

The Country's Progress.

THE following statistics show the growth of the country since the year 1860:—

Twenty-five years ago we were 30,000,000 of people; now we are over 50,000,000.

Then we had 141 cities and towns of over 8,000 inhabitants, now we have 286 of such cities and towns. Then the total population of our cities was 5,000,000; now it is about 12,000,000.

Our coal mines then produced 14,000,000 tons, now 85,000,000 tons, or six times as much.

The iron product amounted to 900,000 tons of ore; to-day it foots up over 8,000,000 tons a year, almost a nine-fold increase.

In 1860 our metal industries employed about 53,000 hands, consumed \$100,000,000 worth of material, and turned out about \$180,000,000 in annual products.

To-day these same industries employ 300,000 hands, consume \$380,000,000 of material, and their annual product amounts to \$660,000,000 a year.

In 1860 the wood industries employed 130,000 persons; to-day they employ 340,000, while the value of their annual product has trebled.

The woolen industry employed 60,000 persons then, and now employs 160,000, while our home mills, which produced goods of the value of \$80,000,000 in 1860, now turn out an annual product worth \$270,000,000.

Finally there is cotton. In 1860 we imported 227,000,000 yards of cotton goods; in 1881 we only imported 70,000,000 yards.

In the meantime the number of hands employed in American cotton mills has increased to 200,000, and we export over 150,000,000 yards of cotton goods a year, instead of importing 227,000,000 yards as we used to do.

The silk industry employed 5,000 persons, now it employs about 35,000, seven times as many.

We import no more silk goods now than we did in 1860, but our own mills, which produced goods of the value of \$6,000,000 then, now turn out a product of over \$40,000,000 yearly.

In 1860, 12,000 persons were employed in American pottery and stoneware works; to-day about 36,000 are employed in this industry.

The chemical industry, which employed 6,000 persons then, now employs 30,000.

In the meantime we have nearly five times as many miles of railways, and double the number of farms, and yielding more than double the number of bushels of cereals.

In the production of sheep we had 22,000,000 of them in 1860, to-day we have over 40,000,000 of them; and whereas we then produced in this country 60,000,000 pounds of wool, now we produce 240,000,000 pounds.

Finally, the total of our exports has doubled. In 1860 it stood at \$400,000,000, and now it stands at about \$900,000,000.—*Philadelphia Commercial List.*

The City of London.

THIS city was anciently founded on the north side of the river, and down to a time comparatively recent the south bank was not thickly inhabited. As soon as people began to extend beyond the city walls, the phenomena so common in great cities showed itself, and the wealthy moved westward, leaving the poor to extend eastward. Various causes have led to a prodigious increase in the extent of London, and it is now difficult to assign limits to what is almost more a compact province than an extended city. Places that formerly were remote suburban villages have been completely swallowed up, and many outlying districts that are situated outside the metropolitan boundary are really connected with the heart of London by unbroken lines of streets and houses. You may now go from Holloway on the north to Penge on the south, or from Stratford on the east to Putney on the west, without passing an unoccupied field.

It will be easily understood that even the refuse from so large a city constitutes a great difficulty. Much land is now occupied by houses which was once so far out of the way that it was used as a deposit for ashes, dust, and garbage.

London streets, even important ones, are, generally speaking, narrow, and the houses low. In some of the newer districts wide streets have been laid out, and the exigencies of traffic are constantly causing old thoroughfares to be widened and straightened at enormous expense. In many of the oldest parts of London, however, tortuous lanes and narrow alleys, and blind streets abound, and the houses have little or no land in the shape of fore-court or back-yard attached. London enjoys a compensation for her narrow thoroughfares in the number of fine open spaces. The parks have been well called the lungs of London; and, in addition to them, the many squares and the wide channel of the Thames provide a sensible and welcome relief from the crowded and compact mass of dwelling houses.—*Sanitary News.*

Work on the Capitol tower at Albany has made good progress this summer. It has risen thirteen feet, and before cold weather it will reach the point where the cone begins. The first curve of stone for the western staircase has been laid. The electric wires are being carried through all the furnished portions of the edifice, and the legislative rooms are being carpeted anew.

The ten finest buildings in this country, according to the majority vote given in the *Boston American Architect*, are Trinity Church, Boston; the Capitol at Washington; W. K. Vanderbilt's house, Trinity Church, and the Jefferson Market Court House, New York; the City Hall, Hartford; City Hall and State Capitol, Albany; Sever Hall, Cambridge, Mass.; and Town Hall, North Easton, Mass.

The Building Acts in London.

THERE have been building acts in London ever since the period of the great fire, mainly directed to diminishing the risk of another general conflagration. Of the acts now in force, which are numerous, the most important are the metropolis local management act, and the metropolitan building act, with sundry amending acts. The former of these contains, speaking broadly, the regulations as to drains and streets, the latter those affecting buildings. The central authority for drainage, etc., within the ancient and comparatively small limits of the city proper is the city commissioners of sewers, a branch of the corporation. That for the rest of the metropolis proper is the metropolitan board of works—having affiliated to it a series of local boards, each consisting of a group of parishes or a single parish. Beyond the boundaries to which these acts apply there extends a large inhabited zone, forming, so to speak, a third division. Drainage is under the direction of surveyors, who are the salaried officers of the various boards. The building act is administered by a large number of district surveyors, who are architects in practice, and each intrusted with the supervision of the buildings in one locality.

The building act, besides attempting to secure a minimum of strength and solidity in walls, and requiring many precautions against the risk of fire, contains some sanitary regulations of considerable importance and value, though the management act is the one mainly directed to sanitation.—*Sanitary News.*

Evidences are abundant and conclusive in regard to the lasting properties of cypress wood. Hence it is gradually creeping into use more and more each year. Already it is being used in many houses in New York City in finishing, with calls for more. Five million shingles is the estimated amount of consumption in the New York market, with an increasing demand. At least 3,000,000 feet of the wood will be required to supply the market in railroad ties. It is exported to some extent to various ports. Railroad ties have been sent to Cuba, France, and England. Lumber has been sent abroad, but in no great quantities.

The employment of cast-iron columns as main supports has been greatly restricted at Berlin by a regulation issued from the architect's department of the police authorities of that city. The order has been issued in consequence of a discovery made last winter at a fire, when it was found that the cast-iron columns had been cracked by the effect of the cold water playing on them while hot. The authorities now insist that where partition walls rest upon cast-iron columns, the latter are to be covered with plaster or bricked in, with an air space between the bricks and the column.

People who advertise only once in three months forget that most folks cannot remember anything longer than about thirty days.

A Nation's Hero Gone to Rest.

NOTHING that we could possibly indite, would add a single iota to the universal homage paid to the memory of the illustrious dead. It has been the lot of but few men to reach an eminence so high and grand, and secure a love and admiration so devout and universal, as did the honored one who at his death and burial aroused the profound and heartfelt sympathies and sorrow of fifty millions of his own people, and in which millions in other lands united—feeling that a truly great, brave, and good man had passed away.

But while he no longer in person mingles in the active scenes of life, he lives in the memory of present generations, and will live in history through all future ages, as one of the noblest and best of his race; and his examples will pass down through coming periods as a guiding star to millions yet unborn. Truly may it be said, though dead, he yet speaketh.

As in life his influence was powerful, in death it was mighty, serving more than any other one event could do, in breaking down sectional asperities and sentiments, restoring the waste places in our national brotherhood, and uniting the people of our common country in sympathies and purposes never, we trust, to be again interrupted.

National Academy of Designs.

IT is proposed to admit a limited number of leading American architects to the National Academy of Design—a step long since adopted by the British Royal Academy and the French Institute. Several architects are already active members. On this head the *American Architect*, referring to this subject, says: "It is much to be desired that architects and other artists should be brought more together in this country, and every movement for bringing about more intimate relations will be warmly promoted by those who best understand the advantages to be gained in this way. . . . It is true that the simple election of a man as a national academician would not imbue him with artistic feeling, nor secure to him always the co-operation of his brother academicians in his work, but it would do something to interest him in other artists and them in him, while the admission of architectural drawings to the annual exhibitions would do still more; and . . . the mutual acquaintance of persons of tastes so similar could not fail to be in some way pleasant and serviceable to all."—*Ex.*

The manufacture of steel nails has made rapid progress since 1883, in which year this industry may be said to have had its beginning. During the last year there were 393,482 kegs of steel nails manufactured, the production of the three leading nail-making States being as follows: West Virginia, 204,336 kegs; Ohio, 130,636 kegs, and Pennsylvania, 29,224 kegs. In 1883 this country produced only 18,224 kegs of steel nails.—*Mining Herald and Colliery Engineer.*



PLATE 3.

APPROACHING EARTHQUAKES.—The earthquake shocks which were felt recently over a wide area in Yorkshire remind us that an authority on the subject of these phenomena, M. Delaunay, of Paris, is of opinion that next year will see the recurrence of upheavals of the earth's crust in an intensified form. M. Delaunay is a prophet of evil, but unfortunately all his prophecies have hitherto come true. His specialty is earthquakes, and he predicts them only too surely. In 1877 he announced that the year would not conclude without violent disturbances of the earth, and as a matter of fact, two frightful catastrophes on the coasts of South America followed. In 1883 M. Delaunay again pointed to approaching earthquakes, and soon after the volcanic eruptions in the Indian Archipelago occurred, by which thousands of human beings lost their lives, and hundreds of square miles of terra firma were engulfed by the sea. Towards the end of last year M. Delaunay once more raised his warning voice, and the earthquakes in Spain proved how well founded were his warnings. Quite recently he has prophesied very severe volcanic disturbances for 1886. Having acquired a well-merited notoriety in foretelling earthquakes, some weight ought to be attached to M. Delaunay's utterances. He affirms that next year these natural phenomena will be of a very intense character, and that they will show themselves either when the earth is under the direct influence of a planet of the first rank, such as Jupiter, or under that of a group of asteroids, or at a time when the sun and moon are nearest to our planet at the same time.—*Iron.*

Be Thorough.

ONE of the mistakes that young people make oftener than any other, is that of not being thorough, of thinking that it is no matter how a piece of work is done as long as it can be made to serve the purpose. An article in an exchange gives several examples to show how thorough work pays.

It was Carlyle who said, "Genius is an immense capacity for taking trouble," and George Eliot gives us the same thought in other words: "Genius is at first little more than a great capacity for receiving discipline." The most successful have always been the most painstaking. A prominent judge, living near Cincinnati, wishing to have a rough fence built, sent for a carpenter, and said to him:—

"I want this fence mended to keep out the cattle. There are some unplanned boards; use them. It is out of sight from the house, so you need not take time to make it a neat job. I will pay you only a dollar and a half."

However, afterward, the judge, coming to look at the work, found that the boards were planned, and the fence finished with exceeding neatness. Supposing the young man had done it in order to make a costly job of it, he said angrily: "I told you this fence was to be covered with vines. I do not care how it looks."

"I do," said the carpenter.

"How much do you charge?" asked the judge.

"A dollar and a half," said the man, shouldering his tools.

"Why did you spend all that labor on the job, if not for money?"

"For the job, sir."

"Nobody would have seen the poor work on it."

"But I would have known it was there. No; I'll take only the dollar and a half." And he took it and went away.

Ten years afterward the judge had a contract to give for the building of certain magnificent public buildings. There were many applicants among master-builders, but one face attracted his attention. It was the man who had built the fence.

"I knew," said the judge, afterward telling the story, "we should have only good, genuine work from him. I gave him the contract, and it made a rich man of him."

The Hon. Josiah Quincy was at one time conversing with Daniel Webster upon the importance of doing even the smallest thing thoroughly and well, when the great man related an incident concerning a petty insurance case which was brought to him while a young lawyer in Portsmouth. The fee promised was only twenty dollars. Yet, to do his clients full justice, Webster found he must journey to Boston and consult the law library. This involved an expense about the amount of his fee, but after hesitating a little he decided to go to Boston and consult the authorities, let the cost be what it might. He gained the case.

Years after this, Webster was passing through the city of New York. An important insurance case was tried that day, and one of the counsel had been suddenly prostrated by illness. Money was no object, and Webster was asked to name his terms and conduct the case.

"It is preposterous," said he, "to expect me to prepare a legal argument at a few hours' notice."

But when they insisted that he should look at the papers, he consented. It was his old twenty-dollar case over again, and having a remarkable memory, he had all the authorities in his mind, and won the suit. The court knew he had had no time for preparation, and were astonished at the skill with which he handled the case.

"So you see," said Webster, as he concluded, "I was handsomely paid both in fame and money, for that journey to Boston;" and the moral is that good work is rewarded in the end, though, to be sure, one's own self-approval should be enough.

Thoroughness implies attention to details, neatness, and method. A young man who was shrewd and exacting, but whose business habits were careless and unmethodical, succeeded by hard work and economy in establishing a prosperous business, but failed and went into bankruptcy at the early age of thirty-five, because of his carelessness in omitting to put a note for a large amount in his bills payable.—*Western Rural*.

THE GREAT PYRAMID.—Mr. J. B. Bailey writes to the *St. James Gazette* as follows, with reference to the desirability of exploring the great pyramid: "Now that Great Britain is dominant at Cairo, would it not be a good plan to clear away the sand and rubbish from the base of the great pyramid right down to its rocky foundation and try to discover those vast corridors, halls, and temples containing priceless curiosities and treasures with which tradition in all ages has credited the great pyramid? The wonderful building, of such exquisite workmanship, was erected many years before any of the other pyramids, which are only humble imitations, built by another nation, and also for other purposes; for neither King Cheops nor anybody else was ever interred beneath this mighty mass of stone. The smaller pyramids also exhibit neither the nicety of proportion nor the exactness of measurement, both of which characterize the first pyramid. From internal evidence it seems to have been built about the year 2170 B. C., a short time before the birth of Abraham, more than four thousand years ago. This—one of the seven wonders of the world in the days of ancient Greece—is the only one of them all still in existence. The base of this building covers more than thirteen square acres of ground. Its four sides face exactly north, south, east, and west. It is situated in the geographical center of the land surface of the globe. It was originally 485 feet high, and each of its sides measures 762 feet. It is

computed to contain 5,000,000 tons of hewn stone, beautifully fitted together with a mere film of cement. And these immense blocks of stone must have been brought from quarries five hundred miles distant from the site of the building. The present well-known king and queen chambers, with the various passages, might also be thoroughly examined by means of electric or lime lights. The astronomer royal of Scotland, some years since, closely and laboriously examined all that is at present known of the interior of this enormous building. He states that measurements in the chambers, etc., show the exact length of the cubit of the Bible—namely, 25 inches. This cubit was used in the building of Noah's ark, Solomon's Temple, etc. He also maintains that the pyramid shows the distance of the sun from the earth to be 91,840,000 miles.

FIRE-PROOF DOORS.—The most efficient fire-proof doors are of wood covered with tinned iron. The door is made of two thicknesses of tongued and grooved boards, crossing each other diagonally and thoroughly nailed together. The sheets of tin are bent over at the edges, forming locked joints as in a tinned roof; it is important that the edges as well as the sides of the door be covered, as its resistance to heat lies in the fact that the fire cannot burn the wood thus protected against exposure to the air, nor can it warp it, as is the case with an iron fire-door subjected to slight heat. If a fire-proof door is hung on hinges, special care must be taken to insure their security by fastening them to the door by means of bolts rather than screws, and connecting them to the wall in an equally secure manner. The latches should be selected with a view to durability, as such a heavy door is apt to be destructive of weak latches. Where the position of the doorway permits sliding doors, it is preferable to have them on tracks, care being taken that cleats be placed on the floor each side of the doorway, so as to secure the door at its lower corners when shut.

In the Boston Storage Warehouse, United States, there are a large number of such doors in the fire-walls, arranged to close an electric circuit when they are all shut, and the fact is recorded on the paper dial of the watchman's clock at certain intervals. Fire-proof doors are frequently arranged to close in advance of a fire by means of the yielding of an alloy fusible at 160° Fahr. The track upon which such a door is hung inclines about one foot in eight feet, and the door is kept from closing by means of a round stick about one inch in diameter, which reaches from one edge of the door to the opposite side of the door-frame. At the middle the stick is cut in two diagonally, and a ferrule, made of two pieces of thin copper soldered together longitudinally with the fusible alloy, covers the joint in the stick. When this ferrule is exposed to a temperature of 160° Fahr., its yielding causes the ferrule to split open, and the stick separates into pieces and allows the door to shut. In order

that the stick shall not fall in the way of the door, and that the door may be shut at any time, the stick is connected to the top of the door-frame by small chains near to each end. This simple device was designed by Mr. Lewis T. Downes, president of the What Cheer Mutual Insurance Company. Another method of utilizing this fusible alloy to close fire-proof doors and shutters, is by means of a wire extending around the room, and containing in various places links made of two pieces of brass soldered together. When the solder melts and allows the two pieces of brass to separate, the wire allows the shutter or door to close. Mr. Frederick Grinnell has improved the ordinary link by cutting a slot in one of the pieces of brass, and laying a short bit of wire therein, when they are being soldered together; the solder flowing around this wire presents a resistance in three planes, in place of the ordinary joint, which may be imperfect and lies in a single plane, concealed by the sheet brass so as to prevent inspection. Formerly solid links of fusible alloy were used, but the metal has so little resilience that it is apt to gradually lengthen, and finally break at some inopportune time.—*Engineering*.

Preservation of Building Stones.

DR. R. OGDEN DOREMUS, in a paper read before the American Institute of Architects last autumn, said that a result of porosity in building stones is that buildings, after absorbing water, effloresce, or become covered with a coating of salts, especially brick buildings laid in mortar made from sea sand. This means the decomposition of the material, besides a disagreeable appearance. In Philadelphia, after a rain, the houses are generally thus whitened. This efflorescence cannot be prevented by ordinary paint nor oil. Another dangerous result of porosity is that buildings absorb malaria. Hospitals thus become poisoned with a poison so deadly that he remarked he would sooner give his child the most deadly poison in the laboratory, and trust to the antidote, than expose him to such contagion. He mentioned many well-known buildings that were crumbling away, such as Girard College, the College of New York, Trinity Church, New York. He had dined with Goringe soon after the obelisk was set up in Central Park, and the subject of the weathering of the obelisk was suggested. Goringe said that it had stood 4,000 years, and would stand 4,000 years more. But, in fact, the obelisk is crumbling away. He showed several vials full of clippings collected at the foot of it, also specimens of stone found peeled off from inside the new Capitol at Albany.

A simple remedy was suggested, and one which has been extensively applied in St. Louis and to some extent in New York, namely, an application of paraffine mixed with a little creosote. The building is heated by a small furnace, and where there is ornamental work a blowpipe is sometimes required to heat depressions. The paraffine is then applied in a

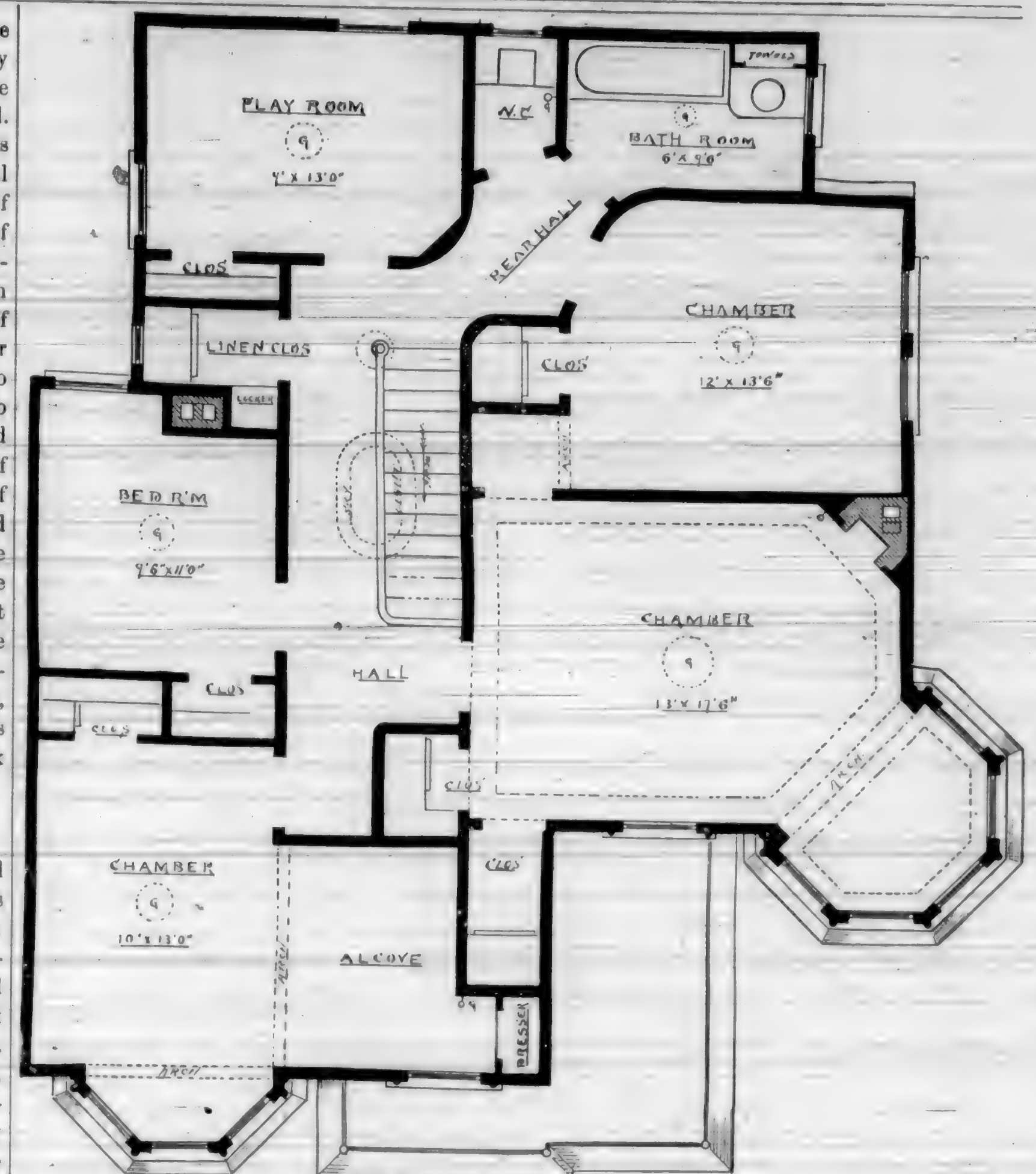


PLATE 4.

melted condition, and sinks in about a quarter of an inch, giving a beautiful and indestructible glossy finish, and rendering the material absolutely waterproof and air-tight. In reply to a question about fire, he said that a fire would only drive it in a little. It costs on an average about fifty cents a yard, and never needs to be applied a second time, as no chemical agent in the air or in the rain affects it at all. Even caustic potash does not unite with it. If the application is made to marble that has been weatherbeaten, the marble should first be cleaned with steel brushes. Marble thus cleaned, however, unless treated with paraffine, soon becomes covered with a yellow stain. Some of the buildings in New York which have been treated with paraffine are St. Mark's Memorial Church; houses 124-6 South Fifth Avenue; Huyler's, corner Eighteenth Street and Irving Place; and a house No. 18 East Fifty-fifth Street, in a brownstone row. Every house in the row except this has its doorsteps "with verdure clad," and the growth of such mosses is destructive to the building material. The paraffine method is confidently commended by Dr. Doremus as the very best ever used.—*Builder*.

TOUGHENING TIMBER.—This is a new process by which it is claimed that whitewood can be made so tough as to require a cold-chisel to split it. This result is reached by steaming the timber and submitting it to end pressure, technically "upsetting" it, thus compressing the cells and fibers into one compact mass. It is the opinion of those who have experimented with the process that wood can be compressed 75 per cent, and that some timber which is now considered unfit for use in such work as carriage building could be made valuable by this means; and more especially since the rapid consumption of our best ash and hickory will sooner or later render some substitute necessary.

A Minneapolis artist, who has been "doing" Alaska, says that all the members of his party, and there were seventy-five of them, agreed that the Greek Church at Sitka is the finest church in America. It is built on the plan of a Greek cross, and the interior is a mass of gold and silver, of a magnificence of which a writer says he can give no idea. The walls are hung with pictures of royalty and the priesthood, sent by a Russian princess, who took this temple under her patronage.

MILL WORK ABUSED IN HANDLING.—This is a thing of common occurrence in the handling and transporting of finishes, doors, blinds, etc. Sometimes damage is done in passing the work out of the mill; such as spauling the arrises and bruising the faces and edges. But the chief source of injury occurs in the loading and unloading, many of the teamsters being of the "baggage-smasher" type, practicing but little consideration for the thing handled, so that it gets on and off the wagon, and the hauling is paid for. Frequently, by the time the mill work, doors and finishes, reaches a building, there are a great many marks, scratches, indentations, and defacements, which often cause trouble and annoyance alike to builder and architect; the former disliking to use the damaged work, which sometimes is of a character that smoothing up and sand-papering will not remedy; but as it is not always the case that the party damaging the work can be found, to fix the responsibility, as "nobody" is always the guilty party, and the contractor, rather than to discard the damaged work, and at extra expense and cost obtain perfect materials, very naturally seeks to use the imperfect, even at some sacrifice of perfect workmanship in the finishes; unless the defects are too glaringly bad, this is a natural result when dollars and cents, and a scrupulous nicety about small things, are the two opposing factors; the former is looked upon and guarded with a more jealous eye, and obtains the benefit of every doubt. If all this can be without noticeable irregularities, and results not discreditably to the architect, nobody is specially harmed; but often such defects are "fixed up" in such a shape that the architect is expected to pass them, at the sacrifice of his own judgment and ambition in the production of perfect workmanship. Ugly issues often spring from the causes outlined, by reason of the architect objecting to defects caused more through carelessness than design, yet of such character as to mar the completeness and perfectness of the workmanship involved; and although the defects may be of no great magnitude in themselves, simply a scratch or a bruise, the effect produced to the technical and practical eye of the architect competent to appreciate the niceties of perfect workmanship, is disagreeable and repulsive, and fully justifies complaint, and a refusal to accept such work.

A SMALL GREASE SPOT OR STAIN

On the dress suit of either a lady or gentleman is a *small matter* in and of itself, still no *tidy* person would willingly appear in public, or in social intercourse, until that *little thing* was removed; because "it spoils the look of the dress." And so in ten thousand other things, "looks"—appearances—produce effects, and judgment more generally follows and is shaped by the impressions made upon the visual organs. If this is so in matters generally, why not in reference to the finishes in buildings, which are continuously in view, either seen or handled every hour of the day, forming one of the permanent surroundings

of the home circle. In this view of the case, an architect cannot be "too particular" and exacting, as upon him rests every responsibility as to the harmonies and niceties which are calculated to make the abode of his client as nearly perfect as possible, all things considered.

TEAMSTERS MOST AT FAULT.

They are often unpardonably careless, dragging and tossing finished work as though it were of but little more importance than a dry goods box or an empty barrel. It is common to see the face casings of window and door panels laid on the iron bound edges of the sides of wagons, and otherwise crossing each other with no attempt at protection from chafing, and thus rode for blocks or miles over rough streets and roadways, with the friction at every step of the horses grinding away the fibers of the wood at the points of contact; so that by the time the place of destiny is reached, the things transported are in parts not fit for use. Not only the same thing occurs with panel doors, but they are often pushed and dragged on and off the load, when laid flatwise, with ungainly indentations made by the ends of the stiles digging into the horizontal parts. All this is bad, should not be, and could easily be avoided by a little care, and with cushions on the sides of the wagons to prevent the friction caused by the iron and wood coming in contact.

Hints on the Care of Tools.

THE following hints on the best means of keeping tools in good condition, which we take from the *Building and Engineering Times*, of London, cannot fail to be useful.

Wooden Parts.—The wooden parts of tools, such as the stocks of planes and handles of chisels, are often made to have a nice appearance by French polishing; but this adds nothing to their durability. A much better plan is to let them soak in linseed oil for a week, and rub them with a cloth for a few minutes every day for a week or two. This produces a beautiful surface, and at the same time exerts a solidifying and preservative action on the wood.

Iron Parts.—Rust preventives.—The following recipes are recommended for preventing rust on iron and steel surfaces:—

1. Caoutchouc oil is said to have proved efficient in preventing rust, and to have been adopted by the German army. It only requires to be spread with a piece of flannel in a very thin layer over the metallic surface, and allowed to dry up. Such a coating will afford security against all atmospheric influences, and will not show any cracks under the microscope after a year's standing. To remove it, the article has simply to be treated with caoutchouc oil again, and washed after 12 to 24 hours.

2. A solution of India rubber in benzine has been used for years as a coating for steel, iron, and lead, and has been found a simple means of keeping them from oxidizing. It can be

easily applied with a brush, and is easily rubbed off. It should be made about the consistency of cream.

3. All steel articles can be perfectly preserved from rust by putting a lump of freshly-burnt lime in the drawer or case in which they are kept. If the things are to be moved (as a gun in its case, for instance), put the lime in a muslin bag. This is especially valuable for specimens of iron when fractured, for in a moderately dry place the lime will not want any renewing for many years, as it is capable of absorbing a large quantity of moisture. Articles in use should be placed in a box nearly filled with thoroughly pulverized slaked lime. Before using them, rub well with a woolen cloth.

4. The following mixture forms an excellent brown coating for protecting iron and steel from rust: Dissolve two parts crystallized iron chloride, two antimony chloride, and one tannin, in four water, and apply with a sponge or rag, and let dry. Then another coat of the paint is applied, and again another, if necessary, until the color becomes as dark as desired. When dry it is washed with water, allowed to dry again, and the surface polished with boiled linseed oil. The antimony chloride must be as nearly neutral as possible.

5. To keep tools from rusting, take $\frac{1}{2}$ ounce camphor, dissolve in 1 pound melted lard; take off the scum and mix in as much fine black lead (graphite) as will give it an iron color. Clean the tools and smear with this mixture. After 24 hours rub clean with a soft linen cloth. The tools will keep clean for months under ordinary circumstances.

6. Put 1 quart fresh slaked lime, $\frac{1}{2}$ pound washing soda, $\frac{1}{2}$ pound soft soap in a bucket; and sufficient water to cover the articles; put in the tools as soon as possible after use, and wipe them up next morning, or let them remain until wanted.

7. Soft soap, with half its weight of pearl-ash, 1 ounce of mixture in about 1 gallon boiling water, is in every-day use in most engineers' shops in the drip-cans used for turning long articles bright in wrought-iron and steel. The work, though constantly moist, does not rust, and bright nuts are immersed in it for days till wanted, and retain their polish.

8. Melt slowly together 6 ounces or 8 ounces lard to 1 ounce resin, stirring till cool; when it is semi-fluid, it is ready for use. If too thick, it may be further let down by coal oil or benzine. Rubbed on bright surfaces ever so thinly it preserves the polish effectually, and may be readily rubbed off.

9. To protect metals from oxidation—polished iron or steel, for instance—the requisite is to exclude air and moisture from the actual metallic surface; wherefore, polished tools are usually kept in wrappings of oil cloth and brown paper; and, thus protected, they will preserve a spotless face for an unlimited time. When these metals come to be of necessity exposed, in being converted to use, it is necessary to protect them by means of some permanent dressing; and boiled linseed oil, which forms a

lasting film of covering as it dries on, is one of the best preservatives, if not the best. But in order to give it body, it should be thickened by the addition of some pigment, and the very best—because the most congenial—of pigments is the ground oxide of the same metal—or, in plain words, rusted iron reduced to an impalpable powder, for the dressing of iron or steel—which thus forms the pigment or red oxide paint.

10. Slake a piece of quick lime with just water enough to cause it to crumble, in a covered pot, and while hot add tallow to it and work into a paste and use this to cover over bright work; it can be easily wiped off.

11. Olmstead's varnish is made by melting 2 ounces resin in 1 pound fresh sweet lard, melting the resin first and then adding the lard and mixing thoroughly. This is applied to the metal, which should be warm if possible, and perfectly cleaned; it is afterwards rubbed off. This has been well proved and tested for many years, and is particularly well suited for polished and Russia iron surfaces, which a slight rust is apt to injure very seriously.

Rust Removers.—1. Cover the metal with sweet oil well rubbed in, and allow to stand for 48 hours; smear with oil applied freely with a feather or piece of cotton wool, after rubbing the steel. Then rub with unslaked lime reduced to as fine a powder as possible.

2. Immerse the article to be cleaned for a few minutes, until all the dirt and rust is taken off, in a strong solution of potassium cyanide, say about $\frac{1}{2}$ ounce in a wine-glassful of water, take it out and clean it with a tooth-brush with some paste composed of potassium cyanide, Castile soap, whiting and water, mixed into a paste of about the consistency of thick cream.

What Mr. Spurgeon said about advertising in one of his recent lectures: "Advertise, for the life of business is printers' ink." He probably, at the time, had in mind the fact that advertising is the staff of life in trade, just as bread is the staff of human life. For if a man wants his name and business to be known, he must keep them before the people. He must let them know where he is, what he is, and what he is doing. What! you doubt if advertising in trade journals does this so effectually as other methods you might mention? Where do you look to find the names of the most successful men you are acquainted with in trade? In the trade papers? Of course. Is your name beside theirs? A commercial man who gets through life persistently ignoring the value of advertising might have his brains exchanged for the stump of a crossing-sweeper's broom, and get along quite as well. Why, when people see a man advertise they know at once he is a business man, and his advertising proclaims that he is not above business, but anxious to do business.

The new building law for the city of New York, which has just been published, proves to be in many respects better and more convenient than that which it supersedes; and

although we are rather disappointed to find that some of the improvements which might have been adopted have not been, the statute, on the whole, marks a decided advance in the official regulation of construction in this country. Among its other merits, the text of the new law embodies many regulations and decisions of the Inspector, which have hitherto formed, so to speak, a part of the common law in regard to building operations, but, not appearing in the official edition of the statute, were only to be learned by architects at the expense of a good deal of trouble and annoyance; and these, particularly the younger ones, will be glad to have at least the greater part of what they are expected to know presented to them in shape for use. One of the principal points of difference between the new and the old law relates to the thickness of brick walls; stone walls, by the way, being entirely ignored in both laws. According to the former statute, no authority could be obtained for building any brick walls less than twelve inches in thickness. The powers of the law seem to have assumed that no New Yorker, however poor, would condescend to live in anything less imposing than a four-story house; and they oblige the builder of a house ten feet high to make all the walls exactly as thick as if it were fifty-five feet high. This provision, by unreasonably increasing the cost of small dwellings, has undoubtedly tended strongly to drive the poorer people of the city into the tenement-houses, which form the reproach of New York; and the new law, very wisely, as we think, modifies the rule so far as to allow houses not more than twenty feet wide, and thirty feet high, to be built with eight-inch walls above the basement, and so that blocks of houses twelve and one-half feet wide, and not over fifty feet high may be built with every alternate party-wall eight inches thick. There is no question that an eight-inch wall, which is, in proportion to its mass, the strongest wall which can be built with bricks, possesses ample strength, if properly built, for carrying the floors and roof of a dwelling house of such modest dimensions; and although the brick-makers may regret the change, hundreds of independent and home-loving workmen will welcome it as bestowing upon them the long-desired privilege of building and owning houses on terms as favorable as those which their brethren in Philadelphia and other cities enjoy.—*American Architect and Building News.*

The strongest wood in the United States according to Prof. Sargent, is that of the nutmeg hickory of the Arkansas region, and the weakest the West Indian birch (*bur seva*). The most elastic is the tamarack, the white or shellbark hickory standing far below it. The least elastic and the lowest in specific gravity is the wood of the *Ficus aurea*. The highest specific gravity, upon which in general depends value as fuel, is attained by the blue-wood of Texas, *Condalia obovata*.

TIMBER IN WASHINGTON TERRITORY.—Some idea of the great wealth of the timbered lands in the western part of Washington Territory may be gleaned from the following report which we take from the Portland, Oregon, *Journal of Commerce*:—

All that portion of Washington Territory lying between the Cascade Range on the east, Coast or Olympic Range on the west, and between the 47th and 49th degrees of north latitude, is a thickly timbered belt of fir, cedar, alder, maple, and other woods. Of these fir probably represents three-fourths. In the midst of this wealth of forest, nature has placed a broad, deep arm of the Pacific Ocean—Puget Sound—with which it is connected by the Strait of Fuca. Thus not only has nature provided the timber, but the water-way also, by which it is possible for the merchant marine of the world to come and obtain their lumber supplies, much of which sometime in the future must be furnished from these forests. Already the lumber trade with Australia, Central and South America, China, and the islands of the Pacific amounts to fully 75,000,000 feet a year, and employs a fleet of about fifteen vessels every month.

Puget Sound is 200 miles long, and has a shore line of 1,800 miles. This irregular shore line forms innumerable harbors splendidly adapted for the erection of saw-mills and other wood-working factories, and also for the establishment of ship yards. Along this whole shore line, and from thence on both sides as far as the eye reaches, nothing can be seen but the vast and magnificent wealth of timber, save here and there where man has established a mill port, a town, or an occasional farm.

In the timber belt of western Washington there are 20,000,000 acres covered with timber, most of which is included within the limits named—an area nearly equal to the combined areas of the states of Connecticut, Massachusetts, Vermont, and New Hampshire. This timber belt will average 25,000 feet of lumber to the acre, or a total of 500,000,000,000 feet of lumber. Hence the saw-mills of Puget Sound, with their present capacity of 500,000,000 feet per year, would take 1,000 years to cut it down. The fir trees frequently attain the height of 250 feet, and planks of lumber are sometimes turned out of these mills 100 feet in length.

There are now erected in this district, as near as we can ascertain, 24 mills, the aggregate value of which is \$5,320,000, with a daily cut of 1,300,000 feet.

In addition to the foregoing statement of the wealth of the mill corporations, very many of them also own sailing vessels and steamers, which are engaged in carrying lumber from the various mill ports to San Francisco and foreign ports. Many of these corporations have agencies in San Francisco, where they own properties in the shape of lumber yards.—*American Engineer.*

The Architects of California.

THE profession upon this coast is numerically large, and in the number there are many most excellent, competent, and honorable gentlemen, as also some who have assumed the practice of the profession without the possession of those essential, architectural, mechanical, and moral qualifications, so necessary to the proper administration of the responsibilities and duties devolving upon qualified architects. But this coast is not an exception in this regard, nor are the lesser class peculiar to the present age. The records of an hundred years ago, and through all periods since then, the complaint of learned and qualified architects in the United States and England, has been the presence, in the profession, of men of exceedingly mediocre attainments, with no higher ambition or aim than the sordid purpose of making money, without any scruples or regard as to the deceit and falsehood that are and must necessarily be practiced by those who have no true merit to recommend them, and who are compelled to rely upon a glib tongue, and wordy commendations of themselves, to entrap unsuspecting clients.

But the purpose of this article is not to dwell upon this class of pretenders, but to suggest a few thoughts to the leading and honorable members of the profession, with whom must emanate, and by whom must be carried into practical execution, the measure necessary to protect the honor and elevate the standard of architectural practices on this coast.

The nucleus for reformatory operations exists in the chapter of architects, which has already accomplished a greater work and influence for good than is accredited by those who have not yielded their personal and apparently selfish notions to a magnanimous acceptance of the possible benefits so manifestly plain, in a united, manly, and earnest commingling as brethren of a highly honorable profession. It may be that some who are not, are the equals of others who are Fellows of the chapter, and who recognize no necessity to become members, feeling confident in their own abilities to conduct their affairs satisfactorily and remuneratively without any assistance. This may be so, but the possessor of great resources is the man who can best afford to be generous. Those who are gifted and learned lose nothing by dispensing to others that which has come to them in abundance. No one lessens his store of knowledge by making others wiser, nor are his individual advantages diminished by an unfolding of facts and principles of life and business calculated to improve and benefit others; and the presumption is fair that, when men who might render assistance in a good cause refuse to do so for reasons not sustained by liberal and generous conclusions, there is a weak point somewhere in their own make-up which might be improved.

But, aside from all this, the architectural profession should be inspired by the high pur-

poses which influence the members of the legal, medical, and other professions to form in society relationships for mutual benefit in the advancement of the respective sciences, and for the protection of their best welfare; to develop methods of improvement among themselves, and scrupulously guard against encroachments and practices of demoralizing character. There is not a true member of the architectural profession who may not accomplish good for himself by aiding in a work of this kind, by mingling with others in advanced movements, and assisting in organizing and maturing measures calculated to better conditions.

It is pleasing to note the good fellowship and kindly professional sentiment which seems to exist among, and permeate the intercourse of architects in many of the States of the Union. The reports of proceedings in numerous cases forcibly illustrate the fact that men with like aims in life's pursuits can lift themselves above all personal bias and prejudices, and all belittling views, and rise to a higher sphere of action, co-operating with one common purpose for mutual interest. Thus it should be, and the more rapid approach to highest possible attainments in architectural science will be the more completely and perfectly accomplished, when this kindly and enlarged feeling and sentiment becomes comparatively universal. It should be so in California, and we need it more from the fact of isolation, and the limited opportunities to gather strength by contact with the advantages enjoyed by architects operating at or in close proximity to the great centers of magnificent structures, and who within a few hours' ride at most, are enabled to pass from city, through country districts, towns and villages, to other cities, gathering new information, ideas, and food for thought and application, and receiving, through the eye and senses, practical suggestions from the thousands of architectural demonstrations presenting themselves at every point. Not so in California. The opportunities are less and circumscribed by local bound; which fact should incite to united and earnest effort in at least seeking to work out the best possible good for the profession as a whole, and in establishing rules and regulations calculated to inspire honorable ambitions and practices, and restraining and correcting, or stamping with disfavor, all individual irregularities, in whatever form they may be found.

A Correspondent of the London "Field"

says: If one wants a carriage or implement photographed so as to make a working copy to scale, all that is necessary is, when the photo is being taken, that a clear and distinct three-foot rule be placed on the carriage; this is photographed along with the carriage, and, no matter what the size of the print or negative, will always be a true scale. It enlarges and diminishes in exactly the same proportion as the carriage.

An Architect's Responsibility.

THIS is a matter about which there are various erroneous notions afloat among the very parties who ought to understand just what responsibility can be properly and justly laid on the shoulders of architects. Probably the most erroneous ideas are those concerning the cost of the work. It is a popular belief that an architect's estimate of the cost of any proposed work is always exceeded by the actual cost, and there is a strong disposition to hold him accountable for this increased cost. It is our opinion, however, that a careful examination of the majority of such cases will show that the extra cost is chargeable to specific demands of the client, based upon the conception that somehow or other he is going to get more for his money than others get; or else from not comprehending the fact that a requirement, which in itself may be inexpensive, often carries in its train extra expenses that foot up to a large total. The client is not, of course, always to blame. We are aware that there is a large class of architects who, for fear of discouraging their clients in the beginning, systematically make all sorts of encouraging responses to inquiries regarding the cost, and doing everything to get a building enterprise embarked for the sake of the fee involved. In considering the responsibility of such architects as these, it must be borne in mind that there are few who descend to false representations in order to gain work, to whom mistakes and blunders can carry any adequate punishment by means of condemnation of their work. After they have secured the work, and it has been executed and paid for, what do they care for any questions of responsibility that may arise? They will find other clients, and their practice may not suffer. They are often successful men, and it is because some of them are frequently taken as typical of the whole race of architects that popular impressions arise that are the reverse of flattering to the profession as a whole.

Let us take such a case as the following: A man makes up his mind to an expenditure of \$10,000, and goes to his architect with his wants really based on that amount, but telling him that the most he can spend is \$8,500. The architect is one of the class we have been considering, and very likely thinks of nothing but producing fine sketches that will catch his client's eye. This he succeeds in doing perfectly, for he is a clever architect when not limited much as to cost. At the last moment, and perhaps because the client himself feels some doubts, the architect is told of the real amount that can be expended, but he is strongly cautioned that this amount cannot under any circumstances be exceeded. The lowest bid comes in about \$11,500, but the client is so in love with the design on which he has set his heart, that he finally decides to go on with it. After the work is under way, various matters crop out that had not been appreciated before, and some things seen only in dim perspective begin to loom up in a very

expensive manner. Of course, the client knew that the heating and mantels were not included, but he was not prepared for sundry other necessities, and he objected to be continually obliged to increase his scale of expenditure throughout. Hence, when he found that the actual cost of the house was \$15,000, he, in his own mind, laid the blame on his architect. In such a case as this the popular judgment is right. The architect is to blame. It is his duty to forewarn his client in the beginning clearly in regard to cost, and if he does not do so, his responsibility is direct. Further than this, if an architect makes misleading statements in order to induce his client to build, we do not see but what he could be held responsible at an action for damages, although it might not be easy to secure the proof unless it was documentary. We do not mean that an architect is bound to state the exact cost. This he cannot do; for even skillful contractors will differ as much as \$2,000 on \$12,000 worth of work. But an architect is certainly in a better position to know the cost than his client; and if his client is evidently expecting too much for his money, it is an architect's duty to inform him of the facts—i. e., that the probabilities are that the cost will exceed the amount appropriated. A little plain speaking on this point at the beginning would relieve an architect of the responsibility for the increased expenditure in case there should be any.

In most cases, however, we think the responsibility for the cost is justly laid at the client's door, the facts being somewhat as follows: The prospective house owner, if he is unacquainted with the building business, fails to realize that when he goes to his architect and says, "I do not wish to spend over \$10,000 under any circumstances whatever," he ought to stop right there if he wishes to hold any one but himself responsible for not exceeding this limit. Suppose the client, after saying as much as this and outlining his general needs as to rooms and peculiarities of living, site, etc., should trust rigidly to the architect for everything else—let the architect determine how much or how little hard wood shall be used, and the scale of the finish throughout. At the same time, let it be understood that the architect is to be held accountable for the result. Is it not a reasonable supposition that the cost would rarely be exceeded? Of course, a sensible architect in such a case would not bind himself down to an exact limit of cost, but if it was understood that his reputation depended upon his success in getting a good thing for the money, we think that the result would in most cases be creditable to architects as estimators. Nowadays there is too much designing without reference to cost. There is far more merit in solving a difficult problem—to build well on a minimum allowance—than to design cleverly, artistically, but, unfortunately, with a total disregard of cost. Any one can design a fairly good thing for \$20,000—we will say; but if the limit was

\$15,000, where is the merit? We are aware, however, that clients do not leave details to their architects. The more usual course for the client is, after the sketches are made, based we will say on \$10,000, to casually mention first one thing and then another, until, by the time the working drawings are completed, a complete category of increased demands not originally contemplated in the sketches, if such a thing were possible, would be astonishing. It is in this way that honestly-estimated sketches lead to increased outlays; and even if an architect is able to point these out to his client, or even if the client has been warned that he is expecting too much, the result is that the architect has to shoulder the blame.—*Building.*

Nuisances Not Due to Plumbing Work.

TWO INSTANCES came to our notice a few days ago which are very good illustrations of the fact which has been often proved, that shortcomings in the household economy are responsible for many complaints of sewer-gas. In the first instance, such complaints were made to a plumber about a house in the best quarter of Jersey City. When he visited it, he was satisfied at once that the odor was not due, as the people in the house supposed, to defects in the plumbing. He suspected dead rats. After a good deal of difficulty, the decaying body of one rat was found between the floor and ceiling; but the odors continued, and it required a week or two of tearing up of floors to get out all the carcasses, some half-dozen, in various stages of decay. But even this did not entirely free the house from the bad smells, and then search was made through the cellar. On a shelf was found a chicken-coop and the filth which would accumulate around such, and when this was removed and the cellar aired, the bad odors disappeared. Yet the family were persuaded at first that their plumbing was bad, and the plumber's reputation would have suffered had he not insisted on a thorough search for the cause of the smells.

In the second case a lady, who prided herself on careful housekeeping and neatness, sent for a plumber in some alarm because bad smells were pervading her house. The plumber informed her at once that it was swill-barrel and not plumbing-work. This was denied; the lady was sure her servants were too well trained to keep a foul garbage-barrel about, but the plumber insisted on looking for the cause, and soon discovered in the rear cellar a barrel with decaying vegetables, which had evidently not been emptied for some time, and had a very "loud" smell. This discovery satisfied the lady. The barrel was removed, the cellar aired, and no more sewer-gas was heard of.

These two cases carry their own moral, now that hot weather is here, and there are many more like them.

Graphite Roofing Paint.

AS FEW of our readers are thoroughly familiar with the nature and properties of graphite, a few general remarks will not be inappropriate before referring to it as a material for roofing paints. Graphite is one of the multitudinous forms in which carbon is found in nearly a pure state. The substance is variously known as graphite, plumbago, and black lead, the last two of which, however, convey the erroneous impression that it is in some way associated with the metal lead. It occurs in nature in different forms, varying from graphite nearly chemically pure to rocks and clays containing a small percentage of the mineral. Its most common use is for pencil leads, for which purpose it is mixed with varying proportions of clay to give the desired hardness. The two most extensive uses to which it is put is in the manufacture of crucibles and similar refractory articles and stove polish. Its peculiar properties are such as to make it an excellent material for roofing paints. Although this use of it has been known for some years, its manufacture is principally confined to one firm, the Joseph Dixon Crucible Company, Jersey City, N. J., who, besides, manufacture graphite for various other purposes.

The method of preparing it for roofing paints, as carried on by the above company, is very simple, and consists essentially in pulverizing the rock containing the graphite, and removing the silica by a leaching process until the remaining compound is suitable for paint. The process is stopped when the product analysis about 70 per cent. graphite and 30 per cent. silica, which proportions are thought to give the best results in roofing paints. This product is next finely ground in boiled linseed oil, in which form as a thick pigment it is put upon the market. The paint when used is thinned with boiled linseed oil until it has the desired consistency, and applied with a brush in the usual manner. Apart from the question of cost, and the fact that, owing to its lesser weight, a pound will cover a larger surface than a similar weight of heavy, mineral paint, graphite has many properties that are said to make it especially valuable as a roofing paint. The spreading properties of graphite are shown in the large surface a small quantity of the pure mineral will cover when rubbed. In virtue of this peculiarity the graphite paint is said to adhere more closely to the metal painted and to fill every small interstice, giving a smooth and perfect surface. Furthermore, the mineral is unaffected by heat or atmospheric changes and resists all corroding influences. The silica is added to give body and hardness to the mixture, and, as it is also unaffected by moisture and heat, it does not lower the quality of the paint. This paint has been used on roofs, bridges, smoke-stacks, etc., and is said to have given excellent satisfaction in all cases.—*Metal Worker.*

Modern Architectural Designs.....\$10.00 Practical Perspective.....\$6.00

PROPOSED DRAINAGE REGULATIONS.—The following excellent regulations have been proposed for the city of Glasgow, Scotland: 1. The positions and sizes of all drains, pipes, cess-pools, or traps, and all soil and rain-water pipes and conductors shall be shown distinctly upon the plans submitted, and the weights per foot of the lead or iron soil-pipes, conductors and cesspools be marked on the plans in figures. 2. Forty-eight hours' notice must be given to the Master of Works, at his office, previous to commencing the laying of any drains. The party giving the notice will receive a card of permission to open the street, which card will be held as proof of the notice having been given. 3. All connection between drains and the public sewer will be made by workmen of the statute labor department, and shall be paid for by the proprietor. 4. Every drain-pipe must have a uniform fall of not less than one inch to every lineal yard, and every pipe must be thoroughly packed and resting entirely on the solid earth. When the Master of Works deems it advisable, he shall require concrete foundations to be put under and around the drain-pipes. 5. The joints must be well cemented and all cement projecting on the inside must be removed. 6. Sufficient traps and ventilation must be provided for and fixed to the satisfaction of the Master of Works. 7. Before covering, all pipes must be inspected by the Master or his representative, and no junction connecting drain-pipes and plumber-work to be covered up until examined and passed by him. 8. The Master of Works to have the power to use the smoke-test on all drains and plumber-work before the building is occupied, and at any other time he may consider necessary, all expenses connected with the test to be paid by the owner of the property. 9. No dwelling shall be occupied until the Master of Works has given a certificate that the drains and cesspools, with traps, have been properly constructed, and the house otherwise fit for occupation. 10. Proprietors and contractors will give every assistance to the Master of Works, for the purpose of performing the necessary inspection.—*American Architect and Building News.*

No place more than San Francisco needs an intelligent, qualified "Master of Works," so named in the article above quoted, with powers to control all irregularities and violations of correct sanitary science and building construction, as defined and established by a commission or board of competent architects and civil and sanitary engineers. The villainous character of seven-tenths of the sewer work done in this city is simply fearful. Not three in ten, if three in twenty, of every foot laid prior to the enforcement of the Plumbing Law, being put in as it should be when entrusted to "sewer layers" upon their own knowledge and honor; nor is the evil fully remedied under the existing law, as the greater portion of the sewer work is still done by those who seldom, if ever, did a good job unless watched at every foot of pipe laid; and men who do well only when they are com-

pelled to, will do badly whenever the opportunity is left to them.

Decay of Iron.

A PHENOMENON has been observed in the Callowhill-Street bridge in Philadelphia, which is of great interest to architects and engineers, although the tax-payers of Philadelphia probably take no satisfaction in it. A few days ago men were sent to repaint the girders of the bridge, and began, as a preliminary process, to scrape off the rust. The attention of the foreman was soon attracted by the unusual size and weight of the scales of rust which fell upon the railroad below, and, on picking some of them up, found that they were solid masses, from one-quarter to three-eighths of an inch in thickness. It is needless to say that plate-iron girders which had lost their substance by rust to such an extent as this would have little strength remaining, and the vibration of the bridge under the movement of a horse-car or loaded cart, which was so great as to compel the painters sitting on their swinging stage to cling to the ropes or the braces of the bridge to avoid being shaken off, indicated still further the necessity for an immediate inspection of the whole structure. The first examination was an informal one, made by persons living in the neighborhood, who found not only that some of the iron-work had been nearly eaten through by rust, but that the whole bridge, which is built on a steep rising grade, had moved down hill so far as to tear out the top courses of stone of the upper abutments, and to buckle the struts of the intermediate supports; while the movements of the roadway framework had cracked the asphalt over them, and forced out the paving-blocks between the horse-railway tracks. The bridge includes one span of three hundred and forty feet, and as there can be no trifling with girders of this length, extensive repairs will probably be necessary. The structure was only completed in 1875, so that ten years of neglect have sufficed to bring it nearly to destruction, and those who have to design important iron roofs or bridges will do well to notice by this example how short is the life of such works if not properly cared for. In the case of the Callowhill-Street bridge, the corrosion was probably hastened by the action of the smoke from the locomotives which passed under it; but there are hundreds of bridges exposed to the same action, and the iron roofs of railway stations and manufactories are often subjected to similar or more dangerous influences.

THE LARGEST APPLE TREE.—The largest apple tree in the country is said to be in the door-yard of Delos Hotchkiss, Cheshire, Conn. Its circumference is thirteen feet and eight inches. The girth of the largest limb is six feet and eight inches. It has eight branches; five bear one year and three the next; 110 bushels have been gathered in one year from the five branches. It is over 140 years old.

Indestructible Paint.

THE Paraffine Paint Company are offering a line of paint compound which is claimed to possess superior qualities, even over the best white lead and oil. It is recommended for a large range of purposes, with extraordinary preservative qualities, and as the best resistant of fire known; also, that it will not chip or peel off, is easily applied, and guaranteed to last twice as long as any other paint. It is strongly endorsed by many of the prominent manufacturing, mechanical, mill, railroad, and other establishments in California.

Commenting on the difference in wages received by plumbers in London and Chicago, a plumbing paper published in London states its belief that the English plumber, by emigrating to the States, will better himself and probably make it better for those whom he leaves behind, by removing his competition from the labor market in England. The reason why this view is held is because wages are so much higher here than in London, and because the plumber here is supposed to have a status in society, that is, expressing it as does the English paper, "they hold a very different position in the States from what they hold at home." As for the latter suggestion, a man's social position in the States does not so much depend upon his occupation, so long as it may be an honest one, as it does upon the character and attainments of the man himself. If he is intelligent and respectable enough to bear the burdens and perform the duties of society, he will receive as much as he is entitled to. He is not hampered by the ridiculous notions of aristocracy; as in England.

As to the question of wages, it is held that the purchasing power of money is greater in London than in the States, but the difference is not equal to the difference in wages. It has been estimated that a man may live one-third cheaper in London than here, but he certainly receives more than one-third higher wages here. The fact seems to be that, in England, the plumber is put upon the same footing as other lines of labor and paid accordingly, while here his labor is recognized as skilled and he is paid accordingly. There is another thing which must be recognized by the intending immigrant plumber. That is, that his trade as learned in England differs materially from the plumber's trade as practiced in the States, and an English plumber just arrived from his native country could hardly hope to receive equal pay with American journeymen.—*Sanitary News.*

One of the simplest and readiest ways of loosening a rusted screw is to apply heat to the head of the screw. A small bar or rod of iron, flat at the end, if reddened in the fire and applied for two or three minutes to the head of a rusty screw, will, as soon as it heats the screw, render its withdrawal as easy with the screw-driver as if it were only a recently inserted screw.

MASONS' AND BUILDERS' EXCHANGE OF SAN FRANCISCO.

Room 11, 314 Montgomery St.

BELOW will be found a list of the members composing this Exchange. Boxes are provided for each member, so that architects, owners, or others desiring the services of any particular member, or those having boxes who are not members, and yet whose business is directly connected with that of the Exchange, can readily secure the attendance of the party sought, by leaving a note in the respective boxes.

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O'CONNOR, J. J., 648 Minna St., " 19
O'BRIEN, D. J., 323 Dupont St., " 31
O'SULLIVAN, P., 432 9th St., " 35
RICHARDSON, GEO., 513 Ell St., " 39
RICHARDSON, M. B., 624 Shotwell St., " 1
RILEY, J. F., 166 Perry St., Secretary, " 38
ROBERTS, S. N., 54 3d St., " 55
STEVENS, W. E., cor. Larkin and Market Sts., " 46
SCHOENMAKER, C., 323½ Chestnut St., " 62
WAGNER, J., Potrero Ave. bet. 22d & 23d Sts., " 5
WORRELL, C. R., 888 17th St., " 3
WATERSON, G. T., 638 Market St., " 64
YOUNG, LEWIS, " 49

BOX RENTERS—IRON MEN.

RAISTON, H. & J., Iron-men & House-smiths, Box 78
LEWELLYN, R., Columbia Foundry, " 77
PENDERGAST, THOS., Howard Iron Works, " 72
WESTERN IRON WORKS, " 69

STONE.

SCHALICKE, F. W., Patent Stone, Box 75
SOMERVELL, W. S., Granolithic Paving Co., " 55
PETERSON, H. M., Sand and Gravel, " 63
RICHARDSON, M. B., Concrete, " 1

BRICK.

ROBERTS & DAVIS, Sacramento Brick, Box 36
REMILLARD BRICK CO., " 23
PATENT BRICK CO., " 29
PETERSON, T. W. & Co., San Jose, Brick Co., " 68

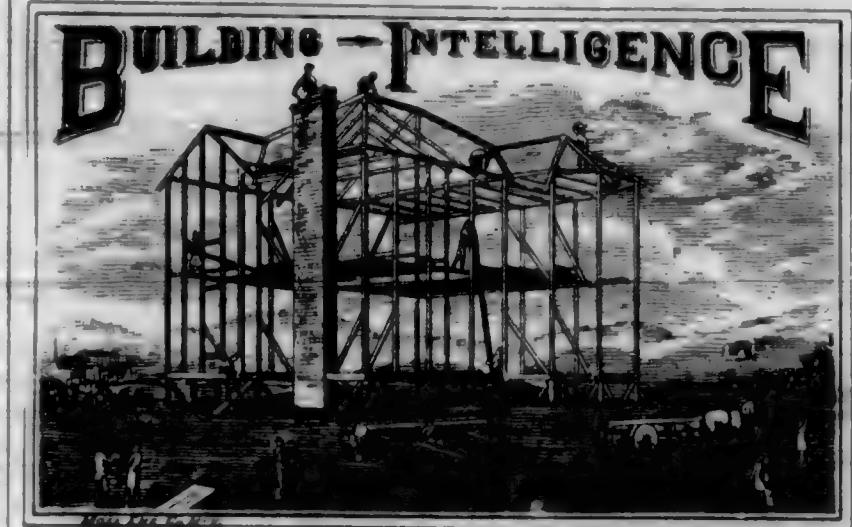
PATENT CHIMNEYS.

STEVENS, W. E., Patent Chimney, Box 46
BROWELL, J., Patent Chimneys, " 71
CLAWSON, L. E., Patent Chimneys, " 2

MISCELLANEOUS.

DAVIS & COWELL, Lime and Cement, Box 43
WHITTIER, JAS. E., Asphaltum, " 41
MCCLURE, P. L., Grader and Waterman, " 30
SIBLEY, L. B., Teamster, " 40
WARREN, CHAS., Grader, " 37
BUCKMAN, A. E., Grader, " 42
KELSO, JOHN, Grader, " 76
ENGLISH W. D. & Co., Graders, " 70
BUTTERWORTH, T. C., Glazier, " 48
HARNEY & SON, Street Contractors, " 54

The minister last Sunday morning had preached a very long, parched sermon on the creation of man, and one little girl in the congregation was utterly worn out. After the services, she said to her mother: "Mamma, were we all made of dust?" "Certainly, my child." "The preacher, too?" "Of course. Why do you think he was not made like the rest of us?" "Oh, because he is so dry, mamma, I don't see how the Creator could make him stick together."



Where owners' names are left blank, it is so done in most instances by special request.

A
Adelaide Place, cor. Taylor, Two-story frame.
O. Mrs. Kate Adcock, " 2800.
A. Geo. E. Voelkel, " 2800.
C. G. Knopf, " 2800.
B
Baker, cor. California, Two-story frame.
O. and H. J. C. Wier, " 85,000.
Bush, bet. Laguna and Octavia, Two-story frame.
O. P. Martin, " 44,000.
C. Wm. Burke, " 44,000.
Bryant, nr. Third, Two-story frame.
O. J. Monahan, " 31.
O. J. J. Clark, " 31.
C. J. Adams, " 31.
Baker, nr. Oak, Two-story frame.
O. F. Crichton, " 40,000.
A. Curlett & Cuthbertson, " 40,000.
C. P. Crichton, " 40,000.
C
Clay, nr. Webster, Alterations.
O. Mrs. M. Dieke, " 11,000.
C. R. Cook, " 11,000.
Clay, nr. Webster, Two-story frame.
O. Mrs. M. Dieke, " 22,800.
C. R. Cook, " 22,800.
Clementina, bet. Fourth and Fifth, Three-story frame.
O. C. H. Ingerson, " 44,000.
A. M. J. Welch, " 44,000.
C. A. N. Nelson, " 44,000.
Castro, near Eighteenth, Alterations.
O. W. J. Seley, " 61,500.
Day's work, " 61,500.
Church, cor. Market, Two-story frame.
O. and B. Jas. J. McKinnon, " 44,000.
Elizabeth, cor. Noe, One-story frame.
O. A. Faas, " 1,500.
A. H. Geilfuss, " 1,500.
C. J. Dryer, " 1,500.
Chesley, cor. Eldridge, Alterations.
O. J. J. Kelley, " 8700.
Day's work, " 8700.
Cumberland, near Guerrero, Three two-story frames.
O. Mrs. M. Gensoul, " 85,000.
A. Huerne & Everett, " 85,000.
C. W. B. Kregier, " 85,000.

D
Drumm, near California, Three-story brick.
O. S. S. Smith, " 80,000.
A. S. T. French, " 80,000.
C. Geo. Richardson, " 80,000.
E
Essex, cor. Laurel Place, Alterations.
O. A. B. Forbes, " 1,500.
A. W. H. Wharf, " 1,500.
Day's work, " 1,500.
Eighteenth, bet. Guerrero and Dolores, One-story frame.
O. and B. J. Durand, " 1,500.
Ellis, near Laguna, Two-story frame.
O. L. Zeiss, " 7,000.
A. W. Schrof, " 7,000.
C. H. J. Wies, " 7,000.

F
Folsom, nr. Twentieth, One-story frame.
O. E. Williams, " 1,500.
C. H. J. Van Warner, " 1,500.

G
Green, cor. Octavia, Two-story frame.
O. J. T. Daniels, " 3,000.
C. M. M. Flint & Co., " 3,000.

H
Harrison, near Twenty-fourth, Two-story frame.
O. Thos. Canlan, " 2,500.
A. J. T. Kidd, " 2,500.
C. J. M. Comerford, " 2,500.

I
Howard, bet. Sixteenth and Seventeenth, Two-story frame.
O. L. Van Lask, " 12,000.
A. H. Geilfuss, " 12,000.
C. F. Hlat, " 12,000.

J
Jackson, near Van Ness, Two-story frame.
O. Dr. DeVecchi, " 25,500.
A. W. Mosser, " 25,500.
C. H. A. Sheidon, " 25,500.

K
Kissling, nr. Twelfth, Alterations.
O. J. Moore, " 26,000.
Day's work, " 26,000.

L
Lyon, nr. California, One-story frame.
O. Wright & Sanders, " 2,000.
C. and B. D. F. McGraw, " 2,000.

M
McAllister, nr. Broderick, Alterations.
O. J. Owens, " 2,000.
C. Schmidt & Havens, " 2,000.

N
Nineteenth, nr. Guerrero, Three two-story frames.
O. Mrs. M. O'Connor, " 2,000.
C. J. McCarty, " 2,000.

O
Oakland, nr. Broadway, Two-story frame.
O. J. J. Welch, " 2,000.
C. W. B. Kregier, " 2,000.

P
Pacific, nr. Gough, Two-story frame.
O. J. S. Webster, " 2,000.
A. F. Bernard, " 2,000.
C. J. A. Ehmman, " 2,000.

Q
Queen, nr. Steiner, Two-story frame.
O. J. O. Pelton, " 2,000.
C. J. H. McKay, " 2,000.

R
Rialto, nr. Sansone, Three-story frame.
O. A. Chichizola, " 2,000.
C. H. J. Wies, " 2,000.

S
Silver Ave., nr. San Bruno road, One-story frame.
O. Jas. S. Bailey, " 1,300.
C. F. Bohnerberg, " 1,300.

T
Tenth, bet. Lyon & Baker, One-story frame.
O. P. Owens, " 2,000.
C. Crispy, " 2,000.

U
Union, bet. Lyon & Baker, Alterations.
O. California Woman's Hospital, " 2,000.
A. Wright & Sanders, " 2,000.
C. J. C. Burpee, " 2,000.

V
Valencia, bet. Mason and Folsom, Two-story frame.
O. Mrs. Ann McBride, " 2,000.
C. Wm. Winters, " 2,000.

W
Washington, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

X
Xavier, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

Y
Yosemite, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

Z
Zion, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AA
AA, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AB
AB, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AC
AC, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AD
AD, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AE
AE, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AF
AF, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AG
AG, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AH
AH, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AI
AI, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AJ
AJ, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AK
AK, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AL
AL, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AM
AM, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AN
AN, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AO
AO, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AP
AP, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AQ
AQ, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AR
AR, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AS
AS, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AT
AT, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AU
AU, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AV
AV, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AW
AW, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AX
AX, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AY
AY, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

AZ
AZ, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

BA
BA, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

BB
BB, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

BC
BC, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

BD
BD, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

BE
BE, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

BF
BF, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

BG
BG, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

BH
BH, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

BI
BI, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

BJ
BJ, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

BK
BK, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

BL
BL, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

BM
BM, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

BN
BN, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

BO
BO, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

BP
BP, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

BQ
BQ, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

BR
BR, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

BS
BS, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

BT
BT, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

BU
BU, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

BV
BV, bet. Mason and Folsom, Two-story frame.
O. Mrs. J. Clark, " 2,000.
C. Wm. Winters, " 2,000.

San Jose Ave., cor. Day.
One-story frame.
O. and B. J. Gillogley.
\$1,800.

Sixteenth, near Market.
Two-story frame.
O. and B. J. Ayer.
\$3,500.

Sixteenth, cor. De Hom.
Two-story frame.
O. Wm. Martin.
C. B. C. Bell.
\$2,700.

Sacramento, nr. Scott.
Two-story frame.
O. Mrs. M. M. Mathews.
C. S. Hatfield.
\$2,800.

Sacramento, cor. Broder-
ick. Two-story frame.
O. B. G. Eldridge.
A. J. C. Pelton.
C. W. H. Wickersham.
\$3,800.

Stockton, cor. Washington.
Four-story brick.
O. W. H. Howard.
A. Percy & Hamilton.
Days' work.
\$25,000.

Stevenson, near Twenty-
first. Two-story frame.
O. T. H. Moore.
A. J. T. Kidd.
C. J. M. Comerford.
\$2,000.

Sacramento, nr. Davis.
Four-story brick.
O. Deming Bros.
C. Geo. Richardson.
\$25,000.

T

Twenty-fourth, nr. San-
chez. One-story frame.
O. J. M. Comerford.
A. J. T. Kidd.
C. J. M. Comerford.
\$2,500.

Twenty-first, bet. Church
and Sanchez. One-story
frame.
O. Capt. Nicholson.
A. Schmidt & Havens.
C. E. W. Rea.
\$2,600.

Tehama, bet. Fifth and
Sixth. Alterations.
O. Mrs. A. Boyle.
A. Wolfe & Son.
C. T. J. Hamilton.
\$700.

Twenty-eighth, corner
Church. Additions. St.
Paul's Church.
O. L. Breslin.
A. T. J. Welsh.
C. Owens Bros.
\$5,000.

Twenty-first, nr. Jessie.
Alterations and additions.
O. John L. Boone.
A. Wolfe & Son.
Day's work.
\$3,500.

Twenty-first, nr. Valen-
cia. Alterations.
O. Mrs. S. Pettit.
C. F. Buckley.
\$1,400.

Treat Ave., bet. Twenty-
fourth and Twenty-fifth St.
Two-story frame.
O. P. Anglin.
C. P. F. Lynch.
\$2,500.

U

Union, cor. Buchanan. One-
story frame.
O. J. Gundlach.
C. Gustave Krone.
\$1,800.

Union, near Hyde. Two-
story frame.
O. Wm. Sloane.
C. Wm. Simon.
\$3,000.

V

Valley, nr. Sanchez. One-
story frame.
O. and B. J. M. Comer-
ford.
\$1,200.

W

Washington, bet. Le v-
enworth and Hyde. Two-
story frame.
O. D. L. Harbach.
A. W. G. Cop land.
C. W. F. Fitzpatrick.
\$4,300.

Waverly Place, corner
Pine. Alterations.
O. Colombo & Co.
C. Kilenger & Cate.
\$2,000.

Webster, bet. Fulton and
Grave. Two-story frame.
O. W. Koch.
A. H. D. Mitchell.
C. Jas. Geary.
\$6,000.

Santa Clara—Alterations. O. Old Mission Church; A.
B. J. Clinch; C. Jas. Binet; \$4,400.

San Jose—One-story frame. O. Sisters Notre Dame; A.
B. J. Clinch; C. Clark & Hutton; \$2,500. Improvements.
O. Jesuit Fathers; A. B. J. Clinch; C. Forderer & Boyle;
\$4,800. Eighth Street—One-story frame. O. Miss J. Ken-
nedy; A. Jacob Lenzen & Son; C. Robt. Smineers; \$1,325.

Park Avenue—One-story frame. O. M. Lenzen; A. Jacob
Lenzen & Son; C. H. C. Stow; \$1,350. Near town. Two-
story frame. O. E. A. Van Dalen; A. T. Lenzen; C. A.
Pickin; \$4,850. Third Street bet. St. Johns and St. James.
O. J. W. Blarer; A. I. Lenzen; C. P. R. Wells; \$4,300.

Park Avenue, nr. Market. O. B. Myers; A. I. Lenzen;
C. A. J. McIlwain; \$3,500.

San Rafael—Two-story frame. O. Mrs. E. Kennedy; A.
B. J. Clinch; C. J. McElroy; \$4,400.

Berkeley—One-story frame. O. Mrs. D. Corrick; A. B.
J. Clinch; C. A. Kocheischwang; \$2,000. Two one-story
frames. O. W. A. Fredericks; A. Schmidt & Havens;
C. J. Parker; \$4,000.

Milpitas—Tanks and tank frames. O. Alms House; A.
Jacob Lenzen & Son; C. E. A. Van Dolen; \$2,000.

Evergreen—Wine Vaults. O. Wm. Burns; A. Jacob
Lenzen & Son; C. J. Carter; \$1,000.

Dixon—One-story frame. O. James Porter; A. N. D.
Goodell; C. Covell & Landrum; \$1,500.

Sacramento—H Street, bet. Eleventh and Twelfth. Alter-
ations. O. James Farria; A. N. D. Goodell; C. Siller
Bros.; \$1,500. F Street, bet. Ninth and Tenth. Two-story
frame school, ten classrooms. O. City of Sacramento; A.
N. D. Goodell; C. Thos. McCaffrey; \$15,000.

San Mateo—Two-story frame. O. A. Hayward; A. Percy
& Hamilton; day's work; \$30,000.

Oakland—Center Street, cor. Eighth. Two-story frame.
O. C. O. Brigham; A. Geo. A. Erdwell; C. F. W. Kern;
\$3,500. Center Street, cor. Eighth. Alterations. O. J.
C. Happe; A. Geo. A. Erdwell; C. F. W. Kern; \$6,500.

Contra Costa—Two-story frame. O. Mrs. J. Gallagher;
A. J. Marquis; day's work; \$4,000.

Temescal—Alterations. O. Jas. Eva; A. J. Marquis;
day's work; \$1,000.

Menlo Park—One-story frame. O. Episcopal Church;
A. J. Marquis; day's work; \$1,000.

Woodland—Two-story frame. O. Milton Enyard; C.
W. H. Winne; \$3,800. Walnut Street. One-story frame.
O. Warren Ford; A. W. H. Carson; C. Glenn & White;
\$3,000. Sixth Street. One-story frame. Woodland Winery
Association; capital for buildings and outfitting; \$15,000.

Main Street. Improvements on Woodland Flaming Mill.
O. and B. S. Caldwell; \$1,000. Main Street. Two-story
frame. Improvements. O. F. W. Brendel; C. Gammel &
Boas; \$1,000. North Street. One-story frame. O. M.
Zirker; \$1,000. Elm Street. Two-story frame mill. O.
and B. Glenn & White; \$4,500. North Street. One-story
frame. O. & B. John Daniels; A. Gilbert & Son; \$1,000.

Capay—One-story frame. O. P. Everett; day's work; \$1,800.

Madison—One-story frame. O. M. Farlen; C. Amesbury
& Davis; \$1,000.

Yolo—One-story frame. O. Henry Kast; C. G. W.
Cooper; \$1,200.

Winters—One-story frame. O. W. J. Cannedy; \$1,000.

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Especially adapted to the climate of California.

Durable, Easy Working, Economical.
MIXED READY FOR USE AS PUT UP.
No turpentine, benzine, gum or rubber. Works as easy as if
mixed with turpentine! Workmen speak well of it.
In use in San Jose for three years.

Sun and Fog do not Destroy its Gloss, or Cause it to Chalk.

COLOR CARDS MAILED FREE ON APPLICATION.

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**Country Mechanics furnished
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AT LOWEST PRICES**

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BLUM, EPPSTEIN & MARSH.

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**FACTORY 209-227 FELL ST.,
SAN FRANCISCO, - - CAL.**

BUILDERS' HARDWARE.

Complete Assortment

House Trimmings,

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MALLORY, WHEELER & CO.'S

CELEBRATED

IMPERIAL BRONZE

Locks & Latches,

Light and Dark Shades,

Plain Antique, Tuscan,

Damascene or Berlin

BRONZE FINISH.

Unrivalled for Beauty of Design and
Superior Workmanship.

D. N. and C. A. HAWLEY, 501 to 507 Market St.

ALSO A FULL LINE OF

COPPER

WEATHER VANES,

Locksmith & Bell

Hangers' Supplies.

Union Spring Hinges

CABINET HARDWARE,

With a Full Line of

CARPENTERS'

**AND
MACHINISTS'**

TOOLS.

The California Architect and Building News.

VOLUME VI.
NUMBER 9.

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ter of THIS JOURNAL.

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159; Stevens' New Surface Gauge, p. 159; M. and
B. Exchange, p. 160; Building Intelligence for Sep-
tember, pp. 160-162.

Our Building Reports.

OWING to unexpected interruptions in the
management of this Journal, occurring in
June last, which were not anticipated nor the
contingency to any extent provided for, very
naturally imposed temporary difficulty, which
has required a little time and some effort to
rectify and arrange; and, perhaps, some prac-
tically immaterial inaccuracies in figures in
connection with the building reports, have
occurred. But these being now all overcome,
from this issue and onward, the reports in this
Journal may be relied upon as more nearly
correct than can be found through any other
source. Our annual report and summary will
be prepared with every possible care, so as to
show the transactions for the year as nearly
perfect as unequaled facilities and earnest at-
tention can make them.

Architects, contractors, builders, owners,
and others will confer a great favor by fur-
nishing the editor of this Journal with infor-
mation upon points of error of any character,
in whatever connection found, as we desire to
have every item and every statement appear-
ing in the columns of this Journal, scrupu-
lously correct and reliable.

SUMMARY FOR SEPTEMBER.

118 New Frame Buildings.....	\$509,050
8 " Brick.....	73,550
43 " Alterations.....	163,590
169 buildings.....	\$746,190

These figures show a considerable increase
in building activities over the preceding
month. A careful review for the twelve
months may develop some inaccuracies, and if
so, the necessary corrections will be made.

NOTICE.—The name of this Journal having
been used by parties not in any manner con-
nected with this office, to obtain building in-
telligence and information intended for its
columns, architects, contractors and others
will hereafter please assure themselves before
furnishing same, that the party canvassing is
properly authorized to represent us. Author-
ized canvassers will be supplied with sufficient
evidence upon this point.

When stained glass windows are used in
private houses, it should be remembered that
the effect of the colored glass upon the light
coming through it is to give to it its own tint,
and should this chance to fall upon furniture,
carpet, or wall, whose color, may be, is affected
unpleasantly by that of the window, the re-
sult would be perpetually disagreeable. In
churches, cathedrals, or public buildings,
where colored windows are introduced, it will
be noticed that their surroundings are plain,
generally the stone or marble of the building.

The Present Building Outlook.

THERE is a singular anomaly in the present
aspect of building activities. The general
expressions in commercial and business circles
is, "Times are exceedingly dull," "business is
poor," "aren't clearing expenses," etc., yet the
erection of buildings goes on as lively as might
be expected under the most prosperous and
active condition of general trade and com-
merce, with but little, if any apparent increase
in the number of buildings to let. One year
ago or more, it was generally regarded and
stated that "building was being overdone,"
and that an early grand collapse was inevitable
in this connection; still a monthly addition
has been made since then, of about one hun-
dred houses, representing well-nigh two hun-
dred new places of abode, or homes for families,
many of the contracts reported representing
"flats" of two and three stories, and single
buildings sometimes containing six or more
family apartments. Still the number of un-
occupied houses and tenements has increased
but little, if any, and architects and builders
continue to be busy, with but little signs of
abatement.

Much new work is now in course of prepara-
tion in the offices of the architects, and a good
fall business is assured. The low cost of ma-
terial has and has had much to do with this
state of things; but in addition to this the
"common people,"—small traders, mechanics,
laborers, and wage earners,—have, as a rule, ac-
cumulated and saved money sufficient to en-
able them to secure lots and improve them,
and wisely, very many of them are pursuing
the safer course of investing in real estate,
rather than jeopardizing their earnings by in-
vestments in stocks and uncertain securities.

Notice to Correspondents, Subscribers, and
Patrons of this Journal.

A CHANGE HAVING OCCURRED IN ITS MANAGEMENT, GEO. H.
WOLFE RETIRING.

All Parties in Business Relations, Corre-
spondent, Financial, and Otherwise,

WILL PLEASE HEREAFTER ADDRESS

JAMES E. WOLFE,

Editor California Architect and Building News,
240 Montgomery St., S. F.

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from the publishers, at \$3.00 per copy.

Discussion on the Mechanics' Lien Law.

THE subject of discussion before San Francisco Chapter of Architects at its special meeting held the 14th inst., was the Mechanics' Lien Law of the State of California.

Mr. T. A. Eisen led the discussion, in a review of the several sections of the law as amended at the last session of the Legislature of this State, pointing out its many defects, inconsistencies and illegalities, and showing up its inharmonies with well-known principles of common law, the law of contracts, and the decisions of the Supreme Court of California. Also exposing the private interests sought to be favored, on the part of those who at their own cost and expense employed a well-known "limb of the law" to concoct the amendments as passed, knowing that after passage the cruel thing could not be again amended until the next session of the law making body, and that during that period at least, some personal benefits might be derived, through the cumbersome and in some respects obscure working of the law as it stands, by which advantages may be taken of technicalities, and owners, rather than pay the cost of appeal to the supreme court, may be made to pay monies for which they could not be holden, under a fair and equitable statute, in keeping with the constructions and ethics of law as heretofore announced by the court of last resort, on former appeals. The views expressed by Mr. Eisen were indorsed by all the members present, and for the purpose of more fully considering the subject, its further discussion was continued, to be taken up at subsequent meetings of the chapter.

There cannot be any question as to the palpable illegality of some of the provisions. That compelling the filing of contracts with the county recorder is a violation of personal right, which will be set aside whenever that question is submitted for final decision. A contract is private property, an agreement between the parties of the first and second part, and it cannot be removed and held from the possession of the rightful owner by any process of law. Its recording might possibly be required, but it would be just as reasonable to say that no deed of trust, transfer, conveyance, etc., should be valid, unless filed—stowed away in the safe keeping of the officer of records. And the gentleman who framed that section not only doubted "whether it would stick," but knew that it was an extravagant stretch of legal tactics that would not be sustained when passed upon by the proper tribunal. But aside from this view of the section referred to, it is a most unnecessary provision, serving no good purpose—is impractical, because never availed of—and is troublesome and expensive.

The preposterousness of the proposition is shown by its practical application: for instance, an owner residing in San Francisco determines to erect a building costing over \$1,000, in any county of the State, it may be

the most distant from this center, and there being no planing mills, dealers in building materials, nor competent mechanics in that locality, as a matter of necessity all materials would be forwarded from San Francisco or some other place distant from the improvement contemplated; and the contractor as well must, and naturally would in such cases, be found in this city. So that every party in interest would be in San Francisco. But the law demands that before any work is commenced, or any material furnished, the contract must be filed with the county recorder of the county in which the work is to be executed; and unless so filed before commencement, the contract to become void, and all parties then to have recourse on the owner under the rule of day's work.

Consequently, if a building or other construction is contracted to be built in Sierra County, and the owner does not send the contract beyond his reach for filing in the county recorder's office, of the county named, his contract rights cease. And further, all parties furnishing material, etc., if they desire to examine the original contract which is the pretext upon which the obnoxious amendment is based, must go or send hundreds of miles from the place of his business to see the document, which in all reason should be in the owner's or his agent's possession, and a copy in the possession of the contractor. The concoction is an overreach which fails both in fairness and justice, and is useless to those perpetrating it, except so far as the "little joker" may in some cases prove the winning card, over the right and left bowers of right and justice; and it is questionable whether, while the arrangement holds, and subjects thousands of owners, architects, and contractors to the annoyances and expense of filing contracts, a single one of those who have been instrumental in imposing the hardship, or others in their line, will ever avail themselves of the protection proposed by the amendment.

The delay of thirty-five days after the completion of the building or works for the payment of the twenty-five per cent of contract money held for that period, is another foolish and oppressive provision. The argument that responsible contractors can afford to wait, is fallacious, for experience proves that the penniless scrubs can secure credit from material men which places them practically upon equal footing with the best. Consequently the good and bad can go on just the same, whether the monies of the contract are paid at completion or at any other deferred period; and the objectionable amendment or any other of like character fails to effect the purpose contemplated. But somebody must under the law be all the same kept out of monies due them for thirty-five days. As long as business facilities and favors are extended to the impecunious class of contractors, by material men, planing mills, etc., there will be a way found by them to practically nullify all enactments of character and intent such as that under review.

Science in Architecture.

(Written for this Journal by F. Hillert, architect and mechanical engineer.)

SCIENCE is the interpretation and knowledge of the laws of nature, and the forces governing the same. Man is commanded to investigate and use them for his moral and intellectual welfare, his health and material benefit.

Science has no nationality, but is the collective and aggregate accumulation of the intellectual work of men, both of the past and the present. Its information is extensive, and is found applied in all occupations of men—probably unknown to him—its singular laws governing not one but all of them. The study of the sciences and their investigations cannot be too much recommended.

SCIENCE ON HEAT AS APPLIED IN DOMESTIC ARCHITECTURE.

Heat is a power used for domestic purposes, for mechanical and industrial work. Heat produces work, and work can be converted to heat. Heat must be attached to a medium, and by the abstraction of the same therefrom, work is accomplished.

Heating is the judicious transmitting of heat to fluids or solid bodies; to the air for domestic warming purposes, to the changing of fluids to steam and vapors, to be used at the place of creation for the desired work, or to be conveyed hence to a more convenient place for the abstraction of its work. The necessary heat, therefore, is to be first created by the combustion—a chemical process of uniting the chemical elements of the fuel with oxide—developing heat and light—of fuel on or in a fire-place arranged to collect the heat created, and to admit the atmospheric air required therefor, and the product therefrom, as fire gases by natural or artificial current or draft to be conveyed off, so as not to become obnoxious to men and its surroundings.

The fuel used for home and industrial purposes is in general the wood fiber—a carboniferous hydrate—a combination of carbon with hydrogen and oxygen (H₂O) in the same proportion as in water.

Carbon and hydrogen are the heat-producing elements, oxygen and nitrogen the heat-absorbing elements. The first, therefore, gives the real value to the fuel.

Combustibility of fuel is the greater and smaller capacity by which the same can be ignited and made to continue to burn, requiring therefor a certain high temperature, and is dependent on the condition and composition of the same; fuel being porous and containing a large quantity of hydrogen, has a larger combustibility than fuel, being dense and containing a smaller amount of hydrogen.

The heat developed by the perfect combustion of fuel—the changing of the carbon and the hydrogen contained in it to carbonic acid (CO₂) or water (H₂O)—can be measured in a double relation: by the quantity of heat developed and the degree of temperature (intensity) produced.

Since for heat there is no certain measure

we must be satisfied to give the relative quantity of the same, that is, how much more—quantity—heat is developed from the one fuel than from the other. If the comparative values of heat are referred to the unit of volume, we obtain the specific effect of heat, but when referred to the unit of weight we obtain the absolute heat, or caloric. Both valuations are dependent on the composition of the fuel, the specific heat of the fire gases created by combustion, the outer condition of fuel, its degree of moisture, and the quantity of ashes left as residue.

The heat felt by the sense of feeling and measured by thermometer, does not give the same as quantity.

By actual measurement it has been found by perfect oxidation that

1 unit of weight of carbon heats 8,080 weights of water.
1 unit of weight of hydrogen, 34,462 weights of water.

From 0° (centidegree) to 1°; the comparative figures thus obtained we call "caloric," or units of heat. In the same way the effects of heat are obtained for

Carbon changed to acid of carbon..... 8,080 cal.
Carbon changed to oxide of carbon..... 2,474 " "
Carbonic acid to acid of carbon..... 2,413 " "
Fire-damp..... 13,063 " "
Petroleum (raw), our future fuel, and now extensively used in Russia on the Black Sea and its tributary rivers for navigation purposes..... 11,773 " "
Wood, air dry..... 3,600 " "
Peat (loose) existing in the tule lands..... 3,000 " "
" pressed..... 4,300 " "
Coal (mineral)..... 6,000—8,000 "

To give an estimate, how much measurable heat is bound or lost and named "caloric," mix 1 lb of ice with 1 lb of water of 75° temperature, we obtain 2 lbs of water of 0° temperature, 75° of temperature having been consumed by melting of 1 lb of ice.

For hydrogen and its combinations in the fuel, the values given above do not give the exact effect of heat, a portion of the same developed by combustion is lost and used for the evaporation of the water produced; but in consideration that water (H₂O) is composed of 1 atom of hydrogen and 16 atoms (8 molecules) of oxygen, making 9 units of water, and that in CH₂ and C₂H₄ are contained respectively 1/4 and 1-7 of hydrogen—and, further, 600 units of heat are required to change and evaporate 1 unit of water—we obtain the corrected effect of heat, namely:

For hydrogen..... 34,462—9,600=29,062 cal.
For fire-damp..... 13,063—9,460=11,713 " "
For olefiant..... 11,358—9,760=11,087 "

And in round numbers for future application:

Oxide of carbon... CO..... 2,400 cal.
Hydrogen gas... H..... 29,062 " "
Fire damp..... CH₄..... 11,710 " "
Olefiant..... C₂H₄..... 11,090 " "
Butelyn..... C₂H₆..... 10,840 "

The results for carbon are obtained from the solid carbon of the charcoal. The combustion of a denser constituted carbon furnishes smaller results: Coal from gas retorts, 8,017 cal.; coal from sugar, 8,040 cal.; natural graphite, 7,844 cal.; graphite from furnaces, 7,785 cal.; diamant, 7,770 cal.

The absolute effect of heat can be calculated by the amount of water evaporated, namely: One unit of weight of water changed to steam of 150° temperature require 652 caloric, hence:

1 unit of solid carbon, giving $\frac{8080}{652} = 12.4$ units of steam.

1 unit of hydrogen, giving $\frac{34462}{652} = 52.9$ " "

Chemistry is the science of exact quantities, and uses at her experiments, scales and weights, and when the component elements of the various fuels are known, quantitatively, the effect of heat of the fuel can be calculated from the effects of the components, namely:

Air-dry wood is composed of 0.39 C + O, 40 H₂O, 0.015 ashes and 0.95 water. The effect of heat can be calculated with the assistance of the formula for the effect of heat: 8,000 C + 29,060 H—680 H₂O—600 W. Inserting the quantitative values of the elements we obtain the effect of heat: 8,000. 0.39 + 29,060. 0—680. 0.40—600. 0.15=2,731 cal.

FUEL.	C	H	H ₂ O chemical water.	Hydro-scopedical water.	Ashes.	Effect of Heat.
Air-dry wood.....	0.39	0.01	0.40	0.105	0.015	2,731
Air-dry peat.....	0.35	0.01	0.29	0.25	0.10	2,743
Siluminous coal.....	0.50	0.015	0.205	0.20	0.08	4,176
Mineral coal.....	0.8	0.04	0.09	0.13	0.04	7,433
Charcoal.....	1.0	0.03	0.03	0.16	0.05	7,034
Coke.....	0.8	0.06	0.015	0.15	0.06	7,065

The effect of heat from gaseous fuel, which is more economical, and a better combustion can be obtained—can be found with more certainty—when the component elements are known.

One unit of this gaseous fuel contains: H units of hydrogen, CH₂ of fire-damp, C₂H₄ olefiant, C₂H₆ Butelyn, CO oxide of carbon, CO₂ acid of carbon, N nitrogen. Formulating a formula as above, the effect of heat will be: 29,060 H + 11,170. CH₂ + 11,090 C₂H₄ + 10,840 C₂H₆ + 2,400 CO. And for the different gases:

	H	CH ₂	C ₂ H ₄	C ₂ H ₆	CO	CO ₂	N	Effect of Heat
Of illuminating gas.....	0.05	0.54	0.10	0.08	0.15	0.08	0.08	11,113
Furnace gas from coal.....	0.01	0.04	0.02	0.02	0.22	0.05	0.50	1,509
Furnace gas from charcoal.....	0.01	0.01	0.01	0.01	0.36	0.06	0.63	897
Furnace gas from coke.....	0.01	0.01	0.01	0.01	0.35	0.01	0.64	840
Generator's gas from wood.....	0.01	0.01	0.01	0.01	0.34	0.12	0.63	1,107
Generator's gas from peat.....	0.01	0.01	0.01	0.01	0.22	0.14	0.63	819
Generator's gas from charcoal.....	0.01	0.01	0.01	0.01	0.34	0.01	0.65	816
Generator's gas from coke.....	0.01	0.01	0.01	0.01	0.34	0.01	0.65	816

Since the combustion of fuel is the chemical process of oxidation, taking the oxygen, therefore, from the abundant surrounding atmospheric air, which is a mechanical mixture, or diffusion of 77 parts of nitrogen and 23 parts of oxygen gas; and when the amount of atmospheric air required to burn 1 unit of fuel is 10/3 times larger than the amount of oxygen consumed, and when the amount of the latter can be calculated from the known composition of the fuel, the atomic weight of carbon being 12, of hydrogen 1, of oxygen 16; when, further—1 unit of carbon and 1 unit of hydrogen is used for their change to acid of carbon and to water respectively $\frac{32}{12} = \frac{8}{3}$ and $\frac{8}{2} = 4$ parts of

oxide, than for 1 unit of fuel composed of C units of carbon, H units of free hydrogen, H₂O of chemical water, W units of hygroscopical water, and A units of ashes, we obtain the amount of atmospheric air required by $L = \frac{100}{23} (\frac{8}{3} C + 8 H)$.

To obtain the amount and composition of the fire gases created from the burning of one unit of solid fuel, such as carbonic acid = Ac; units of water Aq; units of nitrogen and A units of ashes we use the formulas:—

$$Ac = \frac{1}{3} C; Aq = 9 H + H_2O + W, \text{ and } N = L + 1 - A - Ac - Aq.$$

And for one unit of gaseous fuel, containing, besides nitrogen, H units of hydrogen, CH₂ units of fire-damp, C₂H₄ units of olefiant, C₂H₆ units of Butelyn, CO units of oxide of carbon, and CO₂ units of acid of carbon:—

$$L = \frac{100}{23} [8 H + 4 CH_2 + \frac{2}{3} (C_2H_4 + C_2H_6) + \frac{1}{2} CO]$$

$$Ac = \frac{1}{3} C; CH_2 + \frac{2}{3} (C_2H_4 + C_2H_6) + \frac{1}{2} CO + CO_2$$

$$Aq = 9H + \frac{1}{2} CH_2 + \frac{1}{2} (C_2H_4 + C_2H_6)$$

$$N = L + 1 - Ac - Aq.$$

The atmospheric air required to burn up one unit of solid fuel is generally larger than L and equal up to 2 L and over, and can be set = m L; than will be the quantity of weight of the fire gases created from 1 unit of solid fuel fire gas = (m—1) L + Ac + Aq + N.

If the mixture of the surplus of air, carbonic acid, nitrogen, and vapors (the moist containing in it) is of such a small quantity as not to bear any considerable effect on the state of condition of the fire gases. To investigate the action and condition of them in the fire channels and the smoke stacks, the density d and the specific heat e of the gas mixture must be known.

The density d of the mixture can be calculated from the density of its compounds; when

$$(m-1) L \text{ units of surplus air} = \text{density} = 1. \\ Ac = \text{carbonic acid} = 1.529. \\ Aq = \text{vapors} = 0.623. \\ N = \text{nitrogen} = 0.971.$$

Then the fire gas mixture will have a density of

$$d = \frac{(m-1) L + Ac + Aq + N}{1.529 + 0.623 + 0.971}$$

The specific heat of the fire gases could as easily be computed from the specific heat of the compounds, if the same, for instance for carbonic acid and vapors, for the different high temperatures would be constant, for they with sufficient correctness for all practical purposes would be set equal to 0.24.

$$e = \frac{0.24 (G = Aq) + 0.18 Aq}{G} = 0.24 (1 + \frac{Aq}{G})$$

With the assistance of the above given formulas and the previous components of the different fuels given, the quantities of air necessary for a perfect combustion of one unit of solid fuel, the quantities and conditions of the fire gases can be computed, and are given in the next following table.

Mineral coal composed of 0.80 C, 0.04 H, 0.09 H₂O, 0.03 W., 0.04 A.

The amount of air required is:—

$$L = \frac{100}{23} \cdot (\frac{8}{3} C + 8 H) = \frac{100}{23} \cdot (\frac{8}{3} \times 0.80 + 8 \cdot 0.04) = 10.67.$$

$$\text{Carbonic acid gas} = A_c = \frac{11}{3} C = \frac{11}{3} \cdot 0.80 = 2.93.$$

$$\text{Vapors} = A_q = 9 H + H_2 O + W = 9 \times 0.04 + 0.09 + 0.03 = 0.48.$$

$$\text{Nitrogen} = N = L + 1 = A - A_c - A_q = 10.67 + 1 - 2.93 - 0.48 = 11.67 - 3.45 = 8.22.$$

The density of the mixture is:—

$$d = \frac{G}{(m-1)L + A_c + A_q + N} = \frac{22}{1.529 \cdot 0.623 + 0.971} = 1.022$$

$$(2-1) \frac{10.67 + 2.93 + 0.48 + 8.22}{1.529 \cdot 0.623 + 0.971} = 1.022$$

The weight of the gas is: for $m = 2$.

$$G = (m-1)L + A_c + A_q + N = 10.67 + 2.93 + 0.48 + 8.22 = 22.30.$$

And the specific heat is:—

$$c = 0.24 (1 + \frac{A_q}{G}) = 0.24 (1 + \frac{0.48}{22.30}) = 0.245.$$

NAME OF FUEL	Air required.	AC, AQ	Nitrogen	$m = 1$		$m = 2$	
Wood	4.52	1.43	3.48	c. 0.206	d. 1.003	c. 0.254	d. 1.002
Peat	4.41	1.28	3.40	c. 0.563	d. 0.993	c. 0.256	d. 0.996
Bituminous Coal	6.32	1.33	4.87	c. 0.258	d. 1.023	c. 0.250	d. 1.012
Mineral Coal	10.67	2.33	8.22	c. 0.250	d. 1.043	c. 0.245	d. 1.012
Charcoal	10.20	3.12	7.85	c. 0.244	d. 1.071	c. 0.242	d. 1.036
Coke	10.26	3.19	7.90	c. 0.242	d. 1.077	c. 0.241	d. 1.039

Quantities of air required for the perfect combustion of 1 unit of gaseous fuel, the quantities and conditions of the fire gases:—

GAS MIXTURE.	L.	Ac.	Ag.	N.	G.	d.	c.
Illuminating gas	4.19	2.29	1.90	11.00	15.19	0.957	0.270
Furnace gas from coal	1.89	0.67	0.21	2.01	2.89	1.018	0.259
Furnace gas from charcoal	0.92	0.56	0.02	1.34	1.92	1.080	0.247
Generator gas from wood	0.87	0.56	0.02	1.31	1.87	1.090	0.242
Generator gas from peat	0.19	0.65	0.09	1.45	2.19	1.062	0.250
Generator gas from coal	0.89	0.49	0.09	1.31	1.89	1.042	0.230
Generator gas from charcoal	0.84	0.54	0.02	1.30	1.84	1.037	0.241
Generator gas from coke	0.84	0.54	0.02	1.30	1.84	1.087	0.240

The temperature of the fire gases, or the intensity of the heat, could be readily calculated from the kind of fuel and the proportionate quantity of air used, if the combustion would be perfect, or, pro unit of the fuel used, the quantity of heat created could be applied for the increase of temperature of the fire gases, but such is not the case; then, a portion of the fuel falls into the ash-pit unconsumed, the loss of heat by heating of the fuel freshly given up, which is of a low temperature, by the loss of heat consumed for the evaporation of the hygroscopic water, and for heating of the cold air entering through the fire door into the fire-place; the existing heat becomes insufficient for the perfect combustion—the union of the carbon with hydrogen. The carbon, divided into small particles, enveloped by the vapors of the hygroscopic water, escapes and forms the black smoke after every new filling up of the fire grating with fuel; after the period of black smoke follows one of a lighter smoke, containing a smaller amount of solid carbon (soot), but considerable quantities of imperfectly burned gases, oxide of carbon, hydrocarbonic combination and hydrogen, occasioned by the insufficient air, or the imperfect mixture of the same with the distilled combustible gases. Further: from the heat produced, a portion of it is lost by radiation into the ash-pit and the surroundings of the fire-place. (The open fires and the fire-place used for warming the rooms of our houses are the most imperfect arrangement for combustion, as we only utilize the radiating heat from the fire-place and the back wall of the same.) We take the agreeability at the expense of the wasted fuel and it being fashionable. The ranges used for cooking do the same, only by radiation from the fire-place. A great saving of fuel may be and is had from the use of the continuous brick and lime kiln, etc.

T_s , the quantity of heat, in consideration of the losses and the imperfect combustion, of 1 unit of fuel developed for use— $Y K$; Y should be named the degree of effect of the fire, and $S Y, K$ the amount of radiation against the direct and indirect heating surfaces, then is the temperature:

$$(1-5) Y K \\ (m L + 1) c$$

Assailable for the increase of the temperature of the products of combustion of 1 unit of fuel, wherein $m L + 1$ is the weight of the product and $m L$ the weight of atmospheric air used, and c the specific heat of the same, and 5 is the proportion of the heat radiated towards the heated surface to the heat usefully developed. If we set $m=1, y=1, s=0$, we find the highest possible temperature of the following named fuels (practically not obtainable) to be:

	degs.		
Air-dry wood.....	1,860	Furnace gas from coal.....	2,032
Air-dry peat.....	1,892	" " from charcoal.....	1,801
Bituminous coal.....	2,211	" " from coke.....	1,352
Coal.....	2,585	Generator gas of wood.....	1,022
Charcoal.....	2,574	" " of peat.....	1,726
Coke.....	2,593	" " of charcoal.....	1,848
Illuminating gas.....	2,405	" " of coke.....	1,848

For, technically, the most important fuel the coal, we set the specific heat of the prod

For, technically, the most important fuel, the coal, we set the specific heat of the prod-

uct of combustion = 0.25, and with $K=7,483$ we obtain the temperature:

$$29,932 (1-s) y = \frac{1,760 (1-s) y}{10.67 m + 1} \text{ for } m=1.5 \\ = \frac{1,340 (1-s) y}{10.67 m + 1} \text{ for } m=2$$

To the temperature existing in the fire, room must be added for the temperature of the air admitted, and with gaseous fuel the temperature of the same, which is considerable.

The melting points of some of the different metals are from 1,000–2,500 degrees, and for their reduction require a high temperature, only to be obtained by the perfect combustion of the available fuel.

(To be continued.)

A New Sash-Lock Device.

DURING the past decade, sash-lock devices almost innumerable have been invented, patented, and placed on the market, some of them displaying a good degree of inventive and mechanical genius, and standing well in favor among architects and owners. The latest invention is

THE IVES' PATENT SASH-LOCK.

A device differing materially from all others, operating by cam combination, without any spring, and therefore not liable to get out of order. They are manufactured by Robert B. Ives, New Haven, Conn., and on sale in this market by Huntington, Hopkins & Co., sole agents for the Pacific Coast. The cut shows



the peculiar shape of the lock. There are two motions of the handle, the first locking the sash, which leaves the handle at right angle with the meeting rail, and the second, by a cam movement, drawing the sash tightly together, and placing the handle parallel with the face of the sash. Until something still better is invented, they are likely to assume pre-eminence, and be the lock of the future. They are made of bronze nickel and all the lesser grades of metal, and at prices placing them in full competition with the best of makes.

There is a science, after all, in so simple a matter as driving a nail. A correspondent writes that he recently witnessed the experiment of driving nails into timber that had been hard seasoned and well dried. The first nails, after passing through an ordinary board, went into the timber about an inch and then doubled up under the hammer. The tips of the rest of the nails were dipped into lard, and the driving was accomplished without any difficulty. The remedy is not a new one, but it is simple enough to be recommended for trial.

S. F. Chapter of Architects.

A SPECIAL meeting of the chapter was held August 21, Vice-president Pissis presiding; the committee appointed at the previous regular meeting to nominate officers for the ensuing year, submitted their report, which was approved by vote of the Chapter. Other nominations were then added, after which the discussion of the Mechanics' Lien Law of the State of California was opened by T. A. Eisen, followed by expressions of disfavor from all present. (A partial review of the subject matter will be found in another column.)

The regular annual meeting was held Sept. 4, with a large attendance, Vice-president Pissis again presiding. The minutes of previous regular monthly, and the special meetings having been read, amended and approved, the report of the committee on apprenticeship indentures was presented, read and adopted, and 250 copies ordered printed for the use of the members of the Chapter. The trustees, committees on classes, investigating committees, etc., made their reports. Mr. W. A. Boring, of Los Angeles, was elected unanimously as a fellow of the Chapter. Other Chapter business being disposed of, and the election of officers for the ensuing year being next in order, the names of candidates for the respective offices were read by the secretary, and the balloting commenced with the following result: President, Wm. Curlett; Vice-president, T. A. Eisen; Secretary, B. E. Henricksen; Treasurer, Seth Babson; Trustees, Augustus Laver, G. H. Sanders, Thos. J. Welsh, J. B. Whittemore, and J. J. Clark.

The report of the retiring, and the installation of the newly elected officers will form the features of interest at the October meeting. The harmony and good feeling that characterized the proceedings, rendered the occasion pleasant.

The committee appointed some months ago, to review and report upon the "Fire Ordinances" of city and county of San Francisco, in which are also mixed up what should be distinctly and separately known as the "Building Laws"—not being prepared to report, the subject matter was commented upon by several of those present, expressing the opinion that the present fire ordinances might be materially changed and amended for the better, removing many of the objectionable features, both in the ordinances themselves, and the manner and character of interpretation and enforcement.

The lead covering of the dome of St. Peter's at Rome has lately been successfully renewed. The work has occupied twelve years, and has cost £8,000. Lead was imported from Spain for this special purpose, and was mixed with the old lead in the proportion of one part of the latter to two of the former. The total weight of the new covering is about 350 tons, and it is calculated that if laid in sheets, one-fifth of an inch in thickness, it would cover a space of above 70,000 square feet.

Profits and Losses on Building Contracts.

Most people imagine that the profits from house building in California are large, and that contractors as a rule have made and are making "young fortunes" from their contracting successes; that they are a "well-to-do" class, with comfortable bank accounts to their credit, and ample cash on hand or at command. This to a limited extent is true, but in the main, a great error; yet a conclusion of this character is justified and reasonable, judged by the very large amount of money passing through their hands. Millions of dollars are yearly handled by them, and if a fair, right, and equitable percentage of profits were realized on all transactions, with but occasional loss to a few, the result would justify the presumption that those who build homes and structures for others, were also building and constructing the foundations for, if not the superstructures complete, of competency when age and whitened locks betray the period when active toils and labors should be laid aside for that rest and repose which should come to those who have spent the years of their earlier manhood in hard contests and business conflicts; and the heads and hands long pressed by the many cares, inflictions, and responsibilities which must be encountered during life's devotion to figuring, planning, calculating, managing, and close application to the innumerable demands upon the best energies of mind, intellect and body, should be freed from the necessities of continuing the struggle until the cords of life are stranded and the once active frame laid within the casket.

But the facts of the case do not sustain this presumption as a whole. Some few, and very few of the many thousands who have devoted themselves to house construction under contracts awarded in competition, have done fairly well, maintaining a good reputation for skill, competency, and prudent management, and consequent financial promptness. But the great majority, perhaps seven-tenths or more of the entire number, have gone on from year to year exhausting their time and energies, and the strength and vigor of their manhood, with no better profits to themselves than the mere subsistence gleaned from the monies handled—hundreds of them being compelled, through bad calculations and mismanagement, to defraud creditors by pro ratio settlements, or inflicting still greater wrong by absconding to parts unknown, carrying with them all within possible reach, leaving those who have trusted them to reap the full measure of absolute and total loss of all balances.

The proofs in this connection are numerous; and if the shortages, abscondings, and clean profits were footed up, and a truthful balance arrived at, it would be found that the sum of losses by material men, sub-contractors, and workmen, from and by reason of the blundering incompetency, ignorance, carelessness, and often premeditated recklessness and dishonesty

esties of a very large number of men denominating themselves, and aping competency as contractors, would far exceed all the profits derived by those who have done well and paid their way, with something to show as the result of true efficiency, careful management, and business integrity.

HOW ARE THESE LOSSES PROVIDED FOR?

The question naturally intervenes, if all this be true, how do material men and other losers compensate and equalize these losses? The answer is simple and plain. First, the shortages, if the party paying short is actuated by any degree of honesty in the settlement, leaves him a pitiable, penniless object, with nothing but discredit if not absolute dishonor in his disastrous undertaking; a practical business fool, having agreed and undertaken to do an impossible thing, i. e., fixing a false value upon a something to be done, and agreeing to do it for a less sum than actual cost, thus exhausting himself—time, means, and energies—and, without their consent, prospectively involving other parties in the results of his personal stupidity, and himself a bankrupt or a rogue. Secondly, as a matter of course, material men and others, knowing these facts, must of necessity compensate these losses, by increase of prices to good paying, honest parties. It cannot be otherwise; for if the right, fair, and reasonable profits on merchandise, and crude or manufactured materials is twenty per cent, with no margin for excesses, the twenty per cent must and will be preserved when possible. And with the fact in view that in the natural order of things losses to an average amount of five to ten per cent are sure to occur, the contingencies must be and are provided for by increase charges all around, sufficient to make the average result what it should be. So that while the advance is charged to all, the excesses paid barely compensate for the shortages, and leave the seller whole with his legitimate profits. But those who cause this state of things—the tenth rate contracting frauds—are left penniless; unless by scheming tricks and absolute, practical dishonest purpose and design, they pocket monies rightfully belonging to others, under the dishonorable pretext that they are entitled to pay for their services, let who may suffer. And the disposition manifested in a majority of these cases is a don't-care-attitude as to who is hurt, with no sense of shame for the state of things existing. The base consolation that "plenty of others have done the same thing," seems to satisfy, and wipe out all consideration of any wrong having been done.

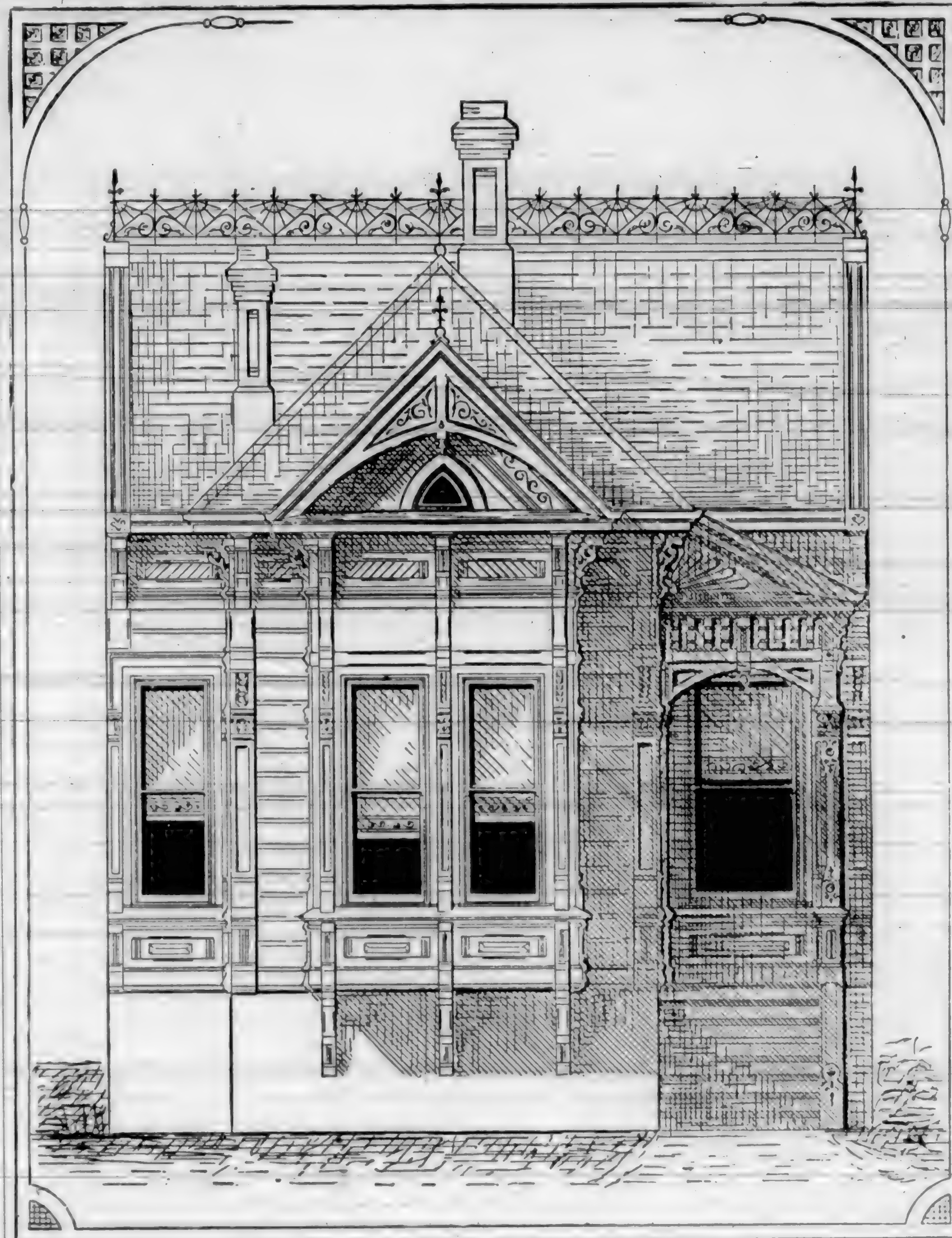
An English locksmith has constructed a key which he says is capable of opening 22,600 patent lever locks, all of which differ in their wards or combinations. As described, the key weighs three ounces, is nickel plated, and is said to be the result of three years' labor on the part of the inventor in making drawings of different wards and combinations.

White Lead and Its Substitutes.

THERE has been much written about this leaden subject, and as the metal is of large production, its consumption is increasing in volume, we may venture a few logical suggestions about its manipulation by the corrodors of white lead. In speaking of lead when acted upon chemically, we must speak of the acids as formed and the acetates in many of its compounds. The old Dutch process is now admitted to be the best method of corrodng pure metallic lead, namely: After the lead has been corroded in the form of thin sheets laid over pots containing acetic acid, the carbonated portion of these sheets is separated and ground in a bath of water to free it from acetic acid, and if so done the white lead will be found in the form of a compound of hydrate and carbonate, as one to two as named; and when ground in about twelve per cent of linseed oil, to the proper grade of fineness, it is then run into packages and branded as the pure white lead of commerce. Now, if the foregoing process is not carefully done the result will be too much acetate of lead combined with the carbonate for a free, limpid, working lead. In such cases the lead is found to be lumpy, or drying solidly *en masse*, if kept in store for any lengthy period. The acetate, or sugar of lead, is a good dryer, and for that reason should be all taken out, so that the carbonate and hydrate will form a smooth, soft paste of lead.

The "stencil" mark of pure white lead is a misnomer, as there is no lead in packages but what bears the mark of pure lead. No person can tell whether the lead is pure without the maker's name is attached to certify to the contents. As there are large quantities of these fictitious brands (*no name*) sold in our markets, the buyers should beware of pure white lead that has only a brand to recommend it. The intentional impurities of white lead are very numerous. The Kremnitz White, or Flake White, are among the purest found in any market. In Europe there is the Venice, which is composed half and half, one part sulphate baryta and one of white lead. Then there is the Hamburg White, which has only one-third pure white lead, and the remainder is made up of sulphate of baryta. The Dutch White is only its inferior by having only one-fourth white lead and three-fourths, by weight, of sulphate of baryta. What is this baryta? It is only one of the simple earths, called by Bergman *terra ponderosa*, or heavy spar. The mineral is reduced by a chemical process to a heavy white powder, not very opaque in body, and hence its employment in adulterating white leads which have great body or covering qualities. What has been said of those foreign brands is largely improved upon in the United States, for they beat the Dutch so bad that there is scarcely left a trace of white lead in some of the fancy brands which read "25 lbs. Pure White Lead."

The competition between manufacturers is so great, with large trade influences, that vast



ELEVATION ONE-STORY COTTAGE.—PLATE 1.

quantities of inferior brands of white lead are sold at so low a rate that the better brands of pure white lead, which sell for a slight advance in price, are limited in sale to the better class of painters. This is the true state of the case. While we have lead mines all over the Western States by the thousand, capable of producing millions of tons of pure ore, our American white lead manufacturers import cargoes of baryta and make up fraudulent brands of pure white lead and continue to impose upon a long-suffering public for the almighty dollar. One of the consequences of this system of manufacture has led to the birth and growth of a twin evil to the trade, and that is the making of ready-mixed paints, canned goods in all colors of dope, hermetically sealed in tin, good in any climate. In most cases these infallible mixtures are free from pure lead, being adulterated with the heavy-weighted baryta, not to improve their color or purity, but to give

bulk and weight and less in quality. There are hundreds of factories in the United States that have their own peculiar mixtures, all warranted to be superior to any other, in having fine color and a durable gloss that will outwear any other brand of mixed paint. Thus it will be seen, that to afford capital an opportunity to make its investments profitable the substitutes must have their day. But the trade, house, sign and carriage painters, must educate the young apprentice to know what pure white lead will do, and the technical uses of pure pigments of every grade, and thus protect the trade from these abuses.

J. E. W. C.

Builders' Guide.....	\$ 2.00
Album of Mantels.....	8.00
History of Architecture.....	15.00
Building Superintendence.....	3.00
American Cottage Homes.....	3.00
Village and Country Homes.....	5.00

Architectural Competitions.

IF there is anything connected with the practice of architecture more fruitful of corruption and scandal than competitions we have yet to discover it. A recent sensation is reported from El Paso, Texas, where there was a competition a year ago for a Court House and jail, to which twenty-five architects, so-called, responded. One came in person all the way from Chicago only to see the prize captured by a San Antonio rival. After the usual difficulties with competition, drawings, making changes, supplying omissions, etc., the work was let somewhat informally for the sum of \$135,000. The jail was finished last March, and the Court House was ostensibly progressing properly when a disagreement with a subcontractor led to charges before the grand jury and to a series of ineffectual attempts to secure an investigation, which has compromised the standing of a judge and other county officials, and produced great excitement among the taxpayers. Indignation meetings have been held, funds subscribed to force an inquiry, and the commissioners who had repeatedly evaded the charges were compelled to give them a hearing.—*The Inland Architect and Builder.*

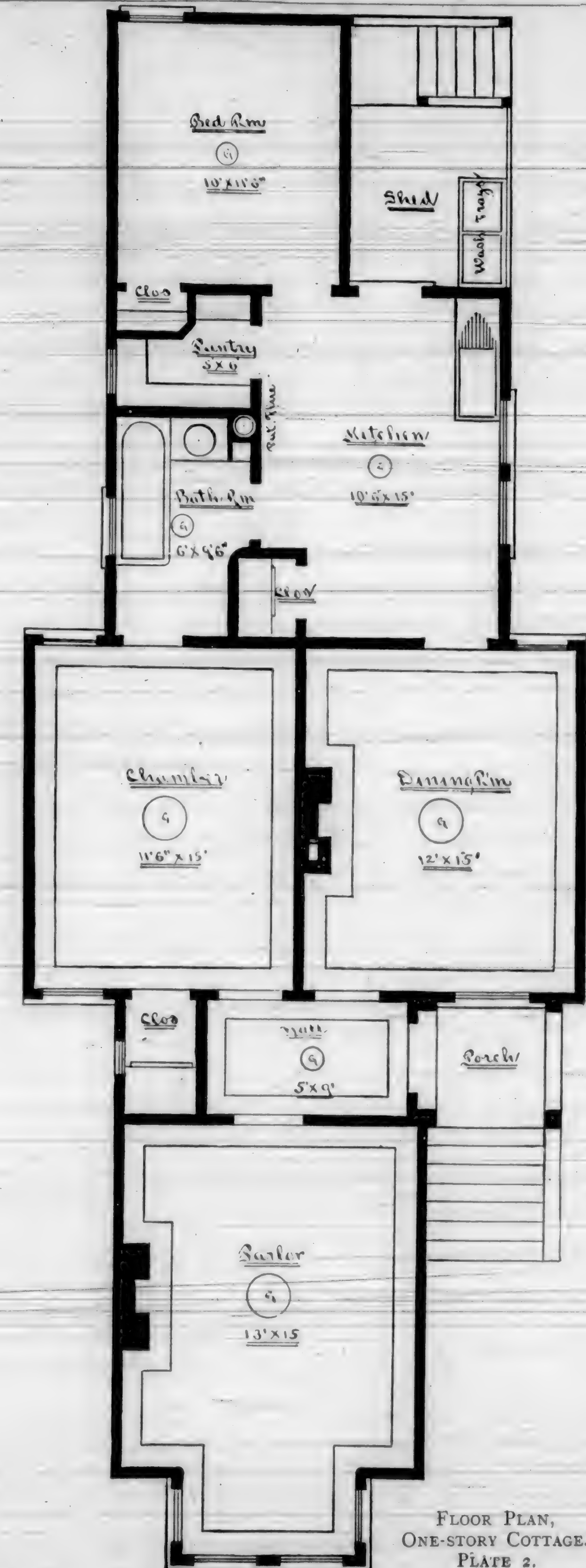
Our Illustrations.

CUTS Nos. 3 and 4, a moderate cost cottage for country, with a total of nine rooms, bath-room, halls, closets, pantries, etc., as shown by the plans. It can be built for about \$3,500, according to the economies practiced.

Cuts Nos. 1 and 2, elevation and plan of one-story cottage with five rooms, bath-room, closets, etc., can be built at a cost of \$2,000 and upward. The space above ceiling of main story will permit the making of four loft rooms, by placing suitable windows in the respective gables.

Queer Origin of Words.

THE word "pamphlet" is derived from the name of a Greek authoress, Pamphylia, who compiled a history of the world into 35 little books. "Punch and Judy" is a contraction from Pontius and Judas. It is a relic of an old "miracle play," in which the actors were Pontius Pilate and Judas Iscariot. "Bigot" is from Visigotha, in which the fierce and intolerant Arianism of the Visigoth conquerors of Spain is handed down to infamy. "Humbug" is from Hamburg; "a piece of Hamburg news" was in Germany a proverbial expression of false political rumors. "Gauze" derives its name from Gaza, where it was first made. "Tabby cat" is all unconscious that her name is derived from Atab, a famous street in Bagdad, inhabited by the manufacturers of silken stuffs called atabi or taffety, the wavy markings of the watered silks resembling pussy's coat. "Old Scratch" is the demon Skratzi, who still survives in the superstitions of northern Europe. "Old Nick" is none other than Niker, the dangerous water demon of Scandinavian legend. The lemon takes its name from the city of Lima.

FLOOR PLAN,
ONE-STORY COTTAGE.
PLATE 2.

Knights of Pythias in San Francisco—Their Prospective New Castle Hall.

A PUBLIC meeting of the members of the order was held in B. B. Hall, Eddy Street, August 31, for the purpose of enlisting a more general interest on the part of the members in the movement now on foot to raise, by sale of capital stock of the Hall Association, the necessary funds to begin at an early day the erection of a

NEW CASTLE HALL.

Large and commodious, and in every way suited to the wants and necessities of the order, not only as providing lodge rooms for the valiant knights in San Francisco, but a grand headquarters—a home where the membership universal on this coast, personally and collectively, may repair and enjoy all the benefits and advantages to be derived from fraternal intercourse and fellowship.

The lot is an eligible one, fronting 77 feet along the northerly side of McAllister Street, opposite the Hall of Records, by a depth of 137 feet 6 inches. It has increased in value a hundred per cent. during the past few years, and the property in time will rank among the most valuable in the city, off from the great main streets, which will forever command and hold pre-eminence.

An incorporate Hall Association has been organized, composed of intelligent, capable, and honorable members of the order, who are working hard to set in practical operation, measures calculated to consummate the desired end. The capital stock of the Association is fixed at \$100,000, divided into ten thousand shares of the par value of \$10 each. The lodges in San Francisco have already taken well on to \$20,000 worth of the stock, which sum will be materially increased from the same sources as necessity requires. The enterprise is one that should not and will not be allowed to fail of success, as it presents many inducements to both lodges, as such, and individual members personally, to become shareholders.

AS AN ORDER MOVEMENT.

With a view to securing and owning meeting-rooms for its lodges and associating therewith in the shape of a grand assembly hall, library, chess room, drill room, and all the modern conveniences and comforts known in connection with buildings of this character, it commends itself to most favorable consideration; and.

AS A BUSINESS PROPOSITION.

It is an investment that should meet a hearty response from every member of the order, as its incomes and profits are assured from its inception, by rental from lodges under Pythian jurisdiction, in addition to large prospective receipts from its grand assembly hall, from organizations other than Knights of Pythias, and other incomes that have crowned the successes of other orders less numerous in membership, who have secured to themselves buildings of their own.



ELEVATION COUNTRY COTTAGE.—PLATE 3.

An interesting review of prospective cost and income was given by P. C., T. F. Bachelor, who was followed by G. C., Geo. B. Katzenstein, P. G. C., John H. Harney and W. H. Bodfish, and by P. C., A. K. Stevens, James Patterson, F. H. Farrar, Dr. N. J. Bird, and others. The assemblage was not numerically as great as was hoped for, but this was made up by the hearty enthusiasm and interest manifested by those present, and the individual subscriptions to the capital stock.

The importance of the matter being more than local, it is expected that every lodge of the order within the jurisdiction, and every member who can afford it, will aid the enterprise by becoming shareholders.

Building Report—Woodland, Yolo County.

DURING the past three months, mechanics generally have been well employed, and material dealers fairly busy, the only drawback experience being a scarcity of coin, as three-fourths of the building business is conducted here on a cash basis. The prosperities have been such that no one should feel discouraged should there be less work done during the remaining months of the year. Still there are a number of first-class buildings and improvements on the prospective state, for early commencement, and good reasons to anticipate a good ending and showing for 1885.

The list of building improvements of all classes for the third quarter of the year is as follows:—

CITY OF WOODLAND.	
35 Frame buildings, value.....	\$102,000
3 Alterations and repairs, value.....	3,000
38 buildings.....	\$105,000
YOLO COUNTY.	
16 Frame buildings, value.....	\$30,875

4 Brick buildings, value.....	25,000
20 buildings.....	\$55,875
A total for the third quarter of 1885, of.....	\$160,875
Corresponding periods in 1884, 29 buildings and improvements of the value of.....	97,400

Gain for 1885 over 1884 of.....\$63,475

In the preparation and prosecution of the figuring, the services of architects are fully up to, if not greater than any previous time, thus demonstrating the fact that our people intend to build wisely and well, observing true and correct taste and principles. Many of the cities and towns in this State are noted for the good judgment, refinement, and æsthetic taste displayed by owners, architecturally and otherwise, in the improvement of their property—a most commendable ambition, which should be practiced in all cases. Good judgment should never be influenced by bad examples, nor inconsistencies and incongruities accepted and duplicated, because other have so far erred as to practice abominations in the name of architectural science. Architecture is susceptible of almost endless treatment and variation, and any community of people may beautify their surroundings, by the exercise of good judgment, and the adoption of styles in buildings calculated to incite and inspire sentiments of admiration. In this view of the case, all artisans and mechanics should be careful in the style and character of the work presented by them for public criticism, so that it may reflect credit and prove worthy of imitation by others. GILBERT & SON.

Woodland, Sept. 5, 1885.

Plaster, How to Make It.....	\$1.00
Shavings and Saw-dust.....	1.50
Lumberman's Hand-Book.....	2.00
Practical Geometry.....	1.00
Architects' Companion.....	2.50

Crowded Out—Exchanges—Future Enlargement.

THE quantity of original matter appearing in present issue, has crowded out a number of valuable articles from the columns of several of our highly-esteemed, and ably edited and conducted exchanges. To meet this condition of things, and provide for the utilization of the vast volume of interesting matter received monthly, through the piles of Eastern and foreign contemporaries, arrangements are being perfected by which this journal,

IN JANUARY, 1886, WILL BE GREATLY ENLARGED AND IMPROVED.

Giving much greater space for both reading matter and advertisements. A number of able and intelligent, scientific and mechanical writers and correspondents will be added to its staff editorial, and nothing that personal devotion and means can accomplish, will be left undone, to place it still higher in public esteem and confidence, and render it a journal of still greater reputation and merit. To this end, we ask the hearty co-operation of every present patron and subscriber, in assisting to

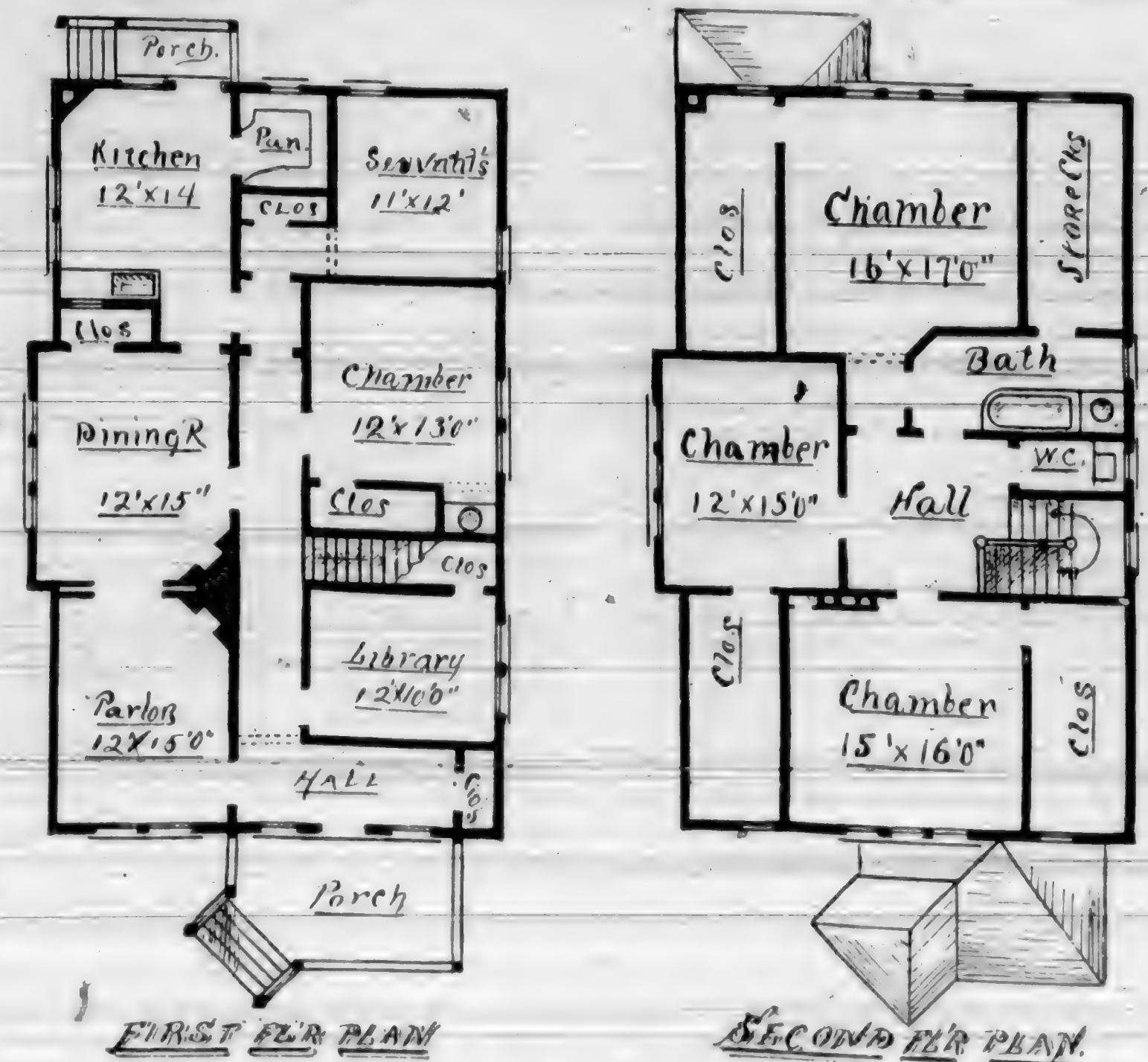
INCREASE ITS SUBSCRIPTION LIST.

Every new, and renewed subscription gives encouragement; encouragement stimulates ambition; ambition, effort; and well-directed, intelligent effort never fails of accomplishing the end and purpose aimed at.

THE BLACK DIAMOND.—The first number of the first volume of a new monthly journal, bearing the above title, is before us, edited by T. I. Jervis and H. A. Bischoff, with C. W. Collins as manager. It is published in Chicago. Very neat, clear, and readable in typographical execution, and its columns well filled with matter interesting to the general reader, as well as to those specially interested in the coal interests, to which it is particularly devoted. We bid it good speed and prosperity, and welcome it to our already plethora exchange list, and hope the number of its subscribers on the Pacific Coast may be large. Our hand, brothers, hoping that while the base of the interest you represent is black, smutty, and not to be handled with white kid gloves, your success may ever be bright and cheerful, and never smoky, even though you may have to replenish the fires of your ambition with earnest effort.

A verdict has recently been given by an English jury, which is of considerable interest. The tenant of a house in Croydon brought an action against his landlord for damages resulting from the death of his wife, from diseases caused, he claimed, by defects in the drainage and plumbing. The lady had possessed an income of \$5,000 a year, which "died with her," and for this substantial loss the husband asked compensation.

He showed that he had rented the house on representations of the landlord that it was in perfect sanitary condition, and that its plumbing and drainage had been done under the



FIRST AND SECOND FLOOR PLAN OF COUNTRY COTTAGE.—PLATE 4.

supervision of the Croydon Local Authority. But the state of the house was bad, sewer-gas escaped from the joints of the soil-pipe and from a broken trap, and a drain in the rear of the house was stopped. Before the death of the wife, the cook, the gardener, and the stepson of the plaintiff were ill. The landlord showed that he had reason to believe at the time that his representations about the condition of the house were true, as the local authority of Croydon had inspected the house, which was a new one, and had not found fault with any arrangements. But the jury, nevertheless, found for the plaintiff, awarding him \$10,000 for the damages sustained in the loss of his wife, and \$1,140 additional for expenses which he had incurred by reason of the insanitary arrangements.

In a circular issued by the Board of Health of Bridgeport, Conn., the following directions about diet and cleanliness in cholera seasons are given:—"As regards special precautions against cholera, great care should be used in the matter of food and drink. Wholesome meats and vegetables, and ripe fruits, may be used freely; in fact the free use of acids in fruit or otherwise is supposed to act as a preventive. But under no circumstances should any decayed or stale vegetables, unripe fruit, or tainted meat be allowed to be sold or used. The liability of water in the wells to become polluted by the contents of sewers and vaults, even if placed at a distance from them, should forbid the use of well-water for drinking purposes in all thickly settled places. Indeed,

during a time of threatened cholera no water should be drank until it has first been boiled to destroy germs. It may afterwards be cooled by placing in contact with ice, but not by the addition of ice. Milk should be boiled before using for the same reason. The use of cathartic medicines should be entirely avoided except under the advice of a physician."—Sanitary Engineer.

In no part of economy are we divorced from wire. It is our slave, and an ever-present master. Sleeping, we repose on wire mattresses. Eating, we see food which has passed through sieves, and which is sheltered from insect appetite by wire covers. Calling, we pull wires to ring curled wire gongs. Traveling, we are conveyed by cable or electric railways, hoisted by elevators hung on wires and hurried over wire bridges. We announce our coming by telegraph or telephone wires, and we tread our way by night through streets lighted by means of electric cables. Across our fields are strung thousands of miles of barbed wire. Our clocks are set by wires, our watches run by wires, our books are stitched by wires, our pictures hung by wires, and our politics managed by wires. Forty years ago there was not a telegraph office in existence. To-day they number over 60,000. Ten years ago the telephone was not in existence. To-day there are 330,000 in use in the United States alone.—Electrical Review.

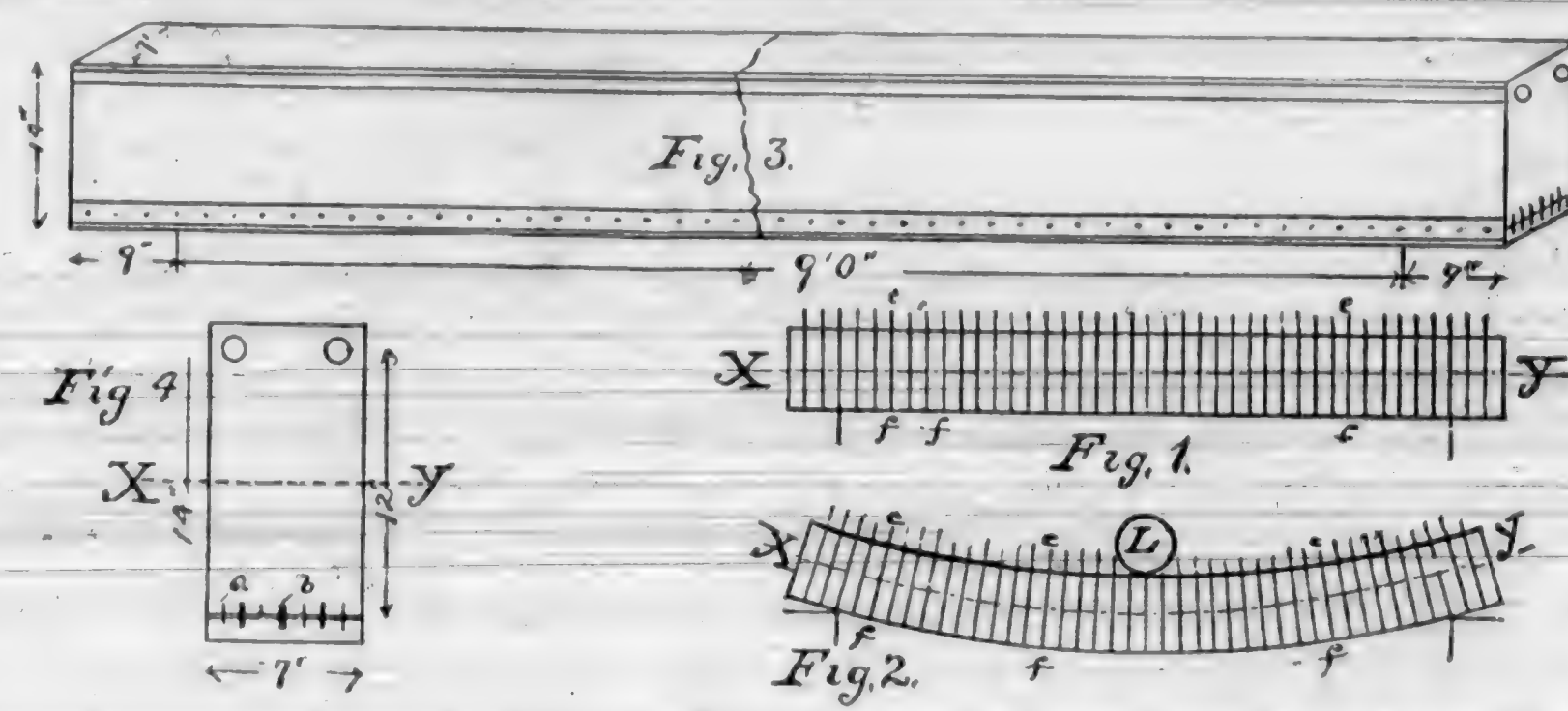
Model Homes.....	1.00
Hand Railing and Stair Casing.....	1.50
Drawing for Carpenters.....	1.75

Concrete.

AN interesting experiment was made on the 31st of August in the presence of several architects and scientific gentlemen at the Industrial Iron Works, No. 233 Beale Street, by Mr. P.H. Jackson, to demonstrate the strength of a Portland cement-concrete beam combined with iron of a kind invented by Mr. Thaddeus Hyatt and largely experimented on in London, in 1876. One of the objects of the invention is that they may be used in part as beams or girders to support sidewalks, floors of buildings, as well as walls, etc. The advantage claimed by the construction is that the sidewalk, floor, or wall aids in its own support, in furnishing all the compressive resistance requisite in the part usual above the neutral axis of a beam. The concrete-combined-with-iron part of the beam is cemented to the bottom part of the wall or sidewalk to be sustained, and is required to furnish only the tensile strength, or that part of a beam below the neutral axis.

These concrete beams or girders are straight and are made of Portland cement and gravel, and with a small quantity of iron or steel bars built on the bottom of the concrete body, sufficient to resist the tensile strain due to the load, the sidewalk or wall to be supported to which it is cemented, furnishing the remaining part of the beam or girder above the neutral axis in resisting compressive force. These bars may be of any shape with their surfaces roughened, corrugated, serrated, or other than a regular surface to hold on to the surrounding cement and prevent its slipping or sliding when under strain. Trials have proved that smooth bars with their ends fastened pulled through. These bars may be either singly or in combination; the latter are threaded to each other by $\frac{1}{4}$ -inch round rods, the width of the beam, passing through their centers, which stiffens the structure in its width. Also the concrete beam may be separately employed in resisting compression as well as tension, performing the entire function common to all beams. One of this kind was the subject of the trial. In this case the iron or steel ties furnish the tensile strength to that part of the Portland cement-concrete which is comparatively very weak in resisting tension below the neutral axis, to balance the strong compressive-resisting property of this material above the neutral axis. In General Gilmore's work on the strength of artificial stone he found by experiment that a mixture of 1 volume of Portland cement to 2 volumes of sand the ratio of the crushing to the tensile strength will generally be found between the limits of 14 to 1 and 19 to 1. With cement 1 and sand 4 it reaches as high as 25 to 1 and 29 to 1. With cement 1 and sand 5, as high as 35 to 1.

An explanation of the forces exerted on a single beam is as follows: When a straight beam or girder is subjected to a bending stress, it becomes more or less curved, by virtue of which the lower part is lengthened and the



upper part shortened in proportion to the depth of the beam and the difference in length between the radii of the curves. Were the beam made of horizontal layers the effect of the stress would be to cause these to slide one upon the other, but the beam being solid, the particles are held together by their own cohesion, the shearing strains being thus opposed by the cohesive force. The primary strains in the beam on the lines of compression and extension being upon curved lines, the disturbed particles must of necessity tend to arrange themselves in harmony with the radial lines of circles, all below the neutral axis seeking extension and all above compression. An illustration referring to figure 1 represents the side view of a straight beam or structure to be subjected to transverse strain when loaded and resting on end supports, the line $x y$ representing the neutral axis when loaded, being the dividing line between where the compression force ceases and the tensile strain begins, the greatest force and strain being at the extremes from the neutral axis. The imaginary vertical lines are at right angles with the bottom of the beam. The distance from any two of the lines at the top from e to e is the same as from f to f at the bottom. The length of the beam at top and bottom is equal.

Figure 2 represents figure 1 subjected to severe bending stress curved by the load L , which has caused great deflection. The vertical imaginary lines e, f in figure 1 have become radial lines in figure 2, radiating from a center to the curve of the bottom of the beam. The distance from f to f at the bottom of the beam in figure 2 is greater than in figure 1, the thrust force causing the disturbed particles to extend the greatest at the bottom, and gradually diminishing up to the neutral axis where it ceases, and from there the compressive force begins and gradually increases till the top surface is reached, which is the greatest, and the distance from e to e has shortened, the neutral axis line $x y$, being the original length of the beam, providing the two opposite forces have been equal in resistance. It is evident that when the beam is loaded and the imaginary lines e, f are held in their vertical position and not become radial lines, there can be no deflection of the beam, and its integrity remains intact. Mr. Hyatt, knowing

the great compressive-resisting strength of Portland cement, and the great disparity in its comparative feeble tensile resistance, united iron or steel in such a way as to bind them to the weak part of the concrete body, in resisting separation along the bottom of the beam or structure, so as to furnish all the tensile strength needed below the neutral axis to balance the great compressive resistance above the neutral axis. The beam in question tested at the Industrial Iron Works, had iron longitudinal bars connected together by small cross rods and in the manner that the places of juncture would be at equal distances as represented by the vertical lines at f, f , as in figure 1, which in this instance was 3 inches centers as shown by the dots at the bottom of figure 3. These cross-roads were $\frac{1}{4}$ -inch diameter as shown in figure 4, representing them passing through the 7 vertical bars, thereby holding the concrete to the beam every 3 inches in the manner of the vertical line at f, f , figure 1.

Referring to figure 3 is a longitudinal view of the beam tested. Figure 4 is a cross section, 7 inches wide, 14 inches deep, 10 feet 6 inches long. Distance between supports, 9 feet, $x y$ representing the neutral axes. At $\frac{1}{4}$ inch up from the bottom was built in 3 of $\frac{1}{4} \times 1$ inch and 4 $\frac{1}{4} \times 1$ inch wrought bars, extending the length of the beam, and at every 3 inches $\frac{1}{4}$ inch round iron rods extended through these 7 bars, some as shown in cross section figure 4 and longitudinally as in figure 3. The total weight of the wrought iron was but 46 $\frac{1}{2}$ pounds; this resisted the tensile strains until the beam was broken. The area of cross sections of these wrought iron ties to resist the tensile strain of the beam, after deducting the holes for the $\frac{1}{4}$ inch rods, is less than a bar of wrought iron 1 inch square, or the bottom flange of a wrought iron beam 8 inches wide by $\frac{1}{4}$ inch thick.

Without due consideration, Mr. Jackson informs me, larger pieces of cast iron, as shown in figure 3 near its top, were used than the necessity of the case required to make up in compressive resistance what the beam above the neutral axis might be deficient in, hence are larger than required. These were 2 of $\frac{1}{4}$ -inch diameter cast iron rope mouldings built in near the top, weighed 36 pounds; the compressive resistance of cast iron is 93,000

pounds per square inch. The beam was five months old.

The load was of pig iron, piled uniformly over the length of the beam, ending in a line over the inside of the supports.

When laid on	deflection 1-16 in.
15 $\frac{1}{2}$ tons 30,989 lbs.	3-32 "
18 " 33,589 "	" "
19 " 35,703 "	" "
20 " 36,045 "	" "
21 " 38,113 "	9-32 "
22 " 40,956 "	" "
23 " 42,062 "	" "
24 " 44,077 "	9-16 "
25 " 45,678 "	21-32 "
26 " 46,115 "	23-32 "
27 " 47,018 "	" "
28 " 47,996 "	13-16 "
29 " 49,001 "	" "
30 " 50,054 "	15-16 "
31 " 52,062 "	" "
32 " 52,692 "	13-16 "
33 " 53,654 "	brake by separation.

The pig iron was closely piled, and was 7 feet 6 inches above the beam.

The broken beam is now in front of 231 First Street. The gentlemen present exhibited great interest in the great strength of the construction, and when it is considered that this construction is called upon to act a part of half a beam, when supporting brick or cement work, the part to be supported acting in one-half of its own support, the invention may prove of great value.

The great strength of this beam, being but 7 inches wide, and considering the compressive resistance of the cast iron acting relatively to the wrought bars below, makes the distance in height but 12 inches. (See figure 3.) Therefore, computing the strength of this compared to a wrought-iron beam, of an area of bottom flange equally the area of all the ties in the concrete beam, we have as the breaking distributed load:—

$$1 \text{ in. area of bottom } 12 \times 180 = 17 \frac{1}{10} \text{ gross tons.}$$

Or 19 $\frac{9}{10}$ net tons. Excess of this concrete combined with iron beam over a wrought iron beam computed by the formula is 7 tons, or above one-third. This may be attributed to the solidity of the Hyatt beam compared to the web of a wrought iron beam, which is subject to lateral deflection, also from the punched rivet holes weakening the iron, and from what other causes is a subject for consideration.

Symmetry of line came in place of the extravagant contours which had prevailed, resulting in an inspiring transformation, the influence of which has been felt in all succeeding times. Even now, with the many combinations of styles in this most fruitful period of art, the Louis XVI. style receives in furniture, architectural woodwork and mural decoration very full recognition. There is an abundance of detail in present styles of ornamentation, more probably than at any former period, but there are abundant evidences that so far as simplicity of general aspect can be combined with rich and graceful elegance, designers, guided in part by advanced public tastes, will not be found wanting.—*Exchange.*

The Architect.

Of all professional men the architect should have the broadest and deepest knowledge—that is if we are to judge by the standards of the past.

Pythius, in his commentaries, the oldest work on architecture that we have any record of, says "that an architect should have that perfect knowledge of each art and science which is not even acquired by the professors of any one in particular."

Vitruvius tells us that an architect "should be a good writer, a skillful draughtsman, versed in geometry and optics, expert at figures, acquainted with history, informed on the principles of natural and moral philosophy, somewhat of a musician, not ignorant of the sciences both of law and physic," etc.

The great Hindu authority, "The Maushyalaya Chandica," gives it as a law that "an architect should be conversant in all sciences; ever attentive to his avocation; of an unblemished character."

One thing is true, that all those who intend to follow architecture as a profession should pass through some solid and rational system of instruction—drawing, geometry, motives, materials, and the machinal skill necessary to use them; "a philosophical study of the history of architecture in its relation to various phases of civilization," the causes of its development or decline, etc. The moral side should also be taught—more particularly the personal responsibility of the architect. Unless something of this kind is done we cannot hope to have able and skillful architects.—*Art and Decoration.*

In Chicago, the cry of the people for open spaces and parks has not become so intensified as it is in London, or even in New York. Yet there is pending an action in the city council which threatens to hasten the time when this cry will be bitter enough. The lake-front park is a magnificent open space, directly facing the lake in what will soon be the busiest section of the city. An effort is being made to secure the opening of streets in this park, and an ordinance is ordered drawn up for the purpose. This is but the entering wedge which it is expected will secure this valuable land for commercial purposes. It is a great mistake. The commercial interests of Chicago should be made to pay something for the hygienic influence which the preservation of this park will exert in the future.—*The Sanitary News.*

The ancient city Smyrna, now called Ismir, the only city on the western coast of Asia Minor, which has prospered, commercially, from the time of its foundation by Alexander the Great to the present, has always been defective in sewerage. Through an oversight of its architect, no provision was made for sewers, and the effects were so pronounced fifteen hundred years ago that Strabo speaks of them in his writings. The city has always been the seat of pestilence and plague.

Present Taste in Decoration.

The general abandonment of wainscoting is all in favor of a more effective display of furniture. The beautifully patterned styles of wall paper now supplied ordinarily in subdued tones and neutral tints, with no one color unduly predominating, make, when judiciously chosen, a more effective background than one partly of wood and partly of paper. This and the fact that wainscoting is a sort of walling up, has driven it out.

The selection of the tone and pattern of paper may be properly made with reference to the intended hue and tone of the furniture and of the carpet. No arbitrary rules can be laid down in this matter. A general harmony, however, is quite consistent with strong contrasts, only these contrasts demand greater art to manage than closely analogous colors. In carpets, for instance, we now see admirable patterns in which a light field is traversed by bright and dark bands; so also in upholstery textile coverings of chairs, sofas, lounges, and fauteuils. The truth is that improved taste has set in against tameness; more inspiring effects than mere neutral colors themselves will yield are looked for. Hence the abundance of gilded and colored metal ornaments in all sorts of quaint forms, which it is now the fashion to introduce, brilliant coloring extends even to lamp-shades, in some of which mosaic colored glass is introduced; in others, opalescent hues.—*Art and Decoration.*

The competition for the new Chamber of Commerce in Cincinnati, which has just been decided, presents several points of interest. Its general character, the high reputation of the architects invited to compete, the universal excellence of the designs submitted, and the final decision of the committee, all mark it as a great advance on methods formerly in vogue in competitions for public work. In issuing their invitations, the real estate committee of the Chamber of Commerce, composed of gentlemen of unimpeachable integrity and standing, selected six representative architects, whom they offered to pay about what sketches necessary for a fair presentation of designs for the building would cost. The original circular from the committee reserved for them the rights, first to retain as their property all plans presented, and second, to pay the successful architect \$2,000, and employ another man to make working drawings and complete the building. These two clauses the committee, in response to strong representations from Mr. Richardson, and Burnham & Root, finally modified, specially agreeing to return all plans except the one premiated, to use no features peculiar to any one of these designs, and virtually conceding that the architect presenting the accepted design should be chosen to finish the drawings and superintend the building.—*The Inland Architect and Builder.*

Practical Perspective.....\$ 6.00
Modern Architectural Designs..... 10.00

Abominations of the Back Yard.

MANY back yards are abominations to the eye and nose. One finds in them all sorts of litter and refuse from oyster cans to old boots. Here the slops of the kitchen are poured to increase the odors which ought to warn every thoughtful person of the malarial influence breeding there, to break out eventually in fevers or diphtheria. If any member of the family dies from one of these diseases, his death is probably lamented as a "mysterious dispensation of Providence;" but the minister would say if he were to visit the back yard, that death was caused solely by a violation of hygienic laws. A very strong argument against a dirty back yard, is the spirit of deception which it is apt to foster in the young members of the family, for it is a constant decoit to present a clean and attractive front yard to the gaze of the passers, while the back yard is not fit to be seen. Children should be taught to be clean for the sake of cleanliness, and not because outsiders are likely to criticise them. The best plan is to have a hoghead or large box fitted up in one corner of the yard, and make it a rule to throw into this old cans, boots, broken dishes, and all such rubbish, and when there is a great accumulation, to bury or burn it. Do not allow anything to be thrown about. Have drains made to convey all slops entirely from the house. Make good walks, and let the ground have a fine covering of grass, not weeds. Put up strong supports for the clothes line. Keep the fence in repair, and plant currant bushes near it. Set vines about the refuse barrel, and train them over it until it is hidden. If you have a receptacle for ashes, let it be something which can be shut up, not a row of old barrels to offend the eye, and give out a cloud of ashes every time the wind blows. Make it a rule to have the back yard at all times as clean as the front one.—*Eben E. Rexford, in American Agriculturist.*

Solar Heat.

THE light's intensity at the sun's surface is 190,000 times that of a candle flame, 5,300 times that of metal in a Bessemer converter, 146 times that of a calcium light, or three-fourths times that of an electric arc. The temperature, according to Rosette, is about 18,000 degrees Fahrenheit. The mechanical equivalent of the solar radiation, continuously acting, is nearly 10,000 horse power per square foot of solar surface.

The tallest chimney in the world is that of the Townley Works at Port Dundas, near Glasgow, Scotland, which is built of brick and stone, and is 454 feet in height. It is circular in form. The highest stone chimney is octagonal in form, and stands 381 feet in the air, and is located in Halifax, England. In Rouen, France, there is an iron chimney 279 feet high, which was riveted together and afterwards lifted into place with a crane.

Large quantities of timber are now creosoted, in a special manner, for railroad purposes, the effect being to increase the tenacity of the wood for holding spikes, &c., as well as its density, and its ability to resist mechanical wear. This is done by means of an apparatus consisting of a boiler-plate cylinder, of a size adapted to the timber; this cylinder is of a strength sufficient to resist 300 pounds pressure per square inch, and has a track extending for its whole length along the bottom, the cylinder's ends being closed by strong iron doors, air and water tight. When the timber has been run into the cylinder and the doors closed, steam at about 100 pounds pressure is injected into the cylinder, the supply continuing as required by the nature and dryness of the wood; the steam is then shut off, and vacuum pumps are worked as long as any liquids or vapors are obtained, the hot preserving liquid being now run to the cylinder from the reservoir until full. The force pumps are again operated until the interior pressure is some 100 pounds per inch, and kept thus until sufficient preservative fluid is forced into the pores of the wood; the force pumps are now shut off and the creosote oil or other liquid contained in the cylinder is discharged into a suitable cistern, after which the doors at the ends of the cylinder are opened, and the car carrying the timber or ties run out.—*Wood-Worker.*

"Talking about funny things," said a big, bronzed, bearded man in the reading-room of an up-town hotel the other night, "the funniest thing I ever heard of happened in my saw-mill out in Michigan. We used a heavy upright saw for sawing heavy timber. One day not long ago the men had all gone to dinner, leaving the saw, which ran by water power, going at full speed. While we were away a big black bear came into the mill and went nosing around. The saw caught his fur and twitched him a little. Bruin didn't like this for a cent, so he turned around and fetched the saw a lick with his paw. Result: a badly cut paw. A blow with the other paw followed, and it was also cut. The bear was by this time aroused to a perfect fury, and, rushing at the saw, caught it in his grasp and gave it a tremendous hug. It was his last hug, and we lived on bear steaks for a week. When we came up from dinner there was half a bear on each side of the saw, which was going ahead as nicely as though it had never seen a bear. This is a fact, so help me, Bob," and the big lumberman bit off a fresh chew of tobacco.—*N. Y. Tribune.*

It is reported that Boston will soon have an opportunity to see the practical workings of the electric railway system on one of her streets. A line is being laid on Huntington Avenue in connection with the Metropolitan street-car line. If it works satisfactorily there, after a thorough test, it will probably be adopted on some one or more of the roads in Boston.

Disintegration of Building Stone.

THE sandstone commercially known as freestone, which is extensively used for building purposes in American cities, is subject to disintegration from the action of the sulphurous acid produced by the consumption of coal and from frost. There is much difference in the ability of various quarries to withstand these destructive influences. The outer surfaces of some buildings in New York and Philadelphia have been, by the advice of an eminent chemist, treated with a mixture of paraffine and carbolic acid with apparently good results. The flat surfaces are warmed by means of a stove like a plumber's stove, but with a flat side, and the paraffine when applied in a melted condition penetrates the stone readily, it is said in some instances to the depth of 1½ inches. Mouldings and carved work are heated by means of a blast flame from India-rubber bags of illuminating gas. Another process has been suggested, but the preliminary results do not appear to be of a satisfactory nature on account of its tendency to crack. In this process the mixture used is an artificial stone, and consists of three parts glass sand, three parts broken marble, two parts anhydrous clay, and two parts freshly slaked lime still warm. After a coat of the above has been applied wash it with water the following day. The central portion and wings of the Capitol Building at Washington were originally built of freestone, which disintegrated so rapidly as to threaten the permanence of the structure, and the whole was protected by several coats of white paint. The wings afterwards added to the above, and now used for the House of Representatives and Senate Chamber, are built of white marble, which conforms in color to the central portion of the building, so that the whole building appears to be made of marble.—*Mechanical News.*

The "Sanitary News" has often urged the sanitary examination of school buildings during vacation. To give force to its own opinion it now desires to quote the words of Mr. William Paul Gerhard, an eminent sanitary engineer. In a recent article on school and college sanitation, he says: "The annual vacation term would seem to be a particularly fit time to undertake a sanitary inspection of the school-buildings, of their interior construction, sanitary arrangements, and of their immediate surroundings." He calls attention to the absolute necessity of such a periodical inspection, by qualified persons, and the correction of such structural and sanitary defects as may be discovered. While the water supply, drainage, and ventilation should be examined into, it is necessary to demonstrate the entire absence of dampness, and to examine the methods of lighting the class rooms, of heating the building, the means of egress in case of fire, the arrangement of seats and desks, and finally into the plumbing appliances.

Treads and Risers..... \$.50

Architects Get Their Fees by Suing.

ANOTHER architect in England has had to sue his client to get his poor pay with the usual result. In this case, which is known as *Taylor & Locke vs. Greene & Son*, the plaintiffs, composing a firm of architects, brought suit to recover \$2,250, the balance due them for services in preparing plans and drawings, with other professional work, for the rebuilding of a certain business structure. The defendants in resisting this claim, brought forward the usual tale of woe, to the effect that among other things, the architects had not sufficiently considered or warned them about the claims of neighboring owners in regard to light and air, and that through this neglect disputes had arisen between the defendants and their neighbors, involving the former in expenses amounting to \$18,000, which, as they claimed, the architects ought to pay. The reply of the architects to this was simply that they had been engaged to do the work of architects, under the instructions of the defendants, and that they had done this, and nothing more. Although the trial lasted seven days, and a great deal of evidence was brought forward, the jury seems to have retained through the whole the view of the matter that juries generally take, and promptly returned a verdict for the plaintiffs for \$1,900 and costs. So far as we can judge from the brief but clear account which we find in the *Builder*, this seems to have been one of those cases where a man, having engaged a young or over-ambitious architect to do a certain piece of professional work, imagines that he has a claim upon his time and services to any extent, and for any purpose, and keeps him trotting about, investigating, negotiating, and inquiring in regard to matters which do not come at all within an architect's province, however convenient it may be for the architect's employer to have him busy himself about them without charge; and after getting all the work out of him that he can, avails himself of all the disappointments that he may have experienced in the results of the errands which he has persuaded the architect to do for him to cut down the pay due him for his legitimate services. There are plenty of such men in the world, and plenty of architects who suffer from them, but the number of the latter would be smaller, if the younger members of the profession fully understood how little respect a court accords to any pretext whatever for depriving a man of any part of the money which he has earned by reasonably skillful and faithful services in his own vocation.—*American Architect and Building News.*

Durability of White Lead.

WHY is it that white lead does not wear as well as it used to? is a question that is frequently asked by painters and consumers. They also add: We used to be able to obtain an article that would wear for years, while

now its durability is much less. The important reason for this is found in the difference between the methods of manufacture employed now and a few years ago. Formerly, white lead was corroded by immersing it in vinegar acidulated with acetic acid, which is only concentrated vinegar. The process required about eight weeks before the carbonate was ready for use. This process, however, was found too costly, and the production was too limited to supply the demands. Then, too, a process requiring so long a time would compel corrodors to invest a large capital from which they could realize no returns for a long period. They could not afford to produce lead in this manner at a cost sufficiently low to meet the demand for a low-priced article. Accordingly their ingenuity was taxed to invent some method whereby the carbonate could be produced much quicker and at a much less price. Thus they adopted the present process whereby the lead is now corroded by means of a stronger acid in a month, or even in a few days. The result is that the pure article is much less durable when applied to buildings. Speed in the manufacture of some articles, it is true, does not sacrifice quality, while in others the greater celerity in manufacture the less durable the products. Not only is this seen in the production of lead, but another branch of manufacture where it is especially noticeable is that of leather. Formerly it required fifteen months to thoroughly tan a hide. Now the process has been shortened and a month and a half at the longest witnesses the completion of the work. As in the case of white lead, the result is lack of durability, and people constantly complain that leather soon cracks out and lacks its original durability.—*P., in the Painter.*

Painting Ironwork.

THE point of prime importance, says the *Painters' Magazine*, is the actual condition of the surface when ready to receive the first coat. Upon this point rests the success or non-success of subsequent applications, for if not in proper condition no paint will prove permanently preservative. Now the best state is that where there has been formed upon the surface of the iron a film of black oxide which has been, while hot, thoroughly permeated by and incorporated with a resinous or tarry covering. This covering insures perfect success, and its thickness may be increased from time to time by additional coats of paint. If, however, a layer of hydrated oxide (ordinary rust) be once allowed to form, the successive coats of paint will fall off, their separation from the iron being merely a question of time. During the time, also, the rust has been spreading under the paint. An instance of this may be seen after outdoor riveted work has been in place for some time. Usually all the riveting is done before the final painting is begun, each rivet-head, in the meantime, being exposed to a damp atmosphere; the paint begins to peel off the rivet-heads long before it leaves

the adjacent plates, and, when this occurs, nothing but thorough scraping will give the paint a chance to adhere again. So slight are the differences of manipulation which determine whether a given piece of work shall or shall not rust away, that they may all be found in the different methods of manufacture pursued now and formerly.

Taking the case of a piece of ornamental ironwork, which in so many instances has come down to us in unimpaired beauty and condition, it would now, probably, be forged in detail in one part of a factory, drilled, filed and fitted in another, and when completely finished, be painted in three coats of best oil paint. Formerly the smith who forged the work punched the necessary holes at the same time, fitted his various pieces together as he went on, completing each piece as he proceeded, doing all the work with his hammer, and, to quote an old book of directions to good smiths, brushing his work over with linseed oil and suspending it for some time over a strongly smoking wood fire. This will give at once a sort of elastic enamel coat, perfectly adherent and calculated to preserve the iron to the utmost. Of course ironwork to-day is not made to undergo any such preparatory process, and the consequence is that we find it very difficult to produce good results in painting on iron surfaces. But it is pretty well established that the very best finish coat for iron is found in red lead, upon which any desired shade of lead paint may be placed with the best possible results.

EXCAVATIONS AT OLYMPIA.—The excavations at Olympia are to be recommenced immediately under the auspices of the Archaeological Society of Athens. On these excavations the German Government has expended so far a million marks, (£20,000) more than is generally supposed, the sums voted by the Reichstag and granted by the Emperor having been supplemented at a later date by a large bequest from an unknown quarter in Berlin. It is declared by those best qualified to judge, that two-thirds of the site of Olympia still remain to be excavated. The Germans themselves, however, seem to be glad to have done with the work, as they have cleared out the principal parts where the richest harvest of *trouvailles* was expected, while nationally they have derived very little profit from the undertaking. They think they made a great mistake in stipulating only for duplicates of what they found, as of course no important objects existed in duplicate. They fancy that nothing of any great artistic value can now be found in the vast area of the Stadium or in the other outlying structures; but the Greek society has determined to clear away the vast mass of superincumbent earth, and to bring back the whole site to the original level, so that the lines of ancient Olympia may be clearly discerned. The local museum, the gift of a patriotic Greek gentleman, is a large building now roofed over, and is being plastered. In a few months it will be ready for the reception of the statues and bronzes already found.—*Athenaeum.*

A Grand Monument.

No ONE laughs now at the Washington monument. The day of its being a subject for ridicule is over forever. It is the wonder of Washington, and its beauty the admiration of both Americans and foreigners. It rises from the banks of the Potomac, a great, white marble shaft, piercing the clouds and backed against the blue of the sky. It is the grandest obelisk the world has ever seen, and in the eyes of the future, should the nations of to-day pass away, leaving no more records of their progress than the mighty ones of the Egyptian past, it will surpass the pyramids in the wonder of its construction. It is higher than the third pyramid. It is taller than St. Paul's Cathedral. To-day the cathedral of Cologne—512 feet high—is the tallest work in the world; next comes the great pyramid, 483 feet high; then the Strasburg Cathedral, 473 feet; then the second pyramid, 453; then St. Peter's, 430; St. Steven's at Vienna, 443; and St. Paul's at London, 384. The monument is 555 feet high, forty-three feet higher than the Cathedral at Cologne. It will be far different, however, from the needle-like shafts of the great European cathedral, each of its sides at the top being thirty-five feet in width, and the whole massive tower seems a solid growth of natural rock, rising from the earth and reaching to the sky. The width at the base of each of its four sides is fifty-five feet, the monument gradually tapering for over five hundred feet, until it becomes a pyramid, each side of which is thirty-five feet.

Our indefatigable American cousins are constantly finding out something new and useful, or making improvements on past inventions, thought to be already at their best. The latest thing is an improvement in acoustics, by means of wood. We learn that a telephone has just been brought to this country from America which is based upon entirely new principles, being absolutely independent of electricity, so that batteries, coils, and cells are quite dispensed with. This obviously greatly simplifies the working of the instrument, and in the "mechanical telephone," which was subjected to a severe test on Saturday last, simplicity and distinctness are claimed as its chief characteristics. The instrument consists of a diaphragm, or sounding-board, made of strips of willow-wood, which has been found by experiment to possess a remarkable sensitiveness to sound vibrations. These strips of wood are closely woven together and varnished. In the center of the diaphragm a small disk of metal is placed, from which the wire proceeds to any point desired up to two miles. In Saturday's trials the instrument freely answered to all demands upon it, the ticking of a watch, musical sounds, whispering, etc., being heard with great distinctness.—*Timber Trades Journal, London.*

Cumming's Details..... \$6.00
Cutting Tools..... 1.50

THE Brooklyn *Real Estate Review*, in discussing the question of low bids and poor work, makes the excellent suggestion that the contractor should be awarded the work whose cost estimate comes the nearest to the average of all the bidders. The center of difference between competitors would seem to be the proper point on which to weigh the probability of poor work on the one hand against unreasonable charge on the other, and would be the most removed from the danger of either. An average price would certainly induce a belief that a living profit could be made on an average quality of work, which is all that can be expected in a competition for trade. The complaint has always been that the work is generally below the average in quality, while the price asked really pays for nothing better. The simplest principles of reasoning would seem to teach that results not in accord with the causes that produce them should not be expected, and if bad work follows as a regular sequence of poor pay, there is nothing so very astonishing in the fact.

The remedy suggested above lies with the contractors themselves, and is the only alternative that presents itself. If they would agree with each other, and give the public to understand, that no competition would be entered into unless on this basis of award, the now much abused system of letting by inviting competition would be productive of some good, at least, to all concerned. Every contractor would be compelled to hold up his end by doing a grade of work for which he was justly paid, or go out of business, and the old excuse to his conscience and customer that the work was "good enough for the money," would have no validity or foundation in truth.

It is difficult to convince some business men that it pays to advertise. They have tried it, they say, and it did not pay them. These men expect too much; they place an advertisement in a journal for two or three insertions and if they do not get orders enough from its insertion to pay them a profit on its cost, they arrive at the conclusion that it has not paid them. They do not take into account the indirect benefits that they may derive without being able to trace them to their source. The principle of advertising is to keep your name before the trade, and to call attention from time to time to the new goods that you have for sale. The liberal advertiser is always a live business man; customers know this, and naturally go where they think the most exertion is being made to sell goods.—*Furniture Worker.*

The natural gas vein which was struck some time ago at Gardenville, near Buffalo, N. Y., while boring for salt, continues to attract attention. The gas is said to be of good quality and shoots up to a height of about fifteen feet. There is talk of forming a company to utilize the well by laying pipes to Buffalo, a distance of about twelve miles.

The Pine Lumber Supply.

HOW LONG will this wonderful work among the pines continue? The stock of pine yet standing in Michigan can produce 40,000,000-000 feet of lumber if cut for the purpose. In eight years, therefore, at the last average production of the State, the pine will have been used up. But such predictions have been made for years past. In 1867, the standing pine of Michigan was estimated to be 52,416,000,000 feet, and it was predicted that it would all be gone in seventeen years. But since then the Saginaw Valley alone has produced about 12,000,000,000 feet, and will continue to cut in the neighborhood of 1,000,000,000 feet a year for eight or ten years to come. As pine grows scarcer, it will make more lumber than when it was plenty.

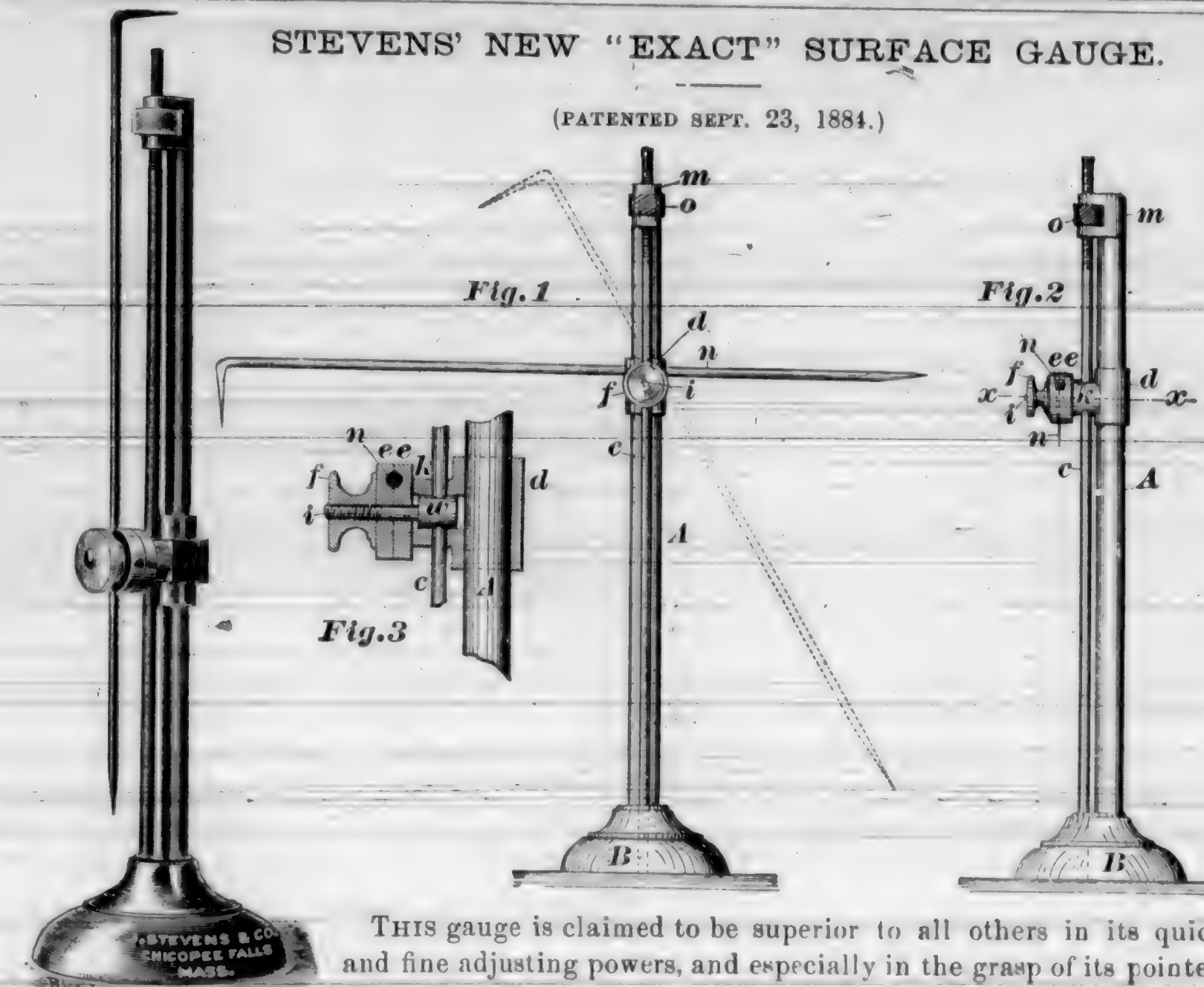
But, in predicting the end of pine lumber, a person must take into account the lumber which is yet standing in Wisconsin, Minnesota, Canada, and the South. And it will be many years before it even grows scarce, when we estimate the whole. Yet an end must come to the forests that the white race found in this country. Doubtless pine forests of the second growth will be raised for future use, but the present magnificent forests will disappear. It has been estimated that the demand for lumber in this country from 1880 to 1890 would require 210,000,000,000 feet, and one can readily see that at that rate the stock must soon be gone.—*Chicago Current.*

The large Royal Theater at Munich, Germany, is now lighted by electricity, the lights used being more than 1,400 Edison incandescent lamps, each of sixteen candle power. The auditorium is lighted by a central chandelier containing 140 lamps, which took the place of a luster with 240 gas-jets. The different galleries are, moreover, illuminated by 84 lamps, equally distributed in front of the boxes. The stage is fitted up with 610 incandescent lights, while 566 more lamps are placed in the dressing-rooms, offices, storage-rooms, etc. The current is furnished by six large Edison dynamos, located in an engine-house, placed about 400 feet away from the theater, and underground wires are used for the transmission of the current. In order to avoid the annoyance to the eyes of the glaring light, all audience lights, as well as those in the halls and reception rooms, are encased in glass bulbs, the glass of which is rendered opaque by applying to it a caustic solution. The latter arrangement is much to be commended, and forms an important step forward in the successful practice of lighting buildings by electricity.

The City Council of Litchfield, Ill., Aug. 21, granted L. C. Van Vleck the exclusive right of supplying the city with natural gas for twenty-five years. Natural gas has been found just outside the city limits in large quantities at a depth of about 507 feet, and it is proposed to utilize this in lighting the city. The work of laying the mains is to be commenced at once.

STEVENS' NEW "EXACT" SURFACE GAUGE.

(PATENTED SEPT. 23, 1884.)



THIS gauge is claimed to be superior to all others in its quick and fine adjusting powers, and especially in the grasp of its pointer. This, tightening on to one of the rods, and moving only with it instead of sliding upon it as others do, is held perfectly firm in all of its adjustments.

In this tool the post A is rigidly fastened to the base B in the usual manner. At the top of the post is the nut guide m, for nut O. The adjusting rod c is guided at the top in a hole through m, and at the bottom in a hole in the base B. By means of the nut O the rod and attached parts can be adjusted vertically.

The support d is made with a branch k, through which the rod c passes. This branch is recessed to receive the cylindrical head w, of clamp screw i. The rod c passes through head w and branch k.

The pointer n is held between two clamps, e, e, as clearly represented. This permits of turning the pointer and clamps on the screw i, and of binding the whole by means of nut f.

It will be understood that the mechanism carrying the pointer can, when the nut f is loosed, be readily moved up or down the post, that when the nut f is tightened, it clamps this mechanism to the rod c, but that by turning nut O, the pointer can be adjusted a short distance up or down to bring it to the exact position required, after it is otherwise securely clamped.

The advantages of providing for this adjustment will be apparent to those accustomed to use such tools.

By having a hole drilled in the base, it is also adapted to a depth gauge and various other purposes.

SMALL SIZE.

The basis is of cast iron, round, and turned true with the upright spindle. The total height is eight inches, and will scratch eight inches sideways and thirteen inches high. The cast steel needle is pointed at each end, one of which ends is bent to a right angle. All parts are polished and accurately fitted.

LARGE SIZE.

Same, only weight is two pounds, and arm will scratch ten and a half inches sideways, and eighteen inches high.

These points, together with its simplicity, as shown by the cut, make it a most desirable tool for practical mechanics.

These surface gauges are made by J. Stevens & Co., the well-known manufacturers of fine machinists' tools, Chicopee Falls, Mass. They are for sale by

DUNHAM, CARRIGAN & CO.,

Nos. 17 and 19 Beale Street, and Nos. 18, 20, 22, 24 Main Street, who carry not only a full line of these gauges, but also a complete stock of fine machinists' tools, and light, dark, and antique bronze hardware. Orders also taken for gold, silver, nickel, and enameled work in all colors.

"PRACTICAL ESTIMATOR."—A neat little book of 96 pages, published by David Williams, New York, is full of instructions, tables, and suggestions for the use of contractors and all parties figuring on buildings and constructive works. While its contents may not be in every particular adapted to this section of country, owing to the differences in methods and materials as between this and the Eastern States, they, and the blanks referred to in this connection, will be found most excellent safeguards against the omission and oversight of items of cost. A very large proportion of the ruinously low bids submitted in competitions that end in pro ratio settlements, are the result of careless figuring, the neglect to include costs and expenses which are sure to occur. The book and blanks under notice are excellent reminders of every detail in figuring, and should be in the hands of every contractor.

"The 'Handy Estimate Blanks' have been prepared with an idea of furnishing to contractors and builders a convenient form upon which to make estimates and record the cost of the work which they execute. Two general divisions of work are recognized, namely, 'Masonry' and 'Carpentry.' Under each of these heads subdivisions are indicated, which include all the parts of the work required to complete any ordinary structure. In the column rulings there is a space for 'Estimated Quantities,' one for 'Prices,' and then a space for extensions, entitled 'Estimated Cost.' Outside of these rulings there is another set of columns, entitled 'Actual Quantities,' 'Actual Price,' and 'Actual Cost.' This arrangement affords a convenient system of comparison between estimated cost and actual cost, not only upon an entire job, but also upon any particular portion of a contract. The arrangement is such that each individual part of a building may be figured independently of all the others as to cost and allowances and profits, or all may be taken together and a single entry made for the allowances and profits. Materials are figured independently of the labor required to put them in place, the latter being separately listed in each division. In addition to the items listed as composing a building, a number of blank spaces are provided, both under the head of 'Masonry' and 'Carpentry,' for listing such items as the special character of a given contract might make necessary, or which the practice of a given neighborhood might require."

"Practical Estimator," and the "Handy Estimate Blanks," together with a line of practical publications on architectural, constructive, and mechanical subjects, for sale at the office of this journal, at publishers' prices. All orders from parts distant from San Francisco will be forwarded upon receipt of postal order, cheque, greenback or coin.

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Palliser, Palliser & Co. Useful details. Specimen copy of

STEAM ENGINE CATECHISM, 1885.

By Robert Grimshaw, President James Watt's Association, received. A handy little work of 149 pages, on matters suggested by its title—engines, and steam in its ten thousand applications as a motive power. It will be found useful to young engineers, interesting to older heads, and convenient for examination boards.

It seems probable that the German engineers, using the record of others with the care and thoroughness characteristic of their race, have succeeded to an unusual degree in securing the benefits usually sought in the introduction of sewerage systems, but one is hardly prepared for such surprising results as those which M. Durand-Claye describes. According to him, the recent health statistics of the city show that in the portions not yet connected with the sewers there has been within a given time, we suppose a year, one case of typhoid fever to nine and three-tenths houses, and one death from the disease in every forty-third house; while in the sewered districts there was in the same time only one case of the fever to forty-nine and three-tenths houses, and one death from it to one hundred and thirty-seven and five-tenths houses. It must be remembered that Berlin is above all others a city of great apartment-houses, the average number of persons to a house being fifty-eight, so that these figures do not in either case show an extraordinary mortality from typhoid fever, but it is remarkable that the simple connection of the buildings with the sewers, without any change in the character of the drinking-water used in them, should at once diminish by four-fifths the liability of their inhabitants to the disease. In fact, as the interior portions of the city, which are at once the most crowded and the least wholesome, have been the first to be provided with sewers, while the houses in the suburban circle, where the system is not yet complete, would naturally have fewer occupants, and those of a cleaner and better nourished class, it seems quite possible that a comparison of the numbers of individuals attacked, instead of that of houses, would show a still greater difference in healthfulness between the sewered and unsewered districts.—*American Architect and Building News.*

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BELOW will be found a list of the members composing this Exchange. Boxes are provided for each member, so that architects, owners, or others desiring the services of any particular member, or those having boxes who are not members, and yet whose business is directly connected with that of the Exchange, can readily secure the attendance of the party sought, by leaving a note in the respective boxes.

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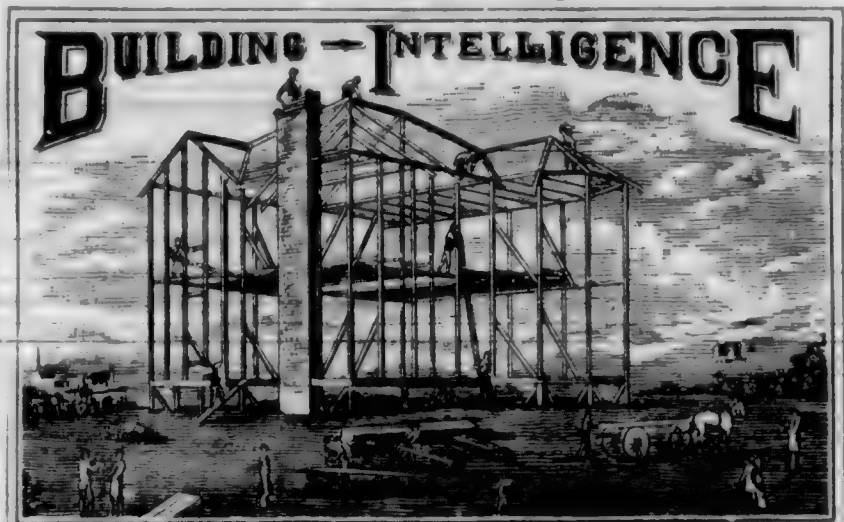
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THE CALIFORNIA ARCHITECT AND BUILDING NEWS.

Duncan, corner Dolores. One-story frame. O.—F. Donahue. C.—M. Loftus. \$1,000.	2
Douglas, bet. Eighteenth and Nineteenth. Two-story frame. O.—J. Alex. Campbell. A.—J. J. Clark. C.—W. H. James. \$3,000.	2
Fell, No. 428. Alterations. O.—G. Berge. C.—Hulley & Perkins. \$1,000.	2
Folsom, north side, bet. Tenth and Eleventh. Two-story frame. O.—H. T. Bryan. A.—H. T. Bestor. C.—C. H. Ackerson. \$5,500.	2
Fulton, cor. Scott. Two-story frame. O.—A. W. Wilson. A.—J. M. Curtis. C.—J. W. Messenger. \$12,000.	2
Fillmore, east side, bet. California and Sacramento. Four two-story frames. O.—M. S. Grinbaum. A.—Schmidt & Havens. C.—J. A. Hayden. \$13,000.	2
First, northeast cor. Jessie. Four-story brick. O.—Michels & Watt. A.—Percy & Hamilton. C.—J. McCarthy, brick work; J. C. Gibson, carpenter. \$12,000.	2
Fell, nr. Baker. One-story frame. O. and B.—E. H. Henrick-son. Day's work. \$3,000.	2
Fillmore, nr. Sutter. Two-story frame. O.—S. Bates. A.—S. & J. C. Newsom. C.—J. Rebnan. \$8,000.	2
Filbert, nr. Webster. One and one-half-story frame. O.—R. Malney. A.—W. H. Wharff. C.—Walker & Perry. \$2,000.	2
Filbert, bet. Kearny and Dupont. Three-story frame. O.—A. Vaccaro. A.—Wm. Mooser. C.—W. F. Fitzpatrick. \$8,000.	2
Fifteenth Ave, south side nr. St. John's St. One-story frame. O.—J. Baker. A.—S. & J. C. Newsom. C.—Cupps & Green. \$3,000.	2
Fern Ave, bet. Franklin and Gough. One-story frame. Day's work. \$800.	2
Fifth, east side, bet. Har-ison and Bryant. One-story frame. O.—E. F. Northam. Day's work. \$600.	2
Filbert, bet. Larkin and Polk. Two-story frame. O.—P. Mathews. A.—W. H. Wharff. C.—A. N. Nelson. \$1,400.	2
Filbert, bet. Fillmore and Webster. Alterations. O.—A. C. Chisholm. C.—R. Cook. \$1,000.	2
Gough, west side, bet. Cal-ifornia and Webster. Alterations. O.—C. Muller. A.—Schmidt & Havens. \$12,000.	2
Haigh, near Buchanan. One two-story frame. O.—P. Noon. C.—S. H. Shanks. \$1,500.	2
Harrison, nr. Eighth. Two-story frame. O.—C. Casey. A.—J. J. Clark. C.—J. Sweeney. \$3,900.	2
Harrison, west side, nr. Fourteenth. Alterations. O.—Mrs. Thomas. C.—J. Collins. \$1,100.	2
Hill, No. 18. Alterations. O.—L. Imhaus. C.—J. W. Baldwin. \$1,200.	2
Laguna, bet. First and Geary. Three-story frame. O.—Mrs. H. Goding. A.—J. J. Clark. \$7,000.	2
Lombard, bet. Jones and Leavenworth. Two-story frame. O.—Thomas Groves. A.—Schmidt & Havens. C.—P. Creighton. \$4,000.	2
Lyon, nr. Sacramento. One-story frame. O.—Miss Sullivan. C.—W. Plins. \$2,000.	2
Liberty, above Guerrero. Two-story frame. O.—Mrs. Linsk. C.—J. A. Britton. \$3,000.	2
Minna, bet. Fourth and Fifth. Two-story frame. O.—Dr. Wm. Hammond. A.—Geo. P. Ashton. C.—Terrill & Slaven. \$3,750.	2
Minna, bet. Fourth and Fifth. Three-story frame. O.—P. Reynolds. A.—Geo. P. Ashton. C.—A. Campbell. \$3,500.	2
McAllister, bet. Gough and Octavia. Two-story frame. J.—Jas. McNally. A.—Salfield & John. C.—R. Munster. \$8,500.	2
McAllister, near Gough. Alterations. O.—Besagno & J. Morizio. C.—J. Bamber. \$800.	2
Middle, bet. California and Pine. Alterations. O.—Mrs. L. T. Allen. C.—R. Cook. \$2,000.	2
Ninth Ave, nr. Point Lo-bosave. Two-story frame. O.—Thos. Farrell. C.—Geo. De Hoff. \$2,500.	2
Natoma, bet. Tenth and Eleventh. Alterations. O.—D. D. Sherry. C.—Hulley & Perkins. \$1,000.	2
Nineteenth, bet. Stevenson and Jessie. Three-story frame. O.—J. J. Smith. A.—M. J. Walsh. C.—Cormack & Elam. \$3,500.	2
Oak, nr. Webster. Two-story frame. O.—H. Wempe. A.—J. J. Clark. C.—A. H. Plummer. \$5,000.	2
Olive Ave, west of Polk. Four-story frame. O.—P. A. C. Stoddard. A.—Eisen & Pierce. C.—Wm. Langstaff. \$2,600.	2
Potrero Ave., nr. Twen-ty-seventh. Alterations. O.—Sisters of Mercy. A.—J. J. Clark. Day's work. \$600.	2
Park Ave, bet. Harrison and Bryant and Fifth and Sixth. Alterations. O.—B. M. A. Grane. A.—J. J. Clark. \$1,800.	2
Post, bet. Powell and Mason. Four-story brick. O.—W. S. Hobart. A.—C. Geddes. C.—W. E. Stevens, mason; T. Day, carpenter. \$53,000.	2
Page, north side, nr. La-guna. Two-story frame. O.—Mrs. C. S. M. Plums. A.—J. H. Littlefield. C.—S. Hatfield. \$6,500.	2
Polk, No. 710. Alterations and alterations. O.—M. A. de Saveaga. A.—Schmidt & Havens. C.—P. Creighton. \$4,000.	2
Pine, cor. Octavia. Alter-ations. O.—Thos. Denigan. A.—Geo. P. Ashton. Day's work. \$2,000.	2
Pine, south side, near De-visadero. Two-story frame. O.—Mrs. A. Kelly. A.—Geo. H. Miller. Day's work. \$3,500.	2
Richland, cor. South ave. One-story frame. O.—Mrs. Gorman. A.—T. J. Welch. C.—J. J. Welch. \$600.	2
Shotwell, east side, near Twenty-third. One-story frame. O. and B.—T. J. King. \$1,600.	2
Silver Ave., cor. Fifteenth. Alterations. O.—Sisters of Charity. A.—J. J. Clark. Day's work. \$600.	2
Silver, nr. Third. Two-story frame. O.—M. McCoy. A.—T. J. Welch. C.—Smith & Knopf. \$4,000.	2
Sacramento, northeast cor. Van Ness. Two-story frame. O.—D. N. Walter. A.—Schmidt & Havens. C.—Connamy & Beards-ley. \$2,000.	2
Stevenson, bet. First and Second. Four-story brick and basement. O.—Campbell & Stoddard. A.—Pissis & Moor. C.—Riley & Leone, brick work; Jas. Geary, car-penter. \$10,000.	2
Second, bet. Brannan and B. vant. Two-story frame. O.—G. Kohake. A.—Pissis & Moor. C.—R. Bruce. \$3,000.	2
Valencia, nr. Twenty-third. One-story frame. O.—C. Houston. C.—Wm. Barrett. \$1,500.	2
Van Ness, cor. Washing-ton. Two-story basement frame. O.—C. Holbrook. A.—H. C. Macy. C.—Jas. M. Kelly. \$30,000.	2
Whitney, south side, nr. Randall. One-story frame. O.—J. Austin. \$1,000.	2
Whitney, north side, nr. Randall. Two-story frame. O.—Capt. W. Patterson. Day's work. \$700.	2

TOOLS.

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Figures in Wood by Compression; The London Tower; Sewerage—Berlin; Taxes and Manufacturers; Old Files that Look New; Shoe Lumb'r; To Remove Dry Rot; A Destructive Fire; An Ancient Sanitary Ordinance; California's Tribute to the Honored Dead; A Door that Cost \$28,000; Black Walnut Worth One Dozen Farms; The Annual Architectural Gatherings; Special Book Notices; The Russian Admiralty; The Fire Waste in this Country; Architects and Builders of Churches.

House painting in Paris is a very extensive business, as a periodical renovation of the houses is rendered imperative by law, no one being allowed to disfigure a neighborhood by presenting stained and disfigured walls. The houses being of soft cream-colored sandstone, many of the finer structures, instead of being painted, are redressed by the stone-cutter and come out from the process looking bright and new.

American Newspaper Annual. A very comprehensive book, covering the whole ground of its specialties, 996 pages; practical, useful, well arranged, and neat in its typographical appearance. Published by N. W. Ayer & Son, Philadelphia. May be ordered through this office or direct from the publishers, at \$3.00 per copy.

A Destructive Fire.

THE conflagration occurring the early part of last week, which entirely destroyed the fine four-story edifice occupied by H. S. Crocker & Co., and owned by Chas. Crocker, the railroad magnate, was one of the most destructive in this city within a decade. The building, which was one of the handsomest business buildings in San Francisco, was completely gutted. All the floors above the cellar, and all girders, posts, and supports were consumed, or fell to the cellar, leaving nothing but the walls standing. The excellent construction of the edifice is sustained by the fact that, although the heat was fearful, and all the floors giving way and tumbling, the front wall, perforated by numerous door and window apertures, remained standing, and apparently but slightly affected by the raging flames. There was nothing saved. All within—a magnificent stock of stationery, and the largest on the Pacific Coast—together with an immense lithographic department, and all its machinery and appliances, and the manufacturing department of the largest jewelry house on the coast, were all consumed. And to all this is to be added the horrid fact that two daring firemen were caught by the debris falling from above, and were roasted to death in sight of their comrades, who could render no assistance.

The Building Boom Unbroken.

THE continuance of building activities has been to many, and continues to be a matter of surprise. Months ago the feeling gained ground, and was very generally entertained, that there must be a let-up—a cessation in building operations. But the decline has not as yet manifested itself, and there are no present appearances of a falling off in the near future. Architects' offices generally are "full of work," and as far as the future can be judged from the stand-point of the present, there will be a large building trade during the remaining months of 1885, with considerable work in course of preparation for commencing "after the rains."

This flood of building prosperity has not settled in any particular locality or section, but has spread itself over the entire city; for "go where you will," piles of building materials meet the sight, and the sound of busy mechanic's tools greet the ear. And yet withal, rental rates are well maintained, and the number of empty houses seems not to increase, although each month the average of new places of abode—single tenements, flats, etc.—amount to not less than one hundred and fifty, and perhaps nearer two hundred.

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Water Closets \$1 00
Building Superintendence 3 00

San Francisco Chapter of Architects.

THE regular monthly and annual meeting of the Chapter was held October 2, with a good attendance of members. Mr. Macy acted as president *pro tem*.

The minutes of the previous meeting were read and approved. The Committee on Apprentices Indentures reported; the report was accepted and the committee discharged. The Committee on Incorporation reported progress.

Seth Babson, treasurer elect for the ensuing year, tendered his resignation as such, owing to residency "across the bay," and inability to attend the meetings regularly. Received and filed.

The annual reports of the retiring president, A. Laver; secretary, B. E. Henrickson, and treasurer, J. M. Curtis, were received, and ordered spread upon the minutes.

The newly-elected president, William Curlett, read an interesting paper, which was ordered spread upon the minutes, and to be published in the CALIFORNIA ARCHITECT AND BUILDING NEWS. It will be found in full in this issue.

A discussion arose in reference to the plumbing law, which resulted in the appointment of a committee, consisting of Messrs. Macy, Henrickson and Curtis to consider the subject and report at next meeting.

Messrs. Macy, Pissis & Curtis were nominated to fill the office of treasurer, made vacant by the resignation of the treasurer elect, Babson.

A resolution was adopted that the president, at each meeting of the Chapter, appoint a member to lead in the discussion of some subject of interest to the profession. In harmony with the resolution, the president appointed James E. Wolfe to open the series of discussions, at the November meeting, which will be held the first Friday in November next.

No further business requiring attention, the Chapter adjourned.

An Ancient Sanitary Ordinance.

THE burgh records of Glasgow, Scotland, for the year 1574, show a complete and excellent set of regulations "for awaye haldyng and preservation of this gud town" from the pest or plague. In these regulations occurred the following item concerning the reporting of cases of sickness to the proper officers, termed "searchers":—

"It is statute and ordanit, that gif ony persone or persones indwellaris in this town, happens fra this tyme furth to fall sick, that the maister of the hous incontinent cum to the visitours and sercharis of the gait, or any of thame, and shew the samyn, that thair may be sichtit; and gif ony persones happinis to deceis in ony house within this town, that the maister of the hous sall cum to the visitouris adpoyntit for sighting thair of or thair be wyndit under the pane of banishment."

Another provision in the regulations read to this effect:—

"Ordnais the schule-hous wynd and all the wennallis to be simpliciter condampnit and stekit up."

Address of Mr. Wm. Curlett, before S. F. Chapter of Architects, Oct. 2, 1885.

GENTLEMEN: Permit me to thank you for the honor you have conferred upon me by electing me President of this association, and if, as I hope, I shall succeed in filling its responsible duties to your satisfaction and the advancement of our professional interests, but more particularly the advancement of the younger members of the Institute, I shall attribute it to your cordial support, which I feel assured will at all times be afforded me, so that, by your co-operation, every meeting may serve to bind us more closely together, for we know that without union in all matters it is useless to hope for success.

I cannot conceal from myself, however, that there are many Fellows whose claims to this honor are far in excess of my own, when I reflect that many of our members are eminent architects, and have practiced in this city for more than a quarter of a century, and that many of those older practitioners have been active members and colleagues together in the pioneer association, which, unfortunately, existed but for a limited period—however, it must be gratifying to those members, even at this late date, to view the result of their laudable efforts to form and maintain an Architectural Association on this coast, for the present association is but an offspring of the former, which, I feel sure, is now beyond the possibility of failure.

In reviewing the progress that has been made by the present association since its affiliation with the American Institute, I congratulate the Chapter on the substantial advancement made during that time, in the acquisition of members as well as the general improvement and development of the possibilities of our art.

I also congratulate you individually on the earnest and studious manner with which you have at all times sought to cultivate professional relationship and further the promotion of mutual intercourse and the advancement of professional knowledge, which is essentially necessary to the advancement and development of the principles of architecture; for we must remember that knowledge is accumulative, and that we all know more now than we did even one year ago; that each one of us has some new idea to impart—moving, as we are, onward in the pursuit of our calling—for every year education makes strides, and we can only maintain our position in the world by showing that we are worthy to do so. To neglect all efforts at culture and the scientific side of our work is simply suicidal.

It should therefore be the desire of every member to make this institute attain its object and realize its noble ideal. To this end he should at all times endeavor to lend the full force of his ability and influence, so far as his time will permit.

I will venture to say that I am but expressing the sentiments of the individual members of not only this, but any Chapter or association

of architects throughout the length and breadth of this country, that their monthly meetings should be something more than merely assembling for the purpose of reading the minutes of the previous meeting and transacting the usual, or routine business, such as hearing reports and appointing committees.

Now, then, I will suggest that our meetings be turned to some account, and that our time be spent so that it may redound with not only credit to ourselves, but of interest to the public. To properly accomplish this end, I should recommend that we improvise some system whereby at each meeting we elect one of our number to prepare a paper on some subject of his own choice, to be read at the following meeting. Would it be too much to ask of each of our Fellows, or associates, as they join our ranks, the contribution of an essay, or paper, on some subject connected with architecture or its practice, of which he has made a particular study?

The arguments and debates naturally arising from the reading of such papers cannot fail to be of lasting benefit to us, as I can assure you that for whatever time we devote to the study of the most simple, as well as the most complex subject, we will each in return obtain some new and interesting information that otherwise would have been passed unnoticed. Suppose we begin at the bottom, and take up the subject of foundations. What a field for discussion this first and most important part of our building construction affords us, and particularly in a city like this, where so many of our heavy and expensive structures have been erected on the most dangerous and deceptive mud banks, which, I regret to say, in some cases have already shown conspicuous signs of miscalculations? This, I claim, is something that requires our most careful attention; otherwise, but a short time will elapse before the engineer will add this portion of our vocation to his already large practice, for, indeed, he has already encroached on a class of building, such as railroad depots and manufacturing warehouses, all of which formerly came under the province of the architect, and which, undoubtedly, was a most lucrative part of his profession. Such men are generally called civil engineers, but whether this is a civil act towards us I will leave you, gentlemen, to be the judges.

Then, for instance, the topic which is agitating the minds of the public at present, the importance of which has been so ably set forth by the *Chronicle*, that of drainage and house sanitation, what an endless subject for study! One of the first inquiries of almost every one now who takes a house, or contemplates building, is about the plumbing and drainage. Considering that the health of a family depends largely on the perfection of this branch of our work, the importance of this subject cannot be disputed; and unless an architect can advise and carry out sanitary work in the most scientific manner, his reputation must assuredly suffer. Should an architect neglect this branch of his profession, we may look for an

increasing number of specialists; for have not the interior decorator and manufacturer appropriated another slice of our commissions? What we must convince the public of is that we are, as a body, necessary to their health and comfort, and that they lose in the long run by going to outsiders, whose only recommendation is that they do the work cheaper. This I consider entirely wrong, for the architect should not only design the house, its interior fittings and furniture, but he should also supervise and direct all interior decorations. If he is not the person most competent for this work, he should, before he is entitled to be recognized as an architect, or to be intrusted with such matters, be thoroughly conversant with all styles, so that he may give to his client sound and valuable advice.

It is true that a greater change and general improvement in interior decorations have taken place in this city during the past five years than have occurred since the discovery of gold.

We cannot disguise the fact that the architect of to-day must make his work apparent. He should, therefore, not be satisfied merely to act as a draughtsman, simply designing the skeleton of our dwellings for the decorator and manufacturers to step in and complete, but he must also prove to his client that he has both the intellect and culture to carry out any work that may be intrusted to his care, whether it requires a good knowledge of construction or a well-trained artistic taste.

It would seem, however, that the mission of the modern architect reminds a person of what is happening in the bee world just now, where, by the aid of an ingenious patent, ready-made cells are stamped out in wax of the correct shape and size, and when placed in the patent hive, the bee forthwith completes the cells and fills them in with honey. And I regret to say that it is seldom that the American people have to thank the architect for the poetry of their homes. However, it must be admitted that the profession is a learned one, for we all have read with deep interest of the attainments and achievements of the eminent architects both of the Old and New World; for what we know of Wren, Inigo Jones, and the Chambers, the architect was conversant with every branch of the work included in the structure.

It has often occurred to me that one of the most pleasant provinces of an architect should be to turn the necessary articles of daily use into works of art. And it must be conceded that year after year there is a growing tendency to make simplicity in design the guide towards beauty, as well as towards convenience and stability, instead of an adherence to some conventional type of design and decoration, or a straining effort after originality.

Speaking of originality in design, suggests to me that we have in this city a great amount of the so-called work, which I do not think reflects very highly on its authors. I think the more perfect the young architect's educational training has been, the more conservative he will

be in his work, and is thus less liable to foist on the public this hodge-podge of incongruities, which their authors and their innocent clients are pleased to consider as architecturally correct. However, we have a right to be hopeful for the future, as I think we have passed a period in this city of what was termed "California style," which produced so many mere houses, for we are fast growing away from the thralldom of the aggressive and persistent stereotyped front, covered with meretricious ornamentation. Does it not seem a useless waste of skill and labor to put so much detail and elaboration on a piece of carved work which is often placed so far from the naked eye as to baffle all attempts to fathom its character or design. I believe all architectural features in which carving is introduced, ought to be looked at and drawn in the exact place for which they are intended. A great advantage will be gained by the young architect who will devote some of his time to learning to model, for I believe all carving, whether for the interior or exterior of our public or private buildings, should first be modeled, if not by the architect himself, under his immediate direction. By this system we may hope to obtain some harmony throughout the work, which is essential to good effect.

To the younger members of the Institute, who naturally will, sooner or later, take the place of their older brethren, and who I cannot doubt will be no unworthy successors, I recommend that a close intercourse be cultivated throughout the Chapter; for you will find that an addition of minds well trained in the profession, broadens its influence on the public taste, and enlarges its sphere of knowledge. You will also find that the building community is imbued with clearer conceptions of the science on what our art depends for its stability, than in the early mining days. The more time you devote to study, the more you will find that it is a profession that to attain success in, taxes the best efforts that you can put forward. It is true that industry alone will not make a great artist, architect, or sculptor. But we all know that if there is one thing more certain than another in art, it is that all great men have been industrious. You will find that the pursuit of references must needs open up studies which will be of lasting benefit to you, little dreamed of at the time, and which will prevent your being drawn into the downward current which sets strongly in the direction of business as against art, for we must admit that the commercial spirit of the country has too little sympathy with the artist.

One thing more I would have you remember, and that is, to ascend the ladder of fame you must be persistent in work, so that when the golden opportunity presents itself you may be well prepared to move onward and upward. Remember that in all professions thousands are blockading the bottom, or first round of the ladder, while but few make the ascent to that position where competition is seldom known. Although our members are steadily

on the increase, there are yet a few highly qualified men in this city whom we would gladly welcome into our midst as members of this Chapter.

Before closing this short address, I should remind you that the parent Chapter holds its annual meeting on the twenty-first and twenty-second of this month in Nashville, Tenn., and in conformance with the established rules, a report of our past year's transactions is to be transmitted to that body. And I would now offer a suggestion, that we should be represented each year by one at least of our number, with a view of persuading the Chapter to hold its annual Convention in this city at some early date.

I think it is in order here to say that we are largely indebted to the reporters for their attention at our meetings, and their readiness to impart to the public our deliberations. We are also particularly indebted to the editor and proprietor of the CALIFORNIA ARCHITECT AND BUILDING NEWS for the large space he has set aside for the record of our meetings. And now, in conclusion, with heartfelt desire for the advancement and further development of the Pacific Coast Chapter of Architects, I again thank you.

WILLIAM CURLETT.

California's Tribute to the Honored Dead.

It is a well-assured fact that the people of California will erect a monument to the memory of the immortal Grant, and that it will be one worthy of the Golden State. The movements thus far developed place the matter beyond reasonable doubt as to its finality. The recent meeting, presided over by the Hon. Senator Stanford, will create wide-spread confidence and give tone and character to the movement, and there is every good reason to believe that the gentlemen whose names are prominently connected with the several committees will so shape future operations, and guard the various avenues surrounding and leading to the grand consummation, that nothing will occur in judgment or action that will not be above all suspicion of personal interest, prejudice, favoritism, or ulterior motives not of the purest and most worthy character, and universally acceptable and satisfactory.

THE DESIGN.

The most difficult part of the whole work will be the obtainment and selection of a suitable design, one that will meet the highest expectation of the greater number, and be worthy of the approximately perfect type of manhood, whose memory it is designed to perpetuate. There are greater possibilities of error in this connection than in any other, and it will require of those with whom the responsibility may rest, the exercise of

GOOD JUDGMENT, PRACTICAL KNOWLEDGE, AND FIRM AND HONEST PURPOSES AND DETERMINATIONS

To avoid serious mistakes as to the design. Every one who conceives and produces a design will naturally hold that his own is the better, and universal experience proves that

men more skilled in manipulating, working, things, than in the art and science of designing, have succeeded over true merit.

We shall again refer to this matter. At present, appearances are all favorable to earnest and vigorous action.

Cost of Buildings East of San Francisco.

VERY many of the exchanges received at this office monthly, contain plan and designs for buildings—more generally those of medium and the lesser grade classes, suitable for persons of moderate means and wage-earners—in connection with which the cost of construction is also stated.

It may be possible in some parts of the grand universe of God, bounded by the domains of the United States, to do as much for the money as is sometimes stated, but we know not where—all labor and materials being paid for.

One thing is most certain and sure, no plan yet published in plan book or periodical can be built in California for the sum affixed as the cost value of construction, not by 25 to 100 per cent added. As a rule, gross deception prevails in this connection, and we risk the assertion that there never has been anywhere, a strict conformity to the plans published, within the limits of cost stated by the author. This is a pretty broad assertion to make, but it is based upon the experiences of nearly fifty years in almost constant contact with building matters, and upon the ground that all the materials used cost a right and reasonable commercial market value, special and extraordinary advantages excepted.

The effect of this is bad, in that it leads owners to expect more than can be realized, and when told by an honest and intelligent architect that their visions of cheapness cannot be attained, disappointment follows, and hardships created for architects, as they must necessarily explain and show causes and facts, why the thing cannot be done, which, however reasonable and true in themselves, are not always convincing and clear to the party whose mind may have been influenced and pre-disposed to an impossible conclusion.

It is very well known and understood that the price of both material and labor varies in different sections of the country, and the same exact results would scarcely be possible in any two localities; consequently figures of cost representing and fitting one, would apply to no other section, beyond the same conditions and surroundings. Yet plans are sent in all directions, with the same figures of cost for all without discrimination or modification. But the broader proposition stated is that the prices as a rule are placed too low—less than can be reached anywhere, and very much below the cost of construction on the Pacific Coast.

Dwellings for Village and Country Homes. \$3.00
Ferguson's History of Architecture. Two volumes. 15.00

The Mechanics' Fair—1885—Ended.

THE twentieth exposition under the auspices of the Mechanics' Institute, ended a most successful career of thirty odd days, on the 26th of September. It was a pleasant place of resort, and tens of thousands of visitors of all ages availed themselves of the opportunity of enjoying sights and scenes which can be found clustered only at exhibitions of this character.

Some of the preceding annual displays may have been more crowded with exhibits, particularly in heavy and noisy machinery; but it is questionable whether any have been more enjoyable or instructive to the multitudes who have, through its opportunities, sought information and pleasure from real life in the varied forms presented. Persons uninterested in any particular thing, whose faculties of appreciation are normal and obtuse, might spend a day or evening "at the fair" or anywhere else without profit or improvement. But the eye and mind awake and alive to see and learn from the evolutions and developments of the age, as demonstrated in the innumerable shapes and forms to be seen during the fair, could not be otherwise than benefited and instructed.

The moral aspect of the fair was excellent. While the streams of life and smiling faces flowed full and cheerful and happy greetings abounded, there were no events of rudeness or indecorous conduct transcending the bounds of the strictest proprieties, and many were the regrets expressed upon the closing evening that the managers had not extended the time at least two weeks longer.

The fruit, vine, wine, wool, silk, mineral, and other great resources of the State were well represented, as were also the industrial, mechanical, commercial, and other arts and sciences. It would be impossible for us to mention in detail each particular object or thing of interest. Some of the exhibits, as a matter of course, attracted more general attention, and at all times crowds were gathered around them. Of this class, the exhibit of

NATIVE CALIFORNIA AND OTHER HARD AND FANCY WOODS.

By Thomas Hatch, covering a very large space, and including a great variety of tree growth, and some extremely singularly marked specimens, representing in native laurel, black walnut, and redwood, perfect representations of the faces and forms of men, bears, fish, birds, and other animal life. There were also splendid specimens of California maple, sycamore, oak, etc., as well as representative woods from Mexico and the islands of the Pacific. This display secured a gold medal.

THE DISPLAY OF STAINED, GROUND, AND BENT GLASS.

By John Mallon, was complimented by the presentation of a gold medal, and also for cut and embossed glass, a silver medal. As usual with displays by Mr. Mallon, it was good.

THE S. F. EMBOSSED GLASS WORKS.

W. H. Warren, proprietor, 997 Market Street, made a liberal and handsome display of col-

ored, ornamental, and enriched sheet glass, varying in suitability and beauty from the gorgeous cathedral and church window, down through the various lesser designs, to the street-car lights. The display attracted much attention, and was awarded a bronze medal.

CALIFORNIA ONYX.

Mantel and pedestals, etc., exhibited by J. and F. Kessler, silver medal. This display was very attractive, the material being unequalled by any other variety of the marble species for beauty of color and tint.

WEED & KINGWELL.

Made a fine display of brass goods and devices of their own manufacture, and were awarded a gold medal for best assortment of brass works, and silver medals for best assortment of bells, and best display of plumbers' goods.

WILL FINCK.

Received grand silver medal for best display of cutlery. This firm manufactures not only handsome, but excellently good articles.

HARVEY'S HOT WATER RADIATORS.

Were among the notable exhibits, and enlisted the interest of thousands during the fair. This being the age of evolutions, the Doctor has improved the time within the past twelve months, and evolved several new devices as attachments to his original system of heating, and now claims to have the most perfect and practical hot water heater in use, for heating both public and private buildings. A silver medal was awarded. Place of business, 23 Stevenson Street.

PATENT CHIMNEYS.

Mr. Browell made a good, practical display of this desirable and almost indispensable adjunct in house building, by means of which fires can be enjoyed in every room in a building, with perfect immunity from the dangers of conflagration. Mr. Browell has spent many years of his life upon this device, and in renewed approval the Committee on Awards presented Mr. B. a silver medal.

BURR FOLDING BED CO.,

603 Market Street, under the Grand Hotel, exhibited a variety of styles of sideboards, bureaus, library cases, desks, etc., which, by a motion or two, and in less time than is required to write one line of this notice, can be transformed into full-fledged spring beds, and as speedily folded back again into desks, sideboards, etc., leaving no trace of the sleeper's couch. They are ingenious, and supply a handy bed and bedstead convenience in the parlor or dining-room, if you please, disguised under the perfect appearance of any desired piece of furniture. Bronze medal.

PACIFIC ROLLING MILLS.

Received a gold medal for best display of steel castings, forgings, etc. There are great possibilities in the future for this pioneer establishment in its line, and it is to be hoped that its management will not only succeed in capturing gold and silver medals at every competitive exposition, but that they will also suc-

ceed in meeting every want on this coast, in things within the range of their manufacture, so as to render it possible for wrought iron workers in San Francisco always to compete successfully with Eastern firms.

HAWLEY BROS. HARDWARE CO.

Were active competitors, and carried off several silver and bronze medals, for best general display of agricultural implements, cultivators, corn shellers, tree diggers, etc., etc.

OSBORN & ALEXANDER.

Bronze medal for best display of bicycles and tricycles. This firm of hardware dealers are energetic, and permit no opportunity to pass unimproved, in variety and kinds of goods and merchandise best calculated to suit the wants of the general public.

THE BOLLER FURNITURE CO.,

Which but recently sustained a very heavy loss by the destructive conflagration on Fourth Street, received a silver medal for best bed-room furniture. Included in their line of manufacture are wood mantels, of which they have many very fine designs, and the class of workmanship is good.

HUETER BROS. & CO.,

Silver medal for best display of varnishes, gums, etc. It is always pleasing to notice California manufactures and productions succeeding in fair contests over imported competitors.

E. G. DENNISTON.

Silver medal, best display of plated wares and works. As the result of close and diligent attention to business, not only in making trade, but in producing good work, Mr. D. has accomplished a decided business success, and with life prolonged there is a large future before him.

J. T. TITUS.

Received silver medal for the best flushing and sewer trap. This device has passed through many trying tests, and has proven itself a success in all cases.

THE GRANOLITHIC PAVING CO.

Had on exhibition samples of the stone manufactured by them, in the form of heavy steps, urns, etc., beside which were specimen pieces of the window sills, ashlers, and other facings and parts intended for use in the Donohoe building. For many purposes this manufactured stone has taken the place of the natural, and in time is likely to be appointed to every service requiring strength and durability. Demonstrations are at present being made, in which concrete, the components of "patent stone," is taking the place of wrought iron beams. A silver medal was awarded to this company.

COTTON HOSE.

"Rubber-lined—always reliable, and the strongest and most durable made," was exhibited by W. T. Y. Schenck, 36 California Street, and the gentlemen appointed to determine relative merits, so far gave precedent to the exhibits of Mr. Schenck, as to award a diploma.

THOS. DAY & CO.

Displayed a fine line of gas fixtures, etc.

CALIFORNIA WIRE WORKS.

As usual, an extensive exhibit of wire works, in almost every form, and for endless purposes; gold medal.

P. & B. PAINT.

Exhibits extensive and varied. The management is indefatigable in pressing the merits of the paint material upon the attention of those requiring paint of its kind, and so far favorably impressed the Award Committee as to receive a silver medal.

MR. DAVID KERR.

Received deserved recognition for his exhibit of a splendidly built, practical truck, which seems ponderous and powerful enough to transport the whole exhibits of the fair in half a dozen loads, yet so neat and perfect, that with a good team of horses, and some cushioned seats, the entire Board of Managers of the fair, with David thrown in, might take a pleasant ride through Golden Gate Park and on to the "cliff" with comfort. This splendid piece of mechanism received a gold medal. To same manufacturer was awarded a silver medal for best four-spring two-seated wagon, and also truck axle, California make.

THE ONLY SPECIALTY IN THE ELEVATOR LINE. Was the *personals* representing the elevator interests. Mr. John Hammond, agent for the Otis Bro. elevator, representing the New York firm. Mr. Wm. Milliken, the genius of the Ram elevator; Mr. Hinckle, of the Hinckle device; Mr. Wm. C. Burch, Mr. Jardine, Mr. B. E. Henriksen, and other elevator builders and clutchmen, being nightly found among the lively throng of visitors.

BAKER & HAMILTON.

Also received gold medals for display of agricultural implements.

John Bergstrom & Co., gold medal, best pipe organ, California make.

S. & G. Gump, gold medal, picture frames, pedestals, mantels, etc.

We have been able to notice but few of the successful exhibitors, as to do so in full would occupy nearly one half the pages of this issue. The management certainly deserves great credit for the completeness of arrangements, and the general good taste and judgment displayed throughout.

Should there be any error in the foregoing report, we will gladly correct the same in the succeeding issue.

The days of machinery, remarks a contemporary, have been for the poor man days of home-making and home-making comforts, as no other days ever were. If machinery has given the rich man luxuries, it has given the poor man the necessities and comforts of habitation, and clothing, and travel, such as he never had before. The printing press, especially, is the poor man's servant and benefactor, scattering abroad our intellectual wealth, raising all to an intellectual level, and binding all into one whole.

Staining of Woods for Decorative Purposes.

A. CURTIS BOND.

THE art of laying various ground shades of color on wood, with or without veins and figures, or vein patterns, and known as staining, adds very materially to the resources of decoration, as enabling white and other soft woods easily worked to present the appearance of rich and costly woods, or the exquisite tints of woods not growing in a sufficient quantity or of a size to be utilized in cabinet or architectural wood-work, especially in the way of veneering.

Staining also admits of altering at any time the wood-work of an apartment so as to bring it into accord, or cause it better to contrast with wall-paper and various mural adornments, or with furniture. One description of staining is applied to merely heightening the color of choice woods. The stains are ordinarily put on with a hog's bristle brush, followed by a badger hair softener, but flannels and sponges are often used in their place. For veining or ingraining, badger sash tools and sable pencils come into play.

Where woods of different hue of the same kind are brought together, as in restoring antique furniture, graining is resorted to in order to match the newly inserted pieces with the ancient. Thus to match light with dark-hued mahogany, the former is washed with soap lees or with quicklime dissolved in water. Aqueous decoctions of logwood, dyed oil, aquafortis, sulphate of iron, nitrate of silver, bichromate of potash, and other preparations of an acidulous and alkaline nature are classified in this connection as "darkeners."

Pleasing, yellow hues are supplied by aqueous decoctions of barberry root; rich, mild reds, by only decoctions of alkanet root, and alcoholic solutions of dragon's blood; a reddening tincture, by rectified naphtha, in which cam-wood dust has been steeped. The color of birch is heightened by sponging it with oil, slightly tinted with rose madder or Venetian red. Discolored ebony is revived by a strong decoction of gall nuts. Inferior rosewood will apparently be advanced in grade by applying the liquid obtained from boiling a pound of oak bark and the same quantity of walnut shells and peels. Honduras mahogany loses its pallid and dull hue by being first coated with spirits of hartshorn, and then with red oil. Raw oil and turpentine have the effect of increasing the attractiveness by adding to the beauty of many woods. American ash is made to resemble oak by drawing veins on it with a white stain, coating these with thin varnish, and darkening the remaining ground; or the veins are scratched fancifully after the varnish is laid on with a rag saturated in the ordinary preparation of French polish. A decoction of Brazil woods supplies the rich hue of rosewood, and the veins may be made by a camel's hair brush dipped in a liquid prepared by boiling logwood chips, sulphate of iron, and steel filings in equally proportioned quantities of vinegar and water. Three distinct coats of this preparation will give white wood the appearance of ebony. Showy elmwood may be delicately darkened so as to pass for Italian walnut. In short, the modifications are as various as the tints obtainable from simple and compound colors, the result being influenced by chemical and mechanical skill brought to bear on woods of different quality.

For a fine crimson, boil one pound of good Brazil dust in three quarts of water for an hour; strain and add half an ounce of cochineal, boil gently for half an hour. If more of a scarlet tint is desired, boil half an ounce of saffron in a quart of water for half an hour, and pass over the work previous to the red stain.

For purple, boil a pound of good chip logwood in three quarts of water for an hour; then add four ounces of pearlash and two ounces of indigo pounded.

For fine blue, add four ounces of indigo to a pound of sulphuric acid.

For a fine green, put four ounces of the best verdigris pounded fine, half an ounce of sap green, and half an ounce of indigo in three pints of the strongest distilled vinegar.

Note that for a bright yellow, the wood need not be stained, as a small piece of aloes put into the varnish will have all the desired effect.

For red, archil will produce a good stain, when used cold, but it is improved in color, if after one or two coats have been applied and suffered to get almost dry, it is brushed over with a hot solution of pearlash in water.

To improve the color of any stain, apply a mixture composed of one ounce of nitric acid, half a tea-spoonful of muriatic acid, a quarter of an ounce of grain tin, and two ounces of rain-water, kept in a well-corked bottle two days before using.

A black stain may thus be made: Boil one-half pound of chip logwood in two quarts of water; add one ounce of pearlash, and apply hot with a brush. Then boil one-half pound of logwood in two quarts of water as before, and add one-half ounce of verdigris and one-half ounce of copperas; strain off and put in one-half pound of rusty filings; with this go over your work again.

The Queen of Roumania is said to be an architect as well as a painter, musician, and poet. A new palace has been erected in the mountains, for which the designs were prepared by the king and queen. Her Majesty's music room is suggestive of a church. The windows are filled with glass, on which scenes from the works of the Roumanian poet Alexandri are painted; the seats are like stalls in a choir, and to aid in the illusion, strict silence has to be observed by all who have the privilege of being present at the performances.

All New Subscribers

PAYING or forwarding \$2.00, will be entitled to the present and all succeeding numbers for 1885, and the whole of 1886.

A small item, page 156 in the September number of this Journal, has called forth the following letter, which is self-speaking:—

BALTIMORE, Sept. 24, 1885.

Dear Sir:—Allow me to call your attention to a slight mistake in your September number of the CALIFORNIA ARCHITECT, in which you mention a new "electric railway on Huntington Avenue, Boston." It is Baltimore, not Boston, that deserves the credit. The Union Street railway here has been experimenting with the Daft electric motors for their suburban road, out Huntington Avenue to several towns in the suburbs, for the past year, and have had the inventor here for weeks at a time trying different ways, and about two months ago finally succeeded in getting everything complete. They now have five motors running trains back and forth over the road, which is about six miles long. The trains go at the average speed of thirty miles per hour, including stops, and the ascents of the grades, several of which are six hundred feet to the mile. Both the cars and the avenue are lit by electric lights.

Owing to the great danger of the center electric rail, it has been boarded up, leaving a narrow groove in which the wheel runs. Before this was done there were a great many accidents to persons and horses stepping on the rail at the crossings and receiving a charge of electricity. Although it works very satisfactorily where it is, there is no telling how it would answer in the crowded city streets, and there is small probability of its being used inside of the city limits for some time to come.

I hope you will make the inclosed correction for the honor of old Baltimore.

Respectfully, W. CLAUDE FREDERIC,
Architect.

Shoe Lumber.

A CORRESPONDENT of the Chicago Times says that one may see, in passing the shops of Tokio, cords of sandal-wood cut into small blocks. This, one learns, is nothing short of shoe timber. These cords of wood will speedily be converted into shoes of various sizes, at prices ranging all the way from four to twenty cents. One feels quite exalted in a pair of twenty cent shoes. The wood is called Kiri, and is very light. The clogs are still further lightened by hollowing out the center. So, in point of fact, there is little truth in calling the shoes heavy, although they appear so to the inexperienced observer. It must be admitted, though, that they are unreasonably clumsy. Sometimes the shoes worn by the ladies are laquered, and are fastened by a velvet band passing from either side over the lower part of the instep, and between the first and second toes. With this same kind of wood are made bureaus, provided with strong iron handles, and the whole box is adjustable in horizontal sections, one piled above another. Owing to lightness of the wood these boxes may be filled with clothing and carried off on the shoulders of the coolie in case of fires, which so often vex the people of Tokio.—The Furniture Worker.

"Hades and sheol" may all be well enough for ordinary occasions, but when a man is putting up stove pipes nothing takes the place of the good old unrevised version.

Architects as Sanitarians.

OUR enterprising contemporary, the *Inland Architect*, has started a crusade, of a very heroic character, against sanitary architecture, plumbing, engineering, and, withal, sanitary literature. It professes to regard the application of sanitary science to practical house-building as a species of modern craze. It denies every important advantage which has, supposably, been derived from the practice of hygienic principles in construction. It urges a return to the insanitary simplicity of an earlier day with its open sewers, untrapped drains, and unventilated soil-pipes.

It is matter for congratulation that this old-fashioned journal is powerless to turn back the hands very far upon the dial of progress, but it is to be regretted that it should seek to use any measure of its influence in so mischievous a cause. In support of its position it adduces, however, several noticeable arguments.

The intricacy and cost of sanitary apparatus; the impossibility of its being obtained by the average householder; the inability of the ordinarily educated architect or plumber to comprehend sanitary details; and the failure of the whole system to lessen the prevalence of zymotic disease—these are the principle pleas which it sets forth. We say that these are noticeable points, not because they are, by any means, answerable, but because they are suggestive of certain obstacles which sanitary scientists have to meet. Simplicity of apparatus is a desideratum, but it is one which it is not impossible, at the present time, to obtain. There is an undue tendency toward excessive elaboration, in some directions, but it is anything but an essential feature of sanitary work. It requires nothing but competent selection to secure simple and manageable apparatus at a moderate cost. Perfect appliances must necessarily cost more than imperfect ones, but the advantages they involve are an actual compensation for the additional outlay.

As to the architects and plumbers, it is a libel to pronounce them incompetent sanitarians as a class. Undoubtedly there are many in both guilds whose education, obtained from the pre-sanitary school, is defective, but progress in any direction would be impossible were the age to wait for the declining generation to be educated up to its advance steps. Men there are, of every time, who are sufficiently progressive to keep abreast of current improvements, but there must always be laggards in the race. It is the business of the architect and the plumber of the present day to be sanitarians, and they are rapidly becoming such. The sanitary engineer may have a future before him in his own separate line, but, at present, he simply fills in the gap between the new school of architects and the old.

Respecting the failure of sanitary science, as applied to the dwelling, to reduce the frequency of zymotic diseases, we can only say



PLATE I.—FRONT ELEVATION OF ONE-STORY AND BASEMENT COTTAGE.

that our esteemed contemporary is evidently unfamiliar with the statistics of the very recent insanitary yesterday and the more enlightened sanitary to-day. Year by year, these diseases are yielding to improved household conditions. More and more distinctly are they traceable to the lack of sanitary conveniences. The annual death rate, from these causes, is steadily decreasing. And because certain robust individuals withstand the influence of unhygienic surroundings, and still live on, are we to credit sewer-gas and its accompaniments with a protective power? The sanitary movement may be, at times, ill-directed, but it has attained an impetus which will carry it successfully forward, and we would kindly caution our journalistic neighbor that "it is hard to kick against the pricks."—*Northwestern Architect and Improvement Record*.

TO REMOVE DRY ROT.—A Russian professor has been experimenting, says the *Architect*, on the best way to remove dry rot. He says that a thorough draught will destroy the parasite within twenty-four hours. If the action of draught be assisted by that of sunlight, a few hours will often suffice to put a stop to further damage. A concentrated solution of common salt is very efficacious, and the stronger it is used the more rapid its action. The action of a concentrated solution of cupric sulphate (blue stone, blue vitriol) is still more energetic and complete than that of common salt. Crude carbolic acid is rapid in its action and cheap, but inconvenient to use. But he considers that the best, cheapest, and most convenient material to employ is the tar obtained when birchwood is distilled for acetic acid; the under surfaces of the flooring are painted with the tar.

Early Plastering and Plasterers.

THE use of plaster, or "plaster," as it was formerly called, is of early date, even in the British Islands, in connection with domestic architecture. Long before lime plaster came into general use, a tenacious clay or sticky and unctuous earth was employed when procurable, and, in its absence, whatever clay, or mixture of mud and earth, produced the most binding material. The rudest and coarsest forms of daubing or plastering in the British Isles were those structures erected of wattles and daubed over with clay to keep out the cold. These kind of domestic buildings were common in Ireland in the time of Henry II. From necessity or in conformity to the fashion of that country, the English monarch erected, according to Roger Hovenden, a royal palace with "uncommon elegance" of smoothed wattles in 1172, and in such buildings his majesty, with the kings and princes of Ireland, solemnized the festival of Christmas. The Devonshire "cob," a class of building not yet extinct, is a fair illustration of the ancient fashion of daubing or plastering practiced in this country for long centuries. In the thirteenth and fourteenth centuries in this country the plasterers proper and the daubers formed two distinct classes of building workmen, and their wages, like the wages of other operatives, were subject to certain regulations summer and winter. The daubers were simply the layers-on of a mixture of straw and mud to a framework of timber. The plasterers in London in the 24 Edward III. (1350), were bound to take no more for their working-day between the feast of Easter and St. Michael than 6d., without victuals or drink, and for the remainder of the year 5d. Upon feast days, when they did not work, they took nothing. The masons and carpenters received similar pay. As a curious contrast with rights claimed by building workmen in the present day, those of the fourteenth century were allowed nothing for making or mending their tools. We know what fierce disputes took place within the last quarter of a century on the question of "grinding money," and how it was at last acceded to by the employers that a workman about being paid off was allowed a certain time for grinding or sharpening his tools, with a view of being prepared for his next job. The dauber or inferior plasterer of the fourteenth century received only 5d. per day from Easter to St. Michael's Day, and 4d. for the rest of the year. The daubers had laborers to attend them as well as the tilers, and these laborers received only 3½d. for one part of the year and 3d. for the other.

At an earlier period in the preceding reign, in the 10 Edward II. (1317), we have an interesting agreement concerning the plastering of the hall of John de Bretagne, Earl of Richmond. From an earlier document the residence mentioned would appear to have been situated in the locality of Ivy Lane or Warwick Lane, near St. Paul's. Thus runs the agreement of the master-plasterer of the

fourteenth century:—Know all men that I, Adam le Plasterer, citizen of London, am held bound to Sir John de Bretagne, Earl of Richmond, to find plaster of Paris, at my own proper charges, good and sufficient, without default, proper for the hall of the said earl, and also that I will competently, at my own proper charges, plaster and complete the said hall, and will repair the walls of the same with the said plaster, well and befittingly within and without, as also the telves [the louvers or flues] to the summit, in such manner as befits the repair of the hall aforesaid; and this I will do for 24 pounds sterling, which my lord the said earl has paid to me beforehand. Faithfully to perform the which work within eight weeks from the day of the Holy Trinity next ensuing, I do bind myself and all my goods, movable and immovable, namely, my lands, houses, and tenements within the City of London being, to distress in part of any bailiff of our lord the king," etc. Plaster of Paris appears to have been used in England long before this period, but whether its use preceded the Norman migration, and how long, we cannot say. Native gypsum could supply a fair material in the absence of the imported article, and there are several beds of it in different parts of the kingdom. We have further mention of the plasterer or dauber and his wages in an account of moneys expended by a trustee on the repairs of a house in the parish of St. Michael Cornhill, in the 33 Edward III. (1359), viz.:—"For 12 cartloads of lom [loam], 4s.; for 9 sacks of lime, 18d.; for 3 cartloads of sand, 12d.; for one workman's wages for daubing, 9 days at 7d. per day, 5s. 3d.; for his man the same day at 5d. per day, 3s. 9d." Again, in an account of expenses incurred by the representatives of the city attending the Parliament in the 13 Richard II. (1389), the plasterers, or daubers, put in an appearance. "For timber and carpentry, tilers and daubers, in preparing the house for their lodgings, as well as the chambers as the hall, buttery, kitchen, and stables for horses; and for making stoles and fourmes [stools and formes] throughout, and for carting out the rubbish, such house being quite ruinous; as also for payment made to the good man of the house for said lodging, £6 9s."

The antiquity of fresco-painting, even its older forms, shows that the services of the plasterer were in requisition at a very early date in Rome, Athens, Egypt, and other places. In the mediæval period fresco-painting, in connection with our ecclesiastical and other edifices, was pretty general over the three kingdoms. In the fifteenth century the windows of cloisters in England, as well as France, were not only filled with scriptural stories, in series, in stained glass, but the walls were sometimes painted in fresco. The walls of our mediæval castles, as far as the state chambers were concerned, were covered with wainscot, painted in fresco upon the panels, where not otherwise hung with tapestry. The churchwarden renovators of our ecclesiastical buildings in the seventeenth and eighteenth

centuries destroyed, by their white-washing processes, many fine specimens of wall-painting and fresco-work. In some instances, careful manipulation on the part of artists and architects has succeeded, says the *Brick and Tile Gazette*, in saving the fresco-painting, but in many cases the thin coat of plaster forming the ground of the painting unfortunately came off with the coat of outside white-wash. An older system of plastering, known as pargeting, or pergeting, was once very general. The term, as it is known in the present day, only applies to coarse plastering inside chimney flues, and between joists of floors. Formerly pargeting was understood in several senses: sometimes it was plain plastering, but generally it was used in connection with ornamental work, including mouldings, figures, foliage, and various other enrichments, sunk and raised. The Elizabethan half-timber houses exhibited on their exteriors ornamental pargeting betimes. In different towns throughout the kingdom houses formerly of the date to which we are referring displayed small figures, and canopies surmounting them, executed in plaster work. The plasterer may put in a claim for much good work in the past as well as an alliance with distinguished artists. The plasterer in the case of fresco-painting had always to be in readiness to render the wall with a coat of coarse stucco formed of lime and sand, which was finished over with a finer material to produce the requisite surface for the artist. Though the ancients were ignorant of the use of oils and varnishes, the fresco-painter, from the very nature of his work, had to evidence marvelous dexterity and skill, rapidity of execution, and a truly educated eye, all these being essential in the efficient performance of his labor. His subordinate, the plasterer, no doubt felt an inward pleasure, at least, that he prepared a good ground or basis for the successful work that resulted.

Of the class of plaster work known as stucco proper, there are several excellent examples in England and Ireland, generally attributed to Italian artists, several of whom were encouraged to settle in these kingdoms by members of our native nobility and some others interested in architecture.

In London and Dublin, in the old town mansions, and in numerous country seats, there is often splendid stucco ornamentation to be met with in ceilings, mouldings, chimney-pieces, etc. From the latter end of the seventeenth century, a very large amount of stucco ornamental work was executed throughout the three kingdoms, and though a portion of it must be put down to the hands of Continental artists, still we have evidence enough to show that our native workmen or artists in stucco often rivaled the foreigner in this class of plaster work. To one Margaritone, who died early in the fourteenth century, is credited the invention of stucco work. At intervals down to the end of last century he was succeeded by a number of clever stucco artists. The names of a few stucco artists or workers of

more than ordinary repute, who practiced their art with fame and profit in London and Dublin, may be found in looking into some local histories. There is an inferior kind of stucco work well known to our modern builders and plasterers, made up of common mortar and plaster, which is applied to the outside of houses. This kind of stucco or "compo," if well made and manipulated, will last for several years, but the ordinary mixture called "stucco" has no tenacity, and a few nights of frost signs its death warrant. Such constituents as a composition of pulverized white marble, mixed with good plaster of lime, well sifted and wrought up to a proper consistency with water, show at once to the practical mind that the essentials for executing lasting work are present.

The half-timbered domestic buildings, or cage-work structures, so plentiful in London up to the date of the great fire, afforded not a little work for plasterers, though the general run of the work of the more common and numerous class of these buildings consisted of filling in the interstices of the frame-work with plaster. The cornices, instead of being run in plaster, were often of wood, and put up by the carpenter and joiner; but when brick-built houses became general in our cities and towns, the house-plasterers by degrees secured a fair share of the work.

Old building practices, like national pastimes and customs, take a long time to die. The builder of the mud cabin still flourishes in portions of her Majesty's dominions, and the thatcher still turns our good ornamental work, as well as the tiler. After long centuries the "cob" wall constructor, the dauber, the rustic carpenter, the hedger, and the dry-wall field mason still vegetate, and find paying patrons. History is repeating itself, for have we not men coming forward again to prove that reeds are better than laths for plaster work, forgetting that our great-great-grandfathers used the vegetable growth, and never thought it worth while seeking a patent to protect its use?—*Building News (London)*.

Excavations conducted at Sunium by the German Archaeological Institute have been handsomely recompensed. All of the ground plan of the Temple of Athens has been disclosed, and it is now put beyond all doubt that the longer side of the building had thirteen columns, and not twelve. The remaining portion of the frieze has been unearthed, but, unfortunately, time has told disastrously with its sculptures. To the age of Pericles must be ascribed the marble temple, of the same general plan as the older and smaller structure, of calcareous tufa, over which it was built.

The Queen of England was the first to send a telegram to America. The message was one of congratulation to the President of the United States, who at once replied. Her Majesty's message and the President's answer cost £500 each, being £1,000 for the use of the cable for rather less than an hour and a half.

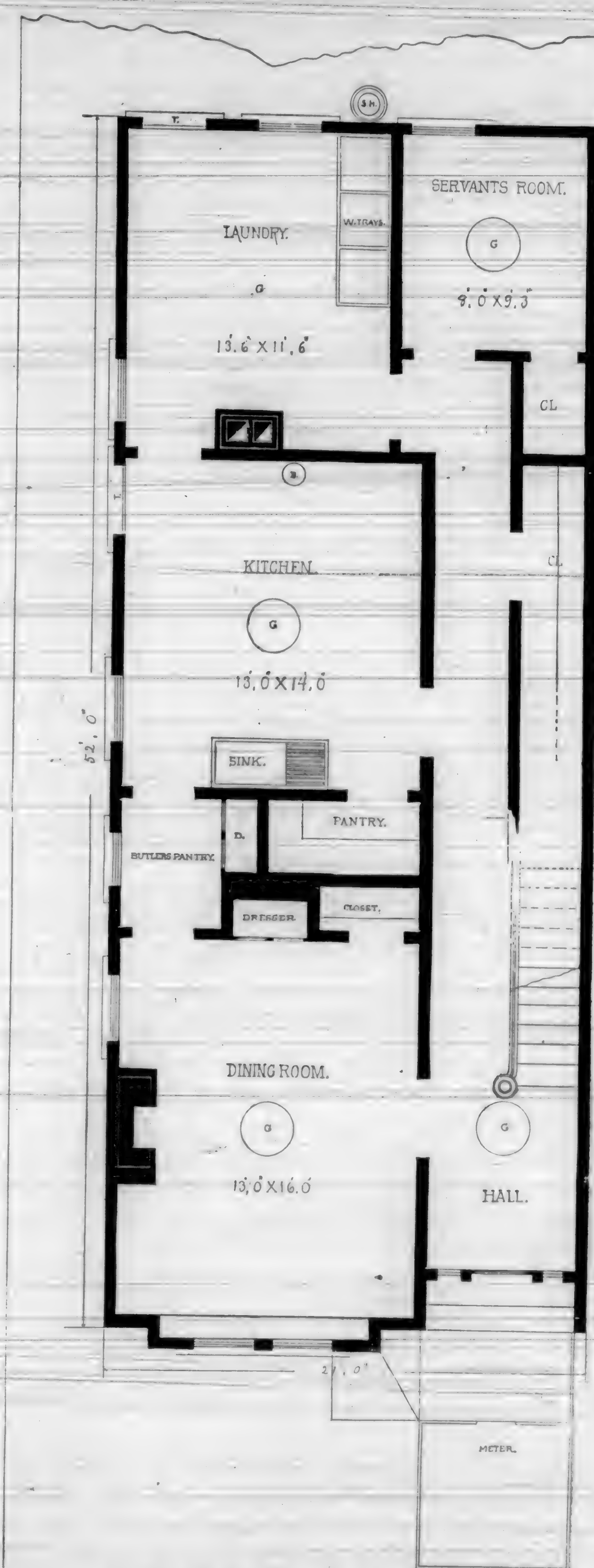


PLATE 2.—BASEMENT PLAN OF COTTAGE.

Early Plastering and Plasterers.

THE use of plaster, or "plaster," as it was formerly called, is of early date, even in the British Islands, in connection with domestic architecture. Long before lime plaster came into general use, a tenacious clay or sticky and unctuous earth was employed when procurable, and, in its absence, whatever clay, or mixture of mud and earth, produced the most binding material. The rudest and coarsest forms of daubing or plastering in the British Isles were those structures erected of wattles and daubed over with clay to keep out the cold. These kind of domestic buildings were common in Ireland in the time of Henry II. From necessity or in conformity to the fashion of that country, the English monarch erected, according to Roger Hovenden, a royal palace with "uncommon elegance" of smoothed wattles in 1172, and in such buildings his majesty, with the kings and princes of Ireland, solemnized the festival of Christmas. The Devonshire "cob," a class of building not yet extinct, is a fair illustration of the ancient fashion of daubing or plastering practiced in this country for long centuries. In the thirteenth and fourteenth centuries in this country the plasterers proper and the daubers formed two distinct classes of building workmen, and their wages, like the wages of other operatives, were subject to certain regulations summer and winter. The daubers were simply the layers-on of a mixture of straw and mud to a framework of timber. The plasterers in London in the 24 Edward III. (1350), were bound to take no more for their working-day between the feast of Easter and St. Michael than 6d., without victuals or drink, and for the remainder of the year 5d. Upon feast days, when they did not work, they took nothing. The masons and carpenters received similar pay. As a curious contrast with rights claimed by building workmen in the present day, those of the fourteenth century were allowed nothing for making or mending their tools. We know what fierce disputes took place within the last quarter of a century on the question of "grinding money," and how it was at last acceded to by the employers that a workman about being paid off was allowed a certain time for grinding or sharpening his tools, with a view of being prepared for his next job. The dauber or inferior plasterer of the fourteenth century received only 5d. per day from Easter to St. Michael's Day, and 4d. for the rest of the year. The daubers had laborers to attend them as well as the tilers, and these laborers received only 3½d. for one part of the year and 3d. for the other.

At an earlier period in the preceding reign, in the 10 Edward II. (1317), we have an interesting agreement concerning the plastering of the hall of John de Bretagne, Earl of Richmond. From an earlier document the residence mentioned would appear to have been situated in the locality of Ivy Lane or Warwick Lane, near St. Paul's. Thus runs the agreement of the master-plasterer of the

fourteenth century:—Know all men that I, Adam le Plasterer, citizen of London, am held bound to Sir John de Bretagne, Earl of Richmond, to find plaster of Paris, at my own proper charges, good and sufficient, without default, proper for the hall of the said earl, and also that I will competently, at my own proper charges, plaster and complete the said hall, and will repair the walls of the same with the said plaster, well and befittingly within and without, as also the tewsels [the louvers or flues] to the summit, in such manner as befits the repair of the hall aforesaid; and this I will do for 24 pounds sterling, which my lord the said earl has paid to me beforehand. Faithfully to perform the which work within eight weeks from the day of the Holy Trinity next ensuing, I do bind myself and all my goods, movable and immovable, namely, my lands, houses, and tenements within the City of London being, to distress in part of any bailiff of our lord the king," etc. Plaster of Paris appears to have been used in England long before this period, but whether its use preceded the Norman migration, and how long, we cannot say. Native gypsum could supply a fair material in the absence of the imported article, and there are several beds of it in different parts of the kingdom. We have further mention of the plasterer or dauber and his wages in an account of moneys expended by a trustee on the repairs of a house in the parish of St. Michael Cornhill, in the 33 Edward III. (1359), viz.:—"For 12 cartloads of lom [loam], 4s.; for 9 sacks of lime, 18d.; for 3 cart oads of sand, 12d.; for one workman's wages for daubing, 9 days at 7d. per day, 5s. 3d.; for his man the same day at 5d. per day, 3s. 9d." Again, in an account of expenses incurred by the representatives of the city attending the Parliament in the 13 Richard II. (1389), the plasterers, or daubers, put in an appearance. "For timber and carpentry, tilers and daubers, in preparing the house for their lodgings, as well as the chambers as the hall, buttery, kitchen, and stables for horses; and for making stoles and fourmes [stools and forms] throughout, and for carting out the rubbish, such house being quite ruinous; as also for payment made to the good man of the house for said lodging, £6 9s."

The antiquity of fresco-painting, even its older forms, shows that the services of the plasterer were in requisition at a very early date in Rome, Athens, Egypt, and other places. In the mediæval period fresco-painting, in connection with our ecclesiastical and other edifices, was pretty general over the three kingdoms. In the fifteenth century the windows of cloisters in England, as well as France, were not only filled with scriptural stories, in series, in stained glass, but the walls were sometimes painted in fresco. The walls of our mediæval castles, as far as the state chambers were concerned, were covered with wainscot, painted in fresco upon the panels, where not otherwise hung with tapestry. The churchwarden renovators of our ecclesiastical buildings in the seventeenth and eighteenth

centuries destroyed, by their white-washing processes, many fine specimens of wall-painting and fresco-work. In some instances, careful manipulation on the part of artists and architects has succeeded, says the *Brick and Tile Gazette*, in saving the fresco-painting, but in many cases the thin coat of plaster forming the ground of the painting unfortunately came off with the coat of outside white-wash. An older system of plastering, known as pargeting, or pergeting, was once very general. The term, as it is known in the present day, only applies to coarse plastering inside chimney flues, and between joists of floors. Formerly pargeting was understood in several senses: sometimes it was plain plastering, but generally it was used in connection with ornamental work, including mouldings, figures, foliage, and various other enrichments, sunk and raised. The Elizabethan half-timber houses exhibited on their exteriors ornamental pargeting betimes. In different towns throughout the kingdom houses formerly of the date to which we are referring displayed small figures, and canopies surmounting them, executed in plaster work. The plasterer may put in a claim for much good work in the past as well as an alliance with distinguished artists. The plasterer in the case of fresco-painting had always to be in readiness to render the wall with a coat of coarse stucco formed of lime and sand, which was finished over with a finer material to produce the requisite surface for the artist. Though the ancients were ignorant of the use of oils and varnishes, the fresco-painter, from the very nature of his work, had to evidence marvelous dexterity and skill, rapidity of execution, and a truly educated eye, all these being essential in the efficient performance of his labor. His subordinate, the plasterer, no doubt felt an inward pleasure, at least, that he prepared a good ground or basis for the successful work that resulted.

Of the class of plaster work known as stucco proper, there are several excellent examples in England and Ireland, generally attributed to Italian artists, several of whom were encouraged to settle in these kingdoms by members of our native nobility and some others interested in architecture.

In London and Dublin, in the old town mansions, and in numerous country seats, there is often splendid stucco ornamentation to be met with in ceilings, mouldings, chimney-pieces, etc. From the latter end of the seventeenth century, a very large amount of stucco ornamental work was executed throughout the three kingdoms, and though a portion of it must be put down to the hands of Continental artists, still we have evidence enough to show that our native workmen or artists in stucco often rivaled the foreigner in this class of plaster work. To one Margaritone, who died early in the fourteenth century, is credited the invention of stucco work. At intervals down to the end of last century he was succeeded by a number of clever stucco artists. The names of a few stucco artists or workers of

more than ordinary repute, who practiced their art with fame and profit in London and Dublin, may be found in looking into some local histories. There is an inferior kind of stucco work well known to our modern builders and plasterers, made up of common mortar and plaster, which is applied to the outside of houses. This kind of stucco or "compo," if well made and manipulated, will last for several years, but the ordinary mixture called "stucco" has no tenacity, and a few nights of frost signs its death warrant. Such constituents as a composition of pulverized white marble, mixed with good plaster of lime, well sifted and wrought up to a proper consistency with water, show at once to the practical mind that the essentials for executing lasting work are present.

The half-timbered domestic buildings, or cage-work structures, so plentiful in London up to the date of the great fire, afforded not a little work for plasterers, though the general run of the work of the more common and numerous class of these buildings consisted of filling in the interstices of the frame-work with plaster. The cornices, instead of being run in plaster, were often of wood, and put up by the carpenter and joiner; but when brick-built houses became general in our cities and towns, the house-plasterers by degrees secured a fair share of the work.

Old building practices, like national pastimes and customs, take a long time to die. The builder of the mud cabin still flourishes in portions of her Majesty's dominions, and the thatcher still turns our good ornamental work, as well as the tiler. After long centuries the "cob" wall constructor, the dauber, the rustic carpenter, the hedger, and the dry-wall field mason still vegetate, and find paying patrons. History is repeating itself, for have we not men coming forward again to prove that reeds are better than laths for plaster work, forgetting that our great-great-grandfathers used the vegetable growth, and never thought it worth while seeking a patent to protect its use?—*Building News* (London).

Excavations conducted at Sunium by the German Archeological Institute have been handsomely recompensed. All of the ground plan of the Temple of Athens has been disclosed, and it is now put beyond all doubt that the longer side of the building had thirteen columns, and not twelve. The remaining portion of the frieze has been unearthed, but, unfortunately, time has told disastrously with its sculptures. To the age of Pericles must be ascribed the marble temple, of the same general plan as the older and smaller structure, of calcareous tufa, over which it was built.

The Queen of England was the first to send a telegram to America. The message was one of congratulation to the President of the United States, who at once replied. Her Majesty's message and the President's answer cost £500 each, being £1,000 for the use of the cable for rather less than an hour and a half.

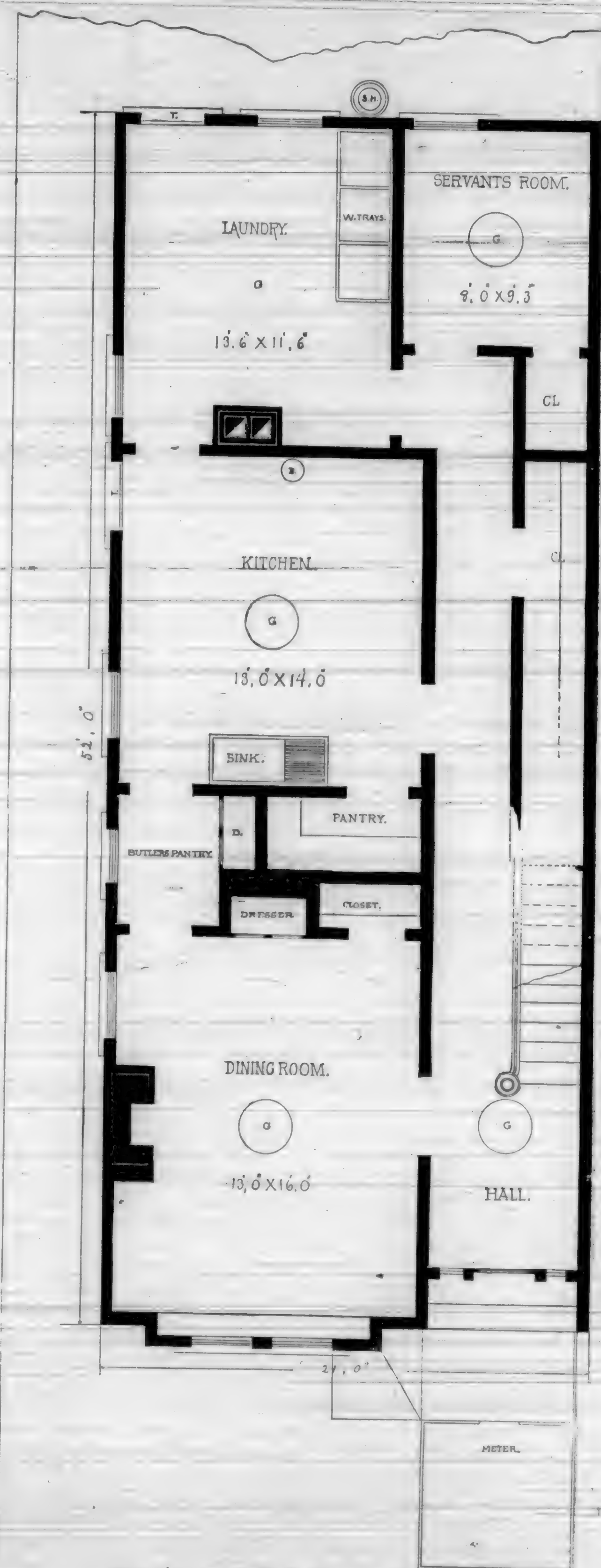


PLATE 2.—BASEMENT PLAN OF COTTAGE.