

strength was 309 kilograms per square centimeter in the first case and 338 kilogramme per square centimeter (4,806.3 pounds per square inch) in the second. The 1:5 mortar protected from carbonic acid broke at a tensile strain of 14 kilograms per square centimeter (199 pounds per square inch), and, treated with carbonic acid, the strength increased to 16.8 kilograms per square centimeter (238.9 pounds per square inch). The crushing tests gave 112 and 138 kilograms per square centimeter (1,592.6 and 1,962 pounds per square inch) respectively.

To be Continued.

SEMI-ANNUAL SUMMARY OF BUILDING OPERATIONS.

IN the following tables we present the number and value of buildings erected in San Francisco during the first six months, it will be noticed that there is an increase in the amount of cost as compared with the first six months of last year while the number of buildings is much less.

FOR FIRST SIX MONTHS, 1898.

1898	No. of Buildings	No. of Contracts	Brick Building Value	No. of Buildings	No. of Contracts	Frame Building Value	No. of Buildings	No. of Contracts	Alterations & Additions Value	No. of Buildings	No. of Contracts	Total Value
January	3	4	\$8,901	19	14	\$1,286	7	7	\$7,338	25	25	\$107,525
February	0	10	\$2,879	15	17	\$2,984	6	13	\$5,380	30	30	\$89,133
March	3	7	\$7,154	39	35	\$12,362	11	13	\$1,870	55	55	\$306,006
April	3	15	\$65,301	33	38	\$39,221	16	19	\$19,891	52	52	\$424,433
May	4	12	\$51,108	19	23	\$7,380	9	15	\$1,815	32	50	\$203,403
June	8	20	\$13,961	28	42	\$57,476	14	18	\$2,156	40	80	\$353,590
Total	27	68	\$99,907	153	171	\$725,720	63	85	\$306,650	239	324	\$1,922,286

To this amount has been added the further estimated sum of \$300,000 where costs have not been given, which would make the grand total for the year, \$2,222,286.

FOR FIRST SIX MONTHS, 1897.

1897	No. of Buildings	No. of Contracts	Brick Building Value	No. of Buildings	No. of Contracts	Frame Building Value	No. of Buildings	No. of Contracts	Alterations & Additions Value	No. of Buildings	No. of Contracts	Total Value
January	12	18	\$28,640	22	24	\$3,324	3	3	\$7,917	37	45	\$190,081
February	6	11	\$18,282	24	21	\$1,475	8	8	\$28,025	35	39	\$280,631
March	10	15	\$25,112	44	47	\$35,619	10	10	\$7,234	64	75	\$405,975
April	6	11	\$15,762	71	73	\$217,570	2	2	\$9,750	102	122	\$723,912
May	12	15	\$19,956	40	43	\$17,366	11	11	\$13,080	64	75	\$277,427
June	7	11	\$8,718	45	48	\$62,750	10	20	\$10,991	71	77	\$261,462
Total	54	101	\$88,638	243	263	\$788,123	76	77	\$217,639	373	411	\$1,888,188

The business for the first six months for several years is shown by the following table.

1885-754 contracts	value, \$4,267,375
1886-670	2,486,633
1887-516	3,269,914
1888-437	2,719,820
1889-546	3,910,600
1890-556	3,793,858
1891-583	3,916,973
1892-411	2,942,496
1893-475	3,024,498
1894-524	2,456,428
1895-517	2,625,024
1896-644	3,636,224
1897-433	2,388,488
1898-324	2,222,286

ANOTHER BUILDING DISASTER.

FOLLOWING close in the train of the recent building disaster at London, Ont., with its terrible consequences, comes the news of the collapse on February 21, of the roof of a large music hall at Oshawa, Ont. The building is described as a three-story brick structure, with a large assembly hall on the upper floor. It was covered by a flat roof about 75x100 feet in size, which fell to the second floor, completely covering the seats in the music hall. The accident occurred at five o'clock in the morning. To this fortunate circumstance is due the fact that a number of lives were not sacrificed. On the preceding Saturday evening a large political meeting was held in the building, and on the evening of the day on which the accident took place an entertainment was to have been given at which it was estimated there would have been present 800 persons. How terrible, therefore, would have been the consequences had the accident been delayed but a few hours! Doubtless the immediate cause of the collapse was accumulation of snow on the roof, but the fact that the roof was a new one and that the building had recently undergone changes and repairs, at a cost of about \$5,000, is sufficient proof of structural weakness. These accidents unmistakably affirm the necessity of a standard of qualification on the part of those who undertake to design and erect buildings—particularly those of a public character. If the title Architect was restricted to persons who had passed a qualifying examination, as is now the case in the province of Quebec and the State of Illinois, the public would at least be enabled to know who were qualified to put up safe structures, and could then govern themselves accordingly. Under present circumstances anybody is at liberty to call himself an architect and to design and erect buildings of every class. So long as this condition of things shall continue, accidents involving injury and loss of life will be the inevitable consequence.—*The Canadian Architect and Builder.*



[The Editor is not responsible for anything which appears in this column.]

BURNT CLAY HAS AN INNINGS.

NEW YORK, N. Y., July 15, 1898.

To the Editor of the California Architect and Building News,

SIR:—We have again to thank you for a copy of your interesting paper of May. It seems to us that the question at issue is primarily: "which is the best material for fireproofing purposes—burnt clay or concrete?" and the solution of this is within the reach of any one. Let him procure a piece of porous terra-cotta and one of cinder concrete such as is used in buildings; place both in any kitchen range; the

when heated red-hot, drop into a bucket of water and noting the result, from his own judgment.

To hold the material responsible for faulty construction such as is shown in your illustrations of the Park Row building in this city, is simply ridiculous; through an agreement entered into some time since between the master builders and unions, the manufacturer of hollow tile is debarred from getting any of his material in New York City, whilst the manufacturers of concrete control the entire operation from first to last.

Give the manufacturer of hollow tile equal privilege to erect his material, grant him at same time leeway to supply any petty deficiencies in the general fireproofing which his experience teaches him is vital and you will secure a structure as thoroughly impervious to fire as the present appliances of science furnishes—and thereby demonstrate clearly what is possible in fireproof construction of burnt clay when unhampered by other considerations than that of perfect efficiency.

The same authority that procured those illustrations could easily satisfy himself that the material is delivered in good condition at the building and that all blame for defective construction and broken tiles rests not with the manufacturer, who deplores, being vitally interested far more than *Engineering News*, such miserable work as you show.

And yet, despite defective setting, which *Engineering News* claims is almost universal in fireproof buildings constructed of hollow tile in New York City, such buildings have withstood the fiercest internal fires with little or no damage; and the Pittsburg fire so demonstrated, Mr. Jenny to the contrary notwithstanding.

If the Firewriters Association of the N. W., desire information as to the best fireproof construction for buildings, it could procure such based on actual experiences, by applying to the New York Board of Fire Underwriters.

A progressive manufacturer of burnt clay fireproofing aims to profit by the lessons which past experiences have taught him; to incorporate in its manufacture every improvement suggested by thoughtful ingenuity and unceasing experiments, but, "there are others".

The other systems of fireproofing which have sprung into recent existence from their very novelty, are limited in practical application to actual building operations and have thereby escaped so far any test of their efficiency in the light of subjection to actual conflagration. We know what to expect of a material which in its manufacture is exposed to a temperature of fully 3000 degrees Fahrenheit, and we have seen its conduct under subsequent fires in numerous instances, but what will result when the newer systems are called upon to prove their claims?

We have a report to the National Fire Protection Association of Boston on a fire of April 2, 1898, No. 278-288 Congress street. "Floors concrete, (Columbian construction). Cause of fire probably spontaneous combustion in the outside surface of three barrels. Did not burn through barrels and floor not scorched. Damage caused by fire starting a Grinnell Sprinkler, which was not discovered by watchman in time."

"The floors which were supposed to be water-proof, allowed water to run through and caused damage in four stories. The action of lime (in concrete) with water, passing through caused silver plated ware to be turned black, necessitating replating and polishing."

As unslaked lime, one of the essential elements of cement and therefore in concrete, is not only a conductor but one of

the greatest known absorbents of moisture, electricity will find its way through any moisture, containing material. The concrete system applied in a moist condition, retains its moisture for a more or less extended period and in these days of ever extending electrical appliances in our steel-frame buildings, the danger to that metal of electrolysis is one that is attracting the earnest attention of our Architects and one to be well considered. Hollow tile, on the contrary, is a perfect non-conductor and is absolutely dry when laid.

Yours truly,

HENRY MAURER & SON.

THE CONTINENTAL FIRE INS. CO.'S ARCHITECTURAL BOOMERANG.

Editor California Architect and Building News.

DEAR SIR:—With your permission I desire to draw the attention of Architects to an announcement in the June number of the *Coast Review*, which states that the Continental Fire Insurance Company of New York has published a work containing plans and specifications of economical buildings, etc., a copy of which the company will send to any property owner desiring to build, if the said owner "will insure with the Continental."

This is a new departure, for a respectable corporation to take, but quite in keeping with the "beautiful present" or "something for nothing" idea so prevalent in these days among certain storekeepers.

How the Continental of New York, expects to be benefited in the long run by adopting these tactics is left to conjecture.

Fortunately Architects (and their clients) still have plenty of choice left in the matter of insuring their buildings, and with companies who do not offer plans and specifications as an inducement to obtain premiums and they still have sufficient intelligence left to exercise it.

The publication referred to is also said to contain (for the owners benefit of course) blanks for contracts with builders and "architects". I can only say that if these contracts are of the New York Standard policy type—"ironclad" and duly Harveyized—they would be as useless to an owner, as the said plans and specifications would probably be.

Yours respectfully,

ARCHITECT.

IRON SHUTTERS VS. WOOD SHUTTERS.

New York, July 13, 1898.

To the Editor of the California Architect and Building News.

DEAR SIR:—In the June number of your Journal I read an article on "Iron Shutters" in which it states that the Fire Department of New York City has lost faith in iron shutters, and that a wood shutter lined with tin is the best shutter in the market today, known as the "Underwriter's Shutter" by the Department.

As one who has been in the business of manufacturing and erecting fire-proof shutters all over this country for twenty years and more, who makes a specialty of shutters, seeing

the ridiculousness of such a claim I take the liberty to write these few words.

If the comparison is made by Chief Bonner between common folded wire shutters and wood lined with tin, I agree with him, as common iron shutters will burst open in thirty minutes under an intense heat—I suppose this is what the Chief had in mind.

In 1886 a large building was erected in Chicago, Ill., designed by the late Mr. Richardson, the Architect, and who took special interest in the shutter question for that building. He selected a shutter which I saw placed in that building in round numbers, seven hundred and fifty in all.

Some six years after the said building was finished, I had a call to put in more shutters for this same concern. In my conversation with the Chief Engineer I asked him "how did the shutters wear in the old building?" His reply was this: "Two years ago we had a terrible fire across the street, burned the whole block and part of another, the shutters you put in were white with heat, then we placed our water on them from the inside as an experiment in our excitement, the shutters had room to expand in the channels and when the fire was all over we had only the painting to do on the shutters."

The above rolling steel shutter was invented by Clark, Bunnet & Co., London.

Yours very respectfully,

J. D. THOMAS, Supt., N. Y.

THE SURVIVAL OF THE FITTEST.

IT WAS Herbert Spencer who, when seeking to define his views, touching the Status of man, and the lower animals, in the visible universe, coined the above axiomatic phrase. This sententious deliverance of the great biologist, has long since abundantly justified the claim that

"Many a shaft at random sent
Finds mark the archer's little meant."

in that it has been found—or made—to fit conditions its promulgator scarcely contemplated. With our characteristic tendency to exalt the apposite, we do not hesitate to utilize terms well befitting a "bacillus" to exploit—well, say for instance—a boiler, or to be quite explicit "A Copper Range Boiler."

If in preparation of plumbing Specifications, wherein the best goods obtainable, are demanded, architects would call for the "Brown Bros. Seamless Drawn Copper Range Boiler, they will certainly obtain what they seek, whereas the words "or equal" added to the specifications, will most certainly defeat the intention and provide an easy path for "the substitution evil."

This seamless drawn boiler is made of two solid seamless shells cold-drawn from pure Lake Copper and has no brazed seams or rivets. It has successfully withstood the test that tries all things—"time"—and is fully guaranteed by its makers not to collapse.

Architects will find that the experimental element does not enter into the "Brown," and he has the positive assurance that in this boiler, he is giving his client the very best article of its class in existence.

FOR STEEL CONSTRUCTION.

THE new building for the Wells, Fargo & Co's., Express consumed nearly 1000 tons of steel in the skeleton structure. To prevent corrosion to this vast amount of metal, covered and fire-proofed, as most of it will be with layers of concrete, the architects gave the preference to Dixon's Silica-Graphite Paint.

CABOT'S SHINGLE STAINS.

THOSE who required further evidence of the value of Cabot's Creosote Shingle Stains in this climate will find it in the brochure just issued from the office of the San Francisco agent, Mr. Charles J. Waterhouse, 421 Market street. This little book, which is illustrated with half-tones and line sketches of a number of handsome country-houses that have been actually stained with these Stains, contains also the testimony of architects and owners all through this section of their complete satisfaction with the coloring effects, preserving properties and durability of the Creosote Stains. Being in the wood, and not wholly on the surface like paints, they cannot crack or peel off, as paints do, which is a very important advantage in this climate, but perhaps their most unique advantage here is the fact that redwood shingles treated with them never turn black, as they always do otherwise. Mr. Waterhouse carries a full stock here, and Mr. P. H. Mathews, 238 South Main street, is Los Angeles agent.

ROOFING OF WELLS FARGO & CO'S BUILDING.

The Paraffine Paint Company have the contract for the roofing work and roofing material on the Wells Fargo & Co's new building, and the roof is now well in hand.

GOOD LOCKS.

SOME INTERESTING FACTS ABOUT A FAMOUS LOCK. THE PRINCIPLE AS OLD AS THE PYRAMIDS AND MODERN AS THE CENTURY.

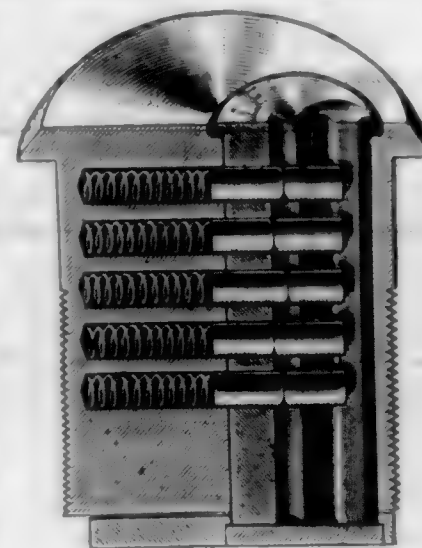


BELIEVING that the subject of locks has a peculiar interest to the class of readers whom our pages reach, we have gathered the following information on this subject:

It is a curious fact that both in England and America the name most prominently identified with locks is that of an American; in the former, that of A. C. Hobbs, and in the latter, that of Linus Yale, Jr.

While the makers of the Yale lock, The Yale & Towne Mfg. Co., of 84-86 Chambers street, New York, have associated the trade name "Yale" with many of their finer products, in connection with locks it can only properly be applied to the original invention of Mr. Yale and to the later improvements thereon which have been developed and introduced since his death by the Company.

The essential characteristics of the Yale system are shown in the accompanying illustrations, and consist in the separation of the key and tumbler mechanism from that of the bolt mechanism, and in the adaptation of a key of sheet metal to the actuation of the peculiar tumbler mechanism shown. The original Yale lock had a perfectly flat, thin key, which was the forerunner of the innumerable forms of flat key now so generally used. It is a common mistake to characterize any lock with a flat key as a "Yale Lock", and many persons are thus misled. The flat key was an incident in Mr. Yale's invention, but its chief importance lies in the form of tumbler mechanism adopted, the vast capacity for key changes which this affords, and the resulting immunity from liability to ac-



cidental interchange of keys. In common locks the key changes are counted by the dozen only; in the Yale lock they are counted by the thousand. The flat, steel key of the original Yale lock gave place later to the corrugated key, and this in turn to the latest form, the "Paracentric," which is shown by the illustration. The peculiar key-way



used with the latter adds greatly to the original security of the lock, while the intricate form of the key itself practically precludes illicit duplication.

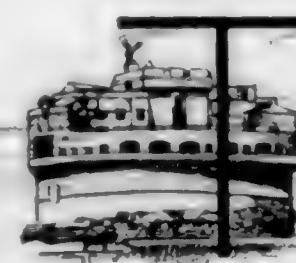
The Yale lock is a curious illustration of the adage that "there is nothing new under the sun". In the pyramids of Egypt locks have been found embodying the pin-tumbler system. Here, however, the resemblance ends. In the application of the principle, and in all refinements of mechanical detail, the difference is as wide as that between the civilization of Egypt under the Ptolomies and that of America at the close of the nineteenth century.

THE KEELY MOTOR UP-TO-DATE.

PROCEEDINGS OF ENGINEERS' CLUB OF PHILADELPHIA.

BY E. J. SCOTT, ACTIVE MEMBER.

CONTINUED FROM JUNE NUMBER.



THE VISITOR also saw the engine built to navigate an airship, recently described in a city journal as a new invention. He saw the engine, afterwards called a "Vibrodyne," which was to revolutionize all commercial machinery. This was not shown in operation. Keely also showed him a large book for the purpose explaining the principles of his vibratory philosophy. It was filled with heavy cardboard leaves, covered with pen drawings, all made by Keely with beautiful exactness. Nearly every one of the plates had one or more bars of music, showing the dominant chords or vibrations which governed certain combinations. The inscription on the Zuni tablets would have been quite as plain to the visitor, and Mr. Keely kindly enlightened him as to their meaning. In explanation of one of the simpler charts, Mr. Keely said: "The chord of polar negative attraction, so far as this sympathetic research is concerned, proves conclusively that the chord of the neutral center of the polar attractive currents of the earth represents the sympathetic chord of B flat, third octave, one-hundredth of a note below the octave, according to sympathetic sub-division."

The visitor had before noted that Keely's language, while sounding perfectly familiar so far as the words were concerned, did not convey any ideas. He soon learned that without a knowledge of the application made by Keely of the terms which fell so glibly from his tongue it would be useless to study the subject by question and answer. Some months afterwards he was given some manuscript of Keely's which was said to be the clearest exposition of his views on the great vibratory principle upon which his discovery is

based. The first paragraph of this paper, which serves as the introduction to the subject, reads thus:

"The peculiar sympathetic conditions whereby a magnet is conserved to polar and anti-polar currents of the earth show a duality of sympathetic inflow and outflow as to prove anything but perfect sympathetic equations, as between its reception and distribution in that part of the electrical field that represents one of the triplets that in celestial physics is classified as inter-atomic vibratory oscillation. Now, if this oscillation represents in its alternating action a vibratory wave-motion representing in its corpuscular field of action, say 128,400 exchanges per second between polar reception and anti-polar (or depolar) distribution (which sympathetic philosophy proves most conclusively), the fact is established of its perfect sympathetic concordance to that third of the electrical triplet representing the sixths as classified in sympathetic physics, and thus that line of sympathetic action as represented in the magnet when it is electrically sensitized becomes thoroughly subserved to polar sympathetic attraction as a medium through which a portion of a polar flow is diverted—not latent, but highly active under all conditions as long as its sensitization exists—that is its magnetic sympathy as electrically induced, and associates itself with every medium in nature where this latent element exists, viz: steel, iron, oxygen at a low temperature, etc."

As Keely has made vibratory physics the study of his life, it will be taken for granted that the statement just quoted is authoritative. At the same time the writer confesses that he does not understand it, although it sounds all right.

Mr. Scott left with the understanding that he should make a second visit at some date to be named. In the meantime he discussed the details of what he had witnessed with Mr. Addison B. Burk, President of the Spring Garden Institute, who agreed with him in some of his conclusions, and it was arranged that both would be present at the next visit to Keely, if agreeable to Mrs. Moore. That lady gave her consent, and named November 23, 1892, as the date. It was arranged between them that if the experiments was repeated, each would pay attention to certain details, so as to cover as many points as possible. At this visit the surroundings of the place and arrangement of the rooms constituting the laboratory were noted.

Entrance is made from the street through a large door into a room in which is a carpenter's workbench, some powerful winches, and an assortment of tools; and on one side was an immense box, bound with iron bands, with a cover so heavy that tackle was arranged above it for lifting it. It was closed and padlocked, and was said to contain machinery not now in use. A large door led into a room on the same floor at the rear of the first one, which was not opened on any of the visits. A stairway to the second floor leads to a landing on which are parts of abandoned machinery. A small room on one side of this contains a large desk, with books, instruments and drawings. On the opposite side of the landing is a room somewhat larger, with many expensive looking instruments, or machines, some of which he exhibited in operation. Back of both of these rooms is a large room the full width of the house, in which some of the apparatus was exhibited. To the rear of this is another room, a step or two higher. This last room is over the back room on the first floor, before referred to. To the north of this building is the central power station of the Columbia Electric Light Company.

One fact which may or may not be of importance, in con-

nection with all the visits, is that Keely required of Mrs. Moore twenty-four hours' notice of any visit at which exhibitions were to be made. On the second visit, at which Mr. Burk was present, Keely was asked to show the sensitized round steel bar before referred to. He produced it, and a measurement showed it to be $7\frac{1}{2}$ inches long and 1-16 inches in diameter, with a small hole through it longitudinally which could be blown through but no light would pass through it; another larger hole was bored through the bar near one end. By striking it on the floor with one end, it would vibrate with a base note like an organ tone which would continue for more than a minute; a blow on the other end produced a note of high pitch not quite so persistent. Keely's explanation of this phenomenon made at the first visit, was that the bar had been "vitalized" and its proportions had been calculated to a nicety. His exact explanation was: "By vitalizing this bar it produces a molecular oscillation of three times the diameter of the molecule, whereas under ordinary circumstances with a piece of forged steel, the oscillation is only one-third of its diameter, 40,000 times a second, which is perfectly inaudible to the ear. By increasing the magnitude of the vibrations by the sensitizing process to three times the diameter, it gives a molecular swing that brings out an oscillation that produces a chord with three different notes."

Mr. Scott had formed a different theory and asked that the bar be weighed. At just this juncture Mr. Keely admitted a caller, a young man with whom he appeared to be well acquainted, and having no scales in his laboratory, he asked the young man to take the bar to a neighboring drug store and have it weighed. He returned, saying its weight was 3 pounds, 3 ounces. During his absence Keely explained that the sensitizing process consisted in treating the metal with hydrogen in an oven, which would sometimes reduce its weight to nearly half the normal. Making allowances for the rounded ends, the bar had evidently suffered a loss in weight, but not in that proportion. Mrs. Moore told the writer that the bar had created a sensation among scientific gentlemen in Europe, and that there was a standing offer of \$10,000 for the production of a similar bar.

To test the truth of this theory and not in the hope of reward, the investigators concluded to have a bar made. After several attempts with vibrating single bars inserted in a bored-out piece of steel, Mr. Burk succeeded in having an exceedingly good imitation made at the Spring Garden Institute, by inserting two ordinary tuning forks of different pitches in the bored-out steel, and concealing the work by screwing on an end piece and then turning the bar off in a lathe. It required more work, probably, than the hydrogen process, but the molecules had the requisite swing, and the notes the proper resonance and persistence. This simply shows that there is possibly more than one way of arriving at the same result. After the duplication of this bar, the original could not be seen.

Mr. Keely on this occasion showed his apparatus for sensitizing bars, and also the amalgam disks which form so conspicuous a feature in all his apparatus. It was a glass receiver, from which the air could be exhausted by an air-pump, with an opening at the bottom large enough to admit the object to be sensitized, which must be mounted on glass. The opening was closed with a screw cap. The objects to be treated must not be touched by the hand, as by so doing vibrations might be set up in the body which would defeat the purpose. When the treatment was completed the disks could be handled without detriment.

The disks referred to were about $2\frac{1}{2}$ or 3 inches in diameter, of brass, and an inch thick, with the center turned out, making it like a cap, or cover of a jar. The cap was then filled with an amalgam and finished off smooth, like the obverse brass face of the disk. Keely said the composition of this amalgam had cost him some years of study. It melts at so low a temperature that he had caused much amusement by having spoons made of it, which when put into a cup of hot coffee would melt and disappear. The brass face of the disk was gold plated, which Keely said was essential.

On this visit the levitation experiment was exhibited again. The apparatus consisted of a cylindrical glass jar 41 inches high and about 10 inches in diameter. It was closed hermetically with a cap extending down the sides at least two inches. It was filled with what Keely said was pure water. On the bottom of the jar was one of the disks before described, standing on edge, also a globe covered with gold leaf about the size of an orange, with a small cylindrical projection on one side on which it rested. Keely said the globe was filled with shot. This jar stood on a small pine table upon a thick sheet of glass. In the cap of the jar Keely said there were copper and platinum strips which were responsive to certain vibrations. On the table near the jar he placed what he called a "Sympathetic Negative Transmitter," and connected this with a thumb-screw on the cap of the jar by a platinum wire. This transmitter was a large brass ball about eight inches in diameter, from one side of which protruded a straight cylindrical handle, or bar, which, by turning one way or the other, was projected into or drawn out of the ball. The movements resembled those made in operating the combination of a safe. On the outside of the ball was a small horn formed of a tube of increasing diameter, coiled with its large end outside. Also three small disks of metal into the circumference of which spines of metal of various length were inserted, forming a scale of tones when snapped. One was the diatonic scale, one harmonic, and one attuned to fifths.

Keely then placed a sensitized disk on top of the jar, and another at its base. He explained that the disks and the objects inside the jar were in sympathy with each other, and that it was essential thus to place them. Then turning the knob or handle of his transmitter a few times, as if to adjust it, he snapped the spines on the scales at different points, and soon the weights at the bottom of the jar began to quiver; the disk started slowly upward, followed by the shot weight, and with a slow, uniform motion they rose to the surface and bumped against the cap, bobbing up and down until they came to rest. The disk, which started first, moved faster than the globe. Keely explained that this was due to the difference in the rates of vibration of their chords of mass. This difference was 120 per minute, and he could, with care, make one ascend while the other descended or remained at the bottom. He played a few notes on a mouth-organ, disconnected the platinum wire from the jar and said the weights would remain at the top indefinitely. The jar was left while the visitors looked at other apparatus, and after a time they were found still on the top. Keely connected the transmitter and jar again by the wire, struck some chords, and the weights descended. He played a chord softly on the mouth-organ, repeating it at short intervals, and both started to rise; using the handle of the transmitter and changing the chord after they had risen three or four inches, the shot ball dropped to the bottom while the disk continued to the top.

To be Continued.

DUNHAM, CARRIGAN & HAYDEN CO.

17 and 19 BEALE ST., San Francisco Cal.

WE show here an illustration of our AMERICAN SLIDING DOOR HANGER for which we claim unusual advantages, great saving in time and expense, and superior excellence in operation, together with the following features not obtained or claimed in other hangers.

TRACKLESS—We obviate the use of a track above or below, and the special framing necessary where a track is used.

NO WHEELS—There are no wheels to bind by reason of warped or sagging track. The movement is perfectly PARALLEL and insures against binding.

NOISELESS—The operation is noiseless and extremely easy.

DOORS EASILY ADJUSTED—The door can be readily adjusted plumb, raised or lowered by drawing them into the opening which gives easy access to the adjusting screws.

QUICKLY PUT UP—The Hangers can be put up in one-third the time required for overhead hangers.

SUBSTANTIAL—The parts are made to carry three times the weight of doors of the size given.

ONE PACKAGE—We pack the Hangers fully assembled and ready to attach, in one package, including all bolts and screws necessary.

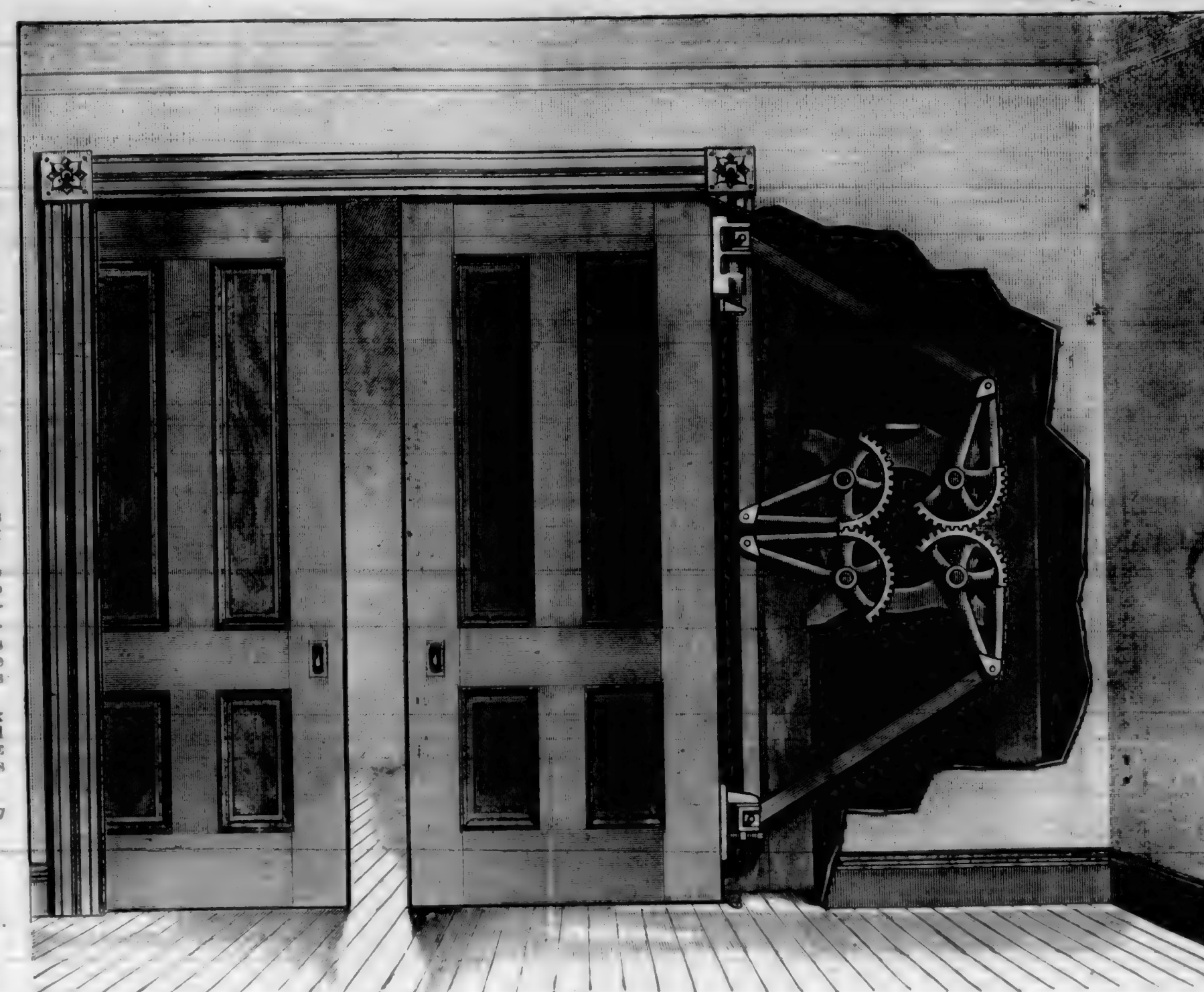
See a full size working model at our store.

WE SELL

The Yale & Towne Mfg Co.

CELEBRATED

YALE LOCKS.



S. F. LIME & MORTAR CO.

Brick and Plasterers' Mortar

Machine Made Mortar.

Estimates made on jobs of more than

OFFICE: 1104 CLAUD SPRECKELS BUILDING.

Works: Montgomery Avenue and Bay Streets.

TELEPHONE MAIN 5977.

25,000 Bricks.

723 MARKET ST.
San Francisco, Cal.

SMITH & YOUNG BUILDING SUPPLIES

230 1/2 S. SPRING ST.
Los Angeles, Cal.

OUR SPECIALTIES:

FOUNDATION AND WALLS

Marble.
Georgia White, Southern Marble Co
Serpentine, Fire and Electric Proof

Sandstone: (BUFF) GOODRICH QUARRY

Joist Hangers. GOETZ PATENT
Forged Wrought Iron

Lath. SHEET STEEL
Painted and Unpainted
WIRE LATH. G. & B. System

Mortar Stain. PECORA
For coloring mortar, cement, and sand finish

Paper. (BUILDING) S & Y BRANDS
Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18 and 19.

Wall Ties. MORSE'S PATENT

McDonough Weather Strips.
Acts as a stop and prevents window from rattling.

Alpine Cement Plaster
For brown and white coat

Porcelite Enamel Paint
Does not craze or crack

Oils. S & Y Pure LINSEED
Triple Boiled, Raw and Varnish

Varnish. S & Y TRANSPARENT

Filler. S & Y LIQUID AND PASTE

Deadening Felt. S & Y BRANDS
1, 1 1/2 and 2 lbs. per sq. yd.

Ornaments. PRESSED WOOD

Casing Blocks
Corner, head, center and base blocks

Carvings. [WOOD]

INTERIOR FINISH

Ceiling. [STEEL CEILING]

Chimney Hood. CLAWSON'S PAT.
To prevent smoky fire-places, and increase heat.

Mouldings. TURNED, CARVED AND PRESSED

Shingle Stains. DEXTER BROS.
PERMANENT COLORS A PERFECT PRESERVATIVE
Send for Samples.

Paints. S & Y EXTRA QUALITY
"GRAPHITE"
For metal and wood
MIXED ROOFING AND HOUSE PAINTS

EXTERIOR FINISH

Roofing
Slate, Mastic and Steel
"Ready-Rock" Asphalt Roofing.
Strongest and most durable roofing in the market. Easily applied.

Roofing Cement. S & Y BRAND
For repairing leaks about chimneys, sky lights, copings, and old tin and shingle roofs.

OTHER SPECIALTIES

Insusorial Earth
Fire proof. Used for boiler and pipe covering

Soapstone. CRUDE, GROUND AND BOLTED

Mineral Wool
For fire-proofing and deadening

CHAS. J. WATERHOUSE

BOX 78 BUILDERS' EXCHANGE. PHONE BLACK 1807. BOX 132 BUILDERS' ASS'N.

OFFICE 421 MARKET STREET, S. F.

DEALER IN

RELIABLE BUILDING MATERIALS

ART MOULDINGS

SAMUEL CABOT'S

CREOSOTE SHINGLE AND RUSTIC STAINS
SHEATHING AND DEAFENING QUILT
MORTAR STAIN PULPS—BRICK PRESERVATIVE

N. & G. TAYLOR CO.'S

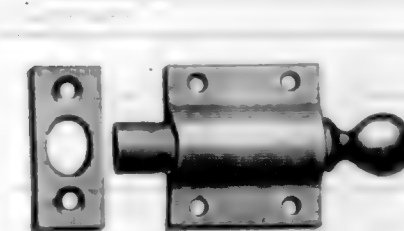
"OLD STYLE" ROOFING TIN
"THE TAYLOR ROOFING TIN"
"COLUMBIA ROOFING TIN"

THE VAN DORN IRON WORKS CO.'S

VAN DORN STEEL JOIST HANGER

ALL ABOVE GOODS ALWAYS IN STOCK.

ALSO SELL FROM THE EAST FOR

THE E. T. BURROWS CO.
Window and Door ScreensHUTTIG BROS. M'FG CO.
Hardwood Interior Finish.WASHINGTON SLATE CO.
Roofing and Blackboard Slates

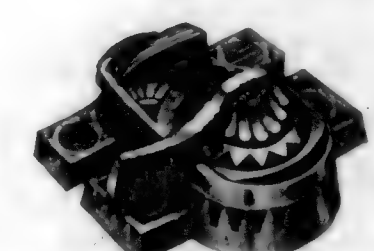
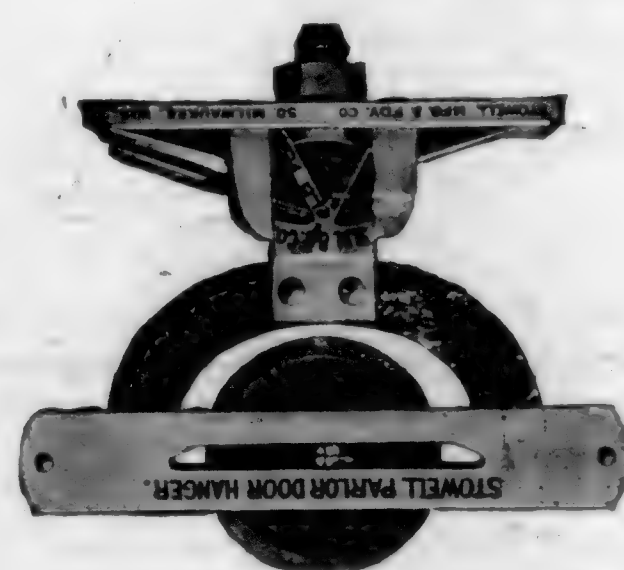
Window Ventilating Bolt.

IVES PATENT



Window Stop Adjuster

Window Hardware Specialties

Leaders with Architects and the Trade
Thirty page Catalogue mailed free.Manufactured only by
HOBART B. IVES & CO.
New Haven, Conn., U. S. A.Satisfaction guaranteed.
There's no hanger like it
Outlasts any Door.
Well made and strong.
Easy to adjust.
Lasts a lifetime.
Liked by architects.**STOWELL**
Mfg. & Fdy. Co.
South Milwaukee, Wis.

The "LINCOLN" LAUNDRY TUBS and SINKS

They are made of
selected clays
glazed in light yellow,
and more durable
seamless, non-absorbent
than iron.GLADDING, McBEAN & CO.
1358 - 1360 Market St.
San Francisco.

CAMPBELL & PETTUS.

CONTRACTORS.

Office, Builders' Exchange, San Francisco.

MEMBERS OF THE BUILDERS' EXCHANGE.

CORNER NEW MONTGOMERY AND MISSION STREETS.

Box No.	Box No.
Adams, John G., contractor and builder..... 270	O'Connor, Thomas, mason and builder..... 47
Alameda Brick & Tile Co., brick..... 170	O'Sullivan, D., mason contractor..... 277
Arizona Sandstone Co., building stone..... 326	Pacific Bridge Co..... 40
Bass-Huter Paint Co., paints, oils and varnishes..... 336	Pacific Refining & Roofing Co..... 40
Bateman Bros., contractors and builders..... 238	Pacific Lumber Co..... 365
Beck, Adam, mason and builder..... 11	Pacific Manufacturing Co., Mill Work..... 192
Bell, Wm., contractor and builder..... 75	Pacific Rolling Mills..... 192
Bibb Lumber Co., lumber..... 241	Pachatz, Gus J., electrician, etc..... 84
Bellingham Bay Imp. Co., lumber..... 241	Palace Hardware Co., builders' hardware..... 292
Boyd, Robert, mason and builder..... 77	Paraffine Paint Co., roofers, building paper..... 144
Brady, M. V., mason and builder..... 290	Patent Brick Co., brick..... 172
Brady, O. E., mason and builder..... 290	Peacock & Butcher, masons and builders..... 172
Brennan, D. J., mason and builder..... 51	Petersen Brick Co., original red pressed brick..... 98
Brennan James, plasterers..... 199	Petersen, H. M. & Co., concrete..... 245
Britt, James E., plumber..... 296	Pfingst, F. L., hardware..... 78
Brode, R., iron works..... 296	Pluse, Henry, mason and builder..... 290
Burden, W., mason and builder..... 290	Pool, Jas. R., house mover and raiser..... 217
Burnham, Stanford Co., planing mill..... 146	Rae, James, stone contractor..... 175
Burt, W. J., house mover..... 296	Rainier Iron Works..... 175
Butler, Wm. A., mason and builder..... 296	Raymond Granite Co., contractors for stone work..... 165
California Art Glass Works..... 223	Reichley Geo., contractor and builder..... 109
California Electrical Works..... 223	Reigle & Jamieson, machine white washing..... 240
California Mills, planing mills..... 223	Reinhard Brick Co., pressed stock and common brick..... 278
Campbell, Alex L., contractor and builder..... 105	Richardson & Gale, masons and builders..... 228
Carey, J. E., brick manufacturer..... 133	Rieman, Geo., door opener..... 255
Carmichael and Masco..... 292	Riley John F., masons and builders..... 228
Cartwright, D. S., teaming..... 10	Ringrose, R., mason and builder..... 18
Central Lumber & Mill Co., lumber and planing mill..... 345	Robinson & Gillespie, contractors and builders..... 11
Chatham, Wm., contractor and builder..... 62	Rocklin Granite Co., granite work..... 69
Chemical Paint Co..... 317	Rosenbaum, Fr. H., glass..... 95
Chisholm, C., contractor and builder..... 47	Ruffino & Bianchi, marbles..... 249
Clark, N. & Sons, terra cotta, etc..... 290	Sacramento Transportation Co., patent and stock..... 332
Clawson, L. E. & Co., patent chimneys..... 66	S. F. Lime & Mortar Co., C. Bennett..... 246
Coghlan, Frank, plasterer..... 91	San Francisco Lumber Co..... 157
Collin & Gunn, lathers..... 24	San Francisco Novelty and Planing Works..... 291
Concannon, Wm., contractor and builder..... 24	San Francisco Planing Mill, Wm. Crocker..... 12
Conlin & Roberts, metal roofers..... 90	San Joaquin Brick Co., brick..... 288
Copplesters & Moeckel, grill work..... 7	San Jose Brick Co., brick..... 250
Cowell, H. & Co., lime, cement, fire brick, etc..... 389	Saunder, J. S. W., contractor and builder..... 5
Crichton, Peter, contractor and builder..... 12	Schroeder, Wm., art glass..... 63
Crocker, Wm., planing mill..... 12	Scott & Van Arsdale Lumber Co..... 193
Cronan, Wm., Eagle Sheet Metal Works..... 277	Sessions, M. P., carpenter..... 71
Currie Donald, contractor and builder..... 143	Smith, A. W., carpenter..... 374
Currie, Robert, contractor and builder..... 143	Smith & Young, building supplies..... 374
Cushing-Wetmore Co., concrete and artificial stone..... 218	Smith & Quilley, street contractors..... 374
Daniels, Gus V., painter and decorator..... 85	Snook, W. S. & Son, plumbers..... 372
Davies, E., plasterer..... 42	Soule Bros., carpenters..... 61
Davis, Geo. & Son, house movers..... 283	Steiger, A. Son, architectural terra cotta..... 134
Day, Thos. H., & Sons, contractors and builders..... 386	Stevens, R. M., patent chimneys..... 15
Degan, Patrick, stone contractor..... 139	Stockton Brick & Terra Cotta Co..... 297
Dillon, David, teamster and contractor..... 139	Stratton, Jno. S., house mover..... 362
Donovan, M. J., painter..... 384	Sullivan, J. P., painter and decorator..... 1
Dunbar, Wm., mason and builder..... 59	Sullivan, Tim, carpenter..... 88
Dunham, Carrigan & Hayden Co., hardware..... 4	Sullivan M. F., grading and teaming..... 148
Dunlop, Chas., plasterer..... 59	Sweeney, Daniel, carpenter..... 135
Dwyer, L. J., painter and decorator..... 197	Sweeney, G. C., plumber..... 258
Dyer Bros., Golden West Iron Works..... 64	Tacoma and Roche Harbor Lime Co..... 289
Elam, & Knowles, carpenters and builders..... 202	Tay, Geo. H. Co., plumbers supplies..... 94
Excelsior Mill Co..... 72	Tobin, J. R., plasterer..... 278
Feely, M. J., contractor and builder..... 88	Towle & Broadwell..... 296
Fennell, M. & Son, masons and builders..... 128	Trotter, John, contractor and builder..... 251
Field, Wm. J., contractor and builder..... 88	Tupper, O. M., lime..... 28
Field, Z. O..... 88	Tuttle, John, teamster, plasterers' supplies..... 79
Flanagan, L. G., lime and cement..... 88	Union Lumber Co., lumber..... 355
Foley, Michael, grading and teaming..... 254	Vermont Marble Co..... 254
	Vulcan Iron Works..... 312
	Warren, Henry F., painting and decorator..... 181
	Wagner, J. Ferd, mason and builder..... 387
	Walker, George H., carpenter..... 272
	Washington & Moen Mfg. Co..... 310
	Washington Street Planing Mill..... 48
	Watson, W. C., plasterer..... 171
	Western Granite & Marble Co..... 316
	Western Iron Works..... 145
	White Bros., carpenters..... 60
	Whittle, H., mason and builder..... 238
	Williams, F. A., contractor and builder..... 178
	Wilson, Bros. & Co., lumber..... 354
	Wilson, W. F., plumber..... 221
	Wilson, James A., mason and builder..... 221
	Wilkie, Andrew, planing mill..... 125
	Worrel, C. R., mason and builder..... 2
	West Coast Wire Works..... 273
	Western Expanded Metal & Fire Proofing Co..... 349
	Yates & Co., paints..... 349
	Yonge, S. T., grading and teaming..... 386

WESTERN IRON WORKS.

MANUFACTURERS OF

STEEL BUILDINGS AND WAREHOUSES.

Stairs, Elevator Enclosures, Roofs, Iron Fencing and Gates.

JAIL AND BANK WORK.

GAS HOLDERS, SHEET AND PLATE METAL WORK.

— FORGINGS. —

Telephone Main 737.

123-125 BEALE STREET, S. F.

TEL. DRUM 80

W. HEIDT

FORMERLY OF

ARCHITECTURAL SHEET METAL WORKS*Metal Tile and Slate Roofing. Patented Ventilated Skylights and Spanish Tile*

224-226 MISSION STREET, SAN FRANCISCO

JOBGING PROMPTLY ATTENDED TO

GEORGE GOODMAN,

PATENTEE AND MANUFACTURER OF

ARTIFICIAL STONE, IN ALL OF ITS BRANCHES.

(SCHILLINGER'S PATENT.)

SIDEWALK AND GARDEN WALK A SPECIALTY.

307 MONTGOMERY STREET,

NEVADA BLOCK, SAN FRANCISCO.

BUILDING NEWS.

Three-story hospital to be erected on east line of road leading to Reicher's house; o, Fred (inch Orphanage; a, Geo. A. Wright; c, Ingerson & Gor.; cost \$4475.

Pleasant and Fruitvale Ave. Carpenter; o, W. O. Balston; a, W. F. Smith; c, D. S. Brehaut; cost \$3425.

MILL VALLEY

Lot 28, Tamalpais Land Co. To build; o, J. Fred Schillingman; a, Edgar A. Mathews; c, Andrew S. Ruch; cost \$3455.

PALO ALTO

On grounds of the Leland Stanford, Jr. Stone work etc; o Mrs. Jane L. Stanford; a, Percy & Hamilton; c, Mc-Gilvray-Stone Co; signed, June 12; filed, July 14; cost \$70,380.

PROSSER, WASH.

J. B. Cape is having plans prepared for an hotel building.

POMONA

J. W. Pierce has plans ready for his new house, which will cost \$3500 to \$4000. It will be located at the old home place on Pasadena street, the old house having been moved to Gibbs street, south of Pasadena. Ferdinand Davis is the architect, and informs us that the house will have somewhat the appearance of Miss Becker's new house on West Holt.

PASADENA

Architect R. B. Young has prepared plans for the new St. Andrews church of Pasadena. The building will cover an area of 60x180 feet, with a seating capacity of 700. It will be of pressed brick with stone basement and slate or metal tile roof. The architecture is of the Romanesque style, and will be a picture of architectural beauty.

SAN JOSE

Seventh and San Salvador. Two frame cottages o, Mrs. Ida Stevens; a, W. Klinkert; c, C. H. Ames signed, July 4; filed, July 14; cost \$800.

SEATTLE, WASH.

The Hotel Denny is to be overhauled throughout the interior. Improvements will cost about \$25,000.

REDLANDS

Architect J. W. Forsythe is drawing plans for a \$3000 residence to be erected on Cajon street, near Kern by Dr. Jewett.

Architect O. H. Jones of Redlands is preparing plans for Carl Wells, for a two-story brick business building to be erected at that place. The same architect is also preparing plans for Mr. Rorer, for a cottage residence.

Albert Johnson is preparing plans for two residences to be built on Jefferson street between Orchard and Vermont avenues.

BUILDING NEWS.**RIVERSIDE**

S. L. Alderman is about to commence the erection of a residence in Hildaigo Place, to cost \$1800.

Plans have been drawn for the rebuilding of the Methodist church. The new edifice will cost about \$4000.

The lumber dealers report a brisk summer trade and the architects are in a good frame of mind.

LOS ANGELES

Architect A. L. Haley is preparing plans for Mrs. A. Burgine o a two-story eight-room residence to be built on West Twelfth street.

Architects Smith & Elder have prepared plans for John Haddock of a two-story eight-room frame residence to be built at Bassett near 21 Monte.

Architect Frank D. Hudson has prepared plans for Frank Douglass of a two-story eight-room residence to be built on Burlington Ave.

Architect Fernand Parmentier has prepared plans for Mr. B. Meyer, for a two-story eight-room residence to be erected corner of Eleventh and Union Ave. Estimated cost about \$2000.

Architects Howard & Train have prepared plans for Dr. Pomeroy for extensive alterations to the residence corner of Washington and Taborian streets. The improvements will cost several thousand dollars.

Architect O. P. Dennis has prepared plans for Fred S. Langdon for a cottage to be built on Pasadena avenue.

Architect August Wackerbarth has prepared plans for O. E. Roberts of a one and a half story frame residence to be erected at Hollywood.

Architects Eisen & Hune have prepared plans for F. J. Thomas; for a complete remodeling of his residence on Flower street.

Architect C. H. Brown has prepared plans for A. A. Hubbard for a two-story brick stable and carriage house with cement floors and shingle roof to be built on the corner of Ninth and Burlington ave.

Architects Morgan & Walls are preparing plans for John H. Jones, of a brick block on Spring and West Fifth street.

Plans are being prepared for Geo. D. Rowan, for an up-to-date brick building to be erected on west side of South Broadway.

Architects Eisen & Hune have prepared plans for the San Gabriel Power Company of a one-story brick building to be used as an auxiliary power house to their present station on Los Angeles street near Third.

Preparations are being made for the erection of a building at the junction of East First and San Pedro streets. The property is owned by the Wilson estate but has been leased to parties who are making the necessary arrangements.

50 YEARS' EXPERIENCE

PATENTS

TRADE MARKS
DESIGNS
COPYRIGHTS & C.

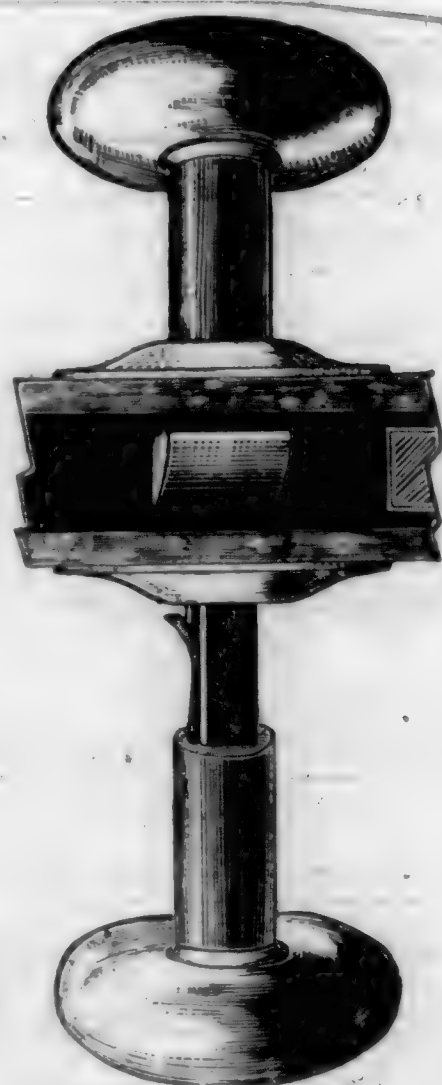
Anyone sending a sketch and description may quickly ascertain our opinion free whether an invention is probably patentable. Communications strictly confidential. Handbook on Patents sent free. Oldest agency for securing patents. Patents taken through Munn & Co. receive special notice, without charge, in the

Scientific American.

A handsomely illustrated weekly. Largest circulation of any scientific journal. Terms, \$5 a year; four months, \$1. Sold by all newsdealers.

MUNN & Co. 361 Broadway New York

Branch Office, 625 F St., Washington, D. C.

SPECIFY**Weatherwax Screwless****DOOR KNOB.**

July, 1898.]

THE CALIFORNIA ARCHITECT AND BUILDING NEWS.

xiii

Plans and Specifications Invited for an Hospital Building.

Public notice is hereby given to architects that competitive plans and specifications for the erection of an hospital building will be received by the Board of Supervisors on MONDAY AFTERNOON, September 12, 1898.

The proposed building to be of modern design and to be constructed of stone or brick, or of both, with all the latest scientific improvements.

The said hospital building to be erected on the lot of land commencing at the most southeasterly corner of a tract of land known as and designated, on the official map of the city and county of San Francisco, as the "Almshouse tract."

The said plans and specifications to be so prepared that the cost of the building shall not exceed in the aggregate the sum of three hundred thousand (\$300,000) dollars.

The architect whose plans are adopted will be appointed architect and superintendent of the building, and will be required to give a good and satisfactory bond to insure the completion and construction of the said building for the amount of the cost as made by the said architect. The architects submitting plans determined by the Board to be second, third and fourth in merit will receive premiums of \$1000, \$750 and \$500 respectively, with the understanding that any features of said plans and specifications which may be considered useful or necessary to be embodied in the plans adopted may be used without further cost of charge.

JNO. A. RUSSELL, Clerk.

THE Rapid Safety Filter

Is in use in San Francisco in all the leading Hotels, Schools, Stores, Saloons, Restaurants and THOUSANDS of Private Residences, including those of the leading PHYSICIANS, who endorse and recommend its general use.

No charge for fitting. Kept in order and cleaned by the Company. Leased only. Terms \$1.50 per month for private residences. Office and Show Room,

1209 MARKET ST., near Eight.

RUBEN H. LLOYD,
President.W. D. MANSFIELD,
Secretary.**P. H. JACKSON & CO**

Contractors for

Wrought Iron Building Work**Sidewalk Lights, Floor Lights****Fire and Burglar-Proof Arched and Flat Sky Lights****Patent Water-Proof Sidewalk Doors****Basement Ventilators, Etc.**

228 and 230 First Street, 7 and 9 Tehama Street

SAN FRANCISCO.

WM. BATEMAN,

MANUFACTURER OF

Wood Mantels, Interior Finish, Inlaid Floors,

Banks, Offices, Stores and Steamboats Fitted Up

411 MISSION ST., Bet. 1st and Fremont,

SAN FRANCISCO, CAL.

**Cabot's Creosote
Shingle Stains.**

The Original and Standard Shingle Stains, and the only Creosote Stains.

**Cabot's Insulating
and Deafening 'Quilt'**

A soft, elastic cushion of dead air spaces. The perfect sound deadener.

House of A. W. Pooley, Millwood, Cal.,
H. A. Klyce, Architect, Eastland.

Mortar Colors and Brick Preservative.

For mortar staining and waterproofing brickwork.

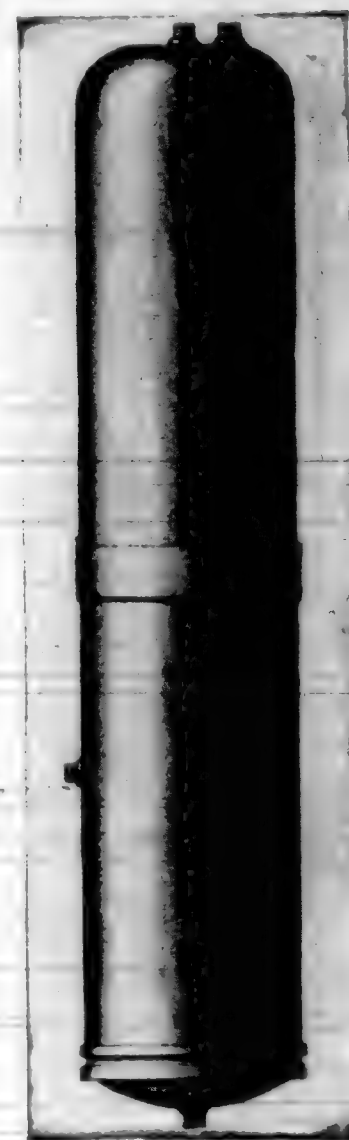
Samuel Cabot, Sole Manufacturer, Boston, Mass.

Stock carried in San Francisco by

CHAS. J. WATERHOUSE, 421 Market Street.

Stock carried in Los Angeles by

P. H. MATHEWS, 238 South Main Street.



For Sanitary Reasons

You Should Specify the
Brown Brothers' Cold Drawn Seamless Copper House
Range Boiler.

The smooth copper surface is heavily tinned inside. This absolutely insures against corrosion or rusting of any kind and affords no rusting place for sediment. You always get

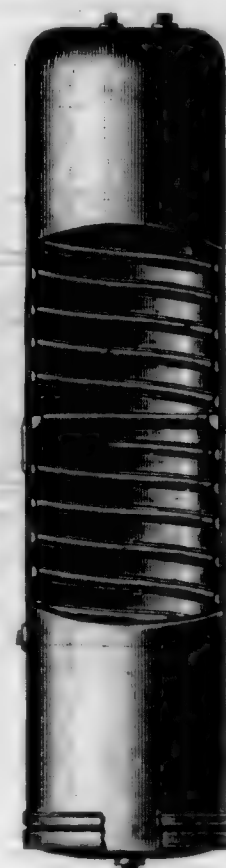
Clean Hot Water

own Boilers are made of two pieces of cold drawn copper, united under great hydraulic pressure, so that they are practically one piece. No seams nor rivets, means freedom from leaks. The inside spiral rib guarantees against collapse. Ordinary weight boilers stand a pressure of 150 lbs. to the square inch; extra heavy, 200 lbs.

Boiler Booklets sent on request.

RANDOLPH & CLOWES, Sole Manufacturers

BOX 47. WATERBURY, CONN.



Candelabra and Decorative Incandescent Lamps and Receptacles.

Adapted for decorative illumination of interiors of fine residences and hotels; and extensively used for that purpose (Catalogue No. 9044).

X-RAY TUBES FLUOROSCOPES Catalogue No. 9050
EDISON Decorative and Miniature Lamp Dept.

(GENERAL ELECTRIC CO.)
 HARRISON, N. J.

Scott & Van Arsdale Lumber Co.

MATT HARRIS, Manager.

Wholesale and Retail Dealers in

SUGAR AND YELLOW PINE.

Yellow Pine selected for Natural Finish

Redwood, White Cedar, Oregon Pine, Spruce Shelving, Curly Redwood, Burl, Shingles.
 Mills at Upton, McCloud River TELMO & MAXWELL, Siskiyou Co.

Office and Yards:
CORNER FIFTH AND BRANNAN STREETS
R. W. Cargoes Furnished San Francisco
 TELEPHONE SOUTH 173

PLASTER OF PARIS.

Golden Gate Plaster Mills,

215 and 217 Main Street,
 Bet Howard and Folsom, SAN FRANCISCO.

LUCAS & COMPANY,
 Manufacturers of
 Calcined Plaster.
 (PLASTER OF PARIS.)
 Marble Dust, Land Plaster and Terra Alba.

THE NATIONAL BUILDER.

Each number contains a complete set of
 architects plans for a low priced building.
 Published at Chicago, Ill.
 Main Office, Adams Express Building,
 185 Dearborn street.
 It maintains its standard as a high class practical
 Builders' Journal.

W. D. HOBRO, Plumber and Gas Fitter,

728-730 Washington Street,
 Opposite the Plaza, SAN FRANCISCO.
 Work done at Reasonable Rates. All orders
 promptly attended to. Res. 2613 Clay St.
 bet. Steiner and Pierce

W. J. Cuthbertson,
Architect.
 Flood Building, Room 93.
 Cor. Market and Fourth Sts.,
 SAN FRANCISCO.

Wm. Mooser & Son
Architects
 Rooms 62 and 63, No. 14 Grant Avenue
 SAN FRANCISCO.

W. Curlett
Architect
 Offices, 307 Phelan Building, Market Street,
 SAN FRANCISCO.

Pissis & Moore,
Architects,
 307 Sansome Street, Rooms 16 and 17,
 SAN FRANCISCO.

R. H. White,
Architect,
 104 Flood Building, Market and Fourth Sts.,
 SAN FRANCISCO.

B. McDougall & Son,
Architects,
 330 Pine Street, Rooms 61 and 62,
 SAN FRANCISCO.
 Take the Elevator.

Seth Babson,
Architect,
 408 California Street, Rooms 12, 13,
 SAN FRANCISCO.

John Cotter Pelton,
Architect,
 Telephone Building, Bush St., Room 52,
 SAN FRANCISCO.

John M. Curtis & Co.,
Architects,
 126 Kearny Street, between Post and Sutter,
 SAN FRANCISCO.

Oliver Everett,
 SUCCESSOR TO HUERNE & EVERETT,
Architects,
 126 Kearny Street, Room 41,
 SAN FRANCISCO, CAL.

Stone & Cahill,
Architects.
 Room 89, Donohue Building, corner Market
 and Taylor Streets, San Francisco.
 Branch Office, 507 Central Bank Building,
 Oakland Cal.

Havens & Toepke,
Architects,
 FLOOD BUILDING, Room 55.
 San Francisco. Tel. Main 5420.

Wm. H. Armitage,
Architect,
 319-321 Phelan Building, Market Street,
 SAN FRANCISCO.

M. J. Welsh,
Architect,
 Office, 1504 Market St., Cor. of 15th. Rooms 7-8,
 SAN FRANCISCO.
 Residence, 906 Treat Avenue.

Harold D. Mitchell,
Architect,
 136 KEARNY STREET.
 Plans and Specifications prepared with the great-
 est Accuracy.

Edmund Kollofrath,
Architect,
 Gutzkow Bldg., 933 Market St. Tel. Jessie 461.
 SAN FRANCISCO.

Emile Depierre,
Architect,
 334 KEARNY STREET,
 SAN FRANCISCO.

T. J. Welsh,
Architect,
 Room 95, Flood Building, Corner Market and
 Fourth Streets.

Chas. J. I. Devlin,
Architect,
 Supreme Court Building,
 N. W. Cor. McAllister & Larkin Streets,
 SAN FRANCISCO.

Fred. B. Wood,
Architect.
 214 PINE STREET, Room 57.
 San Francisco.

Jas. E. Wolfe,
Architect.
 FLOOD BUILDING Room 31.
 San Francisco, Cal. Take Elevator.

H. Geiffuss,
Architect.
 120-122 Fulton St., bet. Polk and Van Ness Ave's,
 SAN FRANCISCO.

John T. Kidd,
Architect,
 Furnishes Plans, Specifications, Superintendence
 for the construction of every description of build-
 ing. 410 Kearny St. Office Hours, 12 to 5, 8 to 4.

A. C. Lutgens,
Architect,
 Phelan Building, Room 325.
 SAN FRANCISCO.

Chas. S. Tilton,
Engineer and Surveyor,
 430 Montgomery St. Take the Elevator.
 SAN FRANCISCO.

EMIL GUNZBURGER,
 SECRETARY
 BUILDING and
 LOAN ASSOCIATIONS
 214 PINE STREET, ROOM 3.

Loans on Real Estate
 EASY TERMS
 Information Willingly Furnished.

FACTS ABOUT PAINTS.

PHOENIX

The best paint is made of White Lead, Zinc and Linseed Oil.

PHOENIX PURE PAINT is made of these materials only.

To make perfect paint these materials must be finely ground and thoroughly mixed with heavy machinery.

PURE

PHOENIX PURE PAINT is made in that way.

During the past five years PHOENIX PURE PAINT has been the one most generally specified by Architects on the Pacific Coast.

PAINT

It is guaranteed absolutely pure and satisfactory on the building or we will replace it with any material the architect may select.

The New Wall finish or Washable Water Color.

Petrifies on the wall and will not crack or chip off.

Damp Walls do not affect it.

DURESCO

Can be washed any number of times and will not change color.

It strengthens the wall and prevents crumbling.

The strongest, most brilliant and most durable Wall finish made.

MANUFACTURED BY

W. P. FULLER & CO.

L. E. CLAWSON & CO.

1340 MARKET STREET, SAN FRANCISCO.
TELEPHONE SOUTH 257

**CLAWSON'S PATENT HOOD OR
THROAT AND ARCH-BAR COMBINED.**

The arch-bar forms a bond for arch in brick work. The hood being bolted on the arch-bar, forms a bond from brick work to mantel.
The throat is one solid piece, having lugs admitting three (3) inches adjustment, to suit depth of mantel.

This hood makes the bricklayer conform with mantel man's work, and guarantees you a safe chimney with a perfect draught.

Clawson's Patent Hoods, Thimbles and Chimneys, comply with the new Fire Ordinance.

CLAWSON'S PATENT CHIMNEY.

See **CLAWSON'S LIVE
VENTILATOR.** It is as
much better than a
dead one, as a live
man is of a dead man.

Price, \$2.50 for any size
from 18 to 26 inches.

Send for illustrated circular.

CLAWSON'S PATENT THIMBLE.

IF YOU SPECIFY

SEND
FOR
SAMPLES

SAMSON SPOT CORD.

You can tell at a glance that no other cord is substituted. Warranted free from waste and imperfections of braid.

SAMSON CORDAGE WORKS,
BOSTON, MASS. Trade Mark.



THE CALIFORNIA ARCHITECT AND BUILDING NEWS

\$3.00 PER YEAR

VOLUME XIX. No. 8.

AUGUST, 1898.

CONTENTS:

Index to Advertisers	vi
The Action of Sea-Water Upon Hydraulic Cements	86
On the Saline Efflorescence of Bricks	87
The Use of Sheet Iron and Steel	88
Tests of Cast Iron Columns	89
Lesson From Fire and Panic	90
Illustrations	90
Painting Ironwork	91
Valuable Information Culled From our Exchanges	91
The Protection of Iron from Rust	92
Experiments on the Behavior of Cast-Iron Columns in Fire	93
Notice of Meetings	94
The Keely Motor Up-To-Date	94, 95

PRICE THIRTY CENTS

DJ. Patterson '98

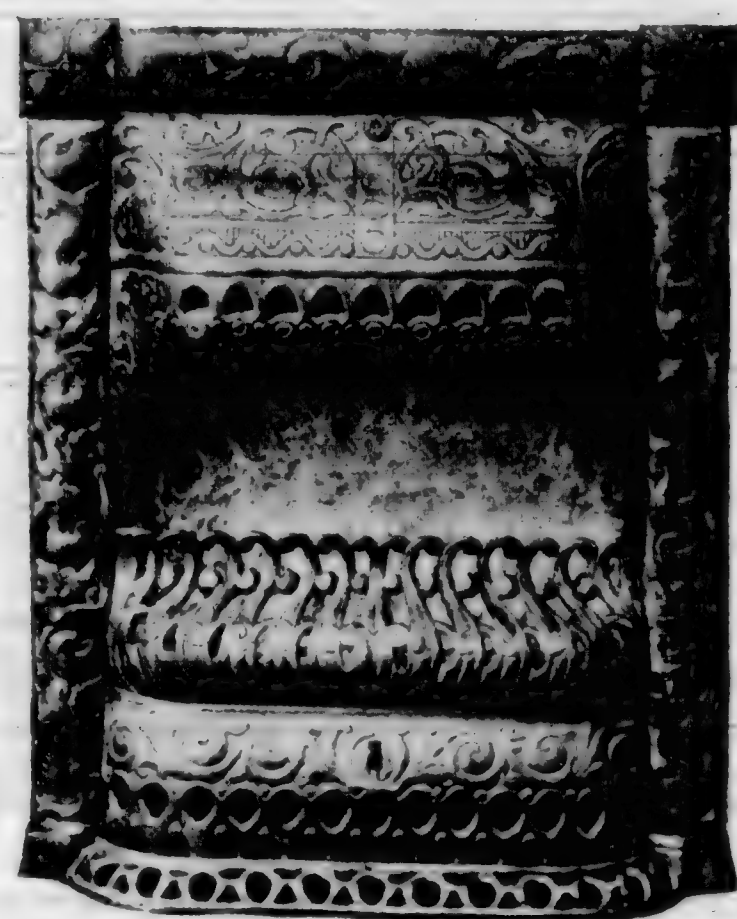
OFFICE 408 CALIFORNIA ST

For a modern house, get modern things!!

Be up to date.

Consider, in building, the innumerable advantages and economy of gas grates.

PERFECTION
Gas Grates.



Always ready.

Always clean.

Gets to work instantly.

Expense stopped when heat is not needed. This is not so with coal.

Examine the various designs of Grates and Heaters of the
SAN FRANCISCO GAS & ELECTRIC LIGHT COMPANY.

STOVE DEPARTMENT

415 POST STREET, SAN FRANCISCO.

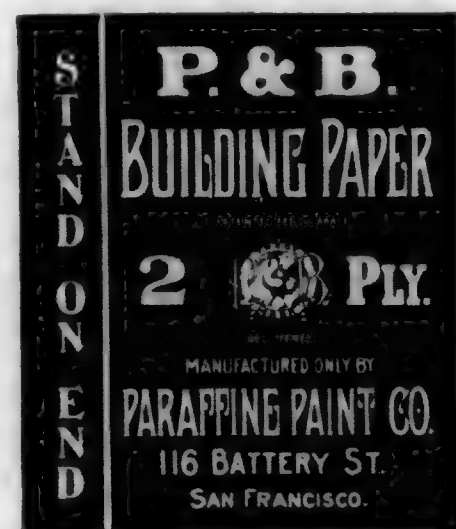
A modern home for a modern man, planned by an up-to-date Architect is always sheathed with

P & B
BUILDING
Paper

PARAFFINE PAINT CO., Sole Manufacturers,

The only Water-proof and Vermin-proof paper on the market that is odorless.

Do you Specify it?



116 BATTERY STREET
SAN FRANCISCO.

A Tin Specification

To be drawn correctly should call for a **Guaranteed** brand of Roofing and one that is **known** to the architect. It should also stipulate that each sheet must be stamped with the brand, the thickness 1C or 1X, and the maker's name.

The Taylor "OLD STYLE" Brand

Is made exactly the same as roofing Tin was first made in Philadelphia in 1830. No other Roofing Tin is made like it or of the same materials.
EACH SHEET IS STAMPED AND GUARANTEED

N. & G. TAYLOR CO., Sole Manufacturers, Philadelphia.

For Sale by **CHARLES J WATERHOUSE**, 421 Market Street, San Francisco.

To our Customers and Friends on the Pacific Coast.

Through frequent complaints made to us, we have learned that unprincipled and dishonest dealers on the Pacific Coast have counterfeited our trademark numbers and substituted inferior, spurious goods as ours, when ours were distinctly ordered, thus defrauding their customers and injuring our trade and reputation.

Our goods are acknowledged to be the best, and are fully warranted by us, and are marked with our name or initials or with our well-known trademark and catalogue numbers.

We request direct notice if any goods alleged to come from us, or bearing our trademark or numbers, prove to be other than the best, and perfect in every respect, as we will follow up and expose such frauds for our customers' and our own protection. We have no exclusive agents on the Coast, but our goods are obtainable from all respectable dealers in drawing materials, stationery, hardware, artists' material, etc.

RESPECTFULLY,

KEUFFEL & ESSER CO.,
New York.



D. H. GULICK

CHAS. WETHERBEE

A. ZELLERBACH & SONS.

GULICK & WETHERBEE
Plumbing and Gas Fitting

ESTIMATES GIVEN ON ALL WORK

210 Mason Street

YOUNG MEN'S CHRISTIAN
ASSOCIATION BUILDING

San Francisco

TELEPHONE BUSH 16

IMPORTERS
AND
DEALERS
IN
PAPER
OF ALL KINDS

419-421 CLAY STREET,

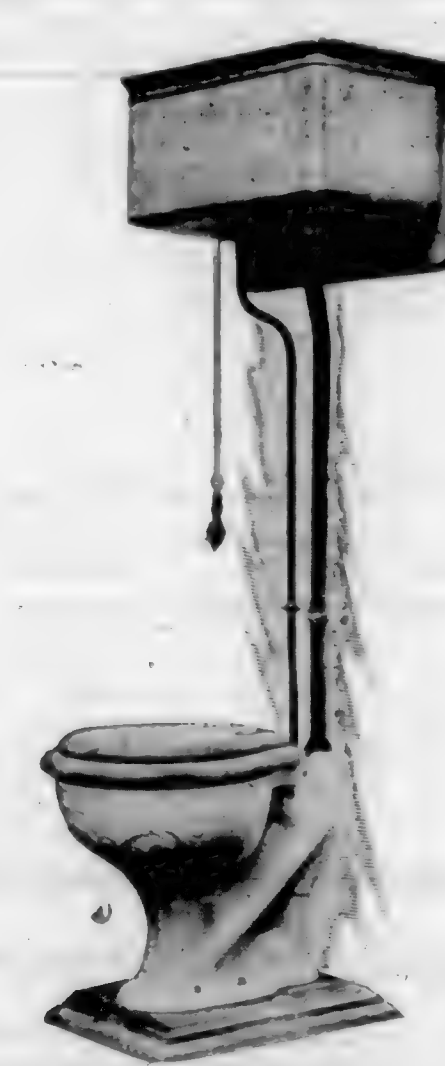
Bet. Sansome and Battery, San Francisco.

TELEPHONE 1133

THE JOHN DOUGLAS COMPANY
CINCINNATI, PHILADELPHIA, ST. LOUIS, CHICAGO, SAN FRANCISCO.



CELSIS
List Price, \$33.00



JUNO
List Price, \$31.75



ELLWOOD
List Price, \$28.50

Three Syphon Jet combinations, with seat attached to bowl; woodwork made of selected cherry quartered oak, and walnut. Polish finish.

For our other combinations, see '98 Catalogue or visit our showroom.

Ask for Catalogue. Correspondence solicited.

EDWARD DOUGLAS, Manager

THE JOHN DOUGLAS COMPANY,
208 ELLIS STREET, S.F.

D. E. GARRISON, Jr., President. S. W. BACKUS, Secretary. C. F. RUNYON, Vice-President.
N. L. BELL, Manager.

WESTERN EXPANDED METAL AND FIRE PROOFING CO.

MAUFACTURERS OF AND CONTRACTORS FOR

Expanded Metal System of Fire Proof Construction.

Fire proof arches, solid partitions and attaching metal lath to ceilings, walls, columns, beams, etc.

LATH ALWAYS IN STOCK.

OFFICE: Rooms 414-15-16 CLAUS SPRECKELS BUILDING.

TELEPHONE Main 5829

FACTORY: Corner Townsend and Clarence Streets, San Francisco.

BUILDING NEWS.

Bay near Lavenworth. To build; o. Neil O'Neill; a. A. W. Smith; c. M. Macgregor; signed, Aug. 8; filed, Aug. 11; cost \$2170.

Broadway near Sansome. Alterations and additions, etc.; o. Board of Education; a. T. J. Welsh; c. W. M. Fletcher; cost \$2230.

California near Walnut. To build; o. E. O. Williams; a. Martens & Coffey; c. R. Trost; signed, Aug. 15; filed, Aug. 17; cost \$2331.

Caselli Ave. near Falcon Ave. Cottage; o. P. Portwig; a. W. H. Armitage; c. D. Ross; signed and filed, Aug. 15; cost \$1910.

Clayton near Waller. Three flats; a. C. A. Meussdorffer; c. A. H. Wilhelm; signed, Aug. 13; filed, Aug. 15; cost \$4000.

Clayton near Hayes. All work except excavations, etc.; o. Mrs. William McCormick; a. T. J. Welsh; c. Wm. Plant; signed, July 30; filed, Aug. 1; cost \$2332.

Edley near Van Ness. Grading, brick work, etc.; o. P. F. Butler; a. W. H. Little; c. John Furness; signed, Aug. 3; filed, Aug. 11; cost \$15,283. Sewers, plumbing, etc.; o. Ford Bros.; signed, Aug. 3; filed, Aug. 11; cost \$1880. Painting, etc.; o. G. A. Peterson; signed, Aug. 3; filed, Aug. 11; cost \$1435.

Ellis near Jones. Brick and terra-cotta work; o. L. H. Sly; c. H. H. Larsen; signed, Aug. 15; filed, Aug. 16; cost \$6285.

Fourteenth near Guerrero. Alterations and additions; o. Mary I. Keating; a. M. J. Welsh; c. T. F. Foley and H. A. Planz; signed, June 22; filed, July 20; cost \$1488.

Fremont near Howard. Brick work, etc.; o. Jane F. and C. M. Belshaw; c. J. W. Wisinger; sub-e, J. A. Wilson; cost \$735.

Franklin and Ellis. Excavating, etc.; o. D. Juttin; a. C. A. Meussdorffer; c. R. Steplin; signed, Aug. 8; filed, Aug. 8; cost \$1638. Carpentry work, etc.; o. A. Olson; cost \$1765. Plumbing, etc.; o. G. C. Sweeney; cost \$840. Painting, etc.; o. J. F. Sullivan; cost \$615.

Geary near Mason. Alterations and additions; o. Mrs. M. V. Baldwin; a. W. H. Little; c. M. J. Savage; signed, July 27; filed, July 30; cost \$5230.

Golden Gate Ave. near Laguna. Excavation, etc.; o. Judah Bous; a. M. J. Lyon; c. W. J. Field; signed, Aug. 2; filed, Aug. 13; cost \$384.

Golden Gate Ave. near Hyde. Alterations and additions; o. Mrs. Isabella Boyde; c. Anderson Bros.; signed, July 13; filed, July 13; cost \$1017.

Guerrero near 24th. Carpentry, brick work, etc.; o. Dominican Sisters; a. Shea & Shea; c. Robert Trost; signed, Aug. 8; filed, Aug. 9; cost \$2325.

Green near Fillmore. All work except plumbing, etc.; o. Amelia M. Burnett; a. W. Mosser & Son; c. Peterson & Person; signed, July 27; filed, July 1; cost \$3300.

Herzog Tract, lot 5, block 12. Two-story frame; o. William Stroheck; c. August Schoor; signed, Aug. 12; filed, Aug. 15; cost \$1535.

Hoffman Ave. near Elizabeth. To build; o. Jacob Heyman; c. Jacob Heyman; cost \$2250.

Isabella near San Pablo Ave. Two-story frame; o. Lee E. Andrews; c. Robert McBeth; signed, Aug. 9; filed, Aug. 10; cost \$1650.

Laguna near Washington. Cabinet work, etc.; o. Dr. A. Barkan; a. Pissis & Moore; c. Fink & Schindler; signed, Aug. 8; filed, Aug. 15; cost \$8370.

Linden Ave. near Gough. Two-story tenement house; o. Arthur Kanzer; a. B. C. Clinch; c. T. R. Bassett; signed, July 30; filed, Aug. 1; cost \$1432.

BUILDING NEWS.

Lombard and Lyon. All work except painting; o. Agness Herman; a. E. A. Garin; c. Cameron & McDonald; signed, Aug. 4; filed, Aug. 4; cost \$2888.

Lombard and Baker. To build; o. P. J. McGaffigan; c. John Keneally; signed, July 27; filed, July 28; cost \$1007.

Market and Hayes. Alterations and additions; o. Bartlett and C. F. De-administrators; c. Robert son & Gillespie; sub-e, L. J. Campmeccost; signed, June 12; filed, July 21; cost \$1800.

Market and Spear. Work for elevators; o. W. W. Young; a. Kenitzer & Barth; c. S. F. Novelty Works; signed, Aug. 10; filed, Aug. 12; cost \$1650. Electric elevator; c. Fraser Electric Works; signed, Aug. 10; filed, Aug. 12; cost \$4200.

Mission and 14th. Carpentry, iron work, etc.; o. Southern Pacific Co.; a. H. A. Schulze; c. Z. O. Field; signed, July 20; filed, July 26; cost \$13,730. Excavation, etc.; c. Quimby & Harrelson; cost \$495. Brick work, etc.; c. O'Sullivan & O'Connor; cost \$7500. Cast and wrought iron, etc.; c. H. Baisdon; cost \$1378. Plastering, etc.; c. Jesse B. Sierce; cost \$3172. Plumbing, etc.; c. W. F. Wilson; cost \$6008. Tinning, etc.; c. S. F. Cornice Co.; cost \$1450.

Natoma and Russ. All work except plumbing, etc.; o. Teresa Murphy; a. M. J. Welsh; c. Allen McDonald; signed, Aug. 4; filed, Aug. 4; cost \$1490.

Pacific Ave. near Webster. Excavation and brick work; o. Jonas Schoenfeld; a. Salfeld & Kohlberg; c. Miller & Beck; cost \$1200.

Plymouth Ave. and Broad St. To build; o. Herman Kiepen; c. Earl F. Crane; signed, Aug. 15; filed, Aug. 15; cost \$1925.

Post near Laguna. All work except plumbing, etc.; o. Leopold Auerbach; a. J. E. Wolfe; cost \$425.

Powell and Vandewater. Two-story frame; o. W. M. Nichols; a. M. J. Welsh; c. K. C. Gardner; signed, Aug. 10; filed, Aug. 12; cost \$445.

Second and Mission. Illuminating tiles and iron work for six-story brick; o. Wells, Fargo & Co.; c. P. H. Jackson & Co.; signed, July 28; filed, Aug. 2; cost \$2887.

Silver near Third. To build; o. Mrs. Emille Ursin; a. C. M. Rousseau; c. W. R. Kenny; signed, July 22; filed, July 26; cost \$3135.

Stanyan and Beulah. Three-story frame; o. Antonio Versalovich; c. R. J. Pavet; signed, Aug. 13; filed, Aug. 15; cost \$1575.

Sixth near Shipley. Alterations and additions; o. Gustave Harshall; a. Shea & Shea; signed, July 30; filed, Aug. 4; cost \$474.50.

Seventh near Howard. All work except plumbing; o. Adolph Cohn; a. P. Schwerdt; c. Bernard Dryer; signed, Aug. 15; filed, Aug. 16; cost \$2700.

Texas near 19th. To build; o. James Gallagher; sup. James Clacken; c. John Keneally; signed, Aug. 9; filed, Aug. 12; cost \$1147.

Twenty-first and Chattanooga. To build; o. Patrick Bannan; c. William Heibing; signed, July 20; filed, July 22; cost \$5500.

Twenty-fourth near San Bruno Ave. To build; a. T. J. Welsh; c. Donovan & Son; signed, Aug. 10; filed, Aug. 12; cost \$275.

Van Ness Ave. and Clay. To build; o. St. Luke's Church; a. Albert Sutton; c. Walker Brother Co.; signed, Aug. 13; filed, 15; cost \$32500.

Washington near Spruce. Excavating, etc.; o. H. Huddleston; a. Percy & Hamilton; c. Richardson & Gale; signed, Aug. 4; filed, Aug. 6; cost \$3900. Carpentry, etc.; c. Chris Christolm; cost \$15,000. Plumbing, etc.; c. W. F. Wilson; cost \$1750.

BUILDING NEWS.

Webster near Filbert. To build; o. Mrs. Agnes M. Goedje; c. W. F. Lloyd; cost \$2050.

OAKLAND

Eight and Madison. To build; o. Mary Eifen; a. Alexander Thomson; c. A. Thomson & Co.; cost \$4414.

Fourteenth and Kirkham. Cottage; o. Ed Swain; a. A. W. Smith; c. D. McLeod; cost \$1240.

Thirteenth near Washington. To build; o. Abramson Bros.; a. Chas. Mau; c. J. C. Caldwell; cost \$3885.

Forty-first and Adeline. To build; o. L. D. Fell; a. W. A. Graves; c. Geo. C. Nall; cost \$1095.

Grove and 1st street. Brick work, etc. for school; o. Roman Catholic Archbishop of San Francisco; c. E. A. Garin; c. Cameron & McDonald; cost \$7940.

EAST OAKLAND

Fifteenth near 18th. To build; o. D. C. Talbot; a. D. F. Oliver; c. Jacob House; cost \$1220.

CLAREMONT

Architect C. H. Brown is preparing plans for the Pearson Hall of Science, a new building to be erected at Claremont, Cal., at a cost of \$25,000. It is an imposing design of two stories high and basement, 60x90 feet, built of brick, faced with cream colored pressed brick and terra-cotta.

MILL VALLEY

Mount Tamalpais. One and one-half story frame; o. Mill Valley and Mount Tamalpais Scenic Railway; a. Percy & Hamilton; c. B. F. Ellis; cost \$1765.

BERKELEY

L. 16, block 8, Antisell's Map of Villa Lots. To build; o. P. P. Robertson; a. Cunningham Bros.; c. J. C. Caldwell; cost \$2900.

BAKERSFIELD

W. H. Scribner has let the contract for a three-story brick building designed for a theatre to be built on Chester avenue.

REDLANDS

Architect J. W. Forsythe has prepared plans for J. H. Fisher for a three-story brick to be on the corner of Orange street; total cost about \$14,000.

DUTCH FLAT

A public school building at Dutch Flat will be built soon; bids close on September 3d; P. F. Martin, architect, cost \$4500.

LOS ANGELES

A. S. Rendall will erect this fall a brick building on the lot at the corner of Los Angeles and Boyd Sts. Architect G. F. Costerline is preparing plans for the trustees of San Fernando school district for an addition of two rooms to their school building. Plans will be ready for bids about Aug. 1st.

Architects Eisen & Hunt have been instructed by the board of supervisors to prepare plans for a one-story brick building to be used as an insane ward on the county hospital grounds on Mission Road and the probable cost will be about \$2500.

Architects Locke and Munsell have prepared plans for Hugh Ehipps of a two-story frame residence to be built on Maryland street.

Architect Chas. L. Strange is preparing plans for a two-story frame and stone residence to be built on W. Adams street. He is also preparing plans for four two-story residences to be erected at Riverside.

Architect John Parkinson has prepared plans and

Continued on page xii.

The Yale & Towne Mfg. Co.

LOCAL OFFICE:

Mills Building, San Francisco.

The "Yale" Locks with new Paracentric Key, afford the highest standard of security. They are made in hundreds of styles and sizes, adapted to almost every possible use.



The Builders' Hardware, made by this Company, and used in connection with the "Yale," "Vulcan" and "Branford" lines of locks, forms collectively the largest assortment in the trade and covers respectively, as used with these locks, fine, medium and cheap goods.



The Art Metal Work (or Hardware of Ornament) as illustrated and listed in the No. 16 Catalogue, includes the largest collection of Ornamentations and patterns of this class in the world; not only those usually required but also a vast variety of special pieces. In all Yale Art Metal Work an intelligent interpretation of design may always be found.



As to Prices. While the goods made by this Company are always "the best for the money," the range of products and grades is such as to meet conditions where cost is a FIRST requisite, as well as where the greatest perfection of design and finish is alone considered.

GENERAL OFFICES:

Nos. 9, 11 and 13 Murray Street, New York City.

GENERAL INDEX OF ADVERTISEMENTS.

CLASSIFIED INDEX.	CLASSIFIED INDEX.	CLASSIFIED INDEX.
Architects.	xv Iron Hangers	Sash Locks.
Artificial Stone.	Van Dorn, Chas. J. Waterhouse, Agent.	Ives, H. B. & Co.
Goodman, Geo.	xii Iron Works	Sewer Pipes.
Boilers.	Western Iron Works.	Gladding, McBean & Co.
Randolph & Clowes.	xiv Iron Cornices.	Sewer Traps.
Building Supplies.	Crown, Wm.	Dallimore, G. C.
Smith & Young.	Wm. Heidt.	Sash Lines.
C. J. Waterhouse.	ix Incandescent Lamps	Samson Cordage Works.
Building and Loan Assn.	General Electric Co.	Shingle Stains.
Ginsburgh, Emil.	Lumber.	(Cabots)—C. J. Waterhouse—Agent.
Brick Preservative.	Scott and Van Arsdale.	Pacific Refining and Roofing Co.
Cabot's.	xv Sierra Lumber Co.	Sidewalk Lights.
Cement Trays.	Mantles Tiles, Etc.	P. H. Jackson & Co.
Bradley, Bros.	Montague & Co., W. W.	Sliding Door Hanger.
Chimneys Patent.	Bachman.	Dunham, Carrigan & Hayden.
Chawson.	xiii Metal Lath.	Stowell.
Door Opener.	Western Expanded Metal Lath and Fire	Stone.
G. Rischmuller.	Proofing Co.	Raymond Granite Co.
Engineers.	xii Mortar Color.	Terra Cotta.
Tilton, Chas. S.	Cabot's Mortar Color.	Gladding, McBean & Co.
Filters.	Paint.	Tin Roofing.
Rapid Safety Filter Co.	L. R. Butler and Co.	N. & G. Taylor Co.
Furniture and Upholstery.	G. Orsi.	University.
Bachman, W.	Joseph Dixon Crucible Co.	Harvard.
Hardware.	Paraffine Paint Co.	Ventilators.
Stale & Towne Lock Co.	Fuller & Co., W. P., & Co.	N. & G. Taylor Co.
Heating and Ventilating.	x Paper.	Water Closets.
W. Morgan & Co.	Zellerbach & Sons.	John Douglas Company.
	P. and B. Building Paper.	Window Cord.
	Cabot's Sheathing and Lendering Quilt.	Samson Cordage Works.
	Plaster.	Wood Preservative.
	Luens & Co.	Cabot's.
	Plumbers and Gasfitters.	Pacific Refining & Roofing Co.
	Hobbs, W. D.	
	Gulich & Wetherbee.	

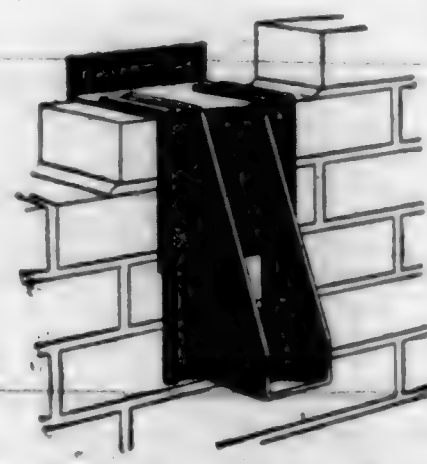


No. 1—Steel joist hanger for wooden header

VAN DORN'S
Steel Joist Hanger
CHAS. J. WATERHOUSE, Agent

421 MARKET STREET, S. F.

PHONE BLACK 1807.



No. 4—Steel joist hanger for brick walls.

Sierra Lumber Company

Manufacturers of and Dealers in

Doors, Windows, Blinds, Sugar Pine.

Yellow Pine, Spruce and Fir Lumber.

Corner Fourth and Channel Streets, San Francisco.

HARVARD UNIVERSITY.

Lawrence Scientific School

OFFERS COURSES IN

Civil Engineering
Mechanical Engineering
Electrical Engineering
Mining and Metallurgy
Architecture
Anatomy and Physiology (as a preparation for Medical Schools).

Chemistry.
Geology.
Biology.
General Science.
Science for Teachers.
Preparation for Medical Schools.

For Descriptive Pamphlet apply to

M. CHAMBERLAIN, Secretary.

N. S. SHALER, Dean. Cambridge, Mass.

DIXON'S SILICA GRAPHITE PAINT

FOR TIN OR SHINGLE ROOFS AND IRON WORK. Tin roofs well painted have not required repainting for 10 to 15 years. IT IS ABSOLUTELY WITHOUT AN EQUAL.

If you need any paint it will pay you to send for circular.

JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J.

TELEPHONE SOUTH 224.
EAGLE SHEET METAL WORKS

WM. CRONAN

Manufacturer of Plain and Ornamental

Copper and Galvanized Iron Cornices

Tin, Iron, Slate Roofing, Galvanized Iron Sky-lights and Cast-Zinc Work.

Steam, Hot Water and Warm Air Heating.

Power Fans for Heating and Ventilating Work.

ROOFS REPAIRED AND PAINTED GENERAL JOBBING ATTENDED TO
Nos. 1213 1215 Market Street, Near Eighth
SAN FRANCISCO, CAL.



A SYSTEM OF
**WARMING AND
VENTILATING**



A SYSTEM OF
**VENTILATED FLUSHING
WATER CLOSET
AND URINAL RANGES**

FOR PUBLIC BUILDINGS.

IMPORTANT

— TO —

ARCHITECTS

W. MORGAN & CO. HEATING, VENTILATING AND SANITARY ENGINEERS. 108 First St., S. F. Cal.

W. W. MONTAGUE & CO
MANTELS

GRATES

TILES.

Fire Place Trimmings

Artistic Brass Bronze
Steel and Iron

WARM AIR
HOT WATER
and STEAM

Heating Apparatus

For Warming Dwellings,
Halls, Churches, School-
Houses, and Public Build-
ings.

Wrought, Steel Ranges and French Ranges

For Hotels, Restaurants, Clubs and Boarding Houses

COMPLETE KITCHEN OUTFITS

MANUFACTURERS OF

Corrugated Iron Roofing and Riveted Sheet Iron Water Pipe

SAN FRANCISCO

LOS ANGELES

SAN JOSE

Subscribe for The California Architect.

SANITARY

The only Water Color for Plastered Exteriors and Light Wells.

539 Mission Street, S. F.

Successor to BRADLEY BROS.

17 Montgomery Avenue
INTERIOR DECORATOR
IMPORTER OF AND DEALER IN

**Paints,
Oils,
Varnish,
Paper Hangings, Etc.**

LAUNDRY

TRAYS

I make a specialty of interior Painting,
Frescoing and Paper Hanging.
Special Agent for Linicrusta Walton; a
large and complete stock always
on hand.

Manufactured of the best PORTLAND CEMENT and GUARANTEED not to
LEAK, CRACK or SWEAT.

Office and Factory 53-57 Tehama St. Between 1st & 2d.
Architects are respectfully requested to specify them.

Estimates cheerfully given.

The Titus Improved Patent Sewer Gas Trap TIDE AND FLUSHING GATE

OPEN

Isolates the House from the Main Sewer in Street, thus stopping the prolific cause of Sewer Gas Infection.

By Report of Board of Health, 33 per cent of deaths in this and other cities are caused by Zymotic Diseases arising from Sewer Gas Infection.

First Premium Mechanic's

Institute. Awarded 1882, 1883, 1884, 1885 & 1896

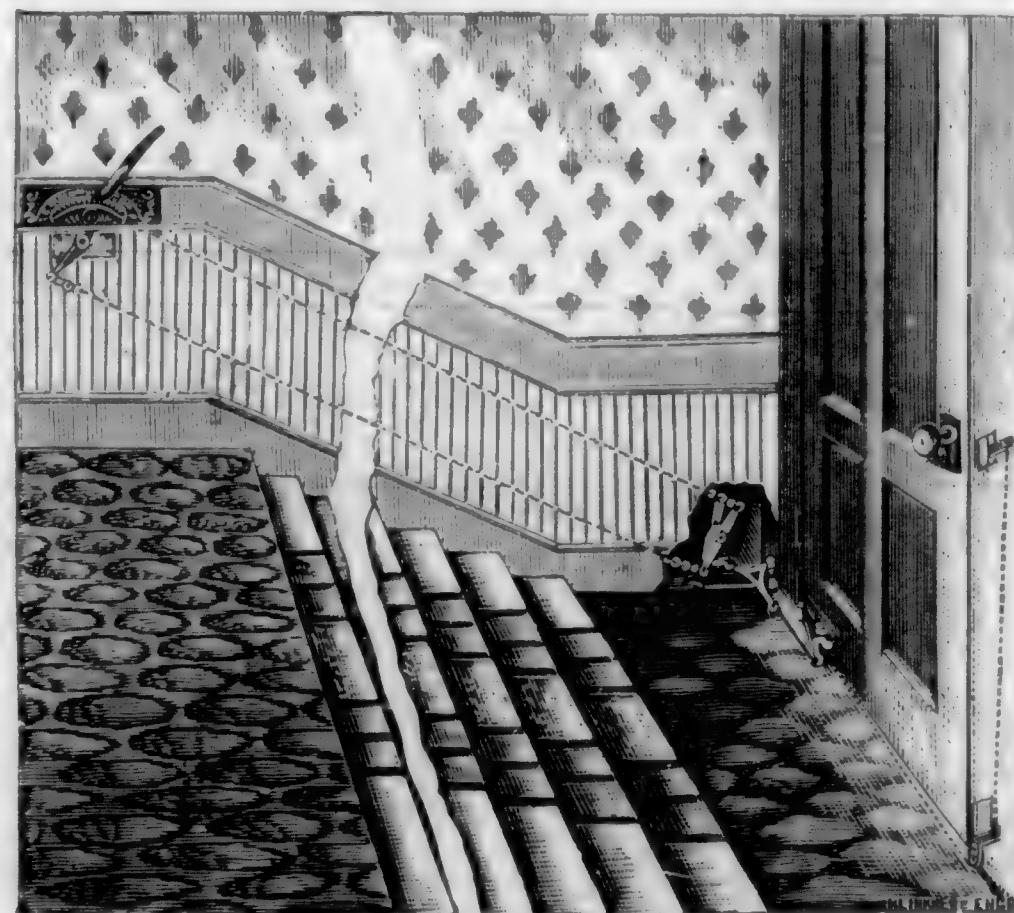
Testimonials, References and Traps can be seen at **414 DEVISADERO STREET, Telephone Pine 1405.**

44—Manufactured by G. C. DALLAMORE, Practical Plumber, Gas and Steam Fitter.

CLOSED

Recommended by Members of
Board of Health

No. 3446 Nineteenth St., S. F



NUMBER 8.

A MONTHLY JOURNAL DEVOTED TO THE ARCHITECTURAL INTERESTS OF THE PACIFIC COAST.

CAUTION—Pay no money to persons representing themselves to be connected with the CALIFORNIA ARCHITECT AND BUILDING NEWS unless a written authority to receipt for the same is shown and accept no receipt unless it be on our printed blanks. All Checks and Drafts are to be made payable to the order of E. H. Burrell.

NOTICE is hereby given that Mr. Tom M. Grant is no longer connected with this Journal.—E. H. Burrell, Lessee and Publisher.

THE Editor of the *Architectural Record* endorses the scheme of the Classical Design and Detail Company, Limited, because of the "substantial benefits to architects" in an apology to his readers under the caption "Architecture Made Easy". It is unique in its way so we print it verbatim:

"It is not our practice to admit commercial reading into these pages of the magazine, but, in the case of the circular that follows we have deviated from our fixed policy because

of the substantial benefits the "Classical Design and Detail Co.," offers to the architectural profession and to the cause of classical art. We are sure nobody will deny that the present conditions of practice demand the formation of a concern like the one just incorporated, which certainly fills most satisfactorily "a long-felt want."

The prospectus of this C. D. and D. Co., is rather startling in many of its announcements which, of course, amounts to innovations as for instance the opening paragraph which boldly declares that "it is well-known that the chief drawback to the successful practice of architecture in the United States is the enormous burden imposed upon the architect by his *office expenses*." Whereas we were always somewhat inclined to the opinion that a "lack of business" had con-

siderable to do with it, but, of course, with this highly, though apologetically endorsed prospectus before us, we must have time to think.

Further on we are told that this condition of affairs is entirely unnecessary, in the actual condition of architecture in this country, and that it is in view of these facts that the Classic Design and Detail Company has been formed.

Then again architects are gently informed that the present methods are really obsolete. Not content with these inspired efforts for innovations, we are given in the summing up a climax of ingenuity that will take high rank for its peculiar power wherever read. It is as follows: "The business of an architect, it is more and more clearly coming to be recognized, is not to design buildings, but to get buildings to design."

This is truly a master piece, and beyond a doubt the most majestic enterprise ever entrusted to the faculties of man—should have been the *Record's* endorsement of that paragraph.

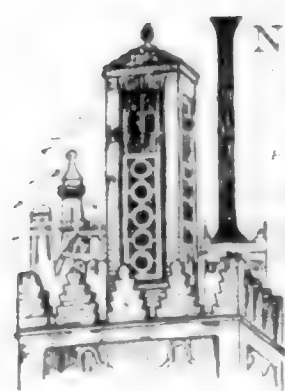
THE ACTION OF SEA-WATER UPON HYDRAULIC CEMENTS.

BY DR. WILHELM MICHAELIS—TRANSLATED AND ABSTRACTED BY WALTER FRANCIS REID.

From Proceedings of the Institute of Civil Engineers [England].

Vol. CXXIX.

CONTINUED FROM LAST NUMBER.



IN THE 1:3 briquettes only 13.3 per cent of the total lime, and in the 1:5 only 24.8 per cent was converted into carbonate. These briquettes being very small, and the conditions for the absorption of carbonic acid favorable, it is evident that even a long exposure of concrete blocks to the air would only cause a very thin film of carbonate to be formed. The whole of the lime was not converted into carbonate until the mortar had been coarsely powdered and exposed to the action of carbonic acid for some time. Immersed in sea-water, or in a 2 per cent solution of magnesium sulphate, the briquettes which had been protected from carbonic acid soon disintegrated, and even those which had been carbonated were strongly attacked in seven months, especially the 1:5 mortar, although this had absorbed more carbonic acid.

In fresh water the conditions are more favorable, for only the free lime can be dissolved or converted into carbonate. The more lime is dissolved out the more insoluble are the residual silicates and aluminates. The whole of the lime can never pass into solution, although this may be effected on a small scale when carbonic acid is excluded. A well mixed and burnt Portland cement may contain 70 per cent of lime and yet resist the action of fresh water.

The magnesia which is deposited during the action of sea-

water upon hydraulic mortar is a preservative agent which tends to close the pores of the mass. It would be more correct to speak of the injurious action of the sulphates in sea-water than to attribute such action to the magnesia salts, although it is true that magnesium sulphate is the special salt which acts in sea-water. The sulphates of lime or of the alkalis, in fact, any soluble sulphate, have the same destructive action, but do not act with the same degree of energy.

The author finds as the result of his investigations that those cements which are richest in lime are those which offer the least resistance to sea-water. The addition of lime or of more calcareous cements to Portland cement mortar is therefore unsuitable, and modern Portland cements of high strength, but rich in lime, are less suitable for marine work than the older cements containing less lime. A mortar containing free caustic lime is as unstable from a physical as from a chemical point of view. By the reaction already explained, great internal strains are produced and expansion and cracking continue, sometimes for many years. All these defects may be avoided by offering to the lime, which remains or becomes free during the hardening process, hydraulic silica or alumina with which it can form more stable compounds. The disadvantage of the efflorescence of caustic alkali cannot be avoided; but as the quantity is small, and it is easily soluble, this caustic alkali cannot endanger the stability of the mortar. In water the alkali is simply washed out; in the air it is only a temporary efflorescence which cannot be washed off.

The addition of milk of lime to Portland cement mortars must be injurious and hastens their destruction. Even in fresh water the advantages of such an addition are only apparent; the excess of lime is easily washed out and the mortar soon becomes porous. Even in two to three years a diminution in the strength of such cement-lime mortars takes place. The action of carbonic acid may come to the rescue, but the chief use of this addition is to make poor mortars more plastic.

In carrying out experiments on the action of sea-water upon cements, it is of importance that the test-pieces should be as porous as possible, otherwise the results would only be delayed. In carrying out a series of experiments with various mortars the author used artificial sea-water, and solutions of calcium sulphate, magnesium sulphate and sodium sulphate. The mortars were moulded in the form of prisms ten centimeters long with a rectangular section of five cubic centimeters. For twenty-four hours the briquettes were allowed to harden in moist air, from which carbonic acid was excluded; they were then placed in the test solutions. The solutions were renewed daily for fourteen days, weekly for three months, and then monthly. One of the mixtures which withstood the action of calcium sulphate best was Teil lime mixed with five parts of standard sand; but all mixtures containing hydraulic silica as hydrate, or in the form of trass or burnt kaolin, were but slightly acted upon, and remained intact after the lapse of two years.

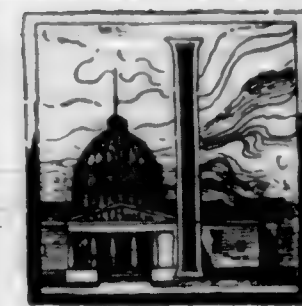
In a one per cent magnesium sulphate solution similar results were obtained. Neat Portland-cement mixtures, without the addition of hydraulic substances, soon disintegrated, especially in the case of those cements rich in alumina. A Bavarian Roman cement containing 47.2 per cent of lime stood well, while a Bosnian Roman cement with 49 per cent of that substance began to show signs of deterioration. Long before there are visible signs of disintegration through the action of sea-water the tensile strength indicates

whether an injurious action is taking place. As porous briquettes are more rapidly acted upon than impervious ones, it is advisable to use a mortar containing one part of cement to five parts of sand, rather than one composed of the 1:3 mixture. A number of experiments were carried out by the author, in which the briquettes were composed of one part of cement mixed with five parts by weight of Berlin standard sand.

ON THE SALINE EFFLORESCENCE OF BRICKS.

THE CAUSES LEADING TO IT, AND THE PRACTICAL MEANS OF AVOIDING THE SAME.

BY OSCAR GERLACH (PH. D., BERLIN.)



PROPOSE in the following article, the first in a brief series, to consider the mode of origin of the common saline efflorescence of bricks. A series of researches which I conducted at the *Laboratory for Clay Industries* of Professor Seeger and E. Cramer, of Berlin, Germany, and which were continued in practical work in America, furnished me with results that not only afford a clear explanation of the origin of efflorescence, but also point to the practical means of avoiding the same. The means of avoidance I shall discuss in a separate article.

By "efflorescence" I understand what is commonly termed "whitewash," wherever and whenever such incrustations appear. For the sake of clearness I shall follow the process of brickmaking in all its successive single stages, as commonly conducted, and point out at each step the causes concerned in the production of the chemical salts occasioning the annoying superficial colorations in question.

Most noticeable and most annoying are the white efflorescences on red or yellow brick; less striking are the green and yellow incrustations on light brick. The white efflorescences are always of inorganic or mineral origin, being mainly sulphates of lime, magnesia, and alkalis. We shall consider here the formation of the white efflorescences, reserving the green and yellow for another occasion, and as a matter of clearness distinguish carefully between:—

1. The formation of efflorescent sulphates which are found *already formed* in the clay pits, or which are first formed from *allowing the clay to lie unused* for a certain length of time, or which arise at any time *during the making of the clay* into green bricks; and

2. The formation of sulphates which arise during the water smoking and during the burning of the green material in the kilns.

This distinction is necessary, because practical brick-makers are prone to think that water-smoking alone is the cause of the whitewashing sulphates making their appearance on the finished products.

I.

ON THE FORMATION OF THE EFFLORESCENT SULPHATES IN THE CLAY BEDS, ETC.

The majority of clays used in brick and terra-cotta making contain greater or less quantities of mineral salts. Chemi-

cal analysis has shown that these salts are sulphates of lime and magnesia, less frequently of iron and alkalis. These sulphates are formed by the weathering of finely and uniformly distributed particles of iron pyrites, which is an almost constant accompaniment of the clay. Through the action of water, air, and heat the iron pyrites (FeS_2) is gradually oxidized and converted into ferrous sulphate (FeSO_4), which, being easily soluble in water, is, in union with the carbonates of lime, magnesia, and alkalis, whose constant presence can also be shown, converted into the respective sulphates of these combinations. For example, $\text{FeO} \cdot \text{SO}_3 + \text{CaO} \cdot \text{CO}_2 = \text{FeO} \cdot \text{CO}_2 + \text{CaO} \cdot \text{SO}_3$.

It is readily intelligible now that the more minute the distribution of the iron pyrites is in the clay, and the more the mass as a whole is exposed to the influences of the weather, i. e., to the effects of water, air, and heat, the greater the quantities of iron pyrites oxidized and the greater the quantities of soluble sulphates stored up in the clays. If we are using, for instance, a stony clay belonging to the carboniferous formations, which always contain heavy quantities of iron pyrites (e. g., blue shale), and work the same into green bricks immediately, and at the beds where the clay is found, then certainly the whitewashing is far less apt to be noticeable than if the clay had been suffered to lie for months before using, exposed and in the open air.

To prove this, I analyzed several specimens of clay from the same pit, and so determined the amount of soluble sulphates in each. One specimen was taken from the upper layer of the clay, another from a lower layer quite protected from the air and heat. The analysis showed that the upper layer contained four times as much soluble sulphates as the lower, protected layer.

Another experiment yielded similar results. I took three specimens from the same layer of clay. Of the first specimen, 100 grams were immediately analyzed and the amount of sulphates therein contained determined; of the second specimen, 100 grams were finely pulverized, moistened, and exposed to the weather for three months, and at the expiration of that time analyzed for the amount of sulphates; while 100 grams of the third specimen were likewise finely pulverized and let lie for three months in a dry, hermetically sealed tin box and then analyzed. It turned out that specimens 1 and 3 contained almost equal amounts of sulphates, while specimen 2 showed six times the amount of the others. Another clay, likewise belonging to the carboniferous period, having been let lie for months in the open air, left behind it on the ground where it had been heaped large quantities of beautifully formed gypsum crystals.

But even if such clays are worked into bricks immediately upon being transported from the pits, it does not necessarily follow that the formation of sulphates will be entirely prevented. If the green bricks be let stand a long while in the drying rooms a constant oxidation of the iron pyrites will take place on the surface of the bricks through the action of the moist atmosphere, and, concomitantly with this, the formation of sulphates which, while not visible to the eye in the green bricks, will, after burning, make their appearance in the shape of whitewash. To prevent this, not only is the immediate working of the clay into green bricks necessary, but it is also requisite to dry and to burn the bricks with all the expedition possible.

The oxidation of iron pyrites is accordingly a main cause of the formation of sulphates occasioning whitewash. A second source is the sulphur contained in the water employed in the preparation of the clay. This water frequently con-

siderable to do with it, but, of course, with this highly, though apologetically endorsed prospectus before us, we must have time to think.

Further on we are told that this condition of affairs is entirely unnecessary, in the actual condition of architecture in this country, and that it is in view of these facts that the Classic Design and Detail Company has been formed.

Then again architects are gently informed that the present methods are really obsolete. Not content with these inspired efforts for innovations, we are given in the summing up a climax of ingenuity that will take high rank for its peculiar power wherever read. It is as follows: "The business of an architect, it is more and more clearly coming to be recognized, is *not to design buildings, but to get buildings to design.*"

This is truly a master piece, and beyond a doubt the most majestic enterprise ever entrusted to the faculties of man—should have been the *Record's* endorsement of that paragraph.

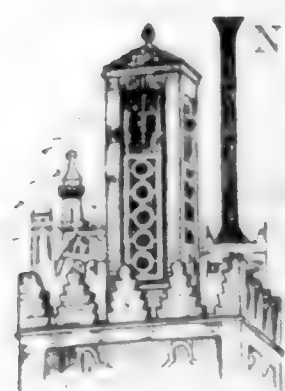
THE ACTION OF SEA-WATER UPON HYDRAULIC CEMENTS.

BY DR. WILHELM MICHAELIS — TRANSLATED AND ABSTRACTED BY WALTER FRANCIS REID.

From Proceedings of the Institute of Civil Engineers [England]

Vol. CXXIX.

CONTINUED FROM LAST NUMBER.



IN THE 1:3 briquettes only 13.3 per cent of the total lime, and in the 1:5 only 24.8 per cent was converted into carbonate. These briquettes being very small, and the conditions for the absorption of carbonic acid favorable, it is evident that even a long exposure of concrete blocks to the air would only cause a very thin film of carbonate to be formed. The whole of the lime was not converted into carbonate until the mortar had been coarsely powdered and exposed to the action of carbonic acid for some time. Immersed in sea-water, or in a 2 per cent solution of magnesium sulphate, the briquettes which had been protected from carbonic acid soon disintegrated, and even those which had been carbonated were strongly attacked in seven months, especially the 1:5 mortar, although this had absorbed more carbonic acid.

In fresh water the conditions are more favorable, for only the free lime can be dissolved or converted into carbonate. The more lime is dissolved out the more insoluble are the residual silicates and aluminates. The whole of the lime can never pass into solution, although this may be effected on a small scale when carbonic acid is excluded. A well mixed and burnt Portland cement may contain 70 per cent of lime and yet resist the action of fresh water.

The magnesia which is deposited during the action of sea-

water upon hydraulic mortar is a preservative agent which tends to close the pores of the mass. It would be more correct to speak of the injurious action of the sulphates in sea-water than to attribute such action to the magnesia salts, although it is true that magnesium sulphate is the special salt which acts in sea-water. The sulphates of lime or of the alkalis, in fact, any soluble sulphate, have the same destructive action, but do not act with the same degree of energy.

The author finds as the result of his investigations that those cements which are richest in lime are those which offer the least resistance to sea-water. The addition of lime or of more calcareous cements to Portland cement mortar is therefore unsuitable, and modern Portland cements of high strength, but rich in lime, are less suitable for marine work than the older cements containing less lime. A mortar containing free caustic lime is as unstable from a physical as from a chemical point of view. By the reaction already explained, great internal strains are produced and expansion and cracking continue, sometimes for many years. All these defects may be avoided by offering to the lime, which remains or becomes free during the hardening process, hydraulic silica or alumina with which it can form more stable compounds. The disadvantage of the efflorescence of caustic alkali cannot be avoided; but as the quantity is small, and it is easily soluble, this caustic alkali cannot endanger the stability of the mortar. In water the alkali is simply washed out; in the air it is only a temporary efflorescence which cannot be washed off.

The addition of milk of lime to Portland cement mortars must be injurious and hastens their destruction. Even in fresh water the advantages of such an addition are only apparent: the excess of lime is easily washed out and the mortar soon becomes porous. Even in two to three years a diminution in the strength of such cement-lime mortars takes place. The action of carbonic acid may come to the rescue, but the chief use of this addition is to make poor mortars more plastic.

In carrying out experiments on the action of sea-water upon cements, it is of importance that the test-pieces should be as porous as possible, otherwise the results would only be delayed. In carrying out a series of experiments with various mortars the author used artificial sea-water, and solutions of calcium sulphate, magnesium sulphate and sodium sulphate. The mortars were moulded in the form of prisms ten centimeters long with a rectangular section of five cubic centimeters. For twenty-four hours the briquettes were allowed to harden in moist air, from which carbonic acid was excluded; they were then placed in the test solutions. The solutions were renewed daily for fourteen days, weekly for three months, and then monthly. One of the mixtures which withstood the action of calcium sulphate best was Teil lime mixed with five parts of standard sand; but all mixtures containing hydraulic silica as hydrate, or in the form of trass or burnt kaolin, were but slightly acted upon, and remained intact after the lapse of two years.

In a one per cent magnesium sulphate solution similar results were obtained. Neat Portland-cement mixtures, without the addition of hydraulic substances, soon disintegrated, especially in the case of those cements rich in alumina. A Bavarian Roman cement containing 47.2 per cent of lime stood well, while a Bosnian Roman cement with 49 per cent of that substance began to show signs of deterioration. Long before there are visible signs of disintegration through the action of sea-water the tensile strength indicates

whether an injurious action is taking place. As porous briquettes are more rapidly acted upon than impervious ones, it is advisable to use a mortar containing one part of cement to five parts of sand, rather than one composed of the 1:3 mixture. A number of experiments were carried out by the author, in which the briquettes were composed of one part of cement mixed with five parts by weight of Berlin standard sand.

ON THE SALINE EFFLORESCENCE OF BRICKS.

THE CAUSES LEADING TO IT, AND THE PRACTICAL MEANS OF AVOIDING THE SAME.

BY OSCAR GERLACH (PH. D., BERLIN.)



PROPOSE in the following article, the first in a brief series, to consider the mode of origin of the common saline efflorescence of bricks. A series of researches which I conducted at the *Laboratory for Clay Industries* of Professor Seeger and E. Cramer, of Berlin, Germany, and which were continued in practical work in America, furnished me with results that not only afford a clear explanation of the origin of efflorescence, but also point to the practical means of avoiding the same. The means of avoidance I shall discuss in a separate article.

By "efflorescence" I understand what is commonly termed "whitewash," wherever and whenever such incrustations appear. For the sake of clearness I shall follow the process of brickmaking in all its successive single stages, as commonly conducted, and point out at each step the causes concerned in the production of the chemical salts occasioning the annoying superficial colorations in question.

Most noticeable and most annoying are the *white* efflorescences on red or yellow brick; less striking are the green and yellow incrustations on light brick. The white efflorescences are always of inorganic or mineral origin, being mainly sulphates of lime, magnesia, and alkalis. We shall consider here the formation of the white efflorescences reserving the green and yellow for another occasion, and as a matter of clearness distinguish carefully between:—

1. The formation of efflorescent sulphates which are found *already formed* in the clay pits, or which are first formed from *allowing the clay to lie unused* for a certain length of time, or which arise at any time *during the making of the clay into green bricks*; and
2. The formation of sulphates which arise during the water smoking and during the burning of the green material in the kilns.

This distinction is necessary, because practical brick-makers are prone to think that water-smoking alone is the cause of the whitewashing sulphates making their appearance on the finished products.

I.

ON THE FORMATION OF THE EFFLORESCENT SULPHATES IN THE CLAY BEDS, ETC.

The majority of clays used in brick and terra-cotta making contain greater or less quantities of mineral salts. Chemi-

cal analysis has shown that these salts are sulphates of lime and magnesia, less frequently of iron and alkalis. These sulphates are formed by the weathering of finely and uniformly distributed particles of iron pyrites, which is an almost constant accompaniment of the clay. Through the action of water, air, and heat the iron pyrites (FeS_2) is gradually oxidized and converted into ferrous sulphate (FeSO_4), which, being easily soluble in water, is, in union with the carbonates of lime, magnesia, and alkalis, whose constant presence can also be shown, converted into the respective sulphates of these combinations. For example, $\text{FeO} \cdot \text{SO}_3 + \text{CaO} \cdot \text{CO}_2 = \text{FeO} \cdot \text{CO}_2 + \text{CaO} \cdot \text{SO}_3$.

It is readily intelligible now that the more minute the distribution of the iron pyrites is in the clay, and the more the mass as a whole is exposed to the influences of the weather, *i. e.*, to the effects of water, air, and heat, the greater the quantities of iron pyrites oxidized and the greater the quantities of soluble sulphates stored up in the clays. If we are using, for instance, a stony clay belonging to the carboniferous formations, which always contain heavy quantities of iron pyrites (*e. g.*, blue shale), and work the same into green bricks immediately, and at the beds where the clay is found, then certainly the whitewashing is far less apt to be noticeable than if the clay had been suffered to lie for months before using, exposed and in the open air.

To prove this, I analyzed several specimens of clay from the same pit, and so determined the amount of soluble sulphates in each. One specimen was taken from the upper layer of the clay, another from a lower layer quite protected from the air and heat. The analysis showed that the upper layer contained four times as much soluble sulphates as the lower, protected layer.

Another experiment yielded similar results. I took *three* specimens from the *same* layer of clay. Of the first specimen, 100 grams were *immediately* analyzed and the amount of sulphates therein contained determined; of the second specimen, 100 grams were finely pulverized, moistened, and exposed to the weather for three months, and at the expiration of that time analyzed for the amount of sulphates; while 100 grams of the third specimen were likewise finely pulverized and let lie for three months in a dry, hermetically sealed tin box and then analyzed. It turned out that specimens 1 and 3 contained almost equal amounts of sulphates, while specimen 2 showed six times the amount of the others. Another clay, likewise belonging to the carboniferous period, having been let lie for months in the open air, left behind it on the ground where it had been heaped large quantities of beautifully formed gypsum crystals.

But even if such clays are worked into bricks immediately upon being transported from the pits, it does not necessarily follow that the formation of sulphates will be entirely prevented. If the green bricks be let stand a long while in the drying rooms a constant oxidation of the iron pyrites will take place on the surface of the bricks through the action of the moist atmosphere, and, concomitantly with this, the formation of sulphates which, while not visible to the eye in the green bricks, will, after burning, make their appearance in the shape of whitewash. To prevent this, not only is the immediate working of the clay into green bricks necessary, but it is also requisite to dry and to burn the bricks with all the expedition possible.

The oxidation of iron pyrites is accordingly a main cause of the formation of sulphates occasioning whitewash. A second source is the sulphur contained in the water employed in the preparation of the clay. This water frequently con-

tains gypsum; and since many clays require so much as 30 per cent of water for rendering them plastic, the gypsum present in the water naturally contributes a high quota to the formation of the annoying superficial efflorescences in question. So, too, by various other admixtures, as mineral colorings, oxide of iron, ochre, superoxide of manganese, the whitish efflorescences can be argued. Wherefore, it is necessary that all such substances when used as admixtures should, without exception, be analyzed for the amount of sulphates they contain.

The quantity of water requisite for working the clay depends wholly on the nature of the clay and on the peculiar methods employed in working it. The greater the quantity of water, the greater the quantity of the sulphates dissolved in it, and the greater the quantity of dissolved salts deposited on the surface of the bricks in drying.

The method of drying is also of paramount importance, both as bearing on the formation of these efflorescences and as affecting their visibility on the surface. The quicker the drying can be perfected, the more advantageous will be the appearance of the burnt product, for in a perfectly dry brick all further oxidation of the iron pyrites is absolutely excluded; and then again, in consequence of the rapid evaporation of the water, the dissolved sulphates are not wholly deposited on the surface of the product, but in large part are left behind in the pores of the clay. The drying process consequently deserves the highest attention at the hands of the practical brickmaker. But since the space at my present disposal is limited, I shall reserve the discussion of the advantages and disadvantages of the different methods of drying for a future occasion.

To recapitulate: the substances giving rise to the efflorescence or whitewash of green clay products are (1) the soluble sulphates contained in the natural clays, and (2) the sulphates formed during the storing and initial treatment of the clays consequent upon the weathering of the iron pyrites and its resultant transformation into sulphuric bases. It remains to be mentioned that the efflorescences which find noticeable lodgment upon the green, unbaked material are subsequently burnt in indelibly on the surface of the brick, and can be removed neither by chemical nor mechanical means.

ON THE FORMATION OF SULPHATES WHICH ARISE DURING THE WATER-SMOKING AND DURING THE BURNING OF THE GREEN MATERIAL IN THE KILNS.

The presence of iron pyrites in the clay is, we have seen, the main cause of the origin of whitewashing sulphates on the surface of the unburnt material, and iron pyrites again is chiefly concerned in the production of whitewashing sulphates during the water-smoking and burning of the green products. This happens in a twofold manner—first, and again, by the presence of iron pyrites in the clay; and secondly, and particularly, by the iron pyrites contained in the coal, which is mostly used as a fuel.

In burning two processes are distinguished: (1) water-smoking, and (2) burning proper.

WATER-SMOKING.

The object of the water-smoking is to expel the water which has been mechanically absorbed by the clay, and which still remains in after drying—the so-called "hygroscopic" water,—whereby the clay is thoroughly dried, but

losses none of its original physical qualities. The purpose of burning, on the other hand, is (1) the expulsion of the water chemically contained in the clay (clay substance being essentially $Al_2O_3(SiO_2) + 2H_2O$), (2) the chemical disintegration of the several components of the clay, and (3) a more or less perfect fusion of the individual argillaceous particles, whereby a definitive and permanent alteration of the substance is attained. With the loss of the chemically contained water, the clay loses its plasticity—a property so essential to the manufacture of argillaceous products.

We shall consider the process of water-smoking first, which has for its object the expulsion of the hygroscopic water. Since water is converted into steam at 212 degs. Fahr., this latter is the proper temperature for the process—attainable only by the artificial convection of heat to the products, i. e., by the consumption of fuel. But since the size and the construction of the kiln in which the water-smoking is conducted renders it absolutely impossible for a perfectly uniform temperature to be obtained throughout the whole enclosed space, consequently that portion of the kiln and of the contents of the kiln which first comes in contact with the hot gases from the fireplace will be heated first. At these points a part of the water in the green products will be converted into steam, whilst at points more remote from the fireplace scarcely any rise at all in temperature will be noticeable. At these latter points the water vapor originating at the first points will be condensed and precipitated on the surface of the cold green products, whence, since the clay is strongly hygroscopic, it will be absorbed into the interior of the bricks. If the clay, now, still contains soluble sulphates in its interior, these sulphates will be dissolved in the water, and later, when the points in question have in their turn reached evaporating heat, will be drawn to the surface of the bricks, and, as the heat is increased, be burnt in there. If the green clay does not contain sulphates, or if the sulphates be rendered innocuous by the admixture of appropriate chemicals, the water so condensed will have no injurious effect upon the appearance of the bricks, provided the fuel employed contains no sulphur. But if a sulphurous fuel be employed,—for example, coal, which always contains more or less iron pyrites,—the water will absorb the gases of the sulphurous acids produced by the combustion of the iron pyrites, and this diluted acidic solution will act on the carbonates in the clay and form sulphurous salts, which, as the heat increases, will come to the surface and there be oxidized to sulphuric salts, thus causing again the annoying colorations.

To be continued.

THE USE OF SHEET IRON AND STEEL.

THE USE of sheet iron and steel in the construction of buildings has increased enormously of late. Not only are ornamental cornices a feature of some very handsome buildings, but in many instances the entire front of the building is covered with sheet steel in imitation of the pressed brick or rock, which when painted and sanded gives a very handsome effect. Corrugated iron for roofing and siding is used for manufacturing buildings, storage buildings, and of late years has been largely employed for sheds on the docks of various seaport cities. One of the largest build-

ings that has been covered with sheet iron is that of the Western Oil Manufacturing Company, at Belleville, N. J. The main building is 30x100 feet and 100 feet high. The extension at the right is 30x60 feet and 35 feet high, and the left extension is 100 feet long, a portion of which is 40 feet wide, and the remainder 20 feet wide, and the whole extension is 35 feet in height. Sheet iron was selected as a covering for this building, owing to the protection afforded against contiguous fires and for its cheapness as compared with clapboarding. Clapboarding of a good quality put on the building was found to be worth between 5 and 6 cents per square foot, and the sheet iron covering of No. 24 black iron, 30x96 inches in size, put on, cost a little more than half the cost of clapboarding, owing to the little labor required, and the large space covered with a sheet of iron. The buildings are of frame construction, and the timbers are covered with a sheeting of 1-inch board. The sheets are attached to these boards with a layer of building paper beneath, and several tons were required for the covering. After the work was completed the entire building was treated with one coat of red lead paint. The wooden tanks holding the water supply for the buildings, which were not set upright at the time the picture was taken, are also covered with sheet iron. Galvanized iron was used in covering the tanks, and galvanized iron was also used in covering the building which supports the water tanks. This building is 20x40 feet and 100 feet high—*The Improved Bulletin*.

TESTS OF CAST-IRON COLUMNS.

A VERY important series of tests of cast-iron columns has recently been completed at Phoenixville, Pa., by the department of buildings of New York city, and from an extensive account given in *Engineering News* we make some abstracts.

Three sets of columns were tested to destruction in the hydraulic testing machine of the Phoenix Bridge Company, these being respectively 15 feet 10 1/4 inches long by 15 inches in diameter; 13 feet 4 inches long by 8 inches in diameter; and 10 feet long by 6 inches in diameter; the thickness varying from 1 1/16 inches to 5/8 of an inch. In the first group were two columns taken from the "Ireland Building," which collapsed in the summer of 1895, in New York, and four similar ones cast for the purpose of the test, while the second and third groups each consisted of two columns of kinds used in regular building construction, made by well-known firms, and were fair samples, coming within the provisions of the law.

The data of the tests are tabulated in the paper referred to, and some of the salient features may be especially noted. With but few exceptions the thickness varied materially in different portions of the same column, so that in one instance the metal on one side was 1 1/4 inches thick, and on the other only 5/8 of an inch; and, although this was an extreme case, there was a decided irregularity of thickness, which probably affected the strength materially. All of the 15-inch columns were broken, except one, which was nearly uniform in thickness, and which remained intact at the maximum pressure of the testing machine—a load of more than 2,082,000 pounds, or more than 40,000 pounds per square inch of area. The breaking load of the others of this group varied from 25,000 to 30,000 pounds per square inch, the variations being apparently due to the presence of cinder, foundry dirt,

chaplets, and blow-holes. The smaller columns were all broken with loads ranging from 22,000 to 32,000 pounds per square inch of area.

According to the building law of the city of New York, the strength of all columns and posts is to be computed by Gordon's formula, using a coefficient of 80,000, and a factor of safety of five for cast iron. The application of Gordon's formula, under these conditions, to the columns tested shows that the 15-inch columns should have a breaking strength of 75,000 pounds per square inch, instead of which it actually ranged from 25,000 to 40,000 pounds; while for the 6- and 8-inch columns the breaking strength by the formula should be 40,000 pounds per square inch, instead of 32,000 to 22,000 pounds, as shown by the tests.

Had these columns, therefore, been loaded as heavily as the law permits, the factor of safety in some cases would have been only a little more than 2, instead of 5 as intended. Judging from the physical description given of the columns tested, this discrepancy is much more likely to be due to the defects in the castings than to the inaccuracy of the formula, and apparently a requirement for better material and more carefully-made castings would raise the strength nearly, if not quite, to that indicated by computation.

An interesting feature of the paper is the description of the calibration of the Phoenixville testing machine by comparison with the Emery testing machine in the United States Arsenal at Watertown, Mass. This calibration was effected by testing a special soft-steel Phoenix column, first at Watertown and then at Phoenixville, using a roller extensometer reading to 0.0001 inch, the conditions being reproduced as nearly as possible in the second test, and the same extensometer being used. The result showed the gage readings of the Phoenix machine to be from 15 to 17 per cent higher than the actual values, this being due to friction of the machine and possibly to gage error. By using this correction, the tests at Phoenixville are made comparable with those at Watertown, with a possible error of about 3 per cent.

LESSON FROM FIRE AND PANIC.



WHEN I undertook this subject the fatal fire at the Paris Charity Bazaar had not happened, nor did we anticipate that great disaster among the warehouses at Cripple-gate, which has added its own unnecessary lesson. Indeed, neither of these events was necessary, for they conveyed no warning not already known, and they were useless, for by this time they are practically disregarded.

The fact that the destruction of a building by fire is an improbability removes from it the class of considerations with which the architect usually deals. In proportion to the number of buildings fires are exceedingly few, considering the variety of risks I might say surprisingly few; and if it is a hundred thousand to one against a fire in a particular place on a given day, the ordinary man, environed by more threatening perils, will scoff at precaution and take his chance. But after calamity the general public with all its tongues asks who the precaution was not taken, and looks out for a victim. By the standard then set up, and not by

any doctrine of chances, the architect may expect to be judged.

It is a question whether danger from fire is not increasing in spite of Building Acts. Our buildings are getting more lofty, more closely packed together, and more thickly inhabited. In commercial buildings the rooms are larger and more encumbered with goods, among and over which manufacturing processes are carried on. There is more machinery actuated by heat. The timber we use is more easily combustible, fittings are lighter, and everything is kept warmer and drier. All our arrangements for obtaining light, from the lucifer match to gas and mineral oil and electricity, are novel and productive of new dangers. The proportion of window openings to wall space is much increased, and with the growth of honesty outside, or trustfulness within, shutters have been abandoned. The old-fashioned solid window frame that stood flush with the face of the wall, and being dangerous had to be abandoned, is through modern fashion being brought out again from its reveal and made in thin casing which will catch fire and fall into the street. Lifts going through several stories neutralize the advantage of fire-resisting floors, lighting areas common to different premises do away with the security of the party-wall. Unrestricted skylights bring ridicule on the incombustible roof covering of the Building Acts. In fact the most scrupulously legal building of brick or stone and slate may be no more than a kind of grate in which its internal structure and its contents can be most conveniently burned. So in the Cripple-gate fire, the progress was about as rapid, and the destruction over its limited area no less complete, than in the Great Fire of 1666; and if our arrangements for the extinction of fire had not made immense progress, this recent event might have rivalled that great calamity.

Our own lesson from this must be to improve by all means the construction and arrangement of buildings, even though we may be in advance of Building Acts. We cannot widen the streets, nor increase the unoccupied areas, nor reduce the necessary openings for light, nor dictate to the trader modes of conducting his business which would make his business impossible, nor can we do much in advance of public opinion to diminish the numbers of an audience or spread them over a larger area. The most that we can do is to diminish the chances of fire and to delay its progress, to prevent its passage from room to room and from house to house, to so arrange the construction that a fire may be more easily put out, and as regards the safety of the inmates, to provide the best means of escape.

We should be wiser if we knew more of the causes of fires. The final comment on most of our great fires is "cause unknown." They have destroyed the evidence of their origin. We learn something from the records of those that are most easily extinguished, and we should learn more from the far greater number that are discovered and dealt with on the first alarm without troubling the fire brigade. In one of those summer exhibitions that are spread over buildings of a temporary character, I had information of ten such alarms within six months. In my own house we have had, through no fault of ours, at least three of the narrowest escapes from the kind of gas explosion by which the house of one of my friends was lately wrecked. We may learn something from these and other failures, but our great lesson must be to distrust the safety from fire of any building unless the greatest care is taken in its construction, and on no account to think that any deficiency in that particular will be made up by carefulness in its occupation and management.

The points which I think is most useful to notice are the following:—

- (1.) The structure and arrangement of buildings generally.
- (2.) Certain legal and other provisions for preventing loss of life in dwelling houses.
- (3.) Certain legal and other provisions for preventing loss of life in factories.
- (4.) Certain legal and other provisions for preventing loss of life in public buildings generally.
- (5.) Certain legal and other provisions for preventing loss of life in theatres and music halls.

To be Continued.



The management of this journal desires to extend a cordial invitation to all architects on this coast and elsewhere to contribute designs for publication.

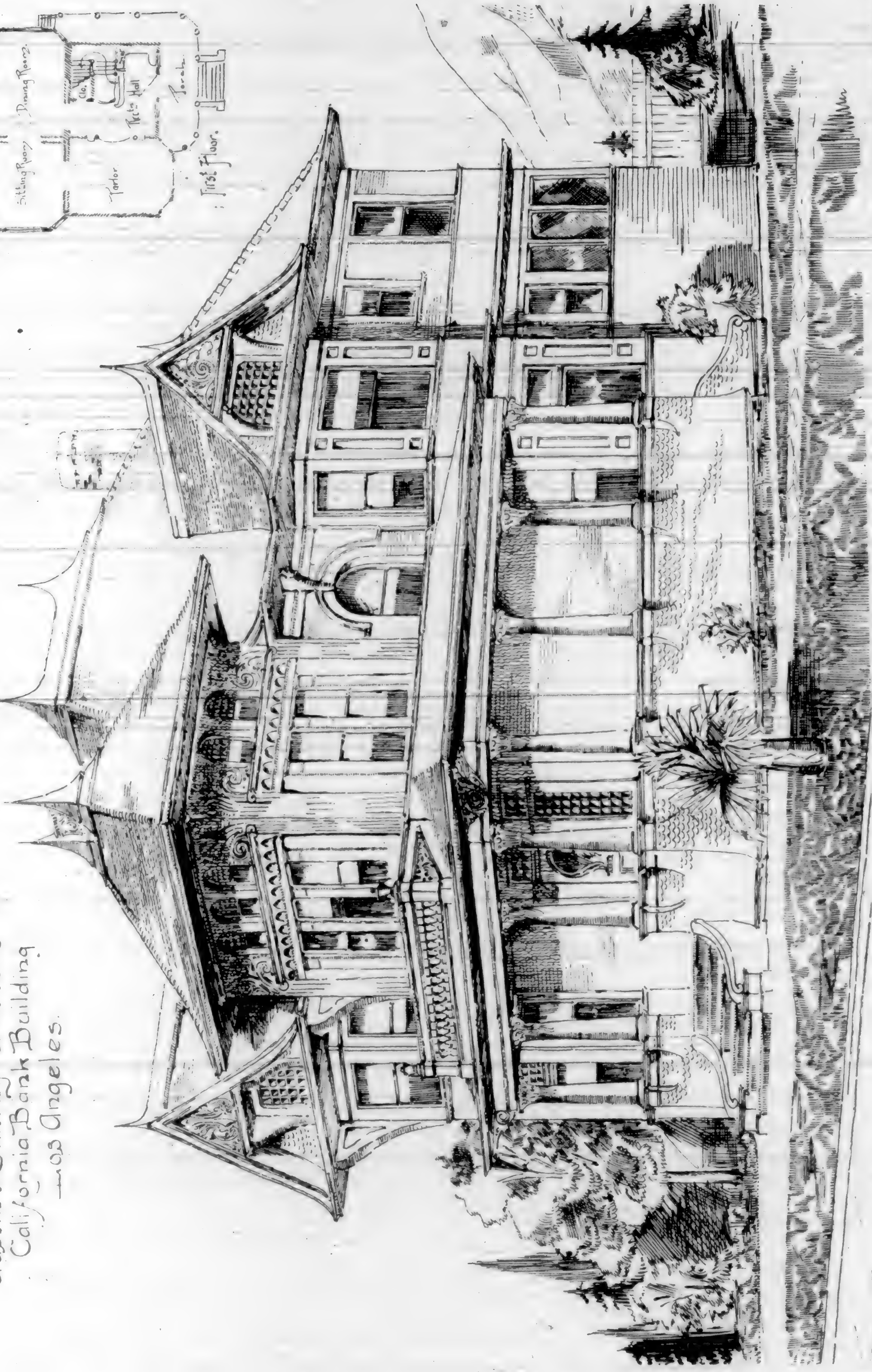
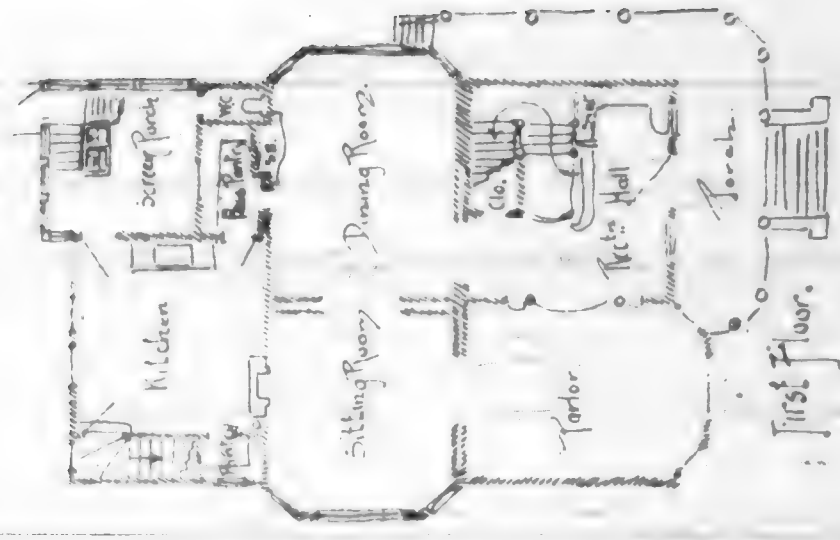
Drawings should be made with perfectly black lines on a smooth white surface. Good tracings, if made with black ink, answer the purpose.

The designs selected will be published without charge. All drawings, whether accepted or not, will be returned to their authors, who must bear express charges both ways.

THE "Hotel Nevills," illustrated in this number, which was opened to the public last April, is situated on an elevated site at the terminus of the Sierra Railway, Jamestown, Cal., and was built by Capt. W. A. Nevills of the famous Rawhide Mines, for the Jamestown Improvement Company, from designs by and under the supervision of George Rushforth, architect, of Stockton, Cal. The building which is mainly "frame construction" was begun and completed for occupancy within a period of four months, and in the winter time. The size of the building is 74 feet by 184 feet, two stories in height and attic, containing in all sixty five rooms. The exterior is treated in the Japanese style of Architecture, which is admirably suited to the mountainous landscape surrounding it. The verandahs are 10 feet wide, and extend almost entirely round the building, the lower part of verandah columns also the house base $4\frac{1}{2}$ feet high, are constructed with variously colored "quartz" taken out of gold mines in the neighborhood, and is put up in random rubble fashion; between this and the second-story the walls are covered with steel lath and cement in imitation of ashlar stone. The main floor consists of large reception hall and office, dining room, seating 200, billiard room, bar, barber shop, kitchen, etc., a section of the building nearest the depot being fitted up for the Wells, Fargo & Co's offices and baggage rooms.

Upstairs are the general parlors, private suites with bath-

RESIDENCE OF G. H. MILLER ESQ.
 Austin & Skilling Architects
 California Bank Building
 Los Angeles.



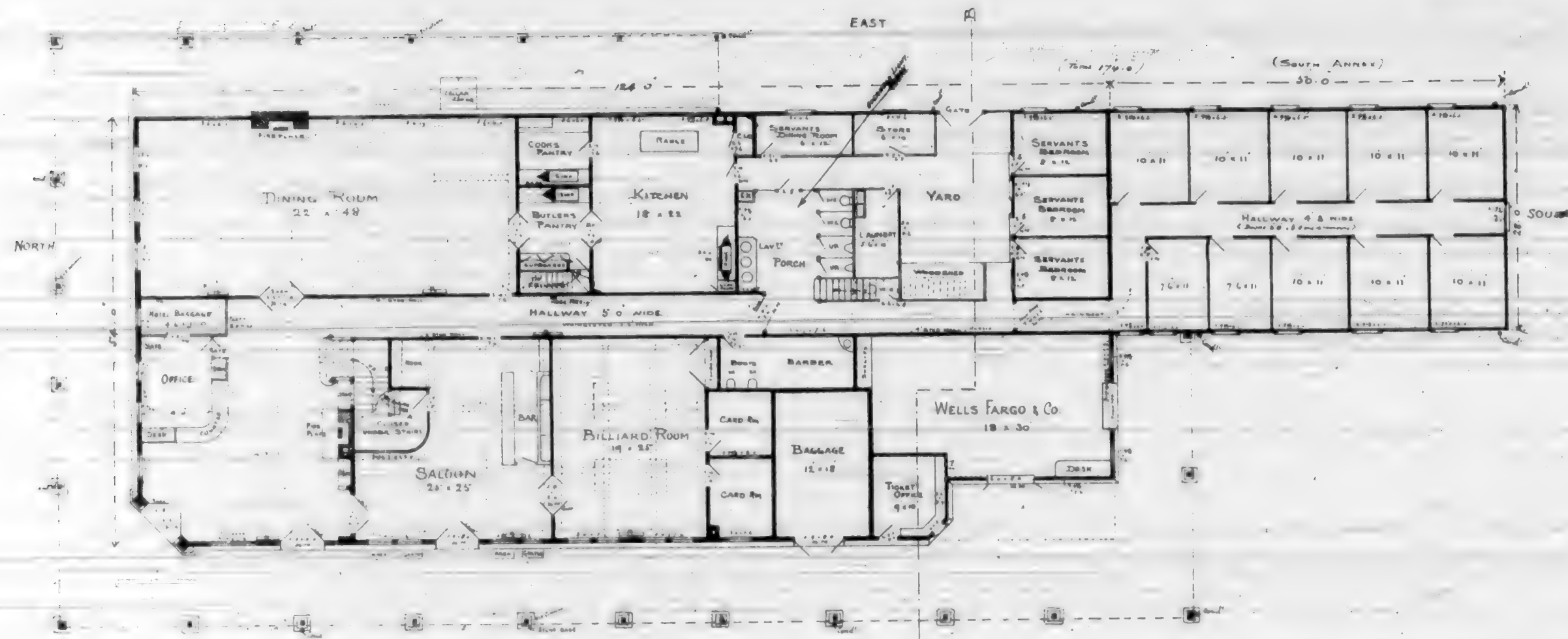
CALIFORNIA ARCHITECT & BUILDING NEWS
 SAN FRANCISCO

BRITTON & REY, PHOTO LITH.

VOL. XIX NO. 8 AUGUST 1898

SHEET 1

SHEET 2



FIRST FLOOR PLAN
SCALE 3/8" = 1'-0"



SECOND FLOOR PLAN
SCALE 3/8" = 1'-0"

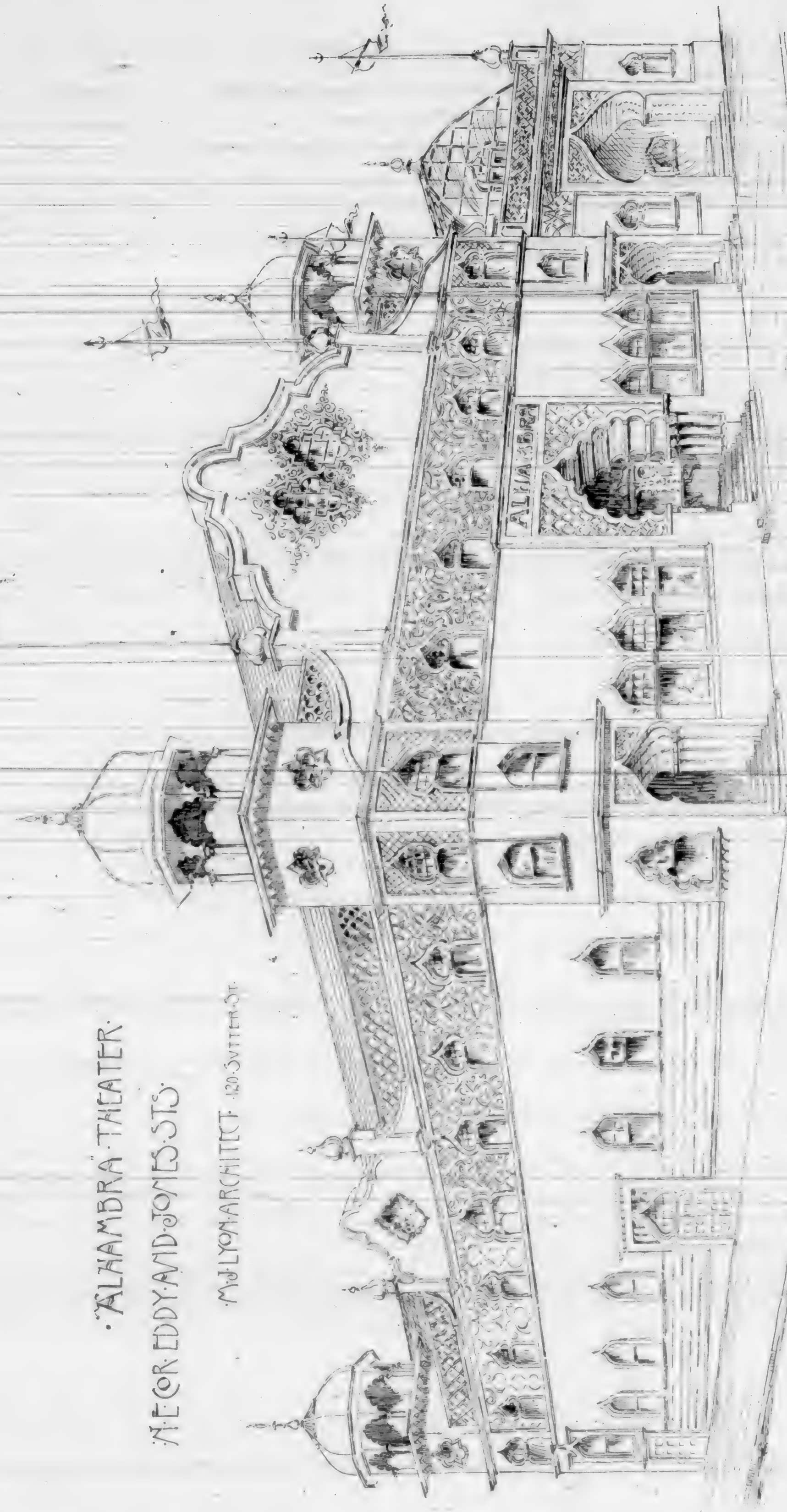
THE "HOTEL NEVILLS"
JAMESTOWN, CAL.



Geo. Rushforth, Architect.
Stockton, Cal.

ALHAMBRA THEATER
 BY EDDY AND JONES STS.

MILYON ARCHITECT 120 SUTTER ST.



rooms and toilets, bridal suites, etc., the hallways having exits to balconies.

The principal rooms have large open fireplaces, but the building is also furnished with the gravity system, hot water heating, with direct radiation put in complete by Jackson & Carle of Stockton, who are making a growing reputation for this line of work. The house is lighted by electricity and is wired for return call and fire alarm bells, in fact the entire building is equipped with all the essentials of a modern hostelry. The cost of the building being close to \$30,000.

The building was constructed by Robert Powell one of the best established contractors of Stockton.

The Stockton Lumber Co., Joseph Fyfe manager, furnished all the sash, doors, millwork and stairs, their headquarters are at Stockton but have branch establishments located at Jamestown and other parts of the State.

The plumbing and tinning was done by Geo. F. Schuler of Stockton.

Morrell & Mitscher, wood carvers and cabinet makers of Stockton, were engaged to put in the elaborate office and saloon fixtures, they also make a specialty of this class of work.

F. T. Riley of San Francisco supplied all the plaster staff and Japanese characters on the building and E. T. Burrows & Co., Chas. J. Waterhouse, San Francisco, agent, furnished the "Copbronze" screens throughout the building.

RESIDENCE for G. H. Miller, Esq., Austin & Skilling, Architects, California Bank Building, Los Angeles.

ALHAMBRA THEATER, N. E. cor. Eddy and Jones streets, M. J. Lyon, Architect.

PAINTING IRONWORK.

THE painting of ironwork is one of the most neglected yet important factors in its preservation and one to which the mechanical engineer rarely devotes much time or thought. The majority of specifications merely state that the iron work is to receive one, two, or three coats, as the case may be, ignoring entirely the quality of the paint. Perhaps the engineer is not wholly to blame for this, as the manufacturers of paint, like other vendors of special articles, puff their rival wares, until everyone, except the expert, is quite at a loss what special paint to choose. As a general rule, price is the first thing which influences the choice of paint, after which comes color, and finally covering power. The preservative action is seldom considered, whereas if this were kept prominently forward, we should have had exhaustive experiments on the subject and some consensus of opinion as to the proper paint to use for ironwork, one which would thoroughly preserve it under the most adverse circumstances, thereby saving the loss due to oxidation.

A paint to preserve ironwork should possess great firmness, good hardening properties; it should be elastic and expand and contract readily with the iron at varying temperatures. Of the best paints those most used are the oxide of iron and red and other colors of lead paints. Oxide of iron paints possess greater covering power than lead paints in the proportion of three to two. From some experiments which have been made with some of Wolston's Torbay oxide of iron paint, it was found that on a surface of ten superficial yards it took for the first coat of oxide, 1 lb.; for the second coat, 1½ lb.; for the third coat, 2 lb.; whilst with the lead paint 1½ lb. were used for the first coat, 2½ lb. for the second coat, 3½ lb. for the third coat. It is claimed by the makers of paint from natural oxides that these oxides possess some mysterious advantages over artificial oxides which have been obtained as by-products from chemicals, that the paints from artificial oxides do not possess good covering powers, that they have not the power of amalgamating with oil, and that they have an acid reaction which necessarily corrodes the iron. This may be the fact in some cases, but we have seen artificial oxide paints which have none of these disadvantages, and which have a decided alkaline reaction, thus equalling, if not rivalling, the natural oxide paint, and being made from waste products, they are necessarily cheaper. A good paint for iron work should be free from grit, uniform in quality, unchangeable under atmospheric influences, possess great covering powers, and be of an alkaline nature. The whole of these qualities can be tested by the ordinary painter under proper supervision, except the last, which requires chemical knowledge; and we should strongly recommend the users of paint for ironwork to test their paints in conjunction with a qualified analytical chemist who has made the subject his study.

Before painting the surface of galvanized iron it should be washed by an alkaline solution, as the galvanized iron frequently has a greasy acid surface when it leaves the galvanized bath. In painting constructional ironwork the wrought iron should be allowed to weather first before painting, as the oxide which forms on the surface of the iron when rolled will always, sooner or later, peel off, carrying whatever coats of boiled oil or paint there may be put upon it. We have seen this oxide peel off in flakes 2 ft. and 3 ft. square; we know that engineers are fond of specifying the iron to be oiled whilst hot from the rolls, and we have even seen it specified that castings should be coated with boiled oil whilst red hot. How the gushing engineer expected the castings to be fettled and cleaned before this operation we know not. A good coat of paint improves the appearance of a machine, bridge, or roof, and although it may seem a minor matter, yet we believe there is money to be saved by careful attention to the quality and price of the paint used on ironwork.—*Mechanical World*.

VALUABLE INFORMATION CULLED FROM OUR EXCHANGES.

CONSIDERABLE dissatisfaction has been manifested in Chicago over the requirement, by the new building ordinances, of the consent of all property owners in a residence block to permit the erection of a building to be used for any

other purpose than that of a dwelling. Sixteen buildings are delayed as a result of this provision, and it is probable that an effort will be made to amend the ordinance by only requiring the consent of the majority of the property owners. As the ordinance now stands any person desiring to erect a business building in a block, where one-third of the existing structures are residences, must secure the written consent of every property owner of both sides of the street in such block. In several cases, one property owner has seen a chance to secure compensation for his consent and has refused to approve of the subject. As a result the plans are tied up in the city building department, and will not be approved until unanimous consents have been obtained. If an attempt is made to amend section 49, it is likely that the commissioner will recommend that livery stables be stricken out of this section, and that they be placed under the same restrictions as hospitals.—*The Construction News.*

bronze, 10,000 cubic feet of granite, weighing 900 tons, 260,000 square feet of fire proofing, weighing about 3600 tons, 1360 tons of patent mortar used in plastering to cover 42,000 square yards of plastering; about the same amount of cement mortar used in brick and stone masonry; 40,000 square feet of Pevonizza, Numidian and Italian marble; 15,000 pounds of nails, 10,000 cubic feet of terra cotta, weighing about 290 tons; 325,000 face brick, 1,500,000 common brick, 24,000 sq. ft. of glass, weighing about 73,660 pounds; about thirty miles of electric piping to encase the electric wiring throughout the building, and about ten miles of plumbing and steam-fitters' piping. There were on an average 200 men working on this structure from the start until the finish.

THE PROTECTION OF IRON FROM RUST.

MR. J. Morton Brydon, the architect who has been selected Mr. Akers-Douglas to design the larger of the two new Government buildings to be erected at Whitehall, has been in conference with the authorities recently, and his plans will shortly be completed. Mr. Brydon is a Scotsman by birth, but his main work has been in London. He designed the Women's Hospital in the Eustonroad, the Free Library at Chelsea, and recently extended the Municipal Building at Bath. The authorities seem to have departed from the ordinary mode of selection. When the Law Courts were projected there was a competition which resulted in the present buildings. Mr. Akers-Douglas, it is understood, consulted the Royal Institute of British Architects, who submitted twelve names, and from these the two architects were adopted.

THE SECOND architect is Mr. William Young, one of the best known names in connection with great buildings. He will be responsible for the offices to be built on what is often spoken of as the Carrington House site—that is, the piece of land which has for so long a period been vacant between Whitehall Buildings and Whitehall, and exactly opposite the Horse Guards. Mr. Young has earned an almost world-wide reputation by the Municipal Buildings in St. George's square, Glasgow, which are even more notable for their interior arrangement than for their striking and picturesque exterior. A more recent work by Mr. Young was the erection of Lord Wemyss's seat in Scotland. For the new War Office Mr. Young has an admirable site.

AN idea of the amount of material required in the construction of a modern office building can be secured from the following figures furnished by Charles McCaul, who has charge of the construction of a 16-story skyscraper in Philadelphia:

About 8000 cubic yards of excavations, 4000 yards of concrete and stone masonry, 4,371,555 pounds of steel, 300,000 pounds of ornamental iron, 36,000 pounds of ornamental

THE use of paint as a protection from rust is so general that to attack its efficacy seems almost a heresy, and yet it is well known that the protection it affords is only partial, and that, in spite of many and frequent coats of paint, iron work will rust. A leading article in *The Engineer*, in discussing this subject, shows that there are many good reasons why paint should not be an efficient protecting material. The pigment contained in a paint possesses no protective value in itself, dependence being really placed upon the liquid matter alone; hence, in using heavy coloring matter, assuming that the proportion of oil per square foot remains constant, the engineer is simply paying more money for a substance not only of no service, but positively deleterious to the rest of the material.

Linseed oil, however cannot be used alone, since it expands on drying, and the resulting film is apt to be rugose; moreover, if the adhesion of the oil to the metallic surface is not perfect, it may cause the production of blisters. The lack of stability possessed by the solid body resulting from the oxidation of the oil also causes it to crack and fall to pieces; hence as a protection against rust it is not successful.

Varnishes have been suggested, but many of them are apt to crack and peel, or else are so porous as to permit moisture to penetrate. A few varnishes are free from these defects, but their cost renders their use for this purpose impracticable.

Better results in many ways are obtained by the use of such materials as tar, pitch, or asphaltum, and, although they may not altogether respond to the demands of the ideal specification, they will be found to possess many serviceable qualities. Coal tar has been charged with possessing a corrosive action upon iron, although this action is said to be prevented by heating with lime; but pitch, softened with creosote and dissolved in one of the cheaper light oils recovered during distillation, or in a corresponding petroleum derivative forms an excellent protective varnish.

Asphaltum dissolved in a spirit solvent is also suggested as a safe and suitable paint for the protection of iron work, and this may also be used in connection with linseed oil for a second coat. This, indeed, seems to form the ideal combination. The iron should first be cleaned from all scale or rust, and every trace of moisture removed, after which a thick priming coat of pure bodied linseed oil is applied, and carefully worked into all cracks and crevices. When this

has become perfectly dry and hard a second coat of black varnish, composed chiefly of pitch or asphaltum should be applied, the combination forming the best protection against rust at present available.

Probably in this connection the use of the sand blast for obtaining a thoroughly clean surface would greatly assist the protecting medium by enabling it to make a perfect contact with the surface of the metal.

TRADE NOTES.

The Keuffel & Esser Co. of New York are without doubt the leaders in America of drawing materials and surveying instruments. They carry a most complete and assorted stock and their goods are recognized as of standard quality all bearing their trademark. Architects and surveyors should send for their illustrated catalogue as they will be sure to find something that they are in need of. See advertisement on page iii.

EXPERIMENTS OF THE BEHAVIOR OF CAST-IRON COLUMNS IN FIRE.

BY H. SCHULER.

(Abstract from *Deutsche Bauzeitung*, 1897, in *Proceedings of the Institute of Civil Engineers, England*, Vol.

CXXIX, p. 407.)

IN CONSEQUENCE of the warehouse fire in Hamburg in 1891 the Senate of the city caused experiments to be made with wrought-iron and timber stanchions,* which were continued in 1895, with cast-iron columns 10 feet 8 inches long, 10½ inches diameter, and 1½ inch or 1 inch metal, centrally or eccentrically loaded, with or without fire-proof casing. They were finished with spherical ends and placed upright, gripped by the two halves of an oven, two yards high, swinging on door-hinges and containing twelve gas-burners which emitted flames at least a yard high. A hydraulic press was below the column and its cross-head above it. The oven was furnished with apparatus for measuring heat, etc., with peep-holes and with the nozzle of a fire-engine. On an average a load of 3.2 tons per square inch, with a red heat of 1400° F. obtained in thirty-five minutes, produced deformation in a centrally loaded column without casing, which showed itself by bulging all round in the middle of the heated part, especially where the metal happened to be thinner; fracture occurred finally in the middle of the thickest point of the bulge. If the load was less this occurred at a higher temperature, and *vice versa*. Jets of water had no effect until deformation heat was reached. The casings tried were of Monier structure, of patent "Korkstein," of asbestos silicious marl and of asbestos cement. These had the effect of increasing the time, till deformation heat was reached, from thirty-five minutes to four hours or five hours, with a measurable temperature of 2,000° F. to 2,500° F. The best result gave a casing of asbestos silicious marl, as a temperature of 2,000° F. was maintained

**Deutsche Bauzeitung*, 1895, pp. 274, 280.

NOTICE OF MEETINGS.

SAN FRANCISCO CHAPTER, AMERICAN INSTITUTE OF ARCHITECTS, meets second Friday of each month at 409 California street, SETH BARSON, Pres. H. A. SCHULTZ, Vice-Pres. OLIVER EVERETT, Sec. JOHN M. CURTIS, Treas.

SOUTHERN CALIFORNIA CHAPTER AMERICAN INSTITUTE OF ARCHITECTS, meets first Wednesday of each month at 114 Spring street, Los Angeles, Cal.

THEO. A. EISEN, Pres. ARTHUR B. BENTON, Vice-Pres. WILLIAM C. AIKEN, Sec't. AUGUST WACKERBARTH, Treas.

WASHINGTON CHAPTER AMERICAN INSTITUTE OF ARCHITECTS, regular meetings at 8 o'clock P. M., the first Friday of each month, except July and August.

JOS. C. HORNBLLOWER, Pres. JAS. G. HILL, Vice-Pres. E. W. DUNN, JR., Sec. W. J. MARSH, Treas.

ASSOCIATION OF ARCHITECTS OF ARIZONA, meetings held at Phoenix, Arizona.

D. W. MILLARD, Pres. T. H. MADDOX, Vice-Pres. W. R. NORTON, Sec. and Treas.

TECHNICAL SOCIETY OF THE PACIFIC COAST, meets first Friday of each month at Academy of Sciences Building.

E. J. MOLERA, Pres. W. F. C. HASSON, Vice-Pres. OTTO VON GELDERN, Sec. EDWARD T. SCHILD, Treas.

MASTER PLUMBERS' ASSOCIATION, meets every first and third Friday of each month at the Flood Building.

JAS. E. BRITT, Pres. J. L. E. FIRMAN, Sec.

BUILDERS' EXCHANGE, Directors meet first Friday in each month at Mission and New Montgomery.

S. H. KENT, Pres. JAS. A. WILSON, Sec.

MASONS' AND BUILDERS' ASSOCIATION, meet first Friday evening of each month.

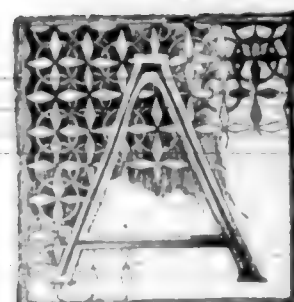
ADAM BECK, Pres. M. V. BRADY, Sec.

KEELY MOTOR UP-TO-DATE.

PROCEEDINGS OF ENGINEERS' CLUB OF PHILADELPHIA

BY E. J. SCOTT, ACTIVE MEMBER.

[CONTINUED FROM JULY NUMBER]



AN INTERESTING experiment of a different character was made in the third room. The apparatus stood in the northwest corner on a table with a glass top. It was a large ball covered with gold foil mounted upon an axis upon which it revolved stiffly and was considerably out of balance. It looked like an old timer. The two investigators stood by the apparatus while Keely went into the middle room and looked through an aperture. Just large enough to show his face, across the room to the ball. From the axis of the globe ran a thread of black silk to Keely and was attached to a zither. Keely said the ball would turn round once, twice or any number of times the visitors might name. One was suggested, and Keely struck a chord on his instrument and the ball turned over once. Three was called, and another chord resulted in its rolling over three times, and so on with other numbers, or it would roll rapidly when so indicated. It went with a wobbling motion and seemed to be rubbing on something. When it stopped it stopped suddenly. It was also noted by



LEVITATION EXPERIMENT

the visitors that the same number of turns did not necessarily require the same chord on the zither.

The great machine for navigating an air-ship also stood in this room. It had wheels not made to revolve, but only to be set to certain combinations. It was covered with resonators, sensitized disks and spiny scales, and had on the end of a large shaft a gong, or Kladna, as Keely called it, which when struck created as much dismay as a fire-ball in the night. This machine, which weighed tons, Keely said would rise like a feather by creating about it a vibratory condition which annihilated gravity. He was understood

to say that this same apparatus had been moved about the room in that very way.

After these three visits Mrs. Moore was plainly told by the two gentlemen that they had seen no evidence of any new force in any of the experiments shown by Mr. Keely. In fact some of them were readily explainable by the laws of nature already known, and no doubt, with proper facilities for investigation in addition to what the eyes alone had afforded, they would be able to explain them all.

Soon after this Mrs. Moore arranged with Professor W. Lascelles-Scott, of London, to come to Philadelphia and examine the apparatus and be instructed by Keely in the secrets of its operation. He arrived in this city in March and entered upon his investigations. Mrs. Moore said to the writer that the Professor was to be allowed to handle and take apart the apparatus, which was a greater privilege than had been allowed to any prior investigator.

There was naturally great curiosity to know what opinion the English scientist would form. He was unknown to the scientific world on this side of the water, but to the writer he said he was "late consulting expert to the India Museum under Dr. Forbes Watson, and lecturer on chemistry and physics to the London Conservatoire." From this it would appear that he had some reputation in his own country, and would be entirely competent, with the facilities afforded him, to pass a proper judgment on Keely's invention. The Professor pursued his inquiries for fully a month before he made any public expression of his views, and it was with great interest that the members of the Franklin Institute, at the monthly meeting, held April 15th, listened to his remarks.

He stated in brief, that he had commenced to get a glimmering idea of Keely's great principle, which was based upon vibrations, a subject with which the Professor declared himself thoroughly familiar, as he had devoted much attention to it, and had published some of the results of his investigations in that branch of physics. He had, he said, been quite unable for some time to understand Keely's explanations, as they were made in language too unscientific, the terms used being unintelligible, because, although the words were familiar, Keely had used them out of their generally accepted meaning, giving them a signification known only to himself, and possibly to Mrs. Moore. The Professor stated, however, that it was his opinion that "Keely had certainly discovered a means of utilizing a force that has been suspected, but has never been realized in any form." He could say it was neither magnetism nor electricity, either static or in the form of a current.

In saying so much the Professor stated that he told less than he knew. He promised, after he had more fully investigated the matter, to come again before the Institute and tell the result of his study into Keely's secrets. That promise was never fulfilled.

About a fortnight after the Franklin Institute meeting, Mrs. Moore sent for the writer and said that Professor Lascelles-Scott has arranged an experiment which would convince him that he was entirely wrong in his surmises as to the force used in experiments already witnessed, and named Saturday afternoon, May 2d, for a meeting at Keely's laboratory.

On that day there were present Mrs. Moore, Mr. Elliott (a friend of Mrs. Moore's), Professor W. Lascelles-Scott, E. A.

Scott and Mr. Keely. It has been assumed that the writer believed that the platinum wire, connecting the sympathetic negative transmitter with the "vibrodyne" or engine, carried a current of electricity, and the Professor had arranged for a delicate test to show that not the faintest current could be detected in the wire. The mere statement of the object of the experiment was sufficient, and Mr. Scott said he granted the conclusion at once and without experiment, as he had no thought that the wire was used as a conductor of electricity. The wire had been wound in its center, into a small coil of a dozen or more turns, and within this coil it was proposed to insert a rod of soft iron, which the Professor stated had been chemically prepared, so as to produce the best results. Keely had himself made this coil and when the Professor carelessly took the wire in his hand to explain it, Keely nervously took it from him, saying it might become broken and that he had wound it with great care. The writer, as on former visits, was not permitted to handle anything, and was repeatedly cautioned not to do so. He used his eyes, however, to the best advantage in examining the coil which it had cost Keely so much trouble to wind, to see the evidences of its being a tube, and in the flattening at certain places, the tendency to bend at an angle at others, and its general tendency to bend in the form of a polygon instead of a circle when being wound, there was no reason to doubt his former convictions that the "wire," which seems to be an inseparable adjunct to Keely's apparatus generally, was a thin platinum tube. This latest experiment only afforded additional proof of what was quite well known before.

On one of the visits with Mr. Burk, the writer picked up one end of the platinum wire which had fallen on the floor at the end of an experiment, and held it up so that Mr. Burk could see that it was a tube.

Following his general policy at all these visits, the writer did not avow his belief. A question indicating doubt or a statement of a discovery made would have prevented him from seeing other experiments where he might obtain further confirmation of his views. When Mr. Elliott, who had never before seen any of Keely's experiments, began to ask questions, which both the Professor and Keely answered, the writer asked the privilege of making some stenographic notes, which Keely had permitted on a former visit, and he occasionally asked a question himself on points not well covered by the other questions. This conversation brought out the description of the construction of the "sympathetic negative transmitter," which forms so important a part of the whole system, and without which but few experiments are made. The Professor's description in his own words was, that "it is a hollow globe, the axis of which (a cylinder 1 1/2 inches in diameter) is retractable within certain ranges; that is, it is drawn out or thrust into the globe by turning it like a screw. That axis carries a sensitive disk, called a kladna, which is sensitive to vibrations of every kind, and especially to those vibrations which are inaudible, beyond the voice to utter or ear to perceive. Therefore Keely is quite right when he calls it a sensitive disk. Beyond the kladna is a series of resonators, on this same central axis, and when it is screwed in or out the kladna and the series of tubular resonators (which resemble small organ pipes) go backwards and forwards, and occupy different positions in this globe, sometimes central, sometimes a little to one side and sometimes a little to the other side."

Keely said the moving of the disk inside is to get one way the attraction and the other way the repulsion. He added

to the description: "There is also a sympathetic scale, formed of straight wires of different length struck around the edge of a disk, which represents progressive chords, the same as in a piano. This scale is placed on the axis, between the kladna and the resonators, and all are fixed on the central axis. On the outside of the globe is a similar scale, which to a certain degree corresponds to the scale on the inside. There is also another smaller scale on the outside, which has two series of spines or wires. I might use three of these spires for one experiment and half a dozen at another. There is no regular interval of sound between any two of the spines; they vary one-quarter tone to one-half tone and sometimes a full tone. The larger scale has about seventy spines."

The above description by the English scientist and Keely is all that is known of the interior construction of the "sympathetic negative transmitter." The only apparent use of the axis or handle is to shift the position of the kladna, the resonators and the spines to a greater or less distance from the center of the globe by turning it backwards and forwards.

Keely then exhibited his levitation experiment, or the floating of heavy weights in a jar of water, which the writer had seen on each of his three former visits. He noticed that the jar was a new one and had a different cap or cover from the one he had before seen. The Professor explained that, at his instance, Keely had taken a new jar and that it had been filled with distilled water. He said he was familiar with the general principle of the experiment. Two weights similar in every respect to the weights used in the old jar, were reposing on the bottom, the one, a disk-shaped flat brass box, without a cover, filled with amalgam, and the other, an orange-shaped globe, said to be filled with shot. In answer to the writer, Keely said these were not the same weights which were used in the old jar; the globe, however, had the same indentations and the gold-foil with which it was covered the same spotted appearance which had been particularly noted at his former visits, and the desk seemed to be the very same, although there were no distinguishing marks by which it could be absolutely identified.

The Professor had carefully weighed these weights before they were put into the jar and that the flat disk weighed 68 ounces and 387 grains in air, and 58 ounces 383 grains in distilled water, a difference of 10 ounces and 4 grains, which represented the water displaced. The globular object weighed 53 ounces 3 4 grains in air, and 45 ounces 362 grains in distilled water, a difference of 8 ounces 22 grains. The jar appeared somewhat smaller than the old one, and was 4 1/2 inches high, and perhaps 10 inches in diameter. The cover was of glass, and was sealed on with a white cement. A space from one-half to three-quarters of an inch was left between the surface of the water and the glass cover. Inserted through the cap was a plug, with a binding screw for attaching a wire. The jar stood on a small, cheap table, with a thick, glass top. Keely placed the sympathetic negative transmitter on the same table, and connected the top of the jar with it by means of the platinum wire. On the top of the jar he placed a disk similar to the one in the jar.

When every thing was ready, Keely turned the handle or axis of the sympathetic transmitter, twanged some of the wires of his scale, blew softly on the mouth-organ, and the round weight started for the top, followed a few seconds later by the disk-shaped weight. In answer to the writer, he said he could not reverse the order of their rising. The

tone of B natural, he said, started the first one to go up, and B flat the second one. He struck a tuning-fork for the purpose of subdividing those notes, he said, and setting a chord for their descent. Then, again turning his handle, and blowing upon his mouth-organ, the disk-shaped weight came down first at the end of about three minutes, the other remaining at the top for a time. He said he could arrest it before it reached the bottom, but failed to do so, and it struck the bottom and bounced up and down three or four times before it finally settled itself. Afterwards, he sent both to the top, and then sent the disk to the bottom, leaving the globular weight at the top, where he said he could make it stay ten years. After about three minutes, with blasts upon the mouth-organ, and turning the handle backwards and forwards, the ball was sent to the bottom, where it struck and bounced up about four inches.

The writer found by jarring the table with his knee, which he did several times unobserved, he could make the weights bounce up 3 or 4 inches without the aid of the sympathetic negative transmitter, the mouth-organ or the "chord of mass," which was rather remarkable, when the specific gravity of the weights as given by Professor W. Lascelles-Scott, is taken into consideration. It was an experiment in vibrations which were quite visible, though inaudible, and which produced results that did not demand for their explanation the theoretical force of "apergy."

At this point the Professor gave as his general conclusion on this levitation experiment of Keely's, that if Keely were to take a standard barometer, a standard thermometer, and a standard electro-scope, and take the condition of the air at the time of making an experiment, and would also have his scales graduated in precise tones, which they were not at present, than with the barometer reading for instance at 29.5, the thermometer at 55.5, and the electro-scope at .26 with a certain response note and chord of mass, and a certain note struck upon the sensitive sympathetic transmitter, he could at all times raise the weights to the top without feeling his was as at present; and another note would as certainly send them to the bottom. This, he said, was the first time he had unbosomed himself so far; but that was his opinion, founded upon what he had seen there. Keely replied that we were just beginning to learn sound sense.

To be Continued.

MANAGEMENT OF QUICKSANDS IN FOUNDATIONS.

TWENTY-FIVE years ago, anticipating that I would probably have to contend with quicksand in my work, I read up on the subject everything that I could find, but with very little satisfaction. In fact the theories set forth by the majority of writers on the subject were virtually of no use when I met with the actual facts in the course of my experience. I investigated the matter very thoroughly, however, finding a very essential point in the fact that in all quicksands a great variety exists in the sizes of the atoms, this variation requiring various plans to be tried to successfully contend with the difficulties that must be overcome.

I did not have long to wait before meeting with a quicksand bottom. I was then engaged on the foundations of the bridge work of the D. L. & W. Railroad, in Hoboken. In

foundation east of Henderson street we had to go two feet into a bed of quicksand to get our depth. In this case it happened that I had a large bank of oyster shells in the way, which I utilized. I cribbed my sump large enough to give me plenty of room, mixed the oyster shells with gravel, and put a bed of the mixture all around the sump, shoveling the sand out of the middle and allowing the mixture to sink until I got below the required depth; the mixture closing in and making a solid bottom for sump. After this I uncovered about ten feet square section of the sand, throwing out the sand as quickly as possible with as many men as could conveniently handle a shovel. The moment the required depth was reached we covered the bottom with a foot of the gravel and shells. When this was done and walked over, it would all be in a movement, but after standing a few hours it would become perfectly solid. The cause of its becoming solid is that the larger atoms of the sand passing up through the mixture adhere to the shells, gradually closing up all the crevices. Leading drains across the foundation we successfully completed the work. After this I used crushed stone with better results than with the gravel.

Some years later when superintending the construction of a large tank—200 feet in diameter—for gas holder in Brooklyn at thirty feet in depth—just the depth we had to go—we uncovered a quicksand bed. The contractor was very much excited, having previously lost several thousand dollars in a similar case. I proceeded this time with crushed stone in getting my sump down, sinking a wall of broken stone all around the well hole, got our pipes into their proper depth and made this our sump, leading box drains from this point all over the bottom, uncovering sections of ten feet square and replacing with crushed stone a foot thick, completing the whole bottom of this system with entire success.—J. B. Gordon in Stone.

CONCRETE STAIRS.

CONCRETE STAIRS, owing to the hardness and nature of the aggregates used, are apt to become slippery on the treads. Various methods, such as grooving, inserting wood or lead cubes in the concrete, have been used to render the treads non-slippery. Grooving has the defect of retaining dust, while lead or wooden cubes are difficult to replace when worn out. These defects have been entirely overcome by the use of rubber cubes which are made in the form of a screw, so that they can be raised when they become worn, and when finally worn out they can be readily extracted and replaced by new ones. Most people are aware that a staircase always becomes worn in the centre, while the ends are never trodden upon, inasmuch as it is impossible to tread within 7 in. or 8 in. of the wall or handrail. Therefore the rubber cubes in the centre of the tread wear out first. Being made to unscrew they can be changed from one position to another until they are all worn out, when new ones can be had. The rubber cubes not only render the treads non-slippery, but afford a firm, noiseless surface.

Subscribe for CALIFORNIA ARCHITECT AND BUILDING NEWS—\$3.00 Per Year.

DUNHAM, CARRIGAN & HAYDEN CO.

17 and 19 BEALE ST., San Francisco Cal.

WE show here an illustration of our AMERICAN SLIDING DOOR HANGER for which we claim unusual advantages, great saving in time and expense, and superior excellence in operation, together with the following features not obtained or claimed in other hangers.

TRACKLESS—We obviate the use of a track above or below, and the special framing necessary where a track is used.

NO WHEELS—There are no wheels to bind by reason of warped or sagging track. The movement is perfectly PARALLEL and insures against binding.

NOISELESS—The operation is noiseless and extremely easy.

DOORS EASILY ADJUSTED—The door can be readily adjusted plumb, raised or lowered by drawing them into the opening which gives easy access to the adjusting screws.

QUICKLY PUT UP—The Hangers can be put up in one-third the time required for overhead hangers.

SUBSTANTIAL—The parts are made to carry three times the weight of doors of the sizes given.

ONE PACKAGE—We pack the Hangers fully assembled and ready to attach, in one package, including all bolts and screws necessary.

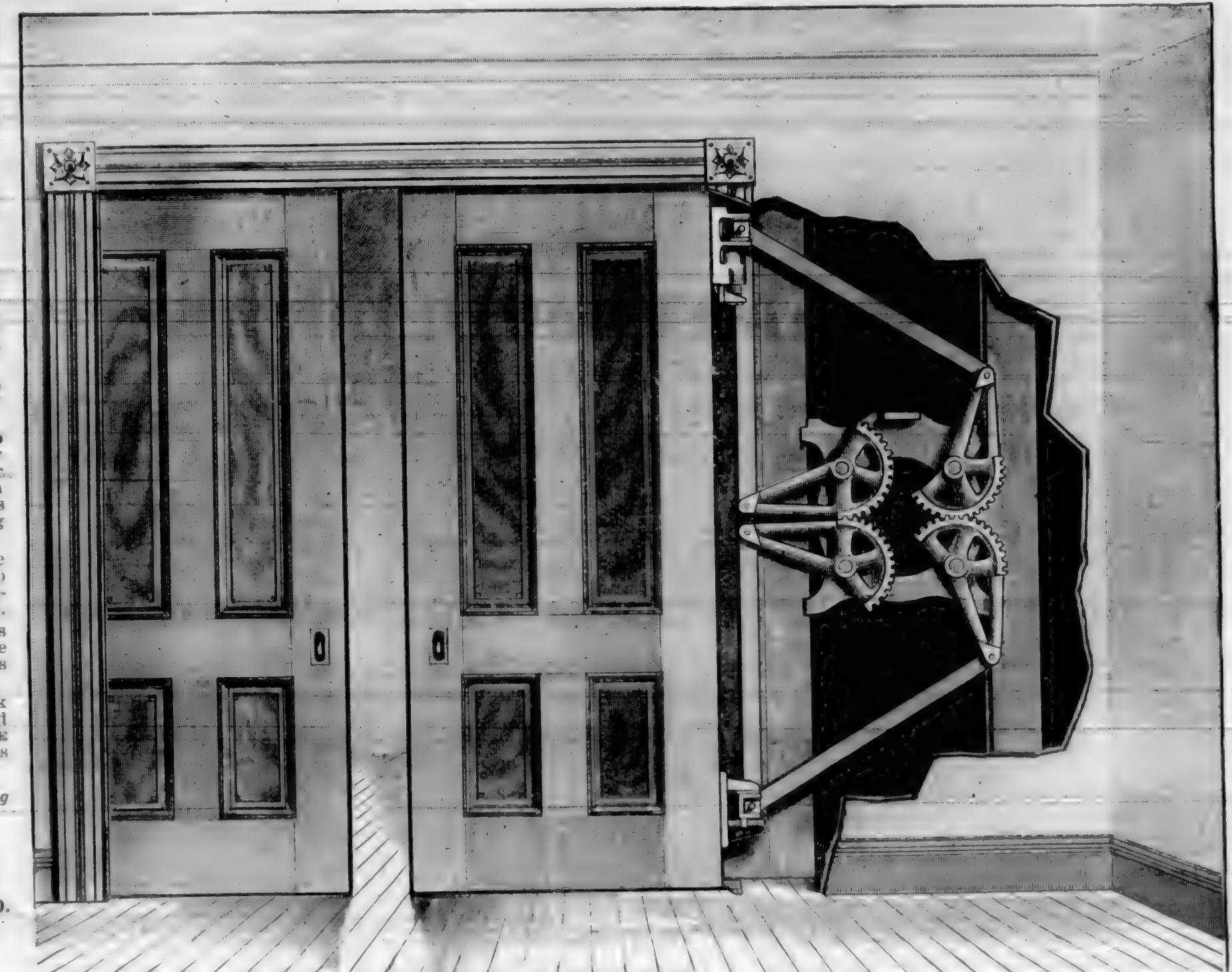
See a full size working model at our store.

WE SELL

The Yale & Towne Mfg. Co.

CELEBRATED

YALE LOCKS.



W. & P. SHINGLE STAINS

In soft and pleasing tints.

Of highest grades of material.

SPECIALLY ADAPTED TO REDWOOD.

PACIFIC COAST PRODUCT.

PACIFIC REFINING & ROOFING CO.

113 NEW MONTGOMERY STREET, S. F.

Sample Tablets on Application.

Sold by Dealers.

723 MARKET ST.
San Francisco, Cal.

230 1/2 S. SPRING ST.
Los Angeles, Cal.

SMITH & YOUNG BUILDING SUPPLIES

OUR SPECIALTIES:

FOUNDATION AND WALLS

Marble. Georgia White, Southern Marble Co. Serpentine, Fire and Electric-Proof.

Sandstone. [BUFF] GOODRICH QUARRY.

Joist Hangers. GOETZ PATENT Forged Wrought Iron.

Lath. SHEET STEEL Painted and Unpainted. WIRE LATH. G. & B. System.

Mortar Stain. PECORA For coloring mortar, cement, and sand finish.

Paper. [BUILDING] S & Y BRANDS Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18 and 19.

Wall Ties. MORSE'S PATENT

McDonough Weather Strips. Acts as a stop and prevents window from rattling.

Alpine Cement Plaster. For brown and white coat.

Porcelite Enamel Paint. Does not craze or crack.

Oils. S & Y Pure LINSEED Triple Boiled, Raw and Varnish.

Varnish. S & Y TRANSPARENT.

Filler. S & Y LIQUID AND PASTE.

Deadening Felt. S & Y BRANDS 1, 1 1/2 and 2 lbs. per sq. yd.

Ornaments. PRESSED WOOD.

Casing Blocks. Corner, head, center and base blocks.

Carvings. [WOOD]

Ceiling. [STEEL CEILING]

Chimney Hood. CLAWSON'S PATENT To prevent smoky fire-places, and increase heat.

Mouldings. TURNED, CARVED AND PRESSED.

Shingle Stains. DEXTER BROS. PERMANENT COLORS. A PERFECT PRESERVATIVE. Send for Samples.

Paints. S & Y EXTRA QUALITY "GRAPHITE" For metal and wood. MIXED ROOFING AND HOUSE PAINTS.

EXTERIOR FINISH

Roofing. Slate, Mastle and Seal. "Ready-Rock" Asphalt Roofing. Strongest and most durable roofing in the market. Easily applied.

Roofing Cement. S & Y BRAND For repairing leaks about chimneys, sky lights, copings, and old tin and shingle roofs.

OTHER SPECIALTIES

Insular Earth. Fire proof. Used for boiler and pipe covering.

Soapstone. CRUDE, GROUND AND BOILED.

Mineral Wool. For fire-proofing and deadening.

CHAS. J. WATERHOUSE

BOX 78 BUILDERS' EXCHANGE. PHONE BLACK 1807. BOX 132 BUILDERS' ASS'N.

OFFICE 421 MARKET STREET, S. F.

DEALER IN

RELIABLE BUILDING MATERIALS

ART MOULDINGS

SAMUEL CABOT'S

CREOSOTE SHINGLE AND RUSTIC STAINS
SHEATHING AND DEAFENING QUILT
MORTAR STAIN PULPS—BRICK PRESERVATIVE

N. & G. TAYLOR CO.'S

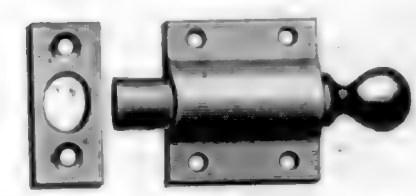
"OLD STYLE" ROOFING TIN
"THE TAYLOR ROOFING TIN"
"COLUMBIA ROOFING TIN"

THE VAN DORN IRON WORKS CO.'S

VAN DORN STEEL JOIST HANGER

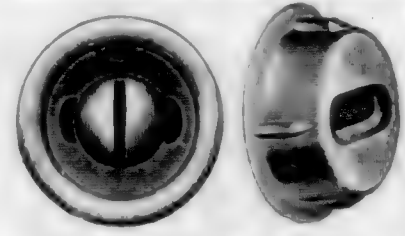
ALL ABOVE GOODS ALWAYS IN STOCK.

ALSO SELL FROM THE EAST FOR

THE E. T. BURROWES CO.
Window and Door ScreensHUTTIG BROS. M'FG CO.
Hardwood Interior Finish.WASHINGTON SLATE CO.
Roofing and Blackboard Slates

Window Ventilating Bolt.

IVES PATENT



Window Stop Adjuster

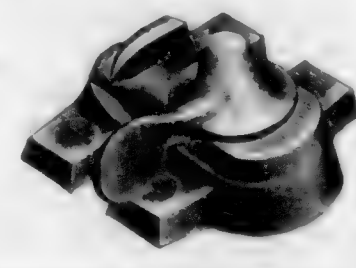
Window Hardware Specialties

Leaders with Architects and the Trade
Thirty page Catalogue mailed free.

Manufactured only by

HOBART B. IVES & CO.

New Haven, Conn., U. S. A.



The "LINCOLN" LAUNDRY TUBS and SINKS

GLADDING, McBEAN & CO.
1358-1360 Market St.
San Francisco.

CAMPBELL & PETTUS.

CONTRACTORS.

Office, Builders' Exchange, San Francisco.

MEMBERS OF THE BUILDERS' EXCHANGE.

CORNER NEW MONTGOMERY AND MISSION STREETS.

Box No.	Box No.
S. H. Kent, President.	Box No.
Gus V. Daniels, Vice-Pres.	Box No.
Edw. B. Hinder, Treasurer.	Box No.
DIRECTORS:	Box No.
S. H. Kent, John Tuttle, Gus V. Daniels, D. McPhee, R. Herring, Edw. B. Hinder, J. R. Tobin.	Box No.
COMMITTEES:	Box No.
J. R. Tobin, R. Herring, Thos. Elam, E. B. Hinder, T. McLaughlin, G. V. Daniels, Jas. A. Wilson, D. McPhee, Gus V. Daniels, E. L. Snell, Gus V. Daniels, D. McPhee.	Box No.
Abrahamson, P., patent ventilators.	Box No.
Adams, John G., contractor and builder.	Box No.
Alameda Brick & Tile Co., brick.	Box No.
Arizona Sandstone Co., building stone.	Box No.
Bass-Huter Paint Co., paints, oils and varnishes.	Box No.
Bateman Bros., contractors and builders.	Box No.
Beck, Adam, mason and builder.	Box No.
Bell, Wm., contractor and builder.	Box No.
Bibb Lumber Co., D. H.	Box No.
Bellingham Bay Imp. Co., lumber.	Box No.
Boyd, Robert, mason and builder.	Box No.
Brady, M. V., mason and builder.	Box No.
Brady, O. E., mason and builder.	Box No.
Brennan, D. J., mason and builder.	Box No.
Brennan James, plasterers.	Box No.
Britt, James E., plumber.	Box No.
Brodie, R., iron works.	Box No.
Burden, W., mason and builder.	Box No.
Burnham, Stanford Co., planing mill.	Box No.
Burrell, E. H., building material.	Box No.
Burt, W. J., house mover.	Box No.
Butler, Wm. A., mason and builder.	Box No.
California Art Glass Works.	Box No.
California Electrical Works.	Box No.
California Mills, planing mills.	Box No.
Campbell, Alex. I., contractor and builder.	Box No.
Carey, J. E., brick manufacturer.	Box No.
Chignani and Masow.	Box No.
Cartwright, D. S., teaming.	Box No.
Central Lumber & Mill Co., lumber and planing mill.	Box No.
Chatham, Wm., contractor and builder.	Box No.
Chemical Paint Co., paint.	Box No.
Chisholm, C., contractor and builder.	Box No.
Clark, N. & Sons, terra cotta, etc.	Box No.
Clawson, L. E. & Co., patent chainways.	Box No.
Coghlan, Frank, plasterer.	Box No.
Collins & Gunn, lathers.	Box No.
Concepcion Wm., contractor and builder.	Box No.
Conlin & Roberts, metal roofers.	Box No.
Copplest & Moeckel, grill work.	Box No.
Cowell, H. & Co., lime, cement, fire brick, etc.	Box No.
Crocker, Wm., planing mill.	Box No.
Crichton, Peter, contractor and builder.	Box No.
Crozier, Wm., planing mill.	Box No.
Currie Donald, contractor and builder.	Box No.
Cushing-Watmore Co., concrete and artificial stone.	Box No.
Curry, J. M., stone dealer.	Box No.
Daniels, Gus V., painter and decorator.	Box No.
Davis, Geo. & Son, house movers.	Box No.
Day, Thos. H. & Sons, contractors and builders.	Box No.
Degan, Patrick, stone contractor.	Box No.
Dillon, David, teamster and contractor.	Box No.
Donovan, M. J., painter.	Box No.
Dunbar, Wm., mason and builder.	Box No.
Dunham, Carrigan & Hayden Co., hardware.	Box No.
Dunlop, Chas., plasterer.	Box No.
Dwyer, L. J., painter and decorator.	Box No.
Dyer Bros., Golden West Iron Works.	Box No.
Elam, & Knowles, carpenters and builders.	Box No.
Excelsior Mill Co.	Box No.
Feely, M. J., contractor and builder.	Box No.
Fennell, M. & Son, masons and builders.	Box No.
Field, Wm. J., contractor and builder.	Box No.
Field, Z. O.	Box No.
Flanagan, L. G., lime and cement.	Box No.
Foley, Michael, grading and teaming.	Box No.
Forrester, Cornice Works, patent sky lights, roof- ing, etc.	Box No.
Fortin Brick Co.	Box No.
Frazer, J. P., painter and decorator.	Box No.
Fuller, W. P. & Co., paints, oils and glass.	Box No.
Furness, John, contractor and builder.	Box No.
Geier, Frank A., Market Street Planing Mills.	Box No.
Gietl, Second, artificial stone.	Box No.
Gillogley, Geo., teaming.	Box No.
Girvin & Eyre, Importers.	Box No.
Gladding, McBean & Co., architectural terra cotta.	Box No.
Golden West Iron Works, Dyer Bros.	Box No.
Goodman, Geo., artificial stone, etc.	Box No.
Grannis, J. G. & Co., steam heating, etc.	Box No.
Gray Bros., artificial stone and concrete work.	Box No.
Griese, Carl, artificial stone and concrete work.	Box No.
Hammond, Philip, metal roofers.	Box No.
Hansen, A., planing mill.	Box No.
Hansen, F. L., contractor and builder.	Box No.
Hansen, M. & Co., planing mill.	Box No.
Harmon Lumber Co., lumber.	Box No.
Harris & Jones, Lumber Dealers.	Box No.
Hauslein, H., tiles.	Box No.
Heidt, W., cornice works.	Box No.
Herrig, R., mill work.	Box No.
Henzel, Ed. F. & Co., electricians.	Box No.
Hille, Wm., cornice works.	Box No.
Hindes, Ed. B. & Co., patent blinds.	Box No.
Hobson, R. P., painter.	Box No.
Hock, T. & Son, masons and builders.	Box No.
Hoffman, V., mason and builder.	Box No.
Holmes, H. A., Lime Co., lime, cement, etc.	Box No.
Hooper, C. A. & Co., lumber.	Box No.
Hulbert, R. P., builder.	Box No.
Ickelheimer, Samuel & Bros., plumbers.	Box No.
Ingerson & Goe, contractors and builders.	Box No.
Jacks, Henry, contractor and builder.	Box No.
Jackson, P. H. & Co., illuminating tiles.	Box No.
Jackson, W. E., carpenter.	Box No.
Jesse, Geo. H., stair builder.	Box No.
Jordan D. & Son, masons and builders.	Box No.
Joshua Hendy Machine Works.	Box No.
Judson Mfg. Co.	Box No.
Keating, M., Artificial Stone.	Box No.
Keatinge, R., Artificial Stone.	Box No.
Kelleher, M., house raiser and mover.	Box No.
Kendall, A., Pacific Coast Lumber and Mill Co.	Box No.
Keefe, J. H., painter and decorator.	Box No.
Kent, S. H., contractor and builder.	Box No.
Kern, F. W., contractor and builder.	Box No.
Kittredge, E. H. & Co., sash, doors and blinds.	Box No.
Knox & Cook, contractors and builders.	Box No.
Kuss, P. N., painter, decorator and wood finisher.	Box No.
Lang, Geo. K., contractor and builder.	Box No.
Larsen, H. H., mason and builder.	Box No.
Leahy, D., plasterer.	Box No.
Leonard, J., Concrete and Artificial Stone.	Box No.
Leproun, P., steam and hot water heating.	Box No.
Logan, J. F., adjuster and builder.	Box No.
Lovett, A. E., roof repairing and painting.	Box No.
Lucas & Co., Gilded Gate Plaster Mills, calcined plaster.	Box No.
Lynch, M. C., contractor and builder.	Box No.
Macdonald & McKinnon, lumber.	Box No.
Maguire, A. B., lime, laths, plaster, cement, etc.	Box No.
Maguire, James A., manufacturer's agent.	Box No.
Mangiesdorf, M., Electrical Maintenance Co.	Box No.
Manzrum & Otter, heating, ventilating, tiles, etc.	Box No.
Market Street Planing Mill.	Box No.
McCarthy, John, mason and builder.	Box No.
McClure, H. N., teaming and grading.	Box No.
McClure, A., contractor and builder.	Box No.
McClure, Stone Co., stone contractor.	Box No.
McClure, M., mason and builder.	Box No.
McKee, John, stair builder.	Box No.
McLaughlin, T. M., contractor and builder.	Box No.
McMahon, Henry, stair builder.	Box No.
McPhee & Co., stone contractors.	Box No.
Mennie, Alex., plasterer.	Box No.
Miller, J. W., mason and builder.	Box No.
Montague & Co., W. W., tiles, mantles, etc.	Box No.
Moore, C. Parker, contractor and builder.	Box No.
Moore, C. Howard, contractor and builder.	Box No.
Morehouse, C. C., plasterer.	Box No.
Morehouse, J. J., plasterer.	Box No.
Mulcahy, J., mason and builder.	Box No.
Niehans, Edward F. & Co., hardwood lumber.	Box No.
Niehans Bros. & Co., planing mill.	Box No.
North, J. J., Brick manufacturer.	Box No.
Nutting, J. O.	Box No.
O'Brien, Jas. J., carpenter and builder.	Box No.
O'Brien, P. R. & Son, plumbers.	Box No.
O'Connor, Thomas, mason and builder.	Box No.
Ogle, John, contractor and builder.	Box No.
O'Sullivan, D., mason contractor.	Box No.
Pacific Bridge Co.	Box No.
Pacific Refining & Roofing Co.	Box No.
Pacific Lumber Co.	Box No.
Pacific Manufacturing Co., Mill Work.	Box No.
Pacific Rolling Mills.	Box No.
Pachetz, Gus J., electrician, etc.	Box No.
Palace Hardware Co., builders' hardware.	Box No.
Paradise Paint Co., roofers, building paper.	Box No.
Patent Brick Co., brick.	Box No.
Peacock & Butcher, masons and builders.	Box No.
Petersen, Brick Co., original red pressed brick.	Box No.
Petersen, H. M. & Co., concrete.	Box No.
Pingst, F. L., hardwood.	Box No.
Please, Henry, mason and builder.	Box No.
Pool, Jas. R., house mover and raiser.	Box No.
Rae, James, stone contractor.	Box No.
Ralston Iron Works.	Box No.
Rosenbath, F. H., glass.	Box No.
Reichley Geo., contractor and builder.	Box No.
Reigle & Jamieson, machine white washing.	Box No.
Remillard Brick Co., pressed stock and common brick.	Box No.
Richardson & Gale, masons and builders.	Box No.
Richmiller, Geo., door opener.	Box No.
Riley John F., masons and builders.	Box No.
Ringrose, R., mason and builder.	Box No.
Robinson & Gillespie, contractors and builders.	Box No.
Rocklin Granite Co., granite work.	Box No.
Rosenbath, F. H., glass.	Box No.
Ruffino & Bianchi, marble.	Box No.
Sacramento Transportation Co., patent and stock brick.	Box No.
S. F. Lime & Mortar Co. & Cement.	Box No.
San Francisco Lumber Co.	Box No.
San Francisco Novelty and Planing Works.	Box No.
San Francisco Planing Mill, Wm. Crocker.	Box No.
San Joaquin Brick Co., brick.	Box No.
San Jose Brick Co., brick.	Box No.
Sanders, J. S. W., contractor and builder.	Box No.
Schroeder, Wm., art glass.	Box No.
Scott & Van Arsdale Lumber Co.	Box No.
Sessions, M. P.	Box No.
Smith, J., carpenter.	Box No.
Smith & Young, building supplies.	Box No.
Smith & Quimby, atree contractors.	Box No.
Snell, E. L., lime and plaster.	Box No.
Snook, W. S. & Son, plumbers.	Box No.
Soule Bros., carpenters.	Box No.
Steiger, A. Sons, architectural terra cotta.	Box No.
Stevens, F. M., patent chimneys.	Box No.
Stockton Brick & Terra Cotta Co.	Box No.
Stratton, Jno. S., house mover.	Box No.
Sullivan, J. F., painter and decorator.	Box No.
Sullivan, Tim, carpenter.	Box No.
Sullivan M. F., grading and teaming.	Box No.
Sweeney, Daniel, carpenter.	Box No.
Sweeney, G. C., plumber.	Box No.
Tacoma and Roche Harbor Lime Co.	Box No.
Tax, Geo. H., Co., plumbers supplies.	Box No.
Tobin, J. R., plasterer.	Box No.
Towle & Broadwell.	Box No.
Trotter, John, contractor and builder.	Box No.
Tupper, O. M., lime.	Box No.
Tuttle, John, teamster, plasterers' supplies.	Box No.
Union Lumber Co., lumber.	Box No.
Vermont Marble Co.	Box No.
Vulcan Iron Works.	Box No.
Wagner, Henry F., painting and decorator.	Box No.
Wagner, J. Ford, mason and builder.	Box No.
Walker, George H., carpenter.	Box No.
Warren, C. A., grading.	Box No.
Washington Street Planing Mills.	Box No.
Waterhouse, C. J.	Box No.
Watson, W. C., plasterer.	Box No.
Western Granite & Marble Co.	Box No.
Western Iron Works.	Box No.
White Bros., carpenters.	Box No.
White Bros., hardwood lumber.	Box No.
Whittle, H., mason and builder.	Box No.
Williams, F. A., contractor and builder.	Box No.
Wilson, Bros. & Co., lumber.	Box No.
Wilson, W. E., plumber.	Box No.
Wilson, James A., mason and builder.	Box No.
Wilkie, Andrew, planing mill.	Box No.
Witkie Andrew, Jr.	Box No.
Worrel, C. R., mason and builder.	Box No.
West Coast Wire Works.	Box No.
Western Expanded Metal & Fire Proofing Co.	Box No.
Yates & Co., paints.	Box No.
Young, S. T., grading and teaming.	Box No.

WESTERN IRON WORKS.

MANUFACTURERS OF

STEEL BUILDINGS AND WAREHOUSES.

Stairs, Elevator Enclosures, Roofs, Iron Fencing and Gates.

JAIL AND BANK WORK.

GAS HOLDERS, SHEET AND PLATE METAL WORK,

—FORGINGS.—

Telephone Main 737.

123-125 BEALE STREET, S. F.

TEL. DRUM 80

W. HEIDT

FORMERLY OF

ARCHITECTURAL SHEET METAL WORKS

Metal Tile and Slate Roofing. Patented Ventilated Skylights and Spanish Tile

224-226 MISSION STREET, SAN FRANCISCO

JOBGING PROMPTLY ATTENDED TO

GEORGE GOODMAN,

PATENTEE AND MANUFACTURER OF

ARTIFICIAL STONE, IN ALL OF ITS BRANCHES.

(SCHILLINGER'S PATENT.)

SIDEWALK AND GARDEN WALK A SPECIALTY.

307 MONTGOMERY STREET,

NEVADA BLOCK, SAN FRANCISCO

BUILDING NEWS.

taken bids for a two-story frame residence, with attic and basement for Mrs. Kate P. Miller, to be erected on West sixth street.

Architect Black and Moore are preparing plans for Capt. H. Heaney of the fire department for three cottages to be built on Pasadena avenue.

Architects Smith and Elder are preparing plans for the erection of three cottages to be built on the Wolfskill orchard tract on Crocker street.

Architect Hugh Todd has prepared plans, etc. for a ten-room flat building for H. Mahoney to be erected on a lot on west Eleventh street.

Architect R. B. Young is preparing plans for the St. Andrews Catholic church to be erected on Walnut and Fair streets.

Architect G. P. Dennis has prepared plans for W. G. Nevin for a residence and barn to be built on the southeast corner of Seventh and Garland ave.

An elegant residence is about to be built on the corner of Sixth and Loma Drive for Mrs. S. H. Van Nuyse.

ARIZONA

Architect R. B. Young is preparing plans for E. Block of Prescott, Arizona for a two-story eight room residence.

PASADENA

Architects Locke and Munsell are preparing plans for alterations to the old Glover residence on South Orange Grove avenue, Pasadena. The property has been purchased by Dr. McBrade.

Architect Fred L. Roehrig has prepared plans for W. T. Ball for a two-story frame residence on Palmetto street.

SANTA CLARA CO.

Agnew's Insane Asylum. Two brick cottages; a. Board of Managers; a. Wm. Binder; c. Frank Davis; signed, July 18; filed, July 19; cost \$15,500.

SAN JOSE

Cottage. Owner P. Russo; a. Wolf & McKenzie; c. Davis Steele; cost \$1210.

SAN RAFAEL

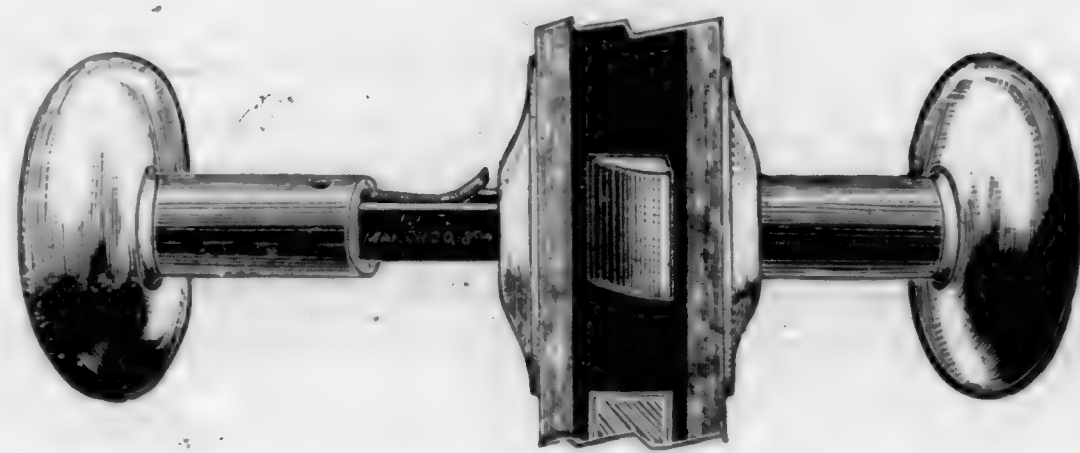
Fourth near E street. To build; a. St. Paul's Protestant Episcopal Church of San Rafael; a. B. A. Brown; c. S. P. A. overhead; cost \$2384.

SAN DIEGO

M. F. Heller is building a two-story residence to cost \$2500 on the corner of Twenty-fourth and B.

The City Council will purchase the Consolidated National Bank Building 5th and 9th streets and convert it into a City Hall.

Mrs. L. S. Kennedy and Mrs. D. P. Hoyle will erect three-story brick building, for hotel purposes, on Fourth and Diego street. The estimated cost is \$50,000.

SPECIFY**THE WEATHERWAX****Patent Screwless Door Knob.**

50 YEARS' EXPERIENCE

PATENTS

TRADE MARKS
DESIGNS
COPYRIGHTS &c.

Anyone sending a sketch and description may quickly ascertain our opinion free whether an invention is probably patentable. Communications strictly confidential. Handbook on Patents sent free. Oldest agency for securing patents. Patents taken through Munn & Co. receive special notice, without charge, in the

Scientific American.

A handsomely illustrated weekly. Largest circulation of any scientific journal. Terms, \$3 a year; four months, \$1. Sold by all newsmen.

MUNN & Co. 361 Broadway, New York

Branch Office, 635 F St., Washington, D. C.

Plans and Specifications Invited for an Hospital Building.

Public notice is hereby given to architects that competitive plans and specifications for the erection of an hospital building will be received by the Board of Supervisors on MONDAY AFTERNOON, September 12, 1898.

The proposed building to be of modern design and to be constructed of stone or brick, or of both, with all the latest scientific improvements.

The said hospital building to be erected on the lot of land commencing at the most southeasterly corner of a tract of land known as and designated, on the official map of the city and county of San Francisco, as the "Almshouse tract."

The said plans and specifications to be so prepared that the cost of the building shall not exceed in the aggregate the sum of three hundred thousand (\$300,000) dollars.

The architect whose plans are adopted will be appointed architect and superintendent of the building, and will be required to give a good and satisfactory bond to insure the completion and construction of the said building for the amount of the cost as made by the said architect. The architects submitting plans determined by the Board to be second, third and fourth in merit will receive premiums of \$1000, \$750 and \$500 respectively, with the understanding that any features of said plans and specifications which may be considered useful or necessary to be embodied in the plans adopted may be used without further cost of charge.

JNO. A. RUSSELL, Clerk.

THE Rapid Safety Filter

Is in use in San Francisco in all the leading Hotels, Schools, Stores, Saloons, Restaurants and THOUSANDS of Private Residences, including those of the leading PHYSICIANS, who endorse and recommend its general use.

No charge for fitting. Kept in order and cleaned by the Company. Leased only. Terms \$1.50 per month for private residences. Office and Show Room.

1209 MARKET ST., near Eight.

RUBEN H. LLOYD,
President.W. D. MANSFIELD,
Secretary.**P. H. JACKSON & CO**

Contractors for

**Wrought Iron Building Work
Sidewalk Lights, Floor Lights****Fire and Burglar-Proof Arched and Flat Sky Lights
Patent Water-Proof Sidewalk Doors
Basement Ventilators, Etc.**228 and 230 First Street, 7 and 9 Tehama Street
SAN FRANCISCO.**WM. BATEMAN,**

MANUFACTURER OF

Wood Mantels, Interior Finish, Inlaid Floors,

Banks, Offices, Stores and Steamboats Fitted Up

411 MISSION ST., Bet. 1st and Fremont,

SAN FRANCISCO, CAL.



House of A. W. Pooley, Millwood, Cal.,
H. A. Klyce, Architect, Eastland.

**Cabot's Creosote
Shingle Stains.**

The Original and Standard Shingle Stains, and the only Creosote Stains.

**Cabot's Insulating
and Deafening 'Quilt'**

A soft, elastic cushion of dead air spaces. The perfect sound deadener.

Mortar Colors and Brick Preservative.

For mortar staining and waterproofing brickwork.

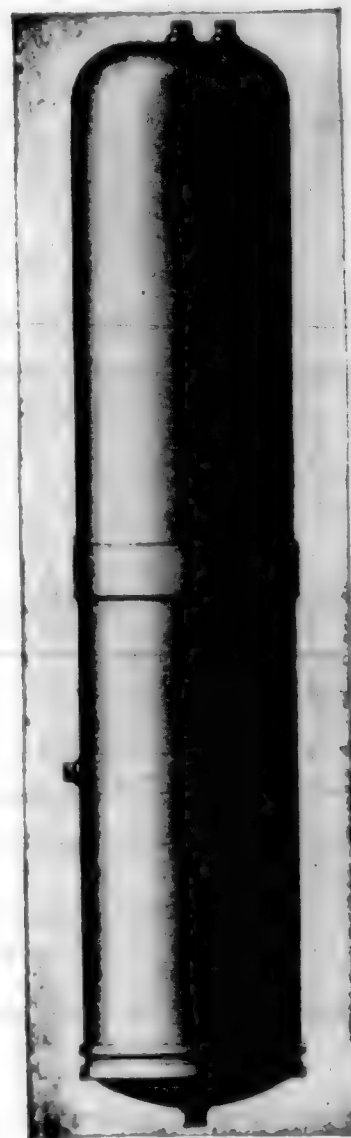
Samuel Cabot, Sole Manufacturer, Boston, Mass.

Stock carried in San Francisco by

CHAS. J. WATERHOUSE, 421 Market Street.

Stock carried in Los Angeles by

P. H. MATHEWS, 238 South Main Street.



For Sanitary Reasons

You Should Specify the

Brown Brothers' Cold Drawn Seamless Copper House Range Boiler.

The smooth copper surface is heavily tinned inside. This absolutely insures against corrosion or rusting of any kind and affords no rusting place for sediment. You always get

Clean Hot Water

own Boilers are made of two pieces of cold drawn copper, united under great hydraulic pressure, so that they are practically one piece. No seams nor rivets, means freedom from leaks. The inside spiral rib guarantees against collapse. Ordinary weight boilers stand a pressure of 150 lbs. to the square inch; extra heavy, 200 lbs.

Boiler Booklets sent on request.

RANDOLPH & CLOWES, Sole Manufacturers

BOX 47. WATERBURY, CONN.



Candelabra and Decorative

Incandescent Lamps and Receptacles.

Adapted for decorative illumination of interiors of fine residences and hotels, and extensively used for that purpose (Catalogue No. 9044).

X-RAY TUBES FLUOROSCOPES Catalogue No. 9050

EDISON Decorative and Miniature Lamp Dept.

GENERAL ELECTRIC CO.
HARRISON, N. J.

Scott & Van Arsdale Lumber Co.

MATT HARRIS, Manager.

Wholesale and Retail Dealers in

SUGAR AND YELLOW PINE.

Yellow Pine selected for Natural Finish

Redwood, White Cedar, Oregon Pine, Spruce Shelving, Curly Redwood, Burl, Shingles.

Mills at Upton, McCloud River

TELMO & MAXWELL, Siskiyou Co.

Office and Yards:

CORNER FIFTH AND BRANNAN STREETS

R. W. Cargoes Furnished

TELEPHONE SOUTH 173

San Francisco

PLASTER OF PARIS.

Golden Gate Plaster Mills,

215 and 217 Main Street,
bet. Howard and Folsom, SAN FRANCISCO.

LUCAS & COMPANY,

Manufacturers of
Calced Plaster.
(PLASTER OF PARIS.)
Marble Dust, Land Plaster and Terra Alba.

THE NATIONAL BUILDER.

Each number contains a complete set of

architects' plans for a low priced building.
Published at Chicago, Ill.

Main Office, Adams Express Building,
185 Dearborn street.

It maintains its standard as a high class practical
Builders' Journal.

W. D. HOBRO,

Plumber and Gas Fitter,

728-730 Washington Street,
Opposite the Plaza, SAN FRANCISCO.

Work done at Reasonable Rates. All orders
promptly attended to. Res. 2013 Clay St.,
bet. Steiner and Pierce

W. J. Cuthbertson,
Architect.
Flood Building,
Cor. Market and Fourth Sts.,
SAN FRANCISCO. Room 93.

John M. Curtis & Co.,
Architects,
126 Kearny Street, between Post and Sutter,
SAN FRANCISCO.

T. J. Welsh,
Architect,
Room 95, Flood Building, Corner Market and
Fourth Streets.

Wm. Mooser & Son
Architects
Rooms 62 and 63, No. 14 Grant Avenue
SAN FRANCISCO.

Oliver Everett,
SUCCESSOR TO HUERNE & EVERETT,
Architects,
126 Kearny Street, Room 41,
SAN FRANCISCO, CAL.

Chas. J. I. Devlin,
Architect,
Supreme Court Building,
N. W. Cor. McAllister & Larkin Streets,
SAN FRANCISCO.

W. Curlett
Architect
Offices, 307 Pheasant Building, Market Street,
SAN FRANCISCO.

Stone & Cahill,
Architects.
Room 89, Donohue Building, corner Market
and Taylor Streets, San Francisco.
Branch Office, 507 Central Bank Building,
Oakland Cal.

Fred. B. Wood,
Architect.
214 PINE STREET, Room 57.
San Francisco.

Pissis & Moore,
Architects,
807 Sansome Street, Rooms 16 and 17,
SAN FRANCISCO.

Havens & Toepke,
Architects,
FLOOD BUILDING, Room 55.
San Francisco. Tel. Main 5429.

Jas. E. Wolfe,
Architect.
FLOOD BUILDING Room 31.
San Francisco, Cal. Take Elevator.

R. H. White,
Architect,
104 Flood Building, Market and Fourth Sts.,
SAN FRANCISCO.

Wm. H. Armistage,
Architect,
319-321 Phelan Building, Market Street,
SAN FRANCISCO.

H. Geiffuss,
Architect.
120-122 Fulton St., bet. Polk and Van Ness Ave's,
SAN FRANCISCO.

B. McDougall & Son,
Architects,
330 Pine Street, Rooms 6 and 6.
SAN FRANCISCO.
Take the Elevator.

M. J. Welsh,
Architect,
Office, 1504 Market St., Cor. of Th. Rooms 7-8.
SAN FRANCISCO.
Residence, 906 Treat Avenue.

John T. Kidd,
Architect,
Furnishes Plans, Specifications, Superintendence
for the construction of every description of build-
ing. 410 Kearny St. Office Hours, 12 to 2 & 4 to 6.

Seth Babson,
Architect,
408 California Street, Rooms 12, 13.
SAN FRANCISCO.

Harold D. Mitchell,
Architect,
126 KEARNY STREET.
Plans and Specifications prepared with the great-
est Accuracy.

A. C. Lutgens,
Architect,
Phelan Building, Room 325.
SAN FRANCISCO.

John Cotter Pelton,
Architect,
Telephone Building, Bush St., Room 52.
SAN FRANCISCO.

Edmund Kollofrath,
Architect,
Gutzkow Bldg., 933 Market St. Tel. Jessie 461.
SAN FRANCISCO.

Chas. S. Tilton,
Engineer and Surveyor,
420 Montgomery St. Take the Elevator.
SAN FRANCISCO.

Emile Depierre,
Architect,
334 KEARNY STREET,
SAN FRANCISCO.

EMIL GUNZBURGER,
SECRETARY
BUILDING and
LOAN ASSOCIATIONS
214 PINE STREET, ROOM 3.

Loans on Real Estate

EASY TERMS

Information Willingly Furnished.

FACTS ABOUT PAINTS.

PHOENIX

The best paint is made of White Lead, Zinc and Linseed Oil.

PHOENIX PURE PAINT is made of these materials only.

To make perfect paint these materials must be finely ground and thoroughly mixed with heavy machinery.

PURE

PHOENIX PURE PAINT is made in that way.

During the past five years PHOENIX PURE PAINT has been the one most generally specified by Architects on the Pacific Coast.

PAINT

It is guaranteed absolutely pure and satisfactory on the building or we will replace it with any material the architect may select.

DURESCO

The New Wall finish or Washable Water Color.

Petrifies on the wall and will not crack or chip off.

Damp Walls do not affect it.

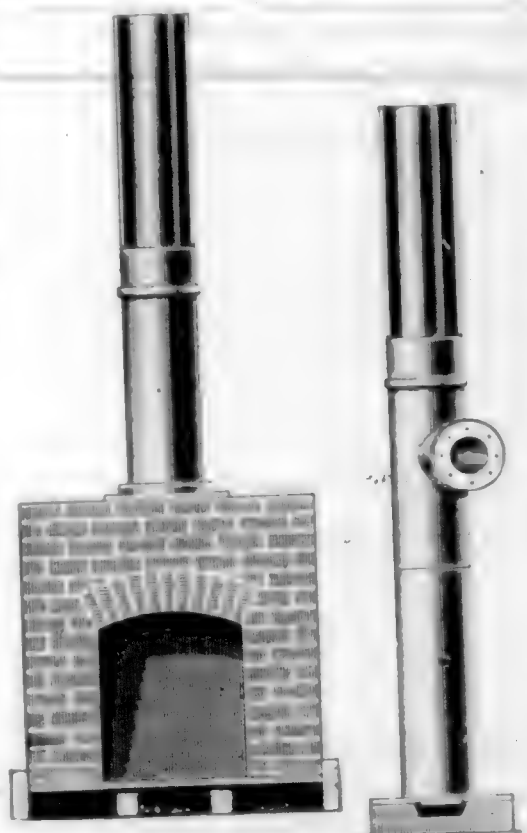
Can be washed any number of times and will not change color.

It strengthens the wall and prevents crumbling.

The strongest, most brilliant and most durable Wall finish made.

MANUFACTURED BY

W. P. FULLER & CO.



CLAWSON'S PATENT CHIMNEY.

L. E. CLAWSON & CO.

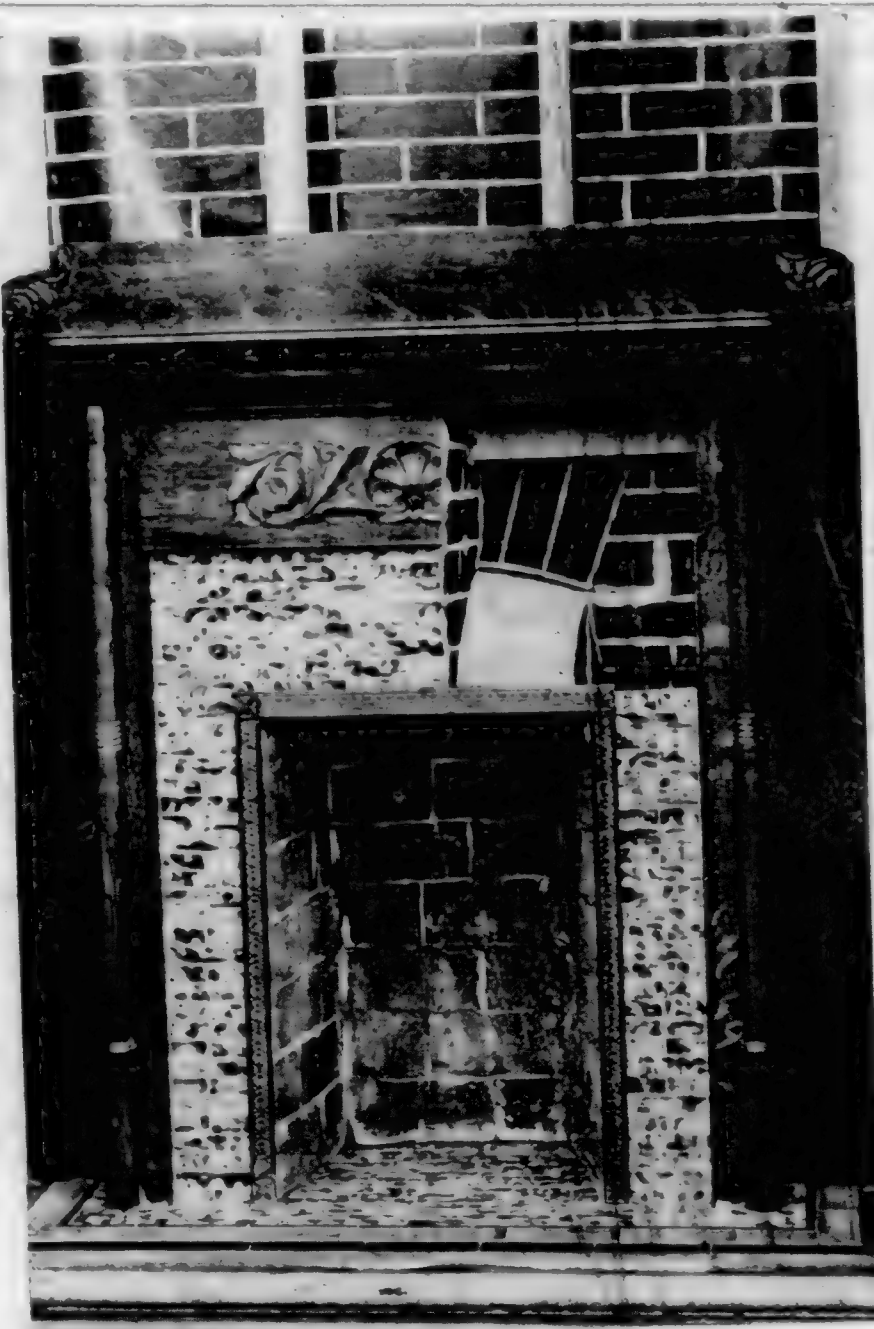
1340 MARKET STREET. SAN FRANCISCO.
TELEPHONE SOUTH 257.

CLAWSON'S PATENT HOOD OR THROAT AND ARCH-BAR COMBINED.

The arch-bar forms a bond for arch in brick work. The hood being bolted on the arch-bar, forms a bond from brick work to mantel.
The throat is one solid piece, having lugs admitting three (3) inches adjustment, to suit depth of mantel.

This hood makes the bricklayer conform with mantel man's work, and guarantees you a safe chimney with a perfect draught.

Clawson's Patent Hoods, Thimbles and Chimneys, comply with the new Fire Ordinance.



See **CLAWSON'S LIVE VENTILATOR.** It is as much better than a dead one, as a live man is of a dead man.

Price, \$2.50 for any size from 18 to 26 inches.

Send for illustrated circular.

CLAWSON'S PATENT THIMBLE.

IF YOU SPECIFY

SEND FOR SAMPLES

SAMSON SPOT CORD,
You can tell at a glance that no other cord is substituted. Warranted free from waste and imperfections of braid.

SAMSON CORDAGE WORKS,
BOSTON, MASS. Trade Mark.



THE CALIFORNIA ARCHITECT AND BUILDING NEWS

\$3.00 PER YEAR

VOLUME XIX. No. 9.

SEPTEMBER, 1898.

CONTENTS

Index to Advertisers.....	VI
The New Columbarium of Odd Fellows Cemetery Association of San Francisco.....	98, 100 101
Meeting of the Builders' Exchange.....	102, 103 104
Lesson From Fire and Water.....	104, 105 106
On the Saline Efflorescence of Bricks.....	106 107
The Keely Motor Up-To-Date.....	107 108

PRICE THIRTY CENTS

D.J. Patterson '98

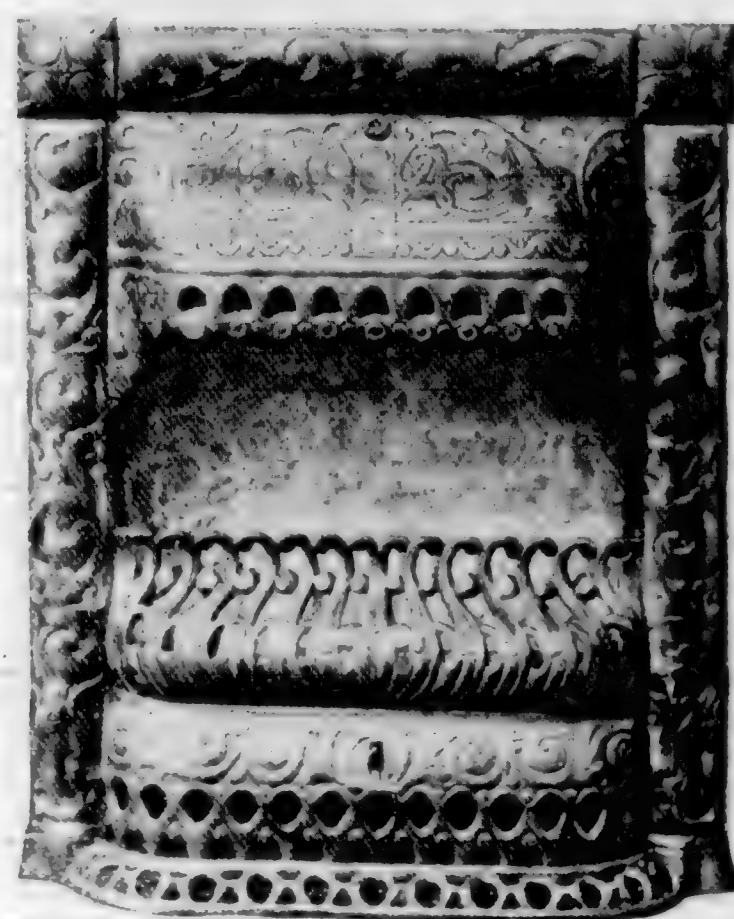
OFFICE 408 CALIFORNIA ST

For a modern house, get modern things!!

Be up to date.

Consider, in building, the innumerable advantages and economy of gas grates.

PERFECTION
Gas Grates.



Always ready.

Always clean.

Gets to work instantly.

Expense stopped when heat is not needed. This is not so with coal.

Examine the various designs of Grates and Heaters of the
SAN FRANCISCO GAS & ELECTRIC LIGHT COMPANY.
STOVE DEPARTMENT

415 POST STREET, SAN FRANCISCO.

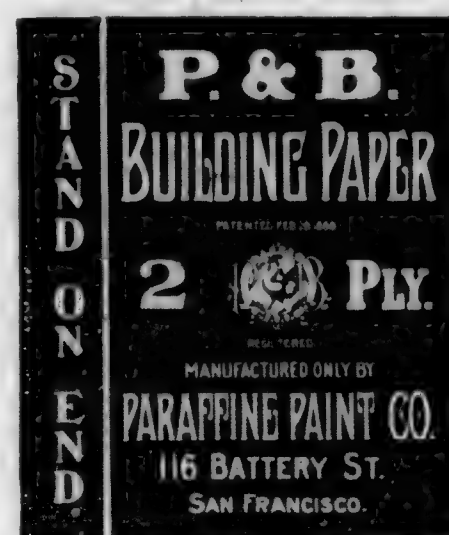
A modern home for a modern man, planned by an up-to-date Architect is always sheathed with

P & B
BUILDING
Paper

PARAFFINE PAINT CO., Sole Manufacturers,

The only Water-proof and Vermin-proof paper on the market that is odorless.

Do you Specify it?



116 BATTERY STREET
SAN FRANCISCO.

A Tin Specification

To be drawn correctly should call for a **Guaranteed** brand of Roofing and one that is **known** to the architect. It should also stipulate that each sheet must be stamped with the brand, the thickness 10 or 12, and the maker's name.

The Taylor "OLD STYLE" Brand

Is made exactly the same as roofing Tin was first made in Philadelphia in 1830. No other Roofing Tin is made like it or of the same materials.

EACH SHEET IS STAMPED AND GUARANTEED

S. & G. TAYLOR CO., Sole Manufacturers, Philadelphia.

For Sale by CHARLES J. WATERHOUSE, 421 Market Street, San Francisco.

To our Customers and Friends on the Pacific Coast.

Through frequent complaints made to us, we have learned that unprincipled and dishonest dealers on the Pacific Coast have counterfeited our trademark numbers and substituted inferior, spurious goods as ours, when ours were distinctly ordered, thus defrauding their customers and injuring our trade and reputation.

Our goods are acknowledged to be the best, and are fully warranted by us, and are marked with our name or initials or with our well-known trademark and catalogue numbers.

We request direct notice if any goods alleged to come from us, or bearing our trademark or numbers, prove to be other than the best, and perfect in every respect, as we will follow up and expose such frauds for our customers' and our own protection. We have no exclusive agents on the Coast, but our goods are obtainable from all respectable dealers in drawing materials, stationery, hardware, artists' material, etc.

RESPECTFULLY,

KEUFFEL & ESSER CO.,
New York.



D. H. GULICK

CHAS. WETHERBEE

A. ZELLERBACH & SONS.

GULICK & WETHERBEE
Plumbing and Gas Fitting

IMPORTERS
AND
DEALERS
IN
PAPER
OF
ALL
KINDS

ESTIMATES GIVEN ON ALL WORK

210 Mason Street

419-421 CLAY STREET,

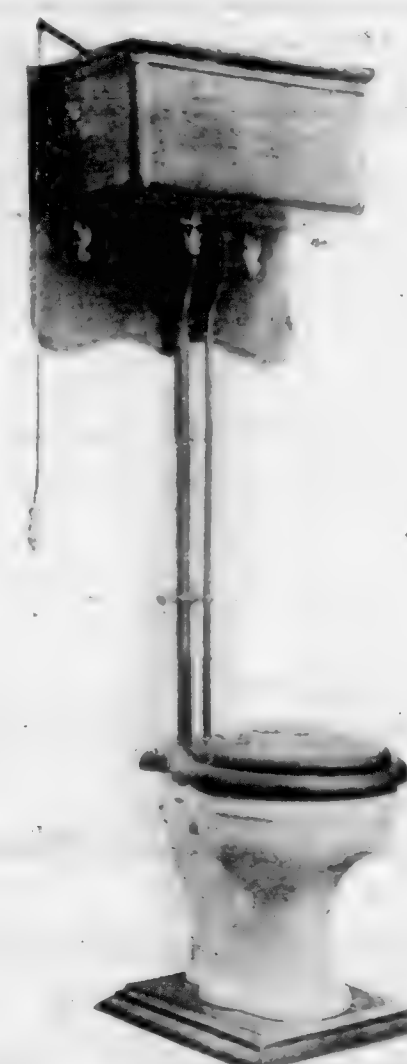
YOUNG MEN'S CHRISTIAN
ASSOCIATION BUILDING

San Francisco Bet. Sansome and Battery, San Francisco.

TELEPHONE BUSH 16

TELEPHONE 1133

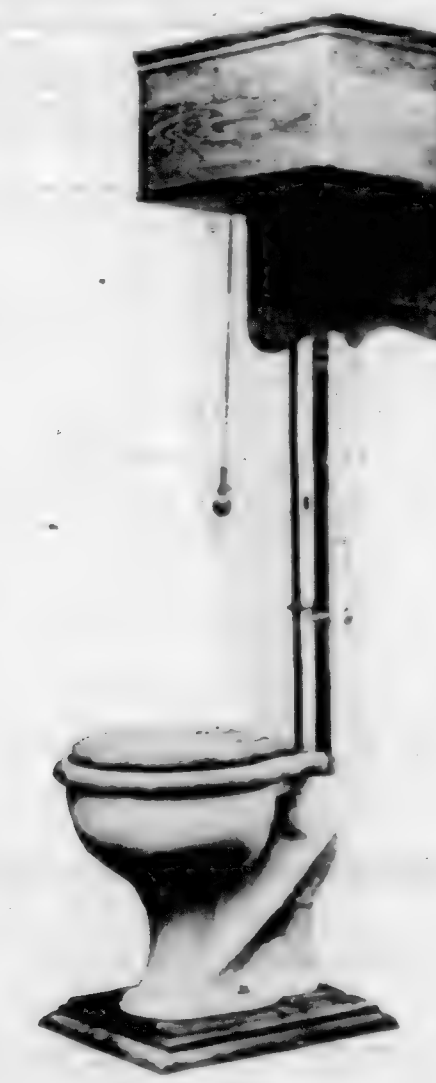
THE JOHN DOUGLAS COMPANY
CINCINNATI, PHILADELPHIA, ST. LOUIS, CHICAGO, SAN FRANCISCO.



EXCELSIS
List Price, \$35.00



JUNO
List Price, \$31.75



ELLWOOD
List Price, \$28.50

Three Syphon Jet combinations, with seat attached to bowl; woodwork made of selected cherry quartered oak, and walnut. Polish finish.

For our other combinations, see '98 Catalogue or visit our showroom.

Ask for Catalogue. Correspondence solicited.

EDWARD DOUGLAS, Manager

THE JOHN DOUGLAS COMPANY,
208 ELLIS STREET S F

D. E. GARRISON, Jr., President. S. W. BACKUS, Secretary. C. F. RUNYON, Vice-President.
N. L. BELL, Manager.

WESTERN EXPANDED METAL AND FIRE PROOFING CO.

MAUFACTURERS OF AND CONTRACTORS FOR

Expanded Metal System of Fire Proof Construction.

Fire proof arches, solid partitions and attaching metal lath to ceilings, walls, columns, beams, etc.

LATH ALWAYS IN STOCK.

OFFICE: Rooms 414-15-16 CLAUS SPRECKELS BUILDING.

TELEPHONE Main 5829

FACTORY: Corner Townsend and Clarence Streets, San Francisco.

BUILDING NEWS.

Bartlett near 23d. One-story and attic; o. W. P. Henry and Mary M. H. Henry; c. J. J. Mansueti; signed, Sept. 10; filed, Sept. 15; cost \$2100.

Broadway near Filbert. To build; o. Mrs. George Young; a. F. M. Van Trees; c. W. B. Knowles; signed, Sept. 15; filed, Sept. 16; cost \$6190.

Cherry near Clay. To build; o. Vary B. Kirkpatrick; a. A. Burgen; c. P. Griffin; signed, Aug. 20; filed, Aug. 26; cost \$2572.

Chestnut near Jones. To build; o. Miss Collins; c. Thomas C. Cochran; cost \$3000.

Ellis near Franklin. Mill work; o. Morris Lande; a. Philip Schwerdt; c. L. H. Birth; signed, Aug. 16; filed, Aug. 23; cost \$1075.

Eleventh Ave. near I street. Cottage; o. Mrs. L. B. Moldrup; a. M. G. Bugbee; c. A. C. Soule; signed, Aug. 20; filed, Aug. 22; cost \$1250.

Fourth and Brannan. Addition; o. J. Bruns; superintendent, Mr. Coleman; cost \$1500.

Fremont near Howard. Four-story brick; o. Jane E. and C. M. Beldaw; c. J. W. Wissinger; signed, July 23; filed, July 29; cost \$17,750.

Guerrero near 17th. Two-story frame; o. B. Mahoney; a. O. Everett; c. J. E. Bindy; signed, Sept. 6; filed, Sept. 8; cost \$1505.

Jackson near Scott. All work except plumbing, etc.; o. Wm. Wankowski; a. Martens & Coffey; c. F. A. Williams; signed, Aug. 20; filed, Aug. 22; cost \$4553.

Jackson and Buchanan. Five two-story, attic and basement; o. Tucker & Co; a. Wm. Koenig; cost \$15,000.

Jackson near Walnut. Brick and concrete; o. William Renner; a. McDougall Bros; c. P. J. Brennan; signed and filed, Sept. 15; cost \$4533.

J street near 8th. Painting, plumbing, etc; o. D. E. Collins; a. M. J. Welsh; c. A. Hermann & Co; signed, Sep. 16; filed, Sept. 17; cost \$1350.

Laguna near Filbert. Two-story frame; o. Mrs. Rosa Camano; c. Wilson & Long; signed, Sept. 15; filed, Sept. 17; cost \$2200.

Laguna near Filbert. To build; o. Mrs. Rosa Camano; c. Wilson & Long; signed, Aug. 30; filed, Aug. 31; cost \$1885.

Loeust near California. Brick and concrete work; o. S. F. Theological Seminary; a. McDougall Bros; c. E. W. Hyde; signed, Sept. 13; filed, Sept. 15; cost \$6000. Plumbing, gas fitting and specification; cost \$1077.

Lyon near Bush. Cottage; o. John Wills; c. Philip Rive; signed, Aug. 30; filed, Aug. 31; cost \$1885.

Mason near Eddy. Gas and electric work; o. R. J. Techau; a. C. M. Rousseau; c. Ickelheimer Bros; signed, Aug. 28; filed, Aug. 29; cost \$1570.

Mason and Green. Carpentry, plastering, etc; o. E. Pierron; a. Jules Godart; c. J. B. P. ne; signed, July 23; filed, July 29; cost \$550.

Market and Spear. Electric elevator; o. W. W. Young; a. Kenitzer & Barth; c. Crane Elevator Co; signed, Sept. 1; filed, Sept. 10; cost \$575.

Montana near Orizaba. Cottage; o. Harry W. and Lulu M. Clark; c. J. E. Schulz; signed, Aug. 27; filed, Aug. 30; cost \$1143.

Mississippi near 19th. To build; o. Carl Johnson; c. Reil & Ahlgren; signed, 19; filed, Aug. 27; cost \$2500.

BUILDING NEWS.

O'Farrell near Larkin. Three-story frame; F. Hufschmidt; a. E. J. Vogel; cost \$3000.

Post near Jones. Raising house; o. Mrs. Alena Hoge; a. T. J. Welsh; c. Frank Gallagher; signed, Sept. 14; filed, Sept. 15; cost \$1600.

Post near Devisadero. To build; o. H. W. Miller; c. Wilson & Long; signed, Sept. 14; filed, Sept. 15; cost \$2800.

Post near Devisadero. To build; o. H. W. Miller; c. Wilson & Long; signed, Sept. 14; filed, Sept. 15; cost \$2800.

Pacific Ave. near Webster. Plumbing and gas fitting; o. Jo as Schoenfeld; a. Saffeld & Kohlberg; c. Ickelheimer & Bros; signed, Aug. 20; filed, Sept. 21; cost \$1430.

Pacific near Larkin. Carpentry work, etc; o. Jean Barbe; a. J. Godart; c. J. B. Pene; signed, Sept. 12; filed, Sept. 17; cost \$2425.

Presido. Hospital; o. California Red Cross Association; a. Newson & Meyer; c. Mallory & Swenson; signed, Aug. 20; filed, Aug. 22; cost \$1322.

Railroad Ave. and 18th. Additions; o. John Puckhaber; c. W. J. Warner; cost \$1200.

Third and Minna. Excavation, etc; o. Thomas Jennings; a. Henry Gellfuss; c. J. F. Riley; signed, Aug. 20; filed, Aug. 20; cost \$11,585. Carpentry, etc; c. Carl Schutt; cost \$18,417. Concrete, basement, etc; c. amp. Carillo; cost \$4053. Structural steel and cast iron work; c. Brode and Clarke Iron Works; cost \$8114. Plumbing, gas fitting and sewers; c. Jos. Flood; cost \$5800. Electric elevator; c. Cabill and Hall Elevator Co; cost \$2775. Painting, graining, etc; c. Gereke & Weber; cost \$1187.

Third and Stevenson. Addition to brick building; o. F. and A. Baruch; a. Percy & Hamilton; mason work, Peacock & Butcher; carpentry work; D. M. Munroe; cost about \$5000.

Twenty-eight near Chur h. To build; o. Jose Dias Soares; c. August Klahn; signed, Sept. 6; filed, Sept. 10; cost \$2842.

Van Ness Ave. and Clay. Brick work; o. St. Luke's Church; a. Albert Sutton; c. Walker Bros; sub-c. David O'Neill; signed, Sept. 10; filed, Sept. 13; cost \$9380.

Valencia near 20th. Brick and carpentry work, etc; o. John A. Christen; a. H. Gellfuss; c. A. H. Williams; cost \$3432.

Webster near Jackson. Alterations and additions; o. Mrs. Munnie A. Taylor; c. William Helbing; signed, Sept. 15; filed, Sept. 17; cost \$104230.

York near 21st. Cottage; o. Christian N. Jensen; c. Fred Miller; signed, July 22; filed, July 23; cost \$1400.

ALAMEDA

Grand near Eagle Ave. Cottage; o. Frances Baxter; a. A. Stenbitt; signed, Sept. 7; filed, Sept. 8; cost \$1400.

Grand near San Jose Ave. To build; o. Elizabeth L. O'Connor; c. D. S. Brehaut; a. W. Cornelius; signed, Sept. 5; filed, Sept. 6; cost \$5575.

San Antonio Ave. near Walnut. To build; o. W. R. and Grace A. Newman; c. Alameda Land Co; signed, Aug. 24; filed, Aug. 26; cost \$3400.

Santa Clara Ave. near Benton. Cottage; o. L. S. Warford; a. M. G. Bugbee; c. William Bell; signed, Sept. 6; filed, Sept. 7; cost \$1570.

BUILDING NEWS.

BERKELEY

Daley's Scenic Park. Euclid Ave. near Virginia street. To build; o. D. Satoff; a. S. S. Quackenbush; signed, Sept. 8; filed, Sept. 8; cost \$2550.

OAKLAND

Hamilton Place near Oakland Ave. To build; o. Sven W. Walstedt; c. W. A. Forbes; signed, Aug. 17; filed, Aug. 18; cost \$1100.

Seventh near Center. All work except plumbing; o. Chas. J. MacDermot; a. D. E. Oliver; c. S. A. and H. W. Norman; signed, Aug. 19; filed, Aug. 23; cost \$160050.

Littlefield Tract, lot 6. Cottage; o. L. P. Boyson; a. John Conant; c. E. Clemensen; signed, Aug. 20; filed, Aug. 23; cost \$1650.

Laee track. Club house; o. California Jockey Club; a. M. J. Lyon; c. George Elder; signed, Aug. 18; filed, Aug. 23; cost \$3020.

Isabella near San Pablo. To build; o. R. W. Ruper; c. W. A. Forbes; signed, Aug. 24; filed, Aug. 25; cost \$1600.

West near 19th. All work except plastering, etc; o. Loui Selby; a. A. W. Smith; c. C. Christensen; cost \$1120.

West 8th and Cypress. To build; o. Carol ne Feege; a. Thos. D. Newson; o. August Winberg; signed and filed, Aug. 29; cost \$2750.

EAST OAKLAND

Washington near Merrill. Carpentry, mill work, etc; o. Trustees Bray School District; a. D. F. Oliver; c. A. N. Frost; signed and filed, Aug. 17; cost \$6000. Plumbing, etc; c. Dalziel & Moller; cost \$1000.

LOS ANGELES

The following prospective buildings are reported by real estate dealers and are given for what they are worth:

Mrs. Florence Maynard has purchased a lot on the east side of Bonnie Brae, between Ninth and Tenth streets, upon which she intends building a residence to cost between \$4000 and \$5000.

Charles Shaw intends to build on the west side of Breed street between Fourth and Fifth streets. F. Stavnow is about to build a cottage on Westlake avenue. The contract has been awarded to F. M. Galer.

M. B. Thompson has purchased a lot on East Fourth street, between Chicago and Breed streets, on which he intends to erect an eight room residence room. He is also about to build a cottage on Star near Pico.

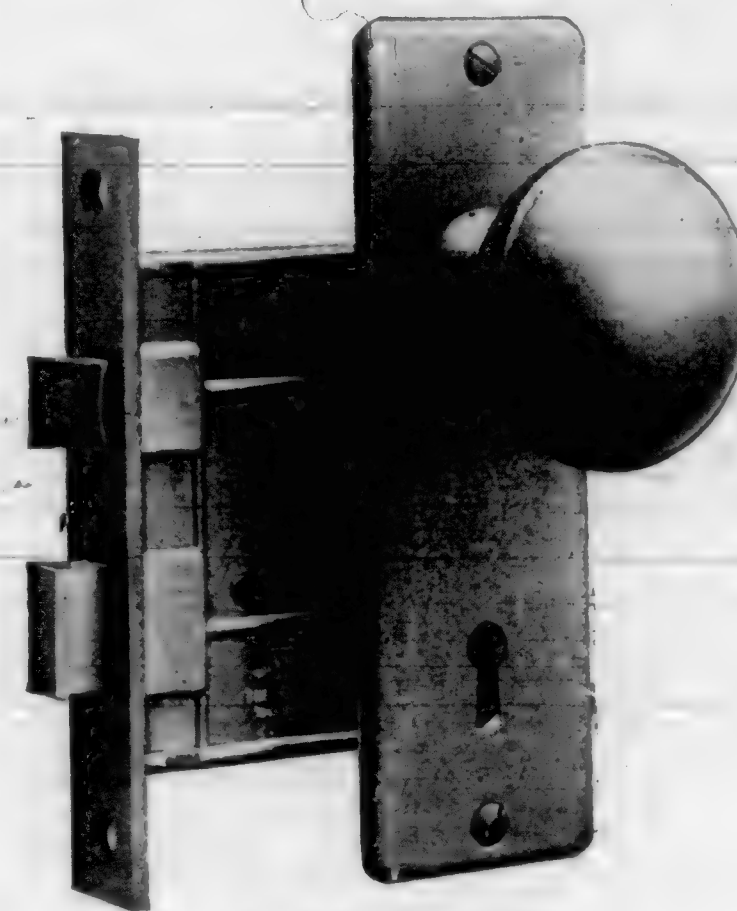
Architect Geo. H. Wyman is preparing plans for two frame buildings to be erected at the Soldiers' Home, one of which is designed as quarters for the women nurses and the other as a bakery building.

J. C. Gladden is about to commence the erection of five or six two-story residences on Westlake avenue, between Tenth and Eleventh streets. Architect A. L. H. dey is doing the preliminary work on the plans. These buildings, like numerous others of the same class, are built for speculation.

Continued on page xii.

The "Vulcan" Locks

All Wrought Metal—with "Compensating" Hubs.



Lock Set No. 220B.
One-half Actual Size.

Our General Offices in New York have recently received the following unsolicited letter from a prominent builder and contractor. Believing that the statement of experience it contains will be of interest, we reproduce it below.

An Artistic Brochure on Vulcan Locks, also a Catalogue of 90 pages, will be sent on request.

The Yale & Towne Mfg. Co.

LOCAL OFFICE:

Mills Building, San Francisco.

GENERAL OFFICES: 9-11-13 Murray St., NEW YORK.

WORKS: Stamford and Branford, Conn.

OFFICE OF A. BEINHAUER,

124 Maiden Lane,

NEW YORK, July 11th, 1898.

The Yale & Towne Mfg. Company,

9-11-13 Murray Street, New York.

Gentlemen:-Having lately had occasion to use and apply your "Vulcan Locks" in the Anderson Building, 12-14-16 John Street, I take pleasure in mentioning the fact that in the application of these locks there is a large saving of labor as compared to the ordinary CAST-case locks.

The difference, as I found it, was that while a man put on six to eight of the latter, he could in the same space of time put on twelve to fourteen "Vulcan Locks," thus decreasing the cost of labor to a considerable extent.

Another feature about these "Vulcan Locks" is that while they give as good service as any cast-case lock of their denomination, they do not require as much cutting away of wood in the lock-rail, thereby strengthening the door to an appreciable extent.

Wishing you all success with your "Vulcan Locks," I remain

Yours truly,

(Signed) ALFRED BEINHAUER.

GENERAL INDEX OF ADVERTISEMENTS.

CLASSIFIED INDEX.

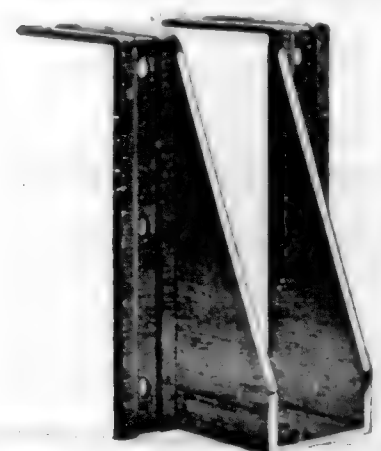
Architects.
Artificial Stone.
Boilers.
Building Supplies.
Building and Loan Assn.
Brick Preservative.
Cement Trays.
Chimneys Patent.
Door Opener.
Engineers.
Filters.
Furniture and Upholstery.
Hardware.
Heating and Ventilating.

CLASSIFIED INDEX.

Iron Hangers.
Iron Works.
Iron Cornices.
Incandescent Lamps.
Lumber.
Mantles Tiles, Etc.
Metal Lath.
Mortar Color.
Paint.
Paper.
Plaster.
Plumbers and Gasfitters.

CLASSIFIED INDEX.

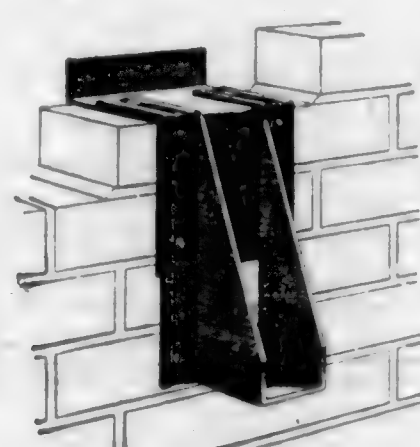
Sash Locks.
Sewer Pipes.
Sewer Traps.
Sash Lines.
Shingle Stains.
Sidewalk Lights.
Sliding Door Hanger.
Stone.
Terra Cotta.
Tin Roofing.
University.
Ventilators.
Water Closets.
Window Cord.
Wood Preservative.



No 1-Steel joist hanger
for wooden header

VAN DORN'S
Steel Joist Hanger
CHAS. J. WATERHOUSE, Agent

421 MARKET STREET, S. F.
PHONE BLACK 1807.



No. 4-Steel joist hanger
for brick walls.

Sierra Lumber Company

Manufacturers of and Dealers in

Doors, Windows, Blinds, Sugar Pine.

Yellow Pine, Spruce and Fir Lumber.

Corner Fourth and Channel Streets, San Francisco

HARVARD UNIVERSITY.

Lawrence Scientific School

OFFERS COURSES IN

Civil Engineering
Mechanical Engineering
Electrical Engineering
Mining and Metallurgy
Architecture
Anatomy and Physiology (as a preparation for Medical Schools).

Chemistry.
Geology.
Biology.
General Science.
Science for Teachers.
Science for Teachers.

For Descriptive Pamphlet apply to

M. CHAMBERLAIN, Secretary.

N. S. SHALER, Dean. Cambridge, Mass.

DIXON'S SILICA GRAPHITE PAINT

FOR TIN OR SHINGLE ROOFS AND IRON WORK. Tin roofs well painted have not required repainting for 10 to 15 years.

IT IS ABSOLUTELY WITHOUT AN EQUAL.

If you need any paint it will pay you to send for circular.

JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J.

EAGLE SHEET METAL WORKS

WM. CRONAN

Manufacturer of Plain and Ornamental

Copper and Galvanized Iron Cornices

Tin, Iron, Slate Roofing, Galvanized Iron Sky-lights

and Cast-Zinc Work.

Steam, Hot Water and Warm Air Heating.

Power Fans for Heating and Ventilating Work.

ROOFS REPAIRED AND PAINTED GENERAL JOBBING ATTENDED TO
Nos. 1213 1215 Market Street, Near Eighth
SAN FRANCISCO, CAL.



September, 1898.

THE CALIFORNIA ARCHITECT AND BUILDING NEWS.

vii

A SYSTEM OF
**WARMING AND
VENTILATING**



A SYSTEM OF
**VENTILATED FLUSHING
WATER CLOSET
AND URINAL RANGES**

FOR PUBLIC BUILDINGS.

GUARANTEE:

A system of warming and ventilating that shall have the capacity to warm and supply each room with enough pure air to renew the entire volume of air in said rooms from four to six times per hour without unpleasant draughts as from open doors or windows.

**IMPORTANT
TO
ARCHITECTS**

W. MORGAN & CO. HEATING, VENTILATING AND SANITARY ENGINEERS. 108 First St., S. F. Cal.

GUARANTEE:

A system of sanitary closets (separate and distinct from the ventilation of the building), so constructed that no matter how much they may be used, the ventilation and flushing device connected therewith, shall prevent any disagreeable odor from either the closet or urinal apparatus.

W. W. MONTAGUE & CO
**MANTELS
GRATES
TILES.**

Artistic Brass Bronze

Steel and Iron

WARM AIR
HOT WATER
and STEAM

**Fire Place Trimmings
Heating Apparatus**

For Warming Dwellings,
Halls, Churches, School-
Houses, and Public Build-
ings.

Wrought, Steel Ranges and French Ranges

For Hotels, Restaurants, Clubs and Boarding Houses

COMPLETE KITCHEN OUTFITS

MANUFACTURERS OF

Corrugated Iron Roofing and Riveted Sheet Iron Water Pipe

SAN FRANCISCO

LOS ANGELES

SAN JOSE

Subscribe for The California Architect.

WASHABLE

TRADE MARK
ZINOLITH
LIQUID STONE

SANITARY

THE IDEAL FINISH FOR INTERIOR SAND FINISHED WALLS.

The only Water Color for Plastered Exteriors and Light Walls.

L. H. BUTCHER & CO.

539 Mission Street, S. F.

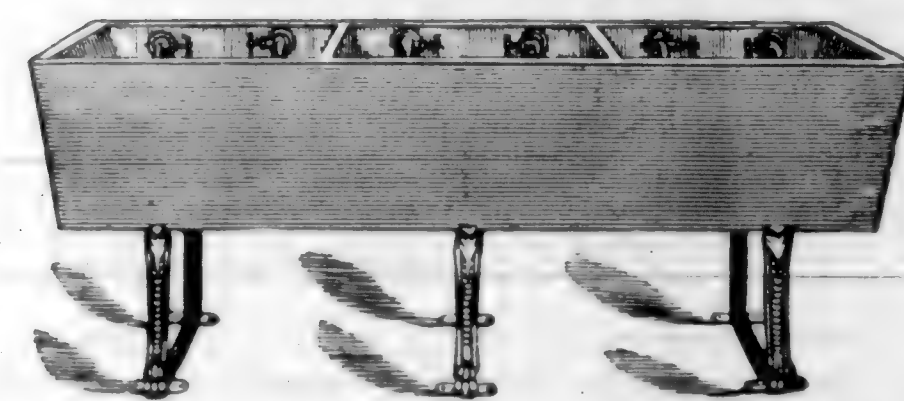
A. BRADLEY

Successor to BRADLEY BROS.

CEMENT

LAUNDRY

TRAYS



Manufactured of the best PORTLAND CEMENT and GUARANTEED not to LEAK, CRACK or SWEAT.

Office and Factory

53-57 Tehama St.

Between 1st & 2d.

Architects are respectfully requested to specify them.

G. ORSI.

17 Montgomery Avenue

INTERIOR DECORATOR

IMPORTER OF AND DEALER IN

Paints,

Oils,

Varnish,

Paper Hangings, Etc.

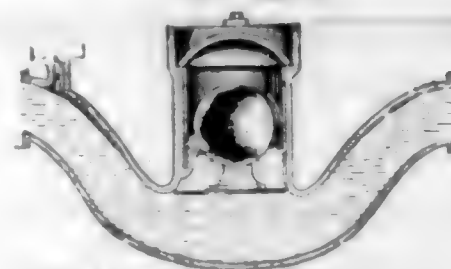
I make a specialty of interior Painting, Frescoing and Paper Hanging.

Special Agent for Linerusta Walton; a large and complete stock always on hand.

Estimates cheerfully given.

The Titus Improved Patent Sewer Gas Trap TIDE AND FLUSHING GATE

OPEN



Isolates the House from the Main Sewer in Street, thus stopping the prolific cause of Sewer Gas Infection.

By Report of Board of Health, 33 per cent of deaths in this and other cities are caused by Zymotic Diseases arising from Sewer Gas Infection.

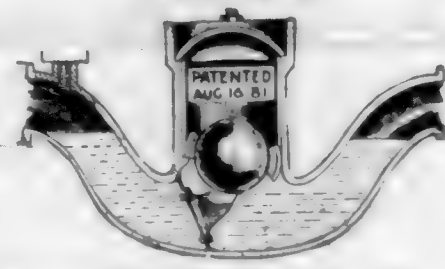
First Premium Mechanic's

Institute. Awarded 1882, 1883, 1884, 1885 & 1886.

Testimonials, References and Traps can be seen at 414 DEVISADERO STREET, Telephone Pine 1405.

Manufactured by G. C. DALLAMORE, Practical Plumber, Gas and Steam Fitter.

CLOSED



Recommended by Members of Board of Health

RISCHMULLER'S PATENT DOOR OPENER AND CLOSER.

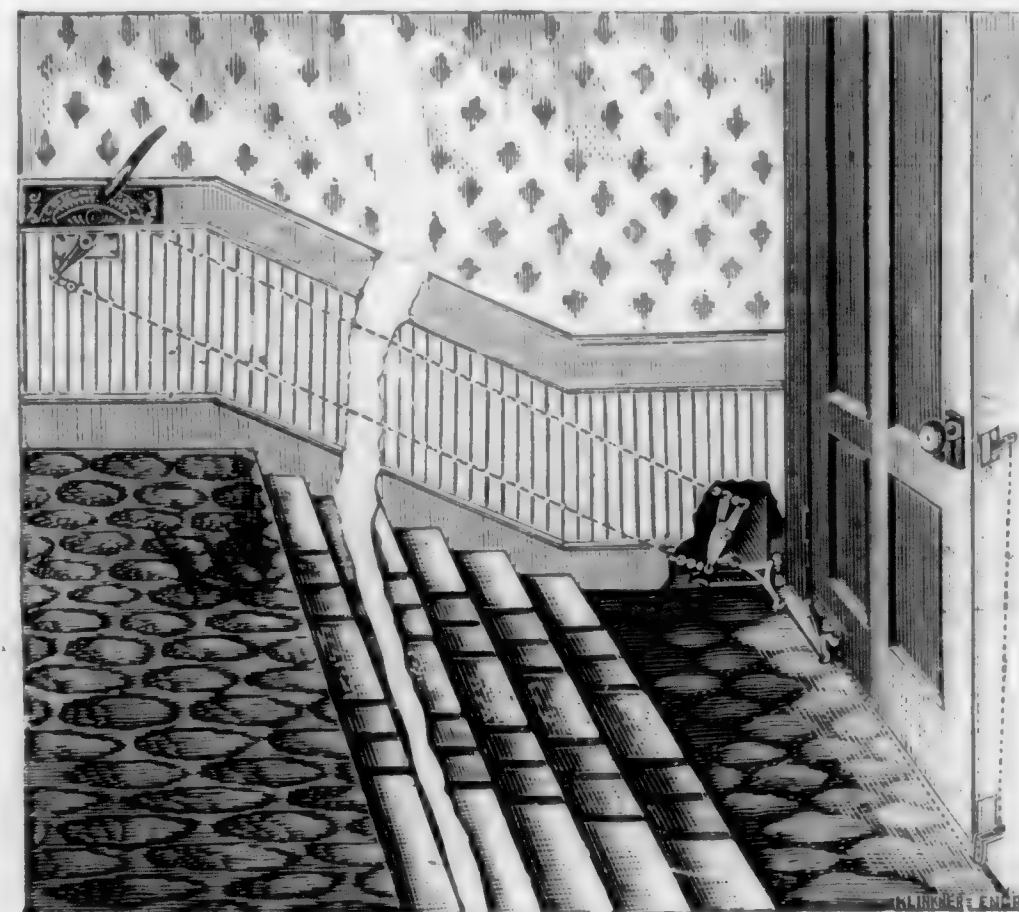
Proven to be the only one CONSTRUCTED ON CORRECT PRINCIPLES.

It is durable and far the cheapest in the end.

Orders promptly filled by

G. RISCHMULLER,

No. 3446 Nineteenth St., S. F.





THE CALIFORNIA ARCHITECT AND BUILDING NEWS

\$3.00 PER YEAR.

PUBLISHED ABOUT THE 20th OF EACH MONTH

BY
E. H. BURRELL, LESSEE, PUBLISHER.

OFFICE 408 CALIFORNIA ST. SAN FRANCISCO, CAL.

ESTABLISHED IN 1879

NOW IN THE NINETEENTH YEAR.

INCORPORATED 1889

VOLUME XIX.

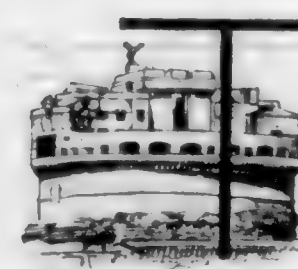
SEPTEMBER 20th, 1898.

NUMBER 9.

A MONTHLY JOURNAL DEVOTED TO THE ARCHITECTURAL INTERESTS OF THE PACIFIC COAST.

CAUTION—Pay no money to persons representing themselves to be connected with the CALIFORNIA ARCHITECT AND BUILDING NEWS unless a written authority to receipt for the same is shown and accept no receipt unless it be on our printed blanks. All Checks and Drafts are to be made payable to the order of E. H. Burrell.

NOTICE is hereby given that Mr. Tom M. Grant is no longer connected with this Journal.—E. H. Burrell, Lessee and Publisher.



HERE is not a law upon the statute books of this State as to which there is such widespread dissatisfaction as what is commonly known as "the mechanics' lien law." This dissatisfaction is not confined alone to the owner of property as to which a lien is to be enforced, but it extends to those for whose protection it was supposed the lien law was designed. In the constitution of the State, and in the statute as enacted, there is no cause for complaint. The trouble has come from judicial legislation, which has made the constitution of the State, and the statute passed in pursuance of

it, fall short of their purposes. The language of the constitution is plain and simple. In fact so plain and simple that, to the mind of the layman, it seems impossible that there should be any room for construction that would result in judicial legislation. The constitution says—"Mechanics, material men, artisans and laborers of every class, shall have a lien upon the property upon which they have bestowed labor or furnished material for the value of such labor done or material furnished."

To the ordinary reader, this would mean simply that a man performing labor upon and furnishing material for a building, would have a lien to the full extent of the value of the labor performed and the material furnished. But the Supreme Court of this State, not long after the adoption of the Constitution, said, and still adheres to the decision, that this language does not mean what it says, and has added

the following proviso: "Provided the value of such labor done and material furnished shall not exceed the contract price therefor."

Had the Supreme Court left this provision of the Constitution undisturbed, and had not added this proviso, the lien law of this State would have been a very beneficent thing and could have injured no one. In that case, it would have been generally known and understood by the owner of property when contracting for the erection of a structure upon it, that the property would be security to the full value of all labor performed upon and material furnished to it, and he would have protected himself against all liens, by exacting from his contractor a good and sufficient bond. Who would have been hurt then? The laborer and the material man would have gotten their money in full, and the owner would not have been hurt, because he would have been protected by his bond.

Now, however, under this addition made to the provision of the Constitution by the Supreme Court, we are all at sea, and there is not a greater delusion and snare than the mechanics lien law. The laborer and material man are injured, because they so frequently have to accept a pro-rata. This position forced by the decision of the Supreme Court is out of consideration for the owner of the property, and yet, as we have shown, if the provision of the Constitution had been followed by the Court, the owner would not have been injured, because he would have been protected by his bond. But now, when neither the owner, the laborer or material man would have been injured by following the provision of the Constitution, the owner is allowed to defraud the laborer and the material man by getting their labor and material for nothing.

Under the decisions of the Supreme Court, things run along in the building line about as follows: An owner concludes that he wants a structure put upon his property at a cost of \$10,000. He goes to his architect, and the architect makes his specifications and draws his plan for such a building, and advertises for bids. When the bids are opened, it is found that some irresponsible contractor has offered to furnish the labor and materials and erect a building according to the plans and specifications for \$6000. This bid is accepted. Things go smoothly until towards the end, and all at once the property is plastered with liens. In a rage, the owner goes to his lawyer and complains in bitter terms of the position into which he has gotten. The lawyer quietly waits until he get through fuming, and then smiles and says: "What are you kicking about? You have gotten a \$10,000 house for \$6000, and the laborers and material men have paid for the difference between the \$6000 and \$10,000. In other words, you have been given \$4000 of other peoples labor and material." This brings a change over the spirit of the owner's dream, and he goes away satisfied at having made such a fine speculation.

Now, this robbery which the owner is allowed to perpetrate, as we have said, would never have been permitted if the Supreme Court had followed the Constitution of the State, and had left it as it was adopted. The laborer and material man would have been paid in full, the owner would have paid the value of his house, and no more, the bond protecting him against any excess over the contract price.

It is a pity that the building interests of this State have been led into such a quagmire, when, as we have said, the Constitution is plain and simple. The Constitutional convention intended to protect the laborer and the material man,

and the protection that it gave to them was without any injury to the owner—the Constitutional Convention, knowing that the owner could protect himself by a bond from the contractor. It is doubtful if the Constitution could ever have been adopted at the time that it was if the people did not understand that this provision had been inserted for the protection of the laborer and the mechanics and material men, and that the building classes had obtained more than a shadow and a delusion by a constitutional provision inserted on their behalf. It is no answer to this to say that the laborer and material man could protect themselves by sitting down and figuring up the cost of the job, and thus finding that its cost would go beyond the contract price. It is not to be presumed that the hod-carrier upon the Crocker Building, in course of construction, nor even the ordinary material man, would be capable of sitting down and figuring upon the cost of marble brought from over the seas for the purposes of that building.

This is not all. The Constitutional provision also intended that the lien referred to by it should be speedily enforced. We have not space in this issue to discuss the practice in regard to the enforcement of this lien. This phase we will defer until our next issue. Then, we propose to call attention to the difference between the practice of our Courts and the provision of the constitution in reference to its speedy enforcement.



THE statement of an influential morning paper that architects were to be shut out from all competition in the designs for a new County Hospital and that the authorities having this important matter in charge, have already selected an architect whose designs were accepted in advance, bears the impress of truth.

No reputable architect ever enters into a competition for municipal buildings but feels that, no matter how meritorious the plans are that he may submit, some one with a "pull" is sure to bear off the honors and emoluments, leaving him with his designs upon his hands and all his labor, time and calculations, thrown away.

This condition of affairs is disheartening to the last degree, not only to the architectural profession but to citizens at large, who would have this great avenue of municipal beneficence a credit and not a disgrace to the city, whose revenues they provide. This branch of charity and which involves the citizens of San Francisco in a very large annual expenditure, is one they share without complaining of the heavy cost. By rights, the very best care of the impoverished sick should be given. A hospital of the vast extent required by this city should rank with the best of those supported by sectarian, national or private munificence, and the first thing to be considered is a building fitted with all the appurtenances for healing the sick and caring for the convalescent that modern science has indorsed. No board of supervisors is competent to decide upon the best qualifications for a great public hospital. Such bodies generally lack the experience and education necessary for the selection. Neither are medical experts altogether infallible, though their opinions are entitled to great weight. No plan should be adopted without having been submitted to the judgment of a competent, broadminded and unbiased committee of architects. A combination of architects of ability, scientific

physicians and surgeons and practical builders should be employed whose decision should be final.

Moreover no architect who has a decent regard for the ethics of the profession should accept a decision in his favor that comes from underground sources and in defiance of all appearance of good faith towards other members of the profession.

It is said, the specifications have been withheld from all architects who desired an open competition in the plans, and this charge is apparently sustained.

For the good name of the city of San Francisco and in behalf of other cities of the state who so closely follow our examples, this publication protests against any methods in the choice of hospital plans which are not open and above board, in which each and every competing architect is allowed an equal opportunity of winning. Public opinion asks nothing more. It demands that much at least.



THE semi-annual meeting of the Builders' Exchange on Monday the 19th was one

of the most important that this great organization has ever called together. The several reports of the officers indicated a very satisfactory condition of internal affairs and a promising outlook for the future.

At this meeting the Builders' Exchange placed upon record its official indorsement of the national policy of retaining those countries which the valor of our army and navy has won from Spain. Without qualification, the sentiment of the Exchange was decidedly in favor of holding the rich islands of the Philippines and West Indies and adding them to the domain of the United States. The unanimity with which the proposition was adopted is significant and in conjunction with the action of the Chamber of Commerce, Board of Trade and other commercial organizations, indicates that a great majority of the people of California view with favor holding tight what our troops have won. The Builders' Exchange as representative of the intelligent bone and sinew of the country can not be charged with selfish motives in advocating this addition to our national territory. Unlike Commercial bodies they have no trade interests to bias their judgment.

The several speeches were brief and pointed and reflected great credit upon those who made them.

THE NEW COLUMBARIUM OF THE ODD FELLOWS CEMETERY ASSOCIATION OF SAN FRANCISCO.

BY ALEX. F. OAKLEY.

THE ODD FELLOWS Cemetery Association of San Francisco has shown the courage of its convictions, in providing handsomely for permanent disposition of incinerated remains, in a Columbarium that in design and execution has the dignity and repose of a grand mausoleum, and the solidity of a fire-proof structure.

The capacity is likely to be equal to the requirements of at least fifteen years, when similar structures may be erected to realize a grand scheme of architectural effect, enclosing a court or *Campo Santo*, with connecting peristyles, that are suggested by the treatment of the existing mass. The de-

mands upon the adjacent crematory have already necessitated the building of an additional furnace. The first incineration



CREMATORY, ODD FELLOWS CEMETERY, SAN FRANCISCO.

at this crematory took place on June 26, 1895, and the increase since that date has been constant.

The Odd Fellows crematory is one of twenty-eight institutions of the kind in operation in the United States; and



INTERIOR VIEW OF CHAPEL, CREMATORY.

many more are organizing. Cremation was abolished in Europe about 400 A. D., and it was not till 1658 that any intelligent agitation of the subject was revived; and not till



WAITING ROOM, CREMATORY.