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CARPENTER
AND
BUILDER

THE WORLD'S GREATEST BUILDING PAPER

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To be in the concrete making business in the Miracle way is to be in it in the most profitable way—and the most satisfactory all round.

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**MIRACLE SEWERPIPE AND TILE MOLDS**

you can start upon a small and inexpensive scale—say $57.50 for a complete outfit for making 24-inch pipe.

You can make 110 feet of this pipe per day, and when you consider that the first 68 feet you sell pays for the entire equipment you can judge how quickly you will be making clear profit on your outfit.

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When a sensible man wants a brick machine he is not going to be satisfied with anything short of a perfect stand-up-and-give-service kind.

That's the Miracle Machine all over. It's made to wear and give satisfaction. And it will turn out from 3,000 to 4,000 brick every day without trouble.

There's nothing in which false economy is falser than in buying a cheap brick machine.

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When you are thinking of building block machines, you must clear the space all around the Miracle in your mind, for it's to be considered by itself alone. Its staggered, double air space arrangement is fully patented and protected—and cannot be imitated.

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Our price for complete equipment for making 69 different sizes and styles is $250.00—and a go-ahead man never invested $250.00 better.

We create the demand by liberal, national advertising.

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We have just received our new catalog which is more complete and attractive than ever before, has over 500 illustrations, pages 9 x 12. We want to place this catalog in the hands of all our cement working friends and while the regular price is 25 cents, if you will tell us what line you are interested in and ask for Catalog K we will be glad to mail it free.

**ADDRESS**

Miracle Pressed Stone Co.,
LARGEST MANUFACTURERS OF CEMENT MACHINERY IN THE WORLD
MINNEAPOLIS, U.S.A.

Miracle Concrete is our new little trade magazine, published "when the spirit moves us." Send in your name and we will place it on our complimentary list.
You will buy a "LITTLE SHAVER" floor scraper

Why not now?

Contractors Supply and Equipment Co.
Old Colony Bldg., CHICAGO, U. S. A.
The Star Floor Scraper

Is the latest improved hard wood floor scraper on the market and has been tested and perfected until we are safe in saying it has no equal. It pays for itself in a few days. One man with a Star Scraper can scrape as much floor in a day as four men can by the old way, and can do it better and easier.

The Ball and Socket

By means of the ball and socket connection between the cutting blade and the carrying head, the knife or cutting blade can be adjusted diagonal across the flooring to any angle desired. Thus having a shearing cut it takes out all the waves that other scrapers leave, which causes so much dissatisfaction among carpenters when using a heavy floor scraper.

The Star Scraper Weighs Eighty Pounds

The Star Scraper is the right heft and is properly balanced, having always enough weight on the wheels to guide it, so no trouble is experienced by it shearing to one side. Nothing to wear out. It is made of cast iron and steel, except the rubber tires and hard wood handle.

Works Fine on Either Old or New Floors

It is worth considering to have a scraper that peels a shaving off an old finished floor that is equal to a shaving from a smoothing plane. We guarantee the Star Floor Scraper in every respect. Price complete with one dozen knives, $50.00, F. O. B., Elkhart.

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STANLEY CONCEALED RATCHET BRACE.

No projections to injure the hands.

Send For Catalogue No. 34.

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Sold by all Hardware Dealers.

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New Britain, Conn., U. S. A.

Hight's Automatic Level and Grade Finder

Patent Applied For

I am pleased to assure you that this level is not equalled as a level, plumb or a grade finder—it almost tells—all you have to do is to apply it to your work and it will show you at a glance exactly where you are at, either in degrees, inches rise per foot, or in per cent.

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The above cut represents my spirit level and plumb. It is easily adjusted and firmly held in place. A new vial can easily be placed and adjusted. These levels are made especially for carpenters and that class of workmen. They are all union made and bear the label.

If your dealer does not carry them, send us the name of your dealer.

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P. O. Box 322
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WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
The American Floor Surfacing Machine

Has solved the perplexing problem that has confronted Architects, Builders and Owners for years, "AN EVENLY AND PROPERLY SURFACED FLOOR." In the past there has been but one method, the unsatisfactory, tedious and expensive one of hand labor.

It is no longer necessary to employ a small army of men to surface a floor—THE AMERICAN FLOOR SURFACING MACHINE will do the work of from FIFTEEN to TWENTY men, depending upon the size and condition of the floor, and do it QUICKER, CHEAPER, BETTER, whether of a dwelling, school house, skating rink, dancing hall, office building, decks of steamers, hotels, bowling alleys or store buildings.

The American Floor Surfacing machine does the work with ABSOLUTE EVENNESS and at a small fraction of the cost of hand labor. It is at once efficient, reliable and consequently has met with unqualified success wherever it has been operated. The machine is built on correct mechanical principles, is SELF-FELLING and the epitome of simplicity. It is MODERN METHODS SUPPLYING MODERN DEMANDS, and a MONEY SAYER, and so simple in operation that any person of ordinary intelligence can quickly learn how to successfully handle it.

Illustrated Booklet and Details upon Request

AMERICAN FLOOR SURFACING MACHINE CO.
TOLEDO, OHIO

THE FOX

The only practical Floor Scraper

I

N these days of high priced labor it is "up to you" to save as much of it as you can. Labor means money and you can save both by owning a Fox Floor Scraper.

FOX MFG. CO.
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The difference between The Fox and other floor scrapers is just the difference between a practical and an impractical machine.

It is the simplest in construction, consequently the easiest to operate and does the most perfect work of any floor scraper on the market.

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Automatic stops for holding up saw. Corrugated backs. Graduated. Gauge for duplicate cuts and many other features
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Full Size 4x5 inches.
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It is not like the Rest.

but so far superior, that the ACME FLOOR SCRAPER is in a class by itself.

The day for LAME BACKS and HEAVY LIFTING is past. Scraping a floor with an ACME SCRAPER is a pleasant occupation for ONE man,—the same floor scraped by hand—is a hardship to FIVE men. Save your men and save your money.

The working principle of the Acme Floor Scraper is AUTOMATIC—that is the reason it is different from the rest. No matter how good the scraper may be, to do perfect work the knife must be in the same condition. The Acme Blade Sharpener which accompanies each scraper is the only device ever invented of its kind, and it will put just the proper cutting edge on a blade in a very few minutes. No up-to-date contractor can afford to be without this outfit. It is the best money making proposition in the builders line today. Write at once for illustrated circulars and prices.

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The newest, cleverest and most satisfactory in use, and the first to be offered at so reasonable a price that every up-to-date mechanic could buy tools of their quality and character. Other tools are very good tools, but “Yankee” tools are better. "Yankee" tools are sold by all leading dealers in tools and hardware everywhere. Ask your dealer to see them.

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Handsomely printed on heavy paper, containing 450 pages, 2000 illustrations, including a full line of Woodworking and Metalworking Tools, Foot Power Machinery, Lathes, etc. This is the largest and most complete catalogue we have ever issued, being a valuable hand book for any mechanic. Sent on receipt of 20 cents postage.

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Severest
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"A Plane Talk About a Good Plane!"

We want you to have a copy, for it is a booklet you really need in your business.
We'll gladly send you this booklet with our compliments, promptly upon receipt of your request.

We want to have a full set of 1900; Dec. 24 you can see our

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SEND $3.00 FOR A SELF-SETTING PLANE ON TRIAL.

For other particulars and large illustration see this magazine for January, 1907, pages 1202 and 1211, and June, page 353.

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All progressive and up-to-date Mechanics, Machinists, Carpenters, Bricklayers, Masons, Plumbers, Millwrights, Road Supervisors, Track Foremen, Surveyors, Architects, Civil Engineers and Others will find this an Indispensable Invention. A Civil Engineer that you may have with you at all times. The most practicable, durable and convenient instrument of the day.
The cost of the instrument is so low that it is within the reach of all. Write for book of testimonials. Agents wanted on liberal terms. Apply to EDWARD HELB, RAILROAD, PA., MANUFACTURER

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are just as good as they look to be.

Finest material, finest workmanship, finest finish. They run easier, cut faster and hold their edge longer than any other saw. If your dealer does not have them be can get them for you.

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Will cut an opening in three minutes for a mortise lock in hard, soft, cross-grained or end wood, parallel with sides of door.
The labor is performed with slight exertion.
The care is practically none as the tool does not get out of order.
The adjustment is done in a moment's time for the different sizes.
The cutters are five in number and cover locks from 1/4 in. to 1 1/2 in. thick.
It cuts all the different lengths of openings for locks.
Thin doors are handled as easily as thick doors.
Brains needed are just common, ordinary brains.
It does not mar the door.

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We have endeavored to place on the market a Miter Box suitable for practical work, and having tested it thoroughly, we are satisfied we have succeeded in doing so, and are placing this Miter Box on the market warranted in every respect.

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Here is a Gimlet

Equal in quality and usefulness to any Brace Bit

HANDLE OF SELECTED COCOBOLO WOOD

THREE SIZES ONLY
Cutting 4-32, 6-32, and 8-32 Holes

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For CARPENTERS

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There is "delight" in having a saw vise that will adjust itself to any position necessary to file the oddest tooth or to fit the comfort of the flier. The Grammes Vise is such a one.

Three sizes. Prices of each size
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This book contains 208 pages entirely devoted to illustrations and description of useful labor-saving tools.

If you pretend to be an up-to-date carpenter, you cannot afford to be without the tool information which this catalog will give you.

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of large concern, who guarantees you a first-class drafting-
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ANNOUNCEMENT!!!

WE WISH to announce that the Fifth
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now ready for delivery. The phenomenal sale
and general endorsement of the preceding
editions has spurred the author on to producing
even a better book than the fourth edition,
which many of our patrons have declared to be
the standard work of its kind on the market.
This new edition is one fourth larger, contains
more illustrations, explanations and data on
special work than the previous edition.

Estimating the cost safely and correctly is
of the most vital importance toward the build-
er's success. No up-to-date builder can afford
to be without a copy of this text book. The
book teaches an easy, simple, rapid method of
accurate and practical estimating, showing the
actual cost of labor and material for each sep-
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adjusted to handle, which of course lessens the risk of
errors and omissions and saves an enormous
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course of estimating.

A share of the popularity of preceding editions is due to the fact that the matter has been boiled down so that all unnecessary
words are eliminated, thus making a subject easily and quickly found, at the same time amply explaining it.

In reviewing the book, The National Builder says: "It is a wonder of terseness, compactness and comprehensiveness." The sound,
practical advice given by the author is worth years of experience. The information in the book is based on actual building experi-
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Say of
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NORTH. Illinois. "They are the best I have ever seen for the pur-
pose. Those that got them last year think they are fine."

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WEST. Arizona. "The best we have ever used. Unusually adapt-
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wash the windows.
(Names and addresses furnished on request.)

If Gossett Hinges pleased their customers, won't they please yours? Send for free sample pair for actual test—there's nothing so convinci
Sold by hardware dealers. Price per dozen pairs $1.20, express prepaid
Six Years of Growing Sales Prove Their Worth

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SEE THAT IRON?

It is used in "Ohio" Adjustable Planes exclusively. Being extra heavy at the cutting end where weight is needed; it absolutely prevents chattering and trembling when the plane is used on hard or knotty timber. Works equally well on soft wood.

Under the "Trade Mark" shown above, (which is a guarantee of highest quality), we manufacture a full line of Planes (both Iron and Wood), Chisels, Gouges, Drawing Knives, Auger Bits, Spoke Shaves, Bench and Hand Screws, etc. Every tool covered by a broad guarantee.

Catalogue No. A sent on request

OHIO TOOL COMPANY, Columbus, Ohio

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Why Don't You Buy in New York?

This Catalog shows you how to do it and save money on everything, make your holiday purchases early.

TOOL CABINETS MAKE POPULAR CHRISTMAS GIFTS

Give one this year to your husband, your brother or son. Help to keep the boy at home. Our tools are the best grade, full size tools—not toys—just such as carpenters use. Complete Cabinets from $10 up. Ask for our Special Tool Cabinet Catalog. We sell reliable goods only. We guarantee everything we sell to give satisfaction or money refunded. We ship promptly and guarantee safe delivery of our shipments. We refer to the publisher of this paper as to our responsibility.

White, Van Glahn & Co., No. 3 Barclay Street, NEW YORK CITY

Our New Steel Square

Aside from excellence of material and workmanship, the greatest difference between the best Carpenter’s Steel Square and the old iron square of the blacksmith, consists of the scales and markings on the improved tool. Our square, as recently improved, enables the carpenter to lay out all kinds of work and to calculate quantities with an ease and accuracy never before known.

Our Steel Square Book, describing the new tool, is a veritable Practical Treatise on the Steel Square and we will send a copy, without charge, to anyone who in writing us will mention the American Carpenter and Builder.

SARGENT & COMPANY

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Whipple’s Automatic Blind Hinge

Write Today

We guarantee everything we sell to give satisfaction or money refunded. We ship promptly and guarantee safe delivery of our shipments, and refer to the publisher of this paper as to our responsibility.

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Save Time and Annoyance

Time is money to all busy men, and you can save hours by using Prouty Parlor Door Hangers.

The PROUTY No. 5 CUSHION TRACK HANGER does not require any cutting of the door, and our adjustment is positive, so when once in place it never requires further attention. It is noiseless, easy-running and strong, and if you use it once you will have no other.

Write us for particulars and sample set free of charge.

T. C. PROUTY CO., Ltd. ALBION, MICHIGAN
What Will it Cost

To equip your house, church, school or store with the Hess Steel Furnace? Send us a sketch of the building with the information following, and we will tell you what our charge will be for a complete equipment, fully guaranteed.

Your sketch need not be to a scale; but should clearly indicate the position and sizes of the rooms, measuring inside, from wall to wall.

Show the partitions by single lines; the doors by spaces in the lines; the chimney by a square; stairs by parallel lines; mark folding or sliding doors, if any.

Make a separate sketch for each floor, and mark the size of each room in figures.

Our sketch on this page shows about what is wanted, though of course, your sketch should be larger.

In the cellar plan indicate the piers, posts and beams, the location of chimneys, fuel supply, and the cellar stairs or entrance.

Show the direction of the joists by an arrow, thus < >

ON THE PLAN PLEASE INDICATE

1. The points of compass
2. In what stage of construction is the building?
3. Is the upper story a full story or a half story?
4. How much below the first story joists do the beams project, if any?
5. Height of cellar?
6. If cellar is not 7 feet where furnace will stand, can you make it 7 feet?
7. Width of stairways—mark on plan.
8. Width of joists, first story?
9. Thickness of floors, first story?
10. Width of studs in partitions?
11. Width of studs next to sliding doors?
12. What kind of fuel will you use?
13. Is the cellar ceiling plastered?
14. Width of doorway through which furnace must pass?
15. If church, school or store, show position and width of aisles?
16. Are any pipes or registers now in the house, if so show sizes and positions?

Give Us This Information and we will make a plan to a scale, showing just how we would heat your house with our furnace, what size to use, where to place it, what size of pipes and register to use, and where to put them; how to provide air supply, and we will send you our estimate of cost, which will include everything, freight prepaid by us, and success guaranteed.

For the Hess Steel Furnaces

This
No. 48
STEEL FURNACE
$49.00
Freight prepaid to any station east of Omaha, north of Ohio River. Five other sizes at proportionate prices.

EVERY HOUSE HERE IS HEATED WITH A
HESS STEEL FURNACE

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WOOD WORKING MACHINERY

Bargains in New and Second-Hand Tools. For immediate delivery.

- Band Saw 20 in. Crescent, tilting table, new.
- Band Saw 25 in. Crescent, tilting table, new.
- Band Saw 26 in. Frank, No. 1 Eureka, tilting table, new.
- Band Saw 26 in. Crescent, tilting table, new.
- Band Saw 54 in. Fay & Egan, new.
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- Boring machine, 3-spindle horizontal.
- Boring machine, 8-spindle Multiple Andrews.
- Boring machine, No. 2 Gmelin Horizontal.
- Boring machine, dbl. spindle radial.
- Chair Bending Press, Swear.
- Circular Re-sawing machine, 28 in. saw.
- Circular Re-saw, 24 in. saw, 4 ft. rolls.
- Dado head, No. 1 Fox adj. 10 in. dia.
- Dado head, 12 in. Crescent 4-side steel head.
- Jointer, 18 in. Crescent 4-side steel head.
- Lathe 14 in. swing, wood worker's.
- Lathe 14 in. Cabinetmaker's on shears.
- Lathe 12 in. Cabinetmaker's.
- Lathe 16 in. Cabinetmaker's.
- Lathe 20 in. Patternmaker's.
- Lathe 24 in. Patternmaker's.
- Lathe 24 in. Turret automatic 4 ft. centers.
- Lock Cornering machine, sing. end.
- Lathe, Turret, 10 in. 10 in. Fay & Egan, new.
- Milling machine, 4-side 7 in. Fay & Egan No. 24, new.
- Mortiser and Borer, tilting table.
- Mortiser and Borer, double automatic blind slat.
- Planer. No. 2 Fay & Egan, 24 x 6 ft., new.

Cuts and description of any of the above will be furnished on application.

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- Band Saw 32 in. Crescent, iron tilt-table.
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Everything Connected with this Bath Room Combination is of
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- Or, Bureau of Navigation, Box 27,

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American Carpenter and Builder
Entered as second-class matter July 1, 1905, at the postoffice at Chicago, Ill., under the Act of Congress of March 3, 1879.

WILLIAM A. RADFORD, EDITOR-IN-CHIEF.
WILLIAM REUTHER, EDITOR.
ALFRED W. WOODS, ASSOCIATE EDITOR.

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The AMERICAN CARPENTER AND BUILDER is issued promptly on the first of each month. It aims to furnish the latest and the most practical and authoritative information on all matters relating to the carpentry and building trades. Short practical letters and articles on subjects pertaining to the carpentry and building trades are requested.

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DON'T mistrust every man, nor do not trust every one; either extreme is sure to bring dire results.

IF YOU mistreat your enemies you may have to offer them an apology afterwards.

SHUNNING a man because his clothes are shabby is a bad practice; he may be more worthy of respect than yourself.

THE greatest man is he who can see himself as he really is and be guided accordingly.

THAT which constitutes a gentleman is a man who is not afraid to be both generous and truthful.

EVERY man who strives will be rewarded with a measure of success. Don't be deterred by first failures.

DON'T Be a Cheap Man

THE term "cheap," originally meant something good at a small price, but in the course of time, because of the attractiveness of the word, it grew to have many uses and took as a secondary meaning "of small value, common, mean," and in the course of time there developed an expression "dog cheap," which meant very cheap, and the phrase is said to have probably been formed by the catachrestial transposition of "good" cheap. In common usage the term cheap has been made to apply to things objectionable so much that there is now an odium attached to it which makes the mere thought of it objectionable to most people. Probably it is justly so, too, in connection with some of the things done and accepted in the name of cheapness, and has but little excuse for existing.

If there is anything that every workingman should avoid and strive against in his career, it is the idea of being classed as cheap.

While this applies in equal importance to wages and other matters, the point of view that it is desired to take here is that of arguing against the appearances of cheapness in one's work. There is an old homely saying that "Anything worth doing is worth doing well," and when a man has a piece of work on hand, no matter what price he receives for it, he should see that every bit of it is done in the best possible manner. If you have accepted a job at too low a figure, that should make no difference so far as quality is concerned, or workmanship, for no matter what you may get out of any given work, there is a chance that the greatest im-
proud, aim along the line, making your aim not that of being any event of the kind ever attempted. The Cement Products Exhibition Company, composed of western cement men, has been organized permanently, and the great opening show at the Coliseum is intended as the premier event that may be permanently, and the great opening show at the Coliseum is intended as the premier event that may be

Every piece of work you turn out tell its own story, and let that story always be one of which you will be proud. So make the tool box a starting cheap chest. With better tools he will do better work, there is nothing suggesting cheapness, not even a look forward to each year by the trade. Going a little further, it might be said along this same line, that a man should avoid cheapness in his tools, for the pleasure in his tools does not come from buying them at a bargain, but from the service they give him long after the original cost is forgotten. There is probably nothing which will do more to help give him long after the original cost is forgotten. The cement men of the west who are backing the Coliseum event are men of unlimited capital, who will make it a success, revealing to the layman the wonders of this material that has come to the aid of humanity at the time when the forests are being depleted.

The organization of the Cement Products Exhibition Company is the outgrowth of the spirit of enterprise in the west that seeks to educate the people in the value of cement as a constructive material. The show must result in tremendous good in this respect. M. L. L. Fest, who has had charge of most of the great shows in other trades at the Coliseum, is to have the direction of this exposition and he already has commenced work. It behooves every company, every cement man, every machine man and every contractor in the central west to begin at once to make preparations for an exhibit. It goes without saying that a creditable exhibit at the Coliseum will be a good starter for business in 1908, and with the Buffalo event coming the next month it will mean the best send off in the new year that the industry ever had. The space in the great building is ample for all who want to be represented. There will be music, beautiful decorations for which the mammoth structure well lends itself, instruction by demonstrators, and features without number. The word sent out in advance to the trade of the west is simply, "Come and see."

The expositions will include displays of every possible use of cement and machinery that is allied with it and to attend it will be as instructive as many months given to study on the subject. This event, together with the great convention of the National Association of Cement Users at Buffalo, N. Y., in January, will make the winter fruitful in opportunities for instruction.

The Chicago exposition, coming as it does the week before Christmas, affords the cement man, the contractor and the user in all parts of the west an opportunity to come here and do his Christmas shopping while visiting the show. It will not interfere in the least with the convention a month later in Buffalo, and it is hoped that thousands will find the time to attend both events.

As a matter of fact the Coliseum exposition, with its display of cement products, will be, as it is intended to be, a tremendous educational force that will boost the industry in the entire country as it never has been boosted before, and the enthusiasm aroused will be a great aid in adding interest to the Buffalo convention to follow. The cement men of the west who are backing the Coliseum event are men of unlimited capital, who will make it a success, revealing to the layman the wonders of this material that has come to the aid of humanity at the time when the forests are being depleted.

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The Cement Products Exhibition Company has established headquarters at the New Southern Hotel, Michigan boulevard and Thirteenth street, Chicago, and inquiries about space in the big show should be sent there immediately. In a few days a diagram of the floor space will be ready and will be sent out to intending exhibitors at their request.

**Two Large Conventions**

The west is to have a cement exposition December 17 to 21, inclusive, that promises to eclipse any event of the kind ever attempted. It will be held in the great Coliseum in Chicago. The Cement Products Exhibition Company, composed of western cement men, has been organized permanently, and the great opening show at the Coliseum is intended as the premier event that may be looked forward to each year by the trade.
Biography of Mr. Thinks E. Knows. No. 3—He Erects the "Studding"
CARPENTERS and builders and contractors in general have, during the past few years, seen that class of buildings that embraces barns and stables and kindred structures attain a new importance as factors in their operations. Not only is there a call for this class of structures in more expensive form than was known in years gone by, but the increase in of an enlarged percentage of the population, and the favorite luxury—the maintenance of horses and carriages—has perforce necessitated the provision of stables. Similarly, the enhanced incomes of persons already well-to-do has enabled many of them to indulge in enlarged stables and more costly appointments.

The number of such contracts upon which builders are asked to bid has been tremendous. Indeed, the expansion in this line of construction has exceeded, proportionately, that in almost any other sphere of the building world.

There are a number of influences which have contributed to bring about the greater activity in this branch of the field. First and foremost, of course, is the prosperity enjoyed by the American people for a number of years past, and which has encouraged a more expensive style of living in both city and country. Luxuries have been brought within the reach of an enlarged percentage of the population, and the favorite luxury—the maintenance of horses and carriages—has perforce necessitated the provision of stables. Similarly, the enhanced incomes of persons already well-to-do has enabled many of them to indulge in enlarged stables and more costly appointments.

Another contributory cause is found in the growing fondness of the American people for country and suburban life. Recently there has been a marked tendency on the part of city dwellers to migrate to the country or suburbs and, as a rule, such a migration comes into the market for some sort of a stable if he does not find one ready at hand on the property that he has acquired. Then the automobile craze has been no inconsiderable factor in bringing about the boom in this class of construction. Thousands upon thousands of automobile houses have been erected in this
country within the past few years, and in many instances a householder starting out to contract for a shelter for his motor car has decided upon reflection to go a little further while he is about it and provide accommodations for a horse or a cow as well.

Finally, the American farmer has come into the field as an awarer of contracts for professionally built barns to an extent unheard of heretofore. In the old days the average tiller of the soil had his barns built on the time-honored co-operative principle. There was an old-fashioned “barn-raising” to begin with, in which all the men of the countryside participated and then the neighbors pitched in from time to time as opportunity offered and assisted the barn builder through the various stages of construction until the last nail was driven. Of course, the farmer who was thus assisted reciprocated by lending a hand in turn to each of his neighbors when they sought to provide structures in similar manner.

With bumper crops, however, that have paid off the old pinching mortgages, the well-to-do farmers have become employers of skilled labor in carpentry. For one thing the farmers have been too busy to devote the time that they formerly did to barn construction, and then again their improved financial condition has enabled them to seek a higher grade of construction, which can be obtained, naturally, only by having recourse to the labor of skilled and experienced artisans. The city-bred folks who have hied themselves to the country as a place for vacation or all-the-year residence have pointed the way by bringing out city carpenters to beautify their estates by the erection of handsome stables and the farmers have profited by the lesson thus set before them and consequently we find many a carpenter or builder whose headquarters are in town or city spending practically the entire summer season on country jobs of one kind or another.

However, the present-day folk who are spending money liberally for barns and stables so handsome that they would have scandalized our grandfathers are not content with mere integrity of construction. They are demanding also the embodiment of the most up-to-date progressive ideas in the arrangement of the structures. Consequently, the far-sighted carpentry contractor must be keen to keep abreast of the times regarding innovations of practice in this field. Nor are exactions on this score unreasonable, for any person who is at all familiar with the subject must admit that convenience of arrangement is of the highest importance in a stable or a barn. If it has not been observed much time will be lost in handling horses and vehicles.

The average city house or suburban estate requires, as a rule, only one small and often handsomely constructed stable, but an extensive country seat, such as is now in vogue with many an American of wealth, may necessitate horse, cow and hay barns in the form of as many different structures or a composite affair under one roof. So many important considerations bear upon the location of a stable that the site is apt to be fixed rather arbitrarily and without too much regard to building conditions. However, the contractor who is limited to a site on a hillside or on low ground need not despair, especially if the soil be sandy. Even wet or soft ground, if a compulsory site, may have the ill effects counteracted in no small measure by coating the foundation walls with asphalt and placing tile drains around the footings of the walls. If such a building is placed on low ground, however, it is desirable to have a circulation of air under the wooden floor beams through the medium of small
openings, protected by iron or wood. Where the floors are concreted they may be placed directly on the ground, if care be exercised regarding the disposition of surface drainage.

Important as is the question of floor plan arrangement in the modern stable, there is great diversity of opinion as to the ideal solution, and there have not as yet been evolved any schemes which are accepted as standard. A very advantageous plan, however, is to have a stable (if the size will permit) built around three sides of a courtyard, with a wall and gate closing the fourth side. Whatever be the general contour of the building, it is generally considered desirable to have entrance doors on opposite sides of the carriage house, so that a turnout may be driven out of the door opposite to that through which it entered, thus saving the annoyance of backing out.

There are many points which must obviously make every stable a law unto itself, as, for instance, the question of whether or not rooms for a coachman shall be incorporated in the building, and if so, how extensive these accommodations shall be—whether merely a sleeping room or a housekeeping suite for the coachman's family. Many stables are, of course, planned with no provision of this kind whatever, but if the matter is left to an architect-builder he usually advises the inclusion of a groom's room or two in the loft as a precaution against future necessities.

As to technical details covering stable construction, it may be said that most builders deem 11 or 12 feet the proper height for the first story, with perhaps a 14-foot entrance and carriage room. The carriage wash varies in dimensions proportionate to the size of the building, but must invariably be well lighted and ventilated, with a floor of asphalt sloping to a central drain. The location of this carriage cleaning compartment is important, it being rather essential that it be convenient to the carriage house, yet removed sufficiently so that its general dampness will not affect the latter. If we may judge by most of the handsome stables erected in this country during recent years, the vogue of the open carriage wash has passed, it now being the general custom to have this space under roof, with a more or less liberal allowance of skylights.

The question of the size and arrangement of stalls is a mooted one with both horsemen and stable builders. Conservative and representative specifications call for ordinary stalls of dimensions of 9 by 5½ feet, with side partitions vertically sheathed about 4½ feet high, surmounted by an iron screen 2 feet high. This screen is preferably of perpendicular bars. The generally approved dimensions for a box stall are 10 by 12 feet, such a stall being provided with doors sliding laterally or swinging outward. One box stall is provided in every stable of large size for use as a sick stall. This compartment is larger than the regular box stalls, say, 12 by 16 feet in size, and is so arranged that it can be entirely cut off from the other stalls if desired.

The flooring of stalls is another question of vital importance, upon which there is sometimes conflict of opinion. The builder who desires above all else cleanliness and durability is often wont to employ brick, but if the comfort of the horses is to be a paramount consideration, elm or oak is likely to be utilized. The flooring must needs be pitched at a very slight incline toward a branch drain in the center of the stall. The location of stall windows is yet another detail of construction, as to which there is no universal procedure. In some instances, the windows are located on a level with the heads of the horses, but as a rule...
stall windows are 9 feet from the floor and carefully screened. Many innovations are constantly being tried out in stable construction. One of the most recent of these, which would seem to have much to commend it, is the installation of a cement floor throughout the entire stable, but with movable plank floors for the stalls.

With barns and stables ranging in cost all the way from $450 to $250,000, it goes without saying that every known form of construction and combination of building material is employed. Frame construction still has the call, however, in a majority of cases. Shingle as outside covering is naturally popular, since it lends itself to more artistic effects than clapboards. On the inside the studding is usually covered with yellow or Georgia pine ceiling strips, 2½ or 3 inch widths being used.

Where an especially simple and inexpensive treatment is desired, the studding is exposed, use being made of 3 by 4-inch studs, placed 3 feet apart, instead of those with dimensions of 2 by 4 inches, and 16 inches on centers. A horizontal piece is usually set in between the studs 4 feet above the floor and the timber is mill-worked.

In this class of construction spruce is, in the estimation of most builders, accounted the best timber for framing, but good hemlock is also extensively employed for all except the beams. For the first tier beams, if exposed to dampness, chestnut is a wood that has preference. Yellow pine is most often used for girders, trusses and small parts. Spruce, two inches in thickness, makes an excellent flooring for ordinary purposes, but in the carriage and harness rooms it is customary to provide a double floor, the upper part consisting of Georgia pine, comb-grained. The doors and windows of a moderate price stable are often trimmed merely with boards without moldings. In the case of brick stables, the interior is usually furred and ceiled with matched strips. A rat-proof grain room is a desirable adjunct of the modern stable, being located over the stall room and fitted with tin-lined bins.

The choice of material for a stable roof lies between shingle, slate and tile, according to the architectural style of the building. Indeed, the architectural style of a building of this class is usually conveyed more by the roof treatment and proportion than by molded and monumental detail. For instance, the deep eaves and narrow moldings in shingle have, as is well known, become a distinctive feature of a most common type of American country barn.

The introduction of concrete construction on an extensive scale is probably the most recent radical innovation in barn and stable building in America. As has already been explained, the material has for some years past had great vogue for barn and stable floors, even in frame buildings, and lately its sphere of usefulness has been considerably extended. Barn or stable floors, it may be noted in passing, are usually laid in the same manner as sidewalks. The thickness of the porous sub-base is 6 to 12 inches, the base 3 to 5 inches and the finishing surface 1 to 1½ inches thick. Latterly it has been discovered that concrete is an ideal material for box stalls, since it provides a structure warm in winter and cool in summer. The standard stall of this material is 4 inches in thickness and reinforced with one-quarter inch steel rods 12 inches apart.

Concrete is also coming into its own as a principal material for barn and stable construction. Such buildings, constructed partially or throughout of reinforced concrete, are becoming common. There was recently completed in Southern New York State an excellently representative example of this class of construction containing forty-two straight stalls and sixteen box stalls. The building is entirely of concrete, except the roof, which is framed and shingled in the...
usual style and lathed inside with wire lath on furring strips. On the wire lath there was laid a scratch-coat of plaster, after which the cement plaster was applied and troweled smooth.

While the average builder has to do only with stables of medium cost, it may be observed that the past quarter of a century has witnessed the development in this country of a growing class of stables that are in every sense equine palaces, and are from every standpoint almost as noteworthy achievements in construction as the mansions of the republic's multi-millionaires. Frank Work was the pioneer in the provision of luxurious private stables when he more than a score of years ago contracted for a building in New York City that cost about $145,000. The second floor of this stable contains a complete suite of bachelor apartments for the use of the owner.

One of the most imposing stables ever constructed is that erected some years since at the estate of the late William C. Whitney at Westbury, Long Island. This building has a frontage of 870 feet and is strongly suggestive of the Swiss chalet style of architecture. A feature of the interior is a 12-foot wide winter exercising ring, which measures two and one-third laps to the mile. On the second floor are quarters for sixty stable hands. Rivaling in magnificence any stables on this side of the Atlantic are those built in the suburbs of Philadelphia by the "traction magnates," Messrs. William and George Elkins and P. A. B. Widener. These buildings, located near the villages of Ogontz, Ashbourne and Elkins, were all designed by the same architect, Mr. Horace Trumbauer.

The stable erected for Mr. George Elkins is arranged to surround two courtyards, one known as the stable court and the other as the barn yard. The ground floor contains offices, a carriage shed designed as a temporary shelter, a carriage house 40 feet square and an elevator by means of which carriages can be quickly transferred to or removed from the main storage room on the second floor. Around the court yard are found stalls, harness and cleaning rooms, while surrounding the barn yard are tool and machinery houses, quarters for work horses, etc. The Widener stables are famous from an architectural standpoint, being constructed of Indiana limestone, in conformity with the medium employed in the residence on the estate. The automobile quarters which are now a feature of many a modern stable, are usually little more than a single large room, liberally provided with closets, etc. In instances where a stable contains a machine shop, it is usually placed adjacent to the motor car space.

A Study of Doorways

IMPORTANT PART A DOORWAY PLAYS IN THE APPEARANCE OF A BUILDING—SEVERAL HISTORICAL DESIGNS SHOWN

By C. Bryant Schaefer

The entrance of a building is, of all places about a structure, the most apt to receive especial elaboration. If a house is new it is intended for the most prepossessing feature and in case of old places may often come in for a little improvement. This is because the front entrance is the one part about a private house that partakes of a public character. The unknown, passing throng, some of whom may be desirable of acquaintance, form their impressions from its appearance and dispose themselves according to its attractiveness or austerity. So it is that much fine art and much benefit to the residents may be involved in the taste displayed in making the entrance ways. It is not a matter of securing a model of art but of having the style appropriate to
the employment and character of the occupants that secures its success.

Much is truly said about the importance of a workman realizing from whence he inherits his aptitude for a trade, whether it runs in the family or whether by adoption the young aspirant takes after some favorable person of good influence. It becomes a great help in case of neglect or difficulties.

What is true of personal talent is also true of a trade or vocation as a whole. It grows from the past, solving one necessity after another. In inventing wholly anew, some of these requirements might be overlooked. Hence it saves much study to refer to that which has stood the test of time as the best. So we have here some selections from the history of doorways that will prove an advantage to persons interested.

These designs are of a domestic nature, suitable to our latitude. That means suitable for residence, climate, materials and workmanship and many other needs that we have to meet.

A couple of thousand years ago North Atlantic persons of responsibility were known by individual carvings. To identify a favorable location in their travels they were wont to carve their personal marks upon the doorways. From the North Sea this system extended as far as Armenia and the east coast of India.

A good example of this kind of work is the runic doorway in Galway, Ireland, illustrated herewith. The heart-shaped convolutions are a mariner's index, the plating above represents a family and is a mode that was also established in North America. The twist to the left indicates a matrimonial alliance.

The old Saagas of the Northmen say this convenient art was copied to such an extent by careless imitators as to have finally confused its usefulness, hence its abandonment.

The doors of Francis I. of France are only a few centuries old, but the ancient custom is still maintained. One may say it has become official. His initial and family token adorn the upper panels. The diamond represents the tried moral status persons of any rank may naturally attain by a short term of perseverance and thenceforth work in the realization
of their ideals. In the case of the French king it was beautiful chateaux and sculpturings as well as broad estates.

In the old-fashioned times of our own day the front entrance was considered to indicate a place of business or public reception, while the side entrance betokened a strictly private abode.

The hospitality of the New Englander during revolutionary times was often somewhat formal and precise on account of political uncertainties, excepting, of course, between well known neighbors. Formal reception rooms, the front parlors, were closed and musty. Accordingly the group of old Colonial entrances illustrated may appear a trifle stiff. That makes it all the more pleasing to note the success with which they departed from scholastic examples in respect to some of the detail. Study of these historical specimens from Petersham, Milford and Hopkins, Massachusetts, will help one out of bookish ruts without being freakish.

In colonial work the possible significance of the detail is not utilized, although the pretty custom is still remembered, for I am told by some of the stable old characters that the original settlers, their forefathers
having fled from fanaticism, would not allow a cross to appear even in the structural arrangement of the door panels of their houses, on account of its obnoxious significance.

The Virginia type illustrated is more pleasing for home use than the cumbersome porticos so often represented in examples of southern architecture.

About a quarter of a century ago, when mill work was first of the boom, there was a great display of sawed and turned work. The mode then was to introduce new features at the jointure of other features, leading on in endless variety.

While it is called old-fashioned in these days, when the ornate designs conformed to the colonial or other structural outline, they remain very pleasing. In the play of sunshine and the dancing shadows of foliage they have the effect of brilliant lace work, but by the absence of some general outline to give homogeneousness, the general clutter of spindles and scrolls came to be facetiously called "gingerbread" work.

In the west, where there was much new building, another class of mill work developed for the decoration of bare walls of frame buildings. It accompanied the introduction of balloon framing. Beaded stuff was introduced with which to wainscot the interiors. Fancy cut shingles were employed and all kinds of paneled belt courses were made use of to relieve the wainscotting of plain surfaces. This became very popular in the prairie towns where foliage and landscape adjuncts were scarce.

There is something indigenous in this phase of building decoration. It is suitable for expressing native ornamental motives like the sketch for a siding design.

People who are accustomed to the solidity of brick and stone construction have somewhat changed the tendency of wood work lately. Some insincerely refer to most anything in the carpentry line as a lot of "kindling wood" and small town people who are prone to admire their glib and pretentious city brethren have taken to imitating the massiveness of other materials.

Glued-up work is the fashion. Broad surfaces, heavy appearing but hollow, concealed joints and unadorned, bungling masses and school book temples are often exploited.

Even much well designed cement work is frequently marred by obtrusive portions of wall surface. Classic votaries also fail to realize that the slight variations they make in their facades are unnoticed by the average person. To such all classic buildings look alike.

The fad of the day will not give owners and occupants permanent satisfaction. Something desirable may be found therein, however. This and the best element from previous accomplishments, from the years and centuries of study, should set the example for the new achievements. In this way we may construct better than ever.

Probably the most practical and satisfactory designs are a recent type, like the last illustration, where formalities and pedantic symmetries are dropped in preference to what is most desirable in convenience.
and materials. A structural form of design results, in which doorways and other features become incorporated in the general scheme of the building. A variety of materials can be used in this way to good advantage, and what is most desirable in sawed, carved and turned work can be adapted in many effective ways. This gives picturesque buildings. People admire them as picture houses. They really represent what good results can be attained on purely artistic principles. The proportions governing art work of all kinds are kept in view but not indicated, just as a person talks without repeating the rules of grammar.

The accurately proportioned classic building may be a magnificent grammatical treatise on architecture. It may be monumental and impressive, but genre art, practical art, by combining the best resources according to our needs, is the true design. It is then the creation of art in which all the people fortunately take part.

A Substitute for Marble

The lack of marble in Denmark has in the past led to many attempts to produce a substitute which would equal in decorative effect the natural product, and at the same time would not exceed it in cost. Some success has been achieved in the manufacture of a substitute in Sweden, but the thin slabs would not keep their shape. The veins were stiff and angular, and the soft transitions of color which make variegated marble a thing of beauty, were lacking. An important advance has, however, been made in the industry by a Danish master builder, who is producing a stone which is claimed to be of such delicate transition of tints and play of color that it is almost impossible to distinguish it from real marble. The claim is made that the article can be produced in any form and that it appears to have the durability of genuine marble, while the cost is about one-tenth.

His Concession

Grace Simpson was the prettiest girl in town, but the young men fought somewhat shy of her on account of her father, who was a wealthy contractor and who had decided objections to having Grace’s beaux calling at the house and didn’t mind letting them know it. One evening a young fellow came to take Grace out. As she was not quite ready, he sat bashfully down on the porch with her father. Nothing was said for a while. Then the young man ventured to suggest that it looked like it might rain. Mr. Simpson sent a heavy stream of tobacco juice over the porch railing into the rose bushes. “Tain’t a-goin’ to rain!” he snapped. This seemed to be final, and for another quarter of an hour the two sat in silence. Finally the old man’s curiosity got the better of him, and he gruffly asked: “Say, who are you, anyway?” “Samuel Wilson, sir,” responded the caller. “What! Not old Bill Wilson’s, the carpenter’s son?” (Old man Wilson and he were good friends, but he had never noticed the rapid growth of the boy). “Yes, sir,” said Sam. “Well, well,” mused Mr. Simpson more kindly, “it may rain, Sam, it may rain.”

I consider the AMERICAN CARPENTER AND BUILDER the best magazine I have ever received, and wish it a long and prosperous voyage on the seas of journalism.

—W. T. Beseman, Nickerson, Kans.
How to Use the Steel Square

SHOWING INDIRECT USE OF THE STEEL SQUARE IN ROOF FRAMING BY MEANS OF PATTERNS—THEIR ADVANTAGE AS A TIME SAVER—EASY TO MAKE AND ANY ONE CAN USE THEM

For an all around tool there is nothing that supersedes the steel square for obtaining the cuts and bevels for general framing work. Yet it has its disadvantages. It is more or less an awkward instrument to carry in the tool box from place to place. In the hands of the inexperienced it is a cumbersome tool, who see in it only an instrument for squaring the ends of timbers or as a measure, and at once drop it at the conclusion as if that constituted about all of its usefulness. They lay it aside to take up some of the more common methods when the steel square should have been applied direct to the timber to obtain the desired cut. But, after all, in resorting to some of these methods, more than likely the steel square is brought in to use to lay out a diagram from which to obtain the desired angles and to these, the bevel square is applied to obtain the cuts. In saying this, we do not mean to be understood that the steel square should be used at all times exclusive to any other method, but after having settled on the desired pitch, its use may be simplified.

Patterns may be laid out with the aid of the steel square for obtaining the cuts, thus saving time in adjusting the square to certain figures for each cut, as there is but one position to apply the pattern and all that is necessary is to mark along its edges. The sides and plumb cut of a jack can be made without lifting the scratch awl from the pattern and practically with one stroke of the hand.

Two patterns are required for an even pitch hip and valley roof, i.e., one for the common and jack rafters and one for the hip or valley, and after once made, will answer for any size roof of like pitch.

Would recommend making the patterns out of heavy galvanized iron. It is a good plan to have patterns for the leading pitches and number them as to pitch as one-fourth, one-third, or whatever pitch they may represent. By cutting a hole in the patterns they can be hung up in the shop or they may be carried in the tool chest, thus always ready for use and anybody can use them.

Now we will show how to lay out these patterns and their relations to the square.

In Fig. 160 are shown three squares. On square
No. 1, A B represents the run of the common rafter, B C the run of the hip, and A C the tangent. The points A, B, and C represent a right angle triangle of 45 degrees and therefore represents the angle or plan for an even pitch roof. From this we get the starting point for the pattern. On the tongue of square No. 2, the same point is taken as shown on No. 1. Lay off the desired rise on the blade, which in this case we will take the one-third pitch or 8 on the blade. A B represents the run of the common rafter; A D the rise, and B D the common rafter. Now to this apply square No. 3 as shown, and with B C' equal to B C (the tangent), and draw the line C D. Then that part of the diagram bounded by A B C' and D will be the layout of the pattern. Trim to the lines and bend to a right angle on the line B D and the pattern is complete. However, the corner C' may be trimmed to a parallel line two or two and a half inches from the line BD, as that will take in the usual run of rafters.

In Fig. 161 the pattern is shown applied to the timber ready to lay off the cuts. The pattern could be any desired size as far as the cuts are concerned, but by making it the size as shown in the previous figure, it will be seen that the distance from A to B is 12 inches and is therefore full scale to one foot run of the common rafter. Then BD must represent the length of the common rafter for a one foot run. Therefore, by sliding the pattern along the timber, the length of the rafter is obtained precisely in the same manner as in running the steel square. By marking the inches and fractions thereof along the edge of the pattern from A to B, the length of the rafter for a fractional part of a foot or inch in the run may just as easily be handled as for even feet. Thus we have the steel square in a simplified form as follows: AB gives the seat cut; AD the plumb cut; BC the square cut across the back of the rafter and CD the side cut of the jack. The corresponding cuts for the hip or valley requires another pattern, but the lay-out would be the same as shown in Fig. 160, except the point B would be at 17 on the tongue instead of 12 as shown. These figures are fixed points for any pitch, or in other words, as though the heel of square No. 3 was pivoted at these points and by moving the blade up or down for the desired rise on square No. 2, as at AD, will determine the lines of the pattern. These same patterns can also be used to advantage in getting the angles for the cornice work pertaining to the same building.

In laying out a pattern for an even pitch hip and valley roof, all the points may be had as shown on the squares Nos. 2 and 3, because B, C is always equal to A, B, but this is not so where the pitches are unequal. In that case the proportions to be taken on square No. 1 are the respective runs of the common rafters, and therefore requires a pattern for each pitch.

The Strength of Beams

The several articles dealing with this subject which have appeared lately in this magazine have not quite exhausted the various aspects in which it is liable to crop up any day in building practice, and one or two more examples will be dealt with this month.

In the October number there was given the method of finding the breadth of a beam when the depth was already fixed; the length (span) and load being also known. The case worked out is only one of numerous instances in which the depth of a beam is limited. A very common case is that of a floor where a beam...
has to be placed to carry a partition above, but is flush with the lower edges of the joist below. The same formula used in the case worked in the October number will apply to that and all similar cases.

Very often, however, it happens that it is the breadth of a beam that is fixed; especially in the case of beams or girders over openings in brick walls, and the problem then is to find what depth the timber should be to carry the load safely. To find this requires, of course, merely a slight turning about of the formulas used in the cases dealt with in previous articles and presents no difficulty to any one at all acquainted with mathematics. It will be worked out, however, in the same manner as the other problems of this series of lessons, and divested as much as possible of all complicated looking and repellant algebraic signs and symbols. The writer's attempts to interest and instruct his two craftsmen friends showed that it is usually the look of the formulas in the books that scares the seeker after knowledge who is some years away from his school days. Also that if these mystifying formulas are properly and simply explained, any man with a knowledge of the elementary rules of arithmetic can make calculations for the sizes of practically all the timbers of the average building.

As before, certain conditions will be laid down, being as follows:

A beam is to carry an 8-inch wall over an opening. The beam is of southern hard (or pitch) pine; the opening is 10 feet wide; the height of the wall above the beam is 13 feet 6 inches, giving 90 cubic feet (10 feet by 13 feet 6 inches by 8 inches), say, 90 cwt. as weight to be carried on beam.

The method of putting down these particulars is shown in Fig. 1, which will be seen to resemble the earlier formulas, although the several factors are differently arranged. Fig. 2 shows the calculations for our present case, which works out in exactly the same manner as earlier ones; that is, all the values above the line are multiplied together and divided by the product of all the values below the line when they have been multiplied together.

The only difficulty is in working out the final answer, for the result obtained at first will be the square of the required depth; that is, the depth multiplied by itself. To arrive at the exact depth it is necessary to "extract the square root" of the answer, which means to find what number multiplied by itself will give the answer. For all ordinary practical purposes of wooden beam calculations, however, the exact result is not absolutely necessary and a sufficiently accurate one can be obtained by inspection of the first answer. For instance, in the foregoing problem the answer is 56½. Now, the nearest square of a whole number to this is 49, the square of 7 (7x7 = 49), therefore the depth of the beam is more than 7. The next square of a whole number is 64, the square of 8 (8x8 = 64), and as that is greater than our answer, evidently our beam should be somewhere between 7 and 8 inches deep. As a matter of fact, it proves in this case to be exactly 7½ inches (7½x7½x56½), but if the sum had not worked out so exactly as that a result quite good enough for practical purposes could have been arrived at by the method indicated above; namely, by finding the nearest squares of the whole numbers above and below the answer and al-
lows a sufficient amount over and above the root number of the square below. As in the previous articles, the nature and position of the load must be considered in any calculations made. The factor of safety used is 5, the usual for a dead load. That is, one-fifth of the breaking weight is considered to be the amount a beam can safely carry when the load is a stationary one.

The position of the load is important, for, as shown in the earlier lessons, a beam will carry twice as much if the load is evenly distributed along it, as it would if the load were in the center only. The figure 2 is therefore placed below the line in the present case. The effect of this is shown by comparing the result in Fig. 2 with that in Fig. 3.

From the several calculations made during this series of articles, it will be seen that if two beams or joists be of the same length and sectional area, the one of greater depth will be the stronger of the two. This can be readily seen by taking as examples two joists of the same sectional area, but of different dimensions. A piece of 12 inch by 2½ inch, another 10 inches by 3 inches, have the same sectional area (30 square inches), but their relative strength when placed on edge is as 360 to 300 when the rule given on page 368 of the June number of this journal is applied. It was there stated that the strength of a beam was as "the square of its depth," that is, the depth must be multiplied by itself. 12x12x2½ = 360 and 10x10x3 = 300, or a proportion of strength between the two as 6 is to 5.

There is, of course, a limitation in the practical application of this, for if a beam be made very deep in relation to its breadth, it will buckle and twist when loaded. In the case of floor joists, the disproportion of depth to breadth is very marked, but their tendency to buckle is overcome by strutting, either with solid blocks the same depth as the joists cut in between each pair, or "herring-bone" strutting cut from narrow battens. Many experiments have been made to find the best proportion for the breadth and depth of wood beams, and it has been laid down that a ratio of 5 to 7 gives the best section. This is a useful thing to remember and easily kept in mind.

In concluding this series on the strength of beams the writer trusts that some of the readers of the American Carpenter and Builder who may have been deterred from going into the matter of calculating the strength of materials will have been in some measure led to see that a formula is only a simple way of putting down a rule for some arithmetical process that would take a long time to describe in words. The strength of beams is a question that is so often cropping up that the articles may have been directly valuable in showing how to find it in any given case, but the writer also hoped that his articles might lead many readers of this magazine to take up other lines of calculation equally simple and useful to the practical man.

**Finishing Concrete Surfaces**

A very large number of bridge abutments, retaining walls and other pieces of masonry presenting large, continuous surfaces are now being constructed in cities throughout the country of concrete, and with excellent satisfaction. In most cases they are given a smooth finish, which offers the objection of being glaring in a bright light, of showing the finest of hair cracks that any irregularity in mixing shows in the color, and that any patching is apt to result in scaling off of the surface, tells the Municipal Journal. A more pleasing appearance has been obtained by the Philadelphia Department of Public Works in its concrete structures by the construction of what it calls granolithic surfaces. In this the removal of the mortar leaves the surface color that of the stones used; it is not so liable to streak, and cannot be scribbled on or covered with posters. The use of a stiff scrubbing brush or wire brush in connection with the washing will expedite the work. The specifications of the Philadelphia Department of Public Works for granolithic surfaces are as follows:

Granolithic surfacing, when required, shall be composed of 1 part cement, 2 parts coarse sand or gravel and 2 parts granolithic grit, made into a stiff mortar. Granolithic grit shall be granite or trap-rock crushed to pass a ¾ inch sieve and screened of dust. For vertical surfaces, the mixture shall be deposited against the face forms to a least thickness of one inch, by skilled workmen, as the placing of the concrete proceeds, and thus form a part of the body of the work. Care must be taken to prevent the occurrence of air spaces, or voids in the surface. The face forms shall be removed as soon as the concrete has sufficiently hardened, and any voids that may appear shall be filled with the mixture. The surface shall then be immediately washed with water until the grit is exposed and rinsed clean, and protected from the sun and kept moist for three days. For bridge seat courses and other horizontal surfaces, the granolithic mixture shall be deposited on the concrete to a least thickness of 1½ inches immediately after the concrete has been tamped and before it has set, and shall be troweled to an even surface, and, after it has set sufficiently hard, shall be washed until the grit is exposed.

**Most Up-to-date**

After forty years' experience as a contractor and builder from Delaware to Colorado, and a constant reader of mechanical journals, I wish to say that the American Carpenter and Builder is the best and most up-to-date journal I have ever seen. It contains the best and most valuable information for the amateur as well as the oldest carpenter of the present day, and I can highly recommend it to the trade generally.

THIS never ending detail of building construction seems almost unlimited in its application, not only in the numerous designs which are evolved by the use of the ordinary common bricks or front bricks, but also with special brands made by different manufacturers. In this short article we will consider the matter of colored and enameled bricks. The question is now a matter which architects are earnestly engaged in developing to the betterment of their designs, both in artistic beauty and constructive strength, obtaining both in unison.

It is not very usual to employ enameled brick for the exterior elevations of buildings for the reason that the surfaces, through the deposit of dust, wind and rain will become streaky and discolored and incapable of being washed or cleaned. In addition to this the cost of the bricks is extreme, as the best enameled bricks are imported from Europe, and the duty being heavy, they are rarely employed except on the very best class of public or private structures. Very fine bricks are now made in the United States and Canada in many colors, whereby various combinations may be obtained, according to the taste of the architect. These front bricks are supplied by the manufacturers in almost all the well-known colors or shades of colors, mottled, speckled or lined; also in the form of stones, as rockfaced, wash face, etc. The effect of the combinations is usually forecast by building a small sample, observing another design already built, or by a colored drawing. In straight perpendicular work the observance of the bonds and the exact placing of the headers and stretchers is the only part of the workmanship to be watched, but in the construction of arches much more is required. The attached sample will illustrate to the reader the value of the care which must be exercised in the laying of colored front, or enameled bricks. It represents an arch in the basement of a public building piercing a 28-inch wall, both sides, jambs and soffit of the walls and arch being laid in blue and enameled brick, the black denoting the blue and the white the primary color. The headers are blue and the stretchers white. Extremely care-
A pivoted window in a sixteen-inch brick wall is made the subject of this installment. The sash is center pivoted top and bottom and set in a rebated frame two and a quarter inches thick.

The masonry opening is spanned on top with a flat stone arch, the key of which projects beyond the face of the wall. Back of this arch a steel lintel, consisting of two three by four-inch angles, is provided to support the masonry. The inside of the wall is furred with two-inch ribbed full porous terra cotta blocks, to which the plastering is applied. Grounds (G) for the wood finish are nailed to this furring which, being full porous, readily receives and holds a driven wire or cut steel nail.

The joint of the wood frame and the masonry is covered with a molded staff bead. The inside head and jambs are lined with seven-eighths inch material tongued into the frame.

Small wood molds cover the joints between the sash and the frame, both on the outside and the inside, so as to make it weather-tight, forming a rebate, as shown. As part of the sash opens outward and the other half into the room, these molds are fastened to the frame in some places and to the sash in other places.

At the head the mold on the outside of the window has half its length fastened to the left side of the sash as at the dotted lines "A" in Fig. 196, and the other half is fastened to the frame. With the inside mold at the top of the window, the reverse is the case, the mold having half its length fastened to the right side of the sash. This is also the case with the inside mold at the bottom of the window, except that this mold is cut as at "B" in Fig. 196, and then slit horizontally as indicated by the dotted lines at "C" in Fig. 197.

The projecting member of the frame at "D" in Fig. 195 is cut away on the dotted line for the distance indicated by "E" in Fig. 196, so that the ends of the moldings which are fastened on the head of the sash and project above it will clear the frame at this point.

Fig. 195 is a vertical section, showing the construction at the head of the window.

Fig. 196 is a horizontal section through the window and shows the position of the sash when opened and when closed.

Fig. 197 is a vertical section, showing the construction at the sill of the window. A drip mold is let into the lower rail of the sash to keep water away from the joint at the sill, and, to take care of any water which may pass this obstruction, an undercut is made in the bottom of the sash over a channel cut in the sill. This catches any water which may beat in, and reamed holes at intervals convey the water from the channel to the sill as indicated by the dotted lines and the arrow. One of these drip holes is shown in plan in Fig. 196.

The inside stool of the window receives the trim, is molded on the edge and is tongued into the sill. Under this stool an apron is provided.

The stone sill is cut with a wash, lugs at either end and extends under the wood sill two inches. The joint between the wood sill and the masonry should be well filled with mortar.

A Short Cut

The board was 10 inches and a fraction in width, and the carpenter's apprentice with his ruler and a pencil was trying to divide it into three equal parts.

"Hang it," he said, impatiently, figuring away, getting bigger and bigger fractions, and still far from the accurate division that he sought. "Hang this business."

"Here's the way to do it," said the old carpenter. And he took a foot rule and laid it across the 10-inch board obliquely, so that the oblique measurement just made 12 inches. Then he marked off three equal divisions, one at the 4-inch line the other at the 8.

"You will find that divides your board quite accurately," he said. "It is the easiest way for carpenters to make divisions. It works on any width or any number of desired divisions. To divide a 934-inch board in four parts, for instance, you'd make your ruler measure obliquely just ten inches across the board, and then you'd mark off your divisions at 2½, 5, 7½. This is a handy thing to know. It saves a man many a quarter-hour of tedious ciphering."
FIG. 195.

FIG. 196.

FIG. 197.

WINDOWS.
Pointers in Planer Practice

IMPORTANT WORK BEING DONE BY SMALL PLANING MILLS—THINGS THAT CAN BE BETTER ACCOMPLISHED ON SMALLER MACHINES

Did you ever ask the question and try diligently to find a satisfactory answer as to what constitutes good planing mill work?

There are too many planing mill men who think the correct answer to this question is to be found only in a large planing mill with heavy and expensive machines. There are probably many operators of small planing mills in country towns with only a few light machines who envy their big brothers in the city and think that there is no need to try and compete with them so far as good planing mill work is concerned, because their plants are overshadowed in magnitude by the city planing mill with all its modern equipment. Because he thinks this way, many a man operating a small planing mill doesn't get as good work out of his mill as he should, because he fails to realize its possibilities. The real truth of the matter is, as you will find when you investigate the subject thoroughly, that it is not the magnitude in planing mill equipment which puts the quality into the work, or does what might be termed good planing mill work. Every mill, no matter what its size, is made up of individual machines and every individual machine, large or small, is the same machine, and will do the same work in a small plant that it will in a big one. All it needs is the same attention.

All of this, and a lot more, might be said to open the eyes of some small planing mill men in the country and put them in a more receptive mood for pointers in planing mill practice which might enable them to better understand the possibilities of the machines they have along the line of doing good planing mill work. Too many think that there is no need to try to turn out work which will compete with the larger mills, because they have not the large equipment and because they think it is no use, rather than because of any lack of equipment or ability; such men fail to put forth their best efforts, and consequently do work that is not as satisfactory to themselves as it might be. This kind of reasoning is too much like the despairing soliloquy of the rooster in saying, "What's the use? Yesterday we were eggs and tomorrow we are feather dusters."

Did it ever occur to any of you who feel and reason in this "What's the use" way that frequently the big planing mill or other large institution will turn to the small and simple machines to get quality into their work and do the best class of planing mill work? If it didn't you have a thought coming that should put some new ideas and some fresh spice into your work, because they do those things and frequently it is the smaller machines and planers that are made use of to do the highest grade work, and also the double surfacer is discarded for the single surfacer when one wants to put real quality into the work. This argument may start a storm of protests, but it is good just the same and worth taking home and thinking about. A student of machinery and methods in a recent discussion on the subject of the development of woodworking machinery, after telling about the advent of the surfacer, said "Then came along the man who figured that the under side of a board could be finished at the same time as the upper, and he demonstrated that practically by making a double surfacer. It was only a step to put on side knives to joint or make tongues and grooves, and this is where we stop today, because after double surfacing, joining or matching a board, that is all that is required of a surfacing machine to do, unless you use it as a surfacing resaw and surface down inch boards to ¾ inch, when the resaw is out of commission, a thing I knew of being done in a box shop once. The red flag of the sheriff was hung out before many millions of feet were 'surfaced resawed' in that way.

"Every machine man makes his claims and every machine offered does something superior to the other man's surfacer. Strange as it may seem, if the superior points in every surfacer were all combined in one surfacer, that combination surfacer, instead of being a paragon of perfection, very likely wouldn't be worth a damn!"

A specific case illustrating this point was brought out recently in connection with the equipment of a plant to make parquetry flooring. This is a class of planing mill work which in some respects calls for a high degree of precision. Good flooring, as we all know, is generally made on heavy, expensive machines, and yet in the equipment of this new plant for making parquetry flooring every machine was small, simple and light running. There was not even a double sur-
facer in the plant, the strips being faced on a single surfacer and the edges jointed afterwards on another simple machine. It was so remarkable, and so different from what one might expect that it excited some comment and some inquiries as to why, and as a result of these inquiries there were obtained some pointers on planing mill practice that seem to be worth while for many of the planing mill men operating small planing mills either in the country or in the city.

The first point relating specifically to such light small work as the making of parquetry flooring strips was that holding it in rigidity for surfacing it on all four sides in the machine involves so much pressure and clamping on all the sides that it takes lots of power to force the strips through, and in case the strips happen to be cross grained or something else, there is danger of it breaking and causing delay and a lot of trouble to get it out of the machine and straighten it all out again. This one point applies specifically to light strips and there are a number of others which apply equally well to planing mill work.

One is that it takes lots of power to operate a big machine and hold the board rigidly for surfacing on all the four sides.

That is, a machine, in addition to the power required for cutting, consumes a lot of power in the friction of the pressure bars and in the power required to feed a board through. Another point and a more important one is better surfacing, better planing mill work, in fact, can be more easily done on a single head machine, a panel planer, for example, than on a big double or four-side surfacer. The one cutter head gives you an opportunity to have a rigid platen underneath and simplifies wonderfully the work of holding the board down to the planer while it is being fed through the machine. There are no complications in the way, no need to hold it up as well as down, and any man with mechanical skill and an eye to details can make a single surfacer do good work and frequently, where quality is the main object, it is found better to run a board twice through the single surfacer to dress both sides than once through a double machine. If there is a limited quantity of the work it is better to run twice through the single facer, but if it is a steady stream of work, some place where quality is an object, it is better to place two single surfacers in tandem order and use two single surfacers instead of one double surfacer. This is one of the things that is done in some of the big institutions which is an important point for the smaller planing mill men to take home to themselves, because it brings with it a realization of the fact that the little surfacer in a small planing mill that looks insignificant is really capable, with proper manipulation, of doing better work than most of the big double surfacers in large institutions.

Take the furniture factories and some other manufacturing institutions, and the big double surfacers are used as a sort of receiving or roughing planer, and not much effort is made at getting a neat finish with it. Stock is sized to dimensions enough larger than what is ordered when finished to leave room for doing the final cutting afterwards on the panel planer. Then, after the work is ready for finishing it comes through the single surfacer or panel planer, which is kept sharp and carefully adjusted for smooth work, rather than for speed or heavy cutting.

This line or argument is not offered as a species of fault finding against the larger and more complicated machines. These larger machines, that is the double and four-side surfacers, are made to fill a purpose which many of them fill well, and that purpose is to save time and extra handling of the stock to get two or four sides surfaced at once. Saving of time, however, is one thing and putting quality into the work is another, and without finding fault with any of these larger machines the idea that it is desired to bring out is that many of the planing mill men have in their shops some small surfacers that are not doing good work as they ought to do simply because they do not realize the possibilities of the small single surfacer and are sometimes kept from realizing them by an erroneous impression that the only way to get good mill work is to have big, complicated, expensive machines and a whole lot of them.

Good work in planer practice might be analyzed and set forth in a formula as 10 per cent skill and 90 per cent detail, and that analysis would pretty well cover the majority of cases. There are some who may take a different view and think that the heavier percentage should be skill, but when they get down to it right, skill itself is largely made of attention to details. There are certain elements of thought and manual training which come from practice only, but with due credit to all of this the fact remains that the larger element in good work is that of close-attention to details. It begins in the selection of the knives for the planer and doesn't end until the board is finished and delivered. It is not much in itself to select a knife that is not quite up to the grade of some other knife to save a little on the price, and this alone might not seriously mar the work of the planer, but it is a little step that leads to others and it is the aggregate of these same little steps that, if allowed to accumulate enough, will seriously mar, if not entirely destroy, the quality in planer work.

The man who takes pride and pains in selecting the best planer knife to be had, after thoroughly testing and trying, will naturally take more pains in grinding that knife, and will be careful that he doesn't burn it, will see that he gets the right bevel and perfectly straight from end to end, and when he begins to put it on the machine his pride in the knife and his work will continue to grow on him until it is a dominating factor, and he will take more pains in seeing his knife exactly balanced, and seeing that all the bolts and washers balance, and that they are neatly tightened down, not strained, and he will be more patient and
THE church we are herewith illustrating is to be built for the Presbyterian congregation at the corner of Mountview boulevard and Dahlia street, Denver, Col. The plans were drawn by G. W. Ashby, architect. The building is to be built of random rubble range stone with cut stone trimmings and the finished effect will be very beautiful. The prominent exterior features are the large tower and the porches, which not only add greatly to the design, but is a large space for the choir and back of this is place for the organ.

Off from one side of the choir is the lecture room and on the other side is the pastor's study room. Both of these rooms are nicely equipped with fireplaces and made as comfortable as possible. The various elevations and cross sections give a good idea of the detailed construction of the building and the dimensions of the material used in the construction.

Oldest Church in United States Burns

The oldest church edifice in the United States was destroyed by fire recently. The ruins of adobe and stone are to be removed, under the direction of the Catholic church authorities, and a thorough search made for hidden treasure, which, according to legends that have been handed down for generations, lies buried beneath the floor of the building. The records go to prove that Ysleta, Tex., is older than St. Augustine, Fla. In the records of the great cathedral of Madrid, Spain, is found the report of Marcus de Niza, a French monk, who says that he left the City of Mexico and made his way north, finally crossing the stream that is now known as the Rio Grande. He says that he followed the road that he left for his mule...
to take. Part of this manuscript is written with the blood of a deer for ink, and his own forefinger nail for a pen. He says that in 1537, across the Rio Grande, he found the village known as Ysleta, occupied by the Pueblo Indians, whose traditions all point to their having been of the ancient Aztec race, or to a people of even more remote origin. Franciscan missionaries arrived at Ysleta four or five years later, and the mission church, which was destroyed by fire, was erected. It was completed about 1550. In many respects it was the most unique mission building in the southwest. Owing to the fact that it was remotely situated it was seldom visited by tourists, and little has ever been written about it. It was a very large structure, and was built with the idea of serving as a fortress in case of attack by Indians, as well as for worshipping purposes. The walls were four feet and six inches thick. It was the boast of the worshippers that the candles which burned at its altar had shed their light continuously for more than 350 years. It was one of these candles that caused the destruction of the church. A piece of tapestry was wafted against the blaze by the wind, and in an instant the inflammable material of the altar was afire. It was as dry as tinder and the flames quickly spread to the other woodwork of the edifice. The interior was soon a roaring furnace. The town has no means of fighting fires, and the people were forced to stand idly by and watch the building go to its doom. There was great sorrow among the people on account of the destruction.
During the past few months we have shown various arrangements of the plans of the same house. We are again taking the same floor plans and giving an estimate of all the work and material necessary to build the house. It may be of special interest to the readers as each item of the lumber and millwork is given.

**Excavating and Masonry**

- 170 yards excavating, 25 cents = $42.50

**Lumber Bill**

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<th>Item</th>
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<td>3 6x6x14 ft. posts in cellar</td>
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<td>26 2x8x24 ft. floor joists</td>
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<tr>
<td>12 2x6x12 ft. porch joists</td>
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<td>20 2x4x14 ft. partitions in cellar</td>
<td>180</td>
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<tr>
<td>40 2x6x14 ft. ceiling joists</td>
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14,000 brick laid in foundation wall, $13 = 182.00
85 yards cementing cellar, 45 cents = 38.25
37 lineal feet 8x12 flue chimney, $1 = 37.00

Total, excavating and masonry = $299.75
AMERICAN CARPENTER AND BUILDER

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<td>80 2x4x16 ft. second story partitions</td>
<td>$880</td>
</tr>
<tr>
<td>20 2x4x16 ft. dormers</td>
<td>$220</td>
</tr>
<tr>
<td>4 2x4x16 ft. hip rafters</td>
<td>$648</td>
</tr>
<tr>
<td>20 2x2x16 ft.</td>
<td>$110</td>
</tr>
<tr>
<td>20 1x3x18 ft. backing</td>
<td>$180</td>
</tr>
<tr>
<td>30 1x6x12 ft. braces</td>
<td>$180</td>
</tr>
<tr>
<td><strong>Total feet framing lumber</strong></td>
<td><strong>$8,956</strong></td>
</tr>
<tr>
<td>8,956 ft. framing lumber at $25</td>
<td>$224,900</td>
</tr>
<tr>
<td>4,100 ft. No. 2 Y. P. shiplap at $35</td>
<td>$106,250</td>
</tr>
<tr>
<td>2,000 ft. No. 2 8 in. Y. P. sheathing at $27</td>
<td>$40,000</td>
</tr>
<tr>
<td>16 M. 5 to 2 clear cedar shingles</td>
<td>$72,000</td>
</tr>
<tr>
<td>2,600 ft. No. 1 1/2x4 in. clear cedar siding at $30</td>
<td>$78,000</td>
</tr>
<tr>
<td>2,000 ft. 1x3 clear Y. P. flooring at $33</td>
<td>$60,000</td>
</tr>
<tr>
<td>250 ft. 1x4x16 ft. clear fr flooring at $40</td>
<td>$1,000</td>
</tr>
<tr>
<td>600 ft. 1x4x12 to 16 ft. No. 1 Y. P. ceiling at $27</td>
<td>$72,128</td>
</tr>
<tr>
<td>50 sq. ft. 1x4x12 to 16 ft. clear fr finish at $45</td>
<td>$2,250</td>
</tr>
<tr>
<td>125 sq. ft. 1x6x12 to 16 ft. clear fr finish at $45</td>
<td>$5,625</td>
</tr>
<tr>
<td>200 sq. ft. 1x8x12 to 16 ft. clear fr finish at $45</td>
<td>$9,000</td>
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<tr>
<td>100 sq. ft. 1x10x12 to 16 ft. clear fr finish at $45</td>
<td>$4,500</td>
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<tr>
<td>325 sq. ft. 1x12x12 to 16 ft. clear fr finish at $45</td>
<td>$14,625</td>
</tr>
<tr>
<td>200 sq. ft. 1½x12x16 ft. clear fr finish at $45</td>
<td>$9,000</td>
</tr>
<tr>
<td>100 sq. ft. 1x12x16 ft. clear Y. P. finish at $45</td>
<td>$4,500</td>
</tr>
<tr>
<td>50 sq. ft. 1½x12x16 ft. clear Y. P. finish at $45</td>
<td>$2,250</td>
</tr>
<tr>
<td><strong>Total lumber bill</strong></td>
<td><strong>$74,72</strong></td>
</tr>
</tbody>
</table>

**Millwork**

<table>
<thead>
<tr>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 porch columns, 10x10x8 ft., $3</td>
<td>$900</td>
</tr>
<tr>
<td>2 half columns, $1.75</td>
<td>$3.50</td>
</tr>
<tr>
<td>2 pieces porch rail, 12 ft., 6 cents</td>
<td>$1.44</td>
</tr>
<tr>
<td>2 pieces porch rail, 16 ft., 6 cents</td>
<td>$1.92</td>
</tr>
<tr>
<td>168 ft. 1½x3½x14½ headed balusters, 2 cents</td>
<td>$3.20</td>
</tr>
<tr>
<td>18 ft. ridge cresting, 10 cents</td>
<td>$1.80</td>
</tr>
<tr>
<td>4 finials, 15 cents</td>
<td>$60</td>
</tr>
<tr>
<td>220 ft. ¾ in. crown mold, ¼ in.</td>
<td>$5.90</td>
</tr>
<tr>
<td>20 ft. ¾ in. crown mold, 4 cents</td>
<td>$4.00</td>
</tr>
<tr>
<td>240 ft. 2 in. bed mold, ½ cent.</td>
<td>$3.50</td>
</tr>
<tr>
<td>200 ft. ½ in. band mold, 1 cent.</td>
<td>$2.00</td>
</tr>
<tr>
<td>100 ft. ¾ in. quarter round, ½ cent.</td>
<td>$1.50</td>
</tr>
<tr>
<td>100 ft. ¾ in. cove mold, ½ cent.</td>
<td>$1.50</td>
</tr>
<tr>
<td>1 outside door frame, ¾ o”x7” o”, $3.50</td>
<td>$2.90</td>
</tr>
<tr>
<td>1 outside door frame, ¾ o”x7” o”, $2.25</td>
<td>$2.25</td>
</tr>
<tr>
<td>1 outside door frame, 3/4”x7” o”, $2.25</td>
<td>$2.25</td>
</tr>
<tr>
<td>1 front door, ¾ o”x7” o”, 1½ glazed B. P.</td>
<td>$12.00</td>
</tr>
<tr>
<td>1 rear door, ¾ o”x7” o”, 1½ glazed D. S.</td>
<td>$4.00</td>
</tr>
<tr>
<td>1 side door, ¾ o”x6” o”, 1½ glazed D. S.</td>
<td>$4.00</td>
</tr>
<tr>
<td>1 window frame, 44x46-40</td>
<td>$3.00</td>
</tr>
<tr>
<td>1 window, 44x16-40, 1½ D. S.</td>
<td>$6.00</td>
</tr>
<tr>
<td>3 sash frames, 30x20, 1½, $1.50</td>
<td>$4.50</td>
</tr>
<tr>
<td>3 sash 30x20, 1½, $1.20</td>
<td>$3.50</td>
</tr>
<tr>
<td>4 window frames, 30x28, 2½, $2.25</td>
<td>$9.00</td>
</tr>
<tr>
<td>4 windows, 30x28, 2½, $2.00</td>
<td>$8.00</td>
</tr>
<tr>
<td>2 window frames, 24x24, 2½, $2.25</td>
<td>$4.50</td>
</tr>
<tr>
<td>2 windows, 24x24, 2½, $1.60</td>
<td>$3.20</td>
</tr>
<tr>
<td>2 window frames, 20x20, 2½, $2.25</td>
<td>$4.50</td>
</tr>
<tr>
<td>2 windows, 20x20, 2½, $1.60</td>
<td>$3.20</td>
</tr>
<tr>
<td>6 window frames, 30x26, 2½, $2.25</td>
<td>$13.50</td>
</tr>
<tr>
<td>6 windows, 30x26, 2½, $1.90</td>
<td>$11.40</td>
</tr>
<tr>
<td>2 window frames, 20x20, 2½, $2.45</td>
<td>$4.50</td>
</tr>
<tr>
<td>2 windows, 20x20, 2½, $1.90</td>
<td>$3.20</td>
</tr>
<tr>
<td>1 dormer mullion sash frame, 20x24</td>
<td>$3.00</td>
</tr>
<tr>
<td>2 dormer mullion sash frame, 20x24</td>
<td>$3.00</td>
</tr>
<tr>
<td>1 set sliding door jambs, 5½ o”x7” o”, $1.40</td>
<td>$1.40</td>
</tr>
<tr>
<td>2 doors, ¾ o”x7” o”, 1½”, $4.00</td>
<td>$8.00</td>
</tr>
<tr>
<td>6 set door jambs, ¾ o”x6” o”, 60 cents</td>
<td>$3.50</td>
</tr>
<tr>
<td><strong>Recapitulation</strong></td>
<td><strong>Total estimate, according to Omaha prices.</strong></td>
</tr>
</tbody>
</table>

**Pointers on Planer Practice**

(Continued from page 221)

By this time his pride in the work and looking carefully after details will have such effect that he will not have to be reminded to see that his cutter head journals are in good order, and that his pressure bar and chip breaker come into position right, and that his planer bed is clean and sets firm and rigid the same distance from the cutter head on each side, and the rollers are high enough to clear the bed, but not enough to make the stock wavy. All of these things will follow in their natural order if he but once starts right, starts out with the idea that nothing is insignificant and every detail is important, and that everywhere the best is none too good. When he does this the work of his little planer, no matter how small, or how simple, will not only compare well with the best work of any mill but best of all it will keep alive in the man pride in his work, which is a great stimulating influence.

About the best advice that can be given is that no matter how old or how small a machine in your planing mill may be, you can get good work out of it if you but go about the thing right.
A Suburban Home

ARTISTIC HOME WITH GOOD INTERIOR ARRANGEMENT—MATERIAL USED AND COLOR SCHEME—ADVANTAGES IN THIS PARTICULAR ARRANGEMENT

The suburban home illustrated this month has been selected for two reasons mainly. Its exterior shows what good taste can do in the way of combining different materials of construction and its interior shows a finish which, for richness and completeness of detail, is seldom excelled in a house of this size.

The foundations are of rubble to the ground line. Upon this is a course of cut stone. Pressed brick completes the foundation. The manner in which the brick have been used to carry up the wall under the triple casement windows, both front and rear, and to form the lower part of the porch, can readily be seen from the photograph of the front.

The upper part of the house is lathed with expanded metal and plastered with cement plaster. A heavy corner mould separates this plaster from the overhanging cornice, which is similarly lathed and plastered. The sand used was of uniform color and the plaster given a uniform soft gray finish which looks well with the white of the wood below. The wide eaves, the low overhang, the simplicity of treatment, the emphasis given the horizontal lines, all serve to make the exterior very attractive and homelike.

The entrance is central and is covered by the wide porch, supported by square and turned columns. These columns are grouped in such a way as to suggest strength. This grouping allows a clear view from door and windows.

The entrance to the porch, being at an end, preserves the unity of the front, furnishes access from a walk common to both entrances, front and rear, and allows the use of the entire front of the yard for lawn, flowers and shrubbery. A full basement extends under the entire house, and is well lighted. It contains a boiler room for the heating plant, laundry with complete plumbing equipment, fuel rooms, etc. Hot and cold soft water is supplied to every fixture. This water is forced to the attic tank by the water lift in the basement, the pressure of the hard water used
at the various fixtures being sufficient to keep the tank full of soft water.

The arrangement of the first floor is one which time has proven to be quite satisfactory. The front entrance, which is through a vestibule having a floor of marble mosaic, leads to a good sized hall. At the rear of this hall is the main stair and an exit to the kitchen and basement through a well lighted side hall. Odors of cooking are virtually excluded from the main part of the house by means of two doors to this side hall. The two doors to the butler's pantry, which is placed between the kitchen and dining room, serve the same purpose. In this way ready access is afforded to all parts of the house without that most serious drawback which usually follows the connecting of the service and the main part of the house.

A parlor, made light and cheerful by a color scheme of French gray and white, with pink window hangings, opens off the main hall through a double-cased opening.

That there are advantages in having a parlor, no one—at least no housewife—will deny. Then why not have a parlor if you want one and call it a parlor, making it, as is this one, light, cheerful and beautiful, a place that will make one's visitors feel they have had the best the house affords?

After all has been said, it is not the arrangement of our rooms or what we call them, so long as they serve our purpose best. We of the present time were not the first to discover that the "best room" has seen abuse, for Whittier long ago spoke of "the best room stifling with cellar damp, shut from the air in hot midsummer, bookless, pictureless save the inevitable sampler hung over the fireplace, or a mourning piece, a green-haired woman, peony cheeked, beneath impossible willows."

The library or living room is made comfortable with window seats and a fireplace. On either side of the fireplace are bookcases, with doors heavily leaded with designs in keeping with the rest of the art glass throughout the house. These designs may be seen in the triple casement windows of the front and in the small windows above the cases.

The dining room, which is connected with both living room and main hall, has its ceiling beamed and the walls paneled. The features of this room are the built-in sideboard, complete in its detail, and the ample window seat, with its comfortable cushions and its beautiful setting of art windows above.

The kitchen arrangement is good, both as to lighting and the convenient placing of doors.

The second floor has large bedrooms and a good bathroom, each room being provided with plenty of closet space. The bathroom is provided with dust-proof lockers for the linen. With the exception of the parlor, which is done in white enamel on whitewood, the woodwork of the main part of the first floor is of oak, finished dark brown. The service portion is finished in southern pine in the natural color.

The library walls are of a soft rich green, the ceiling a light buff. The dining room shades from burnt sienna in the panels to light orange in the ceiling.

Mr. W. G. Barfield of Chicago was the architect and Mr. J. G. Budde is the owner.
We are herewith showing a house designed and built by Geo. O. Richardson, Waterloo, Iowa, and it is considered to be one of the best arranged houses to be built for the money. It was built of white pine and the inside finish of yellow pine, stained dark oak. The first floor is of hardwood with the exception of the kitchen. The cost of this house was $2,200, or $1,900, exclusive of heating, lighting and bath. The following is a complete bill of all the material used:

**Lumber**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>105-2x8x14 ft. No. 1 pine</td>
<td>22</td>
<td>Sel. common S2S</td>
</tr>
<tr>
<td>12-2x8x16 ft. No. 1 pine</td>
<td>2</td>
<td>Sel. common S2S</td>
</tr>
<tr>
<td>115-2x4x14 ft. No. 1 pine</td>
<td>16</td>
<td>Sel. common S2S</td>
</tr>
<tr>
<td>25-2x4x14 ft. No. 1 pine</td>
<td>1-1x12x16</td>
<td>Sel. common S2S</td>
</tr>
<tr>
<td>20-2x6x14 ft. No. 1 pine</td>
<td>4-2x4x14</td>
<td>Sel. common S2S</td>
</tr>
<tr>
<td>155-2x4x18 ft. No. 1 pine</td>
<td>5-1x4x16</td>
<td>Sel. common S2S</td>
</tr>
<tr>
<td>85-2x4x12 ft. No. 1 pine</td>
<td>15 1/2 M. red cedar shingles, E<em>A</em> 6 to 2.</td>
<td></td>
</tr>
<tr>
<td>22-1x8x16 ft. No. 1 pine</td>
<td>9 1/2 M. common No. 1 lath.</td>
<td></td>
</tr>
<tr>
<td>2-1x12x14 ft.</td>
<td>3540 ft. No. 3 shiplap, 12-14-16.</td>
<td></td>
</tr>
<tr>
<td>300 ft. No. 1 common pine S2S</td>
<td>2000 ft. No. 2 pine sheathing, 12x14.</td>
<td></td>
</tr>
<tr>
<td>5-1 1/2x10-12 C finish</td>
<td>1800 ft. flooring maple, oak and yellow pine.</td>
<td></td>
</tr>
<tr>
<td>2-1 1/4 x 8-12 C finish</td>
<td>200 ft. porch flooring, 3/4x4x14. fr.</td>
<td></td>
</tr>
</tbody>
</table>
1900 ft. 4 in. sugar pine lap siding.
600 ft. ¾ in. yellow pine ceiling.
253 ft. 3¾ in. crown molding.
400 ft. 2¾ in. bed molding.
200 ft. ¾ x 1½ crown molding.
200 ft. screen molding.
100 ft. ¾ quarter round.

Window and Door Frames
4 window frames, 2-10x5-2.

Windows
6—18x20—2 light D. S. windows.
2—18x28—2 light D. S. windows.
1—26x20—2 light D. S. windows.
1—30x28—2 light D. S. windows.
2—44x32—1 light D. S. windows.
4—30x36—2 light D. S. windows.
3—20x24—2 light D. S. windows.
1—20x20—2 light D. S. windows.
4—12x16—2 light cellar sash.

Doors
1 front door, 3x7x1¼, bevel plate glass 2x4-0.
1 door, 3x7x1¾.
1 door, 2-8x7x1¾.
2 doors, 2-6x7x1¾.
2 doors, 2-4x7x1¾.
1 door, 2x7x1¾.
2 doors, 2-6x6-6x1¾.
3 doors, 2-4x6-6x1¾.
1 door, 2x6-6x1¾.
1 door, 2-8x6-8x1¾.
1 door, 5x7x1¾.
1 door jamb, 8x7 ft.
1 door jamb, 5x7 ft. 1 in.
1 door jamb, 5x7 ft. 5 in.
5 door jambs, 2-8x7 ft. 5½ in.
2 door jambs, 2-6x6-6 ft. 5½ in.
428 ft. base molding, No. 8420.
428 ft. base, No. 8421.
428 ft. shore, No. 8422.
550 ft. casing, No. 8310.
50 balusters, 1½x2¼ in., No. 2151.
1 1½x8 ft. yellow pine.
1 1x10 in. x16 ft. yellow pine.
3 cupboard doors, 1-8x4 ft.
2 cupboard doors, 1-8x2-6.

**Foundation, Plaster and Chimney**

9 cords stone.

96 cement blocks.
47 sacks plaster.
8 yds. sand.
11 bbls. lime.
1 bbl. cement.
1100 brick.

**Hardware**

100 lbs. 10 d. wire.

25 lbs. 7 d. box.
13 inside door lock sets.
1 single sliding door outfit, 5 ft. opening.
1 single sliding door lock set.
1 doz. cupboard catches.
1 doz. sash locks.
1 doz. drawer pulls.
18 prs. door butts, ¾x3½.
1 doz. fancy box hinges.
3 doz. window springs.
1 pr. shelf brackets, 8x10.
1 pair shelf brackets, 10x12.
12 doz. 7/8 screws.
2½ lbs. 1 in. brads.
27 ft. valley tin, 14 in.

32 window tins.
176 tin shingles, 5x7.
19 8 ft. lengths ridge roll.
50 wire screen, 24 in.
50 wire screen, 32 in.
2 screen doors, 3x7.
2 stove pipe thimbles.
7 10 ft. lengths eave trough.
4 pieces outlet.
6 end caps.
8 eave trough elbows.

3 doz. eave hangers.
5 pieces conductor pipe, 8 ft.
2 bundles sash cord.
200 lbs. window weights.

Painting and Oiling

2½ lbs. putty.
1 lb. steel wool.
15 sheets sand paper.
1 gal. floor oil.
1 gal. floor varnish.
3 gal. interior varnish.
4 pints burnt turkey umber.

7 gal. linseed oil.
2 gal. turpentine.
7 gal. outside white paint, prime and trim.
4 gal. yellow stone paint for body.
Total cost of labor, including stone work, plastering, painting, oiling, carpenter, and excavating, $500.00.

**Cement Plaster House**

On page 232 we are showing the perspective and complete plans of a cement plaster house. Any color can be had, as all desired shades are now produced. This form of building is becoming very popular, not only because of its splendid appearance, but owing to its lasting qualities. When the house is once built the question of repainting is entirely done away with and general repairs are reduced to a minimum.
There is a well lighted basement under the entire house and it is divided into laundry room, furnace room, fuel room and storage rooms. There are concrete footings under all the posts and the foundation is also of concrete.

The first floor is divided into a large reception hall, dining room and kitchen. The reception hall eleven and one-half by sixteen feet and contains a large tile hearth. Two box seats are located on either side of the hearth. The dining room is divided from the reception hall by means of a sliding door. Between the dining room and the kitchen is the pantry, both entrances being equipped with swinging doors. There is also a rear entrance to the dining room from the rear porch. The kitchen is large and well fitted up and also has the convenience of a toilet. The second floor is reached both from the reception hall and kitchen, there being a common landing. The second floor has four bed rooms and a bath room. Each room has a clothes closet and enters directly into the hall. The details give an excellent idea of the finish of the various parts of the house and the dimensions on the various floor plans are also a great aid.

Concrete Block House

On this page we are showing a concrete block house built for O. M. Sholl, Muskogee, I. T., with blocks made on a Waterloo concrete brick and block machine. The porch and balcony across the entire front of the house are constructed of wood, but rest upon concrete block pillars.

The first floor is divided into a large reception hall, parlor, living room, dining room and kitchen. The reception hall is twenty-seven feet long and contains the stair to the second floor and also to the cellar.

The parlor is divided from both reception room and living room by sliding doors which, opened, make one large open series of rooms especially adapted for social gatherings of all kinds.

The second floor is divided into four bedrooms and a bath-room. The bedrooms are all well lighted and so arranged that good ventilation can be had. There is a door leading from one of the bedrooms onto the balcony, which is a desirable feature, especially on warm evenings. The bath-room is located directly above the kitchen, thus simplifying the entire plumbing system. The building of a frame porch takes away from the otherwise monotonous appearance.

The Waning Hardwood Supply

Although the demand for hardwood lumber is greater than ever before, the annual cut today is a billion feet less than it was seven years ago. In this time the wholesale price of the different classes of hardwood lumber advanced from 25 to 65 per cent. The cut of oak, which in 1899 was more than half the total cut of hardwoods, has fallen off 36 per cent.
Yellow poplar, which was formerly second in point of output, has fallen off 38 per cent, and elm has fallen off one-half.

The cut of softwoods is over four times that of hardwoods, yet it is doubtful if a shortage of the former would cause dismay in so many industries.

The cooperage, furniture and vehicle industries depend upon hardwood timber, and the railroads, telephone and telegraph companies, agricultural implement manufacturers and builders use it extensively.

This leads to the question, where is the future supply of hardwoods to be found. The cut in Ohio and Indiana, which, seven years ago, led all other states, has fallen off one-half. Illinois, Iowa, Kentucky, Michigan, Minnesota, Missouri, New Jersey, Tennessee, Texas, West Virginia and Wisconsin have also declined in hardwood production. The chief centers of production now lie in the lake states, the lower Mississippi valley and the Appalachian mountains. Yet in the lake states the presence of hardwoods is an almost certain indication of rich agricultural land, and when the hardwoods are cut the land is turned permanently to agricultural use. In Arkansas, Louisiana and Mississippi the production of hardwoods is clearly at its extreme height, and in Missouri and Texas it has already begun to decline.

The answer to the question, therefore, would seem to lie in the Appalachian mountains. They contain the largest body of hardwood timber left in the United States. On them grow the greatest variety of tree species anywhere to be found. Protected from fire and reckless cutting, they produce the best kinds of timber, since their soil and climate combine to make heavy stands and rapid growth. Yet much of the Appalachian forest has been so damaged in the past that it will be years before it will again reach a high state of productiveness. Twenty billion feet of hardwoods would be a conservative estimate of the annual productive capacity of the 75,000,000 acres of forest lands in the Appalachians if they were rightly managed. Until they are we can expect a shortage in hardwood timber.

Circular 116, of the Forest Service, entitled "The Waning Hardwood Supply," discusses this situation. It may be had upon application to the Forester, Forest Service, Washington, D. C.
Practical Residence Barn

The barn hereby illustrated was designed for a residence barn for the use of four carriage horses and a spare box stall which could be converted into a cow stall if desired. The carriage room is extra large and the main entrance to this room is also extra wide so that large automobiles can be sheltered as well as large carriages. The carriage room is also provided with a closet for harness and tools, and doors leading to the stalls and stairway.

The feed room is convenient to the stalls and is provided with spouts run down from the feed bins, which are located on the second floor directly over the feed room. This room can also be conveniently used as an auto repair room by placing a door between the feed room and carriage room.

The exterior has been carefully designed along the lines of a bungalow. This style of architecture is now becoming very popular for country and suburban houses and can very successfully be carried out on all barns and shelter sheds. The windows have been well placed for practical use and made of the size and shape to give the best exterior effect, as upon the placing and shaping of the windows largely depends the beauty of a building of this kind. One of the main features of this design is the large rubble stone arched doorway and the stone base which runs two feet above the floor, all around the building and thus preventing any moisture from the ground coming into contact with the wood work.

The exterior color scheme for this building is as follows: The stone is of a grey lime stone with black mortar joints. The cornice work, trimmings, window frames and sash are white enameled. The vertical side walls are of undressed boards (cypress) stained brown. The gables are shingled and stained brown and all roof surfaces are shingled and stained.

A Plastering Wrinkle

Some architects are now including in their plastering specifications instructions that the plaster must be cut down the corners with a trowel when it is put on. The purpose is to prevent cracks from shrinkage. It is argued that when plaster is cut through at the corners with a trowel it will leave it free to shrink in drying and thus prevent in a great measure the ugly cracks that sometimes disfigure the walls. The instructions apply not only to room corners, but especially to corners around flues and chimneys. They want what cracks there are to be in these corners, ready made and straight, so that they will not show so plainly. And besides, it is easier to fill them, or when paper is used on the walls, it will cover over them without their showing. If this is a new idea to you, try it once and see whether it is a wrinkle that is worth while or not.
ONE of the most difficult surfaces for the painter to coat successfully is galvanized iron. This is due to the fact that after the sheets of steel are dipped into the melted zinc, which forms the coating, they are then dipped in a non-drying oil, such as palm oil, while still hot, for the purpose of preserving them from atmospheric action. This oil has a tendency to throw off any paint; and in addition to that, the zinc coating offers a surface which seems to particularly repel the coat of paint, causing it to peel off in shreds. Red lead, which clings to ordinary iron work with remarkable tenacity, will not hold at all upon galvanized iron, unless it has been previously treated with something that will neutralize the oil and change the metallic surface of the zinc to a gray oxide. These changes will occur naturally if the galvanized iron has been exposed to the action of the weather for several months or a year, before it is painted, but most people are unwilling to wait so long.

The simplest treatment for galvanized iron is to wash it with vinegar or dilute acetic acid, which will neutralize the oil, and then to prime it with Prince's mineral brown, thinned with half oil and half turpentine. This is said in most cases to prove satisfactory. Care must be taken to avoid the cheap metallic paints that are made from the spent pyrites used in the manufacture of sulphuric acid. These paints are good enough to paint barns and box cars, or other wooden surfaces, but they contain considerable sulphur, which will unite with rain and moisture to form sulphuric acid and will rapidly eat holes through any tin or iron surface upon which such paint may be applied. After the priming coat has been allowed to harden, any good oil paint may be used for the final coats.

A painter connected with the New York Central Railroad recommends the use of a mixture of ninety parts vinegar and ten parts muriatic acid as the preliminary wash. For the priming coat, he uses Prince's mineral brown, thinned down with turpentine to make an egg shell finish.

A preliminary wash for galvanized iron that is highly recommended is made by dissolving two ounces of chloride of copper, two ounces of nitrate of copper and two ounces of sal ammoniac in one gallon of water and then adding two fluid ounces of crude hydrochloric acid. This solution must be made in glass bottles or earthenware jugs or vessels to prevent precipitation of the copper salts. The entire surface of the galvanized iron is coated with this solution. It turns the iron black at first, but after the solution has dried over night, the metal will become light gray in color owing to the formation of oxide of zinc, the same gray film that would be formed on the surface of the galvanized iron by several months' exposure to the weather. On a surface so prepared a coat of red lead thinned with half raw linseed oil and half turpentine will adhere firmly, and may be followed by subsequent coats of paint that are rich in oil.

Another preparation for galvanized iron that is highly recommended is the Concentrated Galvanic Primer, made by Rinald Brothers, of Philadelphia. This is diluted with water and applied with large brushes in a very similar manner to the wash mentioned above. At a convention of railroad painters last year, it was stated that very satisfactory results had been obtained with this primer on the galvanized iron shed of a ferry house at Camden, N. J.

Repainting Smoky Woodwork

One of the subscribers of the AMERICAN CARPENTER AND BUILDER has had an experience in refinishing the woodwork of a kitchen, which is not unusual, although always annoying. As was natural, the woodwork had become very much smoked, as the kitchen had been constantly used for about twenty years, and it had been that length of time since the woodwork had been varnished. The woodwork was to have two coats of paint. It was first scrubbed and then given a coat of shellac. After this was dry it was painted with a paint that had been mixed to dry in about eight hours, but at the end of thirty-six hours it had dried only in those places where the smoke and grease had not been very bad. The painter next gave the whole surface a coat of liquid drier—or japan. This caused the paint to dry and he was able to give a second coat of paint, which seemed to turn out all right, although he fears it may crack. It would surprise us very much if it does not crack, because he has covered up a practically soft and non-drying coat of paint with a hard and inelastic film of japan, which...
building trades.—T. J. Donovan, San Francisco, Cal. must yield, sooner or later. Our subscriber seems to think there ought to be some simpler way to re-paint smoky and greasy work wood than by going over it four times in order to put on two coats of paint.

There is no greater trouble causer in repainting than smoke and grease, and it must be thoroughly removed or it will be impossible to get the paint to dry satisfactorily. Mere scrubbing with soap and water is usually insufficient to clean off all the grease and smoke, and it is better to use a fairly strong solution of concentrated lye, washing soda or pearlash. These act very injuriously on the hands and the workman should use rubber gloves in applying them. As they also act upon the surface of the paint, and if left upon the surface, would act destructively on subsequent coats of paint, they should be thoroughly washed with plenty of clean water, and then the work should be given a coat of vinegar or dilute acetic acid to neutralize any of the alkali that may be left, before the work of repainting is begun. It is only by thoroughly removing the grease and smoke that satisfactory results can be obtained.

Another plan that might have been pursued would have been to rub the surface down with pumice stone or with flour of pumice on rubbing felt, or to cut it down with fine sandpaper or steel wool, while it is still softened by the soap and water.

The New York Central Railroad, in cleaning passenger coaches preparatory to revarnishing, uses a solution of two parts of commercial muriatic acid to five parts of water, instead of soap or lye. Where the surface is very dirty or greasy, the proportion of acid is increased. It is applied with a scrubbing brush and washed off with water. This treatment is specially useful where it is not desired to injure the varnish coat, but simply to clean it preparatory to applying new varnish over it. Where the surface is very greasy it may require a second application.

In the case referred to by our subscriber, we believe that the most satisfactory results would have been obtained by removing the old varnish with ammonia, or a neutral varnish remover, before painting. Either three coats of paint or one coat of shellac and two coats of paint should be given in order to secure satisfactory results. It is far better to explain the difficulties of the case and to get a satisfactory price for doing the work right than to attempt makeshift methods that are sure to prove unsatisfactory in the end.

Smoke stains on plastered walls are often a source of great annoyance to the painter, since they will come through and stain paint or wall paper and are well nigh impossible to cure. A method that is recommended for cleaning a smoky ceiling that is to be painted in calcimine or distemper color is to first brush the ceiling thoroughly and then wash it with a strong solution of pearlash and immediately rinse thoroughly with clear water. When this is dry, the ceiling should be given a thin coat of freshly slaked lime, to which a fair portion of alum dissolved in hot water should be added. When this is hard a coat of glue size, or better a thin varnish size, made by thinning a good grade of hard oil finish with turpentine, should be given before the water color is applied.

A class of stains that require radical measures to cure are those caused by smoky or smutty bricks and laths containing bark. The only remedy for these stains is to cut out the plaster and remove the brick or the lath. These stains will come through shellac or any similar coating that may be applied. The writer had an experience with one case where the stain from a smutty brick came through a marble slab five inches thick and discolored it.

It was stated, however, by a painter at the New Jersey State Convention of Master House Painters and Decorators, in July last, that a process of painting known as the salt process is not only effective in preventing stains of this character from coming through, but it can also be used with good satisfaction on a freshly coated cement surface. By this process ten pounds of salt and three gallons of boiling water are used in thinning one hundred pounds of white lead in oil that have first been broken up in one gallon of oil. The hot salt solution is stirred in slowly until the whole has been added, and then the mass should be stirred for some twenty minutes longer. This will be of the consistency of soft soap, and must be thinned with pure linseed oil to a working consistency. The first coat of paint of this character will dry flat and the second coat will have a varnish like gloss. This can be colored as desired, but the effect of such a gloss coat is very different from the soft, velvety appearance of a calcimined ceiling.

Removing Stains from Wood

One of our subscribers desires a method of removing stains from an oak and cherry hardwood floor, which have been caused by allowing wet iron nails and tools to remain upon it for a few hours.

There are several methods of removing stains from wood, or bleaching it. We presume the floors have not been varnished, and that the stain is in the wood itself, and not on the varnish. Probably the most effective bleacher for taking stains of all kinds out of wood is oxalic acid, dissolved in hot water, about one pound to the gallon. Vinegar or acetic acid may be added for particularly bad stains. This solution may be applied hot, and must be allowed to become thoroughly dry before the wood is varnished or otherwise finished. Oxalic acid will take out weather stains and similar discolorations. Sometimes more than one application is necessary. It is best to wash the oxalic acid off the surface with clean water, after it has become thoroughly dry, or to treat it with vinegar or acetic acid.

I want to say that the AMERICAN CARPENTER AND BUILDER ought to interest anybody connected with the
W E SHALL describe this month a three-part screen designed and built by Mr. Earl N. Rhodes, of the Hawthorne School, Oak Park, Illinois.

Usually, one or the other of two objections may be applied to store bought screens. They are so heavy that they cannot easily be moved or, if not heavy, they are so weak structurally that they will not stand rigidly. This design is singularly free from either of these objections. The frame is light, being made up of seven-eighth inch square pieces. The panels are filled with art burlap or monk's cloth, stretched on light frames of three-eighths inch whitewood. The oak parts are thoroughly mortised and tenoned together.

It will be found more economical to buy the stock in as few pieces as possible. For the oak uprights and rails, secure a board, mill-planed to seven-eighths of an inch, with a width of ten inches and a length of sixty-four inches. Fig. 1. Red or white oak may be used and it may be quarter-sawed or plain.

For the frames which are to support the burlap there will be needed a piece of yellow poplar, mill-planed to three-eighths of an inch, with a width of twelve inches and a length of nine feet six inches. Fig. 2.

Smooth the two sides of the oak board with smooth plane and scraper. Remember that the stock is of such thickness as to allow of no more being planed off than just what is necessary in order to remove the millmarks.

To get the most out of the board and save time and labor as well, joint—that is, straighten and square—one edge of the board. Set the gauge to seven-eighths, gauge and rip close to the line. Plane to the gauge line on this piece. Repeat until nine pieces the length of the board have been obtained, marking each with face marks.

From these pieces select four and square one end of each. Place these pieces on the bench, side by side, and even the squared ends by means of the trysquare. Measure from the squared ends fifty-eight inches—Fig. 3—and square a sharp pencil line across the four pieces. Now separate and square these lines entirely around each piece. These lines locate the lower edges of slopes of forty-five degrees which are to be placed on the tops of the uprights.

Before sawing and planing these slopes select two more pieces. These are for the uprights of the middle section. Square the ends and measure from them sixty-one and one-half inches, squaring lines entirely around each piece at this point.

These slopes can best be laid off by means of the bevel. Set the blade to an angle of forty-five degrees by holding the beam against the blade of the steel square and moving the blade of the bevel so that it shall rest upon similar marks on blade and tongue of the steel square.

With the bevel, mark the slopes on opposite sides of each piece. Saw close to these lines and finish with the plane. This shapes the ends like a house roof with gabled ends. Connect, with straight-edge,
the middle of the ridge to the four corners and chisel or saw, then plane to these lines.

Prepare the cross rails by sawing off nine pieces of the stock squared to seven-eighths inch by seven-eighths inch to a length of eighteen and one-half inches each. These pieces have tenons on each end. Care should be taken to saw them off square and to the lines, so that no end planing need be done.

These tenons may as well be laid off and sawed now. Place the nine pieces on the bench side by side one-half inches, seven-eighths, forty-four and seven-eighths inches, seven-eighths, ten, finally seven-eighths of an inch. There should remain one and one-half inches. Carry the lines across at these points. Fig. 4.

Between the lines which are seven-eighths of an inch apart gauge from the face with the gauge set first to one-quarter, then to five-eighths of an inch.

Cut these mortises with a three-eighths inch chisel to a depth of one-half inch full. Keep the ends of

and even the ends with the trysquare. If it is not found convenient to handle so many at once, take a fewer number. When the first lot has been marked one of these may be placed with the second lot to insure their having the same length. From one end measure one-half inch and from this point seventeen and one-half inches. Square knife lines across the lot at these two points, set the gauge first to one-quarter of an inch and gauge from a face side on two opposite sides as far back as the knife lines, and on the ends of each piece at each end. Fig. 3. Again, set the gauge to five-eighths and gauge as before.

With the tenon saw rip the tenons to thickness and cross-cut the shoulders.

The mortises of the four uprights of the same length may be laid out together. Place the pieces side by side with the lower ends even and the pieces turned so that they pair. One set of face marks on all pieces must, when the parts are assembled, be on one and the same side of the frame, while the other set must face "in." In marking for the mortises the "in" faces should be turned upward.

Measure from the lower end four and one-half inches; then from this mark seven-eighths of an inch; from this, thirty-nine and three-eighths inches; from this, seven-eighths of an inch; then, ten inches; finally, seven-eighths. There should remain one and one-half inches to the lower edge of the bevel. Square knife lines across at these points.

Pair the two longer uprights and measure on the "in" faces as follows: From the lower end, two and

the mortises clean cut and sharp, otherwise they will show badly. Scraper and sandpaper the pieces carefully.

Glue and clamp the parts together, taking care to place the faces either "in" or to one and the same side. Use the steel square to test the corners while clamping, and so place the clamps that the faces level when the straight-edge is placed across any two pieces at a corner.

When these have set over night, scrape off the surplus glue and stain and fill as desired. When stain and filler have dried the parts may be waxed, or if preferred given a very thin coat of shellac. There are many prepared stains on the market now. As these pieces are small, no trouble will be had in following the directions which always are sent with them.

The hinges are the kind called double-acting and allow the wings to be swung either way with reference to the center. The lower ones should be set about seven inches above the floor, and the upper ones about six inches below the top of the side wings. In fastening the hinges but one screw-hole for either side
can be seen. Put the screw in this one, swing the hinge and the other will appear.

Now for the whitewood frames which are to support the burlap. Three of them are to be of the same size. Fig. 5.

Time will be saved by ripping up the three-eighths inch board to the proper widths. Fig. 2. Joint gauge and rip as was done with the oak.

For the three like frames there will be needed six pieces two inches wide by seventeen and one-quarter inches long. Saw accurately and squarely, as no end planing is to be done on any of these pieces. Also six pieces one and one-half inches wide by seven and three-quarter inches.

For the lower frames of the two wings get out four pieces one and one-half inches wide by thirty-seven and one-eighth inches long. Fig. 4. Two parts like this.

For the lower center panel, two pieces of the same thickness with a length of forty-two and five-eighths inches should be squared up. In addition to these pieces, the three lower panels will require six pieces by seventeen and one-quarter inches, and nine pieces one inch by fifteen and one-quarter inches.

Fig. 4 shows the manner in which the upper panels are framed. Lines are squared around the two-inch pieces at one and one-half inches from each end. The gauge is then set to one inch and lines gauged from what is to become the outer edges, as far back as the knife lines. The tenon saw is used to rip and cross-cut these corners.

Very thin wire nails are used to fasten the parts together.

The corners of the lower panels are framed in the same way. The side pieces are prevented from being sprung together when the burlap is drawn tight by having three one-inch cross pieces framed into them to a depth of one-half an inch. Place the four like side pieces on edge, even the ends and measure and mark. Square two lines an inch apart at the middle of the pieces, lengthwise. Also, put lines an inch apart at the middle of the two resulting spaces. Fig. 6. Square these lines across the faces; gauge for depth; saw and chisel. The two side pieces of the lower central panel may be similarly laid out and cut.

The designer shows his ingenuity in the way he fastens the panels so that the fastener shall not show.

Before the frames are covered with burlap, the two rather stout wire nails are firmly fixed in the top rails as shown in Fig. 4. They should project not over one-half an inch. Corresponding to these nails, holes just large enough and deep enough to receive them are bored in the top and middle rails, from the under side.

Two nails are now firmly set in each of the middle and lower rails, Fig. 4, so that their points shall extend upward about half an inch, or it may be more in this case. After having marked and bored holes in the lower rails of the burlap frames, drive these nails back so that their points are flush with the surface.

Cover the frames, using small carpet tacks for fastening. The burlap is to be drawn over both sides and tacked in the edges of the frame. The tacks will then be hidden when the frame is in place.

The burlaps come in a great variety of colors; a soft or dull green or brown will look pretty. Monk's cloth makes the best covering.

Having covered the frames, insert the nails, which they contain, in the top rails, into the holes prepared for them in the oak. The upper frames must be put in place first, of course. Drive up the nails, which were placed in the middle oak rails, into the holes made for them in the burlap frames.

In like manner place and fasten the lower burlap frames.

**Mahogany as Railroad Timber**

Sir William Van Horn, the Canadian railroad magnate, who is at the head of great railroad projects in Cuba, has discovered that his contractors and engineers have been using mahogany for railroad ties and bridge timber, and he has called a halt in the practice, as he regards it as a crime to cut small mahogany trees, and there is plenty of other timber in the forests suitable for construction purposes. A bridge on the Cuba railroad, near Santiago, is built entirely of mahogany, but in violation of orders. The contractor did not know, or claimed not to know, that the caoba tree, as it is called in Spanish, was the mahogany which Sir William had taboed, and the latter did not learn that he had a mahogany bridge on the line until it had been in use for several months.
**How to Make a Sill Rat Proof**

To the Editor:  
Charleston, W. Va.

I see in the July number an article by J. H. Godfrey, on rat proofing a house, also in the September number a reply to same by George A. Sly. Herewith inclosed you will find a sketch which will explain itself. This is my way of making a sill and rat proofing a house at the same time. The objections I see to Mr. Godfrey's plan is that it leaves the ends of the joists without protection and without any brace, which, under heavy weight, would be inclined to creel or fall. The objection to Mr. Sly's plan is that on a pillar foundation it makes a weak sill. The accompanying sketch shows the construction of a very strong sill either for a solid wall or a pillar foundation and makes the walls perfectly rat proof and also draught proof. In case of using a sub-floor, the sill make a good support for the ends of the sub-floor. I hope this may be of some benefit to the readers of your journal.

W. A. Foster.

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**Two Good Questions**

To the Editor: Ames, Iowa.

I have two questions that I would like to have answered through your paper.

First.—What is the proper name for the lower piece of a rafter when it breaks off from the main rafter, as shown in the diagram. The pieces marked X is the part referred to.

Second.—Which should be given first, the run or the rise, when telling what figures to use on the steel square to find the bevels for rafters? I have noticed that some give it one way and some another. The same man will give the run in one place first and the rise in another, for example, take the one-third pitch. He will say, 12 and 8 for the seat and plumb cuts of the common rafter; then he will say 8 and 17 for the corresponding cuts for the hip or valley. So there seems to be no standard among the writers on the subject, and I have noticed that it confuses some workmen that are not familiar with roof framing. I am much interested in roof framing problems, having been studying the subject for years, and have had fair success in practice. I do most of my figuring with the aid of the square as my mathematical knowledge is limited. The problems published in the AMERICAN CARPENTER AND BUILDER have been of great help to me and have no thought of trying to get along without it.

Wishing you all the success possible in furthering the good work, I will close for this time.

Ira St. John.

**Answer:** In answer to the first question, will say that there does not seem to be a standard name for the rafter in question, probably from the fact that it is very generally used and is of comparatively new origin. However, it is quite the style in some sections of the country, and of more recent years, to give this rafter a sweeping curve which, if properly proportioned, gives the house a pleasing architectural appearance. It has some advantage in allowing the cornice to be raised higher than would be the case with the one plane roof, thereby relieving that squatty appearance in two-story houses, especially where 18 foot posts are used, as it allows more room for the frieze above the windows. On the other hand, it has its disadvantages in the shingling of the roof in either case, whether it is curved or not. Because the shingles are more or less in a strain in the curve or at the bend and being at the lower edge of the body of the roof, they not only have to carry the water that falls on them but all that falls on the roof above, and being of a lesser pitch they are slower to shed the water, consequently will hold the moisture longer and necessarily will be the first part of the roof to give out. Pardon us. We did not mean to get so far away from the question asked, but could not resist the opportunity in calling attention to the merits and de-merits of such construction. The name of such rafters may properly be called "look-out.
How to Use the Octagon Scale

To the Editor:
St. Louis, Mo.

On the tongue of most steel squares there is a row of dots enclosed between two lines and figured to a scale of tenths. Will you please explain what this is for and what use is made of it?

W. H. Jones.

Answer: The scale is called the octagon scale and is designed for changing a square timber to an octagon, or for finding the width of the side of an octagon of a given diameter. In Fig. 1 is shown a part of this scale. But very few understand it or are even interested enough in it to look it up. It is quite evident that the inventor did not understand the use of the plain steel square with its standard scale of measurement, which is sufficient for solving all problems of this kind, for he wandered from the path of simplicity into a by-way to exemplify a single problem in the polygons, and then leaving the would-be learner ignorant of any apparent reason why his scale gives correct results. The solution is as follows:

Suppose it is desired to change a seven-inch square stick to an octagon. Lay off a center line on all four faces of the timber and from either side of this line set off a space equal to seven of the spaces shown on the steel square, which will be the point for the gauge line, from which to remove the wood at the corners to form the octagon.

These same proportions may be found direct from the steel square as shown in Figs. 115-6 of our May article. However, there are other ways of arriving at the same result, and in connection with this, we are showing a rule that not only applies to the octagon but any of the other polygons as well. Referring to Fig. 2, it is as follows:

Draw an indefinite line from 12 and passing at 5 as shown. Now if the timber is seven inches square, measure back that amount from 12 on the tongue and square up to the diagonal line, as at "aa," which will be found to be 2 11-12 inches and represents the side of the octagon. If the timber is 16 inches, then "bb" represents the width of the sides and is found to be 6 2-3 inches. This rule, as we said before, applies to any of the polygons. The starting points on the square are the figures that give their respective miters and the diagonal line across the square is governed accordingly.

A. W. Woods.

How to Frame by Degrees with the Steel Square

To the Editor:
Altenburg, Mo.

Will you please kindly explain the following roof pitch?
The roof to have a slant of 40 degrees. How can the cuts of the rafters be found with the use of the steel square?

G. Lohmann.

Answer: The steel squares that are in general use do not contain a degree scale for framing purposes, though unques-
Making Window Frames

To the Editor:  

Red Oak, Iowa.

I will endeavor to fully explain how I make a window frame for wood buildings—2x4 studding. First I rip out my jams 4½ inches wide; blind stop 1½ inches; sub-sill 1x6 inches; sill 2x6 inches. Now I am ready to begin to make my frame. My material is first jointed on one edge before being placed on same table. This edge I bevel about 1-16 inch, this being the edge the inside casing will be nailed onto. Now I run through the saw, or run a circle saw through it. Treat both jams and head jams in this manner. Now I take a bevel square and place it on the steel square on figure 1 on blade of square and turn blade of bevel until it touches figure 7 on tongue of square. Now I make bevel square blade secure. This, it will be seen, gives me a bevel for window sill 1-inch fall in 7 inches. Figure 6 can be used if you desire more pitch.

I take bevel square and lay off bottom end of jams for sub-sill, having enough to receive the sill. I now take a rule and pencil and gauge in 1½ inches, this being the point where my lower sash will strike the sill. From this point I add twice the length of glass and 6 inches for sash rails. This being the desired length for window. I gain for where my lower sash will strike the sill. From this point I add twice the length of glass and 6 inches for sash rails. This being the desired length for window.

I have a job for my fellow carpenters or whom it may concern. Take a board 8 inches square and cut it in three cuts marked each time. I set all frames by the same stick. This done, I take a piece or strip the thickness of the casing made in this manner will need no bracing and will not sag in handling. I have often seen frames that would nearly fall to pieces without braces even nailed on.

Now to set this frame, which is usually the height of doors, put frame in opening each side equal distance from studding. Set this stick in frame, one end on floor, this being the height desired. Put a nail in casing at lower end. Take bevel and place on sill across window. Start nail in casing. Take bore or stick at this corner under sill so you can hold your frame steady, and when level drive your nail. Now be sure your sill is level. Start a nail at top of one as the other casing. Place level against blind stop or edge of casing, and when perfectly plumb, drive your nail. Your frame is level, plumb and square. Proceed to nail in secure. Care should be taken not to stop on sill until you have securely nailed both casings in place. Now you can step up on the sill and nail your head casing.

In making a number of frames I use the jambs for a pattern, and mark one and mark the mate by the last one marked. I now set all frames by the same stick also use a piece of parting gauge to stop on casing.

J. M. HEBBARD.

Another Problem

To the Editor:  

Elverton, Pa.

I have a job for my fellow carpenters or whom it may concern. Take a board 8 inches square and cut it in three cuts that it makes a strip 13 inches long and 5 inches wide. We all know that a board 8 inches square has 64 square inches and 5 by 13 equals 65. It gains one inch in cutting it.

M. W. LEININGER.
Reducing the Cost with Machinery

The American Floor Surfacing Machine Company, Toledo, Ohio, reports a largely increased demand for their Floor Surfacing Machine, as contractors are substituting mechanical power for hand labor wherever it is possible. This machine has been on the market for several years and is no longer an experiment, being the only machine that will satisfactorily surface any kind of a floor to a smooth, sandpapered finish, or polish or wax it, as desired, and does as much work as twenty men could do by the old method of scraping, besides very much better. Their reports show that their machine owners are saving more than the cost of the machine every 60 days of operation.

It is one of the greatest labor saving devices in the building trades, as heretofore many fine, expensively finished buildings had floors that the occupants were obliged to entirely conceal with carpets in order to hide their defects, while at the present time floors can be made to harmonize with the balance of the interior finish, and the demand for this class of work is rapidly increasing in all parts of the country.

The Use of Art Glass in Home Building

While glass was made by the Egyptians during their earliest historic period, its first use for windows was by the Romans in the third century. In the House of Faun at Pompeii a small pane remains in a bronze sash. Window glass for churches was made in the fourth century, according to Lactantius. Artists of the Middle Ages were the first to lead their tints of blue, red, yellow, amethyst and green into window glass, and the history of art glass may be said to date...
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American School of Correspondence,
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back to that period. From that time on, it flourished as an industry all over Europe and was in evidence in the windows of Cairo and other eastern cities as well as in mediaeval Europe. About the twelfth century it reached its highest state of perfection under the old artists and in the windows executed at that time the work of gradation of the tints is of extraordinary delicacy and of extreme reserve. An eminent authority says: "There are many restrictions which the production of art glass shares with other kinds of decoration, such as the absence of cast shadow and the prohibition of elaborate perspective with distance and middle distance, etc., as is the case with bas-relief and to inlay, as well as to wall painting where the architectural surroundings require the wall itself to retain its solid individuality. First: It is necessary that the colors be so assembled as to act together in harmony with each other and with the surroundings. Second: The different parts must be so designed that the radiating power of the colors shall appear, at the average distance of the window from the spectator, in a way that will help rather than hinder the effectiveness of the drawing or design. For instance, in the case of a human figure, a limb will be drawn more slender than the truth because the light pouring through the more translucent glass which represents that limb will eat away the outlines of the darker surface all around and give the limb its proper size, therefore a fine church window seen at a distance of but six feet will seem strongly exaggerated and even distorted."

In its use for windows and doors for modern homes, where the designs are necessarily smaller and must be of a different character from that for churches, the problems and restrictions above referred to are as great or even greater. Since about 1870 and especially in the last few years it seems to have been reserved for artists in the United States to make the most serious advance in art glass production, both from the standpoint of the highest ideals as an art as well as in the invention of methods that may be called commercial, whereby effects and results are produced that have brought art glass, in some form, into such general use, especially in homes of even very moderate cost. Advancement in building construction in this country of late years has called for the introduction of about everything having a tendency to beautify and enrich, and the use of art glass allows of such unexcelled splendor of effect that its growing use is readily accounted for.

The illustrations of some of the many types of art glass especially adapted to home building which are shown here with were selected from a catalogue recently issued by the Suess Ornamental Glass Company, of Chicago, a prominent firm engaged in the business. They show to what extent the ideals of art are combined with commercial product in supplying the variety of ideas which has helped make the use of art glass popular and at the same time
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This booklet will tell you about Simonds Saws and give other information of real interest and value.

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greatly reduced its cost. The introduction of what is called the sand blast process has been a large factor in lowering the cost of production.

Sanitary Metal Tile a Necessity

In the history of races ever since the world began, sanitation has played an important part, and has had its influence on the moral and intellectual development of communities. When modern science first compelled the thought that hygienic conditions were absolutely necessary to our welfare, and sanitation in homes became a permanent feature, one of the first steps taken was to render bath rooms and kitchens impervious to dampness. Thus we see the incentive of clay tile. In the days of the old Roman Empire, and through all that period of development up to the present, marble and clay tile were extensively used as a wall covering. We are now on the eve of another progressive step. Metal tile is finding its place in modern construction and its adoption is being increased continually.

We note, as we survey the field, that the standards of the people may well be judged by the contrivances employed that bring about conditions tending to a healthy environment. Enlightened persons of today would not think of endangering their health and comfort by neglecting those important features of the household requiring a perfect sanitation, one impervious to dampness, and which prevents germs and disease-breeding microbes. No part of their living abode, whether it be in private residence, apartment, or shack, is so susceptible to these objectionable features as the bath room and the kitchen. The trend of modern times, therefore, is to employ those methods in the bath room and kitchen that will more readily conform to the high character of sanitation sought by the housewife. Nothing evolved so far has made itself so convincing, so economical, nor so beautifying as Sanitary Metal Tile. Cleanliness and beauty is as true of the bath as the kitchen, as either may be covered with this product in the same manner that one would paper a room. The material itself is light in construction, thin and pliable, yet thoroughly durable and artistic. Its designs and highly glazed appearance equal those of the most expensive ceramic tiles. It is made of a material that is absolutely non-corrosive, and therefore permanently guaranteed against deterioration, corrosion, etc., and being of a substance that is highly substantial, requires no renewing, as we very often find is the case with wall paper, or clay tile.

The best foundation for Sanitary Metal Tile is a white plaster wall, and therefore wherever it is thus introduced it has the desirable feature of being economical in its construction. This feature is maintained permanently. It does not loosen from the wall because of excessive weight, nor crack across the face when the settlement of a building occurs. Everyone familiar with building construction knows that this is not so where clay tiles are used, since the weight of same is sufficient cause for easily breaking the bond between the tile and the cement, and when this bond is broken the artistic effect of the whole room is destroyed. Sanitary Metal Tile has been of great service in many other instances than those
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TO SUBSCRIBERS TO THIS PAPER

WITH EVERY

ANDREWS SYSTEM CONSISTING OF

THE CELEBRATED ANDREWS STEEL BOILER

ANDREWS STEEL BOILER, made of 60,000 lb. tensile strength steel (same as power boilers), heats more quickly than any cast iron boiler, and will not crack. Fire pot is large and deep and completely surrounded by water down to the grate level. Easily cleaned and very economical; burns any fuel.

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This system makes 100 feet of Radiation do the work of 150 feet of other plant; thus it saves one-third the cost of the radiators and piping, besides being more effective. Thousands of users—we will furnish the names—attest this fact. The system gives quickest heating and hottest radiators in coldest weather.

RICHLY ORNAMENTED RADIATORS

are furnished for every room of the house, in size and shape appropriate for the location.

PIPING—all cut to proper lengths, reamed and threaded, so that it is only necessary to screw together. Any handy man can do it. We furnish all elbows, unions, couplings, nickel plated ceiling and floor plates, air valves, gold (or silver) bronze, liquid and brush—everything necessary to make the plant complete—also fire tools, including flue brush.

FREE UNTIL NOV. 30 ONLY

ANDREWS SELF GOVERNING THERMOSTAT

This is a device, shown in the sketch (MOTOR) which, governed by the temperature in the Living Room of the House, operates the motor that opens and closes the check-damper and draft, according as the temperature rises above or falls below the desired point.

The Andrews Thermostat is sold regularly for $20 and is offered at this low figure because we want every Andrews Home Heater to have this great convenience and fuel economizer. It is free with every heating plant now. Do not expect us to hold the offer open beyond Nov. 30. We have a special object in making this offer now; and it will not be repeated.

YOU TAKE NO RISK with an Andrews System. Every plant is sold under our unparalleled 360 DAYS FREE TRIAL GUARANTY BOND.

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It describes fully our methods of doing business; tells how we make plans for the work and Estimates Free: shows views of our factory, how boilers are made and all material is made ready for shipments; also the simple of 360 DAYS FREE TRIAL GUARANTY BOND, names of users in every state with pictures of houses.

ANDREWS THERMOSTAT IN THE LIVING ROOM

Jesse Axtell of Blue Rapids, Kansas, says: "We first saw your advertisement, and as we could not get a price here less than $375.00, we wrote you for prices.

Your price was ........................................... $375.00

Freight .............................................. 27.00

Cement base ........................................ 6.00

Smoke pipe ........................................ 7.75

Labor to put in ..................................... 16.50

$424.50

"My wife put on the bronze in one day. During the month of March, the coldest of the season, we kept the whole house at from 7 to 80 degrees day and night. It was very economical and very satisfactory, and we would not exchange it for the fireplaces. We could not be better pleased. Everything went together like clock work. I only had to buy a ten cent tipple. The fact has got out here that we have this best heater for the least money, and several have told me they will put in one like ours."

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MINNEAPOLIS

ANDREWS HEATING CO.

603 LaSalle Bldg.
CHICAGO
already mentioned, such as physicians' operating rooms, hospitals, clinics, elevator shafts, hotel ceilings, etc., wherein something more is striven for than merely proper sanitation. Wherever Sanitary Metal Tile has been installed it has given eminent satisfaction, and has now come to be considered as necessary on those walls where it can be used, as the application of anything else on the interior of residences conducive to a modern, high class, well developed home.

**A Sash Sticking Machine with Sash Cord Attachment**

The Sash Sticking Machine is manufactured by the H. B. Smith Machine Company, and is known as their No. 141 A. Used, pulls back to bottom of the hole, then raising the foot, the bit drops; the stile being passed over the narrow grooving head to its stop completes the operation, when the operator places the stile between the feed rolls to run through the machine.

There are two strongly driven feed rolls, held firmly down by weights, and a large idle roll in the bed giving a very strong feed. The top rolls can be quickly raised from the material by handle provided and thus stop the feed and at the same time release the piece should there be a wish to remove it.

The machine is strongly belted with good length of belts running over proper size pulleys. All head arbors are fitted in the White adjustable clamp bearings, making this the most satisfactory running machine of its class on the market. The spring posts are all held by a double arm spring post binder, with wrenches attached.

There are regularly furnished with each machine one four-side slotted head for each arbor with cutters and bolts, one cap head, two Shimer patent grooving heads with cutters and one 3/4 inch bit for sash cord attachment, and all necessary wrenches.

**Three Side Sash Sticker and Groover**

It is built to work one, two or three sides. The one-sided machine with top head can be used as a sash, door and blind sticker or one side moulder with four side slotted head four inches long. The bed will drop sixteen inches. The two-sided machine has top and under heads and will stick the molded edge and joint the back of sash, door and blind stiles, or stick both sides of bars and muntins, while the three sided machine with outside head will bevel the check rail, thus finishing the material at one operation. The side head can be set at an angle and changing width of work will not affect the angle. There is ample clearance around all heads.

The arbors for all heads are 1 1/2 inch in bearings, 1 3/4 inch where heads go, and all heads have the same size cutting circle. The under head has three bearings, the cutter of which is easily removable for change of heads, and all heads are adjustable to working face as well as depth of cut.

The boring and grooving attachment is not in the way of any of the other operations and by it the stiles are bored and grooved without loss of time. The grooving is done with Shimer patent grooving heads. The stile is placed on the table, pushed against a stop, depressing the treadle causes the bit to bore the hole at an angle so the knot in cord, or thimble if
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If you are a Carpenter, Contractor, Builder, Real-estate Dealer, Architect, Draftsman or Mechanic, this set of books offers you exceptional opportunities to acquire the special training that you need. You should let no opportunities slip by you to make yourself master of a well paid trade, or profession. Set your gauge to success and turn the clamp down hard.

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under head, 13 feet of 4 inch; side head, 13 feet 4 inches of 3 inch; grooving arbor, 5 feet 11 inches of 2 inch; boring arbor, 5 feet 8 inches of 2 inch; feed, 12 feet 1 inch of 2⅛ inch, and 6 feet 3 inches of 3 inch.

Data as to styles, weights, speed, etc.:

<table>
<thead>
<tr>
<th>Model</th>
<th>Code Word</th>
<th>Size</th>
<th>To Work</th>
<th>Symbol</th>
<th>Weight in Pounds</th>
<th>Floor Space Required</th>
<th>Size of T. &amp; L. Pulleys</th>
<th>Speed of C. S.</th>
<th>Average H. P.</th>
<th>Price</th>
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<tr>
<td>No. 141-A</td>
<td>Obstime</td>
<td>4 inches</td>
<td>3 Sides</td>
<td></td>
<td>2100</td>
<td>4½&quot; x 8½&quot;</td>
<td>10&quot; x 5&quot;</td>
<td>900 Revs.</td>
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<tr>
<td>No. 141-Aa</td>
<td>Obstend</td>
<td>2 Sides, Top and Bottom</td>
<td></td>
<td></td>
<td>2050</td>
<td>4½&quot; x 8½&quot;</td>
<td>10&quot; x 5&quot;</td>
<td>900 Revs.</td>
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<tr>
<td>No. 141-Ab</td>
<td>Obstray</td>
<td>1 Side</td>
<td></td>
<td></td>
<td>1950</td>
<td>4½&quot; x 8½&quot;</td>
<td>10&quot; x 5&quot;</td>
<td>900 Revs.</td>
<td>3½</td>
<td></td>
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</tbody>
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There's a lot of sash cord on the market nowadays that isn't fit to tie a dog with, much less hang windows. About two weeks after you put it in, your customer calls you up and makes remarks. The cord has given out, and so has his temper. Now, this can be avoided if you stick to the cord which is recognized as best everywhere, because it has been proved to wear many times as long as any other cord, or chain or tape for that matter. Samson Spot Cord can always be distinguished by its trademark, the colored spot. It is made only in one grade. It is made of extra quality fine yarn, and is guaranteed free from bad splicing and rough braiding. There are no rough places to cut out. It is carried in stock by dealers.

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Surveyor
Stationary Engineer
Electrical Engineer
Electrician
Bookkeeper
Stenographer
Ad Writer
Window Trimmer
Commercial Law
Illustrator
Civil Service Exams.
Chemist
Miner

Durability of a Good Tin Roof

A good tin roof, rightly constructed, and given only the reasonable attention that a good article deserves, will last for years. The case reported in the letter below, showing the durability of Target and Arrow Old Style Roofing Tin, is of more than passing interest. The illustration shows a building at Lynchburg, Va., covered with this tin, regarding which the owner writes:

"In talking with the former owner of this house I am told that your tin has been on there so long that they have forgotten when it was roofed. No repairs have been necessary, and you are safe in assuming that the work has never had anything done to it since it was put there, which to my certain knowledge is twenty years. The house has been pulled down practically except the roof, and as there is no front or back on the house at this time I will ask that you write me again in about six weeks, and I will look after the matter for you, sending you a picture of the house rebuilt except the roof, which was in such good condition that it required no work, not even paint."

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The recent destruction by fire of the eastern factory of Hartmann Brothers Manufacturing Company, at Mt. Vernon, N. Y., has resulted in the transferring of the column and porch material business of that company to its Chicago factory, operated by the Henry Sanders Company, at Elston and Webster avenues. These two concerns, although operating under different names, have long been closely allied, their interests and methods being identical. The Sanders Company took care of the column business in the central and western states, while Hartmann Brothers supplied the eastern and southern demand.

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YOUR HOME—Everybody’s home should have a mantel. A mantel is useful as well as artistic and decorative. It saves you furnace heat on chill Spring and Autumn days, and diffuses cheer and comfort more than does any other piece of furniture in the house.

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<tr>
<th>Weight</th>
<th>Yard</th>
<th>Sheet Weight</th>
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<tr>
<td>Bundle</td>
<td>Bundle</td>
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<td>Yard</td>
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<td>No. 27 Gauge</td>
<td>27½ lbs.</td>
<td>12</td>
<td>9</td>
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<tr>
<td>No. 26</td>
<td>30 lbs.</td>
<td>12</td>
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<tr>
<td>No. 24</td>
<td>40 lbs.</td>
<td>12</td>
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<td>Phillips Co., The A. J.</td>
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</table>

<table>
<thead>
<tr>
<th>WOODWORKING MACHINERY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnes Co., W. F. &amp; Jno.</td>
</tr>
<tr>
<td>Chicago Machinery Exchange.</td>
</tr>
<tr>
<td>Crescent Machine Co.</td>
</tr>
<tr>
<td>Indianapolis Machinery Co.</td>
</tr>
<tr>
<td>Kidder, R. E.</td>
</tr>
<tr>
<td>Marion Co., J. M.</td>
</tr>
<tr>
<td>Seneca Falls Manufacturing Co.</td>
</tr>
<tr>
<td>Sidney Tool Co.</td>
</tr>
<tr>
<td>Smith Machine Co., H. B.</td>
</tr>
<tr>
<td>White Co., John A.</td>
</tr>
<tr>
<td>Worner Machinery Co., C. C.</td>
</tr>
</tbody>
</table>

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
### INDEX TO ADVERTISEMENTS, NOVEMBER, 1907

For Classified List of Advertisers see preceding page

**Contents for November, 1907, see page 245**

**NOTICE TO ADVERTISERS.**

New copy, changes and corrections for advertisements must reach office of American Carpenter and Builder, 185 Jackson Boulevard, Chicago, not later than November 20 in order to insure insertion in the December number.
Four New Books

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EDITED UNDER THE PERSONAL SUPERVISION OF

WILLIAM A. RADFORD
Editor in Chief of the AMERICAN CARPENTER AND BUILDER

Assisted by

ALFRED W. WOODS, the World's Greatest Expert on the Steel Square, and

WILLIAM REUTHER, the Leading Authority on Carpenter, Joinery and Building

THE STEEL SQUARE AND ITS USES

TWO VOLUMES

A Complete Encyclopedia on the Practical Uses of the Steel Square

JUST PUBLISHED. This very valuable and practical work is published for the first time. It is up to the minute, being issued January 1, 1907. This splendid edition is a brand new book from cover to cover, written in simple, plain, every-day language so that it can be easily understood and followed. Information of value that has appeared in former works, appears in this work, together with a vast amount of new, practical, every-day information, such as is necessary for every progressive and successful artisan to know.

PRACTICAL CARPENTRY

TWO VOLUMES

A Complete Up-to-Date Explanation of Modern Carpentry

NEW SPECIAL EDITION. This work, "Practical Carpentry," is absolutely new, being completed only January 1, 1907. It is written in simple, plain, every-day language so that it can be easily understood. It will not bewilder the working man with long mathematical formulas or abstract theories.

IT IS THE MOST COMPLETE, most accurate, most up to date and most practical work upon this subject. It contains the best and quickest methods for laying roofs, rafters, stairs, floors, hopper bevels, mitering, coping, splayed work, circular work, and in fact, for forming all kinds of joinery and carpenter work.

SPECIAL CHAPTERS are devoted to building construction, which takes the carpenter from foundation to roof, with complete illustrations of each detail, such as foundation, windows, cornices, doors, roofs, porch work, etc. There are also special chapters devoted to good and faulty construction and all kinds of framing.

400 SPECIAL ILLUSTRATIONS, 400 illustrations many of them cover an entire page, and they illustrate completely and instructively the text. They show the detail and actual construction down to the minutest point. They enable the reader to understand the text easily and to follow the work in hand without difficulty.

REMEMBER, this work has the latest published on this extensive subject. (Issued January 1, 1907). Each volume measures 6 x 9 inches, and is bound in cloth with attractive cover designs, handsomely stamped. Printed on the best quality of paper. Each volume contains 50 modern house plans.

PRICE (Per Volume) $1.00

The Steel Square and Its Uses, Vol. I $1.00 Practical Carpentry, Vol. I $1.00
The Steel Square and Its Uses, Vol. II 1.00 Practical Carpentry, Vol. II 1.00

AMERICAN CARPENTER AND BUILDER
BOOK DEPARTMENT

185 Jackson Boulevard, CHICAGO

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN CARPENTER AND BUILDER
Buy Your Storm Windows and Storm Doors 50% Below Dealers’ Prices

Our wonderfully low prices on Storm Doors and Windows make it possible to protect your home against the wintry blasts at practically no expense, as the amount you save in fuel alone soon pays entire cost of storm protection. Our Storm Doors are extra wide and extra long—attractively painted. All our Storm Sash are made with extra wide side and bottom rails. Don’t wait until cold weather comes—Order Now, save money and keep your house or out-buildings snug and warm in zero weather.

STORM DOORS

White Pine
Hand Painted
Clear Glass

Made 1 inch wider and 1 inch longer to allow for fitting on outside of door frame.

STORM WINDOWS CARRIED IN STOCK

Prompt Shipment

No. R 219, Two Lights

<table>
<thead>
<tr>
<th>Size of Glass</th>
<th>Price Glazed Single Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 x 20</td>
<td>$0.80</td>
</tr>
<tr>
<td>10 x 24</td>
<td>$0.90</td>
</tr>
<tr>
<td>12 x 24</td>
<td>$0.96</td>
</tr>
<tr>
<td>12 x 36</td>
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</tr>
<tr>
<td>14 x 20</td>
<td>$1.00</td>
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<tr>
<td>14 x 24</td>
<td>$1.09</td>
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<td>16 x 24</td>
<td>$1.12</td>
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<td>16 x 30</td>
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<td>28 x 30</td>
<td>$1.85</td>
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<td>30 x 30</td>
<td>$1.95</td>
</tr>
</tbody>
</table>

We carry in stock every size listed on this page and can make prompt shipments. Always try to use stock sizes, as odd sized storm sash will cost more money and delay. We ship odd orders in from two to four weeks but stock sizes we ship promptly. Order your storm goods early—do not wait until cold weather comes.

STORM SASH FOR LARGE FRONT WINDOWS

No. R 218, Two Lights, 11 inches Thick

<table>
<thead>
<tr>
<th>Bottom Glass</th>
<th>Top Glass</th>
<th>Price Glazed Single Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 x 40</td>
<td>40 x 14</td>
<td>$0.88</td>
</tr>
<tr>
<td>40 x 46</td>
<td>40 x 16</td>
<td>$0.90</td>
</tr>
</tbody>
</table>

Ventilators in bottom 10c each extra.

STORM SASH FOR

No. R 217, Twelve Lights, 11 inches Thick

<table>
<thead>
<tr>
<th>Size of Glass</th>
<th>Price Glazed Single Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 x 10</td>
<td>$0.86</td>
</tr>
<tr>
<td>9 x 12</td>
<td>$0.99</td>
</tr>
<tr>
<td>10 x 12</td>
<td>$1.10</td>
</tr>
<tr>
<td>10 x 14</td>
<td>$1.32</td>
</tr>
</tbody>
</table>

Ventilators in bottom 10c extra.

STORM SASH HARDWARE

Storm Sash Hardware

GORDON, VAN TINE & CO.

244 FEDERAL ST., DAVENPORT, IOWA