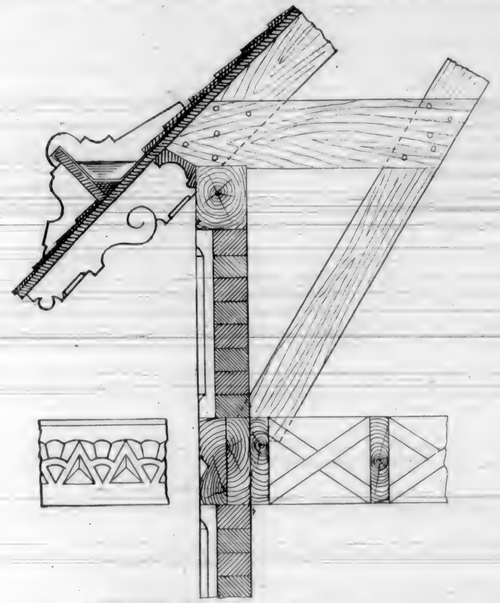


SECTION OF MAIN EAVES

the cracks around the windows and the invisible or unnoticed cracks and pores in the walls, is not altogether a poor exchange, for the air that we get is of far better quality than that which we lose, if of inferior temperature. But the heat that goes through the window panes is absolutely wasted, leaving the air which has parted with it to fall to the floor, keeping all its impurities still in the room.—*The Builder.*

English Law on Boundaries of Property.

MUCH has been said during the session of our late Legislature, in regard to the boundaries of property. English Law has been referred to in many instances, and in order that our readers may properly understand some of the laws referred to, we present a few that may be of interest:—

"In the absence of plans, figures, or rebutting circumstances, where a fence or hedge and a ditch are conjoined, the landowner on whose side either of the former stands, claims the latter; the theory being that excavated soil was cast on the digger's land as groundwork for his barrier, which thus with the ditch forms the boundary, and the limit being the outer bank from the fence or hedge. Property in a fence or hedge between ditches or without ditch may be joint, or rest on acts of ownership of long standing, as executing repairs, especially on demand.

"Posts and rails of paling are presumed to stand wholly on the owner's land, with pales outward and nails driven *home.*

"Joint proprietors of fences, etc., are not necessarily under obligation one toward another to preserve them, any more than a sole proprietor is similarly bound toward the adjoining owner or the public; but in both cases prudent precautions must be taken to obviate injury to others, as by scouring ditches, inclosing holes next to public roads, preventing cattle straying, etc. Generally, the tenant (who must also usually preserve boundaries), not the landlord, is liable to actions in such cases. The time a fence has existed is one element in considering liability to repair it; and twenty years is the least period.

"Where a stream flows between properties, the presumptive boundary is the central line of water, use of which is shared between opposite owners, neither being entitled to injuriously affect the other or proprietors above or below by obstructing, diverting, diminishing, or polluting it.

"In the case of houses or grounds separated by walls used by both owners and built at joint expense, half on the land of each, and also where it is unknown at whose cost or on whose land such walls were erected, they are practically common to the parties, and either may exercise acts of ownership in building, etc., so that one does not prejudice the other. If a man builds on another's ground, the latter must set up his right within a reasonable period from cognizance of the trespass.

"At common law, a man has a right of natural support of soil, so that an adjoining owner must not by excavating cause it to fall. If a house has been erected above twenty years, there is usually a special easement of support from adjoining land or houses (as from party structures), the proprietor of which is liable for injury by settlement, etc., caused by him. In other cases general right to support or to notice to take precautions should be proved. Where a row of houses is built by one owner and sold to different parties, there is by implication right to joint support."

A CARD.

A Book called "Industry of California" represents me in its pages as one of the Architects of the State Capitol at Sacramento.

Permit me to say through the "California Architect, that credit for the design of the building mentioned properly belongs to Reuben Clark (now deceased) assisted by Mr. Kenitzer.

I was, however, associated with the latter named gentleman during the construction of the dome and many other important parts of the building, until near its completion.

Neither did I in any way have anything to do with the Baldwin Hotel.

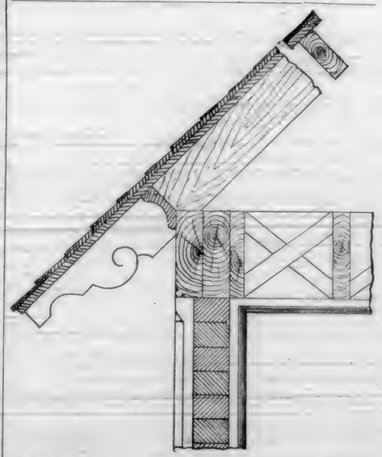
Respectfully,
A. A. Bennett, Architect,
431 California Street.

San Francisco, March 10, 1885.

(This correction was published in the "*Examiner*" of September 13, 1884.)

How Bricks Are Handled in Germany.

THERE are no hod-carriers in Germany. Bricks are passed from hand to hand. The higher up the bricklayers are, the more men are required to toss the bricks Two men to a story is about the average, with enough more to lead from the front of the building to the place where the bricks are needed. One may sometimes see three men on the ground, eight on the front of the building, and five on the top, making sixteen men through whose hands each brick passed before it reached its place of destination.



SECTION OF BAYWINDOW EAVES

Written especially for this Journal.]

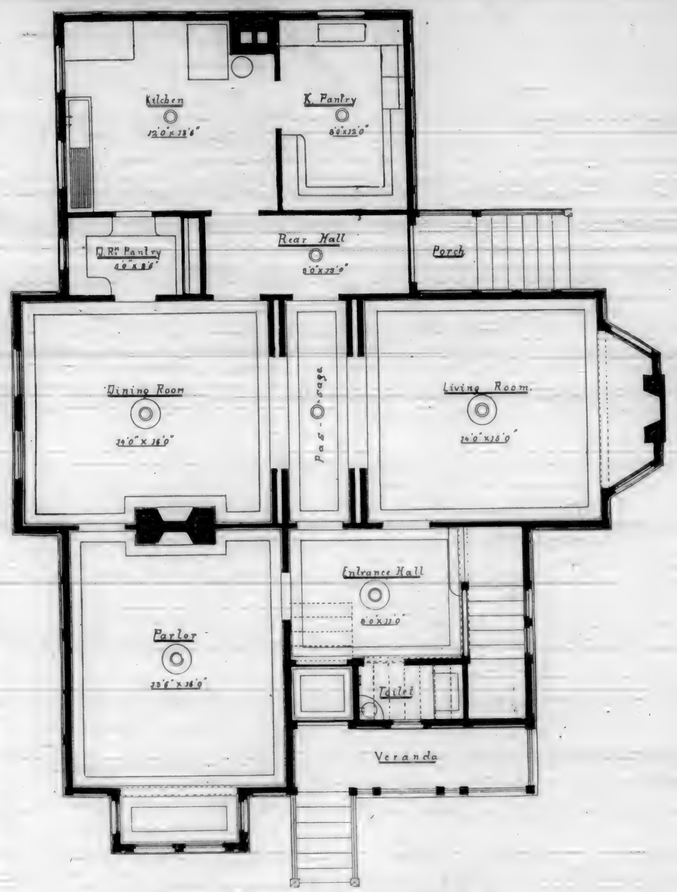
Nature's Lines of Beauty.

PEOPLE whom we have had the pleasure to meet during our occasional visits abroad, have repeatedly expressed their wonderment at the architectural lines of beauty displayed among the ruins of temples, pyramids, and the like, so often seen in Egypt and elsewhere, mentally asking why America, in her massive structures, fails to produce counterparts in this respect alone. Though we, as a nation, are experts in ornamentation and finish, still, when a large structure is completed here and admirers examine, there seems to be something lacking to give it that well proportioned look so characteristic of those preserved temples abroad.

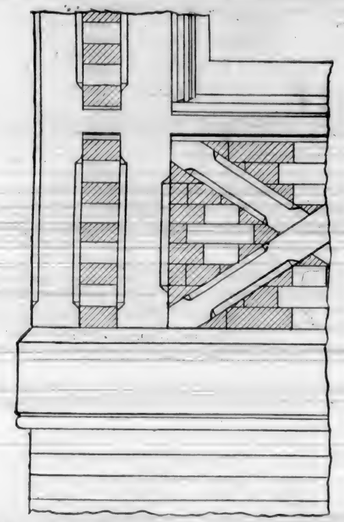
This something, though perhaps indefinable, is something nevertheless, and should we call into requisition the best architect he would be at a loss to define it; the geometrician, however, would state in an instant that in carrying out his plans, the architect had deviated from a rule that governs all things terrestrial, namely, that of the circle, this planet itself being circular in form, and nearly every one of its natural productions partake, to a greater or less degree. Any deviation from it in the arts is, technically speaking, to distort nature. The objective of the eye itself makes everything assume the rounded edge, and these sharp corners and obtuse angles are inconsistencies not to be received by this organ without recoil. All have noticed how an oval cornice, to relieve the junctures of a perpendicular and horizontal surface, mellows the sharpness and enhances the appearance of the space surrounding. A little round corner is the cosiest one of the room, and right angles make them cheerless and cold. In furniture, all æsthetic minds love the graceful curve; in painting every touch of the artist is to mellow the dark corner and round the angles. Even in the human form divine, how square features do mar our ideas of beauty and loveliness; though we educate the sense of sight to admire these lines of beauty and graceful curves, we blunt this the same by placing obtuse and triangles in the field of vision. Everything is built on the square, excepting, perhaps, the formation of character, while the organs of sight are constructed particularly with a view of comprehending circles and curves.

If we examine any of these ancient temples and palaces, we will find them all constructed in accordance with the shape prescribed by nature. The floors and ceilings, walls and copings, the exterior and interior, show the unmistakable signs of circles and curves. Should we care to prove the correctness of this, place the eye on a level with the water of an inland lake or pond, and the center will be found the highest part; do the same with the floor of one of those old-time structures abroad and the same results are apparent, viz., the middle is the highest in proportion to the size of the room, and even the most retired, narrow courts, secluded sanctuaries, and secret closets are all constructed in the same accord. Go out and view the horizon; above, a beautiful, regular dome will appear; do the same with one of their temples, and the center is a dome however small or flat, still circular in form, highest in the center; hence the massive appearance of those rooms, which, were the order of things reversed, would appear smaller in proportion to the size of the circle described. This rule is apparent everywhere in the construction of those buildings. A study of this system of architecture demonstrates many of the characteristics and perfections of a strange people who have left no clue to their origin or supposed destiny, but left these relics of grandeur that will live for all time.

Careful measurements and computation of these rooms and the arcs represented in all their architecture illustrates freely that their knowledge of the earth's shape was the same and equal to ours of this important age; and further, that their knowledge of and ability to incorporate natural appearances with architectural effects, was even superior to ours. It may be that their knowledge of optics and optical effects surpassed ours, but in any event they obeyed nature in their artistic achievements, with results that American artisans need not feel at all humbled to copy; and if they could all see the two effects in a building, they would do so without an invitation. Place a piece of canvas on the ceiling of any room; allow it to bag in the center but an inch; now note carefully how the room appears, its size and general fitness now change; and elevate the center of the canvas and again note the general character of the room, and, notwithstanding the fact that a circle has not been made, only a distorted semblance, no one who will take the trouble to perform the foregoing experiment would be willing to admit that his eye could be improved upon to this extent. Every inch of circle seems to make a foot in the height of the room, and the same rule



FIRST FLOOR PLAN OF A CALIFORNIA HOME.



Outside Elevation of Base & Windowsill.

holds true regarding the walls and corners, and the illusion increases in proportion to the perfectness and size of the circle.

Again, whether this people were aware of it or not, they made one of the best applications of the law governing stability known, for by their system of construction the building is braced from every point, no stress being imposed directly on any single point, but from the very foundation up every stone was made to sustain some portion of the weight of the entire structure, even to the ornamental work of the walls and crevices of the interior.

Placard Benisons.

We sometimes see at the doorstep of some house the word "Welcome" imbedded in the rock or on a foot-mat. It is pleasant to be so cordially and promptly invited within, but we must divide this gushing hospitality with the merest wayfarer, the peddler, and the tramp. If it were thrown down just once and for us only, what a different train of thought it would suggest! But a hospitality so broad overleaps itself and loses its subtle and most cherished fragrance, for the truth is, neither love, friendship, nor religion can be profited by tricks or by rude publicity. Their graces and benedictions, their benisons and benefits, come with silence and secrecy.

Bancroft's Histories.

This magnificent work embraces a complete history of the Pacific States. The territory covered is the western half of North America, from Panama to Alaska, including all of Central America and Mexico, and is equivalent in area to one-twelfth of the earth's surface. There are to be thirty-nine volumes, with maps and illustrations, fifteen of which are now ready. They will be well printed on good paper, neatly and substantially bound, uniform in style, and will average over 700 pages each. Three or four new volumes per annum will appear until the entire series is completed. Subscribers will not be obliged to take the work unless it corresponds with the description in every particular.

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Bound in Extra English Cloth, neat and attractive style	$4 50
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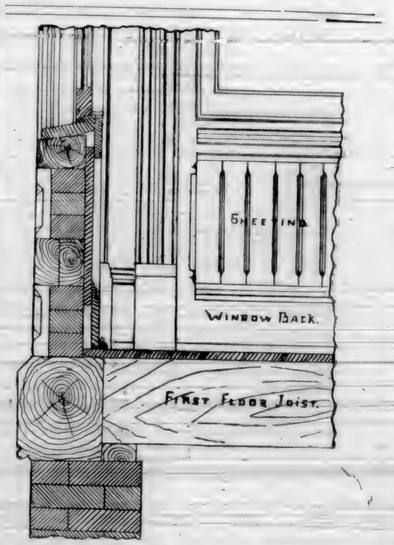
Any information in regard to the above will be given by addressing the office of this Journal.

Concrete Walks.

An engineer tells how to make a cement or concrete walk requiring no great skill in preparing materials. These are water, lime, and gravel or ashes, or both. The gravel and ashes are put in a heap and wetted. One barrel of the waterlime is mixed with sharp, clean sand, dry, being shoveled over back and forth several times to get a thorough mixture. A portion is then mixed with water into a thin, soft mortar, and five parts of the wet gravel or ashes are well mixed with it, so that every fragment is coated with the combining mortar. This is important for obvious reasons. The concrete is spread on the graded walk and beaten down with a rammer until the moisture gathers on the surface; some of the dry sand or cement is then scattered over the surface to absorb the moisture, and the surface is smoothed over with a plank rubber having a sloping handle to work it back and forth. In a few days this is hard, and it becomes harder with time. By making divisions of thin strips of wood or tarred paper the cement may be laid down in blocks, squares, or diamond-shaped, and for extra good walks the blocks may be colored by mixing the finishing coat with brown or gray, or other colors, alternately.

The Safest Part of a Car.

It was well said by the conductor, who, when asked what was the safest part of a car, replied, "That part which happens to be in the shop at the time of the accident." It is a popular superstition that the center of the car is not only the safest part, but is also much the easiest riding. One of the greatest trials of a Pullman conductor's life is the fact that about every passenger asks for a lower center berth the first thing, and is frequently indignant because it cannot be had. If the center of a car rides any easier than the end, then our cars, built as solid and as strong as they are, spring up and down in the middle precisely as does a buckboard. If they do not, why should it ride any easier? As for safety, if you are in the rear of the last car on the train, and another train runs into the rear, you are liable to get hurt. In all other accidents you can conjure up as liable to occur, it is the safest. If a head collision, there is nothing back of you to add force to the blow. If the car leaves the track and collides with a bridge or any obstruction on a side track, it will not be in your end. If the train is thrown down an embankment there is nothing to land on top of you. Then, this location is the most pleasant. From it you can watch all the movements of your fellow passengers, often a good way of passing the hours of a long and tedious journey. If your eye happens to catch a particularly fine view, you can, by turning in your seat, or stepping to the door, take it all in. If there is a safest part of a train, it is in the last seat in the last car.



Section of Base & Windowsill.

Pacific Coast Nail Trade.

Somebody has asked, "What has become of all the pins?" With equal propriety it might be asked what becomes of all the nails. A nail is often a handy thing to have round the house, but it is not so handy to find one if there be any boys about the house. A good housewife says a boy's pocket is the best place to look for nails. It is not certain whether nails attract boys or boys attract nails. The two objects are sure to come together and remain fast friends until a hammer can be found, and then there is an eternal separation, but the nail is found to be just as fast a friend as ever. Less than a century ago, all nails were hand made. Now there are 80 nail factories in the United States running over 6,000 machines, with a capacity, if all were steadily employed, of over 12,000,000 kegs per annum. The largest amount produced that we can recall was 6,147,000 kegs of 100 lbs. each in 1882

Nails are made in some 17 States of the Union. Amoug the latest States to enter upon this industry are Wisconsin and California. The latter entered upon nail making in January, 1883, with 50 machines.

Up to within the past two years, all the nails used on this coast were imported from the East. The imports at San Francisco, in round numbers, for the past twenty-two years, have been as follows:—

1863, kegs	95,000	1874, kegs	215,700
1864	94,400	1875	232,100
1865	70,300	1876	181,900
1866	103,100	1877	218,000
1867	190,800	1878	223,000
1868	158,200	1879	162,000
1869	170,600	1880	192,800
1870	103,900	1881	259,800
1871	150,200	1882	200,700
1872	225,000	1883	178,200
1873	129,000	1884	101,700
Total, 22 years			3,651,300

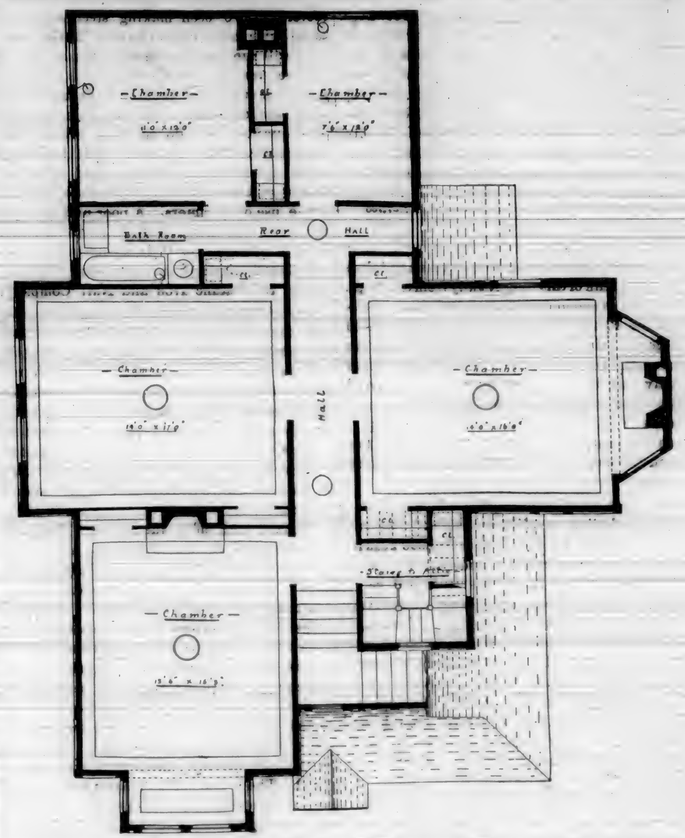
Dividing this period into two equal parts, we find the imports for each to have been as follows:—

1863 to 1873, kegs	1,490,500
1874 to 1884	2,161,000
Totals	3,651,300

The imports for the last eleven years show an increase of 45 per cent. over the first eleven years. The real increase has been larger, because some of the principal cities in the interior, which formerly drew all their supplies of this character from San Francisco, have been importing considerable quantities direct from the East in the last few years. These consignments are dropped off the cars at Sacramento, Marysville, Stockton, San Jose and Los Angeles, and of course no longer figure in the imports at San Francisco. While there was only 101,700 kegs Eastern nails landed at San Francisco in 1884, the total supplies which reached California from the East in that year are estimated at 134,000 kegs, showing that over 30,000 kegs were dropped off at terminal points in the interior.

Prices, brands and means of transportation have undergone great changes during the above period. In the early days of San Francisco nails were very valuable, and many sharp corners were made to the profit of the holding interest. The year 1865 was also a speculative one in this branch of trade. In January, 1865, prices were from $4.50 to $4.75. In February, the outside rate was put up to $5.50, but immediately afterwards, under fresh arrivals, rates went down to $4.37½ to $4.50. These were the lowest figures that year. In April, $5.50 was paid and in May, $5.75. From June to October, the market rated at $6.00 to $6.50. In November the price was advanced to $6.75 and in December to $7.00. In January, 1866, the New York currency price was $8.00, and the freight by sail out was $1.50 in currency. This made the price equal here to $7.00 per keg in gold. Some lots were sold at about that time at $7.25 from ship, while jobbers were generally asking $9.00@$10. These are the highest figures we can recall in the past quarter of a century. From $4.50 in 1869, prices rose to $5.50 in 1870 and $6.00 in 1871. Since the last named year rates have never been as high as $6.00, with the exception of 1880, though they have frequently reached $5.00 and upwards. In 1878 they fell as low as $2.75, which, up to that time, was said to be the lowest figure reached. That was a very unsatisfactory year to importers, who failed to realize cost and freight on some of the lots sold. In 1879, there were sales as low as $2.00 but the price advanced to $5.00 before the end of the year. Prices were also low in 1883, the average being $2.40 to $3.40. They sold as low as $2.75 in 1884.

The favorite Eastern brands have been Boonton, Oxford, Old Colony and Fall River. In 1876 other brands came upon the market. Notably among these were some consignments from the Riverside Iron Works at Wheeling, West Virginia. This factory sent us 20,000 kegs that year, which sold at $3.20 to $3.50. Some of these were said to be peculiarly adapted to Pacific Coast woods. In 1881 some more new brands were received from Pennsylvania and Ohio factories. Reduced overland freights were the inducement at that time. Prior to 1870, all our nails came by sailing ships. Nearly every ship leaving New York or Boston for this port would have consignments of this character, seldom less than 1,000



Second Floor Plan of a California Home.

kegs, and sometimes as much as 7,000 kegs. Soon afterwards, the reduction in freight by the Panama steamers, brought about by the opening of through rail connection with New York, made it possible to ship these goods by way of Panama. Since 1874, the railroad has also been availed of to bring consignments. The imports for that year reached San Francisco by the following means of transportation:

Per ship, kegs	153,900
Per steamer	57,700
Per railroad	4,100
Total	215,700

The steamers and the cars have since taken the great bulk of this freight away from the ships. It is a common occurrence of late years for the Panama steamers to bring us 3,000 kegs on a single trip. But there are only two steamers per month. Freight trains arrive daily from the East, both by the Northern and Southern routes, and scarcely a train comes into the borders of California without some consignments of this kind. At least this has been the case up to the opening of the year 1885.

The estimated consumption of San Francisco, including supplies sent inland, has varied from 85,000 kegs in 1865 to 259,000 kegs in 1883. These figures show a monthly consumption varying from 7,500 kegs to 21,600 kegs. Our dealers have been accustomed to carrying a stock of 6,000 to 60,000 kegs. Now that supplies are obtainable at our doors, the hardware men allow the manufacturers to carry the burden of stock. It will probably be a long time before we cut entirely loose from Eastern supplies of this nature, though we are informed that the local factory has sufficient capacity to meet all the demands of the coast. This factory is located at Oakland, and was erected in the closing months of 1882. It is supplied with the latest improved machinery. The building is two stories high, and the machines are placed in the second story, the nails dropping through apertures in the floor to reservoirs on the first floor.

A rolling-mill is attached to the works, so that the iron is prepared and all the operations completed at the same point. The factory has a fine water frontage, and the first cargo of 500 tons iron came alongside the company's wharf in January, 1883. There is also rail connection direct from the factory with all parts of the country. The factory has encountered the usual obstacles incident to the introduction of manufacturing enterprises in this State. There have been two or three strikes among the workmen concerning wages. But everything is now running smoothly. The factory made about 100,000 kegs in 1883, and 129,332 kegs in 1884. At the close of 1884, the factory held a stock of 21,561 kegs. The managers expect to make 200,000 kegs in 1885, and claim that the factory has a capacity for 300,000 kegs. Despite this outlook from the local factory standpoint, it is probable that at least 100,000 kegs will be received here from the East this year.

Within the past two years some of the factories have been making steel nails and tacks with more or less success, but whether steel will run out iron in this line of manufactures remains to be seen. It is to be regretted that some of the iron nails sold in this market in the past year have been of very poor quality. We do not know where they were made, but have seen them bend and break rather than enter the wood in which they were being driven by those accustomed to the use of hammers. A poor nail is about the most provoking thing in existence, and there is no excuse for their manufacture. We have heard no complaint concerning the product of the Pacific Iron and Nail Company, and it is fair to presume that the poor nails have come from abroad. We understand that the local factory at Oakland has recently added a line of French wire nail machines, and is now prepared to turn out all kinds and sizes of this description. The demand for wire nails has become quite prominent in the last three years, and we are glad that they are now made here. They are largely used by sash, door, furniture and organ manufacturers, picture frame makers, car builders, and house and office furnishers. They are quite stiff, and can be driven into hard wood without the use of a brad awl. They number more to the pound, and are therefore considered cheaper than other sorts.

The Pacific Iron and Nail Company undertakes to make every nail known to commerce. The list is altogether too long to print in this connection, and prices vary with the size and description. The enterprising gentlemen who started this industry on our shores deserve well of their fellow citizens, and it is a pleasure to know that their efforts have been appreciated. The wonder now is that a nail factory was not started here ten years earlier. It meets a long-felt want of this city and coast.

Cherish a Slow Man.

If you have got a "slow man" in your shop, then cherish him. He is a treasure. We don't include lazy men or time killers; bounce them at once.

A genuine "slow man" will do more work than two "lightning dodgers." To one unacquainted with him the slow man seems to be principally engaged in getting ready to do his work, but just about the time you think he has "got ready," the job is done.

He never does a job wrong, or makes a false move. He *thinks*. He plans a blow before he strikes. You never knew him to make a bull of a job and then have to work eight hours to get rid of the mistake. When he makes a mark, he knows it is in the right place, and he takes his time to work to his marks, and has confidence that his work will come together.

Watch the slow man and the lightning chap. They are both at work making patterns for a clamp box. The slow man selects a piece of nice timber, takes it out of wind and squares it up. He is sure he has got plenty of stock. He picks each part from the drawing, cuts a paper pattern of each and blocks out each piece. He will finish up two or three and have the glue drying while he is making core prints and rounding corners.

The lightning chap has found a chunk of wood under the bench which he *thinks* will be "big enough." He measures the patterns, makes a few marks on his blocks, and begins to cut it out. How he makes the chips fly! He cuts and chisels, and then stops to measure. One end of the block is worked down to shape of the box and then he finds it is coming out ⅜ inch short, and a piece must be glued on. While he is waiting for the glue to "set," the slow man gets all ready to glue on the last core print. It takes quite a number too, as the bolt holes are all cored out; it makes a better job than if the holes had been drawn in green sand.

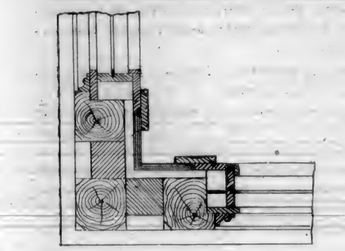
The slow man rounded each piece before he glued them together. He don't have to work into bad corners with his sandpaper, and he is all ready for the first coat of black before the fast man has got his work all blocked out.

Everything is done when the slow man lets go of it. He don't have to look all over his work nine times to see if the splits and jambs are all worked out. When the first coat of black is dry he runs in one or two wax corners and fills up a worm hole, puts on two more coats of black, sandpapers a little, and the job is well done.

As he takes the pattern down to the foundry, he carries the shellac to the "lightning" man, who is just gluing on a corner which he knocked off as he was cutting it down in a "hurry."—*J. F. Hobart, in Wood-Worker.*

A Clergyman on Shavings.

Rev. Dr. Paxton, in a lecture before the Mechanics' and Tradesmen's Union, a few evenings ago, stated in a few words a good many truisms. Shavings, the lecturer said, were not of American invention, like whittling, but were as ancient as the working of metals by Tubal Cain. They are the necessary waste of every work. There is a certain loss from every gain; there is no building without its rubbish heap to remove, which requires almost as many carts as to bring the building material. The fewest substances in nature are found pure. Construction is based upon destruction. Every joy presupposes a sorrow. The door posts of progress are sprinkled with the blood of its martyrs, and along the way are scattered like millstones the bodies of those who have fallen in the path. We cannot get something for nothing; for every tit there is a tat. The wrecks of rich men's sons to be seen everywhere show that it is as hard to keep as it is to get. Without toil there is no substance; hence the recklessness with which estates are squandered, without any regard for the toils and hardships that had to be undergone to procure them. It may be likened to the sacrifice of human life at the battle of Bunker Hill, through which the salvation of our country was procured.—*Scientific American.*



Plan of Corner of Bay Window

Oil Stones.

Keep your oil-stones clean. Many users of oil-stones keep them full of oil all the time, all covered with dirt and gudgeon-grease, and when they want to use them, must scrape a place with a chip before they can make the tool "take hold." Wipe the stone clean after using. Do it every time, too, not once in a while. Get in the habit of it, and it will come natural.

Don't let a stone get gummed up. If you have been guilty of keeping such a one, just take a new deal and "try out" your stone. Put it in a kettle with water and potash—some soapine will do first-rate (and soapine should be kept on the sink of every shop in the land)—and set it over a fire, or stick a steam pipe into it. Boil for an hour or two, then soak and wash well in clean water. You will then be able to see what your oil-stone looks like, and it will "take hold" like a new broom.

Some men place their oil-stones in the sun and let the oil try out. But the potash is the best; it "kills" the grease on the spot.

An oil-stone needs "truing up" very often. I remember, when a boy, of truing a stone. Our worthy father set us at the job of rubbing the stone on a board covered with sand. How slow it did cut! It generally took two or three hours to do the job. Every three or four "rubs" I would have to examine to see if it was "most done;" and then before I got to work again, Tim Blodget would come along and try to argue me into "goin' fishing," and then how I hated that oil-stone.

Don't let a stone get too "hollowing." Use long strokes in rubbing a tool upon it. If it gets a little worn in the center, take it to the grindstone or a big emery wheel. Hold it against the *side* of the wheel; not on the face. It will take but a very few minutes to grind the oil-stone true and smooth.

I never yet saw a loafer hang around a shop half an hour without getting out his jack-knife and "going for it" upon the middle of an oil-stone. If I have a knife to sharpen, I do it near the *end* of the stone. The ends don't wear down; it is the middle that gets most of the work. Some journey-men put a wire across the middle of their oil-stones. They have to work each side of it, but the loafers have to, too.

If you break a stone, don't throw it away. If thick, or nearly new, boil the grease out of it, and *glue* it together with common glue. It will hold if you get all the grease boiled out before you put on the glue. If the stone has become worn pretty thin, you had better grind it down into slips. It will make some nice ones of the very best quality.

Don't put the stone into a block of wood. It makes a nasty thing to keep clean; go to the hardware store and buy a nice oil-stone holder. You can put it on in two minutes, and take it off in "no time," and wipe the stone clean as often as you wish.

A hard, glossy oil-stone is not worth buying. A stone which looks like a piece of marble is good for nothing. A stone with a sand-stone complexion is too soft, and will work bad. The "muddy" stone is another to be avoided. Somewhere I have seen a receipt as follows: "Draw your thumb nail along the stone; the faster it cuts away the nail the better the stone." It looks reasonable, but I have never tried it.

Petrified wood makes the best oil-stone. I have a Scotch stone which cuts very fast, yet will set an edge to "cut a hair." Some years ago a firm started to manufacture "silex" stones for oil and water, both hand and power. The "silex" stone was ground fine, mixed with some secret "uniting compound," and moulded under hydraulic pressure. The stones thus produced were pretty good, but were apt to "glaze," and then neither oil nor water seemed to have any effect in removing it. Whether or not they are made now, I do not know.

There is a knack in using oil-stones well. Don't rock your hand and make six or eight bevels on the work, or else make a curve in place of a flat "bevel." Keep your wits upon the top of the tool, and see that it travels as fast as the bottom edge does. The tendency, when pushing from you, is to lower the top of the tool, but a little attention to this point will enable a man to do a job right, and get a better edge in the very shortest time.—*American Machinist.*

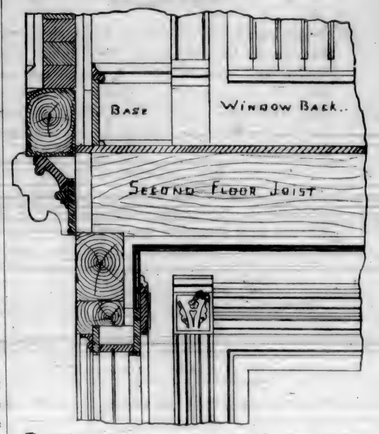
Measuring the Height of a Tree.

There is a very simple way of measuring the height of a tree, which can be practiced by any one on a sunny day or in bright moonlight. All the apparatus that is necessary is a straight stick, of any length. Draw a circle with a radius (half the diameter) of a little less than the length of the stick. This will be done by holding one end of the stick, say two inches from its end, and moving the other end around, making the circle with a knife or a chip. Then place the stick in the ground exactly in the center of the circle, perfectly upright, and press it down until the height of the stick is exactly the same as the radius of the circle.

When the end of the shadow of the stick exactly touches the circle, then also the shadow of the tree will be exactly in length the same measurement as its height. Of course, in such a case, the sun will be at an exact angle of forty-five degrees.

Measurements of this character can be best effected in the summer, when the sun is powerful, and has reached to a good height in the heavens, and when the trees are clothed with living green, so as to cast a dense shadow.

To many to whom this idea may not have occurred, it might be made annually a matter of interest thus on warm summer days to take the height of prominent trees, and so to compare growth from year to year.—*Hall's Journal of Health.*



Section through 2nd Floor Joist

A chicken with a clipped wing made several ineffectual attempts to fly over a fence. An Irishman, who witnessed the efforts of the "chick," laughingly exclaimed: "Begorra, she has a defective flew."

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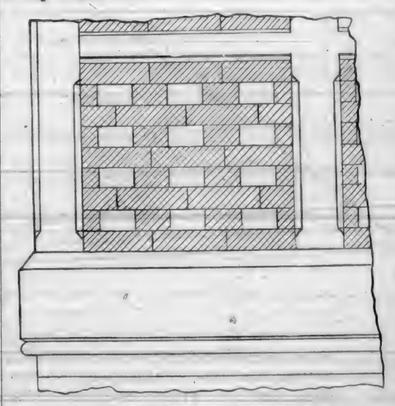

Elevation of Brickwork First Floor

Brick-making.

WE hear a great deal said of late about perfect brick. We mean by this brick with sharp and well defined edges and corners. Not only this, but they must be straight, so that when two are placed together in a wall the edges come close together the entire length of the brick.

In common building, brick defects are not so often noticed, but in front or ornamental brick it is absolutely necessary, in order to make a good job, that the brick be straight, the same thickness at each end, and of uniform size. The reasons are many why brick so often come short of these requirements.

First, as to machine-made brick. Almost all machines that deliver the clay in a continuous stream, with wires or other means of cutting the clay into proper lengths, make crooked brick.

One reason is that the wire in cutting the clay drags the end of the brick, or if cutting the length way of the brick pulls the sides down.

Another reason is, the clay is not of a uniform density in the brick, the machine often delivering more clay to one or other of the sides or edges, thus causing the brick, if not crooked when made, to dry crooked.

The mud machines that make each brick in a separate mould-box often feed one side or end of the mould heavier than the other, and again the brick are often dumped in emptying them out of the moulds and hence dry crooked, and I assure you they get no straighter in burning.

The same difficulties are often encountered in hand-made brick.

The clay is often pressed unevenly into the mould, and in striking it is drawn to one end, and in off-bearing the brick are dumped.

These difficulties need only to be mentioned to suggest a remedy.

First. The machine builder must build his machines so that they will make brick of uniform density throughout. This applies to dry press machines equally as well as to the mud machines.

Second. The brick must be properly delivered from the machine and properly placed on the floor for drying.

But brick machines and hand-moulding are not to be charged with all the crooked brick made.

A brick may be ever so well made, and unless dried properly, it will be crooked and ill-shaped.

The manner of drying brick of course depends largely upon the clay, but there are a few thoughts that equally apply to all clays.

Those who use drying floors have noticed, no doubt, that the brick draw up at the ends. This often comes from too fast drying, and often from the floor being too dry when the brick are placed upon it. We find that by wetting our floors before placing the brick on them they dry without warping. Where the brick are dried in the sun, if the clay is at all dense, they are apt to warp, especially if the ground is moist. As a general rule, the ground should have one day's sun between each day's drying.

In making press brick the drying is very important.

The mud must be of a uniform moisture when the brick are moulded, and the brick must be uniformly dry when pressed. If not they will be of different sizes.

In order that they be straight, each brick must be uniformly dry when pressed and set in the kiln.

If one end be dryer than the other, or if the corners be dry, the brick will not come from the press straight. There being more rebound in the moist portion than in the dry, when the brick is taken from the press, the moist portions swell, leaving the brick of uneven size.

This can be overcome by hacking the brick before pressed into large piles and covering them with wet cloths. In this way the moisture becomes equally distributed through the entire hack, and they become moist.

After they are pressed they should be placed on a moist floor, yet warm enough to dry in hacks of from five to eight high.

The bottom brick should always be perfectly level. They should remain in these hacks until dry enough to handle without damaging them, then taken down and rubbed with the hand and hacked on edge eight or ten high. We are aware that press brick makers have many ways of handling brick, but we have found the above to be the best and surest way to have them dry straight.

If they are straight and thoroughly dry when they are set, they will come out of the kiln in good shape.—*W. A. Eudaly, in Clay Worker.*

An Amateur Carpenter.

BILL NYE, in the Denver *Opinion*, relates his experience as an amateur carpenter, as follows:—

In my opinion every professional man should keep a chest of carpenter's tools in his barn or shop, and busy himself at odd hours with them in constructing the varied articles that are always needed about the house. There is a great deal of pleasure in feeling your own independence of other trades, and most especially of the carpenter. Every now and then your wife will want a bracket put up in some corner or other, and with your new, bright saw, and glittering hammer you can put one up upon which she can hang a cast-iron horse-blanket or lambrequin, with inflexible water-lilies sewed in it.

I made a very handsome bracket last week, and I was naturally proud of it. In fastening it together, if I hadn't inadvertently nailed it to the barn floor, I guess I could have used it very well, but in tearing it loose from the barn, so that the two could be used separately, I ruined a bracket that was intended to serve as the base, as it were, of a lambrequin which cost $9.00, aside from the time expended on it.

During the month of March I built an ice-chest for this summer. It was not handsome, but it was roomy, and would be very nice for the season of 1884, I thought. It worked pretty well through March and April, but as the weather begins to warm up that ice-chest is about the warmest place around the house. There is actually a glow of heat around that ice-chest that I don't notice elsewhere. I've shown it to several personal friends. They seem to think it is not built tightly enough for an ice-chest. My brother looked at it yesterday, and said that his idea of an ice-chest was that it ought to be tight enough at least to hold the larger chunks of ice, so that they would not escape through the pores of the ice-box. He said he never built one, but that it stood to reason that a refrigerator like that ought to be constructed so that it would keep the cows out. You don't want a refrigerator that the cattle can get through the cracks of and eat up your strawberries on ice, he says.

A neighbor of mine who once built a hen resort of laths, and now wears a thick thumb-nail that looks like a Brazil nut as a memento of that pullet corral, says my ice-chest is all right enough, only that it is not suited to this climate. He thinks that along Behring's Strait, during the holidays, my ice-chest would work like a charm. And even here, he thought, if I could keep the fever out of my chest, there would be less pain.

I have made several other little articles of *vertu* this spring, to the construction of which I have contributed a good deal of time and two finger nails. I have also sawed into my leg several times. The leg, of course, will get well, but the pantaloons will not. Parties wishing to meet me in my studio during the morning hour will turn into the alley between Eighth and Ninth Streets, enter the third stable door on the left, pass around my Gothic horse, and give the countersign and three kicks on the door in an ordinary tone of voice.

An auger which bores a square hole is now in common use in Cleveland, where a joint stock company is being organized for the purpose of manufacturing them for the market. The *Herald* of that city thus describes it: "Its end, instead of having a screw or bit, has a cam motion which oscillates a cutter mounted on a steel rocking knife which cuts on both sides. In order to prevent the splitting of the wood the ends of the cutter are provided with small semi-circular-shaped saws which help in cutting out perfectly square corners. It is estimated that this new process will save the labor of three men who work with chisels, as one man can conveniently cut a two-inch mortise in the same length of time that he can bore a round hole."

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A Plain Talk with the Boys.

"ANYTHING that is worth doing at all is worth doing well." Never allow this to escape your memory. Be punctual at your work in the morning; try to be on hand fifteen minutes before the regular time; assist in cleaning up the shop; get out what material is wanted by the journeyman you are helping, and have it in readiness to start with him promptly on his arrival. While in the shop, keep everything looking clean and tidy; have a place for everything, and keep each thing in its place. If you want a tool of any kind, do not have to rummage through half a dozen drawers to find it. Keep the man's tools you are with in a building close together; watch his motions closely and you will be able to know nearly every time what tool he wants next, without his asking for it; do not wait to be told to put on your solder-pot after the man is ready for it; have it ready for him when he is ready; he will appreciate that you are trying to assist him, and paying strict attention to your work more than if you should wait for him to tell you everything.

Never leave a fire you have been using anywhere about an unoccupied building when you quit work at night; see everything safe before you leave. Don't annoy the cook in the kitchen by insisting on heating your metal on the stove or range; she has her cooking and baking to attend to, and the progress of her work is just as important to her as yours is to you. Take your pot outside and build a fire in the street, if you can do no better; by doing so you will often save a great deal of trouble and annoyance. In going to and from your work, and always when on the street, "brace up;" don't go along in the everlasting hang-dog, slouchy kind of way, as if you were afraid of getting somewhere two minutes before time. It looks more like business if you "pull out" like a man,—as though you had to make a train and were afraid of being late. I have seen boys on the street with tools on their shoulder, a pipe or stump of a cigar in the mouth, ambling along as though they were very tired, or afraid of getting to the shop five minutes before quitting time, for fear they might be started on another job. I am sure that if their employers could have seen them they would have much rather the boys would spend their time, if they had any to spend, in the shop. It is just such movements and actions as I have described that attract the attention of employers and customers and make them dislike you. Do your work quickly, neatly, and quietly; move briskly to and from your work, and you will gain friends in the shop and out, and gain the confidence of your employer, who is not slow in noticing any little defects or faults, if you have any, and whose interest it is to advance you as rapidly as possible, if he sees by your actions and work that you are trying to advance yourself. This may seem all very funny to you, but it is plain talk, and I think most of you know what I have stated to be facts, and facts are said to be very stubborn things, and it is best we should know how stubborn they are.

You must not think that all these little things are not noticed by the people you have to deal with every day. They are; and the success or failure of your future life depends very largely upon your present conduct and actions. Ever remember that politeness and a pleasant answer cost nothing at any time—have them always ready—and that neatness in dress and personal appearance, quick, lively movements and a watchful eye to business are the qualities that win.—*The Sanitary News.*

Mortar.

IT is commonly supposed that anybody is competent to make mortar, while, judging from the results attained, nobody seems to know much about it. Good mortar is a solid silicate of lime—that is, the lime unites with the silica or sand, thus forming a silicate of lime. In ancient days those who had some conception of the way these two materials united, superintended their mixing, and the result was mortar, specimens of which have come down to us, and which are far superior to those that we are commonly using. Dry lime and dry sand laid together, or mixed and kept dry for 1,000 years, would not unite to form a silicate of lime any more than acetic acid and carbonate of soda dry in a bottle would effervesce. To make silicate of lime just as good as was made by the Romans, all that is necessary is to proceed intelligently: procure good caustic—*i. e.*, fresh-burned lime—and if you find it all powder, *i. e.*, air-slaked, don't use it; use only clear lumps. Slake this, using only enough water to cause the lime to form a powder. To this, while hot, add clean sand, not dirt and loam called sand, but sand; and with the sand add enough water to from a paste. Then let it lie where it will not become dry by evaporation—in a cellar, so much the better, for as soon as you have mixed the sand and lime as above, they begin to react one on the other, and if not stopped by being deprived of moisture will go on reacting until silicate of lime (as hard as any silicate of lime ever was) is formed. But if you take this so-called mortar as soon as made and lay bricks with it, unless the bricks are thoroughly wet you stop the formation of silicate of lime, and might as well lay your bricks in mud. Lime and sand, after being mixed, might lie two years with advantage, and for certain uses, such as boiler setting, or where the whole structure of brick and mortar is to be dried, the mortar ought to be mixed for one year before use, and two would be better; but for house building, if the bricks are so wetted as not to rob the mortar of its moisture as soon as used, mortar that has been mixed a month will form good, solid silicate of lime among the bricks it is laid with in ten years, and will be still harder in one hundred years. The practice of mixing mortar in the streets and using it at once is as foolish as it is ignorant, and would be no improvement.—*The Mechanic.*

Painted Floors.

THAT carpeted floors are harborers of disease is a question which, to those who have been placed in position to fully investigate, has but one side; and since some of our leading journals have called to mind long arrays of unquestionable authorities proving that carpets, however clean and free of dust apparently, give off at every step or movement infinitesimal germs of lung irrants, the people seem to have indorsed the theory, and in many a fine house carpets have given place to Eastern rugs, which, occupying a central position, leave a fine opportunity for the painter to display his taste in decorating the intervening space between the rug and wainscoting. It will, however, place the work and imperfections of the carpenter more prominently before the people, inasmuch as the floor, being constantly exposed, must be made smoother and of better lumber than often finds its way into the floors of our houses, for when the floors were entirely covered with carpets, damp, unseasoned lumber or timber, or the same affected with dry rot, could be used, and the occupants be little the wiser for the deception; but now the floors must be of good lumber and nicely fitted, else the painter, whose work supersedes that of the carpet-layer, will not accept the floor as the carpenter left it, for his work, being on top, he will be held responsible for its appearance forever afterward.

If this change in fashion brings about this revolution in floor-making, the change will have another argument in its favor; for others, as well as we, have seen damp, unseasoned lumber put in floors, which in turn were laid upon the joists of the same or even worse quality, and then a carpet covered over all. The poor inmates were thus compelled to breathe the moisture of seasoning lumber after it was filtered through a carpet, which tended to render it still more unhealthy, and hence we are of the opinion that carpets are responsible for much less disease than charged with; nevertheless, we are decidedly in favor of the rug system of covering floors, for the reason that it is much more economical, it is hygienically and otherwise a very wise plan, besides the facility of often removing and thoroughly shaking the rugs, without employing a lot of workmen to take up, and beat and put down again. It looks as though carpets, like the Chinese of the Pacific slope, "must go."—*The Manufacturer and Builder.*

AN exchange says: House building is a trade of itself, and a very complicated one, too, requiring not only a large experience and good credit, but also the possession of a discriminating judgment to pass upon the relations existing between demand and supply, the condition of the labor and material market, and the falsely excited or unduly depressed style of reality in particular localities.

Shingle Roofs.

THE form of roof known as a shingle roof is one of the greatest antiquity. When it originated or by whom invented history fails to tell us. It is probably one of those things of natural growth which never had a definite beginning, but came up by gradual steps of improvement from a very primitive form to its present shape. Reasoning by analogy, it may have originated in an attempt to imitate the feathers of birds, which shed water in a most remarkable manner. Its prototype is also found in the arrangement of leaves on certain trees. It may have been preceded by the thatch and some forms of bark roofs, and those have come into use as an improvement on a still more primitive type. Shingle roofs may be described as pioneers in roof construction. When timber is abundant a shingle roof is one of the cheapest that can be constructed. Its lack of durability in a comparative sense, and its frequent destruction by fire, make it less desirable than other materials; accordingly, as lumber becomes scarce, as house owners become wealthier, and as buildings improve in character, shingle roofs give way before material better adapted to stand the test of time employed in the newer sections of the country than in the older, and the use of shingles upon roofs is to a certain extent an indication of the class of buildings that are being erected. As pine timber becomes scarcer, and as prices for shingles gradually advance, their use in this country is likely to be more and more restricted until it is possible that in this country, as in England, the time may come when their employment will be the exception.—*Carpentry and Building.*

Boxwood and the Demand.

IT seems that the rapidly increasing use of roller skates has a marked effect on the price of boxwood, especially on the kinds most in favor for rollers. A dealer in hardwood recently gave a reporter of the *Sun* some interesting points in reference to the trade. If the facts accord with his statements, there are likely scores of enterprising dealers out of all patience with themselves for their failure to institute a corner in the stuff when the opportunity was at hand. "The roller skating mania has completely exhausted the market of a certain size of boxwood. Less than eighteen months ago I could sell a ton of three-inch boxwood for $38.00, and it would be a first-grade in every respect, and admirably suited for turning small work. The demand then was steady, and the principal consumers of the wood were rule makers, tool manufacturers, and turners who supplied the market with boys' tops, pool-pins, and toys of various sorts.

"The sudden and remarkable growth of the roller skating pastime has created a constantly increasing demand for a certain size of wood, and now it is impossible to purchase a ton of suitable wood for skate wheels for $120. Rollers are made in several sizes, ranging from 1⅝ to 2⅛ inches in diameter, and only the natural growth of boxwood approximating these sizes is fit for use. Large wood is too costly, and is less firm in resisting the tremendous strain of a skater's weight upon an axle only 7-32 of an inch in diameter. The boxwood grows in Persia and Turkey, and heretofore the crop has been handled in England. It is a wood of very slow growth, and in its native country stringent timber laws restrict the depletion of the growing trees. At the present rate of consumption, the world will be practically exhausted of its boxwood in less than twelve months unless some equally cheap and durable substitute is found to take its place."

Referring to substitutes, he said that rubber, celluloid, rawhide, vulcanized fibres, and compressed paper have been tried for making rollers, but for one reason or another have proved unsatisfactory; some have proved too soft, while others, like the pure celluloid wheels, have been found too expensive for the trade, and the necessary metal bushings have proved objectionable, because the grit and dust from the floor and the shoes of the skaters, wearing between two metal surfaces, have rapidly cut away the axles of the skate. Rollers with anti-friction bushings, consisting of a number of small steel plugs freely revolving around the axles, have been tried with some composition wheels with success, but they are very expensive, and on this account cannot come into general use. Other woods have been used, such as dogwood, apple, pepperidge, laurel, and lignumvitæ, but have for the most part been rejected. The lignumvitæ alone is hard enough, but it will not stand the strain of the small axle. Metal wheels having a surface of rubber are made, but nothing has yet been found which in all respects is as good as boxwood.—*The Mechanical News.*

Don't Botch a Job.

DON'T botch a job just for the sake of getting it done quick. You cannot do an hour-and-a-half job in sixty minutes and do it right. Some bosses think it is possible and are always trying it. Just take things easy and make your brains save your hands. Take time to get ready before you begin and you will get done before you know it. We do not mean for you to stand around talking about a job. Some men will talk about it longer than it takes to do the whole job. If you are intending to glue up a lot of pieces of board, it pays to look up your hand screws before the glue is put on. A man who gets the screws ready by opening them just the right distance and trying them to see if they work all right, will get done a good deal quicker than the one who gets his glue on, rubs the joint together and finds he lacks two screws. While he is running around to each machine in the shop, looking for hand-screws, the glue gets cold and the joint will not come up. He must wash the joint in hot water, wipe it all clean and then begin over again. If this man had begun right, he could have glued up two joints while he was doing this one. It is a common trick of hand-screws to get lost. They stray away and get covered up under lumber, shavings and fire-wood. Nobody ever took a hand-screw from its place, but it will be found just where you never think of looking for it. You may be sure of finding one or two at every machine in the shop, but you can't find the man who put them there. It is about like the story of the bull which jumped aboard a boat and chewed off the hay rope. The question was, "Did the bull steal the boat, or the boat carry off the bull?" The hand-screws have been carried off or they have run and hid.

If you have got a lot of good hand-screws, take good care of them. Do not leave them screwed up tight any longer than you can help. If you put them on a job during a dry day and a rain comes on, it is all you can do to start those screws, and they are strained unnecessarily. Oil your screws with a good fixed oil and then rub them full of plumbago or black lead. Just try it once; it makes them work nice and the weather does not affect them as much.

One of the most aggravating things that can happen is to have the doors opened while you are gluing. You get nicely at work, the glue just right, the stock well warmed, and begin to set up the joints. Just then the outside doors fly open and a team backs up with 1,000 feet of lumber, or the elevator well is opened and 10,000 cubic feet of cold air come up to see how you are getting along. If you intend to do much gluing, just build a room for that alone. Keep it at a temperature of 90 or 100 degrees and you can make good glue joints. There is one example that seems rather paradoxical in regard to gluing in the cold. In heading mills where barrel heads are made, the heads are pieced up with a coarse circular saw, rubbed together and set one side without clamping. All this is done in a temperature ranging anywhere from 15 degrees below to 60 above zero. Very few heads come apart at the joint, although they are all run through a pony planer and the paring-in machine.—*Exchange.*

THE *Builder and Woodworker* says that "among the unfortunate things of our times is the fact that in all branches of industry, as a rule, the workman has only an ordinary degree of skill. He plies his labor as the routine of his work compels, forgetful of the fact that the man of efficiency is marked, and when changes occur he is the one who is retained or advanced as the exigencies of the times demand. As our industries progress, new fields are opened, and the skilled workman is prepared for the emergencies of the hour that bring him a more remunerative labor. There is no need to question possibilities with reference to labor, for certainly its opportunities are without limit. Let every workman master his trade thoroughly and well, for the reward of so doing is not only in self-aggrandizement but in the strength of character that separates manhood from puerility."

Skin-Plumbing and the Architect.

IN discussing the question of plumbers' profits, my sole aim is to agitate the question to the end that good plumbing will be the rule,—not, as now, unfortunately, the very rare exception. Our societies throughout the country are doing a grand work in educating the master plumber to a just appreciation of the importance of his profession, and his responsibility for the health of his patrons; but, in order that we may have good plumbing, the architects' and health department's assistance is of the first importance; without their aid, the profession will ever remain what it is, —a fat, lucrative, healthy (for himself) business for that conscienceless thick-skinned humbug, the skin-plumber,—a fit subject for the sneers and jibes of every alleged joker and would-be smart Aleck. I have never—and I say it with deep regret—been in any society, large or small, where the name of plumber happened to be mentioned but that some one felt called upon to relate his or her experience with the plumber, and how he or she had been treated by that worthy object of their admiration. After very nearly twenty years' knowledge of, and acquaintance with, my fellow craftsmen, I am sorry to say that our bad name is not entirely undeserved. No doubt that deserving object of our consideration, the skin-plumber, sees nothing in all this but a joke; he is quite satisfied indeed to allow jokes or any remarks to pass at his expense, provided, however, there is prospect of an opportunity to retaliate in his own peculiar way; he will double the dose the next time. Give them something real to talk about, to sharpen their wits on; he don't believe in having folks trying to bother their brains about some imaginary wrong-doing of the poor, persecuted plumber. Oh, no! he'll see to it when his turn comes that the joker pays the piper.

Well, how far can the architects help along this good work,—ridding the plumbing business of that "snake in the grass," the skin-plumber? In this way only,—that any master plumber, unknown to them, seeking to figure in their offices, must show good and sufficient proof of ability and honesty in work already performed, from the owners of such work, who have had five year's trial of said work. If the plumber is a beginner, then he must show from his former employer that he is incapable of doing a skin-job, that he has a just pride in his profession; in a word, that he is an honest man. Architects are all interested in, and desirous of having, good plumbing work done. There is no architect who would knowingly employ or give countenance to a skin-plumber who desired to estimate in his office. Why then not insist on having proof, the only proof that counts for anything in regard to plumbing? During the construction of a job of plumbing, or the "roughing in," very few architects can judge intelligently or pronounce conscientiously on a suspicious looking job. It has to be seen with a plumber's eye, if the skin-plumber's practices are to be prevented during construction. A good thorough job is always surrounded by evidences of its completeness; it requires no expert to judge of its merits. But the skin-job, that's the sticker for the architect, to avoid which their only remedy is, select the plumber whose estimate bears evidence of his intention to live up to the specifications, and whose record is proof of his ability and honesty. The average superintendent, or owner, might just as well be superintending a surgical operation, with a view to directing it in all its nice details, as a plumbing job; he knows as much about one as the other. There is a similarity in the comparison, and a very deceiving one. Both the plumbing job and surgical operation may appear all right on the surface, but away down that little something remains undone, which, to the uneducated, botch-plumber, or unskilled physician matters little. But the plumbing doesn't work; the wound doesn't heal; both jobs have to be done again at greater expense and exceedingly more suffering than in the first instance. Then, I say, let the plumber give proof, as the doctor is required to, of skillful and honest practices, or let his practice be so very limited, for the want of something to do, that it will not be necessary for those who are tempted by his only means of getting work (low figures) to be deceived in him. He will then be like the shyster of any profession,—he can be known at a distance.

As I consider that the health department has most to answer for, for bad plumbing, I will leave consideration of its account to a future letter.—*Martin Moylan, in Sanitary News.*

If the reports that are current on terra cotta lumber are true, it seems almost a mystery that it is not manufactured on a more extensive scale. We are told that saw-dust mixed with common clay, pressed and baked, gives the desired product, which admits of nearly all the uses to which true lumber may be put, besides being fire-proof. Would saw-dust, now too often looked upon as a nuisance, not form an important item in the market if it could be utilized in this way? Or is lumber so plentiful yet that we can ignore the utilization of the waste incident to its manufacture? When statistics tell us that the northwestern lumber region alone produced during the past year the tremendous quantity of about 2,534,300,000 feet of lumber, 1,059,000,000 shingles, and about 630,100,000 lath, we may well pause and ask how long the supply will be able to meet the constantly increasing demands.

The utilization of the waste products has always been one of the most important sources of income to any industry, and the near future may demonstrate conclusively that lumbering will no longer be an exception to this rule, that attention must be paid to the enormous waste in its production, and that some means will have to be devised to either prevent or utilize it. Gas making from saw-dust awaits further development, terra cotta lumber may serve in this connection a two-fold purpose, and many other inventions will be made as soon as the necessity for such a thing is felt throughout the country. Perhaps lumber is too cheap at present in its original cost, but it will not be like that forever; as the most available portions of woods are cut down, the more inaccessible parts will necessitate larger expenses to bring them to market, and the question of "waste" will assume prominence in proportion to this increased cost, and saw-dust may yet prove one of the most important items of profit to the lumber industry in a similar way as the "gas liquor" of gas works, which the manufacturers did not know how to dispose of thirty years ago, now pays them larger profits than any of their other products. —*The Lumber World.*

Never stand at the foot of a sick bed and survey the patient. All figures loom large to fevered eyes, and by the side of the bed are only partially seen, and do not annoy with the sense of too much presence. Do not open the door very slowly, for then the attention is strained, speculating as to who the next comer can possibly be after all this preparation and with such cautious approach. Low but clear tones, quiet but sure movements, and rapid, rather than slow, are a great relief to any patient who is blessed with a practical nurse. Whispering is torture. Silence is best until you can discuss matters in another room; but if you speak, speak out, and make no mysteries about anything. In severe illness the nurse must watch her patient steadily, but not seem to be looking. In convalescence it frequently soothes the invalid to have the nurse seated at the window, apparently looking out. This frees the faculties from the tension that the sense of being watched usually gives.—*Hall's Journal of Health.*

Choosing Hand Saws.

STIFF blades are made of better material than thick ones, and are less liable to "buckle" or "twist," and are not so apt to break. They require less set, will stand an edge longer, and are not so tiresome to work. They should be hung in plain beech handles with rivets flush or countersunk. The blade should be of a dark color and have a clear bell-like ring when struck with the ball of the finger. Blades of a light iron-gray color are not so good. Never take a saw that jars or trembles in the handle. The first point is to grasp it by the handle and see that it *hangs* right, and that the handle fits the hand properly. Then try the blade by springing it and see that it bends regular and even from point to butt. See that it has a good crowning breast. Hold it at a distance and get a proper light to strike on the blade and you will see if there is any imperfections in grinding or hammering.

THERE should be less pride felt in peculiarity of employment and more in excellence of achievement.

Piece Work.

As a rule the man who is employed at piece-work, excepting in those trades where, from the nature of the work, it is habitual and general, is more spasmodic and less regular in his work than the day worker; he frequently runs himself aground, and then he uses stimulants to assist him in keeping up the speed. He can often take an hour or a day, and by dint of driving will contrive to make it up, at least in part, during the rest of the week. This kind of work is not a fair test of a man's abilities; what is wanted is a fair average day's work, taking one day with another all through the year. Piece-work, as a rule, will not give this. If an engine-driver lingered on some part of his journey and then forced his engine at high pressure over the other part, he would be regarded as a dangerous and reckless fellow, to whose care the lives of passengers should not be intrusted. Regularity is required, as well as speed, in all trades and occupations, for the moral in the fable of the tortoise and the hare is as applicable in the case of labor as it is in every other department of life.

Again, when the price of a certain job is fixed on the piece-work principle, the employer usually takes the quickest workman for his sample and test, and calculates the price accordingly; by this means he tries to fix a maximum price for the worker, the less expert workman falling below that price in proportion to his lack of power to compete with the strongest. This seems fair enough on the face of it, but it is not so fair as it seems, for the strong man will *tax* his strength to earn as much as he can, while the weaker will *overtax* his in order to compete and to enable him to earn anything like decent average wages.

It is the old tale, after all, of the employer's trying to fix a maximum wage, and the workmen trying to fix a minimum; if employers are justified in seeking the one, the workmen are equally justified in trying to enforce the other. Moreover, by means of piece-work, employers are often able to cause wages to fluctuate—with a tendency ever downwards; for if a man earns a few shillings over the current wages of the district, the conclusion usually is that the price paid is too high and must be reduced, hence an effort is perpetually being made to lower the wages. Again, each man is more isolated, and as a consequence weaker, and therefore more likely to be compelled to accept the reduction because he is detached from his fellows. This is the secret of some employers' love for piece-work, and of their desire to enforce it whenever practicable; and this is precisely the reason why the workmen strive to restrict it, as far as possible, within the narrowest limits. The mode of fixing the price is one great obstacle to its universal adoption; another is its inapplicability to many of the industries of the country.

Another evil in connection with piece-work is the tendency to "scamp" the work; the chief interest a man has in his work is to get it done, and receive the wages; beyond that his interest is *nil*. This is the reason why all the best work is done by the day, skill being more requisite than speed—the man has time to finish his job in all those small details which make true workmanship, and distinguish a real work of art from the ordinary productions of the workshop. It is useless to talk about a man's pride in his work; he will take as much pride in it as he can afford, neither more or less; if art workmanship be required, it must be paid for; time is often the equivalent of skill; if the former be denied, the latter cannot be effectively exercised.—*Carpenter.*

Paint for Protecting Roofs.

THERE are frequent inquiries about the use of coal tar paints for roofs, and all over the West parties are patrolling the villages with their stink-pots of coal tar, and swabbing every roof they can gain access to. I have had twenty years' experience in the use of coal tar mixed with ground slate, iron ore, mineral paints, and the so-called asbestos—all about alike—and I know what I am talking about. They are unfit to use on wood or tin. They will cause wood shingles to crack and curl, and tin to corrode. A gentleman of utmost reliability has just told me that two new shingle roofs were last fall covered with a preparation of coal tar, petroleum and ground slate, and they are ruined—the shingles have curled up, and the owners are preparing to new-roof the buildings.

To make a desirable cheap roof paint, take four pounds yellow ochre, one venetian red, and add a little white lead and a very little lamp-black—the last two ingredients to improve the color simply—and mix with raw linseed oil. The lamp-black should first be mixed or ground in a little oil so as to mix smoothly with the rest. This will make a durable paint, costing less than seventy cents a gallon at the present price of oil, and can also be put on with a good whitewash brush, or a wide flat brush costing about seventy-five or eighty-five cents.

However valuable coal tar may be for some uses, it is not fit to be used on shingles, or wood exposed to the sun or weather.—*Charles Betts.*

THE AILANTUS.—Many complaints have been made of the overpowering and offensive odor of the flowers of the ailantus trees planted in the streets of Paris and other large cities. According to M. E. André, it is only the flowers of the male trees which exhale this unpleasant scent, and he recommends that none but female trees should be for the future planted in public or other places where the peculiar odor of the males might be offensive. This would seem an important point for Americans and others who plant the ailantus largely as a street tree.—*Woods and Forests.*

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C.—R. Morton.
$2,250.

Polk, bet. Eddy and Turk. Two three-story frames.
O.—Hohn & Saxtorph.
A.—Wm. Schrof.
C.—Day's work.
$11,500.

Sutter, nr. Franklin. Two three-story frames.
O.—Mrs. A. Lezinsky.
A.—J. Marquis.
C.—L. Wagner.
$20,000.

Beale, nr. Market. Four-story brick.
O.—Hobbs, Wall & Gilmore.
A.—Percy & Hamilton.
C.—Maw'n, — Cox; carpenter, — Fletcher.
$26,000.

Main, nr. Market. Four-story brick.
O.—Hobbs, Wall & Co.
A.—Percy & Hamilton.
C.—Mason, — Cox; carpenter, — Fletcher.
$27,000.

Montgomery Avenue, cor. Broadway. Alterations.
O.—L. Duterit.
A.—Huerne & Everett.
C.—J. McCann.
$1,800.

Ellis, bet. Powell and Mason. Three-story and basement.
O.—W. J. Turndal.
A.—H. D. Mitchell.
C.—R. McCann.
$10,000.

Broadway, cor. Mason. Three-story.
O.—A. Garrigan.
A.—T. J. Welsh.
C.—J. L. Binet.
$6,000.

California, No. 104 (rear). Additions.
O.—Parrott Estate.
A.— — Raun.
C.—Butler & McGowan.
$1,500.

Washington, cor. Spofford Alley. Four-story frame brick basement.
O.—Masson Bros.
A.—B. E. Henriksen.
C.—W. Kreyer.
$12,300.

Eddy, cor. Octavia. Two-story frame.
O.—A. Kutner.
A.—Schmidt & Havens.
C.—P. Crichton.
$12,000.

Dolores, bet. Twenty-third and Twenty-fourth. Two-story frame.
O.—W. S. Davis.
A.—Schmidt & Havens.
C.—I. N. & J. G. Day.
$4,500.

Valencia, nr. Twenty-sixth. Two two-story frames.
O.— — Schumacher.
Day's work.
$6,000.

Clay. Two-story frame.
O.—Mrs. Fuller.
A.— — Copeland.
C.— — Prodgers.
$5,000.

Folsom, bet. Twenty-fifth and Twenty-sixth. Two-story frame.
O.— — Potter.
Day's work.
$3,500.

Stevenson, bet. Eighteenth and Nineteenth. Additions.
O.—P. Boyhen.
A.—M. J. Welsh.
C.—A. A. Newbert.
$1,500.

Guerrero, bet. Nineteenth and Twentieth. Two-story frame.
O.—Thos. Neary.
A.—M. J. Welsh.
C.—Buckley & Bergman.
$3,500.

Larkin, nr. California. Two-story frame.
O.—W. W. Stow.
A.—Schmidt & Havens.
$10,000.

Page, bet. Pierce and Scott. Two-story frame.
O.—Jacob Petersen.
A.—M. J. Welsh.
C.—W. Fitzpatrick.
$3,300.

Jessie, bet. Eighteenth and Nineteenth. Two-story frame.
O.—M. McQuade.
A.—M. J. Welsh.
C.—Doyle & Grace.
$3,000.

Buchanan, cor. Ivy Ave. Two-story and basement.
O.—William Murz.
A.—R. R. Warren.
C.—Hatfield & McRea.
$3,800.

Geary, bet. Jones & Taylor. Three-story frame, brick basement.
O.—P. Gordon.
A.—R. R. Warren.
C.—Batemen Bros.
$6,000.

Fifth Avenue, bet. Harrison & Bryant.
O.—E. Sharkey.
A.—R. R. Warren.
Day's work.
$3,500.

MISCELLANEOUS.

San Rafael—O., H. Logan; A., T. J. Welsh; C., Kill & Hobson; $6,000.

Woodland—O., Geo. St. Louis; A., T. J. Welsh; C., Thompson & Co.; $5,000.

Eureka—First Section Eureka Court House. A., Curtis & Bennett; C., — Simson.

Oakland, Tenth, cor. Oak. Two-story frame. O., J. M. Buffington; A., G. A. Bordwell; C., Gray & Stover; $9,000. One-story frame. O., Baptist Church; A., W. G. Copeland; $4,000.

Napa—Two-story frame. O., Capt. Pinkham; A., J. Marquis; $4,000.

St. Helena—Two-story brick. O., Odd Fellows Hall; A., A. Schroffer; C., G. Kennedy; $16,000. Two-story basement. O., R. H. Sprott; A., A. Schroffer; $5,000.

San Jose, Stockton Avenue. One-story frame. O., J. Bergstrom; A., J. O. McKee; C., J. C. Clinton; $1,700. Third, cor. Julian. Two-story frame. O., J. Rinaldo; A., J. O. McKee; C., Vincent & Drew; $5,000. Two-story frame. O., J. Stock; A., Lenzen & Son; C., E. A. Van Dalsen; $9,000. Two-story frame. O., J. Tulley; A., Lenzen & Son; C., J. M. Martin; $2,362. Two-story stable. O., C. W. Breyfogle; A., Lenzen & Son; day's work; $1,500. Two-story frame school-house (Hester School District). A., Lenzen & Son; C., H. C. Skow; $11,086. Improvements at Fair Grounds. A., Lenzen & Son; $1,600.

Woodland, Main Street. Two-story iron and brick; five stores and hall. O., T. M. Prior; C., Iron, Woodland Foundry; brick, D. R. Scott; wood, Glen & White; tin and plumbing, P. W. Burns; $25,000. Main. Two-story brick. O., J. J. McIntyre; A., T. J. Welsh, C., S. Caldwell; $6,000. Two-story brick; O., G. C. St. Louis; A., T. J. Welsh; C., Henderson & Co.; $6,000. One-story frame improvement. O., Capt. W. H. Wood; C., Gilbert & Son; $1,500. College Ave. One story frame. O., Thomas Armstrong; C., A. Blake; $1,000. First. Two-story brick improvement. O., A. D. Porter; C., Glen & White; $1,200. Second. One-story frame. O. and B., S. Caldwell; $2,000. Fourth. One-story frame improvement. O., Mrs. E. R. Moses; C., D. F. Myers; $1,000. Fifth. Two-story frame. O., A. and B., W. E. Perreau; $4,000. North. One-story frame. O., M. Autzen; $1,000. One-story frame improvement. O., Dr. Grigsbey; C., J. Caldwell; $1,000. First. One-story frame. O., Robert More; C., Stamp & Myrick; $1,200. College Ave. One-story frame. O., W. L. Manor; C., Poole & Sears; $1,000. One-story frame. O., W. D. Holcomb; A., T. J. Welch; C., W. H. Winne, $2,000. East Ave. One-story frame. O., A. Merit; $1,300.

Winters—Wolfskill, cor. Second. One-story frame improvement. O., George Johnson; $1,600. Two-story frame. O., H. C. Goodyear; C., Ritchie & Ward; $1,500. New Railroad Depot, C. P. R. R. Company; $1,000.

Madison—Two-story frame improvement. O., George Stevens; C., R. B. Nisson; $1,500.

Capay—Frame Church; day's work; $1,500.

Stockton—Two-story and basement. O., Chas. Belding; A., W. G. Copeland; Day's work; $15,000.

Niles—Building for California Nursery Co. A., Lensen & Son; C., S. W. Easterday; $3,150.

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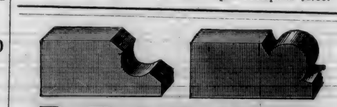
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Advertisements alone inserted that refer to materials used in the construction and furnishing of houses, and to matters and trades belonging to the building interest.
NO OTHERS RECEIVED.

Monthly Summary of Building Improvements.

A larger number of buildings have been erected during the past month than for any other similar period on record.

WE hear of dullness in every branch of business excepting those that are directly connected with the building interest. The glorious showers since the first of the month have caused even the merchants to put on a more happy look, while the mechanics' faces fairly beam at the prospects ahead.

We have made many inquiries in regard to the *real cause* of the building boom, but confess we are not satisfied with the answers received. Many attempt to explain that it is owing to the low price of building materials—not a satisfactory answer as we can prove. The price of lumber is, at the time of writing, $15.00 per thousand for rough, and $30.00 for surfaced.

In the flush times of the lumber pool, the prices were on the list $21.00 and $40.00. Now forty thousand feet of lumber will be sufficient for quite a large size dwelling. Allowing half of that amount for rough, and the balance for surfaced lumber, it would only make a difference of

THREE HUNDRED AND TWENTY DOLLARS

In first cost of lumber on a house worth probably $10,000. Most assuredly not enough to cause an owner to erect a building, merely to save difference in lumber between cheap rates and pool rates.

Again, hardware is now fully 20 per cent. higher than it was one year ago. Plastering is worth 2 cents a yard more now; with the exception of bricks, there is no article—wages included—that is not as high, and in many cases much more costly than they were in the closing months of 1884.

If it was the low price of building materials alone that keeps up the boom, every one would have used their greatest endeavors to build when the price of lumber was actually below the cost of manufacture, viz., $12.00 per thousand; the erection of buildings would have proceeded very briskly for a month or two, and then come to a sudden cessation. But

MONTH AFTER MONTH

There has been an average of four new buildings started for every working day in the month; and this average has been maintained for *seven consecutive months.*

Again, it has been stated that the low rate of interest allowed by the savings bank has induced many to put their savings into real estate and improvements thereon. A careful inquiry at the banks does not show this to be the case during the past month. The number of depositors still is on the increase, while the amount drawn is not in excess of the average.

We think the true cause of the boom lies in the fact that there is a

STEADY GROWTH IN THE POPULATION

Of this city. Manufactories have largely increased in number for the past few years, and have been the means of largely increasing the number of steady inhabitants. The cable lines are exerting a beneficial influence in keeping residents on this side of the bay. Our "glorious climate" attracts numbers from the East, who come for a spell, and then are so pleased at our resources, that they invest in our real estate as offering superior inducements for large profits. The main growth of the city is in the neighborhood of the Park

AND AT THE MISSION.

There are less vacant houses to rent at the Mission than in any other section. There is a beautiful valley facing the Industrial School that needs but one thing to make it the most thickly settled part of the city, and that is

CABLE CAR ACCOMMODATIONS.

From Twenty-sixth Street out to the county line, the distance should be traveled by means of a cable line. The speed from Twenty-sixth could be made much greater than from that point to the ferry. Cars should also be run from 5 o'clock in the morning, to enable workmen of every occupation to be at their work on time. Again, the price of tickets should be reduced to

SIX FOR TWENTY-FIVE CENTS.

If the above suggestions were carried into effect, we think that hundreds now going across the bay on account of cheap rents would locate on this side, and save much of the time now consumed in a trip by rail and boat of five miles and over.

SUMMARY.

During the month ending the tenth of April, there have been commenced in this city the very large number of

178 BUILDINGS, OF THE VALUE OF $1,221,045,

By far the greatest in number and value ever recorded for one month. To summarize:—

158 frame buildings—value	$718,095
2 brick " "	451,500
18 additions	51,450
178	$1,221,045

San Francisco Chapter American Institute of Architects.

THE regular monthly meeting of the Chapter was held in its rooms on Friday evening, April 3d. In the absence of the President, H. C. Macy occupied the chair.

The following report was received from the committee on classes:—

To the San Francisco Chapter of the American Institute of Architects:—

GENTLEMEN: Your committee, the teachers

of the architecture classes of the San Francisco Chapter, beg leave to submit the following report:—

They regret to say that, from unavoidable causes, two of the three classes which have been in progress for the current year have been suspended for the present, and it is thought unadvisable to resume them until some more satisfactory arrangements can be made in regard to them than is at present possible. The class in drawing is still maintained, and will be until further notice. The attendance on the classes has not been as satisfactory for the present year as could have been wished. Those who do attend, however, are tolerably regular and very diligent in their work; all are making commendable progress and are acquiring greater accuracy and better knowledge of their work.

To secure success in these classes it is thought that much would be gained by having a room properly appointed and furnished, in which the students could feel at home, and which could have the various conveniences not possible in a private office, such as, for drawing, good lighting, abundant space, and a good supply of models, copies, etc.

For the mathematical class, blackboards, proper apparatus for calculating strains, testing model girders, model bricks, and other model building appliances.

For the architectural class (practical), such plates, paints, drawings, and models as may best serve the important interests to which this class is devoted.

For all, proper periodicals and publications, which, being provided for the students, might engage their attention and broaden their ideas on matters of unusual interest connected with the profession.

The above are the views of only one member of the committee, the others not having reported. Respectfully submitted,

G. H. SANDERS.

The above is also endorsed by John Gash.

Report accepted, and ordered to be spread in full on the minutes.

A voluminous report was received from the Parent Chapter in regard to the supervising Architect of the State Capitol at Washington. A committee of three was appointed to thoroughly investigate the subject and report at the next meeting. The president appointed as such committee, Fellows John Gash, T. A. Eisen, and R. H. Daley.

The Committee on Indentures presented a full report, including two different forms of articles of indenture for apprentices. Report received and action thereon postponed until next meeting.

Mr. Gash read an interesting paper upon the subject, "THE SQUARE AS A FACTOR IN ARCHITECTURE AND GEOMETRY." Thanks of the Chapter were tendered to Mr. Gash for his able effort, and the paper was ordered printed in full in the CALIFORNIA ARCHITECT AND BUILDING NEWS. [It will be found in another column of this issue.—EDS.]

Men That Are North Winds or Western Gales with a Notification to All to Lie Low.

"HERE, there, don't you give but four blows to send that 8-penny nail home;" and then, without stopping to see whether the confused workman gives one or a dozen blows to drive the next nail to its head, the RUSHING (?) FOREMAN stumbles over a bunch of shingles in his hurry to tell another man—"Better file your saw sharper so you won't be all day cutting that *jice*."

Another workman who has just finished a 3-inch mortise through a very tough pine knot, and whose perspiring brow proves that he has been hard at work, happens to be met while, for a few seconds, he is wiping off the perspiration, with—"You going to stand there all day doing nothing;" and before the astonished workman knows who has spoken, the RUSHING FOREMAN has disappeard around the corner of the building.

Foremen of this character are extremely obnoxious to workmen. Beginners or apprentices are made so nervous that, for some little time after the suddenly spoken words, they are unable to do anything, and, in many cases, it takes half a day for them to regain their equilibrium. Old stagers, however, are worthy of attention by a looker-on after the visit of a cyclone foreman. We have carefully examined the different phases of character as presented in our various phrenological journals but we have failed to observe one that adequately expresses the mingled contempt, hate, go-to-the-devil look, that overspreads the countenance of the true mechanic. The plans of the latter are entirely upset by the unwarranted remarks of the foreman. But the greatest evil befalls the apprentice, for he is led to believe that a great noise and show of work is all that is necessary to please the boss; and so nails, in rustic or flooring, are sent home with three blows, utterly regardless that the head of the hammer makes many indentions in the wood, which, before painting, must be smoothed off, thus giving treble work, simply that the term *rusher* may be applied to their names.

Another great trouble with the kind of foreman under consideration, is his inability to give explicit directions just how he wants to have work finished. His mind is so intent on having all the work going on at a locomotive gait, that he turns from the boss of the framers before he has explained his wants, to tell the roofers what he wants done in their line; and then with a hop, skip, and jump, he is up in the second story trying to show the workmen there how partitions are to be set; then while gently mopping his forehead with his shirt sleeve, he prides himself upon his ability to give distinct orders, if necessary, to twenty different men in as many minutes.

The rushing foreman also inculcates another bad habit among the workmen. While he is around, the men feel strung up like a newly wound clock, but when he is away, a natural relaxation follows, and a positive don't-care-if-I-don't-work feeling is experienced, that, in a short time, becomes a habit, and, necessarily, leads spectators to exclaim, "That gang of men needs watching."

A few such foremen as we have described may be found in this city. They command no respect from the men under them, and, as a rule, they do not get as much work done as a man who is less noisy and demonstrative in the method used to have every workman know just what is to be done and the time necessary to perform the same.

Cause of the Depreciation in Our Lumber Market.

IT is a source of no little inquiry among our people as to what has demoralized the lumber trade during the past six months. As is well known, there existed for some time previous to the late break in prices, a combination among manufacturers to regulate prices by limiting the supply. The California market will consume annually 150,000,000 feet of redwood lumber. To supply this demand each manufacturer was allowed a certain quota, to be shipped to San Francisco, all the redwood lumber arriving in that port being, to all intents and purposes, sold through the agents of the combination. Last fall it was found that at least 20 per cent. more than the market would take would be produced the coming year, and it was proposed to reduce the quota allowed each manufacturer 20 per cent., and thus hold the market at the figure which had prevailed for two years past, giving the mill men good profits and enabling them to employ a larger number of laborers at good wages, thus making business lively in all the lumber regions. Several of the Mendocino lumber manufacturers refused to accede to the 20 per cent. reduction of their quota, and sold their lumber under the combination price, and thus the market was broken. Others in the association said, "Well, it is now every man for himself;" and the price has been gradually getting lower and lower, until now redwood lumber is being sold in San Francisco at less than the cost of manufacture and transportation. It is claimed that this state of affairs can be but temporary, and matters will sooner or later come back to a legitimate business basis—with some manufacturers many thousands of dollars out of pocket. The best informed manufacturers of lumber tell us the demand is quite up to the average, and if it had not been for the circumstances above related, the lumber trade would now be as good as it has been at any time within the last three years. There is a slight dullness at present in the foreign demand for what is known as large, rough, clear, suitable for export. This latter is a branch of the redwood lumber trade, which is supplied almost exclusively by Humboldt County, and renders her manufacturers independent of the home market to a considerable extent. Our lumber dealers feel the effect of the temporary depression in the California market, but take a hopeful view as to a readjustment of prices and better times.

MODERN FLATS.—ELEVATION OF A DESIGN COSTING $4,500.

Strength of Materials.

It is possible, indeed it is probable, that man in the pre-historic ages was endowed with a superior and peculiar mathematical faculty, enabling him, without figures or geometric formula, to estimate cause and effect better than we. Again, the power required to elevate these gigantic stones to position in their temples seems at first glance to leave all our system of craner and other hoisting appliances far in the rear in point of power and efficacy, but when we take into consideration the facts proved by modern geological research, that the sites where these massive models of antique architecture are found, show unmistakable evidences of being once occupied by hills, the problem is not so difficult of solution, inasmuch as there are many reasons for concluding that before the foundations were laid, a lofty hill was selected, hollowed out, and the entire edifice, with i s massive lintels and domes, was erected on the inside; thus the heavy and light substances were elevated by means of the hill's incline, taken to the top, and from there placed in position, and when the structure was completed, the hill was raised, and the building appeared as represented to-day in the crumbling mass of ruins found throughout Egypt and Asia Minor.

Again, architects who have had the good fortune to visit these places have wondered at and admired their arches, placed in position at a time when levels, squares and equilibriums were supposed to be unknown, and the laws of frictional contact and pressure unheard of. At the present time their investigations are conducted with the greatest difficulty, notwithstanding the fact that the most eminent mathematicians of the age have striven to render the solution easier by introducing certain pre-supposed conditions; thus, in the published treatise on nearly all their architectural theories, from the standpoint of the mathematician, the structures of arches and curves are regarded as consistng of *courses of stones* resting on the abutments, and carrying a load which is supposed to press only in the direction of their imaginary lines. Then, again, cohesion and friction are often entirely ignored in the calculation of pressure and strength of the materials used; in short, many investigations are conducted upon the supposition that the materials could slide freely upon each other.

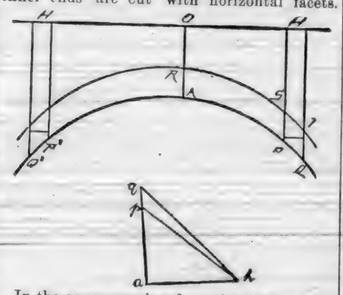
It has been proven, to the satisfaction of the more advanced school of architecture, that if the line of pressure of one stone against another, for instance, cross their mutual surface perpendicularly, there is no tendency to slide; hence if this known knowledge of physical conditions be observed throughout the entire structure, complete stability and permanence of position must ensue, inasmuch as the entire friction and consistency of the cement contributes to this attainment.

In the light obtainable from this, it is plain to be seen that if, in any case, this line of pressure should cross the mutual surface obliquely, the tendency to slide by this pressure must be counteracted by the cohesion of the particles constituting the materials used, and by so doing the actual firmness of the structure would be impaired.

Now if an investigation is conducted on the supposition that the cohesion of particles is to be ignored, then we are led to the best possible construction. The best authorities on this matter do not recognize the pertinency of the conclusion based on the hypothesis that the superincumbent load presses only downwards in accordance with the course prescribed by this lien alluded to in the foregoing. In order to place such a supposition in accordance with the facts of the case of arches, the inner ends of the arch-stones would have to be dressed with horizontal facets for the purpose of receiving and transmitting the downward pressure. But if, as is usually the case, the inner surface be oblique, they cannot transmit a vertical pressure unless in accordance with the law of cohesion, besides which this hypothesis of only downward pressure on the arch-stones is at variance with the fundamental principles of stability; hence in a thorough investigation, this hypothesis must be ignored, and the oblique pressure on the inner ends must be taken into account and the force recognized.

In view of the fact that the depth of these arches is small as compared to the dimensions of the structure as completed, and since the lien of the pressure transmitted from one to another must always be *within* that depth, it is reasonable to suppose that, for the purpose of analyzing the strain, that they form an exceedingly thin course, and that their joints are everywhere normal as regards the divergence from the square. Eventually, however, this depth must be carefully considered and the importance recognized in our calculations.

As the most comprehensive manner to obtain a clear view of our argument, we will examine the following sketch, first assuming that the superincumbent load presses only downward on the arch-stones, or that their inner ends are cut with horizontal facets.



In the accompanying figure let Q' P' A P Q represent such an arch placed equally on the two sides of the crown A, then the entire weight of the structure included between the vertical lines P' H' and P H must be held up or supported at P' and P, so that the downward pressure at the point P must be the entire weight of the structure imposed over A P. This pressure downward is accompanied by a tendency to separate the supporting points P' and P; thus, as this tendency is horizontal, its intensity cannot be changed by the load acting only downward, and must remain the same throughout the structure, whereas the actual pressure at p must be found by combining this stable or fixed horizontal thrust with the downward pressure equal to the weight of the bridge from A to P. In view of this if we draw a h horizontally to represent this constant thrust, and a p upwards to represent the weight of this portion of the arch, the line p h must, in accordance with the law governing the composition of pressures, indicate both in direction and in intensity the actual strain at the point P; this pressure must be perpendicular to the *joint* of the stones, and therefore must be parallel to the straight line drawn to touch the arch at P.

By virtue of the foregoing, if the form of the inside of the arch, or the *intrados*, be prescribed, it is easy to discover and estimate the power of the law of the pressure and its various parts; thus we may find the strain at the point Q by simply applying there a tangent to the curve, and to draw h q parallel to the same; h q represents the oblique strain at Q; a q represents the entire weight from the crown A to Q, and therefore p q is proportional to the weight imposed upon the portion P Q of the arch.

So long as the structures are confined to small dimensions, it is not necessary to incorporate such nicety and technical mathematical calculations in our calculations, inasmuch as in adaptation of the parts the friction of the surfaces, and the cohesion of the mortar are sufficient to compensate for any impropriety of arrangement. The great aim and object of Americans at the present time seem to be very large and massive structures. In eligible, desirable locations, ground surface is scarce and dear, and unlike some of the larger European cities, our workers will not, at least do not, labor below ground; the air and space above to infinity belong to the purchaser of the plat, hence we are building high and massive structures—not too high or too massive by any means—but to avoid these mysterious and fatal catastrophes that occasionally shock the entire country, attention must be paid to these minor and minute technicalities suggested in the foregoing.

The strength and intensity of these various strains must needs be carefully considered. The strength from all attainable standpoints of the materials used are within the reach of all, and before the Architects of America can hope for a full realization of their rising hopes and anticipations to acknowledge no superiors in older countries, or among prehistoric ages, they must master these laws governing strengths, pressures, and strains in all phases; then, and not till then, ages yet unborn will wonder and admire the achievements of the Architects of this, the nineteenth century, the boasted era of civilization and a high order of faculty development.

Our Illustrations.

The elevation and plans of a modern flat, costing $4,500, will be found on pages 57, 59 and 61. The plans are sufficiently plain to give any one a thorough idea of the arrangements of rooms, etc. Sizes are distinctly marked, as well as the various accommodations usually found in houses of the character shown.

Business Changes.

There have been quite a number of changes in the location of Architects during the past few weeks, the principal of which are the following:—

Albert Pissis & W. P. Moore have formed a partnership. Their office is located at 217 Sansome.

Bennett & Curtis have dissolved partnership, the latter retaining the old offices at 528 California; Mr Bennett may be found at 431 California.

H. D. Mitchell has moved to 126 Kearny, corner of Sutter.

Newsom & Gash have dissolved partnership. Each retains an office in the same building where they have been so long together.

T. D. Newsom, of Oakland, has formed a partnership with his brother, John J. Newsom, and they may be found at 431 California.

W. Mooser has moved to 334 Kearny, near Pine.

Swain & Cleveland have dissolved partnership. Each retains an office in St. Ann's Building.

The Building—Labor Market in San Francisco.

BRICK MASONS.

The demand for journeymen brick-layers is, and has been such for months past, as to absorb the entire supply of good hands, on brick buildings and the better class of work. Every knight of the trowel worthy the name, is employed, with well-assured prospects of continuance the season through. The outside, second-rate men, both as contractors and journeymen, are also generally employed on light foundations, chimney work, etc.

CARPENTERS.

Notwithstanding the large number of buildings under way, the supply of journeymen carpenters is easy, some not being able to find more than temporary employment. This is owing to the great influx of men from other parts of the country, attracted hither by the reports of a "building boom" in San Francisco. The entire resident class of good workmen, and many of more recent coming among us, are steadily employed, with fair prospects for months to come; but with the probability that there will be some letting up in building activities before the close of the year,—a prognostigation based upon the fact that the number of buildings erected in the recent past, has been greater than the increase in population, and the demand for houses,—consequently the "To Let" signs, which are becoming numerous, will be apt to check the ardor of some who would otherwise build as an investment, or for personal or speculative purposes.

PLASTERERS.

As a matter of course, these also, as a class, are full of work, and frequently difficulties are encountered in this branch of house building, not so much on account of insufficiency in number, as in the moral status and habits of the workmen, many of whom love the overflowing mug—of beer—more than they do the development of muscle, through the masterly use of the trowel.

The Lathers, a distinctive branch of the plastering work, very often cause delay, by demands for higher pay, or deliberate refusal to do anything for one or several days consecutively, as the result of "pure cussedness," a disregard for their own, their employers', or the owners' interest.

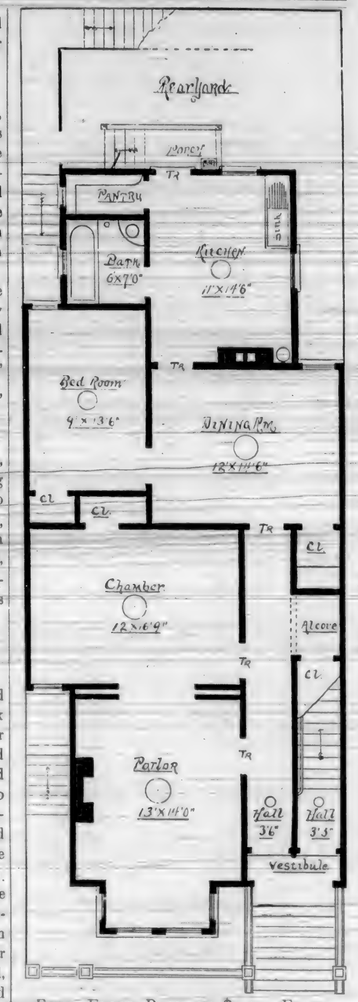
GENERALLY.

With existing lively times, all—painters, plumbers, and all others engaged in building pursuits—are correspondingly busy, and will so continue until the "letting up" times come, with this as a future result, that the best men mechanically and *morally*, will be continued, and those less skillful as workmen, or otherwise faulty, will have to meet the discomforts and misfortunes of non-employment.

Death-Dealing Dish-Cloths.

"I had some neighbors once—clever, good sort of folks. One fall four of them were sick at one time with typhoid fever. The doctor ordered the vinegar barrels whitewashed, and threw about forty cents' worth of carbolic acid into the swill-pail and departed. I went into the kitcken to make gruel. I needed a dish-cloth, and looked about and found several, and such 'rags'! I burned them all and called the daughter of the house to get me a dish-cloth. She looked around on the tables. 'Why,' she said, 'there were about a dozen here this morning;' and she looked in the wood-box and on the mantle-piece, and felt in the dark corner of the cupboard. 'Well,' I said, 'I saw some old, black, rotten rags lying around, and I burned them, for there is death in such dish-cloths as these, and you must never use such again.'

"I took 'turns' at nursing that family for four weeks, and I believe those dirty dish-cloths were the cause of all that hard work. Therefore I say to every housekeeper, keep your dish-cloth clean. You may wear your dresses without ironing, your sun-bonnets without elastics, but you must keep your dish-cloths clean. You may only comb your hair on Sundays; you may not wear a collar unless you go from home; but you must wash your dish-cloth. You may only sweep the floor when the 'sign gets right;' the windows don't need washing; you can look out at the door; that spider-web on the front porch don't hurt anything; but as you love your lives, wash out your dish-cloth. Let the foxtails get ripe in the garden (the seed is a foot deep any way); let the holes in the heels of your husband's stockings go undarned; let the children's shoes go two Sundays without blacking; let two hens sit four weeks on one wooden egg; but do wash your dish-cloths. Eat without a table-cloth; wash your faces and let them dry; do without a curtain for your windows and cake for your tea, but, for heaven's sake, keep your dish-cloths clean." One Who Knows.



First Floor Plan of $4,500 Flats.

Readers of the "CALIFORNIA ARCHITECT" will confer a favor upon the publishers, and derive material benefit themselves, by mentioning this paper when opening correspondence with advertisers. Drop us a postal card when you have written to an advertiser, give us his name, and then we will put you in the way of getting the benefit. Don't forget this.

She Wanted a Bracket.

TO BEGIN with she had two vases and a clock. There was no room for them on the bureau, and the table was full. So it happened she wanted a shelf whereon the vases and the clock could be disposed. There was just the place for a shelf between the windows. She measured the space and gave the carpenter an order for a board twelve inches wide, four feet long, and three-fourths of an inch thick. The carpenter offered to put it up with nice iron brackets costing fifty cents a pair, but she said him nay. Such cast iron horrors were inartistic. She would have it all of wood. Had she not a scroll saw? Was she not mistress of hammer and screw-driver? She would make her own bracket for sweet economy's dear sake and her own delight.

Straightway she drew upon paper a design for a sweet thing in brackets. Procuring a piece of clear pine, half inch stuff, she cut out the design upon it with her scroll saw. It was, indeed, a lovely bracket, and she at once made another, polished and sand-papered the pair, and gave them a coat of shellac just for color's sake. She then put a screw through each into the wall and laid the shelf upon them. This is the result: Fig. 1.

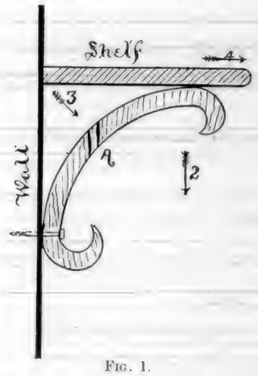


FIG. 1.

The bracket showed a sense of beauty without knowledge. Common sense suggested the placing of the screw at the point shown, near the end of the bracket. Experiment proved that the whole thing was unlovely and inartistic because not founded on the nature of things. The bracket had the beauty of form in a certain bookish way. It was just like the things in the drawing books. It had, also, the inherent beauty of color, because the natural color of the wood had been preserved, yet these things were of no value because the bracket was useless.

She laid the shelf on the brackets, and it at once tipped up, having no support next the wall. She thought this could be remedied by placing a strip of wood under the shelf against the wall. This worked very well, though it did not look quite right. Then she piled a quantity of books on the shelf to see if its factor of safety was within the probable weight of the clock and vases. Both brackets broke off at the point A, and the whole thing was ruined.

At once she went out-of-doors, found a good tree, and sat down to consider the branches thereof. And this is the sum of her consideration: If any one had laid a beam of wood from the main stem of the tree to the branch, say for the purpose of making a support for a swing or for a ladder to gather the fruit, the branch would be essentially a bracket. The beam, like the shelf, would be a lever with the fulcrum at one end. The branch would resist the downward thrust of the lever at the point where it was most needed. So would the bracket—with this difference—the branch resists the thrust in line of its greatest strength or along the grain; the bracket met the thrust in the direction of its weakest point, across the grain. It was also another lever tending to transform the thrust into a transverse strain.

Referring to the bracket, she saw in her mind's eye three strains. First, the tendency of the upper part of the bracket to move outward in the direction of arrow 1. Then there was the thrust downward, arrow 2, due to the weight of the shelf, and lastly there were the two combined that made the breaking strain, shown by arrow 3, in the diagram. Moreover the carved ends of the bracket did not in any way help to support the shelf; they were liable to be broken off, and consequently were inartistic and valueless.

The result of her considerations was a new design for a bracket. Fig. 2.

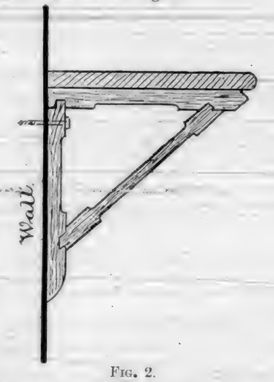


FIG. 2.

At first it appeared painfully stiff and plain. However it worked, so to speak; it could hold up the shelf with ten times the load that would ever be put upon it. Its factor of safety was as ten is to one. Besides this there was only one screw in the wall, and placed where it would be out of sight.

The bracket was composed of three parts, and each, like the branch of the tree, cut out in the line of its greatest strength, or along the grain. The first, or wall piece, was placed upright and had a tenon at the top and a mortise in front near the bottom. This was held to the wall by one screw placed near the top. Why? For two reasons. The tendency of the bracket is to fall under the weight of its load. There is also the tendency to fall outward, because the shelf acts as a lever. If the screw had been put at the lower end of the stick, it would form a pivot on which the bracket would tend to fall outward. By placing the screw at the top it resisted both the downward thrust and the tendency to fall outward.

These things refreshed her mind. It seemed as if she were dealing with the everlasting verities of constructive art. The two remaining members of the bracket had equally important parts to play. The horizontal piece at the top supported the shelf, and, being anchored to the wall-piece by the mortise and tenon, it served as a stay to prevent the bracket from falling outward. It was a tie and resisted the pull of the shelf outward. It was also mortised to the end of the third member, that served to transfer the weight of the end of the shelf to the wall-piece. In this last member the duty is to resist a thrust and to support the shelf by transferring its weight to the wall. This member was also mortised into the wall-piece.

The brackets were a success. Severe in their outline, they still had undeniable beauty. With her knife she cut away the edges in places and made incised ornaments here and there. This took away the square-edge appearance of the work and added a measure of ornament—not much, to be sure, because the whole thing was merely a bracket. It suggested the tree form, the stem and branch. It was fitted to its work and performed it well, because properly designed.

Straightway she placed the vases and the clock on the shelf, and some books and a lamp and other things, and even the baby, when, one day, the nurse upset the bath-tub. Baby sat there for five minutes in mingled comfort and safety, and the bracket did not show signs of distress. Then she considered the thing in a deeper sense.

The bracket was strong, simple, and well designed, and, as a result, artistic. It was truthful, and did not pretend to be what it was not. It might have been turned in a lathe or covered with ornaments, and so long as it preserved the underlying ideas expressed in its present simple form, it would be correct. The moment it departed from these principles it would be inartistic, however ornate, or whatever its material.—*Charles Barnard, in Decorator and Furnisher.*

Safest Way to Use Whisky.

PROCURE any certain quantity of whisky. Into a wide-mouth demijohn, place a quantity of glue; pour the whisky into the demijohn, and put the vessel away for about five days; See that the cork fits tightly. After the expiration of the above time, you will have a superior article of liquid glue, with which broken furniture, etc., can be mended.

Bound Volumes of this Journal Now Ready. Price, Post-paid, $2.50.

Mechanics in Education.

SEEING and feeling are two senses which are more important in aiding to a knowledge of our surroundings than any others, and yet their education is generally neglected until the possessor begins to learn something of mechanics. By mechanics in this connection is intended any attempt to contrive, put together, manufacture or change by manipulation, so that a woman who contrives and fashions a dress out of the unformed and plain material, may be a mechanic. The use of mechanical tools cannot be begun too early in life, whether the pupil is to be a practical mechanic or to follow some other calling—there are few vocations that do not demand for success some practical knowledge of mechanics. "The whittling Yankees" possibly owe much of their undisputed position as inventors and good mechanics to the habit of using a pocket knife. A very prominent inventor and superior mechanic recently remarked that the bent of his taste as a mechanic was undoubtedly given by his schoolmaster, who was a carpenter and joiner, and who worked at his trade in summer and taught the district school in winter. If a boy did not possess a foot rule he made one for him from a shingle or constructed an inch scale. The foot rule and a pocket knife he considered necessary to a schoolboy's outfit, and he encouraged his pupils to estimate dimensions by the eye and then verify them by measurement. Wind mills and water wheels were parts of the pedagogue's training, and the click-clack of one or the other could be heard all about the school-house and on the borders of the brook in an adjoining field. Vanes cut from pine boards, toy ships, bird houses, bows and arrows, pudding sticks, and most of the toys used by boys forty years ago were made by the schoolmaster's boys under his direction. To-day, beside the prolific inventor named, there are one superintendent of a railroad company, one bridge builder, one superintendent of a large manufactory, and two Architects to be counted from memory, who probably received their bent for mechanics from the carpenter schoolmaster.

All these lead lives of usefulness—they are producers, adding to the wealth and comfort of the country and the people; and nothing in their observation education makes them less valuable as members of society. One of the most distinguished orators was a blacksmith, and many men who are noted for their eminence in literature, divinity, law, medicine, and as educators, have had a mechanical training.—*Builder and Wood-Worker.*

Otis Elevators.

SPECIAL attention is called to this elevator now being successfully introduced into general use in this State. The cardinal principle of this elevator is different from that of any other in use, combining strength with simplicity, and more than the usual safeguards against accidents. They are manufactured by John Hammond, 42 Beale Street. Descriptive circulars sent on application.

Not from the Center of the Street.

PREVIOUS to October 1, 1884, it had been the custom with the gas companies to charge consumers for the cost of the service pipe, connecting the mains with the meter, counting the number of feet of such service pipe from the middle of the street. This rule we regard as just and equitable.

Since the above date, however, the companies—now consolidated, to all intents and purposes, into one—have agreed to charge for the actual number of feet of pipe laid, and the rate is made to cover cost of pipe, and an agreed upon cost of labor per foot of pipe laid.

This rule works a hardship upon property owners whose possessions lie on the side farthest away from the main. Take a street 60 feet wide; owners on one side have to pay for 18 feet, and those on the unlucky opposite, 42 feet. At 30 cents a foot, for 1¼ inch pipe, the figures will be $5.40 and $12.60. On wide streets, like Market and Van Ness Avenue, the disparity becomes even more marked.

The gas company claims that the rule now in force is more just to owners, because in the middle-of-the-street rule, they charged a much higher rate than they do under the present system. We do not know by what process of reasoning they arrive at this conclusion, but we do know that there is not a gas fitter in town but who would consider that he had struck a bonanza of the largest proportions if he could get numerous jobs where he could charge 30 cents a foot for 1¼ inch pipe, with as little trouble and expense as the connection of the mains with a meter.

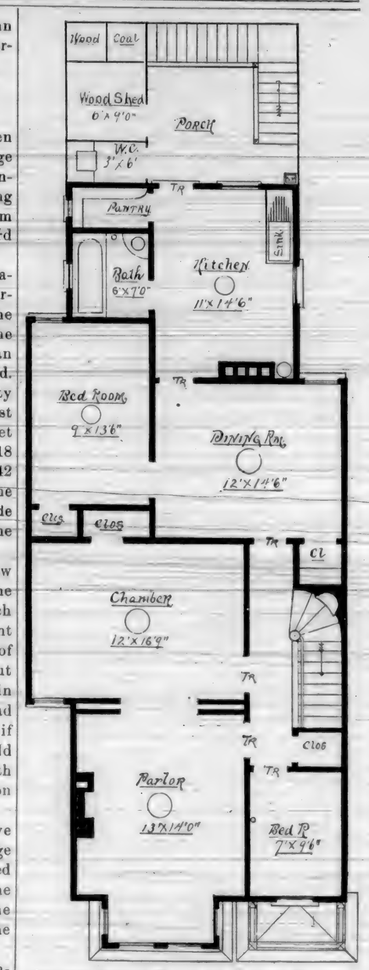
A just rule for the company to observe would be for them to furnish free to the edge of the sidewalk, the pipe and work connected therewith, and then let the owners of the property connect at that point, applying the same stringent test for its security that the law compels to the work inside the house.

When it is taken into consideration, the income derived by the gas company from the consumers of its manufacture, we consider that it should be their aim to reduce the first cost of connection with the mains to a minimum figure. If this policy were carried out, there would be less fault-finding, especially from those who own property on the opposite side of the street from the mains.

Putty.

DON'T you know that if a fire-place fails to draw, it is because your masons filled up the flue; that if the house settles, it's because you failed to use good cement in the foundations; and not because the Architect designed them too small? Don't you know that if sulphate of lime or magnesia blooms out on the face of pressed bricks, it's because your masons failed to do something or other—I don't know just what? And as for the rest of you, take the putty out of your own cracks and own up like men. Don't you plumbers know that scarlet fever and diphtheria were unknown till you and the doctors formed an alliance with the undertakers? Whether your carpenters confess it or not, we Architects know that the only way to keep wood-work from shrinking all to pieces is to catch and kiln-dry the carpenter—poor shrinking thing.

Of course you all do this mischief. Where would we Architects be if you didn't? Why, Architects would have their clients coming into their offices and holding them responsible for defects in their buildings, and then whom would the distressed Architect kick? Thus we discover another use for your putty—to support in the framework of your misdeeds the transparent purity of the flawless Architect.—*Architect John W. Root.*



SECOND STORY PLAN OF $4,500 FLATS.

THE SQUARE AS A FACTOR IN ARCHITECTURE AND GEOMETRY.

Paper Read before the San Francisco Chapter, A. I. A., by John Gash.

MR. PRESIDENT AND GENTLEMEN: I have taken for my papers to read before you this evening, the "Square as a Factor in Architecture and Geometry." That the square with the triangle and circle, form, as it were, the basis from which almost all other geometrical figures are formed, we are all of us aware, nor is it to be wondered at that the circle and triangle should form the basis from which the early architects should draw their outlines and figures as nature set the example, the earth, the sun, with the trees of the forest, all having the circle for their bases. The starry firmament have the triangle, but nowhere do we find the square except in the human form, where a man's arms, extended from tip to tip of his fingers, are equal to his height. The birds have taken the circle for the universal form of their houses, and the bee has adopted the hexagon. To man, then, alone, do we look for the square in his designs for buildings. Why it should be remains so far to the world a mystery.

While the ruthless hand of time has destroyed all chains of past ages to show that mankind in different countries had a sort of affiliation with one another, nothing is left to establish this fact but architecture. How happy should those feel who do their part to continue that chain that was first forged by Tubal Cain, and ever since continued to the present day, despite war, famine, pestilence, and the ever-changing destinies of nation—to you, my brothers, is this handed down. I trust you will pass it along, so that when you are laid in the silent dust, and perchance no mention made of your name, the architects of future generations may look with pride at those who lived in the nineteenth century. History fails to tell us that Greece, Rome, Egypt, Persia, India, China, Babylon, Mexico, the Aztec nation, England, Italy, Peru, were all at some remote period known to one another. The architecture of those countries alone establishes the fact, and the most particular part of that which each of the above countries have adopted, is the square. I will briefly refer to a few of the buildings to be found in those countries which I refer to, that have taken it for a basis. The Jewish people of Palestine, and the Druids of England, have given us the square and circle as the basis of their architecture in the buildings erected to their form of worship, the temple of Jerusalem erected by King Solomon, and the house of the forest of Lebanon by the former, and the stone henge by the latter.

Beginning with Greece we find that, as a rule, her temples were built in the form of a double square, the length being equal to twice the breadth.

The temple of Juno, erected at Samos about 540 B. C., the Temple of Jupitor at Selinus, the Temple of Jupiter Olympus in Sicily, and the Parthenon of Athens are each and all built on the principle of the double square.

Leaving Greece and entering her rival sister, Rome, we find her religious and public buildings partaking of the quadrangular shape, nor is this to be wondered at, as many of them were erected under Grecian Architects, who found Rome a more remunerative field for their labor, more especially after Greece became a Roman province, about 145 years before the Christian era.

The square is most noticeably used in the Roman pantheon, its entire height being equal to its width, and, though being circular in plan in the details of the interior, the *square* is very much used, more especially in the paneling of its vaulted ceiling. In the Temple of Peace, also the Temple of Concord, the Roman Forum, the Temple of Jupitor Stator, the Palace of Diocletean, at Spalatro, all have the square for a basis, and somewhat singular in the Temple of the Sibyl at Tivoli, which is of circular form, with, perhaps, the best example of the Corinthian columns to be found in any Roman temple of its time. The opening for doors and windows are two squares, their height being twice their width, a system adopted long afterward by the immortal Angelo, but somewhat slightly discarded in the nineteenth century. The Temple of Balbac, erected by the worshipers of the sun, being, perhaps, one of the most stupendous pieces of architecture ever erected to the "god of the day," assembled within its walls to hail that majestic circular orb, as he rose in his majesty above the eastern horizon, adopted the square for the outline of the shrine in which they should hail his first appearance and gaze on him as he traversed the vaulted canopy of heaven. Why this should be can only be conjectured because of the close relation that exists between that circular orb and the square.

The first traveler who describes this temple with accuracy is Maundrell, in his journey from Alepo to Jerusalem in 1697. The principal building, the temple, is of a rectangular form, being 3,600 feet long by 350 wide, with a portico 200 feet long by 100 wide, being *two* squares in length to one in breadth.

Perhaps, before referring to the architecture of Greece and Rome, I should have referred to that of Egypt, as this country, which may justly claim to be the *parent* of geometry, the fundamental principles of architecture, uniformity of plan characterizing all their work, never deviated from the right line and square. Their pyramids became the history of an age long past, telling of those wonderful structures referred to by Herodotus, Strabo, Plutarch and others. From these we learn that the great pyramids of Chrops were 800 feet square, running to a height of some 852 feet.

It would, indeed, be doing an injustice to attempt to give you any description of those pyramids in these papers, as that would make a complete subject in itself, which, I trust, some of you may read papers on at some future meeting. But my object was to show how the square was used as a factor in early architecture, and how, especially so, in the pyramids—nor was it less so in her temples, as we may see in those near Thebes, Carnac, and Luxor. The tomb of Osymandy, as we find, according to Diodorus, was a peristyleum 400 feet square, supported by animals 16 cubits high, each in one stone. As Egypt was, without a doubt, the parent of geometry, and the square, a natural outgrowth of the circle, in fact a reasonable consequence resulting from inclosing the circle by four lines, as well as *three*, the outgrowth of the triangle, which was held as a sacred figure by the Egyptians, it may reasonably be supposed that it would be adopted as a basis for their temples and tombs, and hence may be adopted by people who may have emigrated to other parts. Hence, we find in Persia, more especially in Persipolus, the same style and details in architecture as is to be found in Egypt. In the city of Ispahan, when visited by Chardin, in 1666, he describes their houses as being built with large square courts, surrounded with rooms of various dimensions, the sides of the area being planted with flowers and refreshed with fountains similar to the buildings to be found in Mexico at the present day.

Traveling into India we find history lost in trying to discover whence she derived her architecture; until within a late period it was supposed it was from Egypt. Sir William Jones, whose opinion seems to have been that the Indian temples and edifices are not of the highest antiquity, says that they prove an early antiquity, between India and Africa; that the structures of the early temples were pyramidal and partook of the form of a square, may be seen at Duogur and near Tanpore. There is also a pagoda of great antiquity near Posto Novo, on the Carromandel Coast, having within it a square court with a temple and pescina, to which is given the name of the Stream of Eternal Joy. There is also a temple of extraordinary size on the small Island of Scringham; it is composed of seven square inclosures, one within the other, the walls of which are 25 feet high and 4 feet thick. These inclosures are 350 feet distant from one another, making the outer walls nearly four miles in length, when we trace the square in general design of those Indian temples, whose antiquity history fails to describe. Leaving India we pass into China, whose history is buried as deep as that of India or Egypt. We find her architecture has certain features that make, as it were, a connection between her and those other countries I refer to, perhaps the most noticeable being the square.

The imitation of the tent is the true origin of their building, so that, from the accounts of travelers, a Chinese city looks like a large permanent encampment, as well in respect to its roof as its extent.

Yet while these are mostly of a circular form, the palaces and temples are built quadrangular, like the palace at Pekin, measuring 3,600 feet from east to west, by 3,000 feet from north to south. There is the pagoda, or Temple Ho-nany, measuring 590 feet long by 250 wide, and having with it buildings at its angles 30 feet square, and three pavilions 33 feet square; but perhaps the Great Wall of China is one of its most remarkable monuments, having towers on it at intervals of 200 paces measuring 40 feet square at the base, diminishing to 30 feet square at the top.

Leaving the Orient, feeling satisfied that the square, as a factor, was most usually adopted as the basis of their architectural monuments, we would take a passing glance at an equally ancient country, whose buildings are as great a mystery as those of Asia or Africa. While Prescott, in his history of Mexico, tries to describe its people, yet the antiquity of its architecture is lost in the sands of time, and its fundamental principles can only be traced in the use of the square in the general plan of its temples.

The edifices erected by the first inhabitants of Mexico for religious purposes were solid masses of earth of a pyramidal shape partly faced with stone. The great Pyramid of Cholula, the largest and most sacred temple in Mexico, appears at a distance like a natural conical hill wooded and crowned with a small church. Humboldt compares it to a square whose base is four times that of the place Vendome, in Paris, covered with brick to a height of twice that of the Louvre, the length of each side of its square base being 1,423 feet, and the height 177 feet.

In the northern part of Vera Cruz is found a pyramid of great antiquity measuring 80 feet square at the base, and nearly 60 feet high. The Tombs of Mitla are three edifices placed symmetrically in a very romantic situation. The number of separate buildings was originally five, and they were disposed with great regularity, having within them a court measuring 150 feet square. In Sonora, in the Gulf of California, on the banks of the Rio Gila, are some remarkable ruins known by the name of the Casa Grande, showing the remains of an ancient Aztec city, having many distinctive Egyptian architectural features, being quadrangular, with their sides facing the four cardinal points. From these we must conclude that the people had no means of modeling their ideas through study of the existing monuments of other nations, nor of preserving any traces of the style of building practiced by the race from which they originated.

It must be reasonably supposed that the vicinity of the continents of Asia and America is such that the arts and improvements must have been carried from one continent to the other. Having shown from a cursorary glance through the countries which I have above referred to, how the square formed a sort of connecting link in the several temples and monuments erected by each, though widely separated by time and distance, I will now occupy your time a little while in showing how it became a factor after the dawn of the Christian era in Europe. The cross, the emblem of Christianity, being taken as a basis for temples of worship erected to the founder of the Christian dispensation, buildings were erected after the style of the Latin and Greek cross, the former being six squares, the sides of a cube, giving one for the sanctuary, one for each transept, and three for the body or nave of the church, the Greek cross being five squares, one for each arm and one for the body of the building, both of these forming the basis of the several European cathedrals of the thirteenth, fourteenth, and fifteenth centuries, being lengthened in the nave more especially, as in the Cathedrals of Worms, the Church of Santa Maria Del Fiora vi Florence and several others.

Perhaps the best specimen of a church after the Greek cross is the church of St. Geneviere, in Paris, or, as it has since been called, the Pantheon, erected by Louis XV. But in all these the square has been uniformly followed by their Architects, not only in the general plan, but in their interior details, in their doors and windows, most conspicuously the quarter-foil, which, with the trefoil, was a characteristic feature of the early English style in church architecture, as also in the domestic architecture of Louis XIV. of France.

I have thus far shown you what a factor the square has been in architecture to form as if a continuous link in the great chain of our profession from the remotest period; while the work of the historian, the theologian, the scientist, has been lost in the sands of time, to the Architect alone has it been given the talisman that tells how past ages and nations must have intermingled with each other before the railroad, the telegraph, or telephone were even thought of.

In geometry it has of itself stood equally as conspicuous and alone as in architecture, never affiliating with its sister figures, the circle and triangle, save that, in the case of the circle, it condescends to admit of its four sides becoming a tangent to the circle when inscribed within it, and touching the circumference at its four angles when circumscribed round it. No nearer has any mathematician thus far been able to show what relationship one has to the other in point of area, though both may have the same diameter. The squaring of the circle has been an unsolved problem thus far, nor was any relationship in point of area found between itself and the triangle until Pythagoras found that a square described on its diagonal (which cut into two triangles) was equal to the sum of the square described on its other two sides.

It admits of being subdivided in itself without the aid of any other figure in geometry, and even then cuts up some funny pranks that were equally as mysterious as itself; thus, for instance, cutting a side into two equal parts the square of the whole line is four times the square of its half; cutting it into two uneven parts, the square of the whole line is equal to the sum of the square of the two parts and double the products of the parts. Again, dividing the side of a square into two uneven parts, the difference between the square of the two parts is equal to the product of the sum and difference of the parts. Thus you see the square is a mystery in itself; perhaps this is more especially the reason why man is said to act on the square with his fellow-man, being separate from all other beings or figures, and a mystery with himself; however this may be to us, as a Chapter of Architects, it has been transmitted, with its sides equal and angles true. Trusting we may so transmit it to future generations in our works and lives, I thank you for the attention you have given me on the square.

An experienced foreman, who has an eye for philosophy, says that tools apparently partake of the temper of those who use them. A short-grained man has nicked bits; the impetuous man, broken ones; the lazy man, dull ones; the careless man, badly dressed ones; the man with one idea, one dress for all kinds of work; the soft man can rarely keep the edge of a tool from turning, while the good-natured and even-tempered man has the best tools in the shop, and is pestered continually by ill-tempered workmen who come to borrow from him whenever they have a particular piece of work to do. It is quite interesting to note the similarity in the temper of workmen and their tools.

C. H. M. asks why a person will take cold quicker lying down on a bed than if sitting up—yet when they get into or go to bed, they are warmer than while sitting up.

Answer—If you are correct in your statement, it is probably because more vital energy is put forth by people who are not lying down, and in bed one is generally protected by additional clothing.

A Band saw for cutting marble is described in *Le Genie Civil*, which certainly merits mention. Every one knows that the saws ordinarily used for cutting marble or hard stone, which consist of plain steel blades, fed with sand, lose much of their efficiency by the filling of the cut with a paste of finely ground sand and stone, so there is a certain advantage in working with a vertical saw which does not accumulate pulverized stone beneath it. The difficulty in employing a toothed saw-blade lies, however, in the rapid wearing of the teeth, by which the blade is soon reduced to a smooth ribbon of steel. To prevent this, the new saw is provided with an accessory in the shape of a grooved wheel of hardened steel, which is set at right angles with the saw-blade, and engages with the teeth of the saw. This grooved wh el is made to press so firmly against the blade as to notch it, thereby reviving the teeth as fast as they are worn down. The teeth are of course rather rudely formed, and are left with a large "burr," but this seems to help the cutting action, by making more room for the blade in the cut. In practice this saw is operated at a very high velocity; and although we have no statement of its efficiency, it seems quite possi- that it will be useful.

The New Mechanics' Lien Law, Approved March 18, 1885.

THE new law in regard to the enforcement of mechanics' liens, having received the signature of the Governor, is now in operation. It should be carefully read by every owner, Architect, and contractor, as its provisions are essentially different from the law as it formerly stood upon the statutes. We give the law in full as we receive it direct from the authorities at Sacramento:—

CHAPTER CLII.

An Act to amend sections eleven hundred and eighty-three, eleven hundred and eighty-four, eleven hundred and ninety-one, eleven hundred and ninety-four, and eleven hundred and ninety-five of an Act of the Legislature of the State of California entitled "An Act to establish a Code of Civil Procedure," approved March 11, 1872, and to add four new sections thereto, to be known, numbered, and designated as sections twelve hundred, twelve hundred and one twelve hundred and two, and twelve hundred and three, all relating to liens of mechanics and others upon real property, and to carry out the mandate of section fifteen of article twenty, of the Constitution.

[Approved March 18, 1885.]

The People of the State of California, represented in Senate and Assembly, do enact as follows.

SECTION 1. Section one thousand one hundred and eighty-three of the Code of Civil Procedure is hereby amended so as to read as follows:—

1183. Mechanics, material men, contractors, sub-contractors, artisans, Architects, machinists, builders, miners, and all persons and laborers of every class, performing labor upon or furnishing materials to be used in the construction, alteration, or repair, either in whole or in part, of any building, wharf, bridge, ditch, flume, aqueduct, tunnel, fence, machinery, railroad, wagon road, or other structure, shall have a lien upon the property upon which they have bestowed labor or furnished materials, for the value of such labor done, and materials furnished, whether at the instance of the owner, or of any other person acting by his authority, or under him, as contractor or otherwise; and any person who performs labor in any mining claim or claims, has a lien upon the same, and the works owned and used by the owners for reducing the ores from such mining claim or claims, for the work or labor done, or materials furnished by each respectively, whether done or furnished at the instance of the owner of the building, or other improvement, or his agent; and every contractor, sub-contractor, Architect, builder, or other person having charge of any mining, or of the construction, alteration, or repair, either in whole or in part, of any building or other improvement as aforesaid, shall be held to be the agent of the owner, for purposes of this chapter. In case of a contract for the work, between the owner and his contractor, the lien shall extend to the entire contract price, and such contract shall operate as a lien in favor of all persons, except the contractor, to the extent of the whole contract price; and after all such liens are satisfied, then as a lien for any balance of the contract price in favor of the contractor. All such contracts shall be in writing when the amount agreed to be paid thereunder exceeds one thousand dollars, and shall be subscribed by the parties thereto, and shall, before the work is commenced, be filed in the office of the County Recorder of the county, or city and county, where the property is situated, who shall receive one dollar for such filing, otherwise they shall be wholly void, and no recovery shall be had thereon by either party thereto; and in such case, the labor done and materials furnished by all persons aforesaid, except the contractor, shall be deemed to have been done and furnished at the personal instance of the owner, and they shall have a lien for the value thereof.

SEC. 2. Section one thousand one hundred and eighty-four of the Code of Civil Procedure is hereby amended so as to read as follows:—

1184. No part of the contract price shall, by the terms of any such contract, be made payable, nor shall the same, or any part thereof, be paid in advance of the commencement of the work; but the contract price shall, by the terms of the contract, be made payable in installments, at specified times, after the commencement of the work, or on the completion of specified portions of the work, or on the completion of the whole work; *provided*, that at least twenty-five per cent. of the whole contract price shall be made payable at least thirty-five days after the final completion of the work and contract. No payment made prior to the time when the same is due under the terms and conditions of the contract, shall be valid for the purpose of defeating, diminishing, or discharging any lien in favor of any person, except the contractor, but as to such liens, such payment shall be deemed as if not made, and shall be applicable to such liens, notwithstanding the contractor to whom it was paid may thereafter abandon his contract, or be or become indebted to the owner in any amount, for damages or otherwise, for non-performance of his contract or otherwise. As to all liens, except that of the contractor, the whole contract price shall be payable in money, and shall not be diminished by any prior or subsequent indebtedness, offset, or counter-claim in favor of the owner and against the contractor; no alteration of any such contract shall effect any lien acquired under the provisions of this chapter. All such contract and alterations thereof as do not conform substantially to the provisions of this section, shall be wholly void, and no recovery shall be had thereon by either party thereto; and in such case the labor done and materials furnished by all persons, except the contractor, shall be deemed to have been done and furnished at the personal instance of the owner, and they shall have a lien for the value thereof. Any of the persons mentioned in section eleven hundred and eighty-three, except the contractor, may, at any time, give to the owner a written notice that they have performed labor or furnished materials, or both, to the contractor, or other person acting by authority of the owner, or that they have agreed to do so, stating in general terms the kind of labor and materials, and the name of the person to or for whom the same was done or furnished, or both, and the amount in value as near as may be, of that already done or furnished, or both, and of the whole agreed to be done or furnished, or both. Such notice may be given by delivering the same to the owner personally, or by leaving it at his residence or place of business, with some person in charge; or by delivering it to his architects, or by leaving it at their residence or place of business, with some person in charge; or by posting it in a conspicuous place upon the mining claim, building, wharf, bridge, ditch, flume, aqueduct, tunnel, fence, machinery, railroad, wagon road, or other structure. No such notice shall be invalid by reason of any defect of form; *provided*, it is sufficient to inform the owner of the substantial matters herein provided for. Upon such notice being given, it shall be the duty of the owner to and he shall withhold from his contractor, or from any other person acting under such owner, and to whom by said notice the said labor or materials, or both, have been furnished or agreed to be furnished, all money due or that may become due to such contractor, or other person, or sufficient of such money to answer such claim and any lien that may be filed therefor, for record, under this chapter, including costs and counsel fees provided for in this chapter, until such notice is by writing withdrawn; and all money paid thereafter by the owner to the contractor, or such other person, while such notice is in force, shall, for the purposes of all leins of all persons, except that of the contractor, be deemed a payment prior to the time the same was due within the meaning of and subject to the provisions of this section.

SEC. 3. Section one thousand one hundred and ninety-one of the Code of Civil Procedure is hereby amended so as to read as follows:—

1191. Any person who, at the request of the owner of any lot in any incorporated city or town, grades, fills in, or otherwise improves the same, or the street or sidewalk in front of or adjoining the same, has a lien upon such lot for his work done and materials furnished.

SEC. 4. Section eleven hundred and ninety-four of the Code of Civil Procedure is hereby amended to read as follows:—

1194. In every case in which different liens are asserted against any property, the Court in the judgment must declare the rank of each lien, or class of liens, which shall be in the following order, viz.:—

1. All persons performing manual labor in, on, or about the same.

2. Persons furnishing materials.
3. Sub-contractors.
4. Original contractors.

And the proceeds of the sale of the property must be applied to each lien or class of liens in the order of its rank; and whenever, in the sale of the property subject to the lien, there is a deficiency of proceeds, judgment may be docketed for the deficiency in like manner and with like effect as in actions for the foreclosure of mortgages.

SEC. 5. Section one thousand one hundred and ninety-five of the Code of Civil Procedure is hereby amended so as to read as follows:—

1195. Any number of persons claiming liens may join in the same action, and when separate actions are commenced, the Court may consolidate them. The Court must also allow, as a part of the costs, the money paid for filing and recording the lien, and reasonable attorney's fees in the Superior and Supreme Courts, such costs and attorney's fees to be allowed to each lien claimant whose lien is established, whether he be plaintiff or defendant, or whether they all join in one action or separate actions are consolidated.

SEC. 6. Another section is added to the Code of Civil Procedure, numbered one thousand two hundred, and reads as follows:—

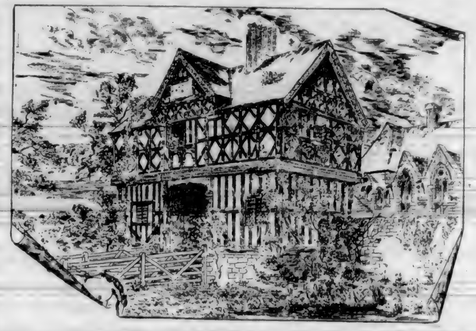
1200. In case the contractor shall fail to perform his contract in full, or shall abandon the same before completion, the portion of the contract price applicable to the liens of other persons than the contractor, shall be fixed as follows: From the value of the work and materials already done and furnished at the time of such failure or abandonment, including materials then actually delivered or on the ground, which shall thereupon belong to the owner, estimated as near as may be by the standard of the whole contract price, shall be deducted the payments then due and actually paid, according to the terms of the contract and the provisions of sections one thousand one hundred and eighty-three, and one thousand one hundred and eighty-four, and the remainder shall be deemed the portion of the contract price applicable to such liens.

SEC. 7. Another section is added to the Code of Civil Procedure, numbered one thousand two hundred and one, and reads as follows:—

1201. It shall not be competent for the owner and contractor, or either of them, by any term of their contract, or otherwise, to waive, affect, or impair the claims and liens of other persons, whether with or without notice, except by their written consent, and any term of the contract to that effect shall be null and void.

SEC. 8. Another section is added to the Code of Civil Procedure, numbered one thousand two hundred and two, and reads as follows:—

1202. Any person who shall wilfully give a false notice of his claim to the owner under the provisions of section one thousand one hundred and eighty-four, shall forfeit his lien. Any person who shall wilfully include in his claim filed under section one thousand one hundred and eighty-seven, work or materials not performed upon or furnished for the property described in the claim, shall forfeit his lien. If the owner and his contractor shall directly or indirectly conspire to, or agree that, the written contract filed shall appear to show the contract price to be less than it really is, and it shall accordingly so show, then such contract shall be wholly void, and no recovery shall be had thereon by either party thereto, and in such case the labor done and materials furnished by all persons, except the contractor, shall be deemed to have been done and furnished at the personal instance of the owner, and they shall have a lien for the value thereof.



SEC. 9. Another section is added to the Code of Civil Procedure, numbered one thousand two hundred and three, and reads as follows:—

1203. Any bond which may be given by the contractor to the owner, for the faithful performance of his contract, shall be filed, with the contract, in the Recorder's office, or be void; and whatever may be its terms, shall inure to any person who performs labor for, or furnishes materials to, the contractor; and any such person shall have an action to recover upon said bond against the principal and sureties, or any or either of them, for the value of such labor and materials, not to exceed the amount of the bond; but such action shall not affect his liens, nor any action to foreclose it, except that there shall be but one satisfaction of his claim, with costs and counsel fees. Nothing in this section contained shall affect or impair the rights of the owner under the bond. Nor shall any alteration in the contract, or deviation in the work or in the payments, release the sureties on said bond from their liability, except to the owner.

NOTICE.

We have printed the above Lien Law on fine card-board suitable for hanging in offices. We will mail a copy to any address upon receipt of fifty cents.

Wood Turning.

IT seems like a very simple matter to come the free-hand act in paring down a piece of work in the turning lathe and bringing it up to a shining finish, if the careless manner in which the tools are held and the rate the cuttings fly, are anything to go by. The workman seizes a piece of stock, places it between centers while the lathe is still in motion, and the work starts off almost in its very central line of rotation, stirring up quite a breeze from the four corners of the square piece of stock, and just clears the rest from which the tools are to operate. The gouge sets in first and pares down toward the center, setting back each stroke for the length of chip, till the work is roughed out, when, with a few sweeps, the surface is left smooth and cylindrical. The parting tool reaches the lowest place in each hollow of any bead that is to be made to make room for the clearage of the cutting, and the gouge once more passes right and left from the brink of each bead, with a few delicate sweeps in the hollows, and the work is ready for the next piece, unless it is to be smoothed up with sandpaper held on the work while it is backed up with shavings to keep the hand from burning. This is where a business is made of the free-hand tool in wood turning, and there is no solid rest to work from. The tools rest as much on the work as on the bed of the lathe, and the stock is not torn to pieces by scraping with a chisel. There is a principle for every mishap that is to be found in any part of the process; if the gouge is being drawn forward with a lot of clearance beneath the cutting edge while the tool rests on the opposite side, an increasing spiral convoluted pitch may be attained contrary to expectations, though the principles of this action are as definite as the principles of falling bodies. If the squaring up is to be done with a chisel, where the bevel is on one side, there is every condition that is needed to strike out for parts unknown as soon as the cut leaves the extreme point in the cutting edge. Turning, like any other work, where we must cut across the grain, must have some means for the chips to leave, or they will cling to thrash on the rest, or to break into the finish of the work. It requires but a small effort to hold a tool in turning when it is held properly, but it will need the assistance of a tool post if the cutting edge is running in another direction, if a shearing cut is what is wanted. It will be well for those more acquainted in other departments to resort to scraping when in need of a mallet or a few handles for tools.—*Ex.*

Pine logs, taking the good, bad and indifferent together, will weigh on an average 8,000 pounds per thousand feet.

Questions and Answers for the Consideration of Students in Sanitary Science.

1. WHAT is the object of a trap?—To prevent sewer-gas from entering a house.

2. How is it effected?—By a water-seal, made by confining water in the bend of the trap.

3. Is this an effectual remedy?—Alone, no; because pressure will sometimes force air through the water.

4. Will the water in a trap absorb gas and emit it again?—Yes.

5. How is this difficulty overcome?—By leaving the end of soil-pipe open and making it easier for gas to ascend than to go through water.

6. Where should the open end of a pipe be situated, and how is the pipe usually terminated?—At the highest point of building, and finished with a bend.

7. What is the object of a trap where the soil-pipe enters the house?—To prevent, if possible, the entrance of sewer-gas to the house.

8. Is there any other theory on this point?—Yes: gas should not be confined to the sewers, but allowed to escape through numerous outlets.

9. What is the theory of the New York City Board of Health in regard to this?—That sewers should not contain gas, but as usually built they do.

10. What causes a pressure from the sewers on the main trap?—Difference in temperature between sewer and house, snow on openings and manholes, and tides blocking outlets and manholes.

11. Can the difference in temperature between the air in a sewer and in a soil-pipe unseal a trap?—Probably not.

12. Will open fires cause a suction on soil-pipes, and why?—Yes; they draw air from wherever there is the least resistance.

13. What is the best form of a trap at the outlet of a soil-pipe, and of what material should it be?—A running trap, with a manhole to clean it out.

14. Does a large body of water in a trap afford greater resistance to pressure from the sewer?—No.

15. What constitutes the resistance to pressure in a trap?—The depth of water-seal, not the amount of water in trap.

16. How deep should the water-seal be in a running trap?—About two inches.

17. What is meant by depth of water-seal?—The depth of curve or bend.

18. Is there any objection to a deep trap?—If too deep, matter will not be drawn out, but will remain and dissolve.

19. Why is a flap-valve not a good seal for a soil or waste pipe?—Matter lodging in pipe prevents its closing.

20. Why is the momentum of a column of water not likely to carry the water through a running-trap, and leave the trap unsealed?—Some of the water will usually run back, and the velocity is not sufficient to produce a vacuum.

21. What is the effect of a column of water passing through a pipe and completely filling it?—It causes a vacuum.

22. Why will a vacuum suck the air out of pipes?—Because the falling water drives the air before it, and by so doing causes a vacuum as it passes the branches and draws water out of traps.

23. What is the pressure of the atmosphere on a vacuum?—The greatest possible pressure is 15 lbs. on square inch.

24. How is this suction prevented?—By leaving top of soil-pipe open, so the air will follow the water.

25. Can a vacuum be created in a pipe when it is only partly filled with water?—To a certain small extent; generally, no.

26. What is the object of extending a pipe from the outer air to the soil-pipe just inside the trap?—To allow a current of air to pass through the pipe.

27. What difference does it make where this pipe enters a soil-pipe, so long as it is inside the point where the trap is placed?—It should enter near the trap, or the portion of drain between it and trap will form a dead-end.

28. What is the proper size of this ventilating-pipe?—Four inches.

29. Why does the air enter by this pipe, and pass out at the top of the soil-pipe?—The air in pipe being usually warmer than the air outside, causes an upward current.

30. Why does warm air ascend?—It is lighter than cold air.

31. Can a rush of water through the soil-pipe affect this ventilating-pipe, and should any precaution be taken in regard to it?—It should be placed as far as possible from basement windows, but if properly aired it should be free from gas.

32. Is it a good plan to ventilate a soil-pipe in a flue, and why not?—No; because when there is no fire there is often a down draught.

33. Would two traps where the soil-pipe enters the house be useful?—No; they would form an air-lock.

34. What is an air-lock?—Space in pipe where air is confined between two traps.

35. How does it affect the passage of water?—The confined air is like a cushion, and retards or stops the flow of water.

36. What is the objection to the use of a brick or stone box with a division-wall, known as a mason's trap, as a trap for a main soil-pipe?—It makes a small cesspool.

37. If a soil-pipe empties into a stream, or on the surface of the ground, and has no connection with a sewer or cesspool, is a trap useful?—Yes, if vented in the usual manner, because sewer-gas is generated in the pipe, and if the pipe is long it is better to trap it where it enters the house.

38. If a pipe empties into tide-water, what precaution should be taken to guard against air being forced through the trap by the pressure of the tides?—A line of vent-pipe between outlet and trap above the tide-level.

39. What is meant by the "dead end" of a soil-pipe?—An unventilated end.

40. Why are such ends dangerous?—Sewer-gas forms or collects in them.

41. How would you connect the leaders of a house with the soil-pipe?—By a deep-seal trap, so as to retard the evaporation of the water.

42. How would you connect area and yard drains with soil-pipes?—By suitable traps with house-drain, and always on the inside or house side of trap.

43. When traps are emptied of water to guard against freezing, in an unoccupied house or apartment, what precautions can be taken to shut out sewer-gas?—The traps can be filled with kerosene.

44. Is there any contrivance by which a soil-pipe can be regularly flushed?—Yes; by an automatic flush-tank.

Modern Æsthetic Houses.

"WE have from time to time called attention to the 'Crazy Style' of Architecture adopted by a few of our younger 'would be' architects. One of the principle '*ingredients*' of this style, is to cover the buildings, when finished, with a bountiful supply of paint, using more colors by far than the tailor who designed Joseph's coat, as described in the 'Good Book.' We quote the following remarks from that most excellent authority, *The Painter*, in regard to the style in question:"—

The existing craze for highly-colored houses, consisting almost entirely of chimneys and roof, will probably soon die out. There are symptoms that the public is becoming wearied of red tiling and dormers, and that inmates of "cottages," with every bedroom partly in the roof, and every sitting-room so low that a man standing on tip-toe can almost touch the ceiling, are sighing for lofty parlors and airy bedrooms. In those modern monstrosities which are considered old English because they do not fulfill the requirements of English speaking people of the present day, it is considered a beauty to be ugly. That bilateral symmetry, which is one of the greatest elements of beauty in art and nature, is sacrificed, not to necessity, nor yet to gain some grand effect, but in sheer wantonness. If a hall, by any accident, came in the center of a front, the entrance is placed to one side to produce an out-of-center effect. Mantels are thrown near the corner of a room, and the two sides made unlike, producing an effect like that of a motley clown.

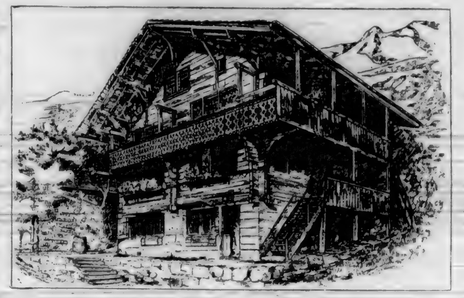
Not even the two halves of a door must be alike, a square panel on one half is balanced by an oblong one on the other. Strange little recesses, capital hiding places for vermin, abound. Glass is cheap, so the windows are cut up into paltry little panes, in base imitation of the times when woodwork was cheaper than glass. Walls are low and roofs are high, but there is no cheapness in the substitution of roofs for walls, for the bedrooms contained in the sloping surface have to be made square by furring, which reduces their size and renders it necessary, in order to reach the fantastic dormer window, to penetrate a deep recess like that which defended a woman's features in the days of the old poke bonnet. With all this there is a ridiculous tendency to divert materials to some purpose for which their fitness is not demonstrated. Shingles and roof tiles, used upon roofs from time immemorial, have crawled down upon the walls. The upper story and all the dormers are covered with them. Fond and foolish persons purchase houses so built. The perversion of shingles has gone further. The walls of rooms are not seldom lined with them, giving a sort of rustic summer-house effect. The straining after novelty or oddity, with total disregard of beauty, is evident in the color that is lavished upon the outside of houses. Red, yellow, chocolate, orange, everything that is loud is in fashion; and the entire exterior is so gay that a Virginia creeper or a Wisteria would be bold, indeed, if it dare set leaf or tendril there. If the upper stories are not of red or buff shingles or tiles, they are parted up into uncouth panels of yellow and brown, while cables and dormers are adorned, not with tasteful and picturesque designs, but with monotonous sunbursts and flaming fans done in loud tints.

It is easy to be odd, easy to be more odd than the oddest thing yet done. Why not at once reverse everything? As the shingles go inside, cover the outside with three-coat plaster, finished in colors; pave the parlors with North River flagstone, stretch the carpets on the porch floors, put the parlors in the roof, with an outside staircase to reach them; place the kitchen next to the front entrance, the bedrooms in the basement, and the furnace, servants' rooms, store-rooms, closets and bath-rooms on the first floor. All this is possible, and the oddity of the arrangement should recommend it to would-be æsthetes.

We find the following plain remarks in a new journal entitled the *Building Budget*, upon a subject that is of much interest to the architectural profession. We have noticed many items in our various exchanges in regard to the same matter, indicating that the custom in the Eastern cities has become a general one. Various remedies have been proposed, but it remains for our new Journal to propose a remedy somewhat bolder than those heretofore suggested.

COMMISSIONS TO ARCHITECTS.

"From time to time, through the columns of architectural journals, there have appeared indignant protests from architects against the dishonorable offers made to them by enterprising, but not over-conscientious, manufacturers and dealers of building material to accept commissions for the consideration of introducing and using their wares. It is but charitable to say that many firms are ignorant of anything dishonorable, since it is a common act of trade to pay commissions to the middle-man.



"But it is not infrequent, even in these days, after there has been so much said against the practice, to hear of some firm who will tender the architect a consideration, or at least suggest it, as an inducement to make use of his material. The honorable architect rejects it and treasures up in his heart a warm and healthy grudge against the man who has considered him vulnerable to a bribe. The dealer who offers it, not viewing the act upon the same moral level, imagines that the cold repulse given his offer betokens the fact that he did not bid high enough, and that some rival firm had raised him out of the sale.

"So long as there is trade and commerce there will be discounts and a sliding scale of prices gauged to the amount of the demand and the source the demand proceeds from. That architects should be able to control discounts is but just and right, but only to the benefit of their clients. If these firms, who are so ready to induce sales by the offers of questionable commissions, would change their tactics so far as to publicly state that sales made through an architect would receive a discount of a certain percentage, a client would understand that his architect's influence extended to that point that he, individually, was not able to reach in the items of cost; and, the quality and finish of goods being equal, the architect could congratulate himself that he was instrumental in producing work for an amount that none but those of his profession could control, while the material man, who has discounts to make could do so through the *proper* channel and to the legitimate party to receive it.

"In one of George Eliot's letters, as recently published, we find the following: 'When one sees a house stuck on the side of a great hill, and, still more, a number of houses, looking like a few barnacles, clustered on the side of a great rock, we begin to think of the strong family likeness between ourselves and all other building, burrowing, house-appropriating, and shell-secreting animals. The difference between a man with his house and a mollusk with its shell, lies in the number of steps or phenomena interposed between the fact of individual existence and the completion of the building.'

"Had George Eliot looked over the more aristocratic portion of our city she might have found another very marked difference, and that is in the veracity of the two. Whatever the mollusk's house pretends to be, it is; whatever our houses pretend to be, they are not. Too many of our most imposing edifices are conceived and brought forth in a mingled sentiment of affectation and pride. Marble fronts of pasteboard thickness, granite stoops and wooden columns, the massive stones, but mineral veneer, and the ornamentation, zinc-moulded shams, roughened with glue and sand, outward and visible signs of an inward and spiritual desire to seem, not to be. You see before you a palatial residence, its front an artistically-conceived design of a modern treatment of architecture, but unfortunately it stands by an alley, and exposes its side, brick, brick—good enough in its place, but as much in keeping as would be repairing a seal-skin sacque with coffee-bagging; while worse to come, penurious pride does not even stop here, but makes the back of the mansion of the severest plainness, of the poorest materials, and an utter shame to the ambitious display of the front."

Sub-contracts.

WE are now, and always have been, opposed to the system by which the several portions of a building are let by the original contractor to a person denominated a sub-contractor. Of course, the only object is, that the former, by this means, is enabled, perhaps, to make a little more money than if he did the work under his personal supervision. But while we are thus opposed to the system referred to, we are in favor of having a law passed by which a sub-contractor can get his money for the work done. We know of no better way by which owners can be protected than by the passage of a bill requiring sub-contractors and others, to notify owners of terms of contract under which they are working, and to report any delinquency on part of contractor to pay for work. Failure to so report should be made a misdemeanor, with certain prescribed penalties. If this course is pursued, the worry and annoyance caused by sub-contractors failing to receive their just dues, would become a thing of the past.

Question—"EDITORS CALIFORNIA ARCHITECT: Which do you consider the best works for an apprentice to obtain the greatest amount of information from in regard to the Science of Carpentry?"

Answer—There are several "*best*" works: "Science of Carpentry Made Easy;" "Tredgold's Carpentry;" "American House Carpenter," by Hatfield; "Practical Carpentry," by Hodgson; "Gould's Carpentry;" and the Bound Volumes of this Journal. In any of the above a student will find fully explained the principles of the Science of Carpentry.

The White Incrustation on Brick Walls.

IT has been the source of much comment among those who watch the progress of our building interests, that more care is not exercised in the selection of clay with which pressed bricks are made. It is supposed by many that the fault is in the bricks. The following item from the *Manufacturer and Builder*, will be of interest to all concerned in the erection of brick buildings:—

"The disfigurement of brick walls in many Eastern cities with a white incrustation is most pronounced in the spring months, when the bricks become thoroughly saturated with moisture from continued rains. Two causes have been assigned to account for this circumstance:—

"(1) The existence of silicate, or other salt of magnesia, in the brick clay, and which is converted into sulphate of magnesia in the process of burning in the kilns by the sulphurous vapors from the coal; and, (2) the employment of lime containing magnesia for the mortar used in the walls, which, by the absorption of the sulphurous vapors derived from the burning of coal, becomes converted into sulphate of magnesia, and, being dissolved by the rain, penetrates the substance of the more or less porous bricks, efflorescing ultimately upon the surface.

The second of these causes is, undoubtedly, the principal one involved in the appearance of this unsightly incrustation. Brick-clay contains, as a rule, so trifling a percentage of magnesia that the supply of sulphate that it would form would soon be exhausted, and if it were not supplied from some other source, the incrustation would soon disappear. This other source, unfortunately, is present, and is found in the magnesian lime used in the mortar.

"Mr. Henry Pemberton, who was the first, we believe, to clearly point out the true cause of this phenomenon, at the same time called attention to the fact that the authorities generally are greatly in error in their statements respecting the quality of magnesian limes for mortar. Nearly all the text-books affirm that the presence of magnesia is injurious; that even 10 per cent. of it in the lime causes it to become lean (slow and difficult to slack); and that 25 or 30 per cent. makes it quite useless. These statements he shows conclusively to be misleading, and that such lime will slack readily. The behavior of the mortar made from such lime is very different from that made from pure lime.

"The lime used in and about Philadelphia, where the disfigurement of the walls is more pronounced, probably, than in any other city, contains, on an average, 57 per cent. of lime and 37 per cent. of magnesia, or nearly the relative amounts required for equal equivalents (or to form dolomite).

"This cement, Mr. Pemberton notes, contains 37 per cent., or nearly half of its weight, of a substance which is readily attacked, dissolved and formed into a soluble salt. In other words, every 100 pounds of such lime contains enough magnesia to form 230 pounds of Epsom salts—a crystallized sulphate of magnesia. It is not surprising, therefore, that such a cement, when brought into contact with the necessary quantity of sulphuric acid, should be disintegrated, washed out, and destroyed.

"That the universal use of coal in our large cities and towns for domestic and manufacturing purposes will, and does, furnish sulphuric acid in enormously greater quantity than is required to effect this destruction of the mortar, is well known to chemists. Mr. Pemberton gives a striking illustration of this fact. In the manufacture of carbonic acid on the large scale for the chemical industries, it is usually obtained by the combustion of coal, and purification by washings. To wash the gases resulting in twenty-four hours from the combustion in said time of 6,000 pounds of coal, 40 gallons of water per minute are sprayed into a tower through which the hot gases are passed. This water escapes from the tower at a temperature of 110° F., and consequently contains but little carbonic acid, yet it permanently and powerfully reddens litmus paper, and is perceptibly acid to the taste. As this process goes on continually, day and night, it appears that the sulphurous gases produced from the combustion of 3 tons of coal are sufficient in quantity to render distinctly acid 480,000 pounds of water. When it is considered, now, that the coal consumption of a great city will figure up to several thousand tons daily, it is not hard to understand that the quantity of sulphurous gases evolved therefrom will be vastly greater than is necessary to account for the phenomenon here under consideration.

"Mr. Pemberton sums up the evils resulting from the use of magnesian lime for mortar very concisely in the following terms, which are not in the least exaggerated: 'Unsightly and disfiguring as this white efflorescence may be, it is, to the owner of the building, the index to a more serious evil, namely, the disintegration of the mortar uniting the bricks, causing the destruction or fall of the chimneys and the washing out of the joints, particularly in the back walls or gable ends of houses, where the bricks are irregular in size and the said joints are consequently thicker. The cavities and open joints thus produced facilitate the destruction, until the retained moisture penetrates the wall and compels the owner to refill or repoint the joints at a heavy cost—the whole proceeding probably to be repeated after a few years.'

"These evils may be entirely obviated by the use of a lime free from magnesia. There is no dearth of such lime, but in many cases the prejudices of the workmen prevent its use; and in bringing this curious fact to light, Mr. Pemberton has, undoubtedly, placed his finger on the real difficulty, which will have to be overcome before the evils he so clearly elucidates can be done away with. This prejudice of the workmen he finds to be easily accounted for by the great difference in the behavior of mortars made from magnesian lime and from pure lime. Magnesian lime, he points out, in contradiction to most European authorities, forms, when slacked, a gelatinous, fatty mass, absorbing much water, and permitting a large amount of sand to be mixed with it. The bricklayer, when using it, spreads out the mortar on the surface of the brickwork already laid, as far as he can reach without removing his feet from their position. He then places the bricks in line upon this bed of mortar, placing, as he does so, a little mortar on the end of each brick as laid, until, perhaps seven or eight or more, are in place, then points up the brick with the trowel on the face of the work. With *pure lime* mortar this plan will not do. The mortar, when laid on the brickwork, becomes soon so firm—being less gelatinous, or *pasty*, than the magnesian—that two or three bricks only can be laid before it *sets*, or becomes so dry as not to make a proper bond with the new brick and those already laid. Consequently the bricklayer, accustomed to the magnesian lime, promptly and persistently rejects the pure lime as worthless, since he cannot execute the work expected of him in a given time, nor, probably, if used by him, would the bricks be securely and properly bedded.

"Mr. Pemberton proved, by personal experience, that this was so strong a local habit with the Philadelphia bricklayers that they rejected as unfit for use a mortar made of pure lime which he had brought to Philadelphia from the interior of the State of Pennsylvania especially with the view of doing away with the incrustation nuisance and its attendant evils. On the other hand, in other localities, as in Pittsburgh, the only lime available for building purposes is a nearly pure lime (containing at most from 5 to 6 per cent. of magnesia); and the bricklayers throughout all that section of the State, being accustomed to it, and knowing no other, use it with entire satisfaction. No incrustation on the walls occurs there, notwithstanding the enormous consumption of coal in the city and its vicinity.

"In view of the serious evils growing out of the use of magnesian limes—which have been very clearly pointed out in this article—and which are now well known and admitted, the abandonment of the use of this material would seem to be very desirable. How to overcome the prejudice of the workmen in its favor is the only difficulty in the way, but this appears to be a very serious one."

Furniture Polish.

THE subjoined simple preparation is said to be desirable for cleaning and polishing old furniture. Over a moderate fire put a perfectly clean vessel. Into this drop two ounces of white or yellow wax. When melted, add four ounces of pure turpentine, then stir until cool, when it is ready for use. The mixture brings out the original color of the wood, adding a luster equal to that of varnish.

BOUND VOLUME OF THIS JOURNAL, $2.50.

The Chapter Should Have a Home of Its Own.

IN a report received at the last meeting of the San Francisco Chapter, A. I. A., it was intimated that the best way to advance and cause an interest to be felt in the Chapter, particularly so by apprentices and draughtsmen in the various offices, was by the furnishing of a suitable room which would be recognized by parties interested, as a home.

This idea is a worthy one, and should be immediately carried out by the Chapter. A room should at once be secured and properly furnished. All the different journals and periodicals referring to architecture, carpentry, modeling, decorating, etc., should be kept on file. A room should be conveniently near in which a work bench could be placed, in order that *practical* lessons may be demonstrated in the various callings.

We understand that a prominent capitalist of this city, has offered to give a room free of charge for the purposes indicated. If so, the Chapter should at once take measures to secure the same and have it properly fitted up, so that all connected with the profession, and visiting brethren from the East, while in the city, can feel that there is one place where they will be at home, and find all those little comforts so necessary to the welfare of all true lovers of the architectural profession.

Building Contracts.

WHEN a building must be speedily completed, it is generally easier to attain that object by putting the whole contract into the hands of one man. Two contractors, responsible only to the owner, and jealous or indifferent in regard to each other's interests, always charge each other with the responsibility for the delays which usually occur under such circumstances, and the owner finds it difficult, if not impossible, either to enforce his contract as to time of completion, or to collect indemnity for the delay without doing injustice. Where, however, the time is not restricted to the shortest possible space, most Architects will agree that the best results are obtained by making at least four separate agreements, the cellar-work and grading forming the subject of one; the carpenter-work, including painting and glazing, of a second; the brickwork and plastering, of a third; and the plumbing, of the fourth. It is often desirable to make a fifth agreement for the painting and glazing, but if the carpenter is trustworthy, there is generally some advantage in allowing these to be included in his contract.

By the system of separate contracts better work is usually to be obtained in each branch, and, considering its quality, at a cheaper rate; although speculative builders have ways of making sub-contracts at prices that seem incredibly low to those who are not familiar with the difference between the good and the "jerry" style of work. The best mechanics always prefer to treat directly with the owner; they are, in this way, sure of their pay, and can, therefore, afford to work at a lower rate, while the owner saves the percentage of profits which the principal contractor feels himself entitled to charge upon the tenders made to him by his sub-contractors. Whatever mode is adopted, too much care cannot be taken to have the plans and specifications as full and explicit as possible. If these are what they should be, a building so simple as a dwelling-house can be, and generally is, when the owner knows his own mind in regard to the kind of house he wishes, and takes the trouble to see that the plans express it, carried out to completion without any "extras" whatever, generally, to the great surprise of the proprietor, who is sure to be informed by volunteer counselors, before he begins operation, that his extra bill will inevitably be "at least as large as the contract price;" that he "ought to restrict the Architect to half the sum he intends to spend," and so on.

We make separate contracts for the cellar-work, the carpentry, the brickwork and plastering, and the plumbing, and have also selected a good furnace, and arranged with the makers to put in the requisite pipes and registers in the best manner, when the proper time comes, under a guaranty that the apparatus shall heat a given number of rooms to a temperature of 70° when the thermometer stands at 0°, without taking air from the cellar or any other part of the house, and without regard to the direction of the wind.

Occasionally, the heating apparatus is included in the principal contract, but this is most unwise. As with plumbing, the work to be done is so difficult for any one but an expert to understand or criticise; and the difference between good and inferior work is so great in value, even more than it costs, that it should never be made the intention of any man to get it done as cheaply as possible.—*From Clark's Building Correspondence.*

Thousand of Building Lots Sold and Purchased.

DURING the preceding year, 1884, and thus far in '85 the number of building lots offered for sale in San Francisco, and the number purchased by parties for immediate or near future improvement purposes, has been very large. In every part of the City, "*This Lot for Sale*" meets the eye, and those desiring to buy, are afforded splendid opportunities to make satisfactory selections as to sites and localities, and to purchase privately from owners or agents. But in addition to this, since January of present year, hundred of building lots have been offered and sold (or are advertised to be sold) at public auction, and such public sales have been well attended by purchasers "meaning business;" and the prices obtained under the influence of the seductive statements of the artful man of the hammer, have in many cases been excessively high. The prices at which "*sold*" has sometimes been cried, has either been "dunning" fictions, or extravagant exaggeration of values on the part of purchasers, in either case, however, serving to inflate and influence to some exent, at least, the minds of succeeding buyers. So that the result of the sales in several instances has been a great surprise to cooler-headed people, who, being willing to buy at fair and reasonable, are not willing to pay fancy prices on already "high market" rates.

The fact that so much property is offered for sale—that a large number of outside blocks have been subdivded into 40 to 50 building lots, and sold at auction—very clearly establishes the fact that the prices now being obtained are entirely satisfactory to owners, who prefer to sell "on the top of the market" rather than risk the chances of a "further rise," which should not be possible, as real estate generally has already reached too high a figure. Even the outlying blocks, miles away from the center of business, which have been cut up into building lots and sold at auction, have brought unreasonably high prices, which assertion is sustained as a fact, by the other fact that the titles to forty or fifty lots sold in one block are scarcely perfected, before one or more other blocks are fixed up for sale, with all the cheap preliminaries of white-washed fences and trees, a flag pole floating a big flag, and such other devices as will add superficial attractions, and tune purchaser's minds up to the highest pitch of appreciation. All of which is well enough on the part of those selling, as there is no rule of law or moral ethics which forbids the practice of any legitimate means on the part of those offering to sell, to "show their goods to best advantage."

But it is a matter of surprise that so many buyers are so easily influenced, and are so anxious to "grab up" lots and pieces offered at auction, at the excessive prices which have been obtained in many cases,—prices from 25 to 200 per cent. greater than the same properties would have sold for two years ago. Advances in the values of realties are all right and proper, as showing growth and prosperity to the city, but there is a limit even in this, going beyond which reaches into the instabilities of inflation, and which, when pricked by reactions, renders the fall of him who climbs the highest, and strikes the most, the more severe.

A Badly-Used Owner.

COMMENTS UPON OUR MARCH ARTICLE.

OUR article entitled "A Badly-Used Owner," in the March issue of this Journal, caused considerable comment among our Eastern brethren. The absurdity of the quantity of brick saved was so apparent, that wonder was expressed how any paper that claims to be reliable, could have published such statements. The *Building Trade Journal* has the following sensible remarks on the subject:—

"A correspondent of a San Francisco paper complains that he has been swindled grievously in the erection of a row of buildings. By his contract with his builder, a brick foundation was to be laid containing 8,000 brick, but by a liberal use of sand filling, so cheap in San Francisco, 5,000 brick were saved to the contractor. It was found that the other work was all done on the same dishonest principle. Now what is the reason? The very clear one is, the owner wanted a good house built for too

little money, and accepted the services of the lowest bidder, without any regard to his reputation or responsibility. The margin of profit for the builder was represented by the amount of sand filling and skin work, and he probably took care that he was well paid for his work. The trouble in such cases is that the quality of the work is not discovered until too late for a demand for restriction. The only remedy, as we have before argued, is to pay a reasonable price for reasonably good work, and take into consideration the previous record of the builder. The reputation of the whole building trade is greatly injured by cases such as this that occasionally come to light, and builders who will stoop to such work for the sake of a small profit should be black-listed for the public benefit and the good of worthy contractors. Beware of bids that have stamped on their face the seal of dishonesty, hidden under a cheap estimate that necessitates a quality of work not honestly in accord with specifications.

Darkening Oak.

TO DARKEN new oak wainscoating and oak furniture dark, and give it an antique appearance, we have it from good authority that ammonia is the cleanest, best and cheapest material that can be used. The liquid stains commonly used are apt to raise the grain of the wood, make it rough, and it is with difficulty evenly applied, whereas in the use of ammonia it is simply the fumes that color the wood, and do it so completely that it is difficult to tell whether the wood is really new or old.

A correspondent in the *English Mechanic*, gives the following process of treatment, which he considers the best, after trying the various other processes used by builders and cabinetmakers to darken woods: "Oak is fumigated by liquid ammonia, strength 880°, which may be bought at any wholesale chemist's at 5s. a gallon. The wood should be placed in a *dark* and *air-tight* room (in a big packing case, if you like!), and half a pint or so of ammonia poured into a soup plate, and placed upon the *ground* in the center of the compartment. This done, shut the entrance, and secure any cracks, if any, by pasted slips of paper. Remember that the ammonia does not touch the oak, but the gas that comes from it acts in a wondrous manner upon the tannic acid in that wood, and browns it so deeply that a shaving or two may actually be taken off without removing the color. The depth of shade will entirely depend upon the quantity of ammonia used and the time the wood is exposed. Try an odd bit first experimentally, and then use your own judgment."
—*Scientific American.*

Modern Architectural Designs and Details. The plan of this work is very comprehensive in its character. Numerous designs are given illustrating the Eastlake, Elizabethan, and Queen Anne styles of architecture. Complete plans of each, together with full and comprehensive details, are produced in a manner that will gratify the tastes of any architect or property owner. Price, $10.00.

Plaster, How to Make and How to Use It. It contains accurate descriptions of all tools and materials used in plastering; description and action of every variety of lime and cement; instructions for making all kinds of mortar, and doing all kinds of plain and ornamental plastering; many important recipes given. Price, $1.00.

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Mechanic's Geometry, or the Science of Framing by the Aid of Card-board Models. New edition of 1885. With the aid of card-board models, and the rules and explanations given, the mechanic can readily learn the method of getting the length and bevels of every description of rafters, hoppers, etc. Stair work is also treated in a manner that at once arrests the attention of the student, and becomes an attractive study. This book will also be found useful, though possibly in a less degree, to those who have already become mechanics, but who have not learned the science involved in their trade. The main object of this work is the elevation of the working man to the dignity of the master mechanic. **Price, Five Dollars.**

The Artisan, or Practical Methods That May be Applied to Works of Building and Other Constructions. New edition of 1885. Among the practical ideas in this work will be found the utility of the right angle, and its application in solving many useful problems. By means of a right angle the exact circumference of a circle is determined at once. It also shows a simple and correct method for the measurement of boards, floors and other surfaces. It is applied to lines of any length, and divides them into equal parts. It gives the cuts and lengths of rafters, braces, and other timbers in framing. There can be no doubt as to the value of a right angle and its utility in this connection. It is clearly illustrated in the *framing square*, a tool which solves nearly every problem in practical geometry. **Price, Five Dollars.**

Science of Carpentry Made Easy. The work, *par excellence*, for every mechanic to have in his possession. It is thoroughly practical in its character, and contains much information not to be found in any other publication. It excels in its methods of obtaining the length and bevels of every description of rafters, both common, hip, and valley. Price, $5.00.

Builder's Guide and Estimator's Price Book. This work is chiefly intended to assist the Builder and Contractor in making estimates of the cost of work they may be competing for. It is written by the author of the "Steel Square and its Uses," which fact is a guarantee that the book is practical in its character. Price, $2.00.

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Hand Saws and the Art of Saw Filing. This book gives full information for putting in order all kinds of saws, from a carpenter's panel saw to a steam saw mill. Illustrated profusely. Price, $1.00.

Building Superintendence. A new work and one that should be in the hands of every architect, contractor, and student. Price, $3.00.

Practical Carpentry. As its name indicates, this work presents practical answers to those questions that so frequently vex the mechanic. Price, $1.00.

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MASONS' AND BUILDERS' EXCHANGE

OF SAN FRANCISCO

Room 11, 314 Montgomery St.

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Daggett, Siskiyou County—Frame dwelling. O., Dr. Jul. Koebig; A., G. E. Voelkel, day's work; $8,000.

Alameda—One-story frame. O., J. H. Miller; C., S. M. Hill; $1,750.

Saucelito—One-story frame. O., J. M. Crowley; C., S. M. Hill; $1,750. Two-story frame. O., J. Thomas; C., S. M. Hill; $1,250. Two-story frame. O., N. Sease; C., S. M. Hill; $1,250.

Fair Oaks—Frame house with stable. O., I. D. Atherton; A., Clinton Day; C., Ingerson & Gore; $3,500. Alterations. O., A Hecht; A., H. C. Macy; C., S. M. Hill; $850.

Woodland—First, cor. Cross ave. Three-story frame Villa. O., A. W. and H. C. Gable; A. and C., Gilbert & Son; $16,500. Second. One-story frame. O., Frank Turner; C., J. Caldwell; $1,500. Fourth. One-story frame. O. and C., Sidney Steinburg; $2,000. Fourth. One-story frame. O., Mrs. Winchel; C., Glenn & White; $1,800. Two-story frame. O., Hugh Cave; C., G. W. Henderson; $2,100. Two-story frame. O., H. P. Merrit; C., G. W. Billings; $1,200. Pendegast Avenue. One story frame. O., Samuel Haines; C., D. F. Myers; $1,600. Elm. One-story frame. O., Thomas McMurry; C., Pool & Sears; $1,500. College ave. Foundry and machine shop. O., Marshale Diggs, building and machinery; $4,500.

Winters—Railroad, cor. Grant ave. O., M. Harriman; Day's work; $2,000. Two-story frame. O., G. N. Seaman; C., Richey & Ward; $1,200.

Knight's Landing—Two-story frame. O., Barney Roseberry; day's work; $4,500.

Martinez—Knights of Pythias Hall. A., Byron Brown; C., Ludden & Marsh; $2,500. Two-story frame. O., — Perry; C., T. Carter; $2,000. Two-story frame. O., — Lazzell; $3,000.

San Jose—Additions. O., — Crites; C., Moore Bros.; $1,500 Alameda Road, cor. Cinnabar. Brick building. O., Fredericksburg Brewing Co.; A., Theo Lenzen; C., Kenny & Leddy; $7,500. Lenzen ave. Additions. O., W. P. Hennessy; A., Theo. Lenzen; C., R. Summers; $1,500. Third. Additions to San Jose Turn Verein Building; A., Theo. Lenzen; C., G. E. McDougall; $1,300. Second. Barn. O., W. A. Parkhurst; A., Theo. Lenzen; $1,900. Near town. Two-story frame. O., A. Malores; A., Theo. Lenzen; $9,000.

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A square is seven-eighths of an inch in length by width of column.

Advertisements alone inserted that refer to materials used in the construction and furnishing of houses, and to matters and trades belonging to the building interest.

NO OTHERS RECEIVED.

Summer Building Operations in City and Country—Review for the Past Month.

WE have taken particular pains during the past month to inquire among the owners of different buildings in various parts of the city, their views in relation to the pr sent building boom and the

LIKELIHOOD OF ITS CONTINUANCE.

Simmered down, the answers from a majority of those interviewed would read about thus: In spite of the cry of dull times, more money is in circulation than for any similar period in many years. Many well-to-do people have erected comfortable dwellings for their own use, and this fact has been the agency by which large numbers of mechanics have been kept at steady work; the latter, in turn, have been able to save money and put the same in a little home, and so money has been continually changing hands and always doing that good which manifests itself in the beautifying and adornment of our streets.

Another interesting fact is noticeable: Many have borrowed money with which to build two-story flats. Living in one and renting the other, an income is derived by which more than the interest is regularly met, and, after a few years' determined and energetic action, with the practice of strict economy, a home is secured which amply repays for the struggle incurred in obtaining the same.

MORTGAGES NOT ALWAYS A SIGN OF RETROGRESSION.

The day has gone by when a mortgage is considered a sign of financial embarrassment. At the present low rate of interest obtainable in most of our savings banks, it is, in our mind, a sign of excellent business judgment upon the part of owners to procure money by this means and erect buildings upon what would otherwise be stagnant property. This matter of

LOW RATES OF INTEREST

Is doing as much, if not more, than nearly all the other ideas advanced put together towards making this city the second in importance on this continent. By the means referred too, large manufactories can be built, and numerous enterprises can be put into operation. It should be the boast of California, that we do not import a single pound of nails, nor a gallon of oil, nor a keg of paint. The shores of our bay should be lined with manufactories turning out vast quantities of glass, hardware, cement, plaster, carpets, furniture, ironwork, both plain and ornamental—in fact, we ought not to import anything that can be possibly made with profit on this coast. The lower the rates of interest, the greater number of these enterprises can be started, and this of course means the addition of thousands of operatives to our population, and the circulation of an immense amount of money.

WILL THE BOOM LAST?

At present we can perceive of no sign indicating any sudden relaxation in the number of building operations. Work has been commenced on Market Street below Drumm. The old buildings are in process of demolition, and fine brick edifices will take their place. Further out, grading has been commenced for a fine four-story building. The number of applicants for plans in the various Architects' offices, seems to be, if anything, on the increase. Owners, however, are exercising a greater amount of caution as to the limit placed on the sum necessary for any contemplated improvement. This is such as to cause misgivings in the minds of the Architect as to the practicability of conforming to their client's ideas.

IN THE CITY

A reference to our Building Intelligence will show the following facts: During the month from the 10th of April to the 10th of May, there have been started in this city—

109	frame buildings, value	$519,556
2	brick " "	11,405
16	alterations "	46,882
127		$577,843

Making a grand total for the amount of

127 Buildings of the Value of $577,843.

IN THE COUNTRY.

There is now more work—in the aggregate—being performed throughout the State, in the building line, than at any period during 1884. The following places and localities may be considered as having their share: PORT COSTA, with its immense docks, warehouses, and near by the Selby Smelting Works. MARTINEZ is livelier than she has been for some time. OAKLAND and her sister ALAMEDA are displaying more activity than at any similar period for years. SACRAMENTO is looking up. YOLO COUNTY, as a whole, presents a more than average record. LOS ANGELES is quiet, but still a goodly number of buildings are in process of erection. FRESNO and vicinity is keeping pace with the section further south. SAN DIEGO, the city of *magnificent guesses*, has awakened from its lethargy and actually several houses and improvements have been started. In fact, from every section is beginning to be heard the sound of mechanics' tools, as they are wielded by men who cheerfully look forward to a prosperous season.

LUMBER.

In spite of the new schedule, this material can be had at rates favoring the buyer. Prices may be again raised, but if an owner will take the money in his pocket and travel personally among our dealers, he will soon find out that the amount placed on the cards representing the price of lumber, is anything but that for which lumber can be obtained.

Building Associations.

THE influence of these organizations is being felt more and more as people better understand their workings. In all of them, the demand for money is greater than the supply. The "Mission Building Association" is growing at a rate that will soon place it at the head of those in this city. It is fortunate in having for its President Mr. Hutchinson, of Sather & Co., bankers. The premium has gradually advanced from 10 per cent. up to 14, and it is not probable that, in the near future, it will be less than the latter figure. We will endeavor soon to give a full history of the workings of these associations.

A New "Castle Hall."

THE Knights of Pythias in San Francisco have taken the initiative toward securing a permanent abiding place,—a "Castle Hall,"—for the order, where the chivalric brotherhood in this city may assemble in weekly fraternal intercourse; and brethren of the order from all sections of this State and the Pacific Coast, and those from beyond the great mountain chain which divides and sectionizes our great country into East and West, and brother knights from foreign countries, may gather and receive fraternal greetings under the order's own vine and fig-tree, with its proud banner floating above its portals, and the great spirit of pure chivalric brotherhood permeating its inner chambers.

A fine lot, 77.6"x137.6" has been secured, located along the northern line of McAllister Street, about opposite the Hall of Records. While the enterprise will be known as the Knights of Pythias Hall, and will be built for the special purposes and uses of the order, its ownership will not be in the order, as such, but in an incorporated stock organization, known as the "*Knights of Pythias Hall Association*," with a stock capital of 100,000 shares, at $10 per share.

The lodges in San Francisco have already made handsome *first* subscriptions to the enterprise, amounting to nearly $20,000 within the time required to search the title papers. It is expected that every lodge of the order within the jurisdiction of the grand lodges of California and Oregon, will become shareholders; and the individual subscriptions already in, and the excellent feeling expressed among the membership generally, assures us that the personal subscriptions to the enterprise will be large, and that soon the forty odd thousand dollars required for the purchase of the lot will be raised, and a sufficient surplus as a building fund to enable the early commencement of the edifice.

The brilliant success achieved by the order during its few years of existence, its growing popularity and great increase in membership, render it both feasible and necessary that the order should enjoy the advantages and benefits of its own Castle Hall, built for, and dedicated to, the benevolent and fraternal objects of the order, and the perpetuity of the sacred principles which called it into existence, and which in less than twenty years has caused it to grow from the small nucleus organized in the City of Washington, D. C., for purposes of the purest and most sacred character, to an order more or less numerous in every State in the Union, with 117 lodges, and a membership of 9,066 in California, and in the United States nearly two thousand lodges, and 135,000 true and valiant knights, with a present high and honorable standing among the oldest and best fraternal organizations of the age, and a future full of hope and promise.

Science of Carpentry **$5.00**

The Buddensick Infamy.

IT is both possible and probable that through the legal technicalities the recognition of doctored testimony, direct perjury, and shrewd legal management, so fearfully admitted and practiced in American courts of justice, the man Buddenseik, if brought to trial, will escape deserved and adequate, if not all punishment for his willful accessoryship before the fact, in the destruction of human life occasioned by the fall of the death traps provided by him in the city of New York, in the shape of houses for human inhabitants. It is unnecessary for us to repeat the story of the fall of the building shams constructed by this man, and the sad results that followed. These have been heralded by the press of the country, and are known to any one who reads the daily papers or class journals; and no disinterested person within the boundaries of the United States questions the culpability and guiltiness of the author of the calamity, except in the degree of punishment that should follow the crime,—for crime it is, whether of negligence or the more probable total disregard of consequence,—or that which is still worse, the ungodly and inhuman spirit of avarice which sets at defiance all laws and ordinances provided to control and regulate the acts of such men, many of whom, if not so bold and daring, are to be found in all parts of the country, San Francisco not excepted. The practical lessons presented in this case are the present more important points worthy of notice.

It is an unfortunate affair for New York, as it involves the reputation of a considerable portion of the real estate improvements in that city, not known to be constructed by reliable contractors under the superintendence of competent and reputable architects. The tendencies are to the depreciation of property, not beyond the possibility of doubt as to character of construction. However limited the Buddenseik class of buildings may be in fact, the happening reveals and fixes *upon the metropolis of* New York the unenviable reputation of a city containing numerous dangerously constructed buildings, and many who might otherwise be inclined to invest in New York improved real estate, will be deterred from doing so through fear of a repetition of trembling walls, fire, and sudden calamitous destruction of life.

The affair is also unfortunate in that it furnishes capital and argument, and gives color to the more or less common notion largely prevailing among the people of other countries, that almost everything American partakes of is shoddyishness and frailty. But while the adverse features of the case are numerous, the occurrence will prove beneficial in the future in this,—that without its warning the man Buddenseik, and perhaps many others of like selfish purposes, would have continued to erect buildings of similar dangerous character, and instead of a single block or row, there would have been, in time, hundreds of fraud structures, each liable to tumble at any moment, killing large numbers of innocent persons.

The good effect of this sad warning has aroused the New York officials having building matters under their control, from the slumber of unpardonable neglect; and for a time at least it may be expected that at least safe, if not eminently substantial, buildings will be the rule. Nor will the influence of the cruel happening be confined to New York. Building commissions, boards of public works, and others appointed and empowered to look after such villainous building manipulators as the man Buddenseik, in other cities, will exercise greater vigilance in the performance of their duties, and it is safe to presume that for years to come the building frauds will be held in check, and but few buildings permitted which will not pass mechanical constructive examination.

Men Who Own Their Homes.

AN artisan who is working industriously to pay for his little garden and home, has a well-defined purpose in life, and when that purpose is attained he becomes the happiest of men. It is laudable ambition to own one's own habitation, in which case a man's house becomes his castle. Rent-paying dulls the edge of effort, and helps to make a man a sort of drone in life's busy hive. Energy and industry will soon earn and pay for a home. The more a man accomplishes the more he may.

The active tool never grows rusty. You will always find those men who are the most forehanded and most forward to do good or to improve the times and the city, always busy. Who start our railroads, our machine-shops, our manufactories, and our new school-houses and churches? Men of industry and enterprise—men who own their homes that they have earned by their own efforts. As long as they live they keep at work, doing something to benefit themselves and others. We go for activity—in body, in mind, in everything. Let the gold grow not dim, nor the thoughts become stale. Keep all things in motion.

New Books.

WATER CLOSETS.—A historical, mechanical, and sanitary treatise, by Glenn Brown, architect.

This new work gives a complete history of progress of inventions in water-closet from a period beginning several hundreds of years before the Christian era, down to the present time. All the late patented closets are fully illustrated and their merits and demerits faithfully portrayed. The sections on tank and supply valves are full of new and interesting ideas. For sale at this office. Price, $1.00.

A query found in the "Mechanical Engineer" deserves to be pasted in the office of every establishment that has an elevator. It is simply: How long is it since you examined the wire rope connections on your elevator? It will not do to suppose things are safe. Inspection reveals that which was hidden, and it is startling to see what we have relied upon sometime.

"INSOLVENT.—*Frederick Cobb, an architect and builder, has filed a petition in insolvency in the Superior Court. His assets are nominal, and liabilities* $3,600."

There are not five in one hundred of Mr. Cobb's class, who are not frauds in more ways than one. Many become *builders*, because they "cannot find steady work" as journeymen; yet the fact is, beyond dispute, that good, competent workmen, unless objectionable through irregular habits, physical ailments or otherwise, are seldom idle even for a day, except of their own choice; and seven out of ten who quit the ranks of wage earners to become master builders, do so from a knowledge of the fact of their inferiority as mechanics, or if not *wholly* from this conviction, the adjunct of great self-conceit in their executive abilities, and the phantoms of great imaginary results sure to flow from the exercise of their latent geniuses, the prospects of placing themselves in positions to control and manipulate the interests of owners, and similar incentives, allure them to venture where even men of honest purposes and good mechanical qualifications have *more generally* failed to make more than bread-and-butter successes. Consequently the field of building operations in California has yielded any number of *tares* of the Cobb kind.

If such men would attempt to reach no farther than the narrow limits to which they may have a shadow of claim, mechanics, the fraudism would be less conspicuous, and they would only be numbered with the thousands of those who have from time to time so tarnished the good name and reputation of "contractors," "builders," etc., that those only who have by years of good, square and upright demonstrations of integrity and competency, gained the reward of honorable recognition. But the assumption of "architect" by such men, is simply adding insult to injury, as not one in a thousand of them has the slightest knowledge of the professional science assumed, and what they do in that direction is more frequently the result of points gained from plans pilfered in some way, ideas obtained from books, or the work of boys and employees in architects' offices.

The failure of Gilbert & Co., of Oakland, is another of like cases as that under notice. They too were "architects and builders," furnishing plans, specifications and contracts, through which assumption they drew into their net many innocent owners, who were misguided by the pretensions—not the integrity or competency of the parties. They had their short day as "architects and builders," with an ending that developed more than intelligent, honest men would consider creditable. We were called upon by one of their victims to help him in his hour of trial, his home being unfinished and more money having been paid than was due, but the papers were of a character which left the unlucky owner at the mercy of those into whose hands he had placed himself, with no remedy at law, and his interests entirely contingent upon the conditions and circumstances of the case. The contract read, "To build a house in San Francisco for A. B." (neither location nor street being mentioned), "according to plans No. 86," etc., for the sum of———. The fact was clear, that the contract was either the result of consummate un-intelligence on the part of the party or parties who wrote it, or a well-concocted purpose to clutch the owner and hold him in a helpless attitude, with no possible redress, and compel him to accept whatever might be given him in the shape of a house.

While any punishment received, is well deserved by owners who will be parties to such transactions for the sake of getting a "cheap house," it is to be regretted that mechanical, architectural and building operations cannot be so protected by law or public sentiment, that such impositions, wrongs and false pretentions would not be possible, or their perpetrators severely punished.

Mend Your Files.

ONCE in a while a file will get broken, even with the best of care; but, with the knocking about they are subject to, it is a mystery how any of them come out whole. Tell the boys to bring a file to you the very minute they break it. Have a little bottle of muriate of zinc (zinc dissolved in muriatic acid), and wet the break with it immediately; then heat a soldering iron and tin the ends of the file. Heat the file pretty warm—not enough to start the temper, but rather too hot to hold in the hand. When well tinned and hot, press the two pieces firmly together, squeeze out nearly all the solder, and let the file cool. Trim off the joint, and, if well done, the file will break in another place next time. It will not pay to solder a file unless it is nearly new. Let it lay a day or two, or, in damp weather, even an hour or two, and you never can mend it so it will stay. Take it the minute it snaps, and you can do what they used to stick a 'prentice on, viz., mend a file.

THE SHARPENING OF TOOLS.—Instead of oil, which thickens and smears the stone, a mixture of glycerine and spirit is recommended. The proportions of the composition vary according to the class of tool to be sharpened. One with a relatively large surface is best sharpened with a clear fluid, three parts of glycerine being mixed with one part of spirit. A graver having a small cutting surface only requires a small pressure on the stone, and in such cases the glycerine should be mixed with only two or three drops of spirit.

The old idea that slow grown timber was stronger than that grown quickly is disproved by recent tests in England, so far, at least, as oak is concerned. Second-growth hickory is usually more valued for handles of axes, hammers, etc., and the annual rings show it to be of swifter growth than the first stock.

Shoddy New York Buildings.

THE details are at hand of the manner in which some buildings in New York City have been constructed. The late disastrous collapse of a row of brick houses, has been the means of exposing the methods by which certain contractors have made fortunes—through and with the aid of public officials. If the latter charge is proven, they, as well as the architect and contractor, should be subjected to the workings of that ancient Persian law which provided that any architect who put up a building that from any cause should afterwards fall down, should be buried alive under the ruins of the fallen structure.

We also notice that the Persians had a way of enforcing this law with great regularity, and that they jammed the sod down tight and quick about the unfortunate builder. The result was a very substantial style of architecture, which, in many places, is still in existence, although more than a score of centuries have rolled away since the foundations of some of their structures were laid.

The best proposition we can advance to our New York friends, is to frame a law with provisions in the same according to the above. The result would be a total cessation of the erection of careless, and we may say criminal, buildings. We fancy, however, that such a law would meet with much opposition from those who adopt the *Buddensick* standard of building as a rule.

The Chapter of Architects.

FOR the first time in a number of months there was not a quorum present at its meeting of the first ult. This should not have been, and its members deserve reproof for neglect. The Chapter is on a good, sound financial and incorporated basis, and should command the support of every reputable architect on the coast. That it can be made a useful, influential and prosperous institution, commanding the respect and confidence of the profession and the public, is beyond doubt; and the only reason why it is not so, is because the architects of San Francisco fail to utilize the opportunity to bring about the result. It is but a small sacrifice for each to make, to devote one evening in each month to fraternal interchanges of views and ideas, and the consideration of matters alike interesting and profitable to all.

In the Eastern States, the Chapter interests are kept up, and much good is being accomplished, and the parent Chapter enjoys a national reputation, while in London the British society is a power in the land, and its published proceedings are worthy the reading and attention of every intelligent architect, at home and abroad. It only requires earnest effort on the part of well-meaning men, firmly banded together, to accomplish results gratifying and beneficial to themselves and others. It is to be hoped that every member of the Chapter will be on hand at its next monthly meeting. Let none be absent.

CALIFORNIA RUSTIC.

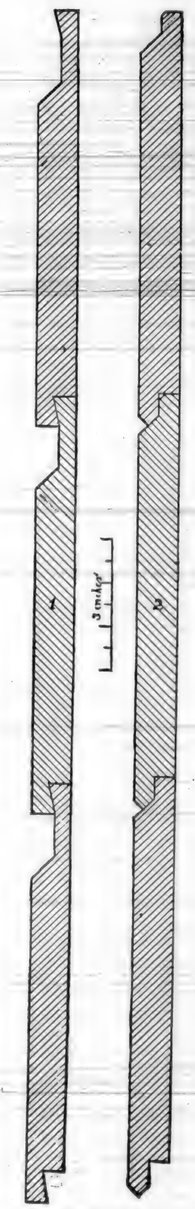


ILLUSTRATION OF CALIFORNIA RUSTIC

SAN FRANCISCO is largely what may be termed a "wooden city." The statistics of last year show that out of 930 buildings erected in that time, but twenty-five were brick; this, however, is not a fair comparison, as the number of frame houses erected was unusually large for that period. A fair estimate would place the ratio of about one to twenty-five. Keeping this fact in view, it is not strange that the ingenuity of our architects is taxed to its utmost in studying new shapes for the material to be used on the outside of buildings. In the earlier times, "clapboarding" was used quite extensively, but now it is rarely seen. Tongue and grooved stuff was also used, but its liability to shrink caused its use to be discontinued except in rare instances.

Previous to 1864, rustic was made of ⅞ lumber, thirteen inches wide, and, owing to imperfect machinery, was necessarily costly, the average price being about five dollars more per thousand than T. and G. surfaced redwood. The lumber had to be passed twice through the machine, the first operation being the reduction of the lumber to a uniform width and thickness. We think that it was in the year mentioned that, acting upon a suggestion made by G. B. Knowles, Mr. C. W. Thomas invented a machine by which the two operations were combined into one, and thus, by reducing the time consumed in manufacturing the rustic, materially lessened the price of the same. The mill owned by Thomas was situated on north side of California, between Davis and Drumm. It has long since been a thing of the past, and its place occupied by wholesale stores.

As mentioned before, rustic when first used was made thirteen inches wide; but this width was found to be too great, and was soon after cut down to ten inches, which is now regarded as the standard. In our illustrations, No. 3 represents the kind in most general use, and is called channell rustic. No. 2 is an other form that is much used, and is known as the V rustic. When the latter is used, it should be thoroughly seasoned and not over eight inches wide. The other patterns shown are in general use with the exception of Nos. 1 and 8. The former has one objection that will prevent its adoption. The natural shrinkage of the lumber will cause a "bump," just where one layer laps on the other. The upper edge of one piece being covered by the lap of that above, will not shrink as much as that on the outside, and so the outside will naturally, in being shortened by shrinkage, be forced out from a direct line on the face. In many kinds of lumber, this contraction would be strong enough to split the board, or at least as before mentioned cause a "bump." A still greater objection could be urged against No. 8. If used, it should be worked out of lumber not less than 1½ inches thick. This design was suggested by one of our first contractors, who evidently has been a deep student of the results of *capillary attraction*.

No. 7 is a design that is lately coming into prominence. It is very neat and when made from dry lumber, and care taken to have the mill work smoothly done, it gives an extra finish to the exterior of a house. With the lower lip cut off it is also a superior design for a base board, a three or three and half inch lip light moulding making it present a fine appearance.

Nos. 5 and 6 differ from No. 2 only in the width, and the size of the V joint.

There are still other kinds than those we have shown. A few years ago, it was fashionable to have the rustic blocked out to represent stone, but like all imitations it soon tired the eye, and is now but seldom seen.

The primitive style of thirteen-inch rustic is now but seldom seen, but for the benefit of curiosity seekers, we will refer them to an old house on Sutter Street not far from Mason, where

ILLUSTRATION OF CALIFORNIA RUSTIC.

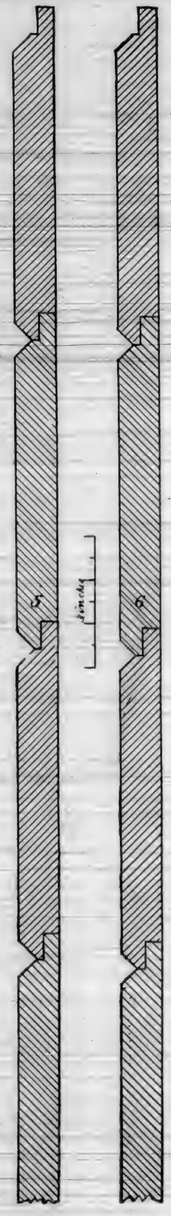


ILLUSTRATION OF CALIFORNIA RUSTIC.

specimens of the *first* ideas may be seen. We may add par parenthesis—that although at first from three to five dollars per thousand was charged extra for rustic, the same *liberal* tactics were applied then that are now so successfully practiced. A small bill of rustic alone would be charged the extra price, but for the sake of selling a *bill* of lumber, it would be placed at the same rate as Tongue and Groove. A difference of opinions exists in regard to which variety is best for a building,—hard or soft rustic. By far the greater portion that comes to this market is of the latter kind; it is generally preferred on account of the ease with which it can be sawed, and for the few blows of a hammer necessary to drive a nail home. But there are some of the *long heads* of the lumber fraternity who claim that *hard* rustic is much the best, when care is taken to have the same thoroughly seasoned, and due caution is exercised in the careful driving of the nails.

Never buy second quality rustic. It is more expensive in the end than No. 1. A pile of second quality rustic is made up from probably the run of several mills at scores of different times, consequently the width varies considerably, and is the source of much annoyance even to those using it on a barn. Hard pieces, crooked grain pieces, short pieces, sappy pieces, etc., are all thrown together into the second quality pile. The keen judgment of a first-class mechanic will enable him to quickly notice these different specimens; but the average mechanic consumes more time "assorting out" than would pay the difference in cost of gilt edge rustic.

In 1865 the price varied from $40.00 to $42.50 per thousand. In September, 1879, the price dropped to $20.00, which is the lowest, we think, for which it was ever sold. At present it is about $30.00.

There are buildings standing to-day upon which three different widths of rustic were used. Why the architect should specify one width for first story, a less width for second story, and still less for the third story, is one of those problems that can be answered only by the professional in charge.

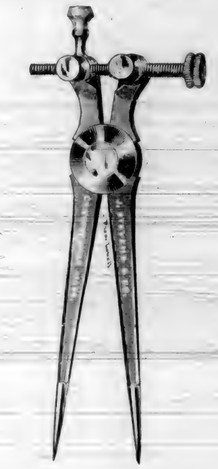
San Francisco owes much of its greatness to redwood rustic. In case of fires, its more than ordinary non-combustible quality has been the means of preventing serious conflagrations. When the wood is heated, the pores of the wood naturally open; and when water is thrown on the same, the wood soaks up the water and is thus rendered less liable to combustion. Thus feeling partly protected from fire, our worthy citizens pile on the exterior finishes, and to-day San Francisco stands forth as the finest built and showiest wooden city of the world. Another safeguard pertaining to rustic, lies in the fact that it is devoid of pitch and other substances of an inflammable character. This is a peculiar feature of all redwood.

Rustic should be V stacked upon the ground immediately upon the commencement of a building; the joints and laps should be primed before being used. A strip of tin placed behind every butt joint is a safeguard against leaks from open joints caused by shrinkage, for redwood *shrinks endways*, and if the material is not extra dry, a disfiguring crevice will appear at every butt joint.

The lumber fraternity generally consider rustic a profitless article to deal in, the thinness of the channel section rendering it very liable to splits and breaks from piling, stacking, or other causes, and the least defect condemns the same from being placed in the *gilt edge* pile.

Other facts in connection with the material under consideration will be given in a future number, as several of our prominent dealers and mill workers have promised us important data in regard to *California Rustic*.

ILLUSTRATION OF CALIFORNIA RUSTIC.



Reliable Dividers.

THE above cut represents the new style of "Reliable Dividers" as manufactured by J. Stevens & Co., Chicopee Falls, Mass. They are forged from heavy stock and operated with a right and left hand-screw, thereby removing all back lash, and making, as its name indicates, a *reliable* instrument. A sample of the above can be seen at this office. We can recommend these dividers for superior finish and the hardness of the points. Any hardware dealer will furnish you with one of these instruments, or we will furnish those living remote from cities with any number upon receipt of the price—$2.50 each for the 5-inch size.

Hanging a Grindstone.

TO HANG a grindstone on its axle to keep it from wobbling from side to side, requires great skill. The hole should be at least ⅜ inch or ½ inch larger than the axle, and both axle and hole square; then make double wedges for each of the four sides of the square, all alike and thin enough so that one wedge from each side will reach clear through the hole. Drive the wedges from each side. If the hole through the stone is true, the wedges will tighten the stone true; if the hole is not at right angle to the plane of the stone, it must be made so, or the wedge corresponding must be altered in the taper to meet the irregularity in the hole.

Concerning the above method of hanging a grindstone, a correspondent of one of our contemporaries writes as follows: "The method described has been in use as long as the grindstone itself, but it is not the way to do it today. Wedging the center of a stone, is a great help to burst it, and when the speed is excessive, the wedging strain is an important factor in the life of the stone and the safety of those around it. The best and easiest way, and the scientific way, to hang a grindstone is by a nut and collars, almost like a circular saw, and exactly like an emery-wheel. If the hole in a grindstone is 6 or 7 inches square (as usually made) fill up with a piece of green timber. If live timber is not available, soak a piece of wood over night in water; then it will not swell when wet and exert a destructive pressure on the stone. Take a pair of big dividers or a trammel, and find the center of the stone. Do this upon each side of the stone, and bore the hole from both sides. Bore a little larger than the shaft, or burn out the hole if your auger is not quite large enough. See that the stone is decently true upon its sides where the collars bear. If not so either chip the stone or mount it temporarily and turn the sides true. Now put it on the shaft and screw up. True the face of the stone, as it is not probable that you will get it to run exactly true. You now have a grindstone that will not come loose by getting dry every time it stands without water a day or two, and is not apt to split open when first wet. When that stone gets worn down to 18 or 20 inches in diameter, it pays to split it, and make two narrow stones, provided it was 6 or 7 inches thick originally. To split a stone, turn a groove ⅜ or ½ inch wide, and as deep as convenient—2 inches will do, but 3 is better—in the center of the face. A piece of ¼ or ⅜ inch gas-pipe is the tool to use for turning the groove. Drive the groove full of dry pine wedges. Have them fit as well as possible. Do not drive too hard, or you may break out a piece and spoil the stone. After the wedges are all fitted, lay the stone in water or keep it wet, and it will split in two at its leisure."

The Credit System.

WE think too much cannot be said about the exercise of great care in the matter of giving credit. It is a most unpleasant duty to be obliged to inform any one that credit can only be given for a limited amount or on only short time, or that it can't be given at all; but it is none the less, in many cases, a duty, and is a duty we all owe, not only to ourselves but also to those toward whom we are called upon to perform it. It is a duty every man owes to himself to see that neither his money nor his merchandise is put out into hands where there is an uncertainty about its return, especially where the payment of his own bills depends upon that return. Undue extension of credit has caused the ruination of more men than has the limitation of it; and so we say, it is often a duty a dealer owes to a customer to keep him from getting too much in debt. The same principle applies to the time given a man on his account, because, being called upon himself to pay his bills promptly at a certain time, he must see to it that his own customers keep their own accounts up, and therein is where the retail dealer too often makes his mistake —*he don't collect his bills*. We have said to many people who have traded with us: "What makes it so difficult for you to make your payments when they become due?" It is true you haven't a large capital, but you get thirty days' credit here, and that should allow you to get around comfortably?" The answer has been, "My customers don't pay me." "Are you getting a lot of bad accounts?" "Oh, no, my accounts are all good." "Why don't you make them pay?" "I don't like to ask them for money because they would get mad and not trade with me." Now a man with a limited capital and a credit to sustain, which must be done if he is to buy his goods cheap, had better, in our opinion, get that class of men mad if he can't get his money without doing so (though we think he can if he goes to work in the right manner) and let some man sell them who has plenty of capital to pay his bills and accommodate people too. Don't let your customers run up large accounts with you; it is better for them that they shouldn't, and it is better for you.

A fashionable clock-maker told me in course of conversation yesterday, that, in spite of the large supply of small-priced clocks now on the market, there was still the usual demand for the large and expensive imitation "grandfather's clock," which look as if they had been handed down in the family for many generations. It is a fact that no fugitive from justice is more anxious to conceal his antecedents than many of our so-called society families are. They ride in their carriages, flaunt their wealth and hold their heads high, and yet you could confuse them by asking them what business their grandfather's, or even father's, had been. Such people buy "grandfather's clocks," old china, and such articles, and place them in conspicuous places in their residences in order to impress visitors with the antiquity of their family.—*Ex.*

When a paint brush is stiff and hard through drying with paint on it, put some turpentine in a shallow dish and set on fire. Let it burn for a minute until hot, then smother the flame and work the pencil in the fingers, dipping it frequently into hot spirits. Rinse all paint brushes, pencils, etc., in turpentine, grease with a mixture of sweet oil and tallow, to prevent them from drying hard, and put them away in a close box.

A new process for drying lumber is attracting attention. It consists in surrounding the wood with common salt. In ordinary kiln-drying the albumen is killed or destroyed, and the surface dies out first, thus sealing the juices inside to escape eventually through cracks caused by the uneven expansion of the wood. The new process is said to be better in this respect.

Steam pipes, at the temperature of steam, will not ignite wood, but superheated steam will; low water in the boilers will superheat the steam in the pipes.

Our Illustrations.

PLATE 1 represents the elevation of a very convenient and attractive city residence, plates 2 and 4 being the plans of first and second stories. The design is especially adapted to a 25-foot lot and is arranged so that abundance of light can be had in every room. Care has been taken to mark the sizes of the rooms, the names of the various apartments, closets and conveniences, so that any one at all conversant with a plan can readily understand everything in connection with our engravings. Cornices are shown in the parlor, dining-room, hall, and principal bedrooms. As shown, the plan can be carried out for about $8,000.

Plates 3, 5 and 6, are designs for sideboards. They are all of a handsome design and yet of moderate price. Plate 7 is a design for a parlor chair.

Iron Straps in Carpentry.

T. YOUNG, in the *Architect*, states that when it is necessary to employ iron straps for strengthening a joint, considerable attention is necessary that they may be placed properly. The first thing to be determined is the direction of the strain. We must then resolve this strain into a strain parallel to each piece, and another perpendicular to it. Then the strap, which is to be made fast to any of the pieces, must be so fixed that it shall resist in the direction parallel to the piece. Frequently this cannot be done, but we must come as near to it as we can. In such cases we must suppose that the assemblage yields a little to the pressures which act on it. We must examine what change of shape a small yielding would produce. We must now see how this would effect the iron strap which we have already supposed attached to the joint in some manner which we thought suitable. This settling will, perhaps, draw the pieces away from it, leaving it loose and unserviceable. This frequently happens to the plates which are put to secure the obtuse angle of butting timbers, when these bolts are at some distance from the angles, especially when these plates are laid on the inside of the angles. Or it may cause it to compress the pieces harder than before, in which case it is answering our intention. But it may be producing cross strains, which may break them, or it may be crippling them. The strap which we observe most generally ill placed, is that which connects the foot of the rafter with the beam. It only binds down the rafter, but does not act against its horizontal thrust. It should be placed further back on the beam, with a bolt through it, which will allow it to turn round. It should embrace the rafter almost horizontally near the foot, and should be notched square with the back of the rafter.

Walk the streets with your eyes open. Your daily stroll will never fail to have some ideas for you if you will only meet them half way.

PLATE 1.—SEE "OUR ILLUSTRATIONS"

Blind Nailing.

SINCE nailless flooring has become prominent in all first-class work, the form of matching has been improved by giving the tongue and groove a new arrangement that shall be more consistent with the strength of the joint

Fig. 1.

and accessibility in driving nails. Besides, a nailless floor should be self-sustaining and nailed directly to the floor-joist without the necessity of an underfloor, or rough packing of any kind, and be left air-tight, dust-proof, and preventing in this manner drafts and the penetration of foul gases. The first attempt to keep

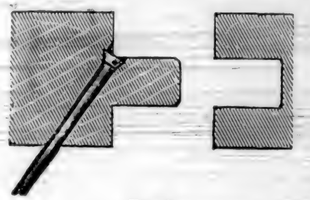


Fig. 2.

the heads of the nails out of sight was to simply toe them in from one edge; as shown on square edge work in Fig. 1, which effectually hides all traces of the nails, which of course must be well set in out of the way of the next board; but, as there were no means of securing only one edge, the flooring was likely to warp and leave

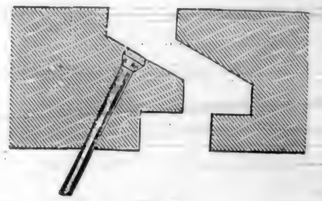


Fig. 3

an uneven floor. As soon as the matching of boards by the tonguing of one edge and grooving the other was employed to strengthen the joint, the shoulder was found sufficient to hold the floor by blind nailing, as shown in figure 2; the shoulder fitting completely over the tongue effectually hides the nails.

The Putney improvement, in the form of matching, not only strengthens the tongue and diminishes the tendency to rise and warp at the shoulder of the groove, but allows any

Fig. 4.

practical man sufficient room to drive the floor nails, which may be better understood by referring to Fig. 3. The nails are driven nearly at right angles with the surface of the tongue and far enough from the roots to make room for the hammer. The joint is easily forced together, and makes a union that is nearly seamless, unless they have been tongued and grooved in a saw-mill where the flooring is actually "rattled" out of on the happy-go-

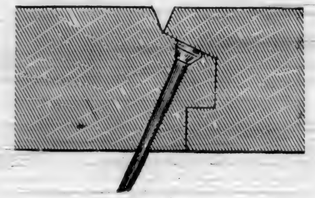


Fig. 5.

which-side-up-you-please, with every now and then a refuse one thrown out of the window. Good work requires care and attention, with machinery that will remain where you leave it. The form shown in Fig. 4 may work with better results where nail-grip is desired. Fig. 5 has been offered for filling purposes or where stock is likely to split. Flooring can be fastened by nailing through one shoulder of the groove instead of the tongue, and Fig. 6 is

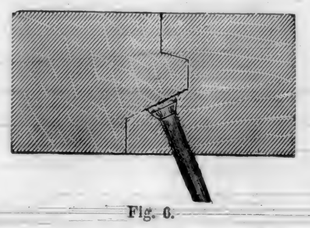


Fig. 6.

given as the most improved form of matching for this purpose. The laying requires but very little skill, and can easily be taken up and relaid without damage, an advantage that must be appreciated in temporary work. The advantages to be derived in nailless flooring where one of these substantial forms are used, must be such as to bring the whole system into extensive use.—*Boston Journal.*

Lecture to Plumbing Apprentices.

THE subject of the fifth lecture to apprentices of the Baltimore Master Plumbers' Association, which was delivered by Mr. John Trainor, March 19th, was: "The present condition of the business in Baltimore, and some of the every-day requirements of a good journeyman and helper."

"In recent years," he said, "I have seen, as others have, 'unskilled and untrained' ride rough-shod into the business, humbugging the people, and injuring the business of those who have made it the study of their lives, until the business, a few years ago, was about as unskilled, or a very great number of those engaged in it were unskilled, and consequently it became very unprofitable for those who do understand the business and had a proper regard for customers' rights and their own reputation. The beginning of a new era in the plumbing business is near, and it is again to take its place among the high mechanical arts. Hence those who expect to command first-class wages must understand the business in detail.

"Great care should be taken in arranging service-pipes, that they may be easily examined or repaired when necessary. Their sizes should be in proportion to what they are expected to supply. Dead ends in water-mains should be avoided, if possible, as they invariably collect considerable dirt, called sediment, for want of means of flushing. Air-chambers are of no value in any other position than perfectly upright, and continuations of pipes below the spigots, and over sinks and other fixtures, where the supply comes from above, never ought to be made, for they are of no value, but collect sediment, and cannot be drained out when necessary. Hydrants and street-washers should not be connected with iron-pipe; if that kind of pipe is used, then there ought to be a couple of feet of lead pipe next to the fixture to prevent the hydrant or street-washer from breaking off when raised by the frost in winter. The size and location of soil, waste, and ventilating pipes is a very important matter for consideration. None of them should be located on the outside of a building if it is possible to have them on the inside, and in no case should ventilation-pipes be on the outside, for in cold and damp weather they are of no use where they are so exposed. The size of soil and waste pipes should be gauged as nearly as possible to answer the services required of them, for, if too large, they are never flushed properly, more particularly on horizontal lines. Dead ends in soil and waste pipes should always be avoided.

"Learn the mechanical part of your business when you are an apprentice, and in after years you can keep step with the march of improvements in your business. Cultivate your hands to work in conjunction with each other. Prepare yourselves to pass such examinations as may be necessary under the 'License Law,' for if you fail in that you will have to go out of the business. So take time by the forelock, and be equipped when your time comes."—*The Sanitary Engineer.*

Various Strengths.

AN important question among architects and wood-workers often presents itself, when two substances or materials are placed in position in a manner that each will be subjected to certain strains, as to the combined strength of both. When an iron rod is placed with a joist, the natural supposition is that the strength of the double will be equal to the united strength of both the wood and iron, which does not always prove correct unless they are firmly attached, which it is impossible to do without weakening one or both; but if such appliances could be brought to bear without thus weakening, of course the combined strength, at normal temperature, would be equal to the square of the combined strength, another impossibility, inasmuch as the difference of contraction and expansion of wood and iron is such that there would be hardly a day in the year when they would both represent their original degree of elasticity and strength.

Take the following results, obtained from laboratory results, of the tensile strength of various materials, and we will find that no two of them placed together will represent the combined strength as represented. The table is based on the number of pounds' pressure required to tear asunder one square inch of each of the following substances:—

Copper, wrought	34,000
" cast	19,000
" wire	61,200
Gold, cast	20,000
Iron, "	27,000
" wire	103,000
" best bar	72,000
" medium bar	60,000
" inferior "	30,000
Lead	800
Platinum wire	53,000
Silver, cast	40,000
Steel	120,000
Tin, block	5,000
Zinc	3,500
Brass	42,000
Ash wood	16,000
Beech "	11,500
Birch "	15,000
Box "	20,000
Cedar "	11,400
Chestnut wood	10,500
Cypress "	6,000
Elm "	13,400
Fir, strong	12,000
" American	8,800
Redwood, Cal.	10,120
Lignum Vita	11,800
Locust	20,500
Mahogany	21,000
Maple	10,500
Oak, white	11,500
Oak, seasoned	13,600
Pine, pitch	12,000
Poplar	7,000
Sycamore	13,000
Walnut	7,800
Willow	13,000

There are many substances in the foregoing not used by wood-workers, but more that are, and the table, taken as a whole, will be found correct, and handy for future reference.

Goods on Approval.

THE practice of sending out various kinds of goods on "sale and return" has attained somewhat considerable proportions in certain branches of the trade. It is severely condemned in many quarters as being wrong in both theory and practice, whilst also being held to be merely a cloak to veil the retailing of the manufacturers who adopt the plan. It is further denounced as being an innovation which invades the domain of the retailer, inasmuch as the tradesman who agrees to so vend the products of a manufacturer sinks his individuality to a great extent, and merges his ordinary profits into that which is really a commission paid to him on the sales he makes. Other objections are also made, prominent amongst them being the charge of encouraging reckless trading; that the system enables a man who may not be worth $5.00, and be void of experience, to make as good a show as the man with $5,000 capital, and well up in his business; and that it raises sundry questions of liability which are not easy of settlement. On the other hand, it is contended that practice promotes sales which might not be made otherwise, seeing that it virtually enables a manufacturer to establish branch show-rooms in different towns without being at the expense of rent, rates, and attendance, besides giving the public an opportunity of selecting from a large stock of goods, which is frequently renewed, and therefore always kept up to the latest ideas. It is also said to benefit manufacturers by "tying" tradesmen to them, and so excluding their competitors.

"Skin Plumbing" originated in the twelfth century, when the tilers attempted to do the plumber's work. The carpenters tried it in the thirteenth century, and it grew to be so bad that legislation was necessary to stop it. In the fifteenth century, 1490, the medical profession turned their attention to bad plumber's work in the attempt to prevent some of the diseases caused by it. In 1690, further checks in the shape of legislation were applied, but to-day when the skin plumber flourisheth like a green bay tree, nothing is done.

A HINT REGARDING TIMBER.—It is a well established fact that timber when seasoning springs toward the sap, and that to secure the best results, all timber should be so placed that the bearing strain will operate against the heart side. In cutting rockers, the heart side should be up; door pillars, with the heart toward the outside; spring bars, with the heart up; axel beds, with the heart down; shafts and poles, with the heart up. This may occasion loss in cutting planks, but it secures a good job.

Rats have a great aversion to the odor of the chloride of lime, and, when mixed with water and poured into the holes through which the rats pass, they usually vacate their haunts. This mixture is harmless, does not kill the rats, but drives them away—sometimes.

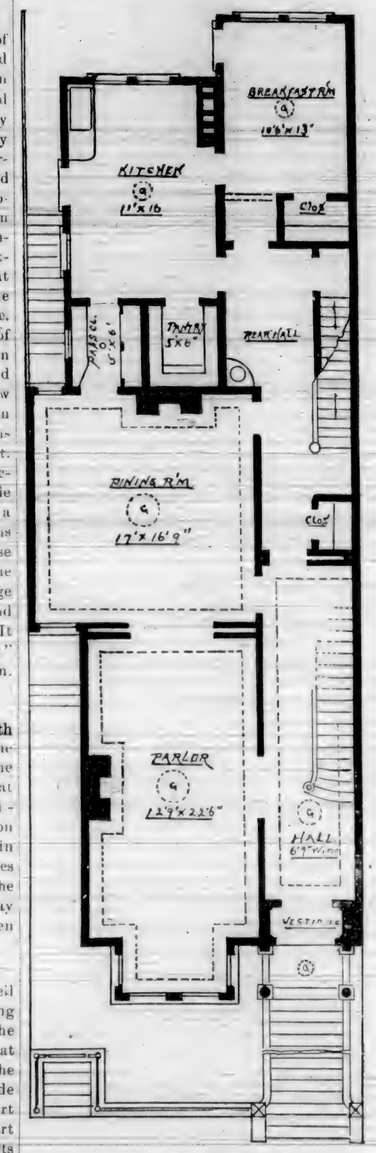


PLATE 2.—SEE "OUR ILLUSTRATIONS."

ARCHITECTS' DIRECTORY.—This work contains a list of Architects practicing their profession, in all the cities of the United States. While there are many blunders, the work, in the main, will be found to be as reliable as any similar publication. For sale at this office. Price, $2.00.