number of the architectural fraternity, in protecting the interests of their clients, recognize the correctness of the position of the dealers, and indicate the general distrust of plumbers and their ways which exist in the community at large. There has been no settlement of the controversy as yet. The plumbers are still engaged in formulating and circulating addresses, and endeavoring to break the solid front of the dealers. A few of the smaller and weaker houses in New York and other Eastern cities have succumbed to the pressure that has been brought to bear upon them, but the leading houses stand firmly in the position assumed at the outset. In St. Louis and some of the other Western cities the plumbers have carried their point, so far as local dealers are concerned. In these cities it is impossible for a house owner or builder to buy his own plumbing materials. The result is to divert orders to New York, where, after all, a better market is afforded.
St. Louis plumbers, however, can be found who will put in the goods bought by builders and owners, notwithstanding these associations. This is due to the situation as we go to press. The plumbers are undoubtedly causing some annoyance to the building trades, but that they can ultimately succeed on the unreasonable plane on which the war is being fought seems impossible.

One of the most interesting features of the St. Louis Exposition, which will have closed before this number of the paper reaches our readers, is the large collection of samples of natural woods, both home and foreign. Every observer must be surprised at the variety and extent of the lumber resources of our country, even in locations not generally supposed to abound in timber. Kansas, for example, is very commonly considered a grain State, yet from a single county no less than 64 specimens of native woods are exhibited. Among these may be mentioned six varieties of oak, three kinds of elm, four kinds of cherry, three kinds of willow and two kinds each of cottonwood, locust, walnut, hickory, ash, maple, mulberry, poplar and pine. There is also a long list of single varieties. The Yocum Lumber Company, of St. Louis, show a very extensive collection of foreign goods, together with a large assortment of native woods. Among the foreign specimens there may be mentioned the Swedish berkenman, the mahogany from New Grenada, ambogny from Algiers, yuba from the West Indies, tulip from Brazil, primavera and brasilia from Mexico, teak from the South Sea Islands, amaranth from South America, gamino and zebra wood from the Sandwich Islands, amaranth from the West Indies and camphor wood from China. There is also an admirable sample of figured ash from Circassia. This wood has an exquisitely rich grain, somewhat like the curly maple of this country, but with a long, woolly fiber quite unlike that of any other wood. The color is nearly the same as our white oak, but a little darker.

The reckless destruction of forests in this country for the purpose of obtaining timber to be reduced to lumber seems to characterize the mahogany interest of Mexico and Central America also. Very little regard is paid to the value of the trees and timber destroyed. A writer in one of our exchanges describes lumbering operations in Mexico in the following terms: "In Mexico the season for cutting the mahogany usually commences about August. Gangs of Indian laborers are employed, consisting of from 20 to 50 each, under the direction of a capitan. Each gang has also a cazador, or "huntsman," whose duty it is to search the trackless forests for suitable trees to be felled, and to guide the woodcutters to the places. The felled trees of a single season are scattered over so wide a space that miles of roadway have to be made to reach them, and numerous rude bridges constructed across the rivers that lie in the way. All the larger logs have to be "squared" before they are brought away on rude wheeled trucks along these forest roads. Each truck requires seven pair of oxen, and the work could be much more expeditiously done by our portable railroads and plantation engines. The implements used by the Mexicans in this trade are rude and insufficient, large quantities of timber being often spoiled by their insufficiency, combined with the ignorance of the workmen."

Every architect and builder who has had anything to do with hanging heavy church bells, and more particularly in the management of chimes, is acquainted with the difficulty of the vibration of the frame, but no doubt act upon, and is unquestionably an important improvement in this line of work.
As the journey of the argument begins, we are presented with a tableau of the educational landscape, where the seed of knowledge is sown and cultivated. The discourse is replete with the seeds of curiosity, intermingled with the fostering of understanding. Upon this fertile ground, professionals of various disciplines—teachers, students, and scholars—nurture their growth, preparing the way for the harvest of wisdom. 

The theme of this text is the augmentation of the intellectual terrain, where the minds are cultivated with the nourishment of ideas, and the spirit is imbued with the essence of inquiry. In the pursuit of knowledge, the reader is encouraged to embark on a journey of discovery, unveiling the mysteries that lie beneath the surface of ordinary life. The landscape of learning is vast, and the path to enlightenment is etched with the map of scholarly pursuits. 

We are introduced to the realm of ebonizing, where the art of coloring is not merely a means of decoration, but a testament to the mastery of techniques. The paper, oil, and other materials are meticulously prepared, creating a masterpiece of black stain. The result is a visual symphony, where the texture of the wood is accentuated, and the beauty of the grain is enhanced. 

This journey into the world of ebonizing unfolds the secrets of preparation and technique, where precision and patience are the keys to success. The process is as much an art as a craft, where the practitioner becomes a maestro, masterfully crafting a work of art. 

The narrative of this text is a testament to the power of education, where the intellectual landscape is enriched, and the spirit is imbued with the essence of inquiry. This is a journey that invites the reader to embark on a quest for knowledge, where the mind is cultured, and the spirit is nourished. 

The text concludes with a call to action, encouraging the reader to share their findings, to contribute to the community of learners, and to inspire others on their journey of discovery. The landscape of learning is vast, and the path to enlightenment is etched with the map of scholarly pursuits. This text is a call to action, a beacon of hope, and a beacon of inspiration, guiding the reader towards the summit of knowledge.
and in season on proper occasions. Religious exercises and prayers are never discussed or interfered with.

At another of the Brooklyn clubs there is a larger and more thriving alley, and a mutual relief society which attends to the sick and to members when out of employment. The foothold is on a much larger scale, and are in a flourishing condition. Mechanic's clubs are, Therefore, no new experiment, but an old one, which all those in business already are aware of. Already we note employers instigating and aiding them, and I believe, if properly managed, they may become of great public service to all classes in business. Very much can be done by volunteers, everywhere. The rooms, &c., will be the main difficulty; and if each member will study just what he can do, the result is likely to be in favor. Of course the first outlay and furnishing of the rooms, payment of fees, disposition of apartments, and conduct all business, rent of halls, &c., is 100 square inches, or the area of the small triangle. The length of the triangle is 12 feet, or 144 inches, and is the altitude of the larger triangle. \( O B \) is the altitude of the larger triangle, and is the unknown quantity. Therefore, substituting numerical values, we have the \( V_{504} : 144 : 786 \). By performing the calculations necessary, we find that \( X = 101.273 \) inches, which is the altitude of the triangle from the base \( AC \) to the line \( ABC \). This, I think, is sufficient to show, through diagrams, that I am correct in this solution. I am only a schoolboy, and shall be glad to have the solutions proffered by more experienced persons.

Problem in Board Measure.

From H. S. K., Watertown, Iowaya—My father is a subscriber to Carpentry & Building, and he has called my attention to the problem in board measure published on page 203 of the issue for October. I have worked at the problem and obtained the following result.

\[ \frac{\text{Area of Triangle}}{\text{Length of Triangle}} = \frac{1008}{120} \]

The triangle \( ABC \), leaves 42.177 inches as the altitude of the triangle. The triangle \( DBK \), leaves 41.277 inches as the distance from the base \( AC \) to the line \( ABC \). I think with what I know, through diagrams, that I am correct in this solution. I am only a schoolboy, and shall be glad to have the solutions proffered by more experienced persons.

Truss Roofs.

From G. A. H., Poughkeepsie, Ont.—In looking over the back numbers of Carpentry and Building I notice in the December issue for 1883 a communication entitled "True Truss Roofs," by F. S. W., Cleve¬land, Ohio. In the same year I put up a hay barn, 110 by 120 feet, with sheds 16 feet wide. I put a truss across the center of the barn, well secured at each end to bolts and rafters. The area of the barn and sheds I trussed upon the same principle as that used by F. S. W., with the exception that instead of nailing truss pieces on the under edge of the rafter I nailed them on the middle edge by notching the rafter. I nailed the bolts to both rafter and truss. This plan has answered a satisfactory purpose, for there is no perceptible heat to the roof, and the wind blows through another hay barn on the same property. It is 10 feet shorter, but built on the same plan, and has the same roof. The barns are 12 feet by 12 feet by 12 feet, and the trusses were 1½ by 3 inches. I inclose a plan of my manner of bracing or trussing. The upper part of the sketch shows one half of the barn roof made one-third pitch. The lower part shows the shed roof one-quarter pitch. The latter is solid. The former has the same features to be aimed at are sufficient stability and simplicity, in the woodwork is concerned, in a less expensive manner. After the woodwork is prepared, however, it is possible to improve and make in ventures to be observed in covering are to make the covering, so far as possible, air-tight, and to avoid soddered seams. The latter are objectionable, because in the case of a fire they would melt, and in a very short time. The advantage of the shutter is exclusion of air, resulting in very slow combustion, even when so much fuel is employed as to cause the shutter to maintain its shape, fit tightly and answer the general purpose in a satisfactory manner. For this purpose it is made of two or three thicknesses of light stuff, tongued and grooved together and laid on diagonally, thus making the pieces cross each other in such a way as to be interlocking and self-bracing. A shutter that will answer satisfactory purposes may be made, so far as the woodwork is concerned, in a less expensive manner. After the woodwork is prepared, however, it is possible to improve and make in

Adz.

From O. T. B., Rochester, III.—I desire to inquire if the word "adz" is singular or plural. I heard a carpenter talking a short time since, and he made use of the following expression: "I thought I had lost my adz. The fellow who borrowed them then had to return to the house when I wanted them there. It was the best adz I ever saw, but now I must grind them, he doesn't want to use it that way any more." You will sometimes hear a cooper speak of his adz as a pair of adz.

Answer.

—The problem presented by these correspondents is one, perhaps, that may be profitably discussed by all who are engaged in the work of heating and ventilating. Two of the rooms in question are 24 x 28 feet in plan, with a ceiling height of 12 1/2 feet. These rooms have a cubic capacity of 200 square feet on a little more than 13 1/2 square feet. Our correspondents do not say how the draft through these ventilating-pipes is to be maintained, and judging from their plan merely, we are justified in inferring that no artificial draft is contemplated. Under these circumstances we regard the system altogether inadequate. The system will be a failure, irrespective of the size of the pipes, unless a strong draft is created in them by artificial means. Perhaps some of the practical ventilating engineers among our readers will see in this scheme an opportunity of reading a lecture to those who are engaged in this class of work without knowledge or experience, and if they choose to furnish us specifications of the thorough ventilating of the building we shall take pleasure in publishing them. We should mention that these correspondents hardly give enough particulars concerning the plan they propose to use to enable any one to pass an intelligent opinion upon it. They do not indicate whether the ventilating-pipes are to be open, or if they are covered, nor whether the building is located near the floor. They do not indicate, either, where the fresh air is to be derived, although we may infer in this case that it is taken at some point near the stoves, the latter being located at opposite sides of the rooms from the ventilating-pipes. We shall be glad to see this question carefully considered by our readers.

Removing Ink Stains from Ivory.

—J. Q. B.,—I find, by inspection of the numerous blackboard writings, that nearly all of the blackboards in use are in a miserable condition. They are either slightly painted on wood or painted on plaster, or you have no school apparatus so defective in construction and unsuited to the requirements of the case, as much corrected, if not the blackboards. Will you not submit the question of the best construction of blackboards to the readers of our practical editors? What is the best method of constructing blackboards, and what are the best materials to be used for blackboards in public schools? How shall the reflection of light be overcome in them?

—Without any desire to forestall the discussion of this question by our practical readers, we would remind this correspondent that various recipes have been published in our columns for the preparation and construction of blackboards. While our correspondent's statement that blackboards in the public schools are in a very bad condition is correct, so far as relates to his particular section of country, we believe that for the most part in schoolhouses erected within the last 15 years the reversity of this is not common. The subject of blackboards has been pretty thoroughly discussed by both the educational and mechanical papers, so that we think there are comparatively few architects and builders who are not acquainted with better methods of constructing boards than the use of simple black paint upon a board or wall surface. Among the materials in the market which may be used for the purpose named, various preparations known as liquid slate, silica, &c., answer an excellent purpose. We some time since described in these columns a material known as soapstone finish, which the manufacturers also recommend for use in the construction of blackboards. They furnish this material properly colored for the purpose, and as the color would be as deep as the coating which was applied, a board so constructed would not be likely to wear out and would never be effaced. This surface, we have reason to believe, would be dead in character and not likely to reflect the light.

Ventilation of Upper Story.

—From W. C. P., Pullman, III.—Can you give me a formula for ascertaining the strain on the end of a floor joist cut in the common manner for fitting over the sill of the building? Such a form, if it fails at all, it would, of course, split from the top of the cut into the body of the joist rather than by shearing. If were known it would be easy to proportion the tenons or gussets so that the ends of the joists would be equal in strength to the rest of the joist. As more faults occur at such places than at all others in carpentry, we seem to think that the question suggested is one of general interest to builders.

—A correspondent gave the question raised by this subscriber some attention in our issue for November, 1882, and at that time presented about all that it seemed to us was worth while under the circumstances. The conditions which determine the cutting of a joint in the manner that our correspondent suggests are so arbitrary that we are under the impression that very few builders ever take the trouble to make calculations in order to avoid the difficulties. We know, of course, that this is no answer to our correspondent's suggestion, but, on the other hand, a formula that determines a theoretical safety point is of comparatively small importance when the entire strength of the piece can be secured by a modification of construction. Considering the varying character of timber, such a formula would be somewhat difficult of use and even more difficult of use even when understood.
Splayed Work.

From A. D., Memphis, Tenn.—In the number of Carpentry and Building, September, I notice a communication from "J. R. L.,” submitting a diagram purporting to be a method for obtaining the arc of the splayed jamb of a Gothic window. Upon inspection I find the same incorrect, and I am persuaded that the correspondent has neglected something—just what, may be derived from the diagram which I include, and which shows how different results may be obtained by following his method. I would inquire, for the benefit of all concerned, what the lines B C and S F of the correspondent’s diagram, and which are reproduced in my sketch, are intended to represent? I would also inquire what proportion should the distance between these two lines bear to the splay of the jamb? Suppose, for example, we make the line a b represent the line S F; we would then have a very different result from what your correspondent anticipates. The point a would be at the point D, making the radius of the article described greater than is required. Then, supposing the line S F is moved to the position indicated by C D. In this case the result would show a wide difference, also in the best manner, the result will be satisfactory work. I believe the reason that outside plaster has not been successful in this vicinity is on account of using improper and inferior materials. I think the sand in particular has been at fault. No plastering, either inside or outside, can be made of a satisfactory quality without using good, sharp, clean sand. This may be easily got at all times and, accordingly, plasterers sometimes resort to soft bank sand and loam. These will not make a good cement, no matter how good the lime may be. This, I take it, is the reason which causes plastering on the outside of buildings about Pittsburgh to prove a failure in the majority of cases.

S. C., Toronto, Ontario.—In response to an invitation contained in Carpentry and Building, a short time since, for records of practical experience in the use of outside plastering, I would say that rough casting is no experiment in this city, or in this section of the country, for that matter. The materials contained in the accompanying diagram, the roof marked A is to be 45° pitch, while that marked B is to be 8 inches to the foot. What I want to break off, exposing the lath in places, which is certain anything but pleasing to the occupants of the house, especially in winter. With the knowledge of this I am inclined to think that the use of rough casting, after being on a house two or three years, assumes a dingy, dirty-drab color that reminds one of a cloud. It soon

Splayed Work.—Diagram Accompanying Letter from A. D. A.

December 1884.

Outside Plastering.

From W. W., Pittsburgh.—Plaster upon the outside of buildings has been a common method of finishing, at least for the last 30 years. I have no doubt that at the present time it can be accomplished as well as formerly, the only requirements being good materials and good workmanship. I must acknowledge, however, that in nearly every town where the method has been adopted, a part of the country that has resulted. On the other hand, in the border states, the weather is more severe than with us, plaster is a quite common finish for the outside of buildings. During a short stay in Toronto last summer I noticed many buildings in that city that were finished in this way. They appeared to be in good condition; the plaster was firm and smooth. The correspondent whose age and was informed that many of them had been finished upward of 20 years. In walking down the street one day I saw a man repairing the plaster on one of the houses. I asked him how long the plaster in question had been in use, and he told me that it had been in use 25 years, and that the present was the first time it had required repairs. He volunteered to show me a house which he had plastered 31 years before, and upon examination it appeared to be in excellent condition and gave the promise of lasting 30 years longer. This particular house had an important advantage over many others that I saw. A deep stone-base cornice kept the plaster high and dry above the accumulation of snow and the splashing of water from the ground. Exterior plastering is like everything else. If proper materials are used, applied intelligently, and in the best manner, the result will be satisfactory work. I believe the reason that outside plaster has not been successful in this vicinity is on account of using improper and inferior materials. I think the sand in particular has been at fault. No plastering, either inside or outside, can be made of a satisfactory quality without using good, sharp, clean sand. This may be easily got at all times and, accordingly, plasterers sometimes resort to soft bank sand and loam. These will not make a good cement, no matter how good the lime may be. This, I take it, is the reason which causes plastering on the outside of buildings about Pittsburgh to prove a failure in the majority of cases.

Valley Eaters.

From J. S. D.—Will some of the readers of Carpentry and Building kindly enough to inform me of the method of locating the valley rafter when two intersecting roofs are of the same pitch? In the accompanying diagram, the roof marked A is to be 45° pitch, while that marked B is to be 8 inches to the foot. What I want to

Winter Houses.

From P. F. D., Fairport, N. Y.—I am not a mechanic, and yet I am an appreciative reader of Carpentry and Building, and I confess myself constantly indebted to it for many valuable ideas. While so much is being done for house plans and house construction and details, it occurs to me that no one has called attention to the general need of frost-proof walls for frame dwellings that could be employed at moderate expense. So far as my observation of house building extends, hewn and splayed over covered with plaster, the paper seems to be the commonly accepted limit of effort in this direction. The suggestion that economy and comfort would warrant one or more air spaces between the walls, lathing, for instance, with one coat of fine plaster, would be at least as important as the idea of making the plastering as weatherproof as possible. The object of this communication is to ask what practical builders have to say on the subject, who would construct a comfortable home and whose means are moderate.

Framing Flag Poles.

From C. N. M., Redfield, Ohio.—I would like to see discussed, in the columns of Carpentry and Building, the best methods of framing flag poles where there is a space in the top bar. I would also like to see discussed the question of construction to be employed upon the cross, and likewise the roof splice to be used in the lower section. It is very popular nowadays for political parties to raise flag poles, and builders are frequently called upon to frame and prepare such work and to superintend the erection. Accordingly, these questions are of general interest to the readers of the paper.

CARPENTRY AND BUILDING.
Circular Railing.

From Wal. W. C., Youngstown, Ohio.—I desire to refer a question to the many readers of the ever-welcome Carpenter and Building. I have occasion to construct a railing for a 7-story building, the radius of which is 8 feet. I wish to know how to get the railing for a 6-inch square molding around a 7-story building, 21 feet in width. The railing in the trade will answer it will not only be a favor to me, but doubtless to others also.

Corrugated Roofing.

From I. B. Dobolzky.—If some reader of this kind exists this practical experience will explain the best construction of corrugated iron roofs, with directions for painting them, he will confer a favor upon the writer and probably other readers of the paper.

TRADE PUBLICATIONS.

Portable Houses.

At a recent annual meeting of manufacturers and salesmen of portable houses it was coming into greater favor of late than ever before. The demand for portable houses from both this country and Canada to various points in the West Indies, Mexico, the Central American States and South America. We do not know how many companies and firms are engaged in this line of work, but it is known that at least 12 such establishments are in the United States. Some have essayed this business and have given it up because it did not prove satisfactory. Others have continued in it with apparent success. We have recently received several circulars of firms engaged in this line of business which we notice briefly.

The American Portable House Manufacturing Company, whose office is at 31 Wall street, and whose factory is at Corona, Queens County, N. Y., have issued a pamphlet called "Artistic Designs of Buildings." The work consists of 24 quarto plates on cardboard, neatly put up in what may be described as a keepsake box, and accompanied by a ribboned sample sheet of the colors—"Atlas Ready-Mixed Paints"—manufactured by the firm and also included. These goods the manufacturers guarantee to be genuine Euscedoil paints. The variety of colors and shades is such that the sample sheet is greatly arranged making a very showy card. The plates show the application of the colors to house fronts. The designs are so varied as to show the manufacturer knows of the different ways to handle different combinations of colors. On the back of each plate there is given a key to the colors employed. Four handsomely colored, a stable carriage-house and two interior studies are presented in this manner. The designs of houses shown may be either the conventional manner current 50 years ago to the modern Queen Anne cottage. Considering the difference in the two styles, beautifully reproduced in a number of different combinations of colors. Some are in the conventional manner current 50 years ago, or a modern Queen Anne cottage. Considering the difference of style, the company is jobbing them in various directions. This company report business very fair, taking into consideration the general depression which exists throughout the business community.

The Cincinnati Corrugating Company have established an Eastern agency in Philadelphia. Messrs. Lindsay, Parrin & Co., 328 Walnut street, are the agents. Through this line they have established a corrugated sheet iron, sheet steel and sheet zinc into the Eastern market. A number of contracts for roofings have been executed by this firm may be mentioned. Among these are the buildings of the Pennsylvania Agricultural Society, Philadelphia, coal breakers for Messrs. Coxe & Co., at Derringer, Pa.; and coal breakers for the Littell Mountain Coal Company, at Delano, Pa., and for the Lehigh Valley Coal Company, at Wilkesbarre, Pa. They have also erected corrugated sheet iron roofing on the Delaware and Hudson Canal Company.

The firm of A. Hammacher & Co., No. 205 Bowery, New York, importers of French hardware, etc., exclusive of the trade, are agents for A. Hammacher, Schlemmer & Co. The firm is now composed of Albert Hammacher, Wm. Schlemmer and Char. F. Gospel.

STRAZY CHIPS.

William B. Morison is building on Vernon and 13th streets, Washington, D. C., a handsome house, which he intends to occupy in the fall. The building is 50 feet on ground floor, and will cost $12,000. The walls are of groved half-inch and outside, and are shipped with the hardboard. The plates are well done, and the samples are neatly arranged, showing the difficulty of correctly representing this manner, the plates are well done, and the samples are neatly arranged, indicating that there is a range of designs of one firm with those of another. There is more apparent in comparing the group of designs than for the sides and ends of the building. A section of double dovetail covering is also extended to the coverings for the sides and ends of the buildings. The double walls of the buildings, ¾ inch in thickness, are headed inside and outside, and are shipped with the hardboard. The double dovetail covering are fully illustrated.

We have also received circulars from the Portable House Construction Company, whose office is at Chicago, Ill. The company has a circular, a general one, and bearing date August, 1880. The construction, which is somewhat different from the others which have been described, is that the parts of the building are braced and held together by a dovetail joint, in which may be divided into rooms at any time. The dovetail joints are also used to a greater or less extent in the construction followed by this company. The factories and roof covers are put into the framework by groves in such a manner as to be held thoroughly in place. The parts of the building, which they have executed by this firm may be mentioned. Some of these buildings are devoted may be some practical experience will explain the best construction of corrugated iron roofs, with directions for painting them, he will confer a favor upon the writer and probably other readers of the paper.

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Seven-Room House in Brick.

The accompanying perspective, elevations and details form the study submitted by Mr. T. C. King, of Des Moines, Iowa, in our Twelfth Competition, and were awarded the second prize in that contest. The subject of the competition referred to was elevations and details of a house in brick, built to the set of plans that had previously been used in similar studies of frame construction. We have already presented the first and third prize designs in this competition, so that our readers are familiar with the subject. Mr. T. C. King, Architect, Des Moines, Iowa.

King's elevations have been carefully considered and his details thoroughly worked out, although there are not as many of them presented as are sometimes given. A contrast between the color of the stone used in the belt courses and for window caps and other trimmings and that of the brick is depended on for some of the effect of the design. This is indicated in both the perspective view and in the elevations.

Bog oak, which the chemical action of the peat-water renders perfectly black, is very rarely obtained in a sound state, and in most cases the outer portions of the tree or log are rotten, and useless even for fuel purposes. When laid up for use, care must be taken that it is not placed in the open air, lest it may, from the sun's rays, become open and shattered into chips from end to end. To preserve it, it must be put into some cool place and left to dry gradually, and when properly seasoned it must be cut in lengths of from 2 to 4 feet, and these lengths be split again and the sound parts removed from the unsound. It takes from four to six years to season some specimens, as in many instances the wood is found at a depth of 8 feet and sometimes to feet under the surface. The finish is not quite perfect until the article has been for some time in use, and the longer the finer the article seems to be, no matter whether used as a personal or table ornament.

Setting up Machinery.

Various readers of this journal have occasionally worked as amateur millwrights or machine erectors. The following remarks on this subject, by Mr. James F. Hibbard, which we find in a recent issue of the Cabinet Maker, will undoubtedly prove interesting to numerous subscribers:

When we first went to work as a millwright we thought everything of "lines and levels." We would spend three hours getting a line by which to set up a cylinder planer. Plumbing down from the line-shaft in two places some distance apart we drew a line on the floor. We measured off from this line to where the planer was to stand, by another line on the floor and set the cylinder-shaft true with it by plumb lines from each end. The counter-shaft was put up in the same manner. We measured off on the floor plumbed up to floor joist, and hung up two plumb-bobs; then brought the center of the counter to them and bolted it up level; time, seven hours. A few days since we had occasion to put up a swing-saw.

It was a well-built iron-frame concern, made by Lovewell, of Chelsea, Mass. The counter-shaft ran in bushings on which the frame was to swing. A set-screw bearing on an intermediate shell held the bushings in place. We had a bench made and fastened to the wall, regardless of being square with the shafting. Hanging the saw up loosely on four lag screws through the frame to which its hangers were bolted, we laid a steel square against the saw and rest upon the bench, moved the saw until it would swing square, and then screwed it up for good.

This saw required the belt to run around a corner. We do not like loose pulleys, so we fitted the corner shaft with a bottom step and top box. We stretched a silk line be-
between the tight and loose pulleys on the saw counter-shaft and extended it beyond the place where the corner shaft was to hang. From this line, opposite the main shaft, we measured off half the width of the pulley on the drive pulley on the corner shaft, and bolted the top box to a floor joist plumb over this point. We then put the shaft in the box, and put on a temporary collar to hold it up. The step we hung in place by three rods, which were threaded and fitted with two nuts at each end; these rods were bent to fit, and were put through holes in a flange on the shaft; they were adjusted by means of a long thread cut on the upper end of the rods. The drive pulley on the counter shaft was moved up so it sighted to the top of the pulley on the counter-shaft. Of course we had to look out and not get our corner shaft out of line with the wood. We then put on the belts, started up this saw, and the belts ran true; time, 2/4 hours. The saw counter is level; it must be to make the saw cut square. The corner shaft may not be more than 15 or 20 degrees, a belt can also be made to transmit power to advantage with the stiffness of its material, and give trouble. The action is terminated, the wood is carefully washed with water, dried and then oiled and polished in the usual manner. The effect produced by this process on several woods is remarkable. On the cherry especially it gives a beautiful red color.

Second Prize in Twelfth Competition.—Front Elevation. Scale, 1/4 Inch to the Foot.

Herr E. Rossdeutscher, of Potsdam. The process, in which heat is altogether dispensed with, as will be seen, of a very simple character. After the bark has been removed from the wood, the latter is wholly embanked in boneblack or past, care being taken that no part be left uncovered and exposed to the air, which would cause "shakes" in the timber. The moisture contained in the wood will be readily absorbed by the before-mentioned materials, and, after having been thus covered for from 10 to 14 days, the wood may be taken out, and will be found thoroughly seasoned, free from all fissures, and is then ready for use.

Wood Stains.

To turn oak black, so as to cause it to resemble ebony, the wood should be immersed for 48 hours in a hot, saturated solution of alum, and then brushed with a saturated and filtered solution of verdigris in hot, concentrated acetic acid, and repeat the operation until a back of the desired shade is obtained. Five minutes suffice ordinarily to give a deep color. A few trials will indicate the proper proportions. The hypermanganese of potassa is spread on the surface of the wood, and allowed to act until a back of the desired shade is obtained. The following contractions were adopted by the recent International Metrical Congress at Paris, and are recommended for general use: 1. Length—kilometre, km.; metre, m.; decimetre, dm.; centimetre, cm.; millimetre, mm. 2. Surface—square kilometre, km²; square metre, m²; square decimetre, dm²; square centimetre, cm²; square millimetre, mm²; hectare, ha. 3. Cubic Measure—cubic kilometre, km³; cubic metre, m³; cubic decimetre, dm³; cubic centimetre, cm³; cubic millimetre, mm³. 4. Liquid Measure—hectolitre, hl; litre, l; decilitre, dl; centilitre, cl. 5. Weight—ton (1000 kilogrammes), t; metric hundred-weight (100 kilogrammes), q; kilogramme, kg.; decagramme, dg; gramme, g.; milligramme, mg. 6. Hollow Measure—hectolitre, hl; litre, l; decilitre, dl; centilitre, cl. 7. Time—second, s.; minute, min.; hour, hr.; day, d.; year, yr. The following contractions succeed the figures to which they refer, on the same line, and after the last decimal placed when figures are used which contain decimal fractions.
Beauty in Fire Screens.

The popularity of open fireplaces has created a great demand for fire screens. Old-fashioned samplers, made by our grandmothers, have been brought down from garrets and made to perform a duty which they had well-nigh forgotten in the lapse of years. Various innovations in the shape of tapestry and embroidery have appeared, but none so well express the artistic sense of the times as the fire screens made by the stained-glass workers. These are combinations of many-colored glass set in frames of polished brass. A very handsome screen of this sort is 2 feet square. It has for its center a half-length painting of Shakespeare. This is bordered in frames of polished brass. A very handsome screen of this sort consists of a picture surrounded by squares of sheet glass, each square being picked out in some pattern. These possess none of the brilliant contrasts of color found in the opalescent and rolled cathedral screens. While these screens are expensive, they are not so costly as might be supposed, the price of the one first described being $5.50, and that of the second one $50. A ready sale is found for such screens.

Shingle Roofs.

The form of roof known as a shingle roof is of the greatest antiquity. When it originated or by whom invented history fails to tell us. It is probably one of those things of natural growth which never had a definite beginning, but came up by gradual steps of improvement from a very primitive form to its present shape. Reasoning by analogy, it may have originated in an attempt to imitate the feathers of birds, which shed water in a most remarkable manner. Its prototype is also found in the arrangement of leaves on certain trees. It may have been preceded by the thatch and some forms of bark roofs, and those have come into use as an improvement on a still more primitive type. Shingle roofs may be described as pioneers in roof construction. When timber is abundant a shingle roof is one of the cheapest that can be constructed. Its lack of durability in a comparative sense, and its frequent destruction by fire, make it less desirable than other materials; accordingly, as timber becomes scarcer, as house owners become wealthier, and as buildings improve in character, shingle roofs give way before materials better adapted to stand the test of time and exposure to fire. In ancient history we find occasional reference to shingle roofs at different periods, showing that this form has been employed in various parts of the world during a very long period of time. We learn that shingles were used in Rome until a period of about 300 years before Christ. Shingles were formerly extensively used in various parts of Great Britain, but during the last two centuries or more have gradually given place to more durable materials. Specimens of old-time shingle-work are to be found on some church-spire roofs in the counties of Kent, Sussex, Surrey and Essex, England. Shingles are more extensively used for roof covering throughout the United States, with the exception of the larger cities and the important public and private buildings of a better class in various parts of the country. Shingles are more extensively

Roof Plan.—Scale, \( \frac{1}{4} \) Inch to the Foot.

the leading runs in every direction, as it does in many stained-glass windows. This screen is made of cast opalescent glass, and the design seems to be a quarter moon rising among clouds. It is studded with jewels and surrounded by a fillet of rolled cathedral glass. The upper half of a small screen has the head of a saint, with squares of opalescent glass, and the lower half a panel of pierced brass. These screens are made from designs drawn out in detail by artists, and as employed in the newer sections of the country than in the older, and the use of shingles upon roofs is to a certain extent an indication of the class of buildings that are being erected. As pine timber becomes scarcer, and as prices for shingles gradually advance, their use is likely to be more and more restricted until it is possible that in this country, as in England, the time may come when their employment will be the exception. A shingle may be described as a flat, wedge-shaped piece of timber of varying dimensions. Shingles are made in lengths from 16 inches as a minimum up to 24 inches, and in a few cases still larger. In width they vary from 3 inches, which is about the smallest that can be used advantageously, up to the widest possible that can be readily obtained from the tree out of which they are cut. The thickness at the butt varies from \( \frac{1}{6} \) inch to nearly \( \frac{1}{4} \) inch with the different lengths. The points are from \( \frac{1}{2} \) inch to \( \frac{1}{4} \) inch in thickness. The most common sizes employed are 16 and 18 inch. In some portions of the Eastern States 18-inch is the standard, while in the vicinity of Chicago and throughout the West 16-inch is most commonly used, in a coat a piece is 4 inches wide, and in speaking of 1000 shingles we mean the equivalent of 1700 pieces of whatever length, 4 inches wide.

The hotel building now in progress of erection at Atlanta, Ga., known as the Kimball House, will cost $750,000. One of the peculiar features of construction will be the roof, which will be handsomely tiled. It will be inclined on all sides with a parapet wall set back from the edges, and will be partially covered with a beautiful garden. It will be illuminated by the electric light.
Bells.

Bells, and especially church bells, are among those things which, possessing a long and varied history, are not to be lightly spoken of. Nevertheless, says an English exchange, this is an age of rational inquiry, and the average Londoner in particular, who has lately been somewhat overcome with bell-ringing, may justly ask himself what time what exact purposes are served by our present church-bell practices under any general principle, or to justify them by an appeal to the history of bell-ringing. We ring to announce marriages and deaths and in more important cases to commemorate births and birthdays. We employ the same means for calling attention to a great church festival as we used in celebrating the return of a local magistrate to his hereditary domains. We ring, too, when we have successfully slaughtered our enemies, or when we have made peace with them on advantageous terms. Nearly every event, whether religious, national, domestic or mundane, seems to require being supplemented by the jangling of from eight to twelve bells for a short- or a longer time. All this may be and often is very suitable. On the other hand, it is just as often quite the reverse. There seems no reason why, without injury to anybody's feelings, we should not place this matter on a common-sense footing. It would be reverent as well as rational to do so. History shows us the bell under three very different aspects. Its first uses were utilitarian only. Its second were ceremonial and superstitious. Its third are, of course, far more ancient than their true rela- tives, but use was the first thing thought of in any case. Even the bells which ornamented the robe of the Jewish high priest were meant, as Dean Hook assures us, to give notice to the people of a new approach. The Romans used them to signify their times of bathing. In early times, before Christianity was recognized by the civil power, they could not, of course, be used for ecclesiastical purposes. But even here they were adopted as the ordinary means of communi- cation already customary. Paulin- us, Bishop of Nola, caused a large brass vessel to be hung up hammer. At least, tradition says he did, although Bingham treats belief in his in- genius conduct as a "vulgar error."

Second Prize in Twelfth Competition.—

Front Elevation of Dormer Over Bay.

—Scale, ½ Inch to the Foot.

Fiendish conduct as a "vulgar error."

No one either can grudge their interpretation of the bell under three very different aspects. Its first uses were utilitarian only. Its second were ceremonial and superstitious. Its third are, of course, far more ancient than their true relatives, but use was the first thing thought of in any case. Even the bells which ornamented the robe of the Jewish high priest were meant, as Dean Hook assures us, to give notice to the people of a new approach. The Romans used them to signify their times of bathing. In early times, before Christianity was recognized by the civil power, they could not, of course, be used for ecclesiastical purposes. But even here they were adopted as the ordinary means of communica- tion already customary. Paulini- us, Bishop of Nola, caused a large brass vessel to be hung up

It is worth noticing that most bells seem to have been originally feminine. There are only two or three bells in England now known by the Christian names of these and all masculine. Great Tom, at Oxford, however, was originally named Mary. Treesham, the vicar-chancellor of the period, was un- bounded in his admiration of her: "Oh, beautiful Mary, how musically she sounds; how strangely she pleases my ear." Mary has done little to deserve her reputation since. Only one of these celebrated chimes has been a dis- grace to itself since adopting the name and attribute of Tom. In the year 1500 it suddenly began a series of intermittent ringings, to the great alarm of the undergraduates, who, according to one of their number, were divided in opinion as to "whether there was an earthquake, or whether the dean was dead, or the college on fire." What they pictured in jest an earlier age would find that nothing could have been more absurd. The peculiarities of the sound of the church bell now calls the scattered congregation together pleasantly and appropriately. Even in the country town the bells of the parish church, undisturbed by competing sounds, are enjoyable, while the University towns would be almost strange without their sound. But in London it is a very different matter. Large, harsh, unmusical bells, made, apparently, on purpose to ring down their neighbors, chime in the startled air, and make not only night, but even day, hideous. The pious soul who would like to feel that it is all as it should be is, just as Carlyle was not, dismayed to find that nothing more significant than a "practice" has occurred, and that no particular emotion need be felt. The weary Londoner, in addition to surrounding noises is only the proverbial "last straw." The music is driven from their homes in nervous dread of the bell repetition, just as Carlyle could not sleep because he knew the cock was going to crow again shortly. In
Working a Slate Quarry.

Those who are familiar with the roofing business have more or less of an idea of the manner in which slate are quarried, dressed and prepared for the market. Nevertheless, particulars of this kind written by a man practiced in the business will no doubt be readable. Some time since, a prize was offered in connection with the annual festival occurring in May, by a society which comprised among its members the slate of Rutland County, Vt., and Washington County, N. Y. The subject of the essay was to be "Slate and Slate Quarrying" in the two counties named. The successful competitor was Mr. Owen Ifor, superintendent of the Brownell Slate and Flagging Company, of Paintlet, Vt. The original essay was prepared in the Welsh language, and it was deemed so valuable by those who became familiar with it in that form that the author was induced to have an English translation prepared and published. From the latter we take the following, which in the pamphlet that Mr. Ifor has put out bears the title of "Operation of Working a Slate Quarry":

The first operation is that of quarrying the blocks. The first process is to drill a hole in the slate rock by an ordinary drill, which is used by two men striking or hammering it down, while another man turns it around in the hole. Another method is by one man lifting the drill up and down as a jumper. The particular method will depend upon the position of the hole and the preference of the men. Of late years the use of steam drills has been introduced in slate quarrying, with considerable success. The explosive generally preferred is the ordinary rock-blasting powder. The force wanted is a dull, heaving one, which will heave and displace the rock without unnecessarily breaking it. The skill of a quarryman is tested by his ability to take every possible advantage of slips, joints and floors, and to make each hole do the greatest possible amount of work. The depth of the hole and the amount of powder used will depend largely upon the right occurrence and use of these natural helps.

Having obtained the blocks, broken into convenient sizes for the slate-makers, here again the judgment of the quarryman is required. He has to study the material—how he can reduce it to make slate with as little waste as can be helped. In the large blocks there are certain amounts of disfigurements which hinder their working, such as curls, bends, cramps and spang veins. These have to be chiseled out and cut off in dressing. When the blocks are too wide, the quarryman has to cut a notch in one end with his gouge and with his chisel cross way to the line of cleavage; he does what is called pilling, or pillaring, dividing it into two parts to suit two slates of different width. He has to study the grain of the block to do this, to enable him to get the pillaring to run straight the whole length of the block; sometimes he has to drill what is called a plug-hole in the block to divide it. When this is done he uses what is termed two iron feathers, putting one each side of the hole, then drives an iron wedge between them, which expands the block by dividing it into two parts. When this is done the quarryman uses his chisel to mark the blocks into the required lengths, and cross-cuts them by striking over the mark with a wooden beetle, ironed for that purpose. After having them split to about 2 inches in thickness they are ready for the splitter.

The splitter now takes the material in charge and splits them into thin plates in the following manner: The splitter is seated on a block raised a little above the level of the floor. He has the blocks placed in a heap on his left-hand side. His tools are a wooden mallet, ironed at each end, and three or four splitters, which are their chisels, with a broad, fine edge, about 3½ inches wide on one end, which range from...
to 1.5 inches in length. He takes the blocks, one after the other, and places them against his left thigh, with the smoothest or the straightest end uppermost. He places the splitter in the center, and splits the block into two parts. This process is repeated until he gets the slate of sufficient thinness. Each time, however, he has to use more care to humor the splitting until he gets them into thin plates ready for the dresser. The dressing process is mostly done by machines at present. He places the thin plates on the carrier of the machine, and cuts one straight line; then he hums it and...

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outside of the dome, and another around the eastern light. For the principals a box section has been adopted, as being peculiarly suitable for resisting the strains to which the roof is subjected. They are arched in form, with a total rise of 17 feet. There are eight principals, six of which span the court-yard, 55 feet in width, and the two centers one carry the dome or cupola. Trusted principals in such a situation have been considered inadmissible, and they are therefore made without tie-beams to prevent them thrusting out the walls. Neither are there buttresses behind the walls to resist the thrust of an arch.

Under these peculiar conditions the principals, although arched in shape, are designed to act as girders, with a vertical or downward pressure upon the wall below, having only 2 feet thick, would resist but little horizontal or outward thrust. The strains in the girders do not exceed $5$ tons per square inch in tension, and $45$ tons in compression. For compression, the maximum horizontal pressure of the wind has been assumed to be half a hundred-weight per square foot of the surface opposed to it in roof and dome, coming from any quarter. The greatest strains are in the two girders carrying the dome, and one of these has been tested with loads equal to all the weights and pressures that can possibly come upon it, in order to ascertain if there would be any danger of its thrusting out the walls. The feet rest on iron plates and spread apart with the loads already mentioned 5 inches, and this was due in a great measure to the two half-inches of iron having been fastened together with wire bolts. The result of this experiment is considered satisfactory. All the wrought-iron arched roof principals were lifted into position by means of an upright tim¬ber, 95 feet high and 16 inches square, properly pivoted, from which the girders were suspended by their middle with a rope a little over 2 inches in diameter. Additional strength was given to the derrick by a system of mistrussing with twisted strand wire and short wooden struts to prevent the timbers. The masts consisted of upper and lower blocks, each containing three sheaves, which made six parts to the rope. The first girder erected weighed, with its attachments, 9 tons. Besides the tackle mentioned, a double-purchase crab was used, and a separate snatch-block at the foot of the derrick.

The accompanying design of a wooden mantelpiece is by Messrs. W. Bailey & Son, No. 202 Curtain Road, London. This firm is noted in England for its large and elaborate stock of mantelpieces and other varieties of cabinet-work, and the novelties which it is continually bringing out. The mantel piece may also be interested in learning the list price which is put upon an article of this kind in England. As given by the manufacturers, the mantel alone costs £6. 15s., while the over-mantel is placed at £60, 5s., making a total of £62. 15s., or, expressed in American money, about $25. The mantel is 9 feet 9 inches high and is 5 feet 3 inches wide. The figures given above include the glasswork of the mantel, which embraces no less than 20 different plates. Those the reader can count and date for himself. The merits of the design will be appreciated upon examination.

Graining Grounds.

The best and cheapest and most convenient simple material, says an exchange, forming grounds for light oak, maple, ash and chestnut is pure Italian siena, tinted with pure white lead, not the so-called imitation, which is sold by most paint dealers under that name, but the genuine article, which can be and should be obtained even at the same cost and trouble, the said article being one of the most useful and indispensable articles in the painter's shop. For maple ground if course, the smallest quantity is required, it being necessary only to change the white to the faintest suggestion of straw color. For oak, the ground should be a little darker. For the same reason the siena will be required, while for chestnut a decidedly yellowish tone is required. Care must be taken not to make the grounds too dark—rather in the other extreme, for the reason that there is a remedy for a too light ground, that is, found in the application of a greater quantity of graining color, as also in the glazing coat, for the reason that there is no remedy for a too light ground, while a ground too dark cannot be made lighter. For dark oak, burnt Italian sienna with white produces a far better ground than any other single color. The same caution must be observed, however, in obtaining the tone, for burnt sienna recommended in the case of light oak is unsuitable. The domestic so-called sienas will serve for the purpose of imitating the genuine Italian pigments. The ground for black walnut may be the same as for light oak, with the addition of a little burnt sienna and black.

The sum of $50,000 has recently been given to Phillips Exeter Academy, of Exeter N. H., for the purpose of erecting a building to be used as a gymnasium.
NOTES AND COMMENTS.

It may interest some of the readers of Carpenter and Building to inform them that many of the articles which appear in our columns from month to month are being reproduced by English and Continental journals. A number of our illustrated articles have already appeared in the English architectural and engineering journals, and recently a monthly paper published at Berlin-Prussia, called Zeitschrift der Zimmerkunst, has reproduced two of the recent series of prize drawings from this journal. In the October number of the paper last referred to, the design published in our January issue, appears. It is significant that none of our competitors, even in the countries from which our columns are most extensively copied, have as yet reproduced a single article from our columns. The appearance of this in a monthly paper published at Berlin is a sign of the growing interest in American architecture, and generally all of the details. The distinction of publishing house designs in such a complete manner as to adapt them to local taste of labor without any corresponding reduction in wages or other conditions of employment, is a frequent complaint among continental mechanics. According to such claims as are made in support of such claims as the strikers have made. No one, however, believes this assertion of a general nature. There is a sense of justice among the strikes that the question resolves itself into the form of a demand for an increase of wages. Supposing that a strike should be successful on the non-offered and managed, is able to stem the tide that sets against it whenever the demands are for more than can be afforded, or, in other words, are out of proportion to the general scale of prices prevailing in the community at large.

There are still other considerations growing out of this general question to which it is well to direct the attention of every thinking mechanic. Irrespective of the justice of the claims of any set of men for an increase of compensation, it is evident that whether the general rate is high or low the man who is content to do nine-tenths as much work as other people must make up his mind to see himself rewarded with only nine-tenths as much comfort and happiness as his neighbors enjoy. Those who succeed in this world, whatever their position, generally do so by hard labor, and at the cost of rigorous self-denial. Many a man has made progress, both financially and otherwise, by working from 12 to 16 hours when others worked but 10, and many another has failed to accomplish anything above the common average because he was not willing to improve his opportunities by working more than was commonly called a day. The effect of organized strikes and of organizations generally is to reduce all to a common level. While they may sometimes be a benefit to those below the average, they are very generally a corresponding disadvantage to those who are smarter or better able than the average to make their way in the world. Those who achieve eminent success in business or in the mechanical trades for the most part pursue their course single-handed.

We have recently had the satisfaction of learning from J. W. Packer, Oenonta, N. Y., a photograph of a residence which he has recently completed for himself, based on the design published in the September number of Carpenter and Building for 1885, from the pen of Mr. F. J. Grodevant. The design of this house has been so well adhered to, although there is a constantly increasing demand for new and improved designs in all parts of the country, that it is well to direct the attention of every thinking mechanic. Irrespective of the justice of the claims of any set of men for an increase of compensation, it is evident that whether the general rate is high or low the man who is content to do nine-tenths as much work as other people must make up his mind to see himself rewarded with only nine-tenths as much comfort and happiness as his neighbors enjoy. Those who succeed in this world, whatever their position, generally do so by hard labor, and at the cost of rigorous self-denial. Many a man has made progress, both financially and otherwise, by working from 12 to 16 hours when others worked but 10, and many another has failed to accomplish anything above the common average because he was not willing to improve his opportunities by working more than was commonly called a day. The effect of organized strikes and of organizations generally is to reduce all to a common level. While they may sometimes be a benefit to those below the average, they are very generally a corresponding disadvantage to those who are smarter or better able than the average to make their way in the world. Those who achieve eminent success in business or in the mechanical trades for the most part pursue their course single-handed.

We have before this referred to the condition of the brick manufacturing industry at St. Louis. Our regular correspondent in that city gives us some particulars with reference to the output of brick during the present year, with an estimate of what will be accomplished another season. The St. Louis Hydraulic Pressed Brick Company have produced 50,000,000 bricks this year, and expect to turn out no less than 60,000,000 in 1886. The Union Brick Company, which has consolidated with the company first mentioned, but which still retains its separate name and management, has produced 20,000,000 bricks the present year. Besides the above-mentioned companies, there are still others that are at work producing bricks, in the face of the large sources of supply which exist, and the constant increase of demand. We are aware that a great many houses are built to designs which are published in Carpenter and Building that we never hear of, but we know of enough buildings based upon these studies to warrant the assertion that this journal, in the few years that it has been published has afforded satisfactory designs for several thousand dwellings—a result of which we may well feel proud. We are always gratified to learn of the success of one of our designs, and shall be glad if others who have used to advantage the studies we have published will follow Mr. Packer's example, and send us either photographs or descriptions of their buildings.

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The number of different ways in which a simple mathematical problem may be regarded for purposes of solution, and the number of different methods which produce the same result, and which, therefore, it may be concluded, are correct in principle, is strikingly illustrated in the additional answers to the problem in board measure which we present this month. The question is not at issue in character, and, as several of our readers have shown, is very easy of solution if principles are thoroughly understood. That it can be made somewhat difficult is illustrated where a factory employing 50 copper-smiths made so little noise as to be scarcely noticed in the immediate neighborhood. It is even asserted that the noise was scarcely audible in the room below where the copper-smiths worked. The device used in this case was a rubber cushion under each bench leg. Another plan is the employment of kegs of sand or sawdust applied in the same way. A few inches of sand or sawdust is first poured into each leg. Upon this is laid a board or block upon which the leg rests, and around the leg and block is poured fine dry sand or sawdust. Not only is all noise overcome by this means, but all vibration and shock is likewise prevented. It is asserted by those who have tried the experiment that an ordinary anvil mounted in this manner may be used in a dwelling-house without annoying the occupants.

Slate and Shingle Patterns.

The illustrations on this and the opposite page show some of the ornamental as well as fantastic forms into which slate and shingles are occasionally cut in modern house-building. We purposely consider slate and shingles together—first, because to a certain extent the same result, and which, therefore, it may be concluded, are correct in principle, is strikingly illustrated in the additional answers to the problem in board measure which we present this month. The question is not at issue in character, and, as several of our readers have shown, is very easy of solution if principles are thoroughly understood. That it can be made somewhat difficult is illustrated where a factory employing 50 copper-smiths made so little noise as to be scarcely noticed in the immediate neighborhood. It is even asserted that the noise was scarcely audible in the room below where the copper-smiths worked. The device used in this case was a rubber cushion under each bench leg. Another plan is the employment of kegs of sand or sawdust applied in the same way. A few inches of sand or sawdust is first poured into each leg. Upon this is laid a board or block upon which the leg rests, and around the leg and block is poured fine dry sand or sawdust. Not only is all noise overcome by this means, but all vibration and shock is likewise prevented. It is asserted by those who have tried the experiment that an ordinary anvil mounted in this manner may be used in a dwelling-house without annoying the occupants.

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Fig. 9.—Cuttings of Slate from the Battery Place Station of the Elevated Railways, New York City.
NOVELTIES.

The Criterion Saw-Set.

A new saw set, the latest addition which E. C. Atkins & Co., Indianapolis, Ind., have made to their line of saw tools, is represented in Fig. 1 of the accompanying illustrations. In this saw-set, which is intended only for cross-cut saws, the manufacturers have combined the principle of the anvil and hammer with other features. The main portion of the tool is made of malleable iron, the anvil being chilled. The hammer and striking part is of steel, drop-forged. The face of the hammer is slightly concaved, to conform to the usual shape of that portion of the saw tooth which receives the blow, thus distributing the effect of the blow, and consequent strain upon the steel, across the tooth, impairing, it is claimed, the requisite and an absolutely uniform set to each tooth, and preventing more set than is desired. For the efficiency of this article the manufacturers make special claims, and put it on the market with the confidence that it will be favorably received.

Tilting-Table Saw Bench.

In Fig. 2 we illustrate a tilting or angling table saw bench recently brought out by the Philadelphia Wood Tool Works. As may be seen by the design, it is substantial in its parts and is provided with attachments and conveniences to make it meet the requirements of a first-class saw bench. The table may be adjusted to any required degree not exceeding a "miter." The elevation of the saw above the table may be increased as desired, and may be retained in any position without clamping. The sliding guides E and M, shown on the table of the machine, are for ripping and cross-cutting, the gauge M being used for the former. This gauge is so arranged as to be quickly adjusted for any width of material up to the entire width of the table. It can be swivelled to line with the saw at all times. When not in use it may be swung entirely out of the way without the necessity of detaching it from the machine. This is an important advantage, since the gauge is always easily found when wanted, and the operator is saved the trouble of hunting among sawdust and cuttings or inquiring among his fellow-workmen for it. The gauge E for cross-cutting can also be angled to any degree, thus allowing two bevels to be cut at one operation—one with the face of the stuff where the table is angled, and the other with the edge of the stuff where the gauge is angled. This arrangement of parts is of advan tags to million and those who have occasion to make work of the general shape of hop saw. There are few machines in the woodworking line that are put to such severe tests or are so roughly handled as saw benches, and there are few machines subjected to the severe strain to which they are subjected. Having these points in mind the builders of this machine have guarded against the defects of other machines by placing the pulley on the mandrel outside of the table, thus making it possible to use a larger pulley than could otherwise be employed. The box or bearing outside of the pulley surface serves to divide the belt strain between the two journals. All this will be understood by reference to the engraving. It is well known to all sawyers that to do good sawing it is absolutely necessary to have the saw and guide parallel. This is difficult to obtain unless such a device as is employed in this machine is resorted to. By examination of the engraving it will be seen that there is a screw which acts upon a box at the belt end of the mandrel. By tilting this the mandrel is swivelled in either direction, and, accordingly, may be kept square with the cross-cut gauge E and parallel with the slitting gauge M. The hand-wheel B for elevating the saw is placed at such a point on the machine that the operator can readily see when he has the saw at the desired height. The boxes on the mandrel of this machine are of the self-oiling type, and therefore require but little attention as to lubrication. We are assured by the makers, Messrs. E. & F. Gleason, that such a machine is intended to be used in connection with various kinds of roofing, and is applicable in the case of slate roofs as well as with common shingle roofs. It is also used in connection with this company's tin shingles. The corrugations at the side stiffen it, and also hold the shingles up from the valley, thus permitting the water to flow out readily, and, in the case of wooden shingles, avoiding the tendency to decay. The corrugations are of a character to prevent water backing up, as is sometimes the case with slate where common flat valleys are employed. In using this valley it is fastened by nailing through the lugs at the upper corners, as shown in the cut. These lugs are of such a shape that after laying the overlap-
already described, and is attached to the principles as are embodied in the device sashes. It works upon essentially the same alarm is arranged for attaching to window of the spring of the alarm being suf¬
much the same manner as a rim lock. A we show an alarm bolt of their manufac¬
ture which has the effect of the rattle of the window from winds will have no effect upon it. Still a third form is made, shown in Fig. 5, which is portable in character and may be applied to any door or window by securing to the top of the lower sash. A cross-bolt, which may be withdrawn for raising and lowering the sash, engages in thimbles which are placed in the upper sash. These are arranged at different intervals so that the sash may be left partly open and yet have the alarm operate. The effect of moving either sash when the alarm is set in this manner is to bring a pres¬
sure upon the bell which sets the alarm go¬
ing, while the adjustment of the device is such that the transom or window sash by means of thumb screws with a very few minutes’ work, and accordingly is specially adapted to the use of travelers and hotel guests. It enables a traveler to rest in perfect security. The device is ingenious in its features, and seems well calculated for the purpose for which it is intended.

Moore’s Suction Ventilator.

The accompanying cut, Fig. 7, represents a new form of ventilator, for which Hall & Carpenter, of No. 709 Market street, Philadel¬
phia, are sole agents for use in the United States. It is a modification of a form of ventilator very largely used in this country, and which goes by the general name of the Emerson ejector. The standards carrying the cap are lengthened somewhat, and a band of metal is placed between the upper and lower section and is sustained by rivet¬
ing to the standards. In this manner it is claimed that the vacuum suction principle is brought into the operation. The ventilator has the advantage of being very simple in construc¬
tion, easy of application and readily under¬
stood by all who have occasion to use or apply it. The improvement gives the venti-
Fig. 5.—Portable Alarm for Doors and Windows.

Fig. 7.—Moore’s Suction Ventilator.

Fig. 6.—The Vassar Alarm Door Bolt.

which is being introduced by Butler & Con¬
stant, 28 Warren street, New York. The special feature of this hook is that it extends back to and rests against the wall, thus relieving the mashing of a certain amount of strain put upon all hooks of the ordinary shape, and enabling it to sustain a much greater weight than it could otherwise carry. Another feature to which attention is directed is that chafing of the cord, or kinks or bends in the wire, are avoided, since with the use of this hook the cord or wire rests on a seg¬
ment of a circle. The hooks are finished in different styles, in some cases being enam-
The Fever Hand Scroll-Saw.

The article shown in Fig. 9, which is made under a recent patent and is just put on the market, is an improvement on the bow saw. It is manufactured and sold by the T. G. Conway Company, 20 Warren street, New York. The improvement, as is evident from the accompanying illustration, consists in the mechanism by which both ends of the saw are turned by one movement of the handle, thus keeping the blade straight and preventing its twisting. By a reference to the cut it will be seen that this is accomplished by means of chains which pass over pulleys, two of which are attached to the spindles which hold the saw, and two to the shaft by which the motion is transmitted. By this device the motion imparted to the handle in turning it is communicated by means of such shaft and chains to the end of the saw opposite to the handle, the spindles at either end of the saw always moving together, thus keeping the saw straight and true. At the outer end of the handle it will be perceived that there is a screw by means of which the saw can be strained. The guides which hold the shaft, it will also be observed, are slotted to hold the square where the groove is to be made, and, running the tool along the square a few times, get the groove started. This done, the square can be laid aside and the groove finished to the required depth. Considering the tool as a side bed, it has the advantage in its work of nailing in place a strip for the groove. This difficulty is successfully overcome in the present tool by means of the adjustment provided. The manufacturer claims for this tool that it is capable of doing more work than others, since it dispenses with the slow work of nailing in place a guide for a guide. All that is required with this tool is to hold the square where the groove is to be made, and, running the tool along the square a few times, get the groove started. This done, the square can be laid aside and the groove finished to the required depth. Considering the tool as a side bed, it has the advantage in its work as well as the wooden one, while it does not take up the chest-room required for keeping wooden bead planes. The tool is easily kept in order from the fact that it is not necessary to keep the bit in conformity with any peculiar shape, as is always the case with the wooden bead plane. As a center bead this tool works equally well, and is much quicker adjusted than the wooden center bead. The necessity of nailing a strip in place for the guide is also overcome. The same bit in this tool will work either as a side or center bit, and only a moment's work is required to change it from one to the other. The advance cutters can also be used in this case, and therefore the tool is not likely to tear the wood. A common objection in the use of dado planes is that after the point of the advance cutter is worn away it will stick in the groove. This difficulty is successfully overcome in the present tool by means of the adjustment provided. The manufacturer claims for this tool that it is capable of doing more work than others, since it dispenses with the slow work of nailing in place a strip for the guide. All that is required with this tool is to hold the square where the groove is to be made, and, running the tool along the square a few times, get the groove started. This done, the square can be laid aside and the groove finished to the required depth. Considering the tool as a side bed, it has the advantage in its work as well as the wooden one, while it does not take up the chest-room required for keeping wooden bead planes. The tool is easily kept in order from the fact that it is not necessary to keep the bit in conformity with any peculiar shape, as is always the case with the wooden bead plane. As a center bead this tool works equally well, and is much quicker adjusted than the wooden center bead. The necessity of nailing a strip in place for the guide is also overcome. The same bit in this tool will work either as a side or center bit, and only a moment's work is required to change it from one to the other. The advance cutters can also be used in this case, and therefore the tool is not likely to tear the wood, as is the case with common bead planes.

With reference to painting shingle roofs, the NorthEastern lumberman says: "The cost of paint is increased as often as it needs to be. If the roof is allowed to remain with the paint partly worn off, the shingles will retain more moisture, and consequently decay more slowly than they would were they not painted at all. On the score of durability, however, little gain can be made in cost by painting. A good shingle roof unpainted will last a great many years, and the expense of painting it a few times would replace it.

NEW PUBLICATIONS.


This pamphlet, which is edited by Robert W. Shoppell and illustrated by Stanley S. Covert and Francis T. Ekin, contains a considerable number of designs of houses ranging in cost from $500 upward. No details are given. Some of the designs are shown in perspective and others by a single elevation. A floor plan of first and second story is given, and a brief description of the desirable features of design and plans accompanies each study. At the bottom of each page there is a reference to the price list of working plans and full specifications, which is given at the beginning of the book. In other words, the special object of this compilation of plans seems to be to make a market for working drawings and specifications. These according to the list, range in cost from $12 to $50 a set. The attempt evidently succeeded in taking up any slack in the chains. The utility of this article is apparent, and it will be found useful for stair-builders, pattern and cabinet makers or other workers where a scroll-saw is required, and will also serve for amateur scroll-saw work. It can easily be carried in the carpenter's tool-box, and can be used with the hardiest of tables. The utility of this article is apparent, and it will be found useful for stair-builders, pattern and cabinet makers or other workers where a scroll-saw is required, and will also serve for amateur scroll-saw work. It can easily be carried in the carpenter's tool-box, and can be used with the hardiest of tables.
CARPENTRY AND BUILDING.

December, 1884.

little remains to be said of them. The engravings are reproductions from pen and ink sketches, and are made to do well. This book is a desirable addition to every architect's library, and designers generally will gain use from the graphic working diagrams and the numerous studies upon which they may be engaged.

Some of the illustrations are already appearing in the current issues of the American Architect and Building News. There is no better guide to the designers than the individual captions. These are very brief, but, for the most part, give the name of the town as shown on the plans to which they are affixed.

DIRECTORY OF THE LEWER MILL AND LOOM BUILDERS IN THE UNITED STATES AND CANADA. 7 x 10½ inches, 328 pages, bound in cloth. Illustrated with finely engraved and colored plates. Published by Rand, McNally & Co. Price, $5.

This book is said to contain about 5,000 names, and to be a complete list of pine sawmills, hardwood sawmills, stave mills, sash, doors and blind factories, lumber dealers in the United States and Canada. It is arranged in such a manner that the manufacturers may find it at a glance.

A number of the designs to which they are attached are distinguishable one from the other. The work also embraces an abstract of laws for nullifying, and a digest of the statutes affecting lumbermen and lumbering. Under the name of each town is given the railroad which reaches it, and also the name of the express company by which goods may be shipped to it. One of the most valuable features of the work is the very good maps of the several States, Territories and Provinces, in color. This, in connection with the list of railroad and express companies above mentioned, makes the work a comprehensive shipping guide as well as a directory.

Wrought Iron and Steel in Construction. 7 x 4¾ inches; 196 pages. Published by John Wiley & Sons, 1892, Price, $3.50.

This book is a compilation of convenient rules, formulae and tables for the strength of wrought-iron shapes used as beams, struts, arches, and by the Pencoyd Iron Works. From the nature of the contents, as well as from the style of its publication, it might be styled a pocket-book, but dealing, as it does, with one subject, it is specially adapted for the use of engineers and mechanics, and is bound in cloth, with a colored map of the United States, indicating the location of the several Wrought Iron and Steel Works, and a digest of the statutes affecting the iron and steel trade. The throughout page includes formulae and tables of figures, and is based upon the results of a hundred experiments made at Pencoyd, a full description of the contents, as well as from the style of its publication, it might be styled a pocket-book, but dealing, as it does, with one subject, it is specially adapted for the use of engineers and mechanics, and is bound in cloth, with a colored map of the United States, indicating the location of the several Wrought Iron and Steel Works, and a digest of the statutes affecting the iron and steel trade. The work is bound in cloth, with a colored map of the United States, indicating the location of the several Wrought Iron and Steel Works, and a digest of the statutes affecting the iron and steel trade.

An Ornate Iron Building.—The Pittsburg and Keystone Bridge Company are now constructing one of the finest iron buildings ever put up in this country. The design is an adaptation of the Mexican Government, which is to exhibit at the World's Fair in New Orleans. It will be located on the Missouri, 32 feet long, with a dome in the center. The whole will require about 150 tons of iron, of which a great deal is made at the works—especially all the castings, which are of the finest kind, representing figures and ornamentations, with painting of many colors. The structure is so arranged that it can be taken apart, and will afterwards be shown, exhibited to the City of Mexico, where it is to be permanently located.

Quaint Old Fireplaces.

One of our English contemporaries a short time since presented a sketch of a quaint old fireplace found in the City Barge Public House, Chiswick, London. This curious old grate was carefully sketched by Mr. Henry Jacques, and an engraving, of which the second of the accompanying cuts is a reproduction, was made of it. The City Barge is a tavern of some antiquity, and, like many other old houses standing in the neighborhood of the church in this ancient village, has features of construction and furniture that are of the greatest interest to all lovers of the old and quaint. The style of the houses in this neighborhood is for the most part Queen Anne. A number of these "standing" were once important residences, while some others, like the house of the famous Hogarth, have a historical character about them of more than ordinary interest. According to the account of our contemporaries, there are a number of good examples of ironwork in the way of gates and railings to be found in this neighborhood. The grate in question is quite novel in its features. It is so clearly shown in the engraving as to require but brief description. The dimensions of the several parts are indicated. The front or hob bars are an inch in diameter and are round in section. Those of the former are flat, measuring in width 1½ inch and in depth 3½ inch. In the opinion of our exchange there is much that is admirable in this somewhat primitive contrivance, and, while more modern arrangements may have superior advantages in many ways, it must be admitted that this old grate is both serviceable and picturesque.

In the first grating presented here, with a show a curious old grate to be found at the Woodman Inn, Holley Head road, Birmingham. This grate may be described as the portable kind. It was sketched by Mr. J. K. James, who gives the following particulars: the grate to be taken apart for cleaning. First, the top bar is removed. Next, the two top bars, with their stanchions, are removed altogether. The grate then falls into pieces or else grate it up—add turpentine. The latter releases the top remaining bar from the hooks of the heavy iron sides of the firebox. They form interesting studies both to artists and mechanics, and, while there is little about them which is adapted to modern wants, useful suggestions can no doubt be derived from them.

For floor polish cut beeswax into small pieces, or else grate it up—and turpentine. Allow the mixture to stand for 24 hours, then heat the mixture over the fire until it dissolves. Care must not be taken to heat the mixture too hot, and also the flame must not be too near, for explosive vapors are generated, which are liable to take fire. Brushes are especially manufactured for polishing the floors.
How to Obtain Good Material for Tin Roofs.

Architects and builders are always interested in obtaining good roof coverings for the structures upon which they are engaged. In many cases they are not content with the ordinary type of roof at a price reasonable in a general way, for the materials which are used in this case, from the standpoint of knowledge and experience, are reasonable in cost; they add little value to the building, and they are of such a character as to give satisfaction in point of durability. It is only poor tin roofs that cause trouble and provoke criticism. With tin roofs, as with almost everything else, excellence in the finished article depends upon the materials employed and the workmanship used. Hence, in the first place, good tin plates must be secured, and to that part of the subject we propose to devote this article.

Of tin plates, whether the term is used in the broad sense or the restricted one of referring specially to those which are commonly used in roofs—which, by the way, are not "tin" plates at all, but "terne" plates—there are in the market at all times good, bad, and indifferent articles. It becomes an important consideration, therefore, to know just how to distinguish between a satisfactory article and one that is unfit for use. Architects who have attempted to obtain satisfactory material appreciate the difficulties which beset their path. Tin plates are commonly described by peculiar terms, which to any one not an expert in the business are somewhat difficult to memorize as well as to comprehend, and, if inquire they were to be made of those regular and constinuous articles as to what these terms really mean, very little satisfaction would be obtained, from the fact that in many cases there is the densest ignorance in this direction. The one who inquired might, however, be justified, in the light of his experience, in referring that the principal use of the "14CS" or "1X" primes, "coke", "test charcoal", coals, and the others, to say nothing of names or brands and of terms indicating number of manufacture, is to beggar and entrap the unwary. It is not, therefore, that architects and builders generally give up the problem, more especially when they find that even the tinner whom they employ or not. We give the table in full, that they may determine for themselves, by casual examination, which may be applied to it are in the headings of the columns to the right. In the squares at the intersections of the horizontal and vertical lines will be found the combination of letters designating the quality of plate and coating. Thus, a plate that may be specified by giving the weight to be expected in milligrams per square inch, with the letter M to indicate the kind of tin and V to indicate the coating of the plate. By this table architects and builders generally give up the problem, more especially when they find that even the tinner whom they employ to do the work are ignorant upon many of the points involved. They attempt in their specifications to indicate just what is required, some mistaken use of terms makes them appear ridiculous, besides destroying the force of the contract. If they name a brand which has been strongly recommended to them by the importing house which sells it, they know that fair competition will be impeded, and that the chances are that the roof, when laid, will be no better than the average, while it will cost probably $1 a square more than the market price.

At different times in the past we have discussed the technicalities of the tin-plate trade, and here laid before our readers much useful information on this general subject. We have now given some particulars of the efforts of The Metal Worker in the way of instituting a reform in the tin-plate trade, which for years past and until recently has been considered the most satisfactory condition. Much has been accomplished in the past by this journal that was of the greatest value to consumers of tin plates, but what it has done very recently is of the greatest importance to sheet-metal workers, but is also of special interest to architects and builders. It is interesting to the efforts of The Metal Worker that there are now in the market what are known as "guaranteed" roofing plates. These are distinguished from others simply in the fact that a correct description of the qualities they possess is given by the dealer, and that he guarantees them in all respects to conform to this specification. This alone assures an architect of his ability to obtain good material for a tin roof on demand. At the present time it is possible to obtain from a number of reputable houses roofing plates that are guaranteed in this way. The table is based upon the plan of using a letter of the alphabet for each of the more important qualities, both of the plate itself and of the coating of the plate. The physical properties of the plate are given in the column at the left, while the different coatings and variety of finish which may be applied to it are in the headings of the columns to the right. In the squares at the intersections of the horizontal and vertical lines will be found the combination of letters designating both quality of plate and coating. By this table, therefore, it becomes possible to designate in a specification the exact qualifications of the quality they desire for use on average buildings.

The Metal Worker Standards

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The coating of Leaded, or Terne plates may be more accurately specified by giving the weight to the box. In such cases, follow the M, O, or R, as the case may be, with the number of pounds, thus: "IChEw 20 Fs," or "IChEw 20, R."
CORRESPONDENCE.

Problem in Board Measure. From A. S., Cincinnati.—In the issue of Carpenter and Building for October I find the following, proposed by "H. J. R.," Buffalo, N. Y., for solution: "Given, a 12 feet bed long, running to a point at one end and 28 x 20 at the other, of even thickness throughout. Required, the exact area of a line parallel to the broad end, which shall cut the board so as to leave the same amount of lumber in each end."

The solution is as follows:

\[
BC = 14 \text{ inches}; \quad AB = 114 \text{ inches}. 
\]

As areas of triangles are to each other as the squares of similar sides, triangle \(ABC\) : triangle \(ADE\) : : \(AD^2\) : \(DG^2\), and as by the tacts of the proposition the line \(DE\) divides the triangle \(ABC\) into equal parts, and as triangle \(A\) contains 1004 square inches, \(AD\) has 504 square inches, so that, substituting into the above proportion, we have 1008 : 504 : : 106 : 58. \(DE\) is 58 inches. As triangle \(A\) contains 904 square inches, the altitude which \(AD\) and \(DG\) and altitude of \(A\) will contain

\[
\frac{A \times E \times D}{2} = 504.099 \text{ square inches} = 3.50 \text{ square feet}. 
\]

\[
A = 144; \quad E = 101.94; \quad F = 42.18; \quad B = 99; \quad D = 58. 
\]

From W. B. M., Forestville, N. J.—I noticed a problem in board measure from "H. J. R.," Buffalo, N. Y. I will give my method of working. All similar triangles are to each other as the squares of their homologous sides, and as one triangle is to be one-half the area of the given triangle, state it thus:

\[
2 : 1 :: 12^2 : 7.5^2. 
\]

Or, in other words, extract the square root of one half of the square of the given length to get the answer sought. I will give the readers a harder nut to crack than the previous one. Divide a board trapezoidal in form and dimensions as follows: Length, 72 inches; width at end, 24 inches; at narrow end, 12 inches. The cut, divided into two equal parts, to be made parallel to the ends. Required, distance and demonstration.

From D. A. W., Salt Springville, N. Y.—I send one method of solving the problem in board measure referred to by "H. J. R." Let \(a\) be the length of line from small point, in inches. It is evident that for every inch from point toward the broad end the board gains in width \(\frac{1}{2}\) inch, and this \(\left(\frac{1}{2}\right)\) inch multiplied by distance \(a\) will give the width at the broad end. Divide the length \(a\) by 2, will equal one half the board:

\[
\frac{a}{2} = 504 \text{ area of half in inches).} 
\]

\[
\frac{a}{2} = 1.008 
\]

\[
\frac{a}{2} = 2.016 \text{ = distance from point from board's end, in inches.} 
\]

From Y., Lisbon, D. T.—I offer the following solution to the problem in board measure. A principle proven in geometry is that the areas of similar plane figures are to each other as the squares of their homologous sides, and as one figure is to be one-half the area of the other, the area of the whole board is to the area of the pointed half as the square of the altitude of the whole board to the square of the altitude of the pointed half of the board.

Area of the whole board is 1008 square inches, altitude of whole board is 144 inches, and area of the pointed half is 504 square inches, altitude of pointed half is 72 inches.

\[
\frac{1008}{504} = \frac{144}{72}, \quad \frac{1008}{504} = \frac{2}{1}. 
\]

Diagram Accompanying Communication from A. S. 

Diagram Accompanying Communication from C. E., Port Jervis, N. Y.—The problem from "H. J. R.," Buffalo, N. Y., is as follows: He has a board 12 feet long, running to a point 14 inches wide, which tapers to a point at the other end. He wishes to draw a line parallel to the ends. Required, distance and demonstration.

Diagram Accompanying Communication from C. E., Port Jervis, N. Y.

G. E.'s Solution of Problem in Board Measure.

A. B. C. D. E. F. G.

Carpentry and Building.
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CARPENTRY AND BUILDING.

December, 1884.

From B. H. H., Fort Scott, Kan.—I submit two methods of solving the problem mathematically. They are both founded on the hypothesis that similar triangles are to each other as the squares of their respective sides or heights.

No accompanying diagram will illustrate both methods:

Let $A B C$ be the board and $D E$ the line parallel to the edge $B C$ which divides $A B C$ into two equal parts. Let $A F$ be drawn perpendicular to the line $D E$, cutting $D E$ in $G$. $A F$ is the given length, 12 feet.

Solution.—By the principle stated above, as $A D E$ is half of $A B C$, then the square of $A G$ will be half of the square of $A F$. But $A F$ is 12 feet, and its square $144$. Therefore, the square of $A G$ is $144 - 12 = 132$.

The area of $A G C$ divided by 2. The area of $S I 00$ divided by 2. The area of $G A F$ divided by 2. The area of $I 00$ divided by 2. The area of $G A F$ divided by 2.

But this area is half of the square of the board, or $144$. Subtracting the square root, we have 101.831 inches as the distance from the point to cut board.

From O. B. C., Philadelphia.—As the given area of a triangle is to the area of the triangle to be cut off, so is the square of the given base to the square of the required base. The square root of the result will be the base of the required triangle. The area in this case is not needed, as we have the proportion given, which is $\frac{144^2}{2} = \frac{14400}{2} = 7200$. The base of triangle sought, $C D E$, is $\sqrt{7200} = 2^{5} \sqrt{72} = 8.485$ feet, or 101.831 inches.

From A. F. H., International Railway, Maine.—If the line is drawn parallel to the whole end of the board, the triangular section of the top end of the board will be similar in shape to the whole board. Areas of similar triangles are to each other as the squares of their respective sides or heights.

The square of the height of the board (12 feet) = 144. The area of the small triangle is half the area of the triangle of the height of the small triangle. $144 ÷ 2 = 72$. Square root of that = 8.485 feet, height of the small triangle, $12 - 8.485 = 3.5147186$ feet, or 42 inches and 7/8ths, which is over 1/2 inch less than $\sqrt{\frac{14400}{2}} = 8.485$.

Diagram Accompanying B. H.'s Letter.

Diagram Accompanying F. S. and N. S.'s Letter.

Problem in Board Measure.—If the line is drawn parallel to the whole end of the board, the triangular section of the top end of the board will be similar in shape to the whole board. Areas of similar triangles are to each other as the squares of their respective sides or heights.

Let the accompanying diagram represent the board. Then, according to the above proportion, as "similar triangles are to each other as the squares of their homologous sides," we have the following: $A B C : D B E :: A B : B D$. Having $B D$, we can easily find $A D$, the distance required, by substituting from $A B C$.

The actual solution is as follows: Area of the whole board, or $A B C = 1008$ square inches; area of one-half the board, or $D B E = 504$ square inches. The square of the length of the board, or $A B$, is 20,736. According to the terms of the proposition, multiplying and dividing, substituting figures for the letters, we have: $20,736 : 10,368$. But the last term is the square of the distance $D B$. Extrapolating the square of the proportion of the board, or $A B$, and we have the required distance, $42.1726$ inches, or 42 inches and nearly. The following formula solves all problems of this nature:

$D B = A B \frac{y}{V} 42.1726$

From E. B., Cincinnati, Ohio.—The following is an analytical method to find a very simple formula that applies only for boards of any triangular shape, but also to those of a trapezoidal shape: The height of the square root is being cut, the one-half of the area of the board, viz., $144 \times 2 = 1008$ inches. The reason of above rule is: The square root of a square gives the length of one side of that square. In this case it is required to find a length of one side of a square that shall contain one-half the area of the larger square; therefore, the square root of one-half the square gives the length for that side. To be exact it is better to use logarithms, as it is difficult to go so with feet and inches.

From O. B. C., Philadelphia.—As the given area of a triangle is to the area of the triangle to be cut off, so is the square of the given base to the square of the required base. The square root of the result will be the base of the required triangle. The area in this case is not needed, as we have the proportion given, which is $\frac{144^2}{2} = \frac{14400}{2} = 7200$. The base of triangle sought, $C D E$, is $\sqrt{7200} = 2^{5} \sqrt{72} = 8.485$ feet, or 101.831 inches.

By the rules of similar triangles, the angles in the large and small triangles being the same, $a = b = y$.

For $a$, used in Equation: $x = \frac{b - y}{2x}$

For $b$, used in Equation: $a = \frac{b - x}{2a}$
This is the common form of a quadratic equation; hence
\[ y = \frac{\sqrt{b^2 - 4ac}}{2a} \]

In other words, a board of any triangular shape is cut in two equal parts; the distance of the cut parallel to any side is \( \frac{1}{2} \) of the corresponding height.

In the example the height (perpendicular to the base) \( h = 144 \) inches.

Hence \( y = \frac{144}{2} = 72 \) inches.

The length of line \( a \) is found by Formula 2.

If we have a board of any trapezoidal shape, as Fig. 2, extend the two, not parallel, sides of the trapezoid to their intersection \( m \); then draw a parallel to \( h \) in a distance \( y = 203.1 \) h (being the height of the constructed triangle).

The cut \( s \) of the trapezoidal board will then be in a distance \( z \) from line \( b \).

Lines \( a \) and \( h \) are parallel in the same triangle; hence area of large triangle: area of trapezoid \( \frac{y}{x} \).

In Equation 4 is known the area of trapezoid (actually measured) also the area of constructed triangle \( \frac{y}{x} \), and that \( y = \frac{1}{2} \) h (height of triangle).

The same method might be applied when the problem is to find the cut for any fraction \( i \). e., if the board is to be cut in a proportion as \( 1 : 3 \), \( 2 : 3 \), or \( 4 : 5 \), &c. The same method might be applied when the problem is to find the cut for any fraction of the board where it is to be cut off (a new series, having 1 as its first term, 2 common difference, and half of 131,776, or \( 165,888 \) as its sum. Required the number of terms:

\[ s = 165,888 \]

\[ \alpha = 1 \]

\[ d = 1 \]

\[ l = \frac{a}{d} \]

\[ s = \frac{a}{1} \]

\[ \frac{a}{d} = 131,776 \]

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For a proportion as 1 : 1.

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For a proportion as 1 : 3, 2 : 3, or 4 : 5, &c.

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Strike the full circle. Then, with the same dividers placed at O and A, strike the intersections. Through these intersections draw the lines which intersect at D. This gives a center from which to strike the curve A B C. Next turn to Fig. 2, in which similar sections represent similar parts. With the dividers set to the distance D B of Fig. 1, make a cut in the molding with the saw that it is intended to use for kerfing, and lay it down at the point D. Fasten the end of the molding in place by a couple of nails and the sides of the molding will not be closed until the cut is closed, giving it the position or crooks, as they are sometimes called. I have in my shop a very complete set of tools for the purpose named, all of which I made myself, excepting the bits. Similar tools to what I am using are made by A. Colton, 338 North Fourth street, Philadelphia. I mention this address because it may be of interest to artisans generally.

**Portable Workbench.**

From L. G. Cortlandt, N. Y.—I inclose a plan of a portable workbench which I think will meet the requirements of "L. W. F.," of Syracuse, who inspired for such an article some time since. Fig. 1 represents the bench with the side off. The bench is built with bed pieces of 1 x 12 inch stuff, and the legs are at an angle of 45° with the upper edge of the legs. The lower end is held in place by braces. The upper end of the brace is made to slip on a pin which holds the legs firmly. To move the bench the slide is taken off, the braces are slipped off and then the legs dropped into the slide, making it convenient for handling. Fig. 2 represents an end view of the bench. The cross-piece at the bottom is round, on which the braces turn. The diagonal braces keep the bench steady when strains are applied sideways.

**Half Full Size.**

From E. J., Louisville, Ky.—Among a lot of detail drawings at hand, which I have in my shop a very complete set of tools for using hand-rail twists, a correspondent for a description of the tools used for making hand-rail twists, the tools used for making hand-rail twists, are plumb would not be parallel. It must be borne in mind that the horizon is a great circle which the center of the earth is so great, being something like 8000 miles, that the lack of parallelism of the plumb lines could hardly be perceptible in the height to which walls are commonly erected. Without stopping to calculate the distance in feet, it is hazard the assertion that it is too small in the highest walls required to be taken into account. The variation in walls from other causes, such as contraction and expansion from unequal laws referred to. From L. L. G., Cortlandt, N. Y.—From "L. W. F.," of Des Moines, Iowa, that when cuts will all be closed.

**Esmailing Brick.**

From H. A., Minoa, D. T.—Please inform me, through Carpentry and Building, if enameling brick is a secret, and, if not, where I can get a formula for enameling. From R. W. V., Winchester, Ind.—I desire to learn where I can obtain a sideling gauge or jack, which is used for marking conventional ½-inch siding before cutting between frames. The tool I have in mind is lined with brass, has a gauge on one side and a level, while the knife runs up and down in a slot on one side. It is Nester's patent, bearing date 1869. If any reader of Carpentry and Building knows of a tool answering this description he will confer a favor by giving me the information.

**Sideling Gauge.**

From J. J. C., Buffalo, N. Y.—In answer to the inquiry of "J. S. D.," I would say that it will be necessary to put in two val¬leys in order to have his roof come together without winding.

**Parallels of Walls.**

From O. B.—I desire to inquire if masons in building high walls which are desired to be exactly parallel are sometimes called. I have in my shop a very complete set of tools for the purpose named, all of which I made myself, excepting the bits. Similar tools to what I am using are made by A. Colton, 338 North Fourth street, Philadelphia. I mention this address because it may be of interest to artisans generally.

**Hand-Railing Tools.**

From O. W., Philadelphia.—In one of the back numbers of Carpentry and Building a correspondent for a description of the tools used for making hand-rail twists, which the center of the earth is so great, being something like 8000 miles, that the lack of parallelism of the plumb lines could hardly be perceptible in the height to which walls are commonly erected. Without stopping to calculate the distance in feet, it is hazard the assertion that it is too small in the highest walls required to be taken into account. The variation in walls from other causes, such as contraction and expansion from unequal laws referred to. From L. L. G., Cortlandt, N. Y.—From "L. W. F.," of Des Moines, Iowa, that when cuts will all be closed.

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prizes at the outset. In order, however, to be successful in this direction and to secure some good designs for farmhouses for the benefit of our readers, we invite every one interested in this subject to send us the best plan of a farmhouse with which he is acquainted. After obtaining a number of ideas in this way, we will either submit them through our columns to the architectural profession for elevations and details, or we will select them privately before members of the profession who are able to work out in a satisfactory manner such problems, and thus obtain results in which our readers generally are interested. We imagine that there are scores of ideas in the planning of the average farmhouse which can scarcely be departed from and having the resulting building in the public eye affects those who occupy it. Our intention, therefore, is to find out the fixed conditions of the problem, and then bring to bear upon it the best architectural talent that we can command. We feel sure our readers will approve of this course, and therefore we solicit from them hearty co-operation. The first step is getting into our hands as large a number of floor plans of farmhouses as possible. Having secured an average or typical plan which is generally satisfactory, the question of elevations and finish will be something very easily taken care of.

From A. R. F., Fairview, W. Va.—If there is one feature of more interest than another in Carpenter and Building, I believe it to be the farm which are published from time to time. While many excellent plans have appeared, admirably suited to almost every class of people in the community, among them all there has not been one adapted to the average independent farmer. But the independent farmer usually is freely circulated among farmers all my life, I am persuaded that such a house in its general features would be as follows: It should have seven rooms, four below and three above. The first floor should have a parlor, a living-room, which would also serve as a dining-room, and a bedroom, making four in all. The kitchen would come in the form of an addition on one side of the house. All these rooms, unless, perhaps, it should be the bedroom, should be not less than 12 x 15 feet, and the whole structure should cost $1,000 to $1,200. Plans for such a house I reasonably sure would interest a large class of your readers. May it not be hoped that before long some such plans will be supplied?

Note.—We direct our correspondents' attention to the fact that the several issues above, merely stating that he is in error in supposing that we have not published plans of farmhouses, although we are not sure that they have been greatly in the minority. Several interesting studies of this kind will be found in our back volumes, with which many of our readers who may be in the market of which the style of house described. There are several things to be considered in this matter, however. In the first place, in rural communities the finish of the house is scarcely ever made as good as in houses of the same grade in the towns. The owner in many instances furnishes a considerable portion of the materials. With a stone-faced frame house on or on his own farmstead, he would secure the idea of a contractor figuring upon items of this kind as a part of the cost of the building. So long as the farmer would have the stone for the foundation, the sand for the mortar, and possibly a good share of the lumber, he would not be so particular about the wood and sawed at a neighboring mill, on the ground. In addition to this, in many instances the house workmen while the building was in progress of erection. We merely point out these features in the construction of many country houses, and as perhaps accounting in some measure for what would otherwise be extremely low estimates mentioned by this correspondent for the house wanted. We hope this general subject will be taken up at the hands of our practical readers.

Carpentry and Building.

REFERRED TO OUR READERS.

Lines on the mixer-box.

From D. P. W., Chippewa, Wis.—If I were not a beginner at the carpenter's trade I might understand the communication from "F. H.," Albany, N. Y., and "G. B.," Louis ville, Ky., recently published in Carpenter on Building, as the subject of roof and level moldings. As it is, I desire to ask one or two questions, which I will be glad if either of these gentlemen or some other reader of Carpenter and Building will answer for my benefit and other beginners. I am trying to build a mixer-box of the miter-box type, about 4 inches on the inside. Suppose the side to be 1 inch thick and the box 4 inches wide, and the surrounding frame to be made from these conditions, what bevel on the sides and across the top will be correct for a third pitch? Also, will the mitered corners be correct for a quarter-pitch roof? If my question is answered, with the reasons for the steps involved, a lasting favor will be conferred.

Skylights.

From H. S. B., Spencer, Iowa.—If some practical builders will explain their mode of lighting the center rooms of upper stories of large square buildings, showing the other extension of skylights useful for such purposes, they will touch upon a subject that will be of value to many of the readers.

Hand-Railing.

From M. L. G., Atlanta, Ga.—I have had occasion recently to get up a rail for stairs built to the inclosed plan. The requirements being unusual, so far as my experience goes, I would like to know how some of the practical readers of Carpenter and Building would construct the piece at the end of the second roof. I have done the work, but have never seen anything like it before. The stairs shown were planned by a carpenter. The rise is 7 1/2 inches, while the tread is 11 inches.

Note.—We present this problem and trust some of our readers will be good enough to be so kind as to write me and give me your ideas. If our correspondent had contributed to the general store of information by sending a diagram illustrating his high, I no doubt would have pleased many of our readers much better. We shall be glad to see him answer his own question, in order that as many different methods of solving the problem as are feasible may be presented for the consideration of our readers at large.

From C. A. Y., Yorkville, Ont.—I would like to ask of the practical readers of Carpenter and Building a question on hand-cast roof, for that is simply the intersection of two curves of the same radius. It is this: What is the proper way to suspend business when the skating is in use. It is being employed for a roller-skating rink at present. There are two stories below the hall, and the noise created is almost deafening. In fact, it is necessary to suspend business when the skating is in progress. The floor is double, with 2 inches of sawdust packed between the flooring. This experiment has done no good. The last floor has just been put in, and is of hard maple laid upon 2 x 4 inch stuff.

Fig. 2.—Plan of Stairs Using Above.

Paper Ceilings.

From E. D. T., Beverly, W. Va.—I desire to learn the addresses of manufacturers who make paper ceilings.

Note.—We refer this question to our readers, in view of the fact that possibly a special article of the kind inquired for by our correspondent may be in the market of which we call not informed. Our impression is that the only paper ceilings in use are an adaptation of the ordinary building paper, the joints being covered by moldings or some similar plan. The work is arranged in squares or other geometrical figures by this means. In answer to a similar question presented to our readers some time since, one of our correspondents took occasion to call attention to the fact that plaster-work as commonly practiced is probably the cheapest finish which can be applied to ceilings and walls at the present day. This information may not be what our correspondent who proposed the above question requires, but we call attention to it as being of possible benefit.

Hand-Railing.—Fig. 1.—Elevation and Plan of Ramp Having Double Curve.

Note

From T. F. V., Morristown, W. Va.—I desire to inquire, through Carpenter and Building, for a means of deading a hall floor already in use. It is being employed for a roller-skating rink at present. There are two stories below the hall, and the noise created is almost deafening. In fact, it is necessary to suspend business when the skating is in progress. The floor is double, with 2 inches of sawdust packed between the flooring. This experiment has done no good. The
TRADE PUBLICATIONS.

Wood-Working Machinery.

P. Prybil, of Forty-seventh street and Tenth avenue, New York City, sends us a copy of a catalogue he has recently issued. Among the new improvements is an adjustable dado or grooving head, consisting of two composition flanges, provided with justifiable guides, and which need only be moved to compensate wear, and adjustable and interchangeable routing knives and router bits, of 2½ to 1½ inches. The latter correspond to the widths of grooves to be cut, and are arranged to be quickly and easily changed. Another new tool is a sand-papering machine, designed for sand-papering both straight and curved surfaces, to be quickly and easily changed. Another interesting catalogue is issued by Messrs. Trevor & Co., of Lock-stock, London, England, which relates more particularly to handle, planers, scroll-saws, molding machines, and car iron, &c.

Carpentry and Building.

The United Ashbestos Company, Limited, of 161 Queen Victoria street, London, E. C., send us a copy of their illustrated catalogue of their manufactures.

Longley & Wood, of New York, have recently made great improvements in the manufacture of their metallic tile for inside building, to be erected in the Ulatis school district, near Hagerstown, Md., and have recently issued a circular-letter to architects and builders, defining some of the guaranteed plates which they offering for fire escapes, rolled cloth packing, &c. The firm might be justified in describing their character has been built up that the type of finish which they produce is growing in favor among those who are best acquainted with it.

THE SHERWIN WILLIAMS COMPANY, of Cleveland and Chicago, have recently made great improvements in the manufacture of their metallic tile for inside building, to be erected in the Ulatis school district, near Hagerstown, Md., and have recently issued a circular-letter to architects and builders, defining some of the guaranteed plates which they offering for fire escapes, rolled cloth packing, &c. The firm might be justified in describing their character has been built up that the type of finish which they produce is growing in favor among those who are best acquainted with it.

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Messer, LANE Brothers, Poughkeepsie, N. Y., have just received a circular from the makers of their fire-door hinges, that the cut of their door-hanger was printed upside down in their advertisement in our November number. They are in directing the attention of their readers to the fact that these hinges are intended to be used in a rational manner, and that the peculiar appearance of the hanger in the advertisement referred to was altogether accidental. It will be found in proper position in the present issue.

Stray Chats.

A joint stock company has been organized at Pensacola, Fla., for the purpose of putting up a gas plant at that place. The capital stock is $50,000, divided into 1000 shares.

A. C. Cook, architect, of Vancleave, Calif., has prepared plans for a factory building for the manufacture of paper boxes, to be erected in the Eastside school district, near Los Angeles, Calif., for $14,000. The firm is J. C. McKenna, Esq., of Des Moines, Ia.

A. M., to have a court house to cost $700. Full particulars may be obtained by address.

At ALVA, Fla., is erecting a two-story frame residence, 36 x 86 feet, to cost $5000. and the Seymour Butter Co., of Chicago, has recently issued a catalogue of their manufactures, which is over 100 pages long and contains a wide range of goods, from asbestos fire-proofing to paper boys, in one of which particularly interest is taken to make the book so attractive as to insure its preservation. The advertisements of the company are modestly confined to the inside cover pages.

A significant statement is made by the Egan Company, of Cincinnati, Ohio, that the cost of material to manufacture anything in wood-working machinery, as compared with the prices that tools of similar capacity would have been made by hand at the same time, is so much less that the value of the tools is increased in the present issue.

The E. W. Johns Manufacturing Company, of New York, will open a branch store in Broad street, Philadelphia, about December 15, where they propose to carry a full line of their goods, to meet the demands of their increasing trade in the West. Prices will be uniform with those in New York.

Messer, Merchant & Co., of Philadelphia, have recently issued a circular-letter to architects and builders, defining some of the guaranteed plates which they offering for fire escapes, rolled cloth packing, &c. The firm might be justified in describing their character has been built up that the type of finish which they produce is growing in favor among those who are best acquainted with it.

At Hagerstown, Md., a building to cost $25,000 for the manufacture of paper boxes, to be erected by Thomasville, N. C., is going up on McClure avenue, Allegheny, Pa., for Mr. Gary. The plans were furnished by Thomas McKenna.

New Orleans, La., is making some improvement in building operations. Mrs. Elizabath Frenson is erecting a house of three stories, 30 x 100 feet in plan; cost, $3500. N. D. Wallace is remodelling a three-story business house, 30 x 100 feet; cost, $1000. A. J. Cowan, two-story frame residence, 20 x 30 feet in plan; cost, $500. General Elk Point, Dak., three-story brick building, 50 x 50 feet in size, to cost $3500. A. J. Cairns, of Corvallis, Ky., is putting up a frame residence, 40 x 50 feet, to cost $1500. E. M. Hough, of Philadelphia, Pa., is building a frame structure for a tobacco warehouse, to cost $1500.

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A. J. Allan, of Hickory, N.C., is erecting a four-story building, to be used as a mill, cost, $5000.

J. SHERRY, of San Rafael, Calif., is constructing a two-story frame dwelling, from plans furnished by Mr. A. A. Biddle, of Philadelphia. Pennsylvania, is erecting a two-story frame residence, 36 x 86 feet, to cost $5000. and the Seymour Butter Co., of Chicago, has recently issued a catalogue of their manufactures, which is over 100 pages long and contains a wide range of goods, from asbestos fire-proofing to paper boys, in one of which particularly interest is taken to make the book so attractive as to insure its preservation. The advertisements of the company are modestly confined to the inside cover pages.

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